

Livestock & Feed Trends



VOLUME - 19 • NUMBER - 3 • OCTOBER - DECEMBER 2021



CLFMA OF INDIA
ASSOCIATION OF LIVESTOCK INDUSTRY

Current Soybean Outlook & Future Opportunities



Welcome Address
Mr. Neeraj Kumar Srivastava
Chairman, CLFMA OF INDIA



Speaker
Dr. Vibha Ahuja
Chief General Manager
Biotech Consortium India Limited



Speaker
Ms. Prerana Desai
Head of Research,
Samunnati Agri



Vote of Thanks
Mr. Suresh Deora
Hon. Secretary, CLFMA OF INDIA



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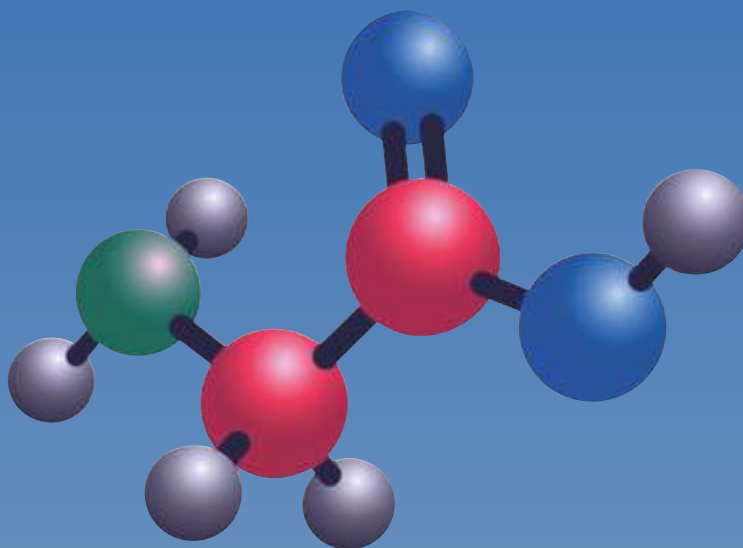
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LAYER
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From the Chairman's Desk.....

Dear Friends,

Greetings!

At the outset, I would like to wish all CLFMA Members and their families a very Healthy, exciting, happy & prosperous new year 2022.

CLFMA's efforts are on to keep the wheel moving for the upliftment of the Livestock Sector. The third quarter of the year 2021, was full of buzz of CLFMA activities, some of the activities are listed below:

CLFMA OF INDIA celebrated the World Egg Day on 8th of October, 2021, in association with Indian Red Cross Society – Mumbai at Adams Wylie Physio Rehab Centre, Mumbai Central (East). Hon. Secretary of CLFMA OF INDIA, Mr.Suresh Deora, distributed eggs at Adams Wylie Physio Rehab Centre, Mumbai Central (East). CLFMA, Executive Director Ms. Chandrika Venkatesh from the secretariat were present along with CLFMA team. CLFMA also distributed Eggs at Mumbai Veterinary College. On behalf of CLFMA, Professor Dr. A. S. Ranade, CLFMA Technical Committee Head & Associate Dean, Mumbai Veterinary College celebrated the event and distributed eggs at Mumbai Veterinary College.

CLFMA OF INDIA supported and participated in the Feed Tech Expo (Digital / Virtual Event), which was organized with the support of Industry peers, Benison Media and Jordbrukare India and sponsored by Kemin Industries from 26th to 29th October 2021 successfully. I delivered the Key Note Address at this online event. CLFMA had its Virtual Stall No. F0018, where almost 50 visitors visited CLFMA Stall.

CLFMA OF INDIA had a meeting with Government of CANADA, High Commission of CANADA on November 24th, 2021 at CLFMA Office, Mumbai. The Meeting was attended by High Commission of CANADA's Mr. Nitin Verma, Counsellor - Agriculture, Agriculture and Agri – Food Canada (AAFC), High Commission of Canada, New Delhi, Dr. Mwate Mulenga, Counsellor Agriculture & Regulatory Specialist, Canadian Food Inspection Agency (CFIA), High Commission of Canada, New Delhi, Mr. Akhil Choudhary, Trade Commissioner, Agriculture and Agri – Food Canada (AAFC), High Commission of Canada, New Delhi, Mr. Prasad Patil, Trade Commissioner Assistant, Consulate General of Canada, Mumbai, Mr. Victor Lee, Managing Director, Saskatchewan India Office Counsellor (Commercial), High Commission of Canada, New Delhi & From CLFMA Mr.Suresh Deora, Honorary Secretary & Ms. Chandrika Venkatesh, Executive Director. The Government of Canada, High Commission of Canada, New Delhi discussed about the ways and means of associating with CLFMA OF INDIA by participating in CLFMA's Webinar / Seminar and was interested in promoting Krill Meal and GM Canola Meal in India.



CLFMA OF INDIA conducted Webinar on 27th November 2021 on the current topic “Current Soybean Outlook & Future Opportunities”. Considering the surge in Soybean Meal prices, due to demand - supply fluctuations, CLFMA OF INDIA felt the need of organizing a Webinar on this important topic. Two eminent speakers were present in the webinar viz. Dr. Vibha Ahuja, Chief General Manager of Biotech Consortium India Limited gave a presentation on “Use of GM crops and derivatives for animal feed: Status and opportunities” & Speaker Ms. Prerana Desai, Head of Research, Samunnati Agri gave a presentation on the topic “Outlook of Soybean for the Current & Future Opportunities”. Overall, 82 participants attended the Webinar. All other activities of CLFMA are updated in the CLFMA updates in detail.

Pursuant to a letter wrote to Shri.Pramod Kumar Tiwari IAS, Director General (DG), BIS HEADQUARTER, New Delhi on 29th October, 2021, CLFMA sent a gentle reminder again to him on 1st December 2021 with a request to help CLFMA OF INDIA to organize a Webinar in association with BIS to discuss all topics related to Cattle Feed Standards involving all the departments viz. FAD5, Registration, Quality,etc., for the benefit of our CLFMA Members.

Mr. Suresh Deora (Hon. Secretary) and I visited Krishi Bhavan, New Delhi on 24th December 2021 to meet Government Of India's key authorities for discussing the pending issues related to CLFMA OF INDIA. The Government Officials visited were Dr.Gagan Garg, Assistant Commissioner, Dept. of AH&D., Shri.G.N.Singh, Joint Secretary (Admin./Trade/GC/IC), Dept. of AH&D., Dr. O. P. Chaudhary, Joint Secretary (NLM/PC), Dept. of AH&D., Dr. Lipi Sairiwal, AC(AH), Dept. of AH&D., Smt. M. Lata, PSO, Office of Secretary (LR), Dept. of Land Resources, etc.

As a Chairman of CLFMA, I was interviewed by Zee Business on 24th December 2021. I appreciated Government of India for extending help to the Poultry, Aqua and Livestock sector as a whole, by permitting soybean meal import and other necessary guidelines for the betterment of livestock industry.

We are participating in the International Aquaculture Expo 2022, which re-scheduled on March 2022 at Chennai, India. CLFMA will have a stall at the IIAE2022. Also, we are participating in the 7th Edition of Feed Tech Expo scheduled on 24-26 March 2022 at Kingston Event Centre, Kurukshetra. CLFMA will have stall at the Feed Tech Expo.

We have planned Aqua, Dairy and Poultry Webinars during upcoming months. More details will be available to all members by CLFMA Secretariat from time to time. These webinars shall enable all the members to get updated

information on various topics of relevance and shall serve as an opportunity to step up our outreach for interaction with multiple stakeholders including industry Veterans, National level organizations, Government Officials, etc.

I look forward to your continued support and co-operation from time to time and solicit your valuable inputs and suggestions for making our livestock industry profitable, progressive and significant at national and global level.

With warm regards,
For CLFMA OF INDIA



Neeraj Kumar Srivastava
Chairman



05-06CHAIRMAN'S DESK

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Commodity Updates

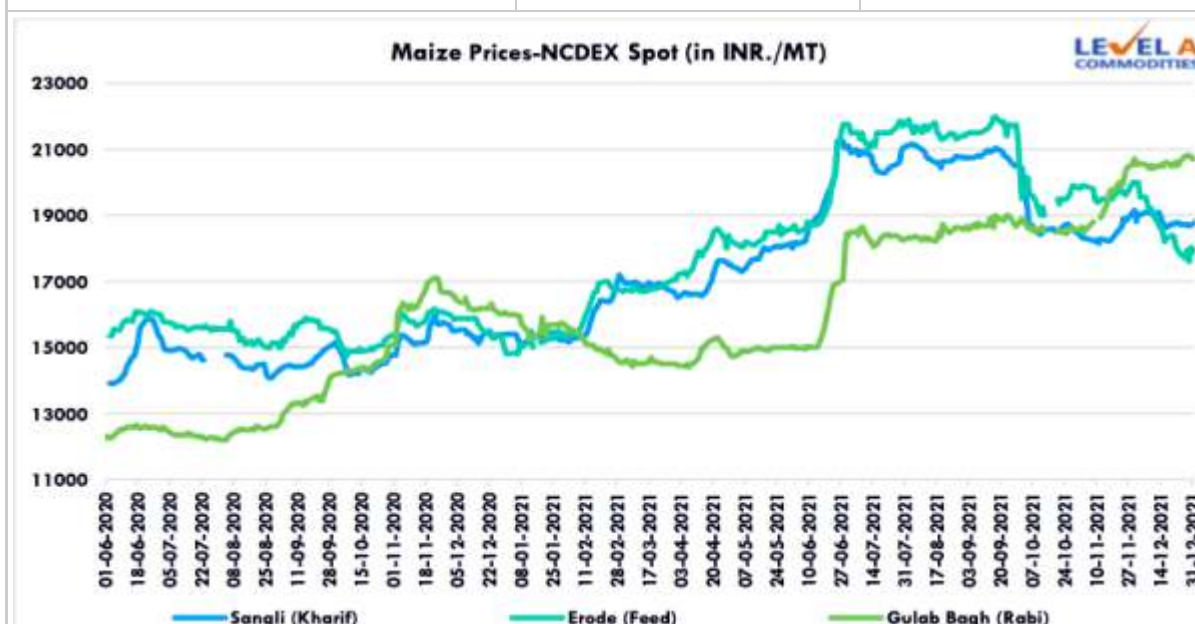


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Domestic Prices in INR/.MT:
Maize NCDEX Spot Price (in INR/MT.):

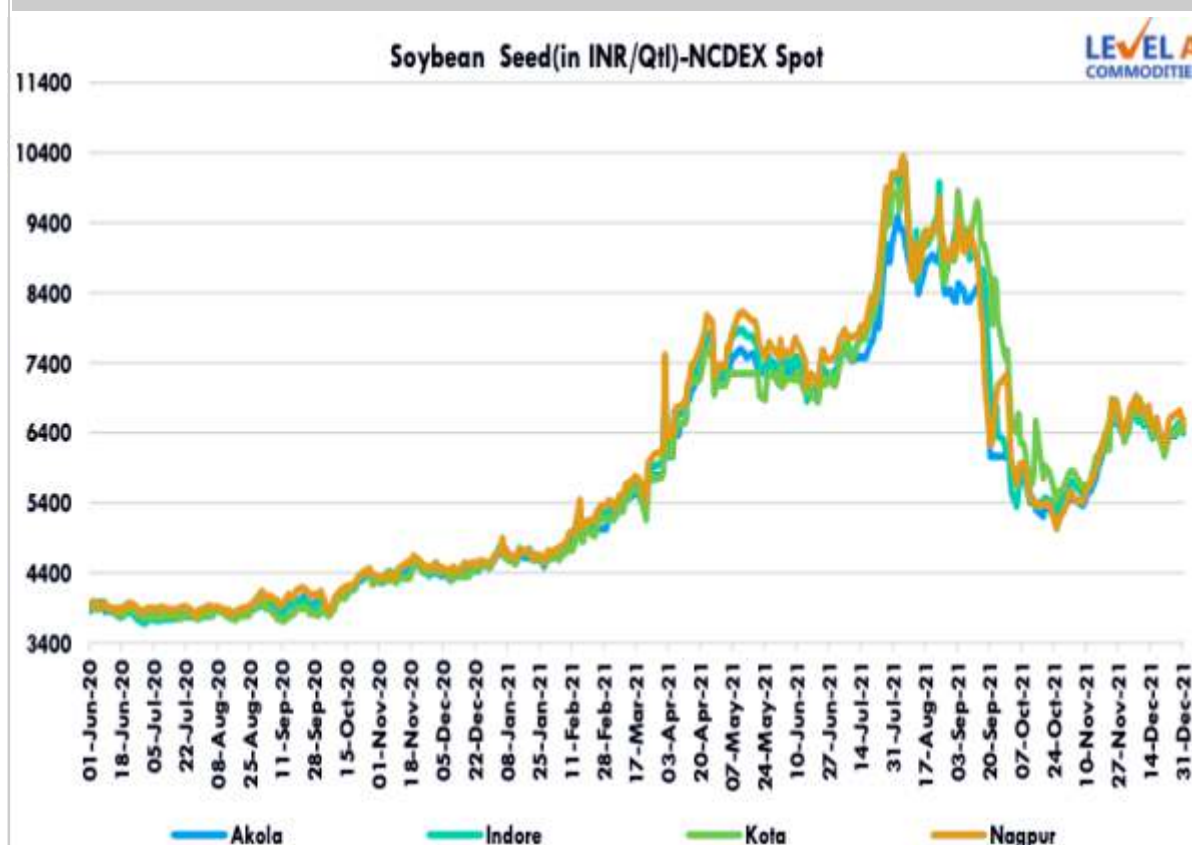
Location	31-Dec-21	30-Nov-21
Gulab Bagh (Rabi)	20710	20720
Sangli (Kharif)	18740	19150
Erode (Feed)	17900	20000



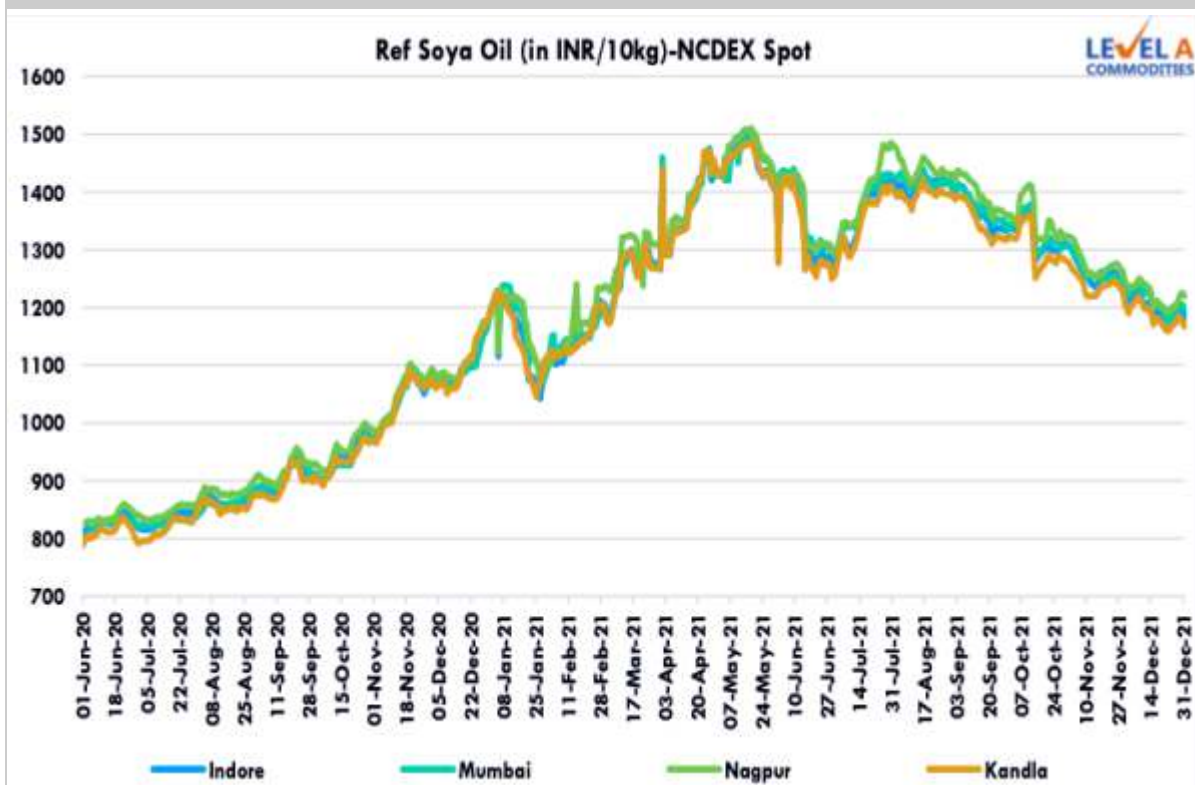
Soybean:
Soybean Complex Prices-NCDEX Spot:

Commodity (Unit)	Location	31-Dec-21	30-Nov-21
Ref Soya Oil (in INR/10kg)	Kandla	1,168	1,205
	Indore	1,181	1,220
	Mumbai	1,197	1,233
	Nagpur	1,221	1,246
Soybean Seed(in INR/Qtl)	Akola	6,407	6,313
	Indore	6,397	6,292
	Kota	6,515	6,262
	Nagpur	6,565	6,414
Soymeal (in INR/MT)	Indore	52,750	52,000

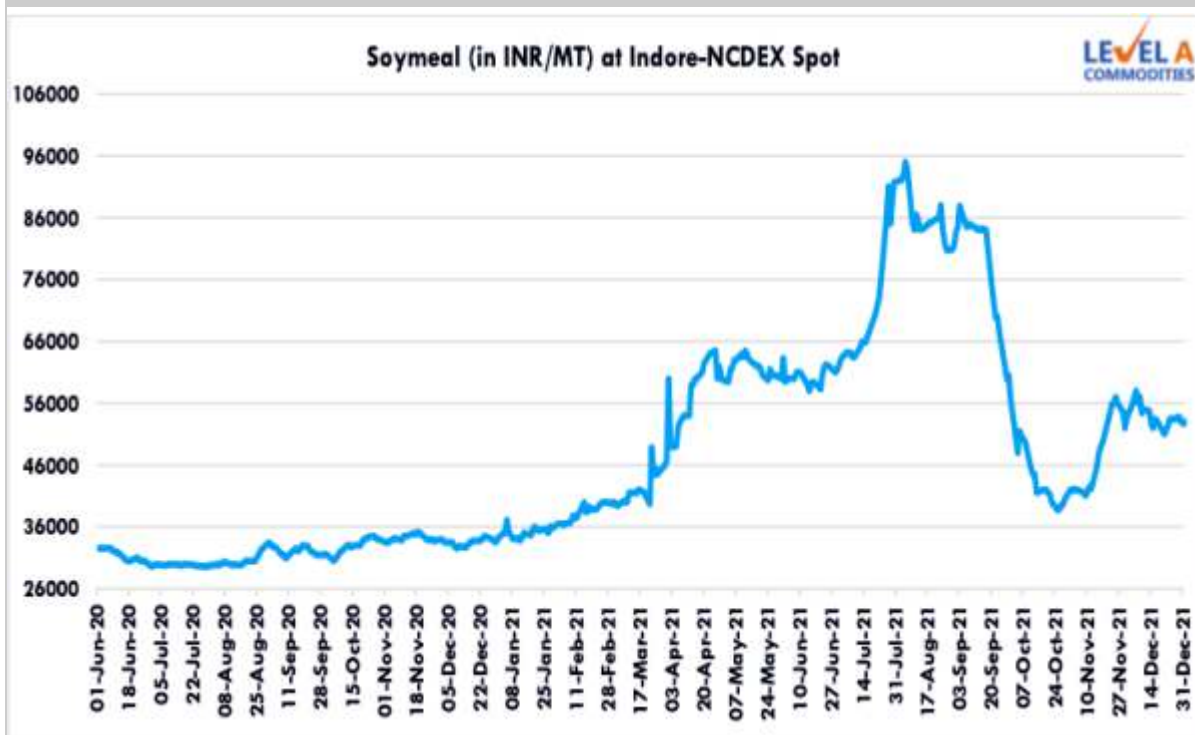
Soybean Seed



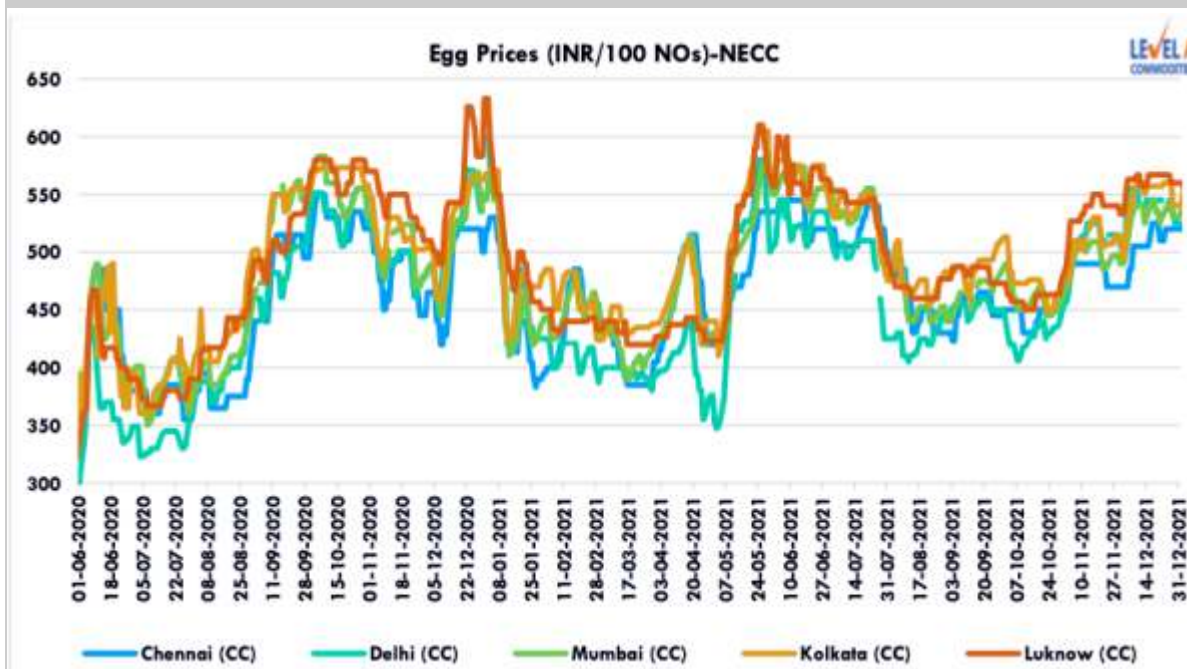
Soya Oil



Soymeal Prices-NCDEX Spot:



Egg Prices



Egg Rates

NECC Prices

Market	31-Dec-21	30-Nov-21
Ahmedabad	532	455
Ajmer	502	435
Asansole	-	-
Barwala	502	431
Banglore (CC)	515	450
Brahmapur (OD)	506	413
Burdwan (CC)	-	-
Chennai (CC)	520	465
Chittoor	513	458
Delhi (CC)	-	451
E.Godavari	480	405

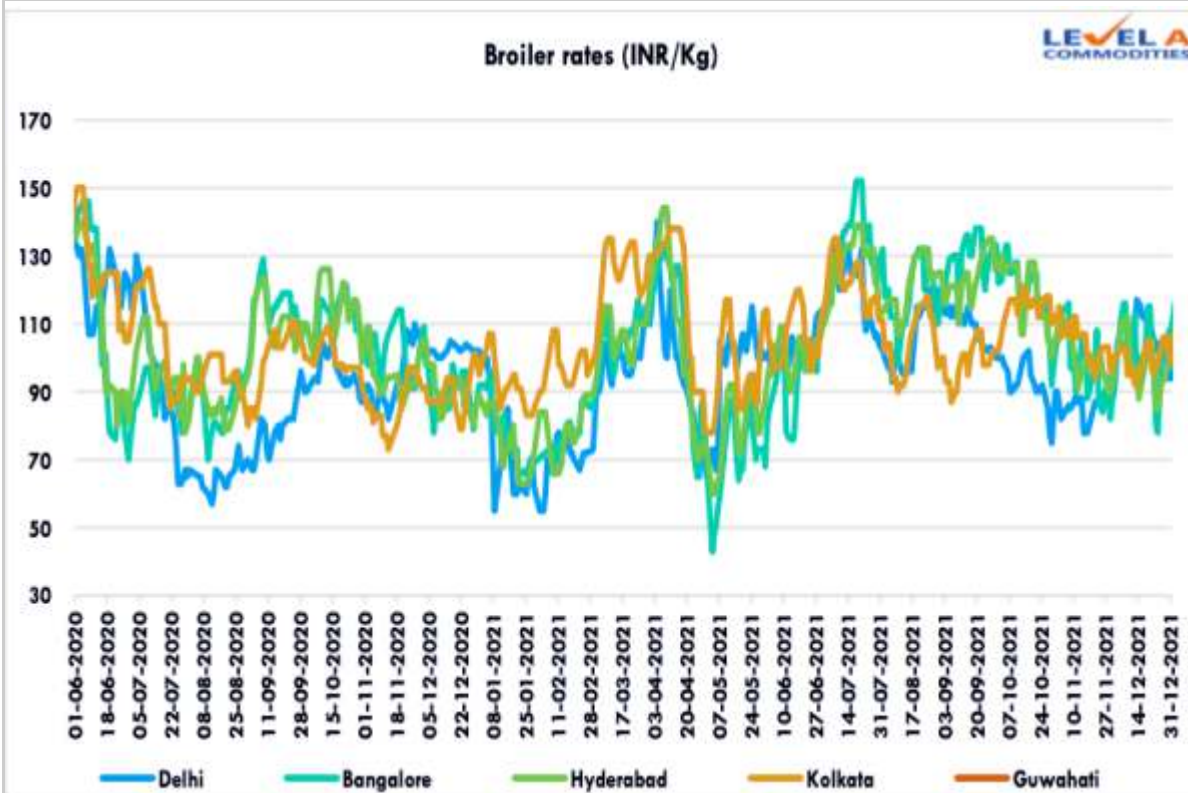
COMMODITY UPDATES

Hyderabad	469	401
Ludhiana	501	431
Midnapur (KOL)	-	-
Mumbai (CC)	530	462
Muzaffarpur (CC)	552	476
Mysuru	515	455
Nagpur	515	425
Namakkal	505	445
Patna	548	467
Pune	522	460
Ranchi(CC)	552	476
Vijayawada	490	415
Vizag	500	400
West Godavari	480	405
Warangal	471	403

Prevailing Prices

Market	31-Dec-21	30-Nov-21
Allahabad (CC)	538	476
Bhopal	510	430
Hospet	475	410
Indore(CC)	-	445
Jabalpur	507	435
Kanpur (CC)	519	462
Kolkata (CC)	540	475
Lucknow (CC)	560	480
Raipur	510	425
Surat	532	473
Varanasi (CC)	563	483

Broiler Rates



Broiler rates (INR/Kg)

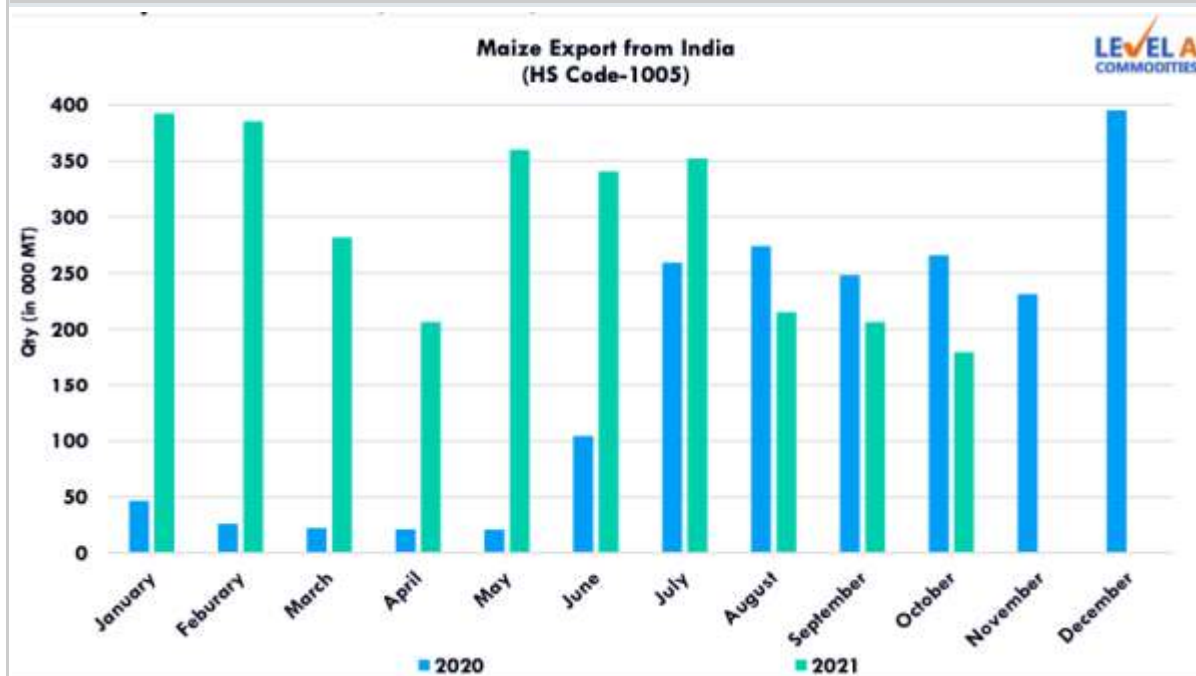
Market	31-Dec-21	30-Nov-21
Delhi	94	-
Punjab	86	83
Raipur	88	80
Pune	106	95
Bangalore	108	87
Hyderabad	100	92
Gujarat	100	88
Kolkata	101	98
Lucknow	90	90
Guwahati	-	-

Chicks Price (INR/Unit)

Market	31-Dec-21	30-Nov-21
Punjab	20	23
Chandigarh	20	23
Haryana	20	23
Himachal Pradesh	21	24
Rajasthan	21	24
Jammu & Kashmir	21	24
Uttarakhand	21	25
Uttar Pradesh	23	28
Madhya Pradesh	-	-
Chhattisgarh	-	-
Bihar	24	32
Jharkhand	23	32

Trade Details

Maize Export from India



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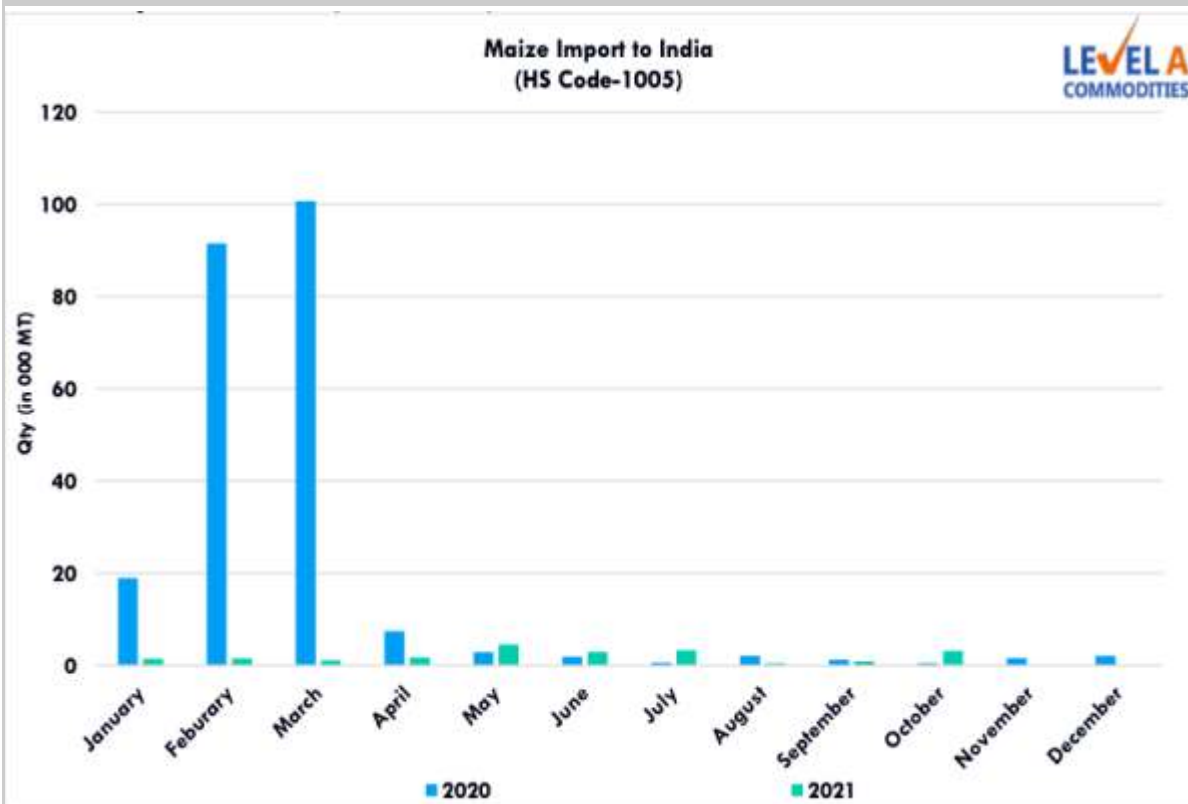
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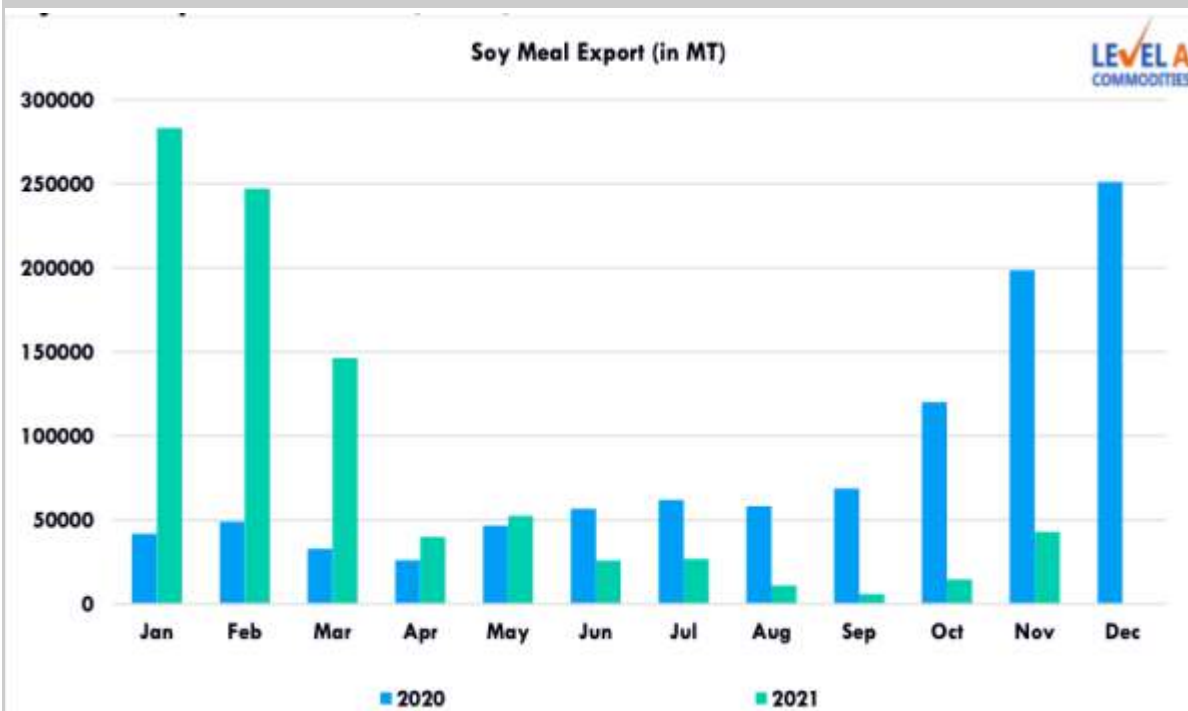
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Maize Import to India



Soy Meal Export from India(In MT)



Market Drivers

Maize

Market Drivers	Monthly Outlook
Maize cash markets showed a mixed trend with firm bias towards end during the month of Dec-21	Bullish
Sowing of Kharif Maize as compared to same period previous year	Bullish
Maize would trade with steady to slightly firm sentiment as demand for good quality material seems to be improving as per the trend	Bullish
USDA increased its World Maize Production Estimates	Bullish

Soymeal

Market Drivers	Monthly Outlook
Soybean traded rangebound amid subdued soymeal export demand	Bullish
India's soymeal exports	Bearish
Soymeal prices are likely to trade rangebound amid slacked export demand	Bullish
USDA lowered 2021/22 Oilseeds Production	Bullish

Disclaimer: The information contained herein is of a general nature and is not intended to address the circumstances of any particular individual or entity. Although we endeavour to provide accurate and timely information, there can be no guarantee that such information is accurate as of the date it is received or that it will continue to be accurate in the future. No one should act on such information without appropriate professional advice after a thorough examination of the particular situation.

REACH US



CLFMA OF INDIA – World Egg Day was Celebrated on Friday, 8th October, 2021

CLFMA OF INDIA – World Egg Day was Celebrated on Friday, 8th October, 2021 in association with Indian Red Cross Society – Mumbai at Adams Wylie Physio Rehab Centre, Mumbai Central (East).

World Egg Day is celebrated on the second Friday of October every year, which falls on the 8th of October, this year.

The day is observed to celebrate how eggs have been feeding families all around the world and to spread awareness about their nutritional value and importance.

Hon. Secretary of CLFMA OF INDIA, Mr. Suresh Deora distributed eggs at Adams Wylie Physio Rehab Centre, Mumbai Central (East). CLFMA Executive Director - Ms. Chandrika Venkatesh, CLFMA Manager - Ms. Shilpa Utekar, Admin Officer - Ms. Shraddha Kadam & Dhondiraj from CLFMA were present.

CLFMA also distributed Eggs at Mumbai Veterinary College. On behalf of CLFMA Professor. Dr. A. S. Ranade, CLFMA Technical Committee Head & Associate Dean, Mumbai Veterinary College celebrated the event.



Feed Tech Expo 2021 | Digital / Virtual Event

CLFMA supported and participated in Feed Tech Expo 2021 (Digital / Virtual Event) catering to Animal Feed Industry, which was organized with the support of industry peers, Benison Media and Jordbrukare India and sponsored by Kemin Industries from 26th to 29th October, 2021 successfully. The 4-day Online exhibition along with 9 Live events discussing important topics like Changing Livestock Policies, Demand scenario of Indian Feed Industry, Alternate raw materials, Reimagining Marketing, Dairy Farm profitability in 2021 and others involved various stakeholders from Feed and Dairy Sector. Key Note Address delivered by Mr. Neeraj Kumar Srivastava, Chairman of CLFMA OF INDIA. CLFMA had its virtual Stall No. F0018, where almost 49 visitors visited CLFMA Stall. The event was registered by 2000+ registrants. Going ahead the Company has announced the next hybrid edition of FEED TECH EXPO & DAIRY INDUSTRY EXPO on 3-4-5 February at Kingston Event Centre.

CLFMA OF INDIA Meeting with Government of Canada, High Commission of Canada November 24, 2021, CLFMA Secretariat, Mumbai



L-R - Mr. Nitin Verma, Counsellor - Agriculture, Agriculture and Agri - Food Canada (AAFC), Mr. Victor Lee, Managing Director, Saskatchewan India Office Counsellor (Commercial), Ms. Chandrika Venkatesh, Executive Director, CLFMA OF INDIA, Dr. Mwate Mulienga, Counsellor Agriculture & Regulatory Specialist, Canadian Food Inspection Agency (CFIA), Mr. Suresh Deora, Hon. Secretary, CLFMA OF INDIA, Mr. Akhil Choudhary, Trade Commissioner, Agriculture and Agri - Food Canada (AAFC), Mr. Prasad Patil, Trade Commissioner Assistant.

CLFMA Chairman Mr. Neeraj Kumar Srivastava interviewed with Zee Business dated 24th December 2021

Participants were:

CLFMA OF INDIA Chairman : Mr. Neeraj Kumar Srivastava
SEA Executive Director : Dr. B. V. Mehta
SOPA Executive Director : Mr. D. N. Pathak

Details:

Interviewer queried about the necessity to limit the stock of soymeal and its benefits for the poultry industry. For which CLFMA Chairman answered as follows:

At the outset CLFMA Chairman thanked Zee Business for organizing the interview and he added that poultry and livestock industry is farmers' industry as it supports the livelihood of farmers. He said that last year, soymeal prices were high rocketing and this effected the farmers of this industry and hence last year CLFMA including other associations raised a single voice against this issue after which, the government of India permitted the soybean meal import. And the soya prices have direct impact on livestock industry and last year there was heavy losses in the poultry industry and also the livestock industry associates demanded for ban on excessive speculation on trading. The demand was made to control the speculation. And this decision is taken for the interest of benefiting the farmers as well as livestock industry.

CLFMA Delegation visit to Krishi Bhavan, GOI., New Delhi on 24th December, 2021

Agenda of the Meeting: Liasioning with Government of INDIA

CLFMA OF INDIA delegation consisting of Mr. Neeraj Kumar Srivastava, Chairman and Mr. Suresh Deora, Hon. Secretary visited Krishi Bhavan, New Delhi on 24th December, 2021. The purpose of the Meeting was to liasion with Government of INDIA authorities for discussing the pending issues related to CLFMA OF INDIA. The Government Officials visited were Dr. Gagan Garg, Assistant Commissioner, Dept. of Animal Husbandry and Dairying, Shri. G. N. Singh, Joint Secretary (Admin./Trade/GC/IC), Dept. of Animal Husbandry and Dairying, Dr. O. P. Chaudhary, Joint Secretary (NLM/PC), Dept. of Animal Husbandry and Dairying, Dr. Lipi Sairiwal, AC(AH), Dept. of Animal Husbandry and Dairying, Smt. M. Lata, PSO, Dept. of Land Resources and other Government Officials.

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We strongly believe in sustainable food systems and that the livestock industry can transform itself from within to be a part of the solution. We want to play a key role in this transformation and work at species and country level, with our partners, to provide tangible and actionable solutions to create brighter lives for all.

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95% of choline pool in the animal body is only in the form of phosphatidyl choline - It means, in animal body dietary choline, gets converted in the form of phosphatidyl choline (PC) (Li and Vance, 2008).

Only 10 to 12 % of dietary rumen protected choline chloride gets converted in to phosphatidylcholine- Rest is waste.

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The information provided is to best of our knowledge.

For more details please contact Dr. Amit Sharma on 9673998176

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**Press Release - Webinar on Current Soybean Outlook & Future Opportunities on
27th November, 2021 at 14:00 hrs to 16:00 hrs**




CLFMA OF INDIA
ASSOCIATION OF LIVESTOCK INDUSTRY


November 27, 2021, Saturday
Time: 14:00 hrs to 16:00 hrs

Current Soybean Outlook & Future Opportunities


Venue: Virtual Zoom




Welcome Address
Mr. Neeraj Kumar Srivastava
Chairman, CLFMA OF INDIA






Speaker
Dr. Vibha Ahuja
Chief General Manager
Biotech Consortium India Limited



Speaker
Ms. Prerana Desai
Head of Research,
Samunnati Agri



Vote of Thanks
Mr. Suresh Deora
Hon. Secretary, CLFMA OF INDIA

Host :
Ms. Chandrika Venkatesh,
ED, CLFMA OF INDIA

Link :
<https://forms.gle/AhB5DhuBEFLurux3A>

CLFMA OF INDIA Organized Webinar on “Current Soybean Outlook and Future Opportunities” on 27th November, 2021.

The feed industry uses diverse raw materials such as grains including maize, sorghum; de-oiled cakes, oil meals etc mainly derived from soybean. Soymeal is the most common and nutritious among all the oil meals used in the country in animal feed as the source of protein. Previously, soymeal was traditionally preferred by the farmers and the feed manufacturers as one of the key ingredients in the feed for cattle and other livestock; but currently, due to surge in Soybean Meal prices, due to demand -supply fluctuations, CLFMA felt the need to organize a Webinar on the topic “Current Soybean Outlook & Future Opportunities” which was conducted on 27th November, 2021.

The Webinar was started by Ms. Chandrika Venkatesh, Executive Director of CLFMA OF INDIA, she introduced Mr. Neeraj Kumar Srivastava, Chairman CLFMA to the audience.



CLFMA Chairman, Mr. Neeraj Kumar Srivastava delivered the Welcome Address and discussed about the soymeal situation for the previous and current year. He said that in the year 2020-21, the industry suffered a lot due to unexpected price rise due to speculative trading. He added that, we had good expectations for the market to get stabilized after the new crop, but unfortunately the prices have jacked up again and since this is a very sensitive matter for the industry, we thought it's prudent to deliberate this issue and he said that, we are working very closely on these issues with the government and other associations as well to tackle them.

He said that the webinar was organized with the following two objectives:

- To create awareness about the current soymeal situation and the steps CLFMA has taken to confront this issue presently and in the future
- To educate the participants about the Genetically Modified Crops and its myths

He then introduced the two speakers to the audience:



Dr. Vibha Ahuja, Ph.D. (Microbiology) serves as Chief General Manager of Biotech Consortium India Ltd. She is based in New Delhi, India. She is an expert on biosafety and regulatory aspects, particularly with reference to genetically modified organisms, having more than 25 years of experience in the field.



Ms. Prerana Desai, Head of Research, Samunnati Agri. She has a vast experience of commodity research of more than 25 years. She specializes in Agri Commodity Research. As a part of her vast experience, she has done commodity research for various value chain participants like manufacturer, trader, exchange, commodity broker, NBFC and now farmers.

Session 1:

Dr. Vibha Ahuja, Chief General Manager of Biotech Consortium India Limited gave a presentation on **“Use of GM crops and derivatives for animal feed: Status and opportunities”** and explained in detail on following points:

1. What are GM crops?
2. Global and Indian status.
3. Biosafety assessment and regulations
4. GM crops/derivatives used as animal feed
5. Myths/Facts and Way forward.

For further details, the video and the presentation are uploaded for the members to view the same

Video Link - Refer below (Pg. 25)

Session 2:

Ms. Prerana Desai, Head of Research, Samunnati Agri gave a presentation on the topic **“Outlook of Soybean for the Current & Future Opportunities”**.

1. Crop Tour Coverage, area covered MP, Maharashtra, Rajasthan for acreage & yield assessment?
2. Overall rainfall status over soyabean regions in our Country
3. Soybean output - SamAgr Survey
4. State-wise Production Outlook – Soyabean
5. Arrivals - Approx. 20% of soybean crop already arrived in the market. Farmers holding soybean in anticipation of higher prices Biosafety assessment and regulations.
6. Soybean, Soy Meal & Soy Oil Balance Sheet
7. Soybean Price Movement
8. Pictorial Slide of Soybean Harvesting / Drying, etc.

For further details the video and the presentation are uploaded for the members to view the same

Link : Video

<https://youtu.be/CNRQ52e5cG4>

Link : Presentation

<https://drive.google.com/file/d/18CamRExT5UrV2eeqPVhPWtj43-bzjMyu/view?usp=sharing>

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After completion of presentation by Ms. Prerana Desai, forum was opened for the Q&A Session.

The following few questions answered by Members / Participants are given below. The rest of the questions and answers can be referred from the video link given below:

1. Dr. Devender Hooda to Ms. Prerana Desai – When the productivity is going up Pan-India by 16%, what are factors by which Madhya Pradesh Productivity has gone up by 31%? What are the crops? then in such case on an average every farmer should get 31% higher yield, please explain.
2. As compared to last year, how this year Soyabean crushing will be lesser in India?
3. As you stated that you are expecting double the amount of soyabean meal import this year. Of course, that import is highly policy driven so expecting that has happen to again. I think is a big question mark. So, these are the three assumptions, which actually I am not able to understand?

Ms. Prerana Desai explained Dr. Hooda and participants what is the yield scenario in detail.

Ms. Prerana Desai explained the other question, that was regarding imports are assumed to be very high. In fact, in this balance sheet, imports are taken very conservatively, which is 4 lakh ton. There will be around 8 lakh ton of meal imports. The lower crush is largely because of 6 to 8 lakh ton of meal ready for consumption, the crush parity will only not come for the crushers, to crush their meal and because of the higher meal imports, the consumption of the meal is rising, the consumption is not going down. The crush that is going down is because of the 6-8 tons of meal that we are importing.

Dr. Hooda said that if that is the case, we could not predict 31%, jump in productivity, this year I agree. But how it is possible that the whole Industry and all the predictors could not predict last year 25% less production in that case?

Ms. Prerana Desai explained that, last year was the Covid year. Hence field survey was not carried out and that is why things went bad, nobody could really know how bad the crop situation was, the other thing was that last year the fiasco also happened because we ended up exporting very large amount of meal in the first half because there was no clarity on the total production and the exports went out so aggressively in the first half and the second half we were actually left empty handed.

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The other CLFMA Member Mr. Rakshith asked a question to Dr. Vibha Ahuja as we have been seeing a large hue and cry from Farmer Community for this GM Crop. Apart from Cotton, we are not seeing any progress in any other crops, why it is so?

Mr. Rakshith asked one more comment on that on-GM Crops farmer community is being protesting like they lose their basic sovereign right for retaining the seeds if they use GM Crops.

Dr. Vibha answered second question first. She explained that genetic modification is just to insert a character so you know this has happened because again in cotton, the varieties, which are used are hybrids, so hybrids are one, which have to be purchased every year by the farmer whether it is GM or Non-GM. The Government does not make it compulsory to buy every year. Suppose we have tomorrow GM Soyabean and it is put in the varieties, then GM Soyabean also can be retained. If the gene put in the variety, you don't have to buy, you can save some part of it, although in reality the practise in many hybrid crops, is that even in the varieties people go and purchase, because of the better quality and purity of the seed but genetic modification has nothing to do with. It will be in the same way as it is done for the conventional crop. This is a myth, misinformation to the farmers. In our country cotton almost 98% is hybrid which are grown. Hybrids have to be purchased every year. She answered the other question why we did not have any other crop? After BT cotton it is again debates, myths and so on. And because of these polarized debates, the government has not taken decision, there has been a delay in the decision, and subsequently it has resulted in slowing down of the Research, introducing new Products and so on.

Mr. Rakshith asked one more question that there is very less human consumption of Soybean and its being largely used in poultry production in Poultry feed making. So, can we, body like CLFMA can take aggressive step and push forward for the Soya GM production in India.

Dr. Vibha answered that present scenario is almost 80% of the Soybean around the world is Genetically Modified Soyabean. All the Soyabean Oil being imported in the Country is derived from the Genetically Modified Soyabean. So why not in our Country we should grow GM Soyabean in our Country and get the productivity increased. There should be intensive Research on new variety and it should be developed in our Country also, that we don't have to go out.

CLFMA Chairman Mr. Neeraj Kumar Srivastava asked one more question received from the participant for Ms. Prerana. Ms. Prerana, you have projected that gist of crushing for this financial year so is it going to impact the availability of the meal and price? How do you see the forecast of soybean meal going forward in this financial year?

Ms. Prerana answered the question that, as you know lower crush is largely because of the meal import. Another thing that I have assumed is Soyabean meal exports, if Indian prices remain this high and global prices so not rebound, then that export will also not happen the, meal actually add to the overhang of the seed and that will put pressure on soybean and soymeal prices. Just there is one disclaimer over here is just historically that if Indian industry chooses not to crush and carry the Soyabean as an inventory despite the fact that we are not importers of oil and we have such a large consuming unthriving sector so that is one disclaimer but I think that we will not have a problem as far as availability is concerned and I do expect prices to soften as we get closer to Rabi Harvest.

There will be visibility of Mustard, large humongous crop of mustard and that will kind of put pressure on all.

Dr. Shivaji Dey asked a question to Prerana Mam. The farmers are expecting a price of the seed around Rs.7000/- and so farmers holding it back or may be the farmers, or hoarders are hoarding it back and at the same time the plants will definitely not crush due to disparity so in that case and on the other hand we would be forced to allow the import of GM meal. So definitely our usage, for our usage the soyabean meal prices being soften but what happens to the seed which have been hoarded by the farmers? If it is not used by the crusher due to disparity and we have historically seen we don't carry forward the seed to the next year and neither we hold it as an inventory due to the lack of fund so what happens to the seed in that case? won't it soften down? and there will be a check and balance in the industry.

Ms. Prerana answered that you are slightly mistaken in believing that we don't carry soyabean inventory. last 6-7-8 years trend is that we had in couple of years we ended up carrying soyabean inventory of 20 lakhs tons or more. Not necessary by the farmers, but it is the inventory in the system, who is holding is the question. But usually, farmers won't hold for that long.

Dr. Shivaji Dey said that soya Crushers also don't hold.

Ms. Prerana answered that the system is holding. I mean whoever finds that the prices will make money will be holding soybean. They end up holding, they end up losing money also. Another thing is that farmers were expecting higher prices. They started with expecting Rs.6000/- prices when actually Soyabean fell to around to Rs.5000, very close to Rs.5000. In Interior mandies it fell, for couple of days below Rs.5000 also but as the prices started rising, they wanted more and that is why the next target of Rs.7000 had emerged. I do believe that close to current prices; the selling will start. One more thing she pointed out that globally the third variant of Covid has now emerged and that has resulted in sale of all assets. So, your crude has fallen by over 11% over night and all agriculture commodities have taken lot of waiting and dollar index is now approaching 97 all of this is creating a sort of black swarm kind of an event that we have seen in last 10 years, the global financial meltdown kind of a situation so that also will put pressure on commodities and we should see commodity prices coming down at least in very near term of one month, one or two months, sort of a thing.

Dr. Shivaji Dey asked one more question, what is the MSP of Soyabean Seed, this year?

Ms. Prerana answered that Soybean MSP is Rs.39.50.

Dr. Shivaji Dey: So future projection will it be come below MSP or we need to wait?

Ms. Prerana answered I doubt it will come down. I mean like you know it will collapse much faster than the global market then we will end up exporting, which is what my base case scenario is that. Always, off course, global scenario changes dramatically.

Dr. Shivaji Dey said so we should just see a mark of around Rs.5000.

Ms. Prerana answered that I think what the best way would be to stay hand to mouth at higher prices, do not panic and believe that the prices have no limit and it will continue to rise as it happened in the last year and last year is the different year.

Mr. Neeraj asked one more question received from the member, it was very straight forward that they are asking a lot of solutions and things from you that when do you think that prices start going down or soften?

Ms. Prerana answered that Rs.7000 is on horizon for Soybean. Usually, farmers sell whatever they harvest but once that is not sold, they kind of stock it and once they stocked it, they are no hurry to sell.

Mr. Krishna Reddy Tetali asked the question in chat box Can we get these presentations? Will you please forward them? And one more question FSSAI has called for public comments on permitting inclusion of GM ingredients in foods and what is the action taken by CLFMA and CLFMA members in this regard?

Dr. Vibha answered that FSSAI authority put up on the website. The new FSSAI regulations and would also like to share history traditionally as per our rules it is Ministry of Environment. The Genetically modified organisms including crops and health care products but alike health care products these products also regulated by the Drug General of India so the Pharmaceutical Company work very hard, 10 to 15 years back and there was a report and so on. The pharmaceutical products were out of the purview of the Ministry of the Environment and they are only taken care by the Drug Controller General of India so now similarly the GM modified foods. After the Food Safety Act came in to place the Food Safety Authority is expected to look at the GM Foods and approve it in the Ministry of Environment, but Ministry of FSSAI do not have any regulations and they have been working on it several years and finally we have a draft, which has been put up, it was put up on 15th November, it is for 60 days for comments. Now, as far as the CLFMA is concerned, presently, the definition of food does not include the feed and that is why there is little bit of confusion. But we understand that the food is, the definition of food is being modified to include the feed also. The CLFMA should look at the regulations very carefully and see how it is going to impact them and we can have a discussion or wherever you need assistance, I will be available to provide you and clarify various things. The meal kind of products, , the one which we saw, soymeal, canola meal all these are highly processed and whatever interventions we have made that has safely tested it need not be into too much of regulations and there should be flexibility in the market.

Link : Video

<https://youtu.be/CNRQ52e5cG4>



The Webinar ended with the summarization and Vote of Thanks delivered by Mr. Suresh Deora, Hon. Secretary of CLFMA OF INDIA.

Even though the webinar was announced in a short period of time by CLFMA, the Webinar was well appreciated by the Audience. Almost 100 registered for the Webinar and 82 participants attended CLFMA Webinar.

Department of Animal Husbandry & Dairying signs MoU with Ministry of Food Processing Industries

Department of Animal Husbandry & Dairying has signed a memorandum of understanding (MoU) with Ministry of Food Processing Industries on Wednesday for extending the benefits of various schemes to the beneficiaries by providing them credit support in establishing dairy processing, meat processing and animal feed plant.

Dovetailing and synergizing efforts of both the departments especially in the context of the common objective of helping the farmers and double their income through the livestock sector is the need of the hour, said Union Fisheries, Animal Husbandry & Dairying Minister, Parshottam Rupala.

Both the departments pledged to work together to achieve the goal for income generation and for sustainable development of the rural poor.

Ministry Of Food Processing Industries has been implementing schemes such as One District One Product (ODOP), while the Department of Animal Husbandry & Dairying runs the credit link grant assistance scheme to dairy, fisheries, poultry and animal feed units.

Now, new units for ODOP products will be supported for capital investment. Similarly, the units in the dairy and poultry sector will be recommended by the Department of Animal Husbandry to avail benefits under the Prime Minister Kisan Sampada Yojana, which is meant to augment the supply chain management from farm gate to retail outlet.

Quality testing infra

“There is a shortage of milk quality testing infrastructure and village level cold chain infrastructure, which is adversely affecting the export, though the possibilities are there,” the government said in a statement.

The country's dairy products have 0.1 per cent share in world trade of these items, even though India has emerged as one of the top 10 exporters of farm products.

The livestock sector is an important sub-sector of agriculture in the Indian economy which grew at 8.2 per cent CAGR between 2014-15 and 2018-19. Even as India is the world's largest producer and consumer of milk and milk products, only 40 per cent of the dairy sector is organised.

Milk production in the country increased to 198.4 million tonnes in 2019-20 from 146.3 million tonnes in 2014-15 with an annual growth rate of 6.28 per cent. Per capita availability of milk has also increased from 307 gm in 2013-14 to 406 gm in 2019-20.

First Fisheries Incubator Launched to Help Aqua-preneurs

The Ministry of Fisheries in collaboration with the National Cooperative Development Corporation (NCDC) on Tuesday launched the first fisheries incubator in the country as part of the efforts to boost aquaculture and value addition in fisheries through cooperatives.

Part of the larger Blue Revolution or Pradhan Mantri Matsya Sampada Yojna launched in September with an outlay of Rs. 20,050 crore for five years, the incubator set up in Gurugram based Laxmanrao Inamdar National Academy for Cooperative Research and Development (LINAC) will make a start with 10 entrepreneurs who will be provided with all facilities and guidance for three years to establish their business.

“Given the Covid protocol, we are initially starting with 10 entrepreneurs who either represent a cooperative or have some link with them. We hope to increase the number of entrepreneurs at a later date in Gurugram and at the 8 satellite centres to be set up,” Minister of Fisheries Parshottam Rupala told media on the sidelines of the conference held to brief interested businessmen.

Announcing plans for the rollout of credit cards to fishermen and those working in the animal husbandry sector on the lines of the Kisan credit card, the minister stressed that for the first time institutional credit will be available to those seeking to become entrepreneurs in the fisheries sector.

The aim is to boost the cooperative sector's role in fisheries business, which is currently just around 20 per cent in India as against the global scenario where cooperatives account for 70-80 per cent of the business.

India is targeting raising fishery exports to Rs. 1 lakh crore by 2024-25 as against 12,89,651 tonne of seafood worth Rs 46,662.85 crore in 2019-20, which declined 6.31 per cent in the last fiscal year due to the health pandemic. Despite the setback, India's fishery export has in the past been growing by 7 per cent.

Sundeep Kumar Nayak, managing director of NCDC, said the incubation centre will provide free or low-cost workspace to incubates or start-ups to reduce overhead costs in their nascent stage as cooperatives or federated self-help groups.

The aim is to promote entrepreneurship in the fisheries right from aquaculture to handling, storage, value addition, marketing, etc., to meet growing demand both within the country and overseas.

“We hope the endeavour will produce 10-12 start-ups or farmer producer organizations (FPOs) in the fisheries sector in a year besides providing 3 to 6 months business training-cum-internship to around 25 aqua-preneurs,” Nayak stated.

The new endeavour is expected to generate more wealth for the fisher community and those engaged in inland and sea aquaculture as also create more employment through cooperatives that are being encouraged to enter new businesses related to the sector.

Export Prospects Look Brighter for Indian Dairy Fats

For India's dairy sector, December 23, 2021, was a landmark day. On this day the Bureau of Indian Standards (BIS) with the help of National Dairy Development Board (NDDB) issued a unified system for quality and safety of milk and dairy products across the country. The integrated logo of Kamdhenu Cow - a seal of certified quality, is the first ever move by India to bring uniformity in milk quality and certify end-to-end milk value-chain.

The move benefits not only dairy consumers, but also milk producers who will get greater access to international markets and look forward to better price realisations.

India's policy thrust in dairy has been to cement the country's numero uno position in milk production as well as make it one of the top global dairy exporting nations. Currently, exports lag.

Rising shipments

Since 2014, when India exported just 66,424 tonnes of dairy products, there has been a 78 per cent jump in shipments abroad. It is still a tiny fraction of India's annual milk production (195 million tonnes of milk in 2020) though.

What has held back India's dairy exports is quality issues and lack of value-addition. Conventionally Skimmed Milk Powder (SMP)/ Whole Milk Powder dominated India's dairy export pack with nearly 35 per cent share in the overall dairy products exports. But this could change in the coming years.

RS Sodhi, Managing Director, Gujarat Cooperative Milk Marketing Federation (GCMMF), believes that Amul's exports are set to rise by 70-80 per cent this year and the overseas market is getting attractive for other players too. "India is becoming a big force. Earlier, SMP was the main commodity of exports. Now our dairy fats are also becoming competitive," Sodhi said.

Consumption push

The year gone by, 2021, saw significant push in consumer demand for dairy products. Regardless of the 10-12 per cent demand destruction in the hotels, restaurants and caterers and events segment, dairy consumption saw robust uptick with the retail consumer segment picking up. "In the past two years, milk inflation was barely 2 per cent annually, as against about 25 per cent jump in prices of edible oils and other

protein/fat sources. So lower price conditions in milk supported demand with exponential growth in the past two years," Sodhi said.

Prices to go up

But the dairy farmers didn't gain much in 2021. Their realisations from milk and milk products did not increase despite higher input costs. Due to the demand-supply factors, the farm-gate price of milk didn't lift even as the input costs shot up. "What they have lost in 2021, has to be compensated in 2022. So, we expect dairy producers to pass on the cost pressure and there would be some increase in prices matching the input costs," said Sodhi.

Investments to flow

Meanwhile, as dairy consumption grows - in domestic and international markets - the prospects get brighter for higher realisations, increased processing and better margins. This will encourage the private sector to invest more in processing capacities as well as in equipment and infrastructure. For example, India's performance-linked incentive (PLI) scheme could create global dairy export giants in India.

2022 will also see dairy sector's transformation being fuelled by Centre's Dairy Investment Accelerator, which will help channelise the 15,000-crore Animal Husbandry Infrastructure Development Fund (AHIDF) for desired goals such as dairy processing and related value-addition infrastructure, etc.

Stock Holding Limits Imposed on Soyameal till June 2022

A week after restricting futures trading on some agriculture commodities and extending the deadline for duty free pulse imports till March 2022, the Centre has now imposed stock-holding limits on soyameal, in a bid to control its prices. The stock holding limits will be in place till June 30, 2022.

A notification issued by the department of consumer affairs, food and public distribution stated that soyameal millers, processors or plants can hold stocks of up to 90 days of production. Traders and trading companies or private chaupals can hold only up to 160 tonne of soyameal with a defined and declared storage location, it said.

In case of stocks held by these respective legal entities are higher than the prescribed limits, then they shall declare the same on the government portal of the department of consumer affairs & public distribution and bring it to the prescribed stock limits within 30 days of the issue of the notification. It shall be ensured that the soyameal stock is regularly declared and updated on the portal and data on the portal will be regularly monitored by the department of

animal husbandry & dairying and any other follow-up action will be taken by this department, the notification said.

Soyameal is a key constituent of poultry feed meal and its rates are directly connected to soyabean prices because seed has more than 80% meal and 18% oil content in them. This season, despite a good harvest, soya bean prices have soared almost 76% in the domestic market, benefitting farmers on one hand but hurting the poultry industry on the other.

In October 2020, soyabean futures were trading close to Rs 3,800 per quintal, which spiralled to a record Rs 10,680 per quintal in August 2021 on lower output and strong demand from the poultry industry. Following this, the Centre first allowed import of 12 lakh tonne of genetically modified soyameal till January 31, 2022. However, till December, only around 8 lakh tonne have been imported. Speculative activity in the futures markets in the entire soyabean complex and also stock holding by traders have also been blamed for the sharp rise in prices by industry people.

Soyabean production is estimated to be 127.2 lakh tonne in the 2021-22 season, as per the agriculture ministry's first advance estimate of this year's kharif crop production. The estimate is only marginally lower than the 128.9 lakh tonnes produced last year. Traders believe growers are holding stocks in anticipation of better prices in the near future, which is resulting in lower supplies in the market.

DN Pathak, executive director, Soybean Processors Association of India (Sopa), says: "Soy processors do not stock soy meal. They cannot afford to stock finished product at huge inventory carrying cost. Soymeal is not an item for long storage even by traders. How this will help in controlling prices is not clear." Pathak felt that that this move may bring back the inspector and raid Raj, which can only have a negative impact.

Sopa recently said the poultry industry's latest soyameal consumption figures are highly inflated. The association also said that the rise in soyabean prices is not in the hands of the processors and it is not because of anything done by the processing industry and they have already flagged the issue of hoarding and undue speculation of soyabean futures. "Farmers cannot be forced to sell soyabean at MSP as desired by the poultry industry. Soyabean farmers have as much right to livelihood and get remunerative prices as poultry farmers," the association said.

Nitin Kalantri, a pulses trader based out of Latur, said that the government is trying all means to bring down prices, but the real stockist this year is the farmer. "The farmer has held back 90% of the crop in anticipation of price rise. It is not clear if he will be willing to sale at lower levels," he said. BV Mehta, executive director, Solvent Extractors Association of India (SEA) expressed the hope that the stockholding limits will only remain for the six-month period.

Initiative Launched to Boost Marine Exports from Varanasi

The Marine Products Export Development Authority (MPEDA) and department of fisheries and Agriculture Products Export Development Authority (APEDA) have launched an initiative to promote marine product export from the Varanasi region.

A series of roundtable conferences are being organised to discuss the same.

According to APEDA regional officer C.B Singh, the Ministry of Commerce and Industries, Government of India, has already been taking several key initiatives to sensitise growers, exporters, government officials and other stakeholders for harnessing the export potential of agri-products from the region.

"As the fishery farmers and their production has increased in this region in recent years, there was a demand from them for giving them similar opportunities like agriculture farmers. In view of it, MPEDA officials who operate from Kochi, were asked to hold a meeting here," said Singh.

Fishery farmers were assured by the APEDA officials about initiatives to boost marine-agri product exports from Varanasi region by inviting MPEDA -- the nodal agency for marine product export.

MPEDA director M.Karthikeyan emphasised on the need to build a hatchery in Varanasi and assured that further action in this regard will be discussed with the concerned department very soon.

Deputy director MPEDA Dr Lahiri said that MPEDA is exploring possibilities for developing Varanasi as a fish export hub. He said that the farmers of the area are working on high-end technology, for which capacity enhancement is necessary. There is a need to study and practice the value addition, residual effect on the farmers.

The officials said that a processing unit, packhouse for fish produce, hatchery in Uttar Pradesh, advancement in technology may also be the project which may be proposed in future for promotion of fish and fish produce export from Varanasi.

In the past 10 years, the value of export of fish has reached Rs 50,000 crores from Rs 10,000 crores.

Centre Bans Futures Trade in Seven Agri Commodities Including Soy Complex

To reign in rising food inflation, the Securities and Exchange Board of India (Sebi) has barred exchanges from launching new futures contracts in seven food items for one year with immediate effect.

The commodities are paddy (non-basmati), wheat, chana, mustard seeds and their derivatives, soybean and its derivatives, crude palm oil, and moong.

In one of the biggest crackdowns on commodity derivative futures since trading was opened in 2003, the regulator said that no new contracts will be allowed in the seven commodities. As to their running contracts, no new position will be allowed to be taken; only squaring off will be allowed.

In a related development, the Centre has extended the permission for free import of refined palm oil until December 31, 2022. Earlier, the provision was allowed until December 31, 2021.

India's retail inflation rate rose to a three-month high of 4.91 per cent in November from 4.48 per cent in the previous month, driven largely by the rise in food inflation to 1.87 per cent from 0.85 per cent, despite the Centre and states reducing taxes on petrol and diesel.

Trade sources said that in the case of paddy (non-basmati), wheat and moong, though there were products available on the exchanges, they attracted very little volumes. As to mustard seed and chana, taking fresh positions had already been suspended in August.

The maximum impact of the decision is expected to be on the soybean complex and crude palm oil. The combined average daily turnover of refined soy oil, soybeans, rapeseed and chickpeas on the NCDEX was 12.7 billion rupees (\$167 million) so far in 2021, exchange data showed.

Crude palm oil clocked an average volume of around Rs 200 crore daily on the Multi Commodity Exchange.

At close on Monday, soybean seed January futures were 4 per cent down from the previous close at the NCDEX, while February futures were 2.36 per cent down from the previous close.

At close, soybean seed January futures were 4 per cent down from the previous close, while February futures were 2.36 per cent down from the previous close. In the case of soy oil, the January futures were 1.76 per cent down from the previous close, while February futures was up 0.09 per cent.

"This seems to be a knee-jerk reaction by the government and driven solely by inflation concerns. The Centre has tried all

sorts of measures to control edible oil prices including bringing duties to zero, and this (banning futures) seems to be the last bullet in their trigger," said Atul Chaturvedi, president of the Solvent Extractors Association of India, a body of oilseed extractors and refiners.

Chaturvedi said the ban is expected to be lifted by March when the next mustard crop starts hitting the market and prices cool down.

"Monday's measure makes it tough for importers and traders of edible oils to do business as they extensively use domestic exchanges to hedge their risk," said Sandeep Bajoria, chief executive of edible oil broker and consultancy Sunvin Group, according to Reuters.

The poultry industry has been demanding a curb on futures trading in soy seed, along with an extension of the import deadline for soymeal, as it was hurting its margins. Soymeal is a key constituent of poultry feed meal and its rates are directly connected to soybean prices because seed has more than 80 per cent meal and 18 per cent oil content in them.

Production of soybean, according to the first advance estimate of the 2021-22 kharif crop released by the agriculture ministry, is expected to be 12.72 million tonnes - marginally lower than the 12.89 million tonnes produced last year.

For chana, wheat and mustard seed, production is still to be ascertained as the 2021-22 rabi sowing is still on.

But the latest data from the ministry showed that in the case of wheat, rabi crops have been sown in around 27.77 million hectares till December 17, which was just around 0.87 per cent less than last year, while chana has been sown in around 9.79 million hectares which has been 1.43 per cent more than the area covered during the same period last year.

The maximum area increase has been in mustard seed because farmers, encouraged by high prices, have sown mustard crops in around 8.42 million hectares until December 17 - that's 24 per cent more than last year.

Trade sources said that if the weather remains benign in the coming weeks, India is on course to harvest a bumper 11 million tonnes of mustard in 2021-22, up from 8.5 million tonnes in 2020-21 year.

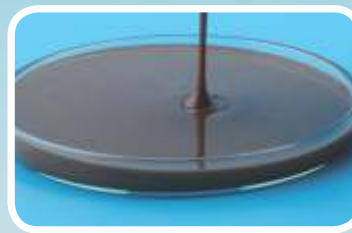
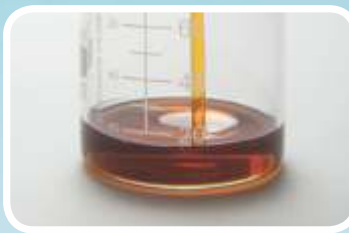
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Physiological Response to Heat Stress and Its Nutritional Management in Dairy Animals

Prasanth M. Nair¹ Antony Johnson² and Veena Mani³

INTRODUCTION

Heat stress is a serious problem throughout our world. Environmentally brought hyperthermia in dairy animals leads to significant production losses. As global warming continues, the occurrence of heat stress in animals increases in terms of duration, frequency, and severity. Modern dairy farming practices (mainly cattle and buffaloes) have raised internal heat loads because of their high milk production and as a result of increased temperature and humidity from the surroundings. To avoid this extra heat, these animals initiate different adaptive mechanisms including increased sweating, respiration rate, panting, reduced milk yield, vasodilatation, and reduced reproductive performance. And the consequence includes mortalities and serious economic loss.

The substantial changes in physiological processes and feed intake occur with temperatures higher than 25°C. This is applicable for dairy animals in temperate conditions. While coming to the tropical region, the temperature-humidity index is the best indicator for heat stress. But, the thermal comfort zone changes depend on several other factors such as the humidity of the surrounding and wind speed, genotype of the animal, its physiological state, thermal susceptibility, acclimation, and the diet offered. Animals try to maintain their body temperature by increasing heat loss and reducing heat production by behavioral and physiological responses. Strategies for the alleviation of heat stress include physical modification of the environment, genetic development of less sensitive breeds, and improved nutritional management schemes using dietary water, protein, fat, fiber, micronutrients, and feed additives.

Different nutritional approaches have been known to cope with high surrounding temperatures, like the use of a high energy diet to balance decreased feed intake and increased energy demand for thermoregulation and adding proteins with low rumen degradability to balance increased nitrogen catabolism. The genetic selection of heat-tolerant breeds is another method such as crossbreeding. An alternative approach is a ventilation coupled with the surface soaking of animals. Animals wetting by sprinklers, foggers, misters, etc. according to a situation that varies. Evaporative cooling may

be useful in various parts of the dairy like the holding area for milking, rest area, the feeding lane, etc.

When an animal fails to lose radiant heat, mainly through convection, it suffers from heat stress. Conventionally, the temperature-humidity index is mainly used to assess heat stress in dairy production. Temperature humidity index (THI) is a simple method to assess and measure heat stress (HS). It works based on humidity and ambient temperature. High-producing dairy animals begin to experience HS at a THI of 65-68. As a comprehensive classification, the level of stress can be divided into light (68-71), moderate (72-79), severe (80-89), very severe (>90), and deadly (>100). Signs of heat stress include reduced rumination, increased CO₂ output, increased respiration and panting, decrease in growth, reduced feed intake, reduced milk production, decreased fertility, reduced carcass quality, increased sweating, and finally these all lead to higher mortality rate.

High milk yield and prolificacy of dairy animals require high metabolic activities to support. This causes high heat production in the body, which united with increasing surrounding temperature will result in heat stress. Animal activates a variety of endocrine, physiological and behavioral mechanisms to deal with heat stress. Usually, reduced feed intake is considered as the major factor towards negative energy balance leading to a decrease in milk production.

PHYSIOLOGICAL AND BEHAVIORAL MODIFICATIONS OF THE DAIRY ANIMALS DURING HEAT STRESS

Homoeothermic animals have a thermo-neutral zone where energy expenditure to maintain the body's normal temperature is minimum, constant, and not dependent on the surrounding temperature. Initial responses to heat stress include increased sweating, water intake, respiration rates, reduced heart rate, and feed intake. If heat load is increased, heat acclimation is achieved by processes of acclamatory homeostasis. But this acclimation may not remain homeostatic if heat stress is continued and by that time the animal will initiate homeostatic mechanisms to dispel incremental heat load and acclimatize to stress conditions. Increased heat dissipation, mainly through

evaporative heat loss, decreased feed intake and reduced milk yield and increased water intake are the characteristic signs of homeostatic responses in response to heat stress. When the hypothalamus sense temperature above the thermo-neutral zone, the heat loss mechanisms, such as sweating and vasodilatation gets activated. Heat-stressed animals consume less amount of feed and consequently ruminate less, and this results in decreased buffering agents entering the rumen. Also, the redistribution of blood flow to the periphery (in an attempt to enhance heat dissipation) and subsequent reduction in blood delivery to the gastrointestinal tract, thus disturbing the digestion process.

NUTRIENTS AND FEEDING MANAGEMENT

Nutritional management approaches for livestock during summer conditions are focused on using high-energy diets, micronutrients, feed additives, antioxidants, managing the proportion of roughage in the diet, and altering feeding time to reduce metabolic heat loads during the hotter hours of the day, etc.

WATER INTAKE

Ambient conditions, diet type, breed, weight, and various physiological and metabolic activities all influence the water requirements of animals. Many physiological activities, such as internal body temperature regulation, growth and development, lactation and reproductive functions, digestion and metabolism, protein, fat, and carbohydrate hydrolysis, ultimately influence daily water intake. DMI is linked to water intake, which is influenced by both feed intake and feed type. The quantity of water received by drinking, eating, and metabolic water, as well as the amount of water lost per unit time through respiration, sweating, faeces, urine, and breastfeeding, all influence water intake. Increased water consumption during the summer is owing to increased urine volume, respiratory tract evaporation, and evaporative heat loss, which is primarily due to sweating. However, an increase in water consumption could indicate ruminants trying to adjust for heat loads, especially in grazing areas that are not shaded. As a result, an appropriate water supply for the animals should be guaranteed during heat stress.

DIETARY FIBER

Heat-stressed animals have lower energy usage efficiency. This is due to the increased maintenance requirement associated with removing the extra heat load. Additional sources of heat output from dairy animals could come from digestion and metabolism. Diets high in fibre may increase heat output. Acetate metabolism (linked to a high fibre diet) generates more endogenous heat than propionate metabolism (related to a high concentrate diet). Ruminants fed low fibre diets (NDF 30 percent of DM) during hot

weather had higher daily milk production, lower body temperature, and lower respiratory rates than those on high fibre diets (NDF 42 percent of DM), according to research. Following that, intake has a significant impact on heat generation, and its significance in developing an effective nutritional and environmental management programme must be carefully considered in lactating dairy animals, reducing NDF from roughage reduced HS-related symptoms such as respiratory rate and rectal temperature, while improving DMI and milk production. Nutrient requirements change during HS in hot conditions, necessitating diet reformulation. In dairy animals, nutritional treatment may be able to recover a percentage of the milk production lost (35–50%) due to heat stress. If milk yield is to be maintained at a level comparable to that in thermo-neutral conditions, the fall in DMI and related efficiency of nutrition utilisation necessitates a high dietary nutrient density. Low metabolic heat increment diets for ruminants can help increase feed intake and performance under HS circumstances. Dietary fibre, on the other hand, is essential for normal rumen activity and supply. It is hypothesised that feeding slowly fermentable grains to dairy animals throughout the summer would lower the amount of heat emitted from fermentation and digestion, hence improving physiological responses to heat stress and increasing productivity.

High fermentable carbohydrate diets can be used under hot conditions to stimulate energy intake, but this positive effect must be balanced with the potential for rumen acidosis associated with high-grain diets. To avoid this disorder is important to maintain the optimal rumen function, with a level of ADF and NDF that should not be lower than 18% and 28% on the dry matter basis of the diet, respectively.

DIETARY PROTEIN

Many studies have shown that heat-stressed dairy animals have a negative nitrogen balance as a result of their reduced feed intake. The decrease in feed consumption can be offset by increasing the protein content of the diet, although this can result in an excess of nitrogen intake. During HS, feeding too much rumen degradable protein resulted in lower DMI and milk output.

The metabolic consumption of crude proteins increases endogenous heat output, which is larger than that of carbohydrate or fat. Urea production and higher protein turnover are both linked to a higher heat increment from crude proteins. Under heat-stress situations, the quality of the protein source should be addressed in addition to the amount of protein provided. Despite this, a diet high in rumen-undegradable proteins did not increase the performance of dairy animals under adverse climatic circumstances.

Essential amino acids in the diet may help to reduce the risk of HS. HS inhibits RNA transcription and translation, resulting in a decrease in milk protein production. For dairy animals, methionine is one of the most important limiting amino acids. Supplementing with methionine boosts milk production and antioxidant capability while also lowering lymphocyte apoptosis. During heat stress, lysine was also found to be beneficial.

In conclusion, if DMI is low during HS, it is vital to increase the amount of protein in the diet. However, given a diet with appropriate energy availability, it is crucial to feed rumen undegradable proteins or increase protein quality by increasing the level of essential amino acids (especially methionine and lysine). Despite these factors, more research into the effectiveness of dietary protein consumption is required.

DIETARY FAT

In dairy animals, a large reduction in feed intake under heat stress causes a negative energy balance, in which energy intake is insufficient to meet lactation requirements. To alleviate the energy deficit and minimise thermogenesis, the typical treatment for this problem is to supplement the diet with more fat (because fat generates less heat increment than dietary carbohydrate or protein).

In comparison to fibre or starch, fat supplementation enhances net energy intake in heat-stressed dairy animals due to its higher energy density and lower metabolic heat. Dairy animals fed diets supplemented with protected tallow used metabolizable energy more efficiently for lactation under thermo-neutral conditions than those not getting additional tallow. In a recent study, a supplement containing 3% unprotected fat was recommended for usage during the hot summer months. Higher circulatory NEFA concentrations were found in heat-stressed Holstein dairy cows fed a higher calorie diet, indicating a reduction in the energy deficit. As a result, milk yield increased dramatically from 28.5 to 30.4 kg/day, but milk fat content decreased. Unprotected fat supplementation is thought to have disrupted ruminal fermentation, lowering the ruminal acetate to propionate ratio and thus milk fat synthesis.

Ruminally-protected fats in the diet considerably reduce metabolic heat increment, improving lipids' role throughout the heat-stress phase. Under thermo-neutral conditions, the high-fat levels resulted in a noticeable decrease in heat output. Despite the lack of solid evidence about the benefits of fat supplementation, fats should be utilised with extreme caution in heat-stressed animal diets. Using treated fat, which bypasses the rumen environment intact and so does not affect rumen microbial growth, is clearly the best alternative.

More research is needed to examine different amounts and sources of fat supplementation throughout time.

DIETARY MICRONUTRIENTS

Micronutrients are little amounts of vital substances that life requires. Major minerals, micro/trace minerals, and vitamins are all included. Micronutrients assist animals to maintain their production, enhance their nutrient utilisation, effectively neutralize oxidant stress, and strengthen their weakened immune systems. Minerals are necessary for animals to maintain regular physiological activities. Heat stress responses, on the other hand, are applied to influence mineral loss through excretion in animals. As a result, adding mineral supplements to the diet (DCAD, Zinc, Chromium, Selenium, and so on) may help to mitigate the negative effects of thermal stress. Vitamins operate as cofactors for enzymes, act as catalysts in a variety of metabolic pathways, and are necessary for animal growth and development. Supplementing the feed of dairy animals with vitamins (Vitamin E, Niacin, etc.) may also help to alleviate the detrimental effects of heat stress.

The increased amount of dietary chlorine in feed is much more detrimental to dry matter intake during summer. A study shows that ingestion of CaCl_2 increases plasma chlorine concentration, which exceeds the bicarbonate buffering power capacity and produces metabolic acidosis, thereby appearing to suppress appetite in pigs. When animals, particularly dairy animals, are given diets with negative cation to anion balance (i.e. more anions than cations) or calcium chloride causes an acidifying effect, it is known as hyperchloremic metabolic acidosis.

Dietary cation-anion difference (DCAD), has been defined as milliequivalents of $(\text{Na} + \text{K}) - (\text{Cl} + \text{S})$ per kilogram of dry matter and has a direct impact on blood acid-base metabolism. Dietary cation-anion difference calculated using Na^+ , K^+ , and Cl^- concentrations, has a significant effect on health status and productivity by influencing acid-base balance. Serum total amino acid and essential amino acid concentrations and the ratio of essential amino acid to total amino acid were greater for high DCAD. These results suggest that increasing DCAD improves amino acid availability for protein synthesis that would otherwise be taken for the maintenance of acid-base balance. A positive Dietary cation-anion difference diet of +350 mEq/kg dry matter improved the immunity status and nutrient intake by ameliorating heat stress. Keeping the dietary cation-anion difference at a healthy lactating level remains a good strategy for reducing thermal stress during the warm summer months.

Zinc is an important micromineral, involved in productive performances like growth, immune system, and

reproduction, and involved in a wide range of metabolic activities. Zinc plays a critical role in anti-oxidant defense as an integral part of the superoxide dismutase (SOD), which is an essential enzyme. The deficiency of zinc has been reported to cause an increase in oxidative DNA damage and impair antioxidant functions. Zinc supplementation lessens the heat shock protein response and enhances immunity in heat-stressed peripheral blood mononuclear cells of periparturient dairy animals.

Chromium is another favorable micronutrient to defy the adverse effects of heat stress in animals. It acts as an excellent antioxidant that prevents heat-stress-induced lipid peroxidation. Chromium improves cortisol hormone activity and nutrient metabolism. It promotes insulin action in responsive tissues, thereby increasing farm animal productivity.

Selenium is an essential trace mineral that is an indispensable component of the antioxidant system. It decreases the adverse effects of heat stress on metabolism and redox balance, resulting in improved dairy animal health, immune function, and milk quality. Studies show that in heat-stressed animals, there is a significant reduction in plasma selenoprotein, diet supplementation with selenium can significantly raise plasma selenoprotein and selenium concentrations, which might be a potential mechanism to protect dairy animals from heat stress.

Vitamin E is an antioxidant that is essential for body functions like growth, immunity, tissue integrity, reproduction, and preventing oxidative stress. Elevated temperature and humidity in summer will lead to greater oxidative stress for animals, so feeding of additional vitamin E is required. Due to the potent antioxidant properties of tocopherols, the impact of α -tocopherol in the prevention of chronic diseases believed to be associated with oxidative stress has often been studied and beneficial effects have been observed.

Niacin has been reported to be a vitamin that resists the heat stress in dairy animals by increasing evaporative heat loss in vivo and cellular heat shock response by increasing gene expression of heat shock proteins during thermal stress in vitro. Niacin (vitamin B3) supplementation increases resistance to heat stress by inducing greater cutaneous vasodilatation and blood flow. A study conducted at NDRI showed that 800 ppm niacin supplementation to lactating crossbred cattle resulted in better heat stress alleviation.

FEED ADDITIVES

Fungal culture and plant extracts may have a beneficial effect on rumen metabolism and body temperature control. *Saccharomyces cerevisiae* was one of the most investigated fungus cultures. Live yeast supplementation may improve

nutrient digestion and feed efficiency while also regulating ruminal pH. In heat-stressed dairy animals, yeast supplementation resulted in improvements in DMI, feed efficiency, and lactation performance. Under HS, nutrient flow to the small intestine and dairy animal performance may be improved by feeding measures that boost digestive efficiency, such as live yeast supplementation. The addition of a mixture of exogenous enzymes and yeast culture to heat-stressed dairy animals lowered rectal temperature, implying a role for thermoregulatory functions. In certain studies, *Aspergillus oryzae* was found to reduce the rectal temperature of heat-stressed animals.

Daidzein was found to be a good promoter of antioxidant power in heat-stressed late lactation cows, owing to an increase in glutathione peroxidase plasma activity. When fed at 0.25 g/kg DM, extract from *Radix bupleuri* showed antipyretic effects in heat-stressed nursing dairy animals, lowering the rectal temperature, lowering the respiratory rate, and enhancing feed efficiency.

CONCLUSION

Because of the deleterious effects on ruminant performance, heat stress is becoming a serious problem. As global warming increases and genetic selection for milk yield continues, the detrimental effects of HS will become more severe in the future. In response to weather changes, heat-stressed animals adjust their metabolism and physiology. The direct and indirect effects of HS on gastrointestinal health and functionality have a significant impact on diet consumption efficiency. When nutritionists approach the development of diets for heat stress they should take into account changes in nutrient partitioning as well as changes in the rumen and intestinal functionality. Water availability and its temperature may represent a key tool to promote DMI and alleviate heat load subtracting heat from the body.

Continued advances in feeding are necessary as dairy animals are selected for high milk yield, but at the same time, are subject to a reduction of DMI because of environmental stress. Developing nutritional strategies which support milk yield but which also address metabolic and physiologic disturbances caused by HS will help the dairy animal to maintain a more normal metabolism which should promote performance.

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Impact of Gut Health Modulation on Dairy Cattle Productivity

Kaushalendra Kumar*, Pramod Kumar and R.R.K. Sinha

Introduction

For centuries, the digestive tract (GIT) was thought of as only capable of digesting and absorbing nutrients. The GIT, on the other hand, contains more immune cells and microbes than any other part of the body. As a result, it is widely accepted that ruminants with healthy digestive systems are more productive. Although recent research has shown that the gut works in tandem with the brain and other peripheral systems, it can adapt significantly in its environment (Spor et al., 2011). Among the body's host cells, immune cells and commensal bacteria populate the gut in greater numbers than any other. The gut's "second brain," or enteric nervous system (ENS), is responsible for a wide range of functions, including digestion and the response to infectious and noninfectious stressors. There are neurons all over the surface of the brain. It's widely accepted that animals with healthy digestive systems are more efficient at their jobs. Dairy cattle's health and productivity are built on the foundation of a healthy digestive system. High-producing dairy cows are susceptible to milk fever, fatty liver, displaced abomasum, and acidosis in their ruminant digestive tract. In addition, these illnesses can be attributed to a variety of factors, including a lack of nutrition, a sterile environment, and an ineffective breeding policy, or a combination of these factors. Intestinal disease is one of the most common reasons why a cow's milk production is impaired. As an alternative to antibiotics in feed, scientists should investigate the role of gut health in animals' well-being, performance, and nourishment.

Significance of gut function in animal health

Animal health and performance are greatly enhanced by the abundance of cells in the gut lining. A dairy farm's environmental and infectious stressors must be able to withstand the gut's ability to maintain homeostasis and function normally. In order for ruminants to be productive and healthy, their digestive systems must be in balance. This is achieved through a healthy microflora and a strong immune system. Gut health is dependent on all of these factors.

Digestive and absorptive efficiency of nutrients

Digestive tract functions include digestion and absorption as

well as barrier function, luminal nutrient sensing and host-microbial communication to work properly. Despite the difficulty of regulating these functions, they are all necessary for a healthy digestive tract. Since the digestive tract's lumen contains such a high concentration of microorganisms, mechanisms for preventing direct contact between the intestinal epithelium and the digesta's microbiota have been developed. In spite of this, the rumen epithelium lacks a mucosal layer. But a multilayer structure with tight junctions has been developed to overcome this problem (Graham and Simmons, 2005). In the hindgut, epithelial cells lack a multilayer structure, but mucus covers and firmly adheres to epithelial cells, making them resistant to bacterial colonisation.

Nutrients can only be absorbed and digested with a well-functioning digestive system. If the digestive system is damaged, it can have long-term effects on the health and productivity of the animal as well as the final product. Milk production and component yields in dairy heifers can be negatively impacted by diarrhoea (Heinrichs and Heinrichs, 2011). In order to absorb nutrients from food, the mucosa must have a wide surface area. Villi, which are folds in the gut lining, allow this to happen. Health and the growth of the villus structure have a direct correlation. Nutritional supplements that improve nutrient absorption may benefit the mucosa's health.

Maintenance of healthy and stable microbial community

Gut health is influenced by the natural microbial composition of the digestive tract. The rumen contains trillions of microorganisms, but bacteria and protozoa are the most prevalent. The development of the mucosal immune system and susceptibility to enteric infections in newborn ruminants both rely on the presence of host-specific microorganisms in the digestive tract. Since its conception, this microorganism community has been influenced by bacteria from the dam and the surrounding area (Fouhy et al., 2012; Rodriguez et al., 2015). To maintain a healthy digestive system, you need probiotic bacteria. Preventing the colonisation of pathogens in the gut, increasing digestive capacity and lowering pH, producing beneficial metabolites like short-chain fatty acids, and enhancing mucosal immunity and barrier function have all been demonstrated by commensal microbes (Uyeno et al.,

2015). Volatile fatty acid absorption is critical because it provides the vast majority of metabolisable energy and glucose for ruminants. As a result of the absorption of VFA, ruminal pH levels are maintained more consistently. However, all of these mechanisms are not mutually exclusive in maintaining a healthy digestive system.

Functional gastrointestinal lining

Gut epithelial cells act as a protective shield against pathogens, toxins and antigens in foods. When mucus forms on top of epithelial cells, only a small amount of food can pass through the gut wall (Turner, 2009). Goblet cells form a barrier between the luminal contents and the host by secreting goblet cells in the mucus layer, which also aids in the uptake of nutrients by goblet cells (Johansson et al., 2013). Fluids and macromolecules are prevented from passing through the epithelial cells of the gastrointestinal tract (Rescigno, 2011). The paracellular pathway, which is influenced by both infection and non-infection stressors, produces both tight and adherent junctions, which determine intestinal permeability. In addition to the gut microbiota, the GIT epithelial barrier is essential for gut and host health. Immune system and gut microbiota are separated by the epithelial barrier, which contains 70 percent of leukocyte and 80 percent of total IgA (mucosal antibody) secreting cells in the body that helps to maintain intestinal homeostasis by working with the gut microbiota.

Effective immunity

Lymphoid tissue (also known as gut-associated lymphoid tissue - GALT) is found in the digestive system, one of the body's most important immunity organs. Immune cells such as T and B lymphocytes, as well as macrophages and dendritic cells, commonly accumulate in the lamina propria beneath the gastrointestinal epithelium. GALT is formed and matures in the foetus as a result of exposure to microorganisms. A growing body of evidence shows that gut epithelial cells play an important role in mucosal defence and in maintaining the normal balance of the mucosa (Hooper, 2015). External or internal factors like stress, infection and dietary or environmental changes all contribute to the production of the body's mediators of inflammation.

Gastrointestinal health complexities

Dairy cow digestive health can be affected by a variety of factors, including infection and management practises. It's not just about mycotoxins, heat stress, and transportation. Gut, microbiota, and immune systems are affected by modern commercial conditions and environmental stressors during weaning. Diarrhoea after weaning is more common in these animals and they are more susceptible to illness and death. A

decrease in animal well-being and productivity is caused by toxins in animal feed. Toxins from mould found in animal feed exacerbate deficiencies in gut barrier function and immunity, as well as animal productivity. The diarrhoea or intestinal haemorrhaging, decreased fertility, and/or abortions that can result from the consumption of mycotoxins can be dangerous. Stress-induced immune suppression and weakening of the intestinal barrier can occur as a result of heat and transportation.

There are environmental and management stresses that can cause digestive problems in cows that produce milk or meat and reduce their ability to produce milk or meat. Gut health can be improved by a variety of dietary supplements. Better understanding of how these substances affect the body's physiology, as well as further exploration of possible synergistic effects among different substances, are required in order to develop more effective antibiotic alternatives.

Application of gut modulators and its significance

The common practise of feeding high grain diets to dairy cows can result in reversible rumen pH depressions or subacute ruminal acidosis (SARA), both of which are potentially harmful to the animal. The gastrointestinal health of sufferers is harmed by this disorder, which affects nutrient utilisation, absorption, and barrier capacity of the gastrointestinal epithelium, as well as the functions of the gastrointestinal microbiota, and causes inflammation, although the exact nature of these effects is not yet known. A thorough examination of the animal, diet, farm, and management aspects is therefore required for the diagnosis of SARA. The development of SARA can be prevented in a variety of ways, including balancing the intakes of coarse fibre and quickly degradable carbohydrates, primarily starch, and using a variety of feed supplements.

In order to improve gut health, livestock producers use more dietary compounds in monogastric animals than in ruminants. Many bioactive compounds, such as prebiotics, essential oils, organic acids, minerals, and more, can be incorporated into the food supply. Microorganisms that benefit the host are known as probiotics, or direct-fed microbes (DFMs). To prevent disease-causing pathogens from obtaining the nutrients they need, or to produce organic acids and bacteriocins when taken orally, which can influence the balance and activities of the gut microbiota (Krehbiel et al., 2003). Good bacteria can be increased by prebiotics like inulin and mannans such as fructooligosaccharides, galactasaccharides, and fructo-oligosaccharides (Uyeno et al., 2015).

Commercial products containing both probiotics and

prebiotics, known as symbiotics, can also be used to study synergistic benefits for the host. Essential oils improve the quality of animal food products by enhancing feed properties and reducing the growth of pathogenic bacteria. Organic acids are distinct from other organic compounds because of their low acidic content. SCFAs, which are organic acids produced by microbes in the digestive tract, have been extensively researched. In the hindgut, the primary source of energy is butyrate, which promotes barrier function, AMP synthesis and reduces inflammation and oxidative stress by promoting the production of AMP. By increasing the absorption and utilisation of intestinal immunoglobulin, bile acids, and glucose by minerals like zeolites, it is possible to reduce the incidence of endogenous diarrhoea (a high content of which in an intestinal fluid acts as an irritant factor). Antimicrobial peptides, or host defence peptides, are a part of the innate immune system's ability to combat pathogens (Robinson et al., 2015). Diarrhoea is reduced in post-weaning pigs and adolescent mice, indicating improved performance and intestinal barrier integrity (Xiao et al., 2015). Researchers should investigate whether a combination of disease prevention and control compounds in ruminant feed works.

Conclusions

Dairy cattle need a healthy digestive system to function properly an number of products available in the market which claims to improve gut health. The synergistic and additive effects of various compounds are currently being investigated. Dairy industries are fortunate because researchers are currently studying the effects of various combinations on gut health. An understanding of ruminant industry developments can be gained from the widespread use of monogastric animal nutrition technologies that have not been tested in this industry's development. When it comes to meeting consumer demands for environmentally friendly animal farming, non-antibiotic strategies must be implemented instead of relying on expensive antibiotics.

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Healthy Dairy Cattle

India's 2021-22 Soybean Output Seen Sharply Higher: SamAgr Survey

Ms. Prerana Desai, SamAgr

Soybean prices touched a record 10,000 /MT and meal prices touched all time high of 100,000/MT in 2020-21 soy season. The feed sector was in turmoil due to sheer non-availability of Soy meal. This resulted in industry asking for the permission to import soymeal. Looking at the prices and the non-availability, the government for the first time, allowed import of GM soymeal. By the time the notification came it was already time for the new crop harvest. This resulted in the prices collapsing by 50-60% for soybean as well as soymeal.

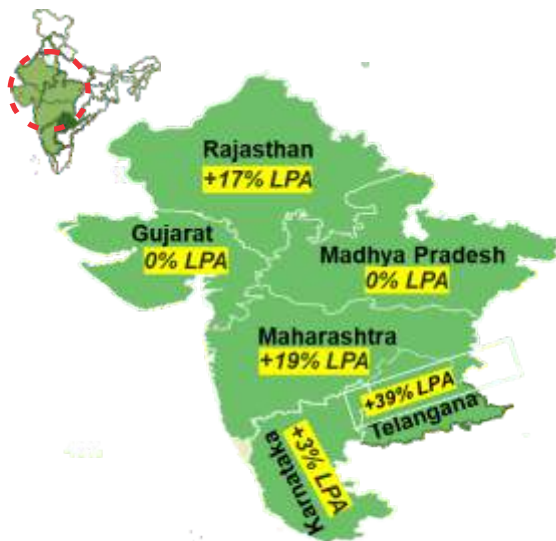
Even after the correction the bean prices remain at the record high levels for Q1 of any season. Considering this it is essential that there is a clarity on next season soybean crop.

Samunnati is India's largest agritech enterprise with small holder farmer at the heart of it. SamAgr is research division of Samunnati. SamAgr estimates overall soybean production at 110 lakh tones Vs 95 lakh tones last year which is higher by

16% on year. In first half of October, SamAgr research completed a detailed crop tour in three major soybean-producing states Madhya Pradesh, Maharashtra, and Rajasthan with 90% coverage of country's soybean acreage.

For the current year, country received normal rainfall. In 2021, Monsoon commenced timely and June rains remained higher by 10% than LPA, however, after a good start in June monsoon takes halts in July and August and rainfall remained lower by 7% & 23% than LPA. Again, from September, the southwest monsoon accelerated, and the country received 36% higher rains than LPA. All major soybean regions received normal and above-normal rains. After a good start monsoon takes a halt in July and August in In Madhya Pradesh, Gujarat, and Rajasthan. Heavy rains in Rajasthan and Telangana during September, resulted in yield loss.

Monsoon Performance:



Cumulative rainfall over soybean region

State	JUN	JUL	AUG	SEP	OCT**
Madhya Pradesh	36%	-10%	-20%	33%	101%
Maharashtra	31%	20%	-35%	94%	43%
Rajasthan	6%	-15%	-10%	175%	110%
Gujarat	-13%	-43%	-70%	271%	77%
Telangana	50%	58%	-14%	78%	-18%
Karnataka	-38%	55%	-21%	1%	52%
India	10%	-7%	-23%	36%	39%

Month wise/State wise rainfall variation Vs. Long period average

In the current season, Soybean acreage is estimated to grow by 1% on year and reached a historical high of 121.3 lakh ha. Soybean acreage from Maharashtra, Karnataka, Gujarat, and Telangana were estimated to increase as farmers preferred soybean over cotton following lucrative prices, while despite lucrative prices, soybean acreage plunges in top producer Madhya Pradesh and Rajasthan due to late arrival of monsoon and erratic rains resulted in lower sowing as compared to last year and diversion of the soybean area to other crops like Urad, Maize, and Paddy. Higher soybean seed prices and losses in soybean crop from the last two consecutive years further forced farmers to shift towards alternative crops. Soybean seed prices remained higher due to massive crop damage caused by unseasonal heavy rainfall last year and there was a very low stock of indigenous seed with farmers. This crop damage has increased prices in the market to record high. In Maharashtra, Gujarat Karnataka and

Telangana soybean acreage increased significantly as farmers preferred more remunerative soybean over cotton and jowar. In Gujarat, soybean acreage remained higher by 50% on year as farmers preferred more remunerative soybean over cotton, Groundnut, and paddy.

Soybean productivity is expected to increase by 15% on year over the low base of last year. Supportive weather, lower pest infestation, and increased share of long-duration high-yielding varieties are estimated to increase the overall yield of soybean in Madhya Pradesh, Maharashtra, and Gujarat. Last year soybean productivity declined significantly in Madhya Pradesh following an infestation of yellow mosaic virus (YMV) and heavy rains during harvesting. Productivity in Rajasthan. Karnataka and Telangana are estimated to decline following heavy rains during harvesting time (September and October months).

Soybean production Estimates

State	Acreage share	Acreage (lakh ha)		Acreage Var %	Yield (kg/ha)		Yield Var %	Production (lakh tones)		Production Var %
		2020-21	2021-22 (P)		2020-21	2021-22 (P)		2020-21	2021-22 (P)	
Madhya Pradesh	46%	58.5	55.8	-5%	610	801	31%	35.7	44.7	26%
Maharashtra	38%	42.6	46.0	8%	990	1050	6%	42.1	48.3	14%
Rajasthan	10%	10.7	10.5	-2%	810	780	-4%	8.6	8.2	-6%
Karnataka	3%	3.3	3.8	15%	890	801	-10%	2.9	3.0	5%
Gujarat	2%	1.5	2.2	50%	1100	1170	6%	1.6	2.6	56%
Telangana	2%	1.6	1.7	10%	1250	1200	-4%	2.0	2.1	6%
India	100%	120.0	121.3	1%	789	906	15%	94.6	109.9	16%

State-wise details:

Madhya Pradesh

SamAgr estimates overall soybean production for Madhya Pradesh at 44.7 lakh tones Vs 35.6 lakh tones last year, which is higher by 25% on year. This is because of lower base last year.

Soybean acreage is estimated to decline by 5% on year from state as farmers shifted towards Urad and Paddy following erratic rains, higher seed prices, and losses in Soybean crop during two consecutive years.

Farmers from Ujjain, Agar Malwa, Vidisha, Dhar, Neemuch, Ratlam, Rajgarh, Ashok Nagar, Bhopal and Betul shifted towards Urad and Paddy.

During sowing time soybean seed prices were reported at

State	Acreage share	Acreage Var %	Yield Var %	Production Var %
Ujjain	8%	-3%	35%	32%
Shajapur	5%	3%	38%	41%
Agar Malwa	5%	-8%	41%	33%
Vidisha	8%	-13%	36%	23%
Mandesar	5%	0%	27%	27%
Indore	5%	0%	30%	30%
Dewas	5%	-1%	22%	21%
Dhar	6%	-5%	45%	40%
Neemuch	5%	-11%	34%	23%
Ratlam	4%	-7%	26%	19%
Rajgarh	6%	-7%	22%	15%
Ashok nagar	4%	-8%	29%	21%
Bhopal	4%	-4%	32%	28%
Betul	2%	-3%	30%	27%
Chindwada	2%	-2%	27%	25%
All MP	76%	-5%	31%	26%

Rs 10,-12000/Qtl compared last year's prices of Rs 4000-5000/Qtl. Soybean productivity is expected to increase by 31% on a year over the low base of last year. Supportive weather, lower pest infestation and increased share of long-duration high-yielding varieties supported overall yield in Madhya Pradesh. Average sowing time for soybean in Madhya Pradesh was reported on 26th June (The last week of June). Share of long-duration high yielding soybean varieties such as JS 2069 and JS 2029 (100-120 days) increased in Madhya Pradesh especially in Agar Malwa, Vidisha, Dhar, Neemuch, Ratlam and Ramgarh districts. Last year soybean productivity declined significantly following infestation of (YMV) Yellow mosaic virus and heavy rains during harvesting, for current year pest infestation reported minimal. Almost 85% harvesting completed from region.

Maharashtra:

For Maharashtra SamAgr estimates overall soybean production at 48.3 lakh tones Vs 42.1 lakh tones last year, which is higher by 15% on year.

Soybean acreage from Maharashtra estimated to increase by 8% on year as farmers preferred soybean over cotton following lucrative prices, especially in Amravati, Akola, Yavatmal, Buldhana, Hingoli, Jalna, Latur, Nanded, Osmanabad, Parbhani, Wardha, and Washim district. With soybean giving better rates and profits than other Kharif crops, farmers in the Maharashtra are bringing more and more land under soybean cultivation.

State	Acreage share	Acreage Var %	Yield Var %	Production Var %
Akola	6%	1%	2%	3%
Amravati	7%	8%	31%	39%
Aurangabad	5%	9%	0%	9%
Beed	4%	2%	-17%	-15%
Buldhana	4%	11%	22%	33%
Hingoli	8%	3%	-6%	-3%
Jalna	5%	8%	-5%	4%
Latur	6%	5%	3%	8%
Nanded	7%	6%	3%	9%
Osmanabad	4%	9%	-13%	-4%
Parbhani	4%	21%	7%	28%
Wardha	4%	20%	53%	74%
Washim	8%	1%	-10%	-9%
Yavatmal	2%	10%	10%	20%
Maharashtra	74%	8%	6%	15%

Soybean productivity in Maharashtra is expected to increase by 6% on year following supportive weather. Early arrival of monsoon and well- distributed rainfall in the main growing

regions of Maharashtra have increased overall soybean productivity from state.

Average sowing time for soybean in Maharashtra was reported on 30th June (Last week of June). Lower pest infestation and increased share of long-duration high-yielding varieties further supported the yield of soybean. Currently, the crop is in harvesting stage and almost 70% harvesting is completed from the region.

Rajasthan:

SamAgr estimates overall soybean production for Rajasthan at 8.16 lakh tones Vs 8.64 lakh tones last year, which is lower by 6% on year.

In Rajasthan, soybean acreage estimated to decline by 2% on year. Higher seed prices and losses in Soybean crop during two consecutive years forced farmers to shift towards Urad, maize and Paddy especially in Baran, Bundi and Kota districts.

State	Acreage share	Acreage Var %	Yield Var %	Production Var %
Baran	25%	-7%	-18%	-24%
Kota	15%	-6%	-7%	-13%
Jhalawad	22%	1%	8%	9%
Bundi	4%	-6%	-17%	-23%
Chittor	9%	7%	12%	19%
Pratapgarh	8%	2%	16%	18%
Rajasthan	83%	-2%	-4%	-6%

Late arrival of monsoon and erratic rains further forced farmers to shift towards other crops. During sowing time soybean seed prices were reported at Rs 9,000-10000/Qtl from last year's average seed prices of Rs 3500-4500/Qtl. Soybean productivity in Rajasthan is expected to decline by 4% on year due to heavy rains during September month. Soybean productivity estimated to decline in Baran, Kota, and Bundi districts while it is expected to increase from Chittorgarh, Pratapgarh and Jhalawar districts. Currently, crop is in harvesting stage and almost 75% of harvesting is completed from the region.

Harvesting status:

Currently, crops in the harvesting stage and almost 90% of harvesting is completed from the region. (Madhya Pradesh 95%, Rajasthan 85%, Maharashtra (80%), Gujarat (90%) and Telangana (90%). Soybean arrivals in most of the mandis

already started. Till 25th October as per market sources, all India soybean arrivals reported at 10.2 lakh bags.

Cost of Production and Realization

For current year soybean farmers realization of own land are positive for all states following a significant rise in prices. Sharp rise in soybean yield and prices have turned realization positive for Madhya Pradesh, Maharashtra, and Rajasthan. Last year realization remained negative following lower yield and prices for Madhya Pradesh. On year cost of production increased following an increase in seed prices (80% higher

than last year) and machine labor following increasing diesel prices.

Arrivals:

Historically, over 70% of arrivals of soybean come in the market from September to January months, however, for the current season arrivals could be delayed following rains during September and October months. In the coming weeks, soybean arrivals are expected to increase as farmers sell their produce before Diwali.

Pictorials:



Standing soybean crop in Vidisha



Arrivals started improving in Kota Mandi



Drying is ongoing to lower down higher moisture

Practical Points for Safe Storage of Feed Ingredients and Finished Feeds in Commercial Goat Farms

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Introduction

Goat production is an important sector of the agro-economy in India and Indian subcontinent. Low capital investment and higher economic returns are the unique features of small and marginal goat production systems (Devendra, 2013). India is endowed with 34 recognized goat breeds (ICAR-NBAGR) with the population of 148.88 million ranking second largest livestock population next to cattle (20th Livestock Census, 2019). Though the total livestock population in India showed only 4.6% increase over 19th Livestock Census (535.78 vs. 512.06 million), the goat population has increased to the tune of 10.14% (148.88 vs. 135.17 million), indicating better future of goat farming in India. The status of goat farming is shifting gradually from poor man's cow to preferred livestock species and traditional goat rearing to a fast growing livestock industry in the country (Ramachandran et al. 2019).

The increased demand of animal products (milk and meat) with health promoting attributes is leading to a gradual shift from small and extensive goat production system for livelihood and nutritional security to the medium and large with semi-intensive and intensive system of rearing on commercial scale. Therefore, the importance of cultivating and /or procuring feed and fodders (dry/green) and its storage in goat farms maintained entirely on intensive stall feeding system is paramount important for round the year feeding with minimal wastage. All types of raw ingredients, as well as complete feeds require special care during storage to prevent deterioration in quality, and loss which is critical to maintain the health and safety of farm animals. Feed spoils during storage either quickly or slowly depends partly on its initial quality but very largely on storage conditions. The environmental factors like moisture, temperature, light, and oxygen influence deteriorative changes and in turn nutrient losses in feedstuffs. These factors affect the feedstuffs either directly or by influencing the rate of development of insects and fungi, which damage/destroy the feed during storage. The following points/steps evolved after finding out solutions for problems faced at organized farms on feed storage.

Steps for successful long time feed storage:

Arrangement inside the store room

- First and most important step is: Always use concentrate feed bags on "FIRST IN FIRST OUT" basis. For this if possible, there should be two doors in store room so as to be able to rotate stock on a "FIRST IN FIRST OUT".
- Store concentrates feed bags' in a building which is dry, leak and moisture proof as possible.
- There should be minimum numbers of window's in the storage building and it is very important to fix windows with iron mesh to protect store room from entry of birds, rats, squirrels and tree leaves.
- Ventilation openings are necessary to have the fresh air and light to reduce the internal temperature in store room. It should under the overhang of the roof so that the rain water does not enter inside the store room. The wire mesh should be strong enough to resist the rusting and damage by rats.
- There should not be any gap between roofing materials and walls. The temporary floor may comprise of two layers of dry bricks laid on well consolidated earth or after making of concrete floor.
- Do not place feed bags directly to concrete or soil surface. Stack the feed bags on wooden or iron plank of about 150 mm (5.906") above the concrete floor. Using of wooden planks to store feed bags is good because plank made of iron would be rusted in rainy season and react with feed, which is harmful for feed bags.

Placing of storage bags

- Feed bags should not be stacked close to the walls inside the store room. Maintain a space of 600 mm (2 feet) all around the store room walls as well as between the stacks. If the store room is extra large in size, there should be space of half to one meter between the exterior walls and the stacks.
- Stack the feed bags in such a manner so as to facilitate

their removal and use in the order in which they are received.

- Make sure the concentrate feed bags are not stored upright or on their sides, but laid flat with their broad sides down.
- Different types of raw ingredients and concentrate feed (mash, kid pellet, adult pellet, compound feed) must be stacked store in separate lots and for better stock controls.
- Vertically stack the concentrate feed bags tightly close to each other to reduce circulation of air and to deduct the moisture in feed bags.
- Height of stack should not be more than 10 to 12 bags for easy handling by labors. Plastic bags in stacks have tendency to slide, whereas, jute bags bind together better which can be stacked up to 15 bags.
- The gap between two stacks should be sufficient enough to move around by staffs or wheel barrows.
- Label each stack showing date of receipt of concentrate feed bags to use them in proper order.
- Concentrate feed left in torn or opened bags should really be used first, but ideally they should be re-bagged in plastic bags or heavy duty garbage bags and the mouths sealed securely with string or tie with rope.

Rodent control

- Use pesticides in store room like B.H.C (Benzene hexachloride), DDT (DichloroDipenyl-Trichloroethane), gammexane powder etc, one time in a month for killing insects. Precautions should be taken while placing some rat-kill in store room, rather rat catching tool shall be placed to avoid contamination of feed leading to poisoning in goats.
- If concentrate feed become moisturized for any reason, dry it in direct sun light and clean it by using sieve before taking back it to storeroom in bags. It would be better to use them quickly in farm.
- The roof of store room should be sloppy (its recommended for medium to heavy rainfall areas), made of R.C.C, cemented sheets, galvanized iron sheets, plastic fiber sheets or any kind of weather proof roof to prevent rain water entry. The roof should have overhang of

minimum 1 meter from side walls at eave or the ending of roofing should be covered with PVC pipes/GI sheet covering for rainwater collection and storage.

- During the rainy season, the stack shall be completely covered with water proofing membrane like thick polythene sheets to prevent moisture.
- Rotate the bags on every four months from upside down.
- In order to guarantee good storage conditions and longevity, the maintenance of storage room buildings must be monitored permanently and any necessary upkeep done promptly, if needed.
- Do not store bags for long time.
- The minor routine upkeep of feed store may consist of:
 - Roof repair (re-setting roofing material that may have been displaced, replacing hooks, filling holes or cracks, replacing defective roofing, etc.).
 - Repair of the stucco (plaster) and paint on the walls.
 - Repair of the door-frames.
 - Cleaning and repair of the ventilation systems.
 - Upkeep of the flooring.

For dry fodder storage, the store should be large enough in such a way that chaffed dry fodder store can accommodate round the year bhusa requirement. Approximately, 80 × 40 × 30 feet (L × W × H) is required to hold 500-600 quintals bhusa in a year. The floor should be concrete one; overhang of roof should be minimum 1 m on both sides of a double sloped roof. The minimum 40 feet width and 30 feet height are required for allowing the truck inside the store room along with bhusa for quick emptying and could be saving manpower. The front side from top should be covered in such a way that rain water entry is prevented and in no case, goats should enter in bhusa store as it may contaminate with dung pellets/urine. In southern India, the groundnut hay is stored tightly in open sky in heaps in dome shape and used round the year for feeding which is the most common dry fodder for goats used without chaffing.

Literatures cited: Available on request.

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Why are Your Fishes not Growing Fast?

The Possible Causes and Remedies

Siddhartha Shankar Sahoo¹ and Sujata Sahoo^{1*}

Many farmers have been complaining of their fish not growing properly. Some farmers may get discouraged and assume that poor fish growth to many things, not knowing that there are essential things they are not doing right. Many cases of poor fish growth are due to the neglect of the fundamental principle for profitable fish farming. If you don't carry out the correct practice methods, you invite poor growth, mortality and general investment loss in your fish farming business.

Poor water quality

Good water guarantees a high growth rate of fish. This is because dissolved oxygen is adequate, carbon dioxide is low, pH is normal, dissolved nutrients are present at required concentrations. Here we will discuss about water quality parameters that matter most to fish health and look at best practices for adjusting these levels. Table 1 provides an optimum level of water quality parameters listed by importance, along with recommended measurement frequency and measurement procedures.

Table 1. Optimum water quality parameters for aquaculture

Parameter	Optimum value
Dissolved oxygen	> 4.0 mg/l
Temperature	Depends on species
pH	7.5 – 8.5
Salinity	Freshwater: < 0.5 ppt Brackish water: 0.5 – 30 ppt Saltwater: 30 – 40 ppt Optimum: 15 – 25 ppt
Ammonia (NH ₄ ⁺ /NH ₄ -N)	0 – 0.5 ppm
Conductivity	Freshwater: 30 – 5000 µSiemens/cm Saltwater: 50000–60000 µSiemens/cm
Nitrite (NO ₂ ⁻)	< 1 ppm
Alkalinity	50 – 300 ppm
Phosphorus (P)	< 0.5 mg/l
Nitrate (NO ₃ ⁻)	< 100 mg/l
Total hardness	40 – 400 ppm
Redox Potential	+125 to –200 mV
Hydrogen sulfide (H ₂ S)	0 ppm
Carbon dioxide (CO ₂)	< 10 ppm
Biological oxygen demand (BOD)	< 50 mg/l
Turbidity or Total dissolved solids (TDS)	Depends on site of pond

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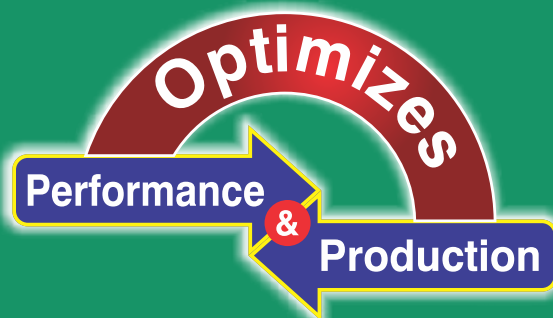
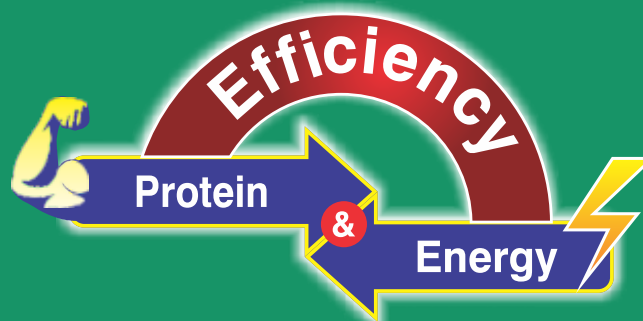
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Dissolved oxygen

Dissolved oxygen is one of the essential parameters in aquaculture. Maintaining optimum levels of DO in the water is essential for fish growth since oxygen directly affects feed intake, disease resistance and metabolism of fish. A sub-optimal level of DO (≤ 3 ppm) is very stressful for fish and shrimp resulting slower growth and reduced immune response and levels below 1 ppm can be lethal. Therefore, it is vital to keep dissolved oxygen levels in aquaculture systems above 4ppm. The DO level of ponds fluctuates throughout the day due to phytoplankton photosynthesis and respiration. Managing the equilibrium of photosynthesis and respiration, and algae growth is an essential task in daily work. Maximum DO occurs in the late afternoon due to the production of oxygen during the day through photosynthesis. Phytoplankton (micro algae) usually consumes the most O₂ and since photosynthesis does not occur during the night, DO levels decline. Algal blooms crash causes critically low DO. The bacterial decomposition of the dead algae cells consumes a lot of oxygen. DO level in water increases as temperature goes down and decreases when salinity increases. Oxygen demand is higher when feeding the fish and shrimp due to increased energy expenditure. Hence to increase the DO, several measures can be taken.

1. Aerators are operated during the night time when dissolved oxygen falls below 4ppm
2. Flush out decaying plankton via water exchange when plankton crash occurs and provide additional aerators for more time.
3. Reduce the feeding rates
4. Circulate the pond water to avoid temperature differences
5. Partial water exchange (in addition to aeration) to improve low DO level.

Temperature

Pond water temperature can affect fish and shrimp metabolism, feeding behaviour and the degree of ammonia toxicity. Temperature also directly impacts biota respiration (O₂ consumption) rates and influences the solubility of O₂ (warmer water holds less O₂ than cooler water). Temperature cannot be controlled in pond. Fish can modify their body temperature according to the environment and are very sensitive to rapid temperature fluctuations. For each species, there is an optimal range of temperature conditions. It is therefore essential to acclimatise fish and shrimp during transferring them from tank to pond. Every 10 °C rise in

temperature doubles the rate of metabolism, chemical reaction and oxygen consumption.

Pond water pH

pH value informs about acidity or alkalinity of the water. An optimal pH level for aquaculture system is 7.5 – 8.5. Maintaining a stable pH at a safe range because it affects fish and shrimp's metabolism and other physiological processes. Values outside that range can create stress, enhance susceptibility to disease and cause poor growth and even death. Signs of sub-optimal pH in pond:

- High mucus on the gill surfaces of fish
- Unusual swimming behaviour
- Fin damage
- Harms the eye lens
- Less plankton growth

Variables affecting pH

At higher temperatures, fish and shrimp are even more easily affected by pH fluctuations. The CO₂ level also affects pH. Increasing CO₂ reduces the pH value. As phytoplankton consumes CO₂ for photosynthesis, the pH will increase throughout day. Lowest pH is observed at sunrise (due to respiration and CO₂ release during the night) and highest in the afternoon when phytoplanktons utilize maximum CO₂. Waters with moderate alkalinity have high buffer capacity, hence shows lesser pH variation. pH readings should be taken daily. The pH level will be influenced by the time of the day the sample is taken due to fluctuations in the CO₂ level in water. Therefore, pH should be measured before sunrise for the minimum value and in the afternoon for maximum value. A sudden decrease of more than 0.5 in pH indicates that the water in the tank should be partially changed. To increase pH, liming is done and to decrease pH sodium bicarbonate or gypsum is added.

Salinity

Salinity is represented by the total concentration of dissolved inorganic salts or ions in water. It plays a significant role in the growth of cultured organisms through osmoregulation of essential minerals according to the surrounding water. An optimum salinity range should be maintained for better survival and growth. Higher salinity causes water loss in fish and shrimp. Younger shrimp usually tolerate wider salinity fluctuation than adults. Drastic salinity changes may alter the phytoplankton fauna and their population densities and lead to instability of the ecosystem. It is recommended to measure

salinity regularly. Salinity is measured by a conductivity meter and is expressed in mg/l or ppm.

Ammonia

Ammonia has a great impact on fish and shrimp production. It causes stress, gill damage and low growth at high concentration. Toxic ammonia comes from excretory products of shrimp and fish and unconsumed feed. High level observed mostly in summer when feeding rates, water temperature and pH are higher and when algae population is less. Death of shrimp and fish occurs at concentration more than 2.0 mg/l. Ammonia level should be kept below 0.5 ppm. Ammonia accumulation can be prevented through optimum feeding rates, maintaining healthy algae blooms and water exchange. Ammonia in water exists in two forms, ammonium ions (NH_4^+) which is nontoxic, and un-ionized toxic ammonia (NH_3) and their proportion depends on pH and water temperature. High pH and temperature leads to increase in the concentration of the toxic un-ionized form. Adding both the ionized and un-ionized form gives total ammonia nitrogen (TAN). The ammonia concentration in the water can also be measured using proper test kits or can be calculated from TAN, temperature and pH.

How-to reduce ammonia in ponds

1. Reduce or stop feeding since high feeding rates creates eutrophic conditions Characterized by substantial phytoplankton blooms
2. Water exchange
3. Pond aeration since low oxygen concentrations increases the toxicity of ammonia.
4. Fertilize the pond with carbon sources such as molasses, flour, starch, etc., to increase the carbon-nitrogen (C: N) ratio.

Nitrite

Nitrite (NO_2^-) is another form of the nitrogenous compound that results from feeding and can be toxic to shrimp and fish. Nitrite is an intermediate product of bacterial nitrification (ammonia into nitrate) and denitrification (nitrate into nitrogen gas). The nitrites are absorbed from the gut and bind to hemoglobin and reduce its oxygen carrying capacity.

Note: An increase in CO_2 decreases the pH to a value below 6.5, which can leads to nitrite toxicity through nitrous acid (HNO_2) formation. Nitrite concentration should be checked regularly. The nitrite test kit is available in market for measuring nitrite ions in water. Nitrites are injurious or lethal to many fish and shrimp at 2 ppm (mg/l) and above.

Alkalinity and hardness

Alkalinity gives buffering capacity to water and it represents the carbonates and bicarbonates amount. Hardness refers to the concentration of divalent cations like calcium and magnesium in water and can be measured by standard kits available in market. Alkalinity affects primary productivity and also the pH of water. Optimum range of hardness and alkalinity for aquaculture is 50 - 300 ppm CaCO_3 , which provide an excellent stabilizing effect to pH fluctuations. Values of 50 - 100 mg/l are generally considered moderate for freshwater farming. For shrimp farming system, alkalinity values are recommended to be above 100 mg/l. Total alkalinity has been traditionally expressed as milligrams per litre (ppm) of equivalent calcium carbonate (CaCO_3). Generally, alkalinity varies from site to site. In seawater, alkalinity usually is higher than 100 ppm, but in freshwater areas, alkalinity is often low, particularly during the rainy season. Low alkalinity in freshwater or low salinity areas will affect the survival rate and moulting of shrimp.

2. Poor Quality of feeds and Underfeeding

Adulterated, unbalanced or substandard feeds lead to poor growth of fish or even death. It is necessary to buy your feeds from an accredited and reliable dealer. If you produce your own feeds, use high-quality ingredients from reliable suppliers or dealers and use the correct feed formula for the specific age of your fish. Faster growth rate of fish can be achieved by feeding the required amount of high quality feeds.

3. Poor quality of fish seed

Poor quality fries, fingerlings, or juveniles do not grow well. This may be the result of poor health condition of the fish seed or the poor genetic ability of the fish. Some fish species show genetically superior growth rate compared to others. This may be due to high feed conversion and disease resistance characteristics of fish. The growth rate of fish can be improved through selective breeding. Some fishes also have poor health conditions or lack resistance against some diseases. This could be because of the broodstock selected to produce the fish seeds or some hatchery error. In all, avoid poor quality fish seeds when stocking your ponds to avoid high fish mortality or (and) poor growth.

4. Overstocking your fish pond

What will be the living conditions when 100 persons are packed into a small room? It's going to be scary. That's how fishes react when you overstock them. An overpopulated fish pond is usually associated with a poor fish growth. This is because of the high competition for food, available oxygen,

and space. Make sure to stock the fishes at the optimum density required for adequate growth and development. Stocking capacity is dependent on management practice. 5000 fishes/ha for extensive system, 10000 - 15000 fish/ha for semi-intensive system and 10-50 fingerlings/m² for an intensive system.

5. Sex of the fish (for catfish and tilapia culture)

Most female fishes of catfish and tilapia convert most of their energy (consumed feed) to egg production and not flesh accumulation. Therefore, this makes them smaller compared to their male counterparts. Hence stocking of only male fishes of these species can guarantee a higher growth rate and flesh accumulation.

6. Fishes not being in good health

Fish with poor health conditions are usually associated with a poor growth rate. Poor health may result from nutritional deficiency, poor water quality, overcrowding, and handling stress.

What should you do to increase growth and prevent losses?

1. Identify the cause of poor growth by going through the points stated above. Any problem can be corrected except poor quality fish seed. Feeds can be improved and given in proper ration. If the water condition is poor, proper management practices should be followed and reduce fish density if you overstocked.
2. Never sell your stock before three months, except when they are raised for such market. This is because some fish species grow slowly initially and pick up after the third month.
3. Feed them with the suitable feed and the right size at the correct number of times.
4. When there is no significant improvement in your fish growth after four months, please sell them out. The more you keep such fishes, the more you lose. Don't ever forget that bad does not convert well no matter how they are fed.

¹ICAR- Central Institute of Fisheries Education, Mumbai

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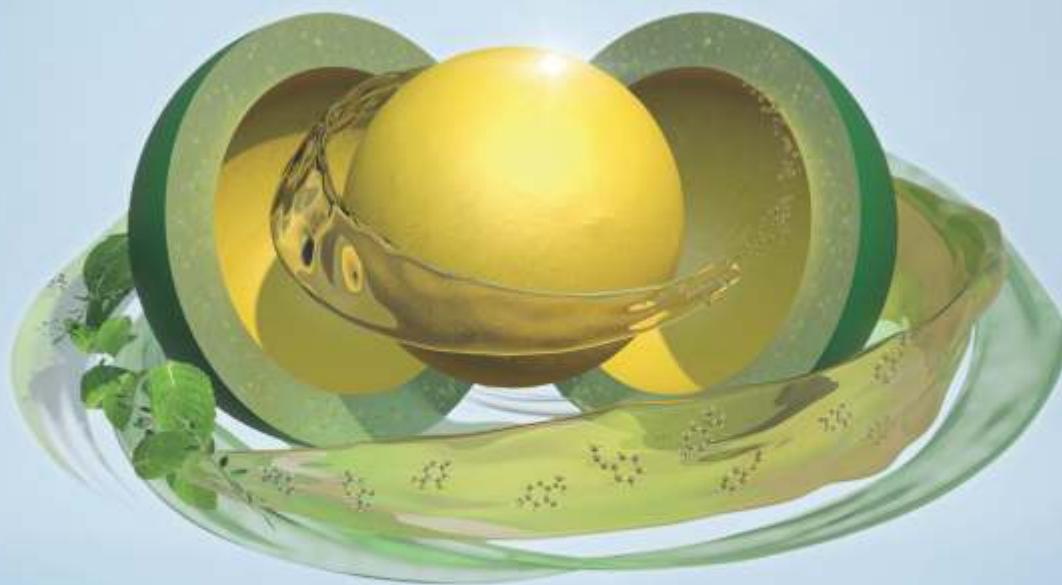
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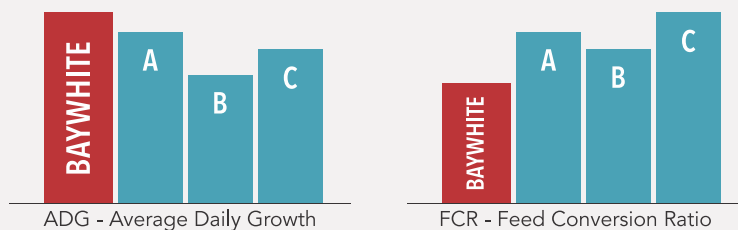
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