Livestock & Feed Trends

VOLUME - 17 • NUMBER - 4 • JAN. - MAR. 2020

Animal Protein Industry after COVID19 Pandemic

Godrej agrovet
brighter farming

बोविनो

प्रीमियम कैटल फीड्स

शारिरीक विकास • दूध • सेहत • प्रजनन

के लिए सहायता करता है.

बोविनो

काफ स्टार्टर

3 रे सप्ताह से 6 महीने की उम्र तक

- निरंतर विकास
- सेहत

बोविनो

काफ ग्रोअर

6 महिनों से गर्भधारणा तक

- निरंतर विकास
- सेहत
- प्रजनन अंगों का विकास

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हीफर फीड

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- भ्रूण का विकास
- थनों का विकास
- प्रसव के बाद दूध के उत्पादन में सुधार

बोविनो

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From the Chairman's Desk.....

Dear Friends,

Greetings!

This will be the last quarterly issue of the year 2019-20 of the Livestock and Feed Trends Magazine. We will come up with quarterly LFT issue for the period April to June'20 (year 2020-21) after we resume our office soon.

CLFMA had started its New Year with full of activities some of them as listed below. Just a brief overview of the CLFMA activities for the quarter Jan to March 20:

CLFMA representation on feed situation was made for the release of Wheat and Rice Stocks for Livestock Feed Industry, in this connection, Joint Secretary (NLM) Shri. O. P. Chaudhary asked for clarification on the same from CLFMA Office. After getting the same clarified from CLFMA, the representation as well as clarification is pending at PMO Office for further action. Then Myself along with Mr. Suresh Deora, President – West Zone had a meeting with Shri. Dr. O. P. Chaudhary, JS (NLM) for further follow up.

CLFMA had meeting with Krishi Bhavan and requested Shri. Ashok Kumar, Assistant Director General (Animal Health), Indian Council of Agricultural Research, New Delhi and Dr. Rajan Gupta, Principal Scientist (Animal Nutrition), Government of India, Krishi Bhavan, to help for expediting the approval of the combined 5th Feed Additive List. We also requested the same to Shri. G. N. Singh, Joint Secretary-Trade and Dr. Gagan Garg, Assistant Commissioner (SR&MP). They had promised that the list is already in the scrutiny and the list will be approved after the same is approved by other respective government departments.

We had a meeting with Smt. Rajni Sekhri Sibal, Secretary, Dept of Fisheries, Ministry of Fisheries, AH & D. We had discussed in detail about the multiple regulation issue of Fish Feed intended to be regulated by Andhra Pradesh State and Coastal Aquaculture Authority (CAA).

We met Dr. Praveen Malik, Animal Husbandry Commissioner, Krishi Bhawan and congratulated him for his new endeavour as AHD, Commissioner

We had a meeting with Dr. P. Rajesh, Joint Director, BIS & Dr. Amit Sharma, Director (Imports), Food Safety and Standards Authority of India, Government of India, New Delhi. They had conveyed that the decision of whether the feed is regulated by FSSAI or BIS will be decided after the joint meeting with BIS, FSSAI & AH& D.

In view of the critical raw material situation of animal feeds viz. Corn, Soya, DDGS Imports, GM and Non-GM Imports of Corn & Soya was discussed in detail and it was agreed to convene a meeting at Coimbatore on February 11, 2020. In this connection, CLFMA sent invitations to all the Poultry Associations for the Meeting.The main agenda discussed was the raw material situation of Maize and Soyabean in India.

CLFMA Members along with Dy. Chairman Mr. Neeraj Kumar Srivastava and Mr. Divya Kumar Gulati, Secretary and other Association representative also attended the Meeting at Coimbatore on "Livestock Industry Feed Situation" dated 11th February 2020. Agenda of the Meeting was to discuss Present Raw Material situation of Maize and Soyabean in India and the meeting was attended by most of the poultry associations from India.

A Press Interview was mobilized for the Chairman with Bloomberg to discuss the present feed situation in India.

BIS Invited CLFMA of India to participate in the workshop on Revisiting Compounded Cattle Feed Specifications & workshop on Feed Ingredient Standards held on 11th February, 2020 at NDRI, Karnal. On behalf of CLFMA, Mr. Suresh Deora, President – West Zone, CLFMA, Dr. R.S. Masali, GM- Nutrition, Godrej Agrovet Ltd, Mr. Mandeep Singh, MD, Tiwana Feeds and Dr. Prashant Shinde,

Commercial Director – Feed & Nutrition, Cargill and Mr. Manish Sharma, GM, PDFA attended the Meeting.

CLFMA circulated four Draft Amendments received from BIS authorities related to Livestock Sector to all CLFMA Members for getting comments from them on or before Feb 21, 2020, the comments received has been forwarded to BIS for action.

4th & 5th March 2020 CLFMA Chairman Mr. S. V. Bhave, Mr. Suresh Deora, President- West Zone visited Krishi Bhavan for follow up of 5th Feed Additives List. They approached the concerned government authorities to include a few more products in the 5th Feed additive List. As per their instructions, the said list was segregated by separating the Antibiotic and Anticoccidials products from the combined list and two lists has been submitted to the concerned government authorities for their approval and hence the delay for getting the approval of the combined 5th Feed Additive List.

On 5th March CLFMA sent a letter to Shri. Dr. O. P. Chaudhary, JS (NLM), Dept. of Animal Husbandry & Dairying, GOI requesting for an additional discussion on proposed Feed Act.

CLFMA after Covid 19 pandemic took following necessary steps for survival of Livestock Industry:

After Indian poultry sales have been plunging on rumours spread by social media claiming that, chicken consumption is linked to the spread of coronavirus, CLFMA sent a note that the Association is very much concerned about the poultry industry and strongly opposes this false propaganda of relating the spread of Corona Virus with the consumption of Chicken.

Top poultry companies in the country said, sales of chicken and eggs have halved over the last few weeks, driven down largely by rumours that linked them to the coronavirus infection.

After that CLFMA Technical Committee head and Poultry Expert, Dr. Ajit Ranade has released a paper in the press stating that there is no connection between the Covid-19 virus spread and chicken consumption. CLFMA circulated the paper released by Dr.Ranade which strongly opposed the false rumour.

Shri. Dr. O. P. Chaudhary, JS (NLM), Dept of Animal Husbandry & Dairying, GOI has released a letter dated March 5,2020, from the AHD Department, stating that the Corona virus does not spread through chicken consumption. CLFMA circulated the letter received from Shri. Dr. O. P. Chaudhary to all.

CLFMA also supported the statement that Chicken consumption is not related to the spread of Corona Virus and widely circulated the same to all.

On March 11,2020, CLFMA gave clarification about the query raised by Mr.Vijay Thakre, Feed & Fodder Unit (NLM Division), DAHD about proposals from various firms regarding export of Wheat Bran and Rice Bran. These items are in the restricted category of export and require permission for export. CLFMA gave a clarification stating that, Rice Bran and wheat Bran is used as cattle and fish feed in India and if this product is exported the prices of the same will increase and hence increase the production cost ,especially of the small cattle and fish farmer and thus he will incur loss, hence CLFMA does not recommend the export of the same.

On 16th March Mr.S.V.Bhave had agreed to be a nominee in the Feed Co-ordination Committee for "Usage of Surplus stock of food grains in Poultry sector and Dairy sector", DAHD.

We have initiated the process for Livestock Survey Report 2020. Around 15 Top Research Organization Request for Proposal has been received and short listing of the top most organization is in the process.

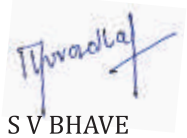
CLFMA continues to participate in all high-level discussions with zeal and helping to resolve the issues related to the Livestock Industry as always on war foot basis.

Also, we would be grateful for your feedback or inputs anytime for our improvement.

Wish you all a great year ahead!

With warm regards,

For CLFMA OF INDIA,



S V BHAVE
CHAIRMAN

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• website : www.clfma.org • E-mail : admin@clfma.org

Commodity Updates

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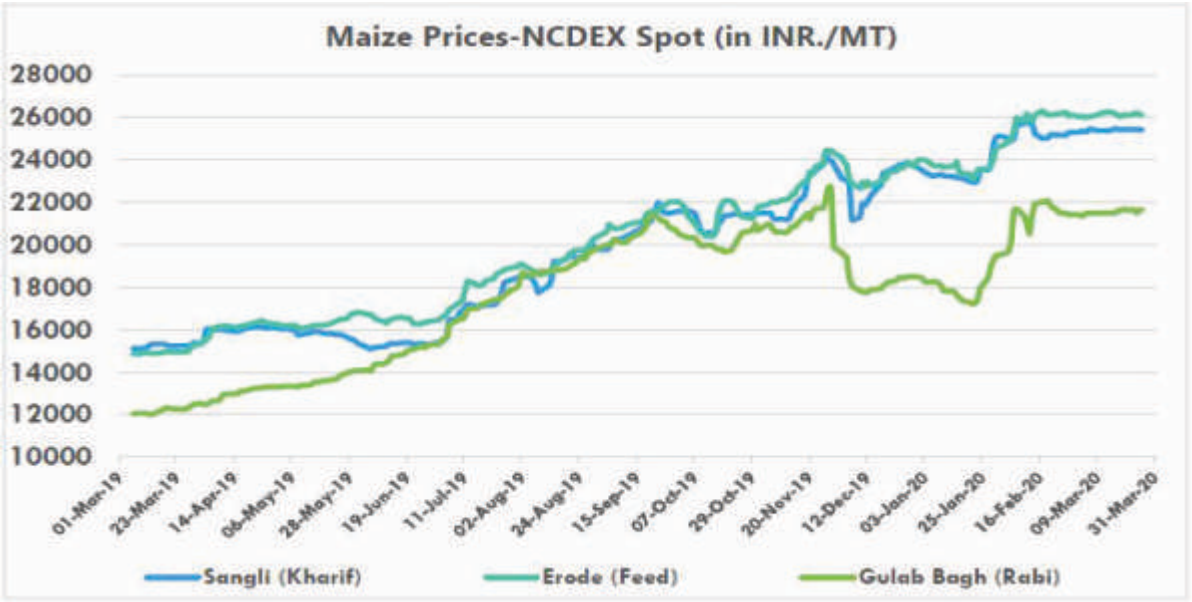
Domestic Prices in INR/Qtl:
Maize NCDEX Spot Price (in INR/Qtl.):

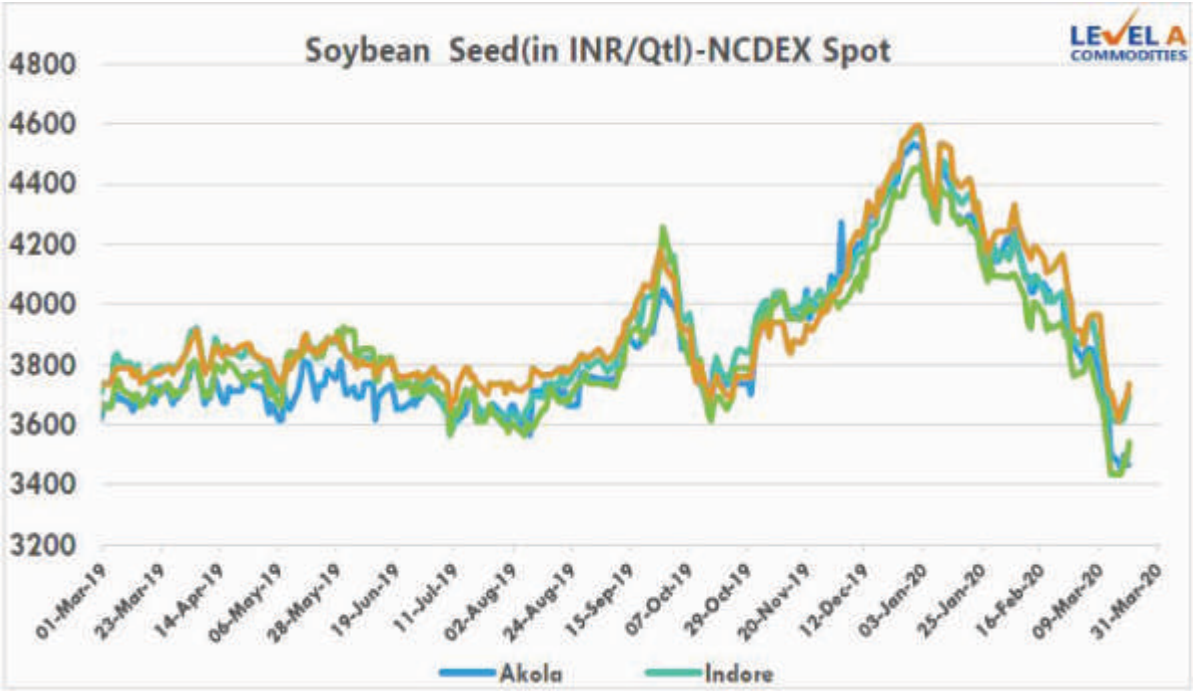
Location	31-03-2020	28-02-2020
Gulab Bagh	-	18636
Sangli	-	17777
Erode	-	18405



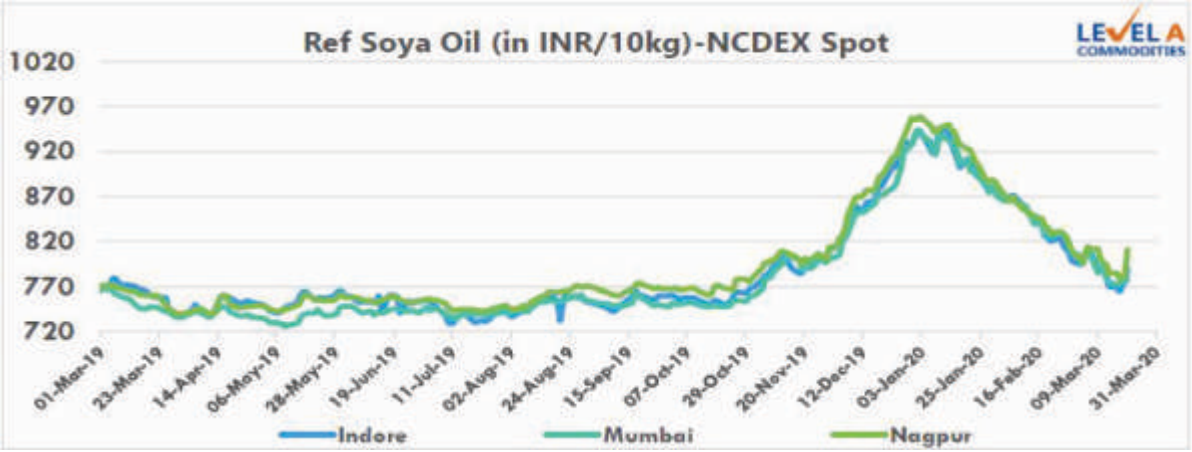
Soybean:
Soybean Complex Prices-NCDEX Spot:

Commodity (Unit)	Location	31-03-2020	28-02-2020
Degummed Soy oil (in INR/10kg)	Kandla	-	-
Ref Soya Oil (in INR/10kg)	Indore	-	798
	Mumbai	-	808
	Nagpur	-	809
Soymeal (in INR/MT)	Indore	-	31,500
Soybean Seed(in INR/Qtl)	Akola	-	3,863
	Indore	-	3,875
	Kota	-	3,762
	Nagpur	-	3,914

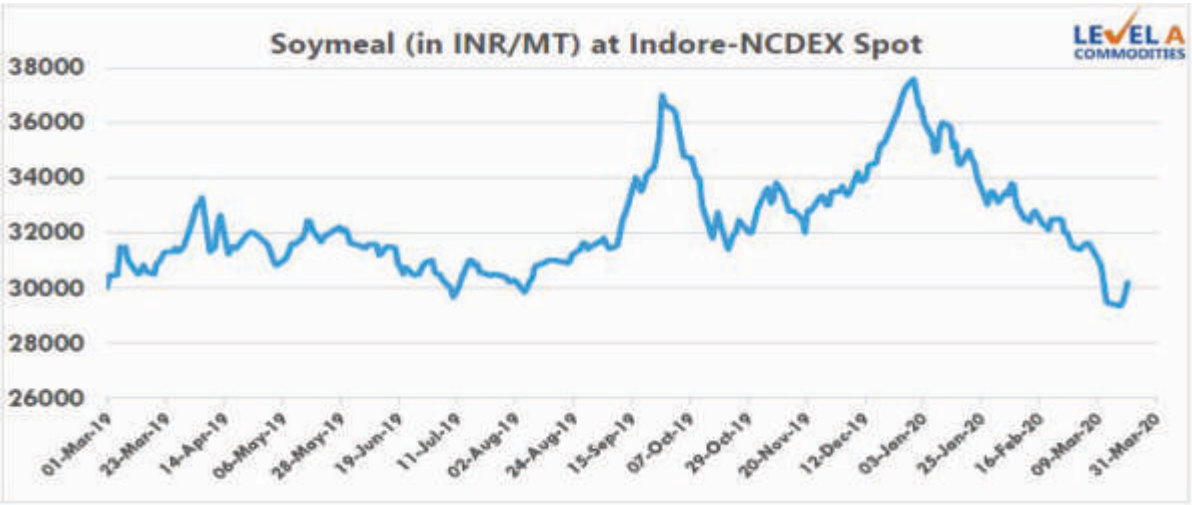
Soybean Seed



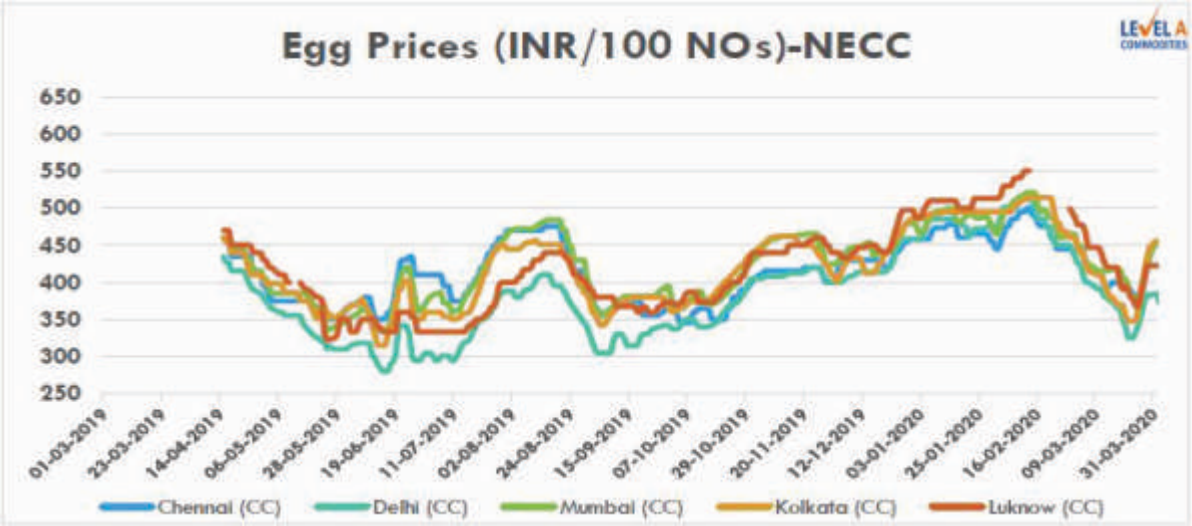
Soya Oil



Soymeal Prices-NCDEX Spot:



Egg Prices



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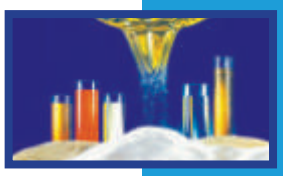

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Egg Rates

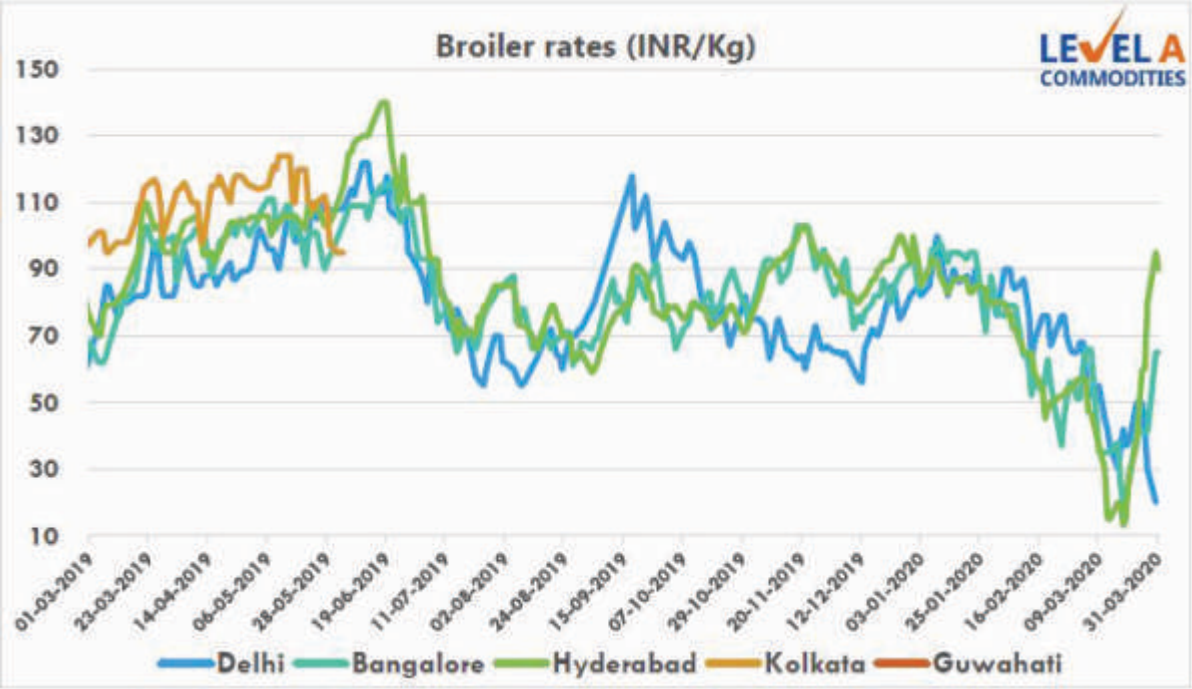
NECC Prices

Market	31-03-2020	28-02-2020
Ahmedabad	345	425
Ajmer	200	330
Asansole	405	383
Barwala	-	332
Banglore (CC)	345	390
Brahmapur (OD)	375	377
Burdwan (CC)	415	400
Chennai (CC)	360	400
Chittoor	353	393
Delhi (CC)	255	365
E.Godavari	345	365
Hyderabad	335	355
Ludhiana	-	346
Midnapur (KOL)	415	400
Mumbai (CC)	395	417
Muzaffarpur (CC)	-	395
Mysuru	345	394
Nagpur	-	357
Namakkal	335	360
Patna	-	390
Pune	410	417
Ranchi(CC)	-	409
Vijayawada	345	365
Vizag	345	400
West Godavari	345	365
Warangal	335	358

Prevailing Prices

Market	31-03-2020	28-02-2020
Allahabad (CC)	-	385
Bhopal	305	385
Hospet	310	355
Indore(CC)	220	385
Jabalpur	260	383
Kanpur (CC)	276	371
Kolkata (CC)	410	370
Lucknow (CC)	333	420
Raipur	350	377
Surat	400	435
Varanasi (CC)	310	407

Broiler Rates



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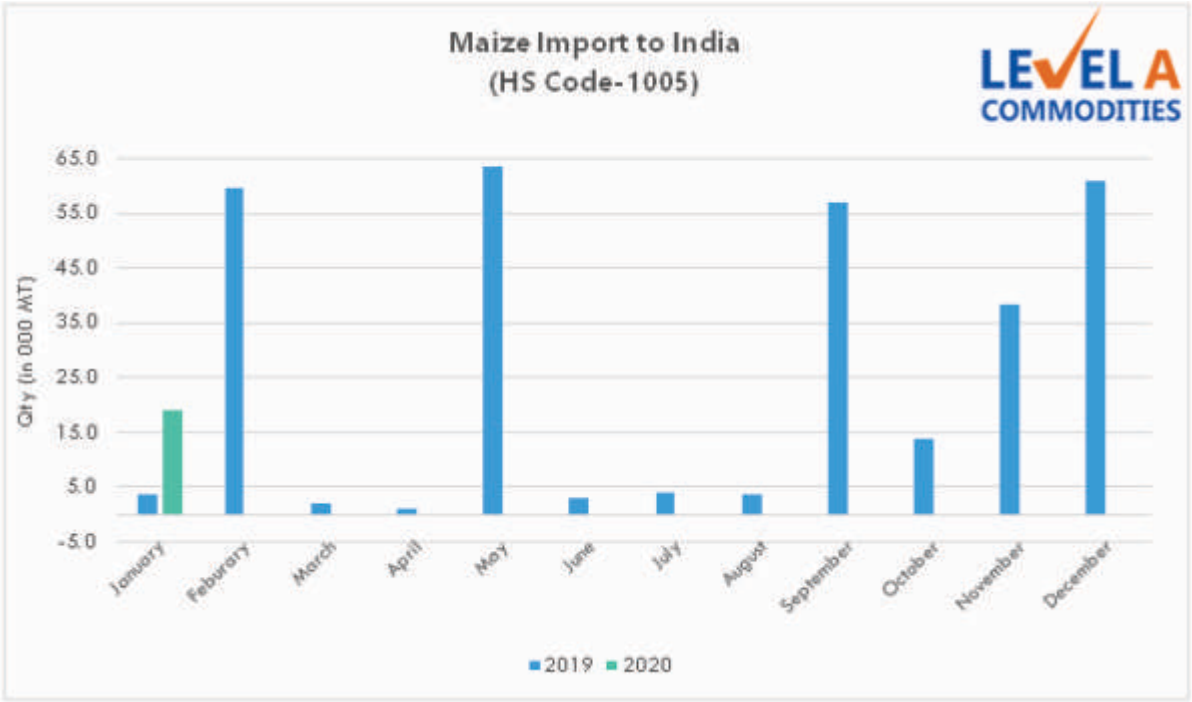
Broiler rates (INR/Kg)		
Market	**31-03-2020**	**28-02-2020**
Delhi	-	65
Punjab	30	65
Raipur	65	40
Pune	50	46
Bangalore	65	56
Hyderabad	90	52
Gujarat	40	47
Kolkata	-	-
Lucknow	-	50
Guwahati	-	-

Chicks Price (INR/Unit)		
Market	**31-03-2020**	**28-02-2020**
Punjab	-	19
Chandigarh	-	19
Haryana	-	19
Himachal Pradesh	-	20
Rajasthan	-	20
Jammu & Kashmir	-	20
Uttarakhand	-	20
Uttar Pradesh	-	15
Madhya Pradesh	-	15
Chhattisgarh	-	15
Bihar	-	15
Jharkhand	-	15

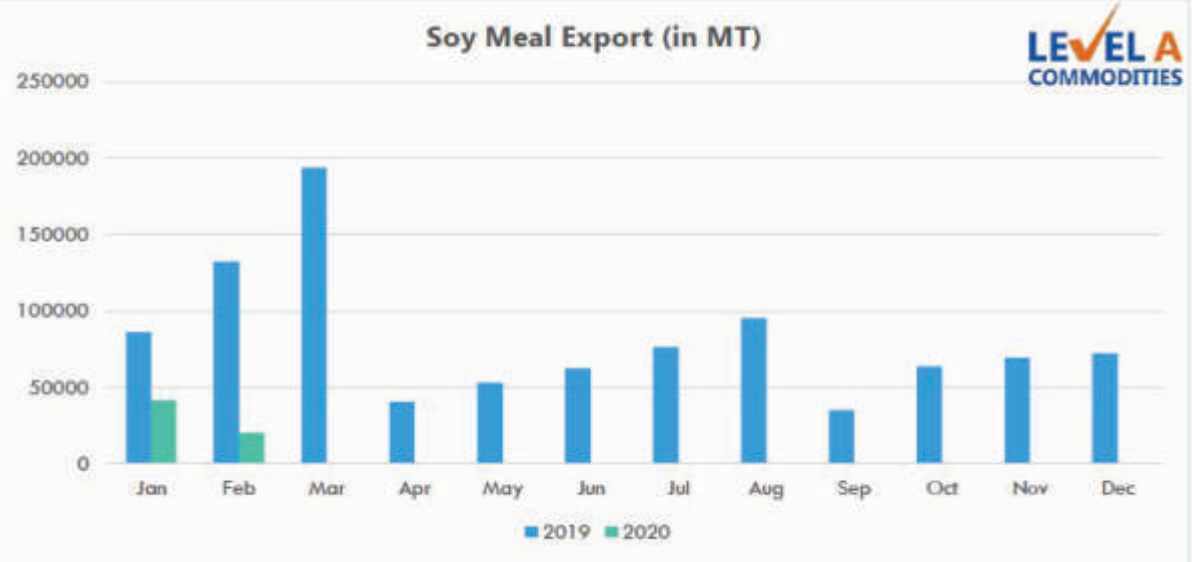
Trade Details

Maize export from India

Maize import to India



Soy Meal Export from India(In MT)



Market Updates

Maize Domestic

Weak poultry demand, imports may drag down maize prices

Maize prices in key spot markets have fallen by about a third over the last one year as supplies improved. And, the bearish streak may be far from over, as prices could fall by another 10-12% once arrivals of the rabi crop start in Apr-May.Traders expect prices of the coarse grain to fall to a two-year low of 1,500 rupees per 100 kg within a month from the current level of around 1,700 rupees, once arrivals from Bihar, the largest rabi maize producer, hit the market.Maize output in Bihar is seen a tad higher on year in 2019-20 (Jul-Jun) at 3.0 mln tn, compared with an estimated 2.6 mln tn last year.

Production in other states too is seen better, with overall rabi maize output seen at 7.0-7.5 mln tn, compared with 6.0-6.5 mln tn last year.However, traders expect the crop to be sharply lower than the government's estimate of 8.2 mln tn this rabi season, largely unchanged on year."The maize output in the rabi season is seen larger on year. This would weigh on prices of the commodity in spot markets in the coming days," an official with a multinational grain major said.

Apart from the anticipation of bigger rabi crop, imports are also seen hitting spot prices. Domestic poultry feed makers and starch manufacturers have turned to Myanmar to import maize at zero duty, and have imported around 130,000 tn of the grain over the last couple of months, industry sources said.India levies 60% duty on import of maize, but imports are duty-free if sourced from least-developed countries such as Myanmar.Due to the imports, demand for the domestic crop from local poultry feed makers has declined.

Demand for maize from the poultry sector is likely to decline further, as poultry consumption has taken a hit after the spread of coronavirus.Rumours that poultry products could be carriers of coronavirus have led to a sharp fall in demand for broilers and eggs, and is seen hitting the prices of maize, a key component of poultry feed, an official with a domestic poultry firm said.

Traders said if prices do fall to 1,500 rupees per 100 kg, it would be a good opportunity for end users as well as large traders to stock up the coarse grain, as overall supplies may not be too comfortable this season, despite a larger crop.Trade estimates peg maize output this year at 23.0-23.5 mln tn, higher than last year's 21.5-22.0 mln tn. Production, however, is still seen much lower than the usual crop size of 27.0-28.0 mln tn.

With annual consumption pegged at 24.0-25.0 mln tn, there could be some supply crunch towards the end of this marketing season, as the next crop would be available only from October.The imports were not adequate for the domestic shortage but prices still fell as sentiment was hit because of an anticipated supply pressure through imports in the future.However, some in trade circles believe maize prices may again be on the boil once rabi supplies dry up and the market enters another phase of tepid supply.

Relief to farmers: Telangana to purchase entire paddy, maize output, to spend Rs 30,000 cr

Bringing a huge relief to farmers, the Telangana government has decided to procure the entire paddy and maize crop being harvested directly from the farmers at minimum support price (MSP) during the lockdown period. The purchases will be done through the village procurement centres over a period of 45 days.Announcing this to the media, chief minister K Chandrashekhar Rao said that the state government will spend nearly Rs 30,000 crore to procure about 1.05 crore tonne of paddy and another 14.5 lakh tonne of maize from farmers. “The market price for maize is as low as Rs 800 per quintal but the state will purchase it at MSP of Rs 1,760 per quintal.

Similarly, paddy will be procured at MSP of around Rs 1,835-1,855 per quintal,” he said. In case of millers or traders planning to purchase paddy from farmers, he insisted that they pay MSP to farmers for the entire yield. The normal area under paddy cultivation in Telangana is 17 lakh acres but this year it has more than doubled. The maize area also increased to 5.84 lakh acres against the normal 3.72 lakh acres. He said rabi crop were grown over 50 lakh acres. The paddy cultivation was taken up on 40 lakh acres which is a record. The procurement of paddy will begin in the first week of April and will continue till May 15-20.

Rao said the district coordination committees led by the respective collectors would convene a meeting and finalise the schedule for procurement of paddy, maize and other crops. The farmers maintain restraint and practice self-discipline during paddy procurement. “Tokens will be issued to each

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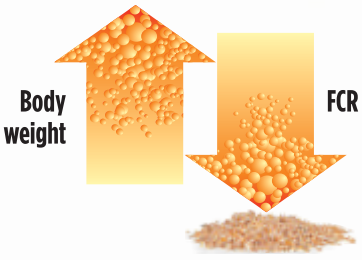

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farmer to bring their produce to the local procurement centre. In case, a farmer decides to bring paddy in advance, it will not be purchased by the government. The idea is to avoid crowd which could spread coronavirus."

The state government has asked the farmers to bring their bank passbook and account number where the amount would be transferred directly into the bank accounts of farmers at a later date. Arrangements have been made for harvesting, procurement, milling and storage of paddy. With majority of harvesting being done by harvesters, the district authorities have been directed to identify those who can mount harvesters on tractors and begin the works.

"There are only 5,000 harvesters in the state for paddy harvesting. Officials will identify them and provide necessary passes to carry forward with their work," he said. Simultaneously, the agricultural extension officers would issue tokens to farmers based on which paddy would be procured. As against the requirement of 70 lakh gunny bags to store food grains, the state government had only 35 lakh bags and efforts were being made to obtain them from various states. Rao wanted the sarpanches and Rythu Bandhu Samithi members to take the lead and facilitate paddy and maize procurement.

Meanwhile, the chief minister said 95% of the workers in rice mills were Bihari migrants. These workers, who load and unload the rice trucks, had gone to Bihar for Holi and are now stranded.The agriculture department officials believe the task can't be completed without labourers from Bihar. The chief minister further reiterated department officials for supplying quality seed, fertilisers and pesticides on time to farmers. Stringent action is being taken under the Preventive Detention Act against those involved in the supply of spurious seeds, adulterated fertilisers and fake pesticides.Telangana state is supplying 23-25 lakh tonne of the 35 lakh tonne seeds required for cultivation of various crops across the country, agriculture minister S Niranjan Reddy had said earlier.

Maize International

WASDE:

This month's 2019/20 U.S. corn supply and use outlook is unchanged relative to last month. The season-average corn price received by producers is lowered 5 cents to $3.80 per bushel based on observed prices to date.

Global coarse grain production for 2019/20 is virtually unchanged from last month at 1,402.8 million tons. This month's foreign coarse grain outlook is for slightly higher production, consumption, and stocks relative to last month. Global corn production is raised 0.4 million tons, as an increase for South Africa is partially offset by reductions for India, Peru, and Russia. For South Africa, production is higher as continued favorable conditions during the month of February boost yield prospects.

Major global trade changes for 2019/20 include higher projected corn exports for Ukraine, South Africa, and the EU. For 2018/19, Brazil's exports for the marketing year ending February 2020 are lowered based on smaller-than-expected late-season shipments. Partly offsetting is an increase for Argentina. Corn imports for 2019/20 are raised for Canada and Peru but lowered for the Philippines. China's sorghum imports are raised reflecting recent purchases from the United States. Foreign corn ending stocks are raised, as increases for South Africa, Canada, and Russia more than offset a decline for Argentina. Global corn ending stocks, at 297.3 million tons, are up 0.5 million from last month.

Canada Outlook:

For 2019-20 , total supply of corn in Canada decreased by 10% as a result of lower carry-in stocks, production and imports.Corn imports for 2019-20 are expected to decrease due to a major decrease in imports of corn into Western Canada, more-than offsetting the slight increase in imports to Eastern Canada. Corn imports, for the crop year to January 2020, dropped by 62% to 350 thousand tonnes (Kt) for Western Canada. However, imports rose by 91% to 380 Kt for Eastern Canada.

Exports for the current crop year are expected to decrease, as a result of low supplies and the slow pace of export sales to-date. For the crop year to January 2020, corn exports declined by 83%, as exports to the EU countries fell sharply.Total domestic use is expected to decrease largely due to the reduction in industrial use and feed use. Carry-out stocks are forecast to fall largely due to smaller supplies.The average price of corn for 2019-20 is expected to be higher than last year due to the expected increase in the US corn price and a significant decline in the domestic corn supply.

US corn production for 2019-20 decreased by 5% from 2018-19 largely due to a decline in yields. The average on-farm price for corn in the US is forecast to increase to US$3.80/bu from US$3.61/bu last year. Corn production in other major world exporters, including Brazil, Argentina, Russia and Ukraine, remains abundant, which will put pressure on corn prices.

For 2020-21 , the area seeded to corn in Canada is forecast to decrease by only 2% from 2019-20 due to good prices and expectations for strong demand. Production is forecast to increase by 3%, largely due to higher yields. Imports are expected to increase. As a result, supply is projected to rise by 2%. Domestic use is projected to rise slightly due to increased feed use. Given the increase in domestic supplies and continued strong global demand, exports are expected to increase. Carry-out stocks are forecast to rise due to good supply.The average price of corn in Canada is expected to drop following forecasts for lower corn prices in the US for 2020-21.

The USDA projects that US corn acreage for 2020-21 will rise by 5%, which, combined with forecasts for higher area harvested and improved yields, will increase US corn production by 13%. Supplies are projected to increase by 9%. Uses for animal feed, ethanol production and exports are anticipated to rise. Ending stocks are expected to increase by 39%. The US corn price is projected to fall to US$3.60/bu from US$3.80/bu in the previous year.

Area seeded to corn for 2020-21 at the world level is forecast to increase, according to the IGC, and world production is expected to set a new record. Total use of corn around the world is expected to continue its upward trend in 2020-21 and is projected to grow to a record level, driven by demand in China and Brazil. In the EU, total supply of corn is expected to fall due to lower carry-in stocks, in spite of higher production and imports. Total use is projected to rise. As a result of lower supplies and higher consumption, carry-out stocks of corn in the EU are expected to decrease.

IGC Report:

The International Grains Council (IGC) in its latest Grain Market Report forecast an increase in global grains production, trade and consumption for 2020-21. However, its projection came with a caveat due to the coronavirus (COVID-19) pandemic that has infected more than 700,000 people worldwide and killed about 35,000.

The 2019-20 global maize crop is forecast to be 1% smaller year-over-year, with declines in the United States and Argentina more than offsetting gains in the European Union, Brazil, China and South Africa. At 1.11 billion tonnes, the estimate is raised by 4 million from the previous month, primarily on an upgraded official EU number, but with increases too for some southern hemisphere exporters, the IGC said. It forecasts production to increase slightly in 2020-21 to 1.15 billion tonnes.

Against the backdrop of the coronavirus pandemic, maize consumption forecasts are quite tentative, but with overall levels of demand assumed to remain high in 2019-20, the IGC said. Based on a reduced US ethanol figure, the global maize consumption forecast is 1 million tonnes lower month on month at a record 1.15 million tonnes.

Soy meal Domestic

Edible oil demand to decline during March-April due to Covid-19 lockdown

Edible oil demand is set to decline at least during March-April as hotels and restaurants have closed down amid nationwide lockdown to fight against coronavirus disease, according to an industry body.Hotel, Restaurants and Cafeterias (HoReCa) segment accounts for 40 per cent of the country's total edible oil demand at 230 lakh tonnes annually.Edible oil imports and processing activities have also slowed down, but there is sufficient stock in the country to meet domestic demand, Solvent Extractors' Association of India (SEA) Executive Director B V Mehta told PTI."Our monthly consumption of edible oil is 18-19 lakh tonnes per month. The demand will certainly fall as hotels, restaurants and cafeterias have closed down," Mehta said.He, however, said it would be difficult to estimate the extent of fall as household consumption might increase slightly during lockdown period.Mehta said imports of vegetable oils (comprising edible and non edible oil) too have slowed down, but there is no concern about availability.

"We have sufficient stock of imported oil. Local production of mustard oil is happening. Harvesting of mustard crop is going on in Rajasthan and Madhya Pradesh, so all local processing mills are operating," Mehta said.He said there is some labour shortage and logistics issues but those are getting sorted out.

India's total demand for edible oil is around 230 lakh tonnes annually, which is largely being met through imports.The country imports palm oil from Malaysia and Indonesia, while shipments of soyabean come from Argentina and Brazil.India's vegetable oil imports increased by 3.5 per cent to 155.5 lakh tonnes in 2018-19 marketing year (November-October).

While shipments of edible oil increased to 149.13 lakh tonnes in the 2018-19 marketing year from 145.16 lakh tonnes in the previous year, the imports of non-edible oil grew to 6,36,159 tonnes from 5,09,748 tonnes during the period under review.During the November 2019 to February 2020 period of the current oil year, imports have fallen by 6.1 per cent to 45,63,791 tonnes compared to 48,62,849 tonnes in the corresponding period of the previous year.

SEA urges members to operate units, continue dispatches

The Solvent Extractors Association of India (SEA) has urged its members to try and run its units and continue dispatches in the wake of the shortage caused by the outbreak of Covid-19. Atul Chaturvedi, president, SEA, said that edible oil is an essential commodity and its supply cannot be disrupted as it can have huge repercussions in the country. “As far as possible, we should try to run our factories continue dispatches.” SEA has around 800 members.Chaturvedi said that factories should engage with local administrators and keep them in the loop and utmost care should be taken to maintain social distancing and employees should be provided masks. More importantly, attendance in the factory should be kept at minimum to ensure operation.

BV Mehta, executive director, SEA, said that the country’s monthly consumption is to the tune of 19-20 lakh tonne per month. However, due to the lockdown there has been a sharp drop in demand from hotels, restaurants and canteens. The supply could be 15 lakh tonne and therefore, the association has appealed to its members to start factories and ensure the supply of edible oil, he said.India’s total demand for edible oil is around 230 lakh tonne annually, which is largely being met through imports. The country imports palm oil from Malaysia and Indonesia, while shipments of soyabean come from Argentina and Brazil. India’s vegetable oil imports increased 3.5% to 155.5 lakh tonne in 2018-19 marketing year (November-October).

The import of vegetable oils during February 2020 has dropped 10.5% to 1,112,478 tonne, against 1,242,533 tonne in February 2019, consisting 1,089,661 tonne of edible oils and 22,817 tonne of non-edible oils. The overall import of vegetable oils during November 2019 and February 2020 is reported at 4,563,791 tonne compared to 4,862,849 tonne, i.e, a drop of

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6.1%. Data complied by the SEA on the import vegetable oils (edible & non-edible) for February 2020 reveals that in view of the placing RBD palmolein under restricted list from January 8, 2020, its import has drastically reduced in February 2020 at 33,677 tonne. Import of crude sunflower and crude soyabean oil in contrast has sharply increased as spread between palm oil and soft oils reduced to nearly $75 to 80 per tonne, encouraging larger import of soft oils.

Indonesia is a major supplier of crude palm oil and refined palmolein at 21.08 lakh tonne. Malaysia, Ukraine and Russia are major suppliers of sunflower oil, while Argentina is the major supplier of soyabean oil to India.Mehta said imports of vegetable oils (comprising edible and non edible oil), too, have slowed down but there was no concern about availability. “We have sufficient stock of imported oil. Local production of mustard oil is happening. Harvesting of mustard crop is going on in Rajasthan and Madhya Pradesh, so all local processing mills are operating.”

Soy meal International

WASDE:

U.S. soybean supply and use projections for 2019/20 are mostly unchanged this month. With soybean crush and exports projected at 2.1 billion bushels and 1.8 billion bushels, respectively, ending stocks remain at 425 million bushels, down 484 million from last year’s record. Soybean and soybean oil prices are reduced this month.

The U.S. season-average soybean price is projected at $8.70 per bushel, down 5 cents. The soybean oil price is projected at 31.5 cents per pound, down 2 cents. Soybean meal prices are unchanged at $305.00 per ton.

This month’s 2019/20 global oilseed outlook includes higher production and stocks relative to last month. Global soybean production is raised 2.4 million tons to 341.8million, mainly on a 1-million-ton increase for both Argentina (to 54 million) and Brazil (to 126 million). Argentina’s larger crop is due to overall favorable conditions in higheryielding central and northwestern farming areas. Soybean crush is lowered 1 million tons for Argentina on the current pace to date.

With higher South American production and lower use, global soybean stocks are increased 3.6 million tons to 102.4 million. Another notable oilseed change includes a 1-million-ton reduction for palm oil production, mainly in Malaysia and Colombia, leading to a 19 percent year-over-year decline in global vegetable oil stocks.

Canada Outlook:

For 2019-20 , supplies are estimated at 7.1 Mt, down from last year's 9.2 Mt on sharply lower production and imports. As of Feb 27, the US shipped a total of 34,900 tonnes of soybeans into Canada since September 1st, compared to 580,700 t for the same period last year. Canadian exports are forecasts to decline to 4.3Mt, versus 5.6 Mt last year, on tighter domestic supplies. Canadian soybean crush is expected to fall by 13%, to 1.8 Mt, as some processors switch to crushing canola. Carry-out stocks are estimated at 0.3 Mt, versus 0.7 Mt last year. Soybean prices are forecast modestly higher at $400-430/t versus $406/t for 2018-19.

World soybean crush is estimated up by 6 Mt, to 304 Mt, by the USDA, primarily on an increase in Argentine processing. China remains the world's largest crusher in 2019-20, at 86.0 M, up marginally from 2018-19 but below the 90.0 Mt processed in 2017-18. Chinese crushing volumes continue to be pressured by outbreaks of African swine fever and COVID-19.

The United States remains the world's second largest processor of soybeans with crush rising marginally to a record 57.3 Mt. American crush is supported by large supplies and increased domestic soymeal usage. Argentine crush is up 4 Mt, to a record 44.6 Mt, on support from increased exports to assorted countries. Brazil remains the world's fourth largest soybean crushing country, at a record 43.8 Mt, on support from rising domestic soymeal consumption. The rest of the world is expected to crush 72.6 Mt of soybeans for 2019-20 versus 73.1 Mt for 2018-19.

Total supply is forecast up slightly, to 7.3 Mt, as higher production and imports more than offsets the drop in carry-in stocks. Exports are forecast at 4.7 Mt to a diverse assortment of countries. Domestic processing is forecast up slightly at 1.9 Mt as crushers return to a normal processing pace. Carry-out stocks are forecast at 0.27 Mt versus 0.30 Mt estimated for 2019-20 and the 0.70 Mt carried out in 2018-19.Soybean prices are forecast up slightly to $410-450/t on support from stronger US prices and a stable Canadian-US dollar exchange rate.

IGC Report:

The world's grain and oilseed output will hit another record high in the 2020/21 marketing year, with the International Grains Council (IGC) calling combined corn, wheat, rice and soybean output for the 2020/21 marketing year 2.2% higher than in 2019/20 at 2.22 billion mt, the highest number on record.

IGC called global soybeans production at 366 million mt.soybeans consumption was put at 365 million mt while trade is set to grow for all grains.carryover stocks were put at 40 million mt.

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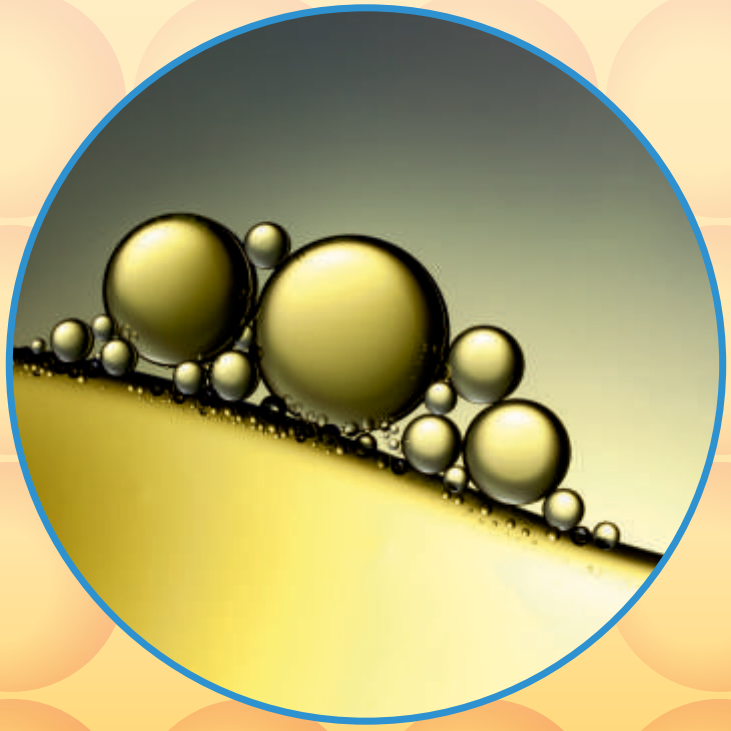

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Market Drivers

Maize

Market Drivers	Monthly Outlook
Lockdown in India due to coronavirus (COVID-19)	Bullish
Overall rabi maize output seen at 7.0-7.5 mln tn	Bullish
Demand from poultry sector and stockists	Bearish
According to USDA, Global corn production is raised 0.4 million tons	Bullish

Soymeal

Market Drivers	Monthly Outlook
Lower arrivals in the month of march	Bullish
Average soybean prices on a rise	Bullish
Soymeal exports forecast to be down	Bullish
According to USDA, soybean production raised for the month of March	Bullish

REACH US

Cabinet Approves Scheme Budget of INR 4558 Crore for Dairy Farming

The cabinet approved scheme budget of INR 4558 crore for dairy farming. The decision will benefit around 95 lakh dairy farmers in India.

Approval of Scheme for Dairy Farming

The approval will benefit around 50,000 villages of the country in promoting the dairy farming sector. Further, the cabinet increased outlay for Dairy Processing and Infrastructure Development Fund (DIDF) to INR 11,184 crore. Also, it has green signaled to increase interest subvention from 2% to 2.5% by revising the outlay. Also, the funds under DIDF will be used to establish 28,000 bulk milk coolers. As a result, the milk chilling capacity will increase by 140 lakh litres per day.

The government will make efforts to enhance milk drying capacity to 210 metric tonnes per day. Further, it will provide 28,000 milk testing equipment to check adulteration in milk. Further, funds will be allocated to enhance infrastructure facilities to provide remunerative prices to milk producers for value-added milk products.

Increase in Interest Subvention

The government will provide interest subvention up to 2.5 percent to NABARD with effect from 30 July 2019 to 2030-31. However, if there is a further increase in the cost of funds, it will be borne by the borrowers. Besides, the government has revised the funding period of the scheme to 2018-19 to 2022-23. Further, it extended the repayment period up to 2030-31 with spillover to the first quarter of 2031-32. Information and Broadcasting minister, Prakash Javadekar addressed media in this regard. He stated that the decisions will take the 'White Revolution' in the country to the next level.

Effects on Dairy Farming

After the cabinet's approval for the scheme, shares of dairy firms rose 1.5-10%. Prabhat Dairy jumped 1.6% to ₹84.65, and Vadilal Industries gained 1.7% to ₹840. While Hatsun Agro went up to 2.5% to ₹665.90, Umang Dairies climbed 9.4% to ₹49.30. The scheme would focus on modernization under DIDF for chilling infrastructure, electronic testing kits, and project management and learning.

In conclusion, the decisions will have positive effects on the dairy farming community and help supply of good quality milk in India.

Cabinet approves crop cover rejig, dairy sop schemes

The Cabinet has approved revamping of the crop insurance scheme to help farmers manage risks better and cleared a proposal to create 10,000 farmer producer organisations (FPOs) to give cultivators economies of scale and better bargaining power in the market.

It also raised interest subvention under the Dairy Processing and Infrastructure Development Fund to 2.5% from 2%, aiming to help 9.5 million milk producers in 50,000 villages with higher cooling, drying and processing capacity as well as infrastructure for value-added products to enhance incomes.

Under the revamped Pradhan Mantri Fasal Bima Yojana (PMFBY), insurance has been made voluntary while states will have the flexibility to select any or many of additional risk covers such as localised calamity, mid-season adversity and post-harvest loss. These will be made operational from Kharif 2020. ET was the first to report such changes were being planned. Agriculture minister Narendra Singh Tomar said central subsidy will be limited for premium rates up to 30% for unirrigated areas and 25% for irrigated areas. The allocation of business to insurance companies will now be done for three years instead of a yearly tender.

“Central share in premium subsidy will be increased to 90% for north-eastern states from the existing sharing pattern of 50:50,” said Tomar. He said the government has created a budgetary provision of Rs 4,496 crore to form and promote 10,000 new FPOs under the new central sector scheme, Formation and Promotion of Farmer Producer Organisations.

Information and broadcasting minister Prakash Javadekar said the proposal approved for dairies will help 9.5 million dairy farmers. The activities include modernisation of new milk processing facilities and manufacturing facilities for value added products, chilling infrastructure, electronic adulteration testing kit, project management and learning. Under the scheme, 28,000 bulk milk coolers will be established with 14 million litres per day as additional milk chilling capacity. Milk drying capacity will be increased to 210 metric tonnes per day and 28,000 milk testing equipment will be provided to check adulteration.

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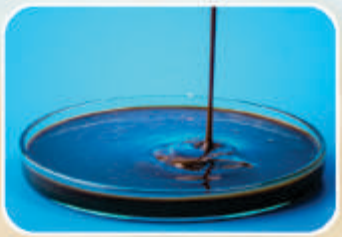

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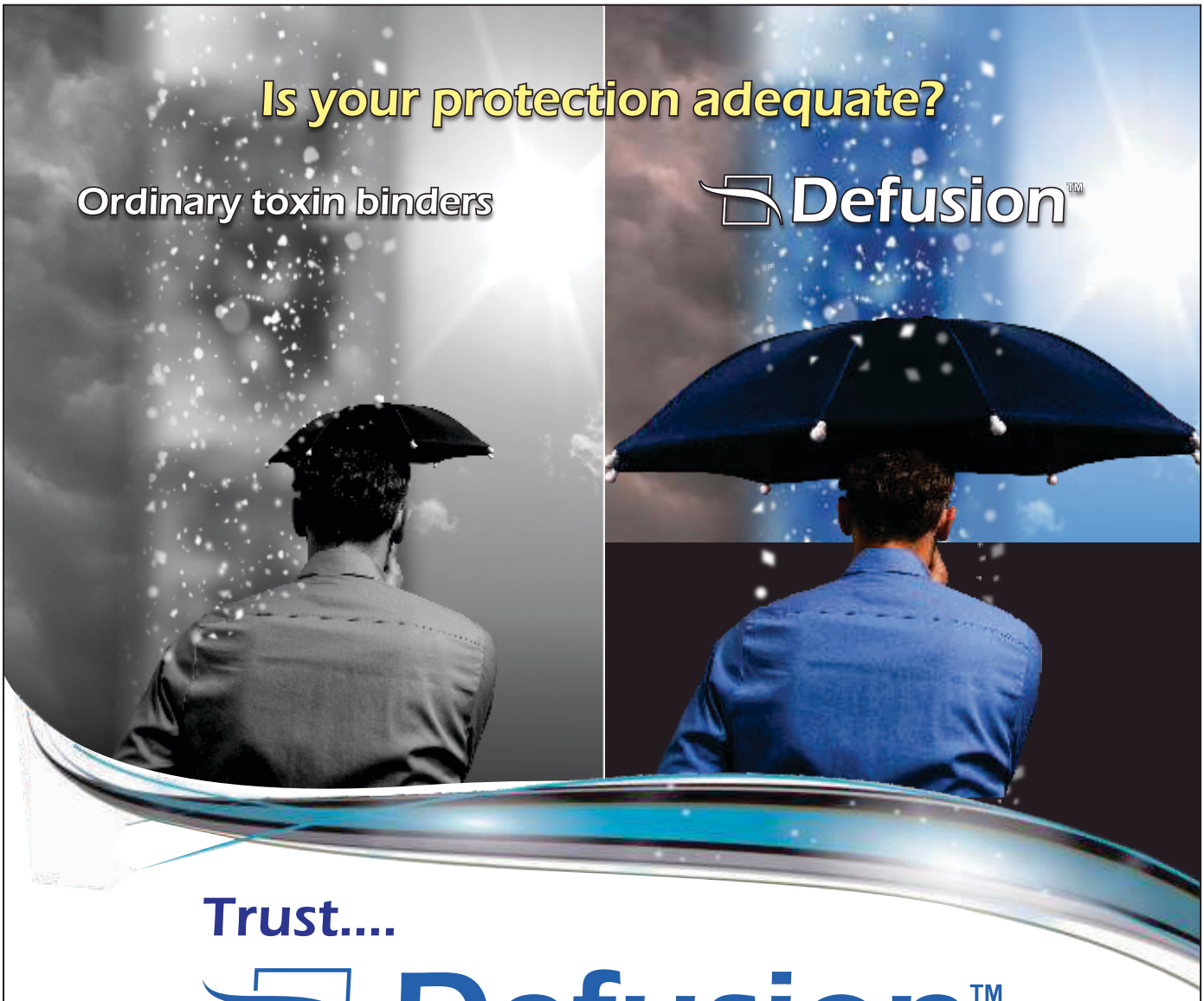

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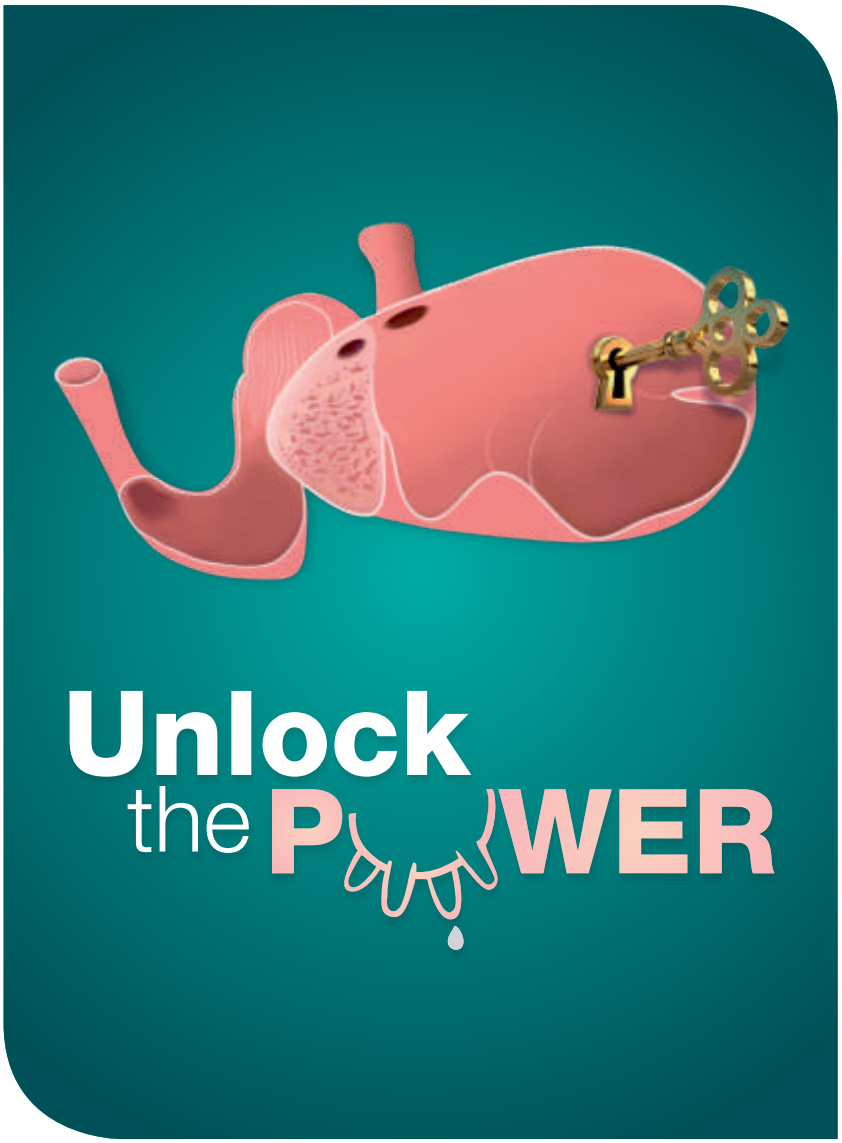

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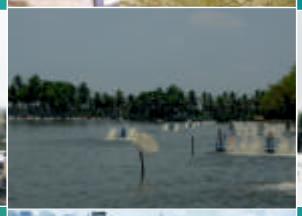

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India's Blue Economy net getting bigger! Country ranks third in fisheries and second in aquaculture

Interim Budget FY20 had created a separate ministry for animal husbandry, livestock, and fisheries, and Union Budget FY20 allocated Rs 770.25 crore for fisheries for a comprehensive development. The budgetary allocation has further increased to Rs 825 crores in the current budget for FY 21. This budgetary support has recognised the significance of 'blue economy'.

Centrally sponsored schemes including the Integrated Development and Management of Fisheries and Fisheries and Aquaculture Infrastructure Development Fund are made available to devise a framework of development, management, and conservation of marine (and inland) fisheries and to increase the exports by Rs 1 lakh crore in FY25. For example, about 65,000 fishermen have been trained under these schemes since FY17 until FY20.

So, to appreciate the significance of blue economy geared by the 'blue revolution', one needs to understand the fishermen economy: what are the fish production systems and how does fishermen economy perform? Fish production system predominantly consists of capture fisheries, marine fisheries, aquaculture, enhancement and integrated fish farming.

India ranks third in fisheries production, and second in aquaculture. Fisheries alone has employed 145 million people and contributed to 1.07% of the GDP and generated export earnings of Rs 334.41 billion as per a recent estimate of National Fisheries Development Board. National Institute of Agricultural Economics and Policy Research reported the projected demand would go 11.80 million metric tonnes by FY21.

Freshwater aquaculture that contributes about 55% of the total fish production is predominantly driven by smallholder farmers and institutionalised culture fisheries in part. In small-scale fisheries, products are consumed at the household level or/and sold in local markets within the fishing community (Food and Agriculture Organization, 2008). Also, small-scale fisheries meet a raging concern for poverty reduction and food security in developing countries as it contains a rich animal protein and Omega 3 fatty acids, providing a nutritional diet.

While there has been a long-standing policy debate over natural resource utilisation and concern for environmental sustainability, small-scale fisheries and freshwater aquaculture system restores ecological safety by improving soil condition and water quality. Freshwater aquaculture engenders sustainability through manure loading, nutrient cycling into the agri-food-ecosystem. We can draw some anecdotal evidences from Nigeria where 50% fish farmers depend on the integrated fish farming for their livelihoods. Fish farming in developing countries utilizing capture fisheries and small-scale subsistence aquaculture system has received external support for capacity building, adoption of improved production practices, institutional credit access, and trade facilitation.

From the governance and organisational view point, the fisheries sector has a long way to go to unleash the potential of blue economy. First, South Indian Federation of Fishermen Societies, working in the marine fisheries sector, can help bring the necessary reforms to marine fisheries since it follows an AMUL-like cooperative model with a three-tier federal structure. With over 9,104 member fishermen, organised through 153 primary fishermen marketing societies in Southern peninsular, the federation renders various services to 65,000 fish workers, including non-members, for the last two decades. Second, the FM made two important announcements for strengthening fisheries extension by mobilising 3,477 'sagar mitras' and promoting 500 fish farmer producer organisations. Therefore, it is important to draw insights from states that have catalysed livelihood promotion of small-scale fishermen.

For instance, a donor agency and NABARD-funded integrated fish farming project was implemented in coastal regions of Odisha in 2011. A voluntary organisation, Gram Utthan , promoted four farmer producer companies with a paid-up capital of Rs 1 lakh for strengthening the market linkage of freshwater aquaculture in FY19. These organisations were hand-held by international donors for capacity building and World Fish for culturing the improved variety freshwater fish.

Third, skilling is important to subsistence of marginalised fishermen. In FY17, about 121,560 fishermen had undergone skill development training with an allocated budget of Rs 2.36 crores. Union Budget 2020 has aimed for skilling fishermen through fisheries extension akin to 'MatsyaVigyanKendras' in collaboration with the Central Fisheries Research Institute.

Govt nod to India-Iceland pact in fisheries sector

Targeting sustainable fisheries development, the Union Cabinet on Wednesday approved a pact signed between India and Iceland.

"The Union Cabinet, chaired by Prime Minister Narendra Modi, was apprised of a Memorandum of Understanding (MoU) signed between India and Iceland in the field of fisheries," an official statement said.

The pact was signed on 10th September, 2019.

"The MoU will strengthen the existing friendly relations between India and Iceland and will enhance consultation and cooperation on Fisheries including consultation on bilateral issues," it added.

The salient features of this MoU are creation of facilities for exchange of scientists and technical experts and their proper placement, especially in areas of estimating total allowable Catches in off shore and deep sea areas.

It also provides for training to fisheries professionals from key fisheries institutions in the various management aspects on areas of modern fisheries management and fish processing.

The MoU provides for exchange of scientific literature research findings and other information as well as exchange of experts/expertise to study the prospects of fishing.

The agreement seeks to promote processing and marketing of products from high seas fisheries for entrepreneurship development.

Government drafting national fisheries policy with Rs 45,000 crore budget

The government is drafting first national fisheries policy with a budget of Rs 45,000 crore for next five years to promote marine fishery, acquaculture and mariculture, official sources said.

The only existing policy is on marine fisheries from which the production stands at 4.3 million tonnes annually, but there is no policy on inland fisheries that produces the rest 23 million tonnes.

The newly carved out Fisheries Ministry is working on an overarching policy that would cover all aspects of the fishery sector, the sources said.

"The fishery sector never had a policy. Now, a new policy is being made. It will focus on promoting marine, acquaculture and mariculture besides addressing the traceability issues. It will cover both catch and capture fishing," an official source told PTI.

The draft policy will soon be placed before the Cabinet for approval. A budget of Rs 45,000 crore would be required for next five years for implementing the policy, the source added.

Basically, a policy is a statement of intent of the government. To execute a policy, certain legislation and regulations either in the form of Act or executive order are required. And schemes are framed to give monetary support. The schemes stay for only 5-10 years, but a policy lasts for longer period.

At present, two fishery schemes are being implemented. One is Fishery Infrastructure Development Fund, which is a five year scheme. The other one is fishery development scheme funded partially by the World Bank. It is for eight years.

The third scheme 'Pradhan Mantri Matsya Sampada Yojana' which was announced in July 2019 Budget is yet to get the cabinet approval. It aims to boost fish and aquatic products through appropriate policy, marketing and infrastructure support.

FSSAI removes ammonium sulphate from milk adulterants under Testing Scheme

FSSAI has removed ammonium sulphate from the list of adulterants, for which dairy plants were asked to conduct checks under the Scheme of Testing and Inspection.

The country's apex food regulator, in this regard, issued a notice containing a revised list of adulterants to be tested under the said scheme, which has to be followed by dairy processing plants for monitoring of internal controls to ensure safe and good quality supply of milk and milk products to consumers.

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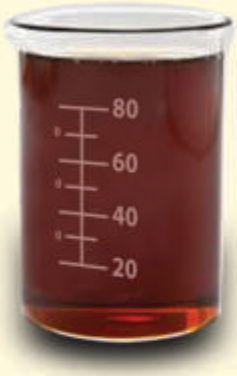

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The scheme was launched in October 2019, after the release of National Milk Survey.

A senior official with FSSAI said, "After a careful review of scientific opinion, the scientific group reached to a conclusion that ammonium sulphate may also come into the milk naturally, and may not be considered as a contaminant as earlier thought. It was noted that ammonium sulphate is allowed as an additive in certain foods in several countries."

"Before releasing National Milk Safety and Quality Survey 2018, a meeting of stakeholders was held on September 9, 2019. This group of stakeholders was of the view that while incidents of adulteration cannot be ruled out, but these are restricted to few areas and in times when there is large demand-supply gap," he added.

"Such incidents can only be tackled by having strict vigil in such areas. The stakeholders' group further deliberated on presence of ammonium sulphate in milk," the official stated.

Overall, the dairy plants need to test for nine physical, chemical/compositional parameters, 12 adulterants, four chemical contaminants and four microbiological contaminants, besides testing for water supply as per IS 10500.

Ashwin Bhadri, chief executive officer, Equinox Labs, said, "Ammonium sulphate in milk is natural and is deemed safe by FSSAI after considering scientific opinion. It is also used as an additive in certain food in several countries."

He, however, pointed out that as the recent reports on the surging rate of adulteration in milk had disturbed the government as well as the dairy industry, the use of artificial ammonium sulphate was a worrying factor. It was used in order to increase the lactometer reading of milk and to decrease its lactose content.

According to FSSAI, the scheme for sampling, testing, and inspection for dairy processing plants was introduced to strengthen the internal controls through self monitoring and has to be implemented at all the dairy processing establishment and was in implementation from January 1, 2020.

The scheme stipulated the sampling points, test methods, frequency of sampling and permissible limit as per food safety regulations and called for a well-equipped in-house laboratory for testing microbiological and other chemical parameters, and testing shall be carried out by qualified and trained personnel.

Precision aqua tech gaining traction

Precision aquaculture technologies has started gaining traction with more Indian entrepreneurs venturing into the aquaculture ecosystem.

"We witness a rising adoption of advanced technologies such as IoT, artificial intelligence, and satellite remote sensing for monitoring and prediction of farm activities. There is a rise in the popularity of land-based recirculating aquaculture systems that can help farmers growing fishes in the indoor farms. The growing interest among investors is also promoting the growth of R&D expenditure in aquaculture technology worldwide," said Rajamanohar Somasundaram, CEO, Aquaconnect.

According to him, the precision aquaculture technology market is estimated to be worth about $400 million in 2019 and is expected to reach $764 million by 2024 at a CAGR of 14 per cent.

Technology use

Somasundaram is currently using AI technologies to assist shrimp and fish farmers to predict diseases in advance, and improve efficiency and revenue. "In India, one out of four farmers is losing the crop to disease outbreak. Our venture Aquaconnect drives precision aquaculture technology adoption to improve production and risk management due to diseases," he said.

Shrimp and fish farming is one of the biggest livelihood activity in the coastal regions of India, which exports $5-billion-worth farmed shrimp and fish every year.

Though it is a multi-billion-dollar industry, the sector uses little or no technology to improve productivity and prevent loses due to diseases.

To predict disease outbreak and minimise the losses, Aquaconnect has created FarmMOJO, an AI enabled farm advisor tool. The mobile app interface advises farmers on water quality, feed usage and the overall health indicators of the ponds.

FSSAI launches 'Verified Milk Vendor Scheme' in Gujarat

In a first for India, the unorganised milk suppliers or vendors will now be brought under the monitoring through a verification programme.

The Food Safety and Standards Authority of India (FSSAI) has launched 'Verified Milk Vendors Scheme' in Gujarat with an aim to cover milk producers and milk vendors under the regulation net.

Under the new scheme, all the unorganised milk producers and vendors in Gujarat will be issued identity cards by taking their registration. "For the first time, we will be monitoring the raw and loose milk suppliers. Till now the focus has remained on the dairy products and the dairies. But the unorganised suppliers to these private dairies and the end-consumers were somehow missed from the regulatory monitoring. So, we are going a step ahead to keep a check on the raw milk suppliers and producers, who independently supply loose milk to small/big dairies and the end consumers," Hemant G Koshia, Commissioner, Food and Drug Control Administration (FDCA) - Gujarat, told Businessline.

The cooperative dairies and registered private dairies are already covered under the Food Safety and Standards Act, whereas the small vendors and producers often go unchecked.

Gujarat is estimated to have about 40 lakh milk producers and vendors who will be given these identity cards.

FSSAI Chief Executive Officer, Pawan Kumar Agarwal was also present during the launch of the scheme in Ahmedabad last week.

"Currently, we are finalising the rollout plan and coverage strategy. Within next six months to one year's time we will cover all the vendors with identity cards," Koshia stated.

Based on the Gujarat experience, the FSSAI will plan to roll-out the similar scheme nationwide.

On the retail consumption of loose milk, Koshia stated that about 85 per cent of the overall milk consumption in Gujarat is pouched milk, so only a small portion of retail consumers actually go for loose milk purchases. However, Koshia also flagged the risk at the private dairies, where a bulk of loose milk gets processed to make different milk products.

The food regulators in Gujarat have observed instances of milk adulteration in the State to be around 6-7 per cent of the samples collected. "This is in line with the national average of milk adulteration cases. In past 8-10 years, we have seen adulteration cases where water or sucrose were mixed with milk. But there has been no case of urea-mixed adulteration at least in Gujarat so far," stated Koshia.

Govt aims to raise fishery exports to 1 lakh crore by 2024-25: FM

The government aims to raise India's fishery exports to ₹1 lakh crore by 2024-25, Finance Minister Nirmala Sitharaman said on Saturday.

By 2022-23, the government also proposes to raise fish production to 200 lakh tonnes, Sitharaman said while presenting the Union Budget for 2020-21 in the Parliament.

“Growing of algae, sea-weed and cage culture will also be promoted. Our government will involve youth in fishery extension through 3,477 Sagar Mitras and 500 Fish Farmer Producer Organisations. We hope to raise fishery exports to ₹1 lakh crore by 2024-25,” she said.

The government also proposes to put in place a framework for development, management and conservation of marine fishery resources, she added.

Youth in coastal areas benefit through fish processing and marketing, the minister said.

PM-Kisan scheme: Fisheries Ministry seeks inclusion of fishermen for benefits

The fisheries ministry has sought inclusion of fishermen in the PM-KISAN scheme, which gives Rs 6,000 annually to farmers in three equal instalments.

“There are around 20 million fishermen, who need direct income support. They work in shared boats and own nothing, not even land. We have requested government to include fishermen in PM-KISAN scheme, the way government has allowed fishermen credit facility through Kisan Credit Card (KCC),” said an official of the fisheries ministry.

Agriculture minister Narendra Singh Tomar said they have received such a proposal from the fisheries ministry. “We have seen the proposal but no decision has been taken,” Tomar told ET.

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The fisheries ministry has launched a programme for identification and Aadhaar verification of fishermen.

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"Under the PM-KISAN scheme, the government has been able to identify only 84.6 million farmers. The government has estimated a total number of beneficiary farmers to be 140 million. It (government) still has room to accommodate 20 million fishermen also in that scheme," the official said.

Like farmers, the government has extended the facility of Kisan Credit Card (KCC) to fisheries and animal husbandry farmers in the budget for 2018-19 to help them meet their working capital needs. Till the last week of November 2019, only 8,400 fishermen were given the facility of KCC.

However, officials in the agriculture department said only cabinet can take a decision on including fishermen in PM-KISAN scheme. Fishermen having landholding can avail this scheme.

"The scheme has the approval of cabinet. Any modification or change in the scheme can be done only on the directions of the cabinet. The basis of this scheme is landholding and no farmer without land ownership can avail this scheme," an official said.

The government has so far distributed over Rs 50,000 crore under the PM-KISAN scheme to 84.6 million farmers in the first year of the launch of the scheme.

MPEDA proposes Rs 2500 crore project to modenise fishing harbours

The Marine Products Export Development Authority (MPEDA) with the assistance of the Centre will take up the upgradation and modernisation 25 fishing harbours in the country at a proposed outlay of Rs 2500 crore.

The project will start with two harbours namely Thoppumpady in Kochi in Kerala and Nizampatnam in Andhra Pradesh, MPEDA chairman K S Srinivas said. Preparation of the detailed project report (DPR) has been entrusted to Ernst and Young.

"After getting approval for the DPR a special vehicle vehicle (SPV) will be formed to implement the project. We expect around Rs 100 crore for the upgradation of one harbour," he told media persons on Thursday on the eve of three-day 22nd India international seafood show (IISS) beginning here on February 7. The idea is to set up processing facilities at the harbour itself to add value to the product.

The chairman stressed the need to increase value addition of marine products which was around 5% in India compared with 50% in South East Asian countries.

Srinivas said the current coronavirus scare virus has not affected the consumption of shrimp in China as the disease is limited to a small province of Wuhan. However, the visit of Indian trade delegation to China to discuss the issue of presence of white spot syndrome virus (WSSV) in some of the Indian seafood consignments has been put off because of the coronavirus outbreak.

India's seafood export to China reached $1 billion by November. But it has slowed down after the detection of WSSV residue in nine consignments. "The virus is present in most countries including China. So as per WTO guidelines the country already having this virus in cannot put restriction on consignments with same virus from other countries," he said.

The seafood export in the FY20 has shown a 5% decline till December. "It has been attributed to shortfall in catches due to cyclone and climate changes. However, the aquaculture production is expected to be higher this year," Srinivas said. Indian seafood export touched $6.7 billion in 2018-19 and MPEDA has targeted $10 billion by 2022.

In all 1500 delegates are expected to attend the international seafood show, including 57 from overseas. The show, jointly organised by MPEDA and SEAI will have the theme 'blue revolution-beyond production to value addition.' It will be inaugurated by Kerala governor Arif Mohammed Khan. Union minister of state for commerce Som Prakash and Kerala fisheries minister J Mercikutty Amma will attend.

Centre implementing dairy devpt schemes, states providing aid for storage

The government of India is implementing dairy development schemes to provide facilities for storage and marketing of milk and milk products. Besides, the state governments also provide financial assistance for storage and marketing of milk and milk products.

This was stated in a press note issued by the Ministry of Fisheries, Animal Husbandry and Dairying, Government of India, on Tuesday.

The Department of Animal Husbandry and Dairying (DAHD) is providing assistance to cooperatives for village level bulk milk coolers (BMCs), which are installed to cool and preserve milk.

As on March 2019, BMC storage capacity at the village level and processing facilities at the district/regional level available with the dairy cooperatives in the country were 41,447 thousand litre and 88,274 thousand litre per day, respectively.

This department is implementing the following schemes for creation/strengthening infrastructure for collection, chilling, processing and marketing of milk and milk products:

(i) National Programme for Dairy Development

(ii) National Dairy Plan-Phase I

(iii) Dairy Processing and Infrastructure Development Fund

(iv) Dairy Entrepreneurship Development Scheme

As per the 19th Livestock Census 2012, there were 190.90 million cattle in the country, owned by 65 million numbers of households. In a cooperative system, farmers owning milch cattle organise dairy cooperative societies (DCS) at the village level, where they pour milk.

The milk so collected from a cluster of such DCS are stored and cooled in BMCs located at one of these DCS. DAHD provides assistance for BMCs to dairy cooperatives for installation at village level dairy cooperative societies to cool and preserve milk.

In Rajasthan, as on December 2019, there were 2,686 BMCs with installed capacity of 4,410 thousand litre and 15,017 registered dairy cooperative societies, covering 8.20 lakh farmers.

In the country, as on March 2019, there was an installed BMC capacity of 41,447 thousand litre, and 1.91 lakh dairy cooperative societies, covering 169.29 lakh farmer members.

This information was given in a written reply by Dr Sanjeev Kumar Balyan, minister of state for fisheries, animal husbandry and dairying in Lok Sabha on Wednesday.

Consumption expenditure on milk increases to Rs 5,37,531 cr in 2017-18

Consumption expenditure on milk and milk products has increased from Rs 4,15,617 crore in 2013-14 to Rs 5,37,531 crore in 2017-18. This was among the findings of the National Account Statistics 2019.

The current production of milk is sufficient to meet the present demand. By and large, the milk produced in the country is consumed. Milk production in the country increased from 137.7 million tonne in 2013-14 to 187.7 million tonne in 2018-19, and value output has increased from Rs 4,23,150 crore to Rs 7,01,530 crore during the corresponding period. The per capita availability of milk increased from 307g per day in 2013-14 to 394g per day in 2018-19.

There is no information in the department that the cases of adulteration of milk are increasing within the country due to the increased demand of milk. However, in the nationwide National Milk Safety and Quality Survey, conducted by FSSAI (the Food Safety and Standards Authority of India) in 2018, only 0.18 per cent samples found to contain adulterants.

In Para 57 of the Food Safety and Standard Act, 2006, there is a provision of penalty for possessing adulterants, which is given as below: if any person who whether by himself or by any other person on his behalf, imports or manufactures for sale, or stores, sells or distribute any adulterant shall be liable

where such adulterant is not injurious to health, to a penalty not exceeding Rs 2 lakh;

where such adulterant is injurious to health, to a penalty not exceeding Rs 10 lakh.

The Act is implemented by Food Safety and Standard Authority of India (FSSAI) through the state food commissioners.

Further, this Department under National Programme for Dairy Development (NPDD) has provided milk testing equipment for testing of microbiological and chemicals parameters of milk and milk products, including adulterants to 231 dairy plants in the cooperative sector with a total outlay of Rs 271.64 crore during the current financial year.

This information was given in a written reply by Dr Sanjeev Kumar Balyan, minister of state for fisheries, animal husbandry and dairying, in Lok Sabha recently.

Centre to invest Rs 50k crore in fisheries sector in next 5 years, reduce post-harvest loss from 20% to 10%

Admitting annual post-harvest loss of Rs 61,000 crore in fisheries a “matter of serious concern”, the government on Tuesday told the Lok Sabha that the Centre to invest Rs 50,000 crore in this sector in next five years and build adequate storage and transportation infrastructure to minimise such loss.

Currently, the annual post-harvest loss (Rs 61,000 crore) in fisheries is more than the amount of India's annual export from this sector (Rs 46,589 crore) in value term.

The TOI on Sunday reported on post-harvest loss in fisheries which was flagged by a parliamentary standing committee on

agriculture. The committee in its report, tabled in Parliament on last Friday, attributed this huge annual post-harvest loss to faulty handling practices, inordinate delay in packing & transportation and lack of proper cold storage facilities.

Referring to the committee's findings, the BJD member Anubhav Mohanty on Tuesday raised the post-harvest loss issue during Question Hour in the Lok Sabha and asked the government about the steps taken by it to address the issue and double the income of fish farmers.

Responding to Mohanty's supplementary question, Union animal husbandry, dairying and fisheries minister Giriraj Singh said the government was trying to reduce the post-harvest loss from current 20% to 10% (of total production) in next few years with the help of setting up proposed infrastructure.

Underlining the Centre's plan to invest Rs 50,000 crore in this sector to boost production, productivity and export, Singh said the government had already sanctioned 191 ice plants, 112 ice plants-cum-cold storages and 206 refrigerated insulated trucks among other infrastructural facilities to deal with the issue of the post-harvest loss.

Currently, the inland fisheries reports much higher annual post-harvest loss (Rs 46,000 crore) as compared to marine fisheries (Rs 15,000 crore). The marine fisheries resources are spread along the country's vast coastline and over 20 lakh square km Exclusive Economic Zone (EEZ) and nearly 6 lakh sq km continental shelf area. The inland fisheries resources, on the other hand, are in the form of rivers and canals, floodplain lakes, ponds & tanks, reservoirs, brackish water and saline/alkaline affected areas.

According to latest estimates, the total fish production in the country stood at around 13.42 million metric tonnes during 2018-19. Of this, the marine fisheries contributed 3.71 million metric tonnes. However, nearly 20% of the total production is lost after harvest.

The minister said the post-harvest loss was earlier 30% (of total production five years ago) which now reduced to 20% and it would be further reduced to 10% in coming years.

During 2018-19, export of marine products stood at nearly 1.4 million metric tonnes and valued at Rs 46,589 crore. The government's target is to increase export of fish and fishery products by more than 50% in value terms so that the annual export can reach Rs 1 lakh crore by 2024-25. In next five years, the target is to increase fish production to 20 million metric tonnes.

The ministry's data shows that the percentage share of inland fishery in the country had increased from 29% in overall fish production in 1950-51 to 71% in 2017-18. Interestingly, the position is completely reversed in case of marine fishery whose share declined from 71% in 1950-51 to 29% in 2017-18.

It can be attributed to additional focus on inland fishery and also inability of fishermen to go for deep sea fishing in absence of deep sea vessels and other infrastructure along the coasts.

Though the share of inland fisheries has increased substantially over the year, absence of storage and transportation infrastructure saw heavy post-harvest loss.

Doubling Farmer Income Through Precision Dairy Farming

Rashmi Kumari and Dinesh Kumar*
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Animal Husbandry Sector plays a vital role in providing household nutritional security, increased income and employment especially of women and in rural transformation. Livestock farming is an integral part of crop farming system and contributes substantially to household nutritional security and poverty alleviation through increased household income. The returns from livestock especially dairying and mixed farming in small and medium holdings are larger and highly sustainable. Livestock contributed about 16% to their income, more so in states like Gujarat (24.4%), Haryana (24.2%), Punjab (20.2%) and Bihar (18.7%). The progress in this sector results in more balanced development of the rural economy and improvement in economic status of poor people associated with livestock. Indian agriculture is an economic symbiosis of crop and livestock production with cattle as the foundation. Dairy animals produce milk by converting the crop residues and by products from agricultural crops which otherwise would be wasted. Dairy sector contributes cash income, draught power and manure to the farmer. Livestock provides for human needs in the form of Food, Fibre, Fuel, Fertilizer, Skin and Traction. It is a living bank providing flexible finance in time of emergencies and also serves as insurance against crop failure for survival of farmer. If Agriculture is the foundation of our national economy, Animal husbandry constitutes the sheet anchor of agriculture. Indian agriculture marches on the patient back of the bullock.

On the other hand colonization of agriculture land due to exploding human population and land division from generation to generation reduces the land holding status amongst the farmers. These farmers are having less than 2.0 acre of cultivable land and are categorized as small and marginal farmers. Now to sustain /earn their livelihood, these farmers are making their subsidiary occupation i.e. dairy farming as their prime occupation as increasing human population and their education level create more demand of quality milk like milk and curd etc. Presently the landless, small and marginal farmers are holing about 70-75 per cent of the total livestock and producing major chunk of milk produced in India.

Moreover the dairy farming has following advantages which make it more lucrative:-

- ✓ The demand of milk will always go up, so there is no chance of market dip.
- ✓ The family labor can be engaged in the business. Even women alone can run this venture successfully.
- ✓ It creates an opportunity for self employment.
- ✓ It acts as reserve bank. Farmer can sell or purchase the animal(s) as and when required.
- ✓ If scientifically managed, there is no risk of failure.
- ✓ There is regular income flow from sale of milk and other subsidiary products. Extra income can be generated from implanting biogas plant, vermin composting, value addition etc.
- ✓ Various schemes and subsidies by different departments are there for promoting dairy farming.

But the beginners, small and marginal farmers have some constraints which put rider in their progress like feed and fodder deficit, lack of scientific knowledge on management and health aspects. By making following measures, farmers can earn more profit in their dairy farming venture.

The systematic approach can be:

1. Acquiring technical skills

This step is must for each and every farmer as ignorance or less knowledge cannot compete with the scientific knowledge at any level. For profitable dairy farming, the farmer must have knowledge of scientific management of animals including seasonal management, shed construction, measure for animals comfort, balance feed at each and every stage of animal's health management including vaccination, deworming, disease preventive measures, clean milk production, latest trend and technologies and value addition.

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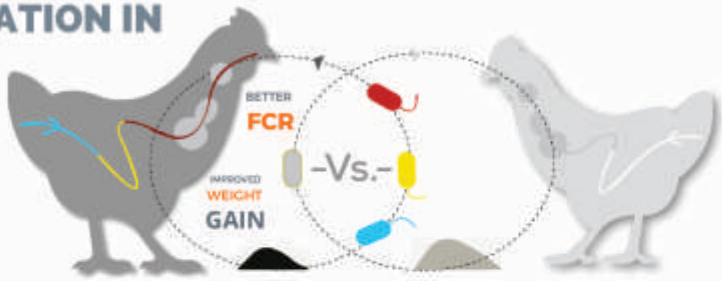

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Some time a very little and unexpected thing is affecting the production performance of the animals, for example water adequacy. There are many incidences where water inadequacy is the main culprit for fewer yield of the animals. So knowledge is very essential. One can have this knowledge by attending various training programmes organized by ICAR-NDRI, Karnal, GADVASU, Ludhiana or some other National Institutes/Training Centres. One point I must emphasize here is that these trainings must be attended regularly as every time farmers get something new from them beside revision of their earlier knowledge.

2. Keeping high performing animals

Majority of the farmers are holding milch animal having average milk production of 7-15 kg/day. Ruminant animals eat dry matter according to their body weight. Suppose two animals having weight of 600 kg and are producing 10 and 25 kg of milk per day. So, the second animal is more profitable as it will consume the feed near about same as that of first one but will produced more milk. So always keep animal with high genetic potential. Therefore, one should keep buffalo/ indigenous cow with daily milk yield of at least 10 kg and crossbred of 15 kg.

3. Shelter Management

Animals should be kept in such a way that they should feel comfortable. The environment should be stress free. Research showed that mounting activity in cows was reduced by almost half when cows were kept on concrete as opposite to softer floors while the duration of oestrus activity was reduced by 25 per cent. Housing arrangement, concrete floors without adequate bedding and feet and leg problems are other factors associated with lowered detection of heat and reduced fertility in herds. Cows do not have enough space to interact with their herd mates once on heat, making detection more difficult. In many cases, slippery floors in barns without bedding (because of straw shortage) affect reproduction. The excessive use of concentrate feeds in the ration of lactating cows along with the prevalence of concrete floors increase the frequency of cows with sore feet among herds. These cows dislike being mounted on coarse floors. They will exhibit fewer stands resulting in poor heat detection. Consequently, they will have significantly longer calving to service and calving to conception intervals.

4. Environmental Management

Among all environmental stressors, the temperature and the relative humidity are the major factors, which affect the reproductive performance of dairy cows. One aspect of the temperature effects is heat stress, which is caused by high ambient temperature and aggravated by high relative humidity. The temperature-Humidity Index (THI) is a widely used tool to assess the impact of heat stress on dairy cows. Hyperthermia after breeding compromises uterine environment with decreased blood flow to the uterus and increased uterine temperature, which can lead to implantation failure and embryonic mortality. These effects are thought to be associated with the production of heat-shock proteins by the endometrium during heat stress and reduced interferon-tau production by the conceptus. Moreover, heat stress can affect endometrial prostaglandin secretion causing abnormal luteal activity leading to premature luteolysis and embryo loss.

The management of heat stress and its effects through environmental modification involves reducing heat gain via solar and thermal radiation and high ambient air temperatures. This may be reasonably accomplished with shade and evaporative air cooling. A reduction in DMI (dry matter intake) is the primary reason milk production declines during heat stress periods. At the same time DMI decreases, maintenance cost of the cow increases in an attempt to maintain body temperature and thus, the overall availability of nutrients and energy for milk production is decreased. The most effective feeding management strategy to minimize production losses during heat stress periods is to provide a cool, comfortable environment by shading, sprinkling and/or forced air flow. The concentration of all nutrients will need to be increased in diets as DMI decreases during heat stress. The ration should be properly balanced, and generally the energy density should be increased in the summer to help compensate for decreased dry matter intake of the cow.

5. Health Management

Many specific reproductive health problems, such as the true anoestrus, ovarian cysts, retained placenta and metritis and other diseases like mastitis, lameness or infectious diseases are quite common in dairy herds. They require a good reproductive health program, which is essential for efficient reproduction, for checking normal uterine involution and return of ovarian cyclicity. Unfortunately, this type of program is lacking in many herds where Veterinarians are usually called on an emergency basis. Anoestrus and repeat breeding were related with deworming, mineral mixture supplementation and concentrate feeding in animals. Majority of organized dairy farmers (90.00%) were having low level of stressors score while majority of unorganized dairy farmers (60.00%) were having medium level of

stressors score. Environmental, nutritional, management and total stressors score of organized as well as unorganized farmers was positively correlated to the disease incidence at the dairy farms. Common infectious diseases can be easily managed through timely vaccination and adequate deworming.

6. One calf per year

This is the basic mantra for profitable dairy farming. Management of the farm/animals should be in such a way that animal must get conceived after 2-3 months of calving. To achieve this target the need of animals during pregnancy, transition period, calving and during milking should be taken care off. Balanced nutrition/feeding are the key. Majority of diseases, reproductive problems and less milk production of the animals are related with the faulty nutrition of the animals. So, farmers should always provide his animals the quality green fodder, balanced and ideal concentrate, ad lib water in proper quantity and proper proportion to extract the maximum from animal as per their genetic potential.

Suggestions for enhancing reproductive efficiency by

- ✓ Efficient heat detection
- ✓ Breeding at the right time
- ✓ Sound recording
- ✓ Comprehensive reproductive health program
- ✓ Sound nutritional program
- ✓ Adoption of heat stress relief strategies

7. Record Keeping

Record keeping is a very vital step to be taken to analyze the cost benefit ratio of the dairy farming, but a very few small and marginal farmers are doing it. Record keeping of every penny spent on inputs for dairy farming must be done along with income generated from sale of milk, animals, dung and other things related to farm. Similarly, record of pedigreed of animals, animal productive and reproductive performance, calving, must also be kept. A pedigreed animal and their calves always get better price than non-pedigreed animal.

8. Marketing Facilities *"Be a milk man-give pure-get more"*

This is what I always suggest to each and every dairy farmer whosoever comes to me. Increasing awareness among masses about quality things and health concerns push the people to buy best things. People are ready to pay extra money for the quality milk. But in our state most of the milk produced by small and marginal farmers are taken away by the middle milkmen who are not the actual milk producers, but the middlemen are getting good deal of money from selling of milk and cream. There are many examples in Bhopal and Indore itself where farmers themselves are selling liquid milk and getting good profit. Some even have hanged the sign board quoting "prove the milk adulteration and get one lakh cash award". This gives a consumer a sense of satisfaction that he is getting pure milk. Similarly clean and untouched milk are also getting higher price and likewise organic milk and antibiotic, insecticide/pesticide free milk are catching high demand among the consumers.

9. Value addition

Value addition is a most sought after thing in dairy farming to get more profit. A spoon of culture and a little effort can fetch you an extra 15-20 rupees per kg i.e. by curd making. Similarly, paneer, cheese, khoa, skim powder and sweets are some other products one can make from milk. Value addition of colostrum can also be done by preparing health drinks or by making panjiri from it especially at farm itself where due to synchronization of heat, calving occurs almost parallel.

10. Biogas plants

Every farmer having 5-10 animals must install a biogas plant, though the initial cost is a bit high but government is providing subsidy on its installation. If farmers are having a few animals, 2-3 farmers can collectively do this venture. Once installed, it will solve the problem of cooking gas and electricity. Many farmers have given the gas connection to other villagers and are getting monthly charges from them. Similarly, electricity can also be produced by running generator on biogas; this also saves the expenses on electricity consumption. On the other hand, slurry produced from biogas plant can also be used for making farm-yard manure and vermin compost, whose demand increases day by day in lieu of growing organic farming.

11. Community farming

This is another thing the farmers can do. A group of 2-3 like-minded farmers can pool their resources i.e. animals and do all the management collectively. This helps in reducing the cost of inputs i.e. labour cost, medicine, vaccination, milking and profit is distributed among these farmers as per their share. Many big firms are entering into this arena of community dairy farming and are doing good business. Likewise, these farmers can do other venture collectively viz. community silage making, community biogas plant, community vermin-composting, community feed plants and many others. Silage feeding is a very important aspect in

economizing the cost of milk production. Even an individual small farmer can make the silage in bulk when there is glut of green fodder and it is a cheap source of storing surplus fodder. He can also purchase the green fodder from the market and make the silage. During the lean periods he can even sell this silage to the other fellow dairy farmers and can get handsome profit besides feeding the silage to their own animals. Feeding silage during lean period prevents the dip in milk production in this time. During lean period, milk rate shoots up due to high demand and low production. So preventing the dip in milk production during lean period, use of silage will keep the income flow regular.

In conclusion, the beginners and the small farmers can first start the venture through five to ten animals. During this period, they will get enough experience for the well-being of his animals, thereby getting profits according to the genetic potential of the animals. First two to three years in this venture will be the incubation period, thereafter, the followers of the adult animals will also start producing and then the farm will be run on firm footing.

ADVERTISER'S INDEX

Seaweeds: a Living Marine Resource

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1. Introduction

Marine macroalgae or seaweeds are plant-like organisms that generally live attached to rock or other hard substrata in coastal areas. It is a multicellular algae that are photosynthetic and have sexual and asexual reproduction. Their reproduction stage has two parts the gametophyte stage is sexual and the sporophyte stage is asexual. They are classified in kingdom protista. Structure of seaweed consists of thallus – the entire body of seaweed; lamina – a flattened structure that resembles a leaf; pneumatocysts – gas filled bladders that keep the blades close to surface; stipe – a stem like structure used for support, not present in all and holdfast – a specialized structure on the base of a seaweed which acts as an "anchor" allowing it to attach to a surface.

Seaweeds are commercially important renewable marine living resources (Rameshkumar and Rajaram, 2019). They occur in the intertidal, shallow, and deep waters of the sea, up to 150m in depth and also in estuaries. There are four classes of seaweeds, Chlorophyta (green algae), Phaeophyta (brown algae), Rhodophyta (red algae), and Cyanophyta (blue-green algae) (Attaway and Zaborsky, 2013). They serve as primary producers and provide shelter, nursery grounds, and food sources for marine organisms. Seaweeds are not only of high ecological importance, but are also of great economic importance. Dried thalli are used as human and animal food, and also as fertilizer. Extracted seaweed substances are used as stabilizers and stiffeners in the food, cosmetics, and pharmaceutical industries, and biotechnology. The greatest variety of red seaweeds is found in subtropical and tropical waters, while brown seaweeds are more common in cooler, temperate waters. There are 221 species of seaweed still utilized commercially. Of these, about 145 species are used for food and 110 species for phycocolloid production (Khan and Satam, 2003).

In 2016, aquaculture was the source of 96.5 percent by volume of the total 31.2 million tonnes of wild-collected and cultivated aquatic plants combined. Global production of farmed aquatic plants, overwhelmingly dominated by seaweeds, grew in output volume from 13.5 million tonnes in 1995 to just over 30 million tonnes in 2016. The rapid growth in the farming of tropical seaweed species (Kappaphycus alvarezii and Eucheuma spp.) in Indonesia as raw material for carrageenan extraction has been the major contributor to growth in farmed aquatic plant production in the recent past. Indonesia increased its seaweed farming output from less than 4 million tonnes in 2010 to over 11 million tonnes in 2015 and 2016. Of the 30 million tonnes of farmed seaweeds produced in 2016, some species (e.g. Undaria pinnatifida, Porphyra spp. and Caulerpa spp., produced in East and Southeast Asia) are produced almost exclusively for direct human consumption, although low grade products and scraps from processing factories are used for other purposes, including feed for abalone culture. China is the largest producer of the farmed seaweed with total production of 14.3 million tonnes in 2016 accounting for 47.9 % share to the total seaweed production of the world (FAO, 2018)

2. Seaweed resources in India

Seaweeds grow abundantly along the Tamil Nadu and Gujarat coasts and around Lakshadweep and Andaman and Nicobar islands. There are also rich seaweed beds around Mumbai, Ratnagiri, Goa, Karwar, Varkala, Vizhinjam and Pulicat in Tamil Nadu and Chilka in Orissa. In 2018, total seaweeds production of India from wild environment was 15,930 tonnes (CMFRI, 2019). In India, 650 species of marine algae, with a maximum of 320 species of Rhodophyta, followed by 165 species of Chlorophyta and 150 species of Phaeophyta, have been recorded, among which, about 60 species are commercially important. About 302 species have been recorded on the Tamil Nadu coast. A total of 147 species of algae comprising 42 species of green algae, 31 species of brown algae, 69 species of red algae, and 5 species of blue green algae are distributed in the Gulf of Mannar (Maheshwari, 2007). Agar yielding red seaweeds such as Gelidiella acerosa and Gracilaria sp. are collected throughout the year, while algin yielding brown algae such as Sargassum and Turbinaria are collected seasonally from August to

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January on Southern coast. The surveys carried out by Central Salt and Marine and Chemical Research Institute (CSMCRI), Central Marine Fisheries Research Institute (CMFRI) and other research organizations have revealed vast seaweed resources along the coastal belts of South India. On the West Coast, especially in the state of Gujarat, abundant seaweed resources are present on the intertidal and sub tidal regions. These resources have great potential for the development of seaweed-based industries in India. The seaweed industry in India is mainly a cottage industry and is based only on the natural stock of agar-yielding red seaweeds and algin yielding brown seaweeds.

3. Commercially important seaweed species

- ***Ulva lactuca (Sea Lettuce):*** **(Family:** ***Ulvaceae)***
- ***Enteromorpha compressa:*** **(Family:** ***Ulvaceae)***
- ***Caulerpa racemosa (Sea grapes):*** **(Family:** ***Caulerpaceae)***
- ***Codium tomentosum:*** **(Family:** ***Codiaceae)***
- ***Sargassum wightii:*** **(Family:** ***Sargassaceae)***
- ***Hypnea valentiae:*** **(Family:** ***Hypneaceae)***
- ***Gelidiella acerosa:*** **(Family:** ***Gelidiellaceae)***
- ***Gracilaria edulis:*** **(Family:** ***Gracilariaceae)***
- ***Kappaphycus alvarezii:*** **(Family:** ***Solieriaceae)***

4. Kappaphycus farming technology

Kappaphycus alvarezii is one of the economically important tropical red seaweed species having higher demand for its cell wall polysaccharides (Bixler, 1996). Commercial cultivation of K. alvarezii originated in the Philippines in 1960 (Doty and Alvarez, 1975). Experimental farming had been carried out in several countries, including China, Venezuela, Japan, Fiji, the United States (Hawaii), the Maldives, Cuba, and India (Saito, 1971). In India, cultivation of this seaweed was initially started at Mandapam on the southeast coast of India. Commercial cultivation of Kappaphycus sp. has been successfully established along the Gulf of Mannar and Palk Bay coast of Tamil Nadu, India (Eswaran et al., 2002). This farming has become a viable alternative source of income and livelihood for small-scale fishermen.

First large scale commercial cultivation of seaweeds in India was started by Pepsi Foods Ltd. (PFL) company along a 10 km stretch of the Palk Bay side towards Mandapam (Ramanathapuram Dist.) in Tamil Nadu (Marine Algal Research Center, CSMCRI, Mandapam). Initially cultivation started in 100 hectares through a contract farming system. Each harvest cycle from planting to harvesting takes 45 days with an annual yield of 100 tonnes (wet weight) per hectare, which translates into 10 tonnes of dry seaweed or 2.5-3 tonnes of carrageenan. The company has plans to expand culture operations to over 5,000 to 10,000 ha in the near future.

Benefits of K. alvarezii farming

- High return on investment
- Culture period is as short as 45 days under optimal conditions
- Environment-friendly method
- Could be a source of supplemental income for small fisherfolk associations and people's cooperatives
- The farming of Kappaphycus can be a low-cost venture and a profitable one
- Demand for seaweeds is high in the local and international markets

5. Status of Seaweed farming in India

- **Lakshadweep:** Gracilaria edulis, Hypnea valentiae and Acanthophora spicifera are the commercial important species cultured in Lakshadweep Island (Mohammed, 2015). Gracilaria edulis, a 17 – fold increase in yield was obtained for Agar yielding species in 76 days in the first harvest at Minicoy Lagoon, Lakshadweep, India during south west monsoon season by adopting single bottom coir rope method.
- **Kerala:** A maximum of 20.1 fold increase in yield in 80 days and a minimum of 13.2 fold increase in yield in 40 days was obtained for the carrageenan yielding red seaweed K. alverazii by adopting raft culture method which was carried out as demonstration along with green mussels (Pernaviridis) – integrated farming – at Vadakkekad, Padane, Kasaragod District, Kerala (Mohammed, 2015).
- **Gujarat:** Farming of Hypneamus ciformis was carried out during post monsoon period using raft culture method at Chorward near Veraval (Mohammed, 2015). A fivefold increase in yield was obtained during August to September period in 62 days. Seaweed culture was integrated with Sea Cage culture. K. alvarezii was farmed in bags and raft with Sea Cage and the growth was found promising. A maximum of 9

fold increase in weight was obtained by adopting bag culture method in 55 days (January and February) and 11 fold increase in weight by adopting raft method in 64 days (February and March) for K. alvarezii farming.

6. Utilization of Seaweed

Seaweeds are renewable source of food, energy, chemicals and medicines. Provides valuable source of raw material for industries like health food, medicines, pharmaceuticals, textiles, fertilizers, animal feed etc. Seaweeds used for production of Agar, Alginates & Carrageenan. Seaweeds have been a staple food in Japan and China for a very long time. The green seaweeds Enteromorpha, Ulva, Caulerpa and Codium are utilized exclusively as source of food. These are often eaten as fresh salads or cooked as vegetables along with rice. Porphyra (Nori), Laminaria (Kombu) and Undaria (Wakame) are used for making fish and meat dishes as well as soups and accompaniments. Seaweeds were rich in minerals, vitamins, trace elements and bioactive substances, seaweeds are called medical food of the 21st century. They are also used for treatment of cancer, bone-replacement therapy, cardiovascular surgery, etc.

7. Problems and Prospects

Overexploitation is one of the major problem leading to a scarcity of raw material, poor quality raw material, labor shortages during the paddy harvesting and transplanting season, lack of technology to improve processed product quality, and a lack of information on new and alternative sources of raw materials (Mohammed, 2015). Efforts are needed to increase production through improving harvesting techniques, removal of competing species, creation of artificial habitats and seeding of cleared areas. As the technology for reliable methods for the cultivation of different commercially important seed stocks and their improvement has either already been developed or presently being in research, it needs to be disseminated effectively to the target community. Extensive surveys need to be conducted to identify suitable sites for large-scale seaweed culture. Seaweed polyculture in association with molluscs and fishes seems to have good prospects to increase harvest and profits.

8. Conclusion

Seaweed farming is a promising opportunity for uplifting the livelihood of the fishermen communities. Unlike other forms of aquaculture, seaweed farming foregoes the use of feed and fertilizers and has minimum technological and capital requirements. In addition, grow out cycles are short, normally lasting less than two months. This low cost occupation involves intensive manual labor and can sustain the entire family, including women, thereby not only helping the families' earning potential, but also supporting the community's holistic economic status. In some communities, seaweed farming has emerged as the most relevant livelihood strategy. Given the rising global demand for seaweed-derived products, seaweed farming has the potential to generate further socio-economic benefits to coastal communities in tropical regions. Seaweed farming also has the potential to be part of a coastal zone management strategy, and can be implemented elsewhere, including developing countries.

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REPORTS FROM IPPE

AB Vista: NIR tools can reduce losses linked to feed ingredient variability

By Aerin Einstein-Curtis, 14-Feb-2017

Related topics: Manufacturers, Markets, Grains, Protein & amino acids, Analytical equipment

NIR technology is moving beyond analysis of traditional components such as fibre and protein to include measurements of phytate, energy and reactive lysine, says AB Vista.

The company works with near infrared (NIR) technology as way to help customers format their feeds more precisely and avoid wasting essential nutrients, said Glison Gomes, global technical manager, AB Vista.

We caught up with him at the International Processing and Packaging Expo (IPPE) in Atlanta to hear more about how the technology can be used for precision feeding, and what new uses may be in available in the future.

"This [NIR analysis] service allows the customer to better understand the key ingredient that is the cereal, and therefore utilize it wisely," he said. *"We don't want our customers to have to put in an extra safety margin, we want them to be precise [and] to have better profitability."*

NIR analysis can be used to screen amino acids now, he said.

"In the past it was not possible to analyze amino acids, and then with better technology, better computational software we're able to measure tiny things in the feed or in the feedstuffs," he added.

"In the beginning everyone was skeptical about NIR; it is only recently that everyone has been keener to use and understand it," he said. *"Also computational technology has evolved a lot – you are now able to carry out data transformation to increase the precision of this technique."*

AB Vista: *"Currently used for basic raw material and feed quality control, new advances in NIR software and hardware are set to deliver commercially viable systems capable of in-line and real-time monitoring of feedstuff and feed nutrient content and physical characteristics. Losses associated with feed ingredient variability can be reduced, feed formulations can be amended and the quality of completed diets continuously monitored."*

Energy capture

One goal of using NIR tools in feed formulation is to ensure that nutritional elements in a feed are not wasted, said Gomes. For example, if a producer knew that two loads of corn being used to make a feed offered different energy levels, they could select the one required for optimal animal performance, he said.

The energy value of different cereals can vary by 360 kcal/kg, said AB Vista, while phytate levels vary not just between feedstuffs but also within a single raw material.

The technology also allows producers to evaluate feed ingredients coming from different locations, said Gomes. It also allows them to both specify and verify that feed ingredients contain certain elements.

"We have a big database of raw materials coming from different countries and for instance some companies import corn from the US, from Argentina, and from Brazil and then you can see the differences," he said. *"I can pay a little bit more for supplier a, b or c because the quality of their feedstuff is a little bit better, or there is more protein or more energy."*

Mixed feed analysis

One recent advancement in NIR technology has been to allow for the analysis of mixed feeds rather than single feed ingredients, said Gomes. However, it is still a common misconception that ingredients have to be examined individually.

"There is still misunderstanding about NIR," he said. *"The technology picks up the vibration of molecules, so organic molecules vibrate and this happens regardless of if they are alone or if they are in a mixture. So in reality, if you have a very good database and a very good calibration, you will be able to pick up differences or vibrations even in complete feed."*

Although NIR technology to track potential anti-nutrients, such as mycotoxins, is not available yet, that is being explored, said Gomes.

Eventually the ability to analyze the nutritional elements or qualities of a feed ingredient could allow feed mills the chance to channel ingredients by grade, said Gomes. But facilities would likely need to significantly increase the number of silos or storage options to make use of that process, he added.

He said improved computer processing speeds would enable feed mill mixing systems to both evaluate feed ingredients as they are brought into a facility and to modify feed formulations as needed: *"We don't have fast enough computers and*

systems to make all of this happen, but people are using these technologies in milk [analysis] – so you have this sort of inline stuff going on with more simple models and that I do believe this will happen soon in the feed industry."

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Importance of Micronutrients in Animal Health

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Micronutrients are required in animal diets for health and welfare, and therefore they are essential for the agricultural production of milk, meat, fibre, and eggs. It is clear from the literature that deficiencies of micronutrients, can result in major reductions in productivity. Nutritional deficiency as well as imbalances are frequently implicated as the cause of infertility in animals .Intensified dairy production today has confined the animals indoor and made them to depend solely on stall feeding practices ,hence for achieving higher production ,increased supplementation of micronutrients are needed. Thus, their deficiency often leads to sub-optimal growth and fertility. For proper functioning of animal body ,in addition to protein ,fat and carbohydrates ,minerals also required in smaller amounts to prevent deficiency diseases in animals .

The first thing to note is that to be important an element must have nutritional relevance for livestock; this usually means that it is possible for an animal to become 'deficient' in that element and show physical signs of that deficiency. These signs may be 'clinical' or 'sub-clinical'. Clinical signs are those that are obvious to see, such as browning of the hair in the case of copper deficiency; in these instances diagnosis is relatively simple. More commonly animals can be sub-clinically deficient, where outward signs are not obviously seen, but where production is compromised. Examples here are loss of fertility through selenium deficiency and loss of immunity to infection through cobalt deficiency. The problem here is that the deficiencies can cause more harm because they are not clearly seen and so they can be more widespread, cause more loss of production, and be more difficult to diagnose than clinical deficiencies. Indeed, if animal health and welfare are obviously compromised by a clear clinical deficiency, then it is probably the case that loss of production has been occurring for a longer time though a sub-clinical deficiency in the animal population. Iron (Fe) Copper (Cu) Cobalt (Co) Selenium (Se) Iodine (I) Manganese (Mn) Zinc (Zn) Boron (B) Micronutrients are also essential for monogastrics such as pigs and poultry and a separate section will deal with these species.

Table - 1 - Role of micronutrients –

Element	Role	Deficiency symptoms	Toxic
CO	Vitamin B12 function and energy assimilation	Poor growth, anaemia loss of coat, exudate from is often termed 'pine' eyes, low immunity to or 'pining'. disease, infertility	No
Se	Vitamin E function	Infertility, Poor growth ,white muscle disease	Yes
Cu	Haemoglobin formation ,enzyme function and pigments	Anaemia ,poor growth ,bone disorders ,digestive upsets ,infertility ,brain and spinal cord lesions. decolouration of hair	Yes
Fe	Protein and enzyme function ,blood haemoglobin	Anaemia	No
Zn	Enzyme function	Stiff and swollen joints	Yes

Role of micronutrients –

Element	Role	Deficiency symptoms	Toxic
Mn	Enzyme activation	Retarded growth ,skeletal abnormalities, ataxia in newborns and reproductive failure	Yes
I	Thyroid gland function	Goitre and reproductive failure	Yes
B	Enzyme function	Weak bones ,low conception rates, poor immune function	?

Cobalt

Cobalt is an essential trace mineral for ruminant animals such as dairy and beef cattle ,sheep and goat .the main function of cobalt in ruminants is to be a component of vitamin B12,also known as cobalamin .Vitamin B12 ,also known as cobalamin .Vitamin B12 is an essential cofactor for the function of two enzymes methionine synthase and L-methylmalonyl -COA mutase and thus plays an essential role in amino acid and fatty acid metabolism ,and in DNA and haemoglobin synthesis Many of the micronutrient deficiencies that exist have a negative impact on the fertility of livestock. Cobalt is no exception and can be used to illustrate the point. Dunlop (1946) was the first to recognise this link for Co deficiency. There is still a lack of evidence in the literature that would fully explain Dunlop's very practical observations and this is the case for most micronutrient effects, but there are some clues. Mgongo et al. (1985) found that goats with Co deficiency showed irregular oestrus, with lower cyclic progesterone and luteinizing hormone concentrations in blood. In a later experiment (Mgongo et al., 1986), these workers also reported a greater number of anovulatory cycles ('false heats') in Co deficient animals and concluded that the site of action for the effects was the hypothalamus-pituitary axis. The inference here is clear; sub-clinical deficiencies of micronutrients can be very damaging to animal performance and profitability, simply by leading to small reductions in fertility. Every infertile cycle or missed fertile cycle of livestock means more time spent barren, higher culling rates, extended calving/lambing indices, and therefore higher costs and lower financial returns.

Selenium

The nutritional importance of Se became evident in the 1950s when it was shown that most myopathies in cattle and sheep could be prevented by supplementing the diet with the element or vitamin E. The role of Se containing vitamin E as a component of the enzyme glutathione peroxidase , was demonstrated in 1973 (McDonald et al., 1981). This enzyme is involved in the removal of hydrogen peroxide from REDOX type reactions in cells and in modern parlance is thus termed an 'anti-oxidant'. A substantial part of northern Europe produces herbage with levels of Se below the minimum range of concentrations, 30-100 µg kg-1 DM, required for satisfactory health and performance in grazing ruminants (Gissel-Nielsen et al., 1984). Deficiency is of far greater concern than toxicity in seleniferous soils. Low concentrations of Se in herbage are generally associated with soils of low total Se content and those derived from acid parent rock. From a practical farming perspective, Gupta and Wilkinson (1985) reported that the greatest variations in herbage Se are probably caused by plant rather than by soil factors, particularly by dilution during rapid growth. Evans et al. (1983), conducting a survey in England and Wales, found a very poor correlation between total soil Se and Se levels in conservation-stage herbage. These latter workers also found that soil and herbage values were very poor predictors of blood Se levels in grazing stock. The ability to detect Se deficiency in animals was aided by the discovery of the Se-containing enzyme glutathione peroxidase (GSH-Px) in blood. The measurement of GSHPx in ruminant serum is now the standard technique for assessing Se status in livestock, but Halliday (1983) rightly points out that finding a low GSH-Px status in animals is an indicator of likely Se deficiency, rather than an unequivocal indicator of deficiency and consequent production loss. Clinical Se deficiency is not common in modern agriculture. This is perhaps due to

greater awareness (see section below on farmers' knowledge). However, subclinical deficiency leading to sub-optimal live weight gain of young beef and lamb stock, and also to reduced fertility of suckler cows, ewes, and dairy cows, if often a problem. Prophylactic treatment is simple and effective, but it should be remembered that, in the UK (which has large areas of acid base rock), Se deficiency is most commonly also associated with deficiencies of Co and Cu (SAC/SARI, 1982). It should therefore be remembered that treating a Se deficiency only will most likely leave a Co and/or Cu deficiency untreated to continue a damaging effect on animal performance.

Selenium toxicity

Poisoning of ruminant stock with Se is uncommon, but can occur on seleniferous soils. 'Alkali' disease and 'blind staggers' are localised names for diseases of animals grazing certain seleniferous areas in the USA. Acute poisoning, which results in death from respiratory failure, can result from sudden exposure to high Se intakes. Chronic forms of the condition include dullness, stiffness of the joints, loss of hair from the tail, and hoof deformities.

Copper

The role of Cu in mammalian metabolism was first reported in 1924 (McDonald et al., 1981). Although not itself a constituent of haemoglobin, Cu is used in its formation. Cu is present in certain other plasma proteins, such as ceruloplasmin. A deficiency of Cu impairs the animal's ability to absorb Fe, mobilise it from the tissues, and utilise it in haemoglobin synthesis. Copper is also a component of other proteins in blood. One of these, erythrocuprein, occurs in erythrocytes (red blood cells), where it plays a role in oxygen metabolism. The element is also known to play a vital role in many enzyme systems; for example, it is a component of cytochrome oxidase, which is important in oxidative phosphorylation. Copper is also necessary for the normal pigmentation of hair, fur, and wool, and is present in all body cells, being particularly concentrated in the liver, which acts as the main Cu storage organ in the body. Since Cu performs a variety of functions in the animal body, deficiency symptoms are many and complex. These include anaemia, poor growth, bone disorders, scouring, infertility, de-pigmentation of the hair and wool, gastrointestinal disturbances, and lesions in the brain and spinal cord. The lesions are associated with muscular incoordination, and occur especially in lambs, where the condition in the UK is known as 'swayback'. However, soil and pasture Cu levels are poor predictors and even poor diagnostic tools for Cu deficiency, because, as with Co and vitamin B12, the liver acts as the main storage organ and acts as a buffer to low Cu intake. Thus, swayback is often a reflection of historical Cu intake and can occur on pastures that seem adequate or even 'high' in Cu content. Copper plays an important role in the production of 'crimp' in wool. The element is present in an enzyme which is responsible for the disulphide bridge in 2 adjacent cysteine molecules. In the absence of the enzyme the protein molecules of the wool do not form this bridge and the wool, which lacks crimp, is referred to as 'stringy' or 'steely'.

Copper toxicity

It has long been known that Cu salts given to animals in excess are toxic. Copper can be considered a cumulative poison and so care is needed in administering Cu to animals in any form. The tolerance to Cu varies between species and breeds, with sheep being the most susceptible of the ruminants. Where Cu in herbage is 10-20 mg kg-1 DM and herbage Mo and S contents are low, then Cu toxicity has been reported (McDonald et al., 1981). Therefore, Cu should only be administered to livestock where it is known that a deficiency exists or where there is a regular history of deficiency diseases; prophylactic treatment without this knowledge is unwise.

Copper-molybdenum-sulphur interrelations

Molybdenum (Mo) can exert a depressive effect on Cu absorption and availability in animals. It is now clear that Mo only exerts its effect on Cu in the presence of sulphur (S). Sulphide is formed by ruminal micro-organisms from dietary sulphate or organic S compounds; the sulphide then reacts with Mo to form thiomolybdate, which in turn combines with Cu to form an insoluble copper thiomolybdate (CoMoS4), thereby limiting the absorption of dietary Cu. Where industrial pollution results in large depositions of S from the atmosphere or where ammonium sulphate is used as a source of nitrogen for livestock farmers (who, with their suppliers, tend to ignore that the fertiliser contained 60% SO3), S induced Cu deficiency can occur where soil Mo is relatively high. However, S/Mo induced Cu deficiency will only occur where herbage levels of S are at least 4000 mg kg-1 DM

(0.4%) and combine with herbage Mo of over 3000 mg kg-1 DM (0.3%).

Iodine

Higher animals need very little . Its only known use is in the synthesis of 2 hormones, tri-iodothyronine and tetra-iodothyronine (thyroxine), both produced in the thyroid gland. These hormones accelerate reactions in most organs and tissues, thus increasing basal metabolic rate, accelerating growth, and increasing the oxygen consumption of the whole animal. The main indicator of clinical disease is enlargement of the thyroid gland, termed endemic goitre (referred to as 'big neck' on-farm, where animals develop a swollen neck as the gland expands). Reproductive disorders are the most common problem arising ., birth to hairless, weak, or dead young. General infertility is the symptom seen in more sub-clinical situations; again a difficult 'symptom' to diagnose and attribute to a micronutrient deficiency. Goitrogenic compounds can also induce goitre. These substances are present in certain potential ruminant feeds, such as plants from the Brassica family (kale, cabbage, and rape) and also soya beans, linseed, peas, and groundnuts. Livestock fed on diets containing significant quantities of these feeds .

Iodine toxicity

Toxic effects of excess I intake include depressions of weight gain and feed intake. However, these are rare and a dietary level of 50 mg kg-1 DM is necessary to induce toxicity in animals of around 100 kg bodyweight.

Iron

More than 90% of Fe in the body is combined with proteins, the most important being haemoglobin, which contains about 3.4 g kg-1 of the element. Iron also occurs in blood serum in a protein called transferrin, which is concerned with the transport of Fe from one part of the body to another. Ferritin, a protein containing up to 200 g kg-1 of the element, is present in the spleen, liver, kidney, and bone marrow and provides a form of storage of Fe. Iron is also a component of many enzymes including cytochromes and certain flavoproteins. Since more than half the Fe in the body occurs as haemoglobin, a dietary deficiency of Fe would clearly be expected to reduce formation of this protein and result in anaemia. Haemoglobin is contained in red blood cells (erythrocytes) that are continually produced in bone marrow and are always being 'turned-over'. However, the Fe from the used red blood cells is recycled in the formation of new ones and, as such, the dietary need for Fe is relatively low compared to how much is contained in the body as a whole. Thus, Fe deficient anaemia is not common in ruminants and is most likely to occur in pregnant dams and rapidly growing young.

Zinc

Zinc has been found in every tissue of the animal body.The element tends to accumulate in bones rather than the liver. High concentrations have been found in skin, hair, and wool (McDonald et al., 1981). The main use of Zn is in enzymes and these include: carbonate dehydratase, pancreatic carboxypeptidases, glutamic dehydrogenase, and a number of pyridine nucleotide dehydrogenases. Zinc also has a role as a co-factor for many other enzymes. Clinical deficiency symptoms in calves include inflammation of the nose and mouth, stiffness of the joints, swollen feet, and parakeratosis. The response to supplementation is dramatic, with improvements in skin condition being seen within 2 to 3 days. Sub-clinical conditions associated with general 'ill-thrift' are also easily treated with Zn supplementation.

Zinc toxicity

The toxic effects of an excess dietary intake of Zn are depressed feed intake and induced Cu deficiency. However, ruminants have a high tolerance for this element and poisoning will be very rare.

Manganese

The amount of Mn present in the animal body is extremely small. Most tissues contain traces of the element, the highest concentrations being in the bones, liver, kidney, pancreas, and pituitary gland (McDonald et al., 1981). Manganese is important to ruminants as an enzyme activator and resembles magnesium in its ability to activate a number of phosphate transferases and decarboxylases, notably those concerned with the tricarboxylic acid cycle and thus energy acquisition and utilisation. Clinical Mn deficiency will show in livestock as retarded growth, acute ataxia in newborns, skeletal abnormalities and reproductive failure. Sub-clinical deficiency symptoms in cattle have been recorded as depressed or delayed oestrus and conception, as well as increased abortions.

Boron

The exact action and function of B in ruminants, indeed all animals, is unclear. Indeed, its inclusion as a micronutrient for livestock may still be seen as controversial in a paper such as this. However, there is evidence that B is needed in bone formation (Bergman, 1981). Apparently, low levels of B can cause brittle bones and joint problems. Boron is associated with Ca processes in plant cells and this may also be the case in mammalian bone. The role of B, directly or indirectly, in bone physiology requires further investigation.

Boron toxicity

This subject is again unclear. Reports of excess B leading to reproductive dysfunction await adequate scientific investigation.

Micronutrients and monogastrics

In swine, deficiency symptoms include hepatic necrosis, oedema of the colon, lungs and subcutaneous tissues, bilateral paleness, white muscle disease, and dystrophy of the myocardium (heart). According to Nielsen (2004), Se deficiency in foals and horses has been observed to result in white muscle disease Pigs can also suffer from impaired reproduction, reduced lactation, and compromised immune response resulting from subclinical and clinical Se deficiency. Se deficient chicks exhibit poor condition, reduced feed intake, and growth and leg weakness; exudative diathesis may result, especially at 3 to 6 weeks of age in housed birds and often leads to death. Chronic Se toxicity in monogastrics has similar symptoms to those in ruminants. Additionally, swine may exhibit impaired reproductive performance generally and in chickens Se toxicity leads to reduced egg production and hatchability and deformed chicks. Whilst Co deficiency is not really an issue in monogastrics, as it is involved with ruminant metabolic pathways, the deficiency symptoms and effects of Zn in monogastrics are very similar to those of ruminants. In swine, the skin lesions are most prominent in the extremities; in chickens the effect is seen as severe dermatitis and poor feathering. In the case of B, monogastric animals respond to deficiency as do ruminants, with malformed bones and joints.

Approaches to correcting deficiency

There are many ways of correcting a low supply or an imbalance of minerals to livestock. Most of these are effective if carried out carefully. They are itemised in the following scheme:

1 -Treat the soil - Fertilisers and sprays

2 -Treat the herbage - Herbage sprays

3 -Treat the animal - Metered water

4 - Feeding blocks and licks

5 - Supplementation through the feed

6 -Injecting

7 -Drenching

8 -Dosing (e.g. of boluses)

The key to deciding which is the most appropriate for any particular situation lies in the following steps:

- Establish through soil/plant/animal investigation that micronutrient supplementation into the system is necessary
- Try to understand why the deficiency exists (low levels in soil; herbage species grown; production level of the animal.

Ruminants excrete most of the elements that they ingest and so manures can be a useful source, particularly when they are imported from areas that do not suffer from deficiencies. This can be used as a fertilizer .

What is entirely certain is that deficiencies of micronutrients, particularly in the sub-clinical form, can markedly reduce the performance and profitability of a livestock agricultural system. Farmers require to be more focused on this, but long-term gain can only be attained if the farmers involved have trust in the solutions provided. In order to gain trust then these solutions must be based on efficacious, appropriate, and cost effective means of delivery. This requires farm advisers to identify problems based on sound scientific knowledge and techniques, starting with the animal first. This information must then be applied in the most appropriate manner to the farming system in question and the situation should be monitored, feedback gained, and further improvements made.

CALENDAR OF EVENTS

APRIL 2020

07 - 09 LIVESTOCK EXPO & FORUM 2020
At Melaka International Trade Centre (MITC)
Malacca, Malaysia
Email: rita.lau@ubm.com

MAY 2020

24 CLFMA WEBINAR
On "Livestock Industry Post COVID"

AUGUST 2020

28-30 POULTRY VISION 2020 EXHIBITION
Poultry Industry Expo
At Sector 17 Parade Ground, Chandigarh
Contact : Ravi
Ph : 184-2250400 / 98126-58400
Website : www.poultryvision.in
Email:- poultryvision2020@gmail.com

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Gandhinagar, Gujarat, India
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09409084661, 07802077033
Email: agriasia@agriasia.in
Website: http://www.agriasia.in/#

NOVEMBER 2020

25-27 14th POULTRY INDIA 2020
Indian Poultry Equipment Manufacturers Association (IPEMA)
At Hyderabad International Convention Centre
HITEX Exhibition Centre, Izzat Nagar
Hyderabad - 500 084, A.P.
Contact: Ms. Sandhya Rani
Ph: 040 2414 2413 /10/20
Email: info@poultryindia.co.in
Website: www.poultryindia.co.in

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27-30 AGRO VISION
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