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Volume 10 | Issue 2 | Dec-2023

Monthly Magazine for Feed Industry

# INDIAN FEED SURVEY



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# Contents



## R&D

08 Study to Explore the Integration of Seaweed in Chicken Feed

## ARTICLE

- 10 Alternatives to Antibiotic Growth Promoters
- 30 Unveiling the Nutritional Marvel: Silkworm Pupae as a Super food for Livestock and Beyond

## SURVEY

14 Indian Feed Survey

## INTERVIEW

22 Escalating Maize Prices and Market Oversupply Raise Alarms for Indian Poultry Sector

## INDUSTRY NEWS

- 12 China's Records an 11% Year-on-Year Decline in Soymeal Usage
- 20 2024 Shrimp Industry Outlook Remains Uncertain
- 28 Indian Government Extends De-oiled Rice Bran Export Ban Until March 2024
- 28 Problem of Plenty in Telangana's Poultry Industry

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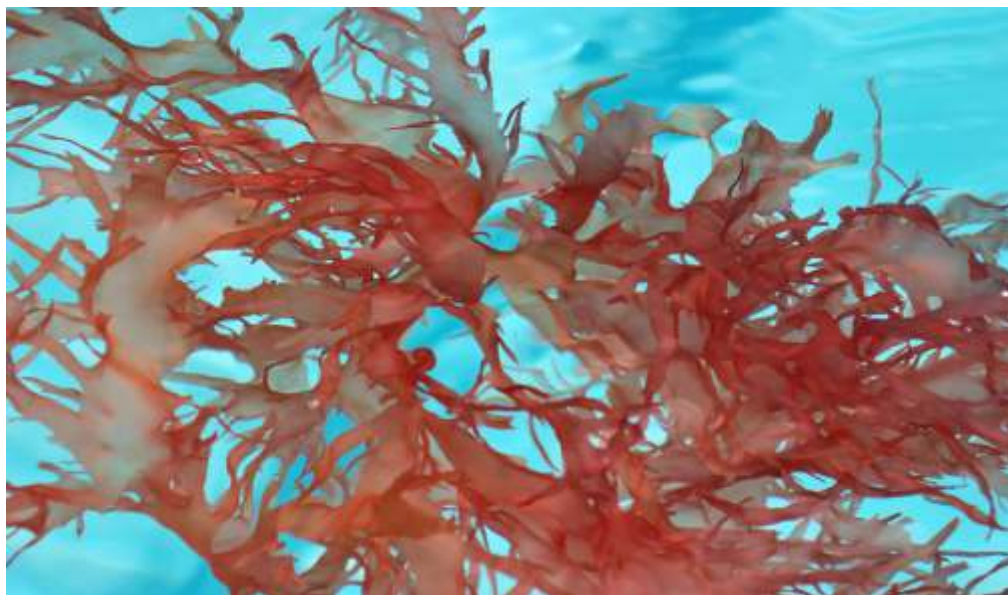
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## Study to Explore the Integration of Seaweed in Chicken Feed



Scotland's Rural College (SRUC) is exploring the viability of a highly coveted red seaweed as a sustainable substitute for soybean meal in U.K. chicken feed.

The Novel Seaweed Chicken Feed Feasibility (NSCFF) project, led by Seaweed Generation in collaboration with SRUC, University of West London, Centre for Innovation Excellence in Livestock (CIEL) and Microgrow Systems Ltd., will explore the feasibility of using tank or sea cultivated dulse – a protein-rich red seaweed – as a practical and cost-efficient alternative chicken feed.

It is one of 32 projects awarded funding from Innovate UK and the Biotechnology and Biological Sciences Research Council (BBSRC) to drive transformation across the food industry to meet the

demands of a growing population while promoting health and sustainability. The GBP 500,000 (USD 637,400) project will develop an automated macroalgal protein cultivation system, harnessing the nutritional benefits of seaweed to create an environmentally conscious protein source for poultry.

Trials will be conducted at SRUC's state-of-the-art poultry facility near Edinburgh to assess the impact of dulse inclusion on nutrient digestibility, growth, carcass quality and gut health, offering essential insights into its potential as a sustainable and efficient alternative protein source for chicken feed.

"Dulse possesses significant potential due to its higher bioavailable protein content," said Dr. Farina Khattak, who will lead the SRUC trials with

Professor Jos Houdijk. "However, the current challenge lies in the prohibitively expensive and intricate nature of dulse cultivation. Although it can be grown at sea, its complex life cycle adds a layer of difficulty to the process. In contrast to terrestrial crops, the rapid growth capacity of dulse holds promise for providing a sustainable supply of biomass suitable for integration into poultry diets as a valuable protein source.

"The project represents a significant leap towards locally sourced and eco-friendly poultry nutrition, envisioning a reshaped industry by introducing a cost-effective alternative to soybean meal, thus mitigating the ecological impact of poultry production."

Source: SRUC



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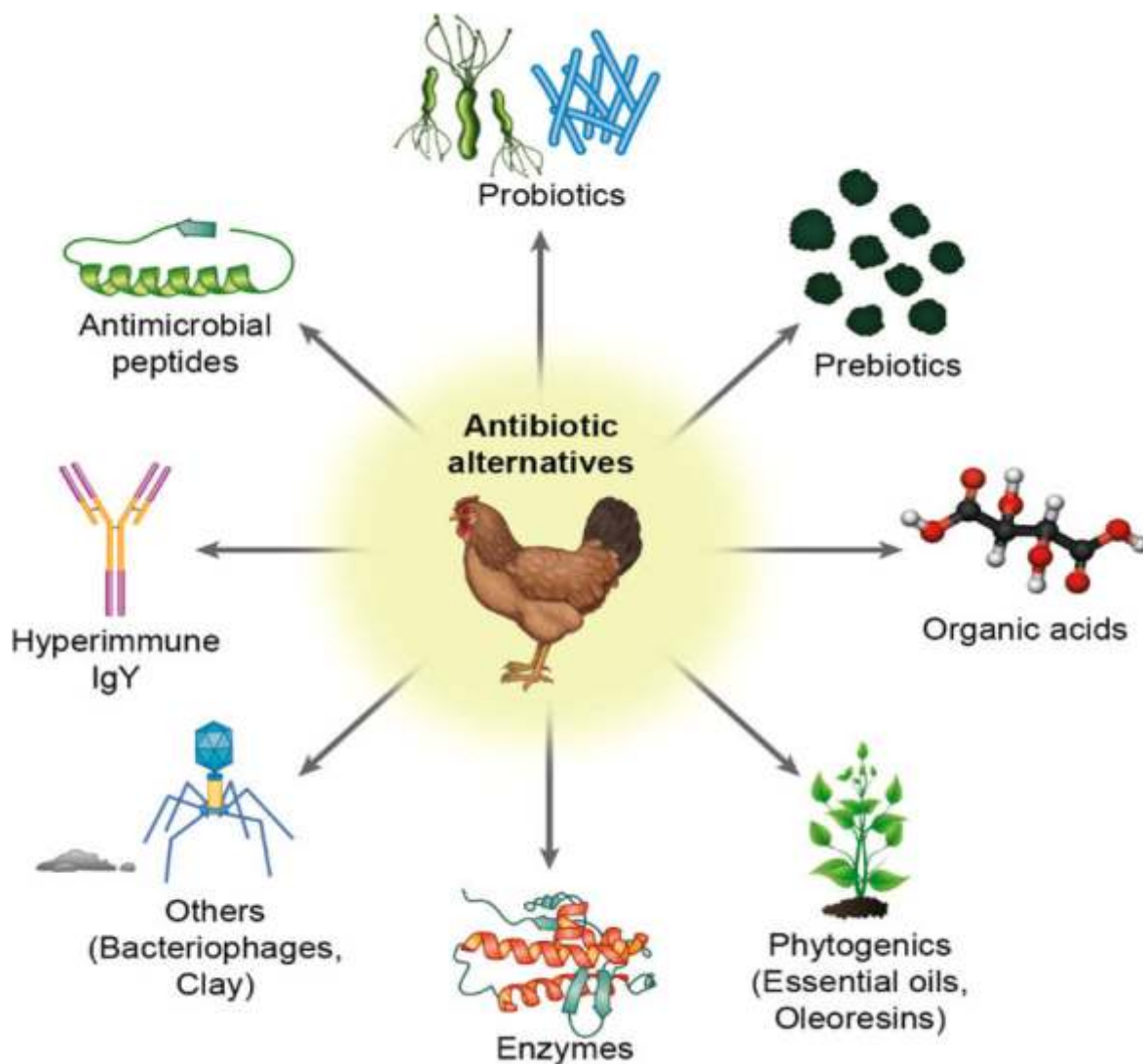
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# Alternatives to Antibiotic Growth Promoters

Dr J Sujith Reddy, Neospark Drugs and Chemicals Private Limited



Dr J Sujith Reddy

Antibiotics as growth promoters played a crucial role in the growth of the poultry industry over the last few decades by maintaining gut health which increased feed efficiency and egg production. However, the use of antibiotics as growth promoters is now causing concern due to the presence of antibiotic residues in livestock products and the emergence of superbugs -

bacteria that are resistant to multiple antibiotics. A report on surveillance of antimicrobial resistance by WHO cautions about the growing threat of antimicrobial resistance and antibiotic treatment is at risk if remedial measures are not taken immediately. It called for the reduction of antibiotic usage in both Humans and livestock. In addition, there is a growing demand from consumers for Antibiotic-free chicken and eggs. With the ever-increasing genetic potential and advancements in nutrition with tremendous growth in poultry

production, the biggest challenge for the industry is to produce Antibiotic residue-free Chicken in general or Antibiotic-free Chicken in specific.

Many alternatives for AGPs have been explored for over a decade. The term "Eubiosis" is gaining significance referring to the optimal balance of microflora in the gastrointestinal tract and the supplements which help in attaining Eubiosis is termed "Eubiotic Feed Supplements" such as Organic acids, Probiotics, Prebiotics, Essential Oils, Phytobiotics, Medium Chain Fatty Acids, Trace Minerals, and Vitamins.

#### **Organic Acids**

The addition of free organic acids and their salts in feed reduces the contamination and recontamination of feed and feed ingredients and enhances the secretion of digestive enzymes which improves the digestibility. These acids exert antimicrobial activity at the intestinal level maintaining an optimal balance of microflora. The usage of Butyric acid salt in its protected triglyceride-coated form has increased significantly due to its Target Release Action and for being a source of energy for enterocytes assisting in maintaining the health of gut epithelium which improves absorption. The usage of diformate salts as a feed additive is approved and its usage is increasing due to its

effective antimicrobial effect and sustained release action.

#### **Probiotics**

Probiotics are defined as animal feed supplements containing live microorganisms which have a beneficial effect on the host by affecting gut microflora. The mode of action of probiotics is by competitive exclusion and antagonism. Upon consumption, probiotics reach the gut effectively blocking the intestinal receptors, and competitively exclude the pathogenic bacteria from the gut. Further, they prevent the attachment and proliferation of pathogenic bacteria by forming an aggregation. Once aggregated, they create microecology in the gut that is hostile to pathogenic microbes. Probiotics also produce and secrete antimicrobial metabolites (Bacteriocins) and prevent enterotoxin absorption. Probiotics can produce Vitamins B complex and K and have a role in stimulating an immune response. Probiotics decrease the urease enzyme activity inside the gut and reduce the production of toxic amines and ammonia. The efficiency of probiotics depends on the selected microbes, their concentration, and their stability.

#### **Prebiotics**

Prebiotics are non-digestible feed ingredients that benefit the host by supplying

nutrients to the beneficial microbes and competitively excluding the pathogenic bacteria by adhering to intestinal receptors. It also exerts its antimicrobial effect by tricking the pathogenic bacteria into attaching to the prebiotics rather than intestinal mucosa and prevents pathogenic bacterial colonization inside the gut. It has an immunomodulatory effect by direct action on macrophages and facilitates T-cell proliferation. The predominantly used prebiotics are Mannon oligosaccharides (MOS) and  $\beta$ -glucans.

#### **Essential oils**

Essential oils are recognized as a potential replacement for AGPs. These are the active ingredients present in various plant species, like Eugenol, Thymol, Piperine, Cinnamaldehyde.

The antibacterial activity of essential oils is not the result of one specific mode of action, but a cumulative effect on many different targets in various parts of the cell. It disintegrates the membrane of bacteria leading to the release of membrane-associated materials from the cells to the external medium, impairs the bacterial enzyme systems, and exerts its effects on the bacterial genetic material too. It also inhibits cell wall division and interferes with metabolism. Further, essential oils stimulate the growth of

beneficial microbes and limit the number of pathogenic bacteria in the gut of poultry. Essential oils increase digestive enzyme secretions and have antioxidant and Immunomodulatory action. Phytobiotics like turmeric and garlic are gaining importance among poultry producers due to their antimicrobial, and immunomodulatory effect along with improved digestive enzyme secretions.

#### **Medium Chain Fatty acids**

The usage of medium-chain fatty acids as an Eubiotic feed supplement has already gained significance in the EU due to its bactericidal properties and as an energy

source for enterocytes. MCFA causes bacterial cell lysis through the invasion of the bacterial cell membrane and subsequent pH drop. It inhibits the production of lipases by the bacterium and prevents its colonization in the gut as lipases are needed for bacteria to attach to the intestinal mucosa.

#### **Trace Minerals and Vitamins**

Increased dosage of Trace Minerals (Se, Zn & Cu) and Vitamins (E & A) in the feed is practiced in the present scenario due to their antioxidant and immune modulatory effect.

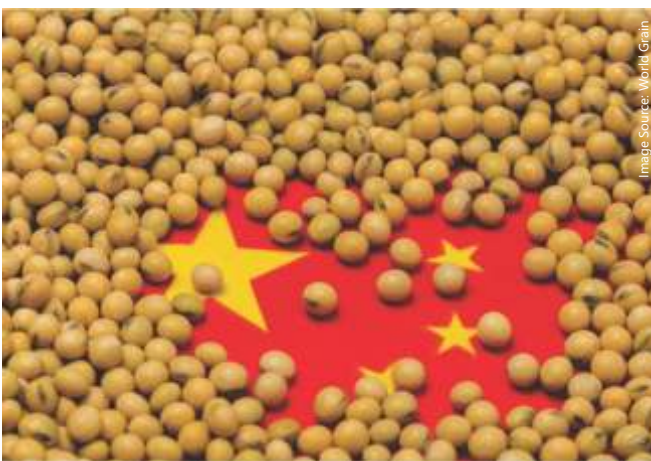
#### **Conclusions**

Considerable research is also

being carried out on Lysozymes, Lactoferrins, and bacteriocins as an alternative to AGPs. Higher inclusion costs are affecting its usage along with practical implications as of now. Any single Eubiotic feed supplement may not replace the effect of AGP, but the judicious combination of the above aforesaid Eubiotic feed supplements has tremendous potential to replace AGPs in years to follow. A lot of trials should be conducted further to arrive at a fruitful combination of eubiotic feed supplements that can effectively replace AGPs.

## INDUSTRY NEWS

# China's Records an 11% Year-on-Year Decline in Soymeal Usage



The animal feed production in China witnessed a rise in the first 11 months of 2023, but the use of soymeal as feedstock dropped 11% year-on-year, its agriculture

ministry said recently, amid a push to cut the country's heavy reliance on soybean imports.

Soymeal consumption by animal feed companies in January-November declined by 4.44 MMT, the Ministry of Agriculture and Rural Affairs said in a statement.

For the full year, the proportion of soymeal used in feed is estimated to drop by 1.5 percentage points, the ministry said. In comparison, the soymeal ratio was 14.5% in 2022

The ministry said that would reduce the demand for

soybean for feed by 9.1 MT. China's agriculture ministry had earlier issued a three-year action plan to reduce soymeal use in animal feed as it tries to reduce its heavy reliance on soybean imports. The new plan proposes soymeal ratios in animal feed should be reduced to less than 13% by 2025, from 14.5% in 2022. Authorities in the world's top soybean importer already issued guidelines in 2021 to its animal feed industry recommending lower soymeal ratios.

Source: Reuters



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# INDIAN FEED

# SURVEY



**Think Grain Think Feed** conducted 3rd Indian Feed Survey with **105** participants representing **47** poultry feed millers, **32** dairy feed millers, **7** aqua feed millers, **8** multiple species feed millers including pet food & swine feed, and **11** nutritionists, research institutions and consultants. Feed millers has an installed capacity of **19.28** MMT per month with an average utilization of more than **75%**.

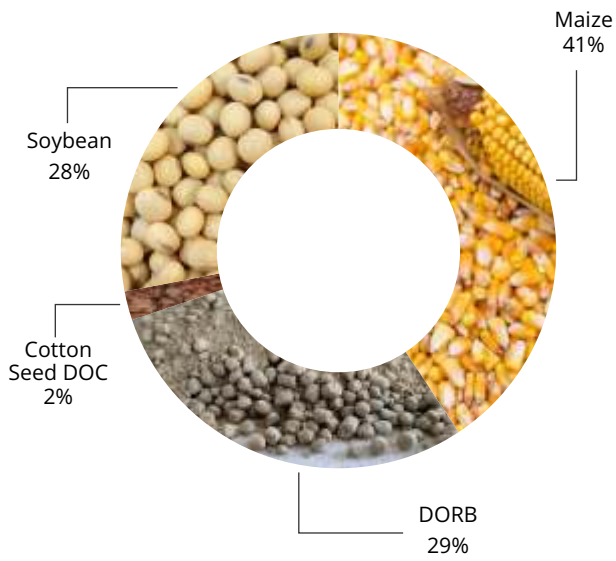


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## SURVEY PARTICIPANTS

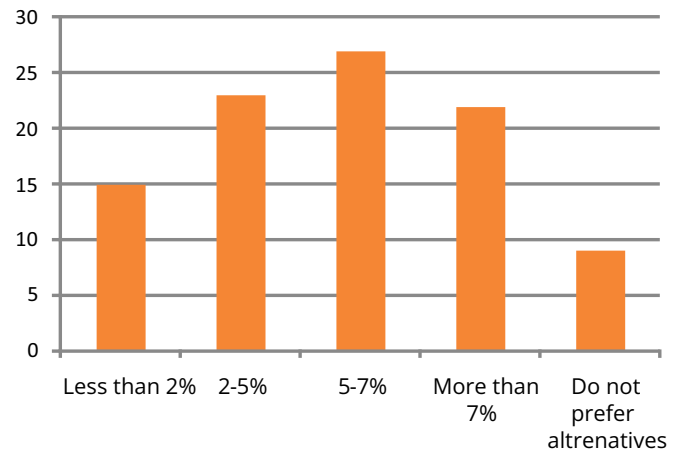


Most volatile feed ingredient in 2023



“ MORE THAN **85%** of participants are HIGHLY FOCUSED on FEED QUALITY

Percent of alternative feed ingredients preferred by a feed miller in feed formulations



Top-choice feed alternative for a feed miller

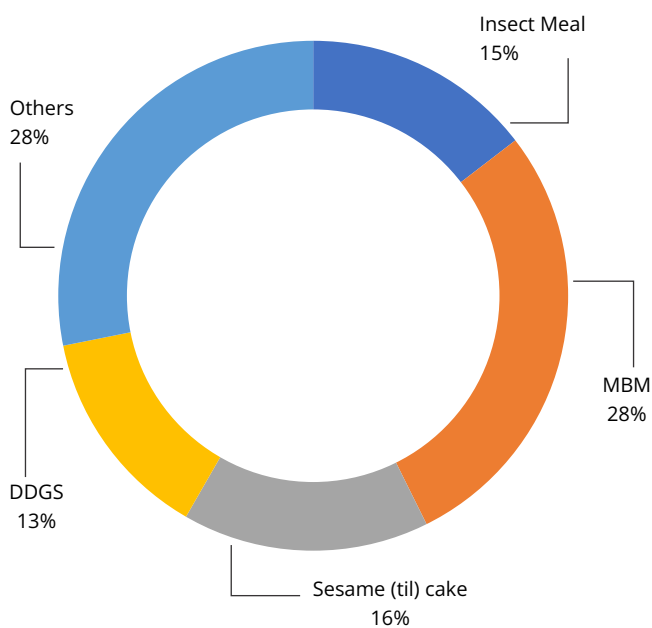


Image Source: Vietnam Plus





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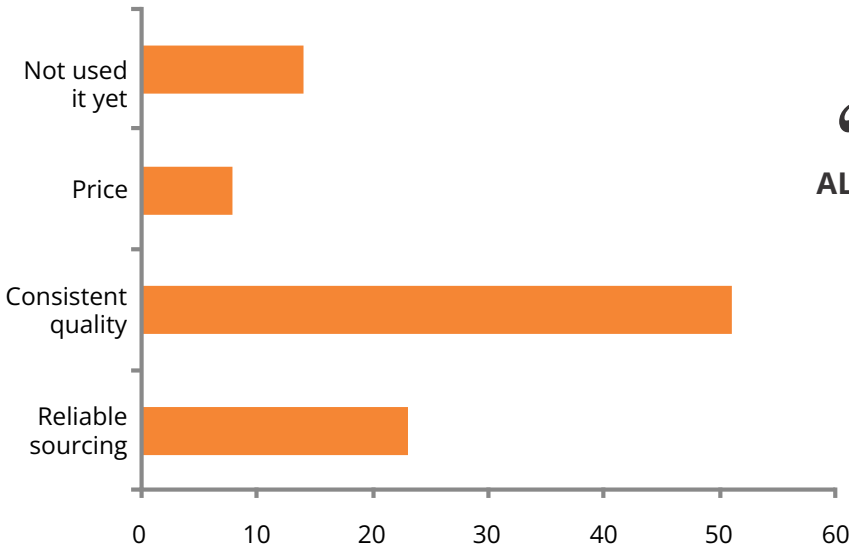
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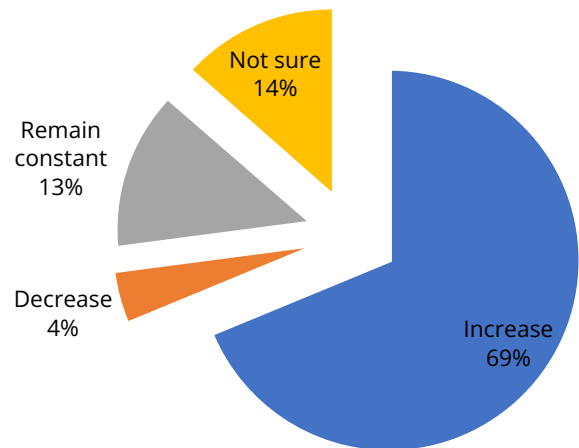
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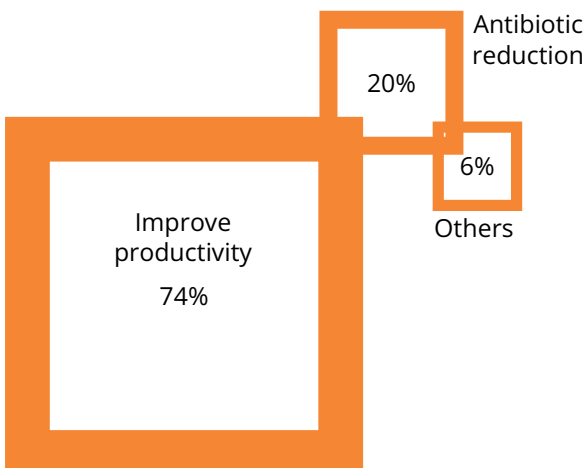
“CONSISTENT QUALITY of ALTERNATIVES is top preference of **54%** respondents



## A feed miller's forecast for feed ingredients pricing in Q1 2024

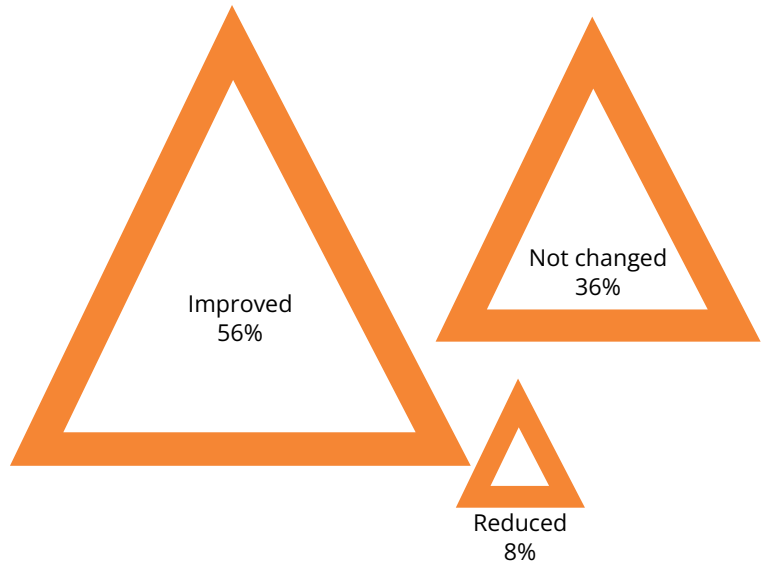


## Key trend in the Indian livestock industry

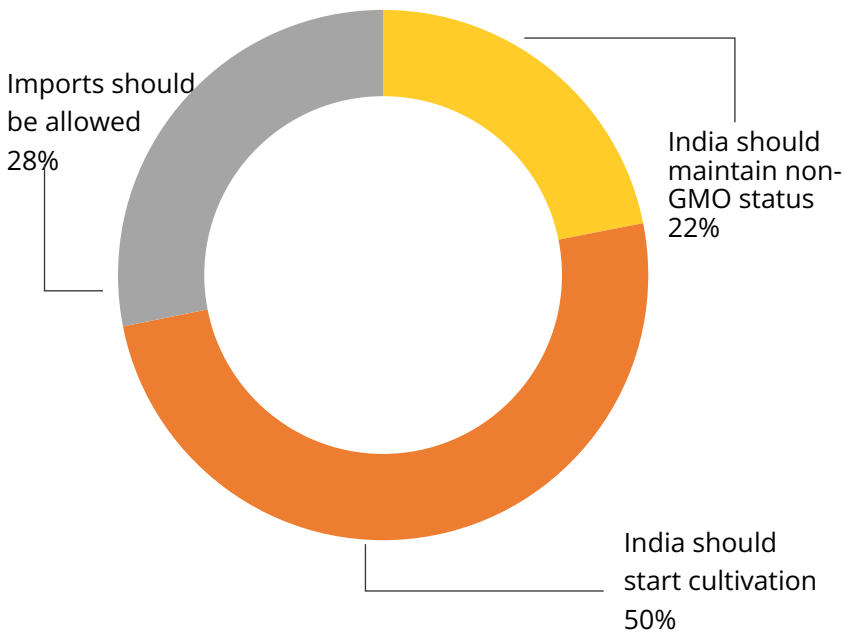


“EMISSION REDUCTION is other KEY TREND

### Level of industry involvement in policymaking compared to previous years



### Industry perception of genetically modified (GM) crops



“**26** COUNTRIES have PARTIALLY OR FULLY BANNED GMOs while **60** COUNTRIES have SIGNIFICANTLY RESTRICTED GMOs

Source: Study of University of California

# 2024 Shrimp Industry Outlook Remains Uncertain



Image Source: The Economics Times

The global shrimp industry is expected to face a challenging year in 2024, with oversupply continuing to be a major concern. Rabobank analysts predict that global shrimp production will remain flat at around 3.9 million metric tons, while demand is expected to grow only marginally. This imbalance is likely to put further downward pressure on shrimp prices, which have already been declining for several years. The situation is particularly dire for shrimp producers in Asia, who account for most of the global production. These producers have been hit hard by low prices and rising production costs, leading many to reduce their

output or switch to other aquaculture species. The situation is expected to be particularly difficult in India, where shrimp production is forecast to decline by as much as 20% in 2024. Despite the challenges, there are some reasons for optimism. Demand for shrimp is expected to continue to grow in the long term, driven by increasing incomes and urbanization in major markets such as China and India. Additionally, there is growing interest in shrimp as a sustainable source of protein, as shrimp farming has a relatively low environmental impact compared to other forms of animal agriculture. However, the short-term outlook for the shrimp

industry remains uncertain. Oversupply is likely to persist in 2024, and producers will need to find ways to reduce costs and improve efficiency to remain competitive. Rabobank analysts suggest that producers focus on improving feed efficiency, reducing disease losses, and developing new markets for their products. The global shrimp industry is at a crossroads. Oversupply and low prices are posing major challenges, but there is also potential for growth in the long term. Producers who can adapt to changing market conditions and improve their efficiency will be well-positioned to capitalize on this growth.

Source: seafoodofindia

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- ◆ Residues (Heavy metals & Pesticides)
- ◆ Mycotoxins, NOTS, Dioxins

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Image Source: Ukraine Business News

## Escalating Maize Prices and Market Oversupply Raise Alarms for Indian Poultry Sector

Christmas & New Year's seasons are causing a surge in egg and chicken demand, leading to price hikes while oversupply in the market due to the increased body weight of chicken is distressing the market. Poultry farmers anticipate further increases in the cost of production due to low maize and soya yields (major feed ingredients) caused by unfavorable weather conditions. The scarcity is prompting calls for maize imports to alleviate shortages, while the government's emphasis on

ethanol production from maize adds to concerns for the poultry industry's supply challenges.

Several industry associations have penned letters to the Animal Husbandry Department requesting permission for maize imports. On December 23rd, a roundtable meeting, led by Ms. Alka Upadhaya, Secretary of the Department of Animal Husbandry and Dairying, featured representatives from various departments and industry associations. This strategic assembly convened key stakeholders, such as major companies, state governments, and industry groups, to discuss the challenges and strategies for exports of Indian poultry products. During the meeting, the poultry

industry also voiced concerns about the rising prices of feed ingredients.

**Think Grain Think Feed**

connected with various industry associations to discuss the ongoing situation and possible solutions to protect the industry.

Various industry associations penned a critical letter to Union Minister Parshottam Rupala, imploring the government to reduce import duties on maize. The poultry sector, a key player in the Indian economy, faces financial instability and consumer affordability issues due to escalating local maize prices, constituting 60% of poultry feed.

**Industry seeks government intervention in maize imports**

In the plea, **Dr. Ajay Deshpande**, President, Vets in Poultry (VIP) underscores the urgency of the situation,

highlighting the immediate threat to the poultry industry's financial health. Poultry feed accounts for 80% of production costs, and the surge in local maize prices, compounded by inconsistent rainfall in major maize-producing states, is adversely affecting chicken production.

He argues that the current maize prices of INR 25 per kg throughout India are unsustainable for the poultry farming community. Anticipating a further increase to INR 28-30 per kg by February 2024, the association foresees a worsening situation post that date due to uncertainties in Rabi maize production. The industry relies on imports to bridge the demand-supply gap, but the existing 60% import duty on non-GMO maize is discouraging.

In response to the crisis,

VIP urgently requests the government to consider reducing the import duty on non-GMO maize from 60% to either NIL or a maximum of 15%. He argues that previous instances of maize imports have not adversely affected local farmers; instead, they played a crucial role in stabilizing demand and supply, benefiting both farmers and the poultry industry, and ensuring affordable access to nutritious protein for the people of India.

**Soybean woes increase risks for the Indian poultry industry**

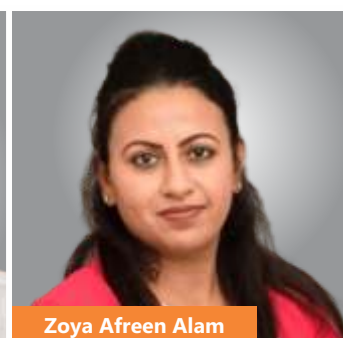
**Suresh Deora**, Chairman, CLFMA of India, an association representing All-India manufacturers of compound feed expressed similar concerns. In the letter,



Dr Ajay Deshpande



Suresh Deora



Zoya Afreen Alam



Ranpal Dhanda



Dr. Pattabhi



Vasant Kumar Shetty



the chairman highlighted that maize prices are currently at INR 25,000 per MT, while international prices for non-GM maize are at USD 275 per MT CNF Mumbai, equivalent to approximately INR 26,000 per MT for plant delivery. He underscored the impact of India's ethanol blending program, which may divert 25 lakh MT of maize for ethanol production.

The industry is expected to encounter challenges with decreasing carry-over stock of soybean seed, making soybean meal more crucial for the poultry feed industry, especially as alternative protein sources like rapeseed DOC and groundnut DOC experience record-high prices.

**The association urged the government to take positive action by permitting duty-free maize and GM**

**soybean meal** to support poultry and dairy farming in India.

**Maize & Indian poultry growth: A substantial disparity**

Over the last decade, maize crop growth has been at 4.5%, while the poultry industry has experienced a growth of 8.5-9%. This disparity highlights the anticipated maize shortage for the poultry industry, making sustainability challenging. The government's plan to promote maize for ethanol would exacerbate the situation.

Representing the All-India Broilers Breeders Association, **Zoya Afreen Alam**, Director of IB Group, suggested that duty-free maize imports could aid the industry in managing this crisis, especially given increased insurance costs due to the ongoing Ukraine war.

**Implementing stock holding capacity on domestic market traders is a potential short-term solution.**

For a long-term fix, she proposed allowing GM crop cultivation, potentially doubling crop production and benefiting both agriculture and poultry farmers.

**Ranpal Dhanda**, President of the Poultry Federation of India (PFI), highlighted the 30-35% cost difference in feed ingredients gives an edge to American and Brazilian poultry industries in exporting to the Asian market. In contrast, India, with its high production costs, holds a mere 0.3% share of the Asian export market.

He proposed a potential solution for duty-free maize imports, emphasizing the need for a long-term strategy. Mr. Dhanda

suggested **motivating agriculture farmers to shift towards maize production by offering a buy-back guarantee at MSP or a rate higher than MSP.**

In alignment with this, PFI has initiated discussions with various seed companies and

plans to experiment with different seeds to optimize production, thereby supporting the farming community.

He anticipates stability in maize prices due to recent developments, such as the removal of the sugarcane ban for ethanol production.

**Vasant Kumar Shetty**, former president of Poultry Farmers & Breeders Association-MH, expressed that while Indian maize farmers deserve fair compensation, it is crucial to safeguard the poultry industry. Rising feed ingredient costs would elevate the cost of production, potentially negatively impacting egg and chicken consumption. Last year, the average production cost was INR 91 per kg, with a selling price of INR 92 per kg, indicating a slim margin for the sustainability of the industry. To address this, Mr. Shetty proposed that the **Indian government should procure maize at MSP from farmers and supply it to the industry to help maintain production costs.**

**Dr. Pattabhi**, Treasurer of the Institution of Veterinarians of Poultry Industry (IVPI), a leading association of poultry veterinarians, communicated his concerns over a 30% reduction in maize crop due to monsoon failure, average quality, and stock holding by traders during a phone call.





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## INTERVIEW

He suggested that allowing some imports would support the industry, with traders likely releasing stock once imports are permitted. This, according to Dr. Pattabhi, would stabilize prices at the current level of INR 24,000-25,000 per MT; otherwise, there is a risk of prices reaching the range of INR 27,000-28,000 per MT by February 2024.

### Oversupply in the market

Regarding market oversupply, Mr. Shetty suggested industry unity in selling birds at 2-2.3 kg to prevent losses. Planning production based on expected demand is essential to avoid market disruptions and ensure profitability through balanced supply and demand.

Three years ago, he initiated National Chicken Day to raise awareness and boost chicken consumption, a concept embraced by the industry. He emphasized the importance of industry collaboration across various platforms for such initiatives. Ms. Alam noted that increased body weight led to a market dip, but the holiday season, including Christmas and New Year, is expected to revive the market with heightened demand, consequently driving prices

up. She emphasized that collaborative efforts among associations and industry members are essential to mitigate the volatility in live bird prices.

Attributing the current overweight birds to favorable weather conditions, even affecting South India with an average body weight of 2.7-3 kg, Dr. Pattabhi anticipates this situation to persist until year-end. He suggested the

**industry shift focus to fresh chilled chicken with each integrator planning its outlets.** As

an association recommendation, they propose that members and farmers adhere to the discipline of culling parent stock by 64 weeks. Although discussed in association meetings, it remains to be seen when the industry will start implementing this practice. Dr. Pattabhi added that even **if the industry begins following this culling practice for the next three months, a correction in supply would be noticeable by April 2024.**

Mr. Dhanda discussed efforts to address market

### Broiler Market 2024



Image Source: Maa Integrators

oversupply. In a recent meeting with North India farmers and PFI members, the association advised to start bird culling at 1.9-2.0 kg within a 32-day cycle instead of allowing it to sell at 3 Kg or more at a 40-day cycle.

### Conclusions

The poultry industry seeks to assist maize farmers while safeguarding its interests. A consensus across discussions highlights the common suggestion that the government should intervene by permitting non-GM maize imports and reevaluate the decision to divert maize for ethanol production. Achieving market supply and demand balance necessitates a concurrent focus on discipline and promotion.

*Disclaimer: A special thanks to Dr Jeetendra Verma, Dr Sujit Kulkarni, Ricky Thaper, and Dr Santosh Ire for their valuable input.*



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## Indian Government Extends De-oiled Rice Bran Export Ban Until March 2024



The Centre has extended the ban on export of de-oiled rice bran till Mar 31, the Directorate General of Foreign Trade said in a recent

notification. Export of oil-cake and other solid residues, whether ground or in the form of pellets, resulting from the extraction of vegetable or microbial fats or oils is prohibited, the notification said.

On Jul 28, the government banned the export of de-oiled rice bran till Nov 30, following a sharp rise in domestic prices of dairy products.

However, the Solvent Extractors' Association contends that de-oiled rice bran rates do not have much impact on prices of milk and dairy products.

"The ban negatively affects solvent extraction, without serving its intended purpose of reducing dairy costs as de-oiled rice bran price has the least impact on milk and dairy prices," the association mentioned in a press release released in November.

The price of de-oiled rice bran has dropped sharply to around INR 13,500 per ton at present from INR 18,000 in August, the association said.

India exports de-oiled rice bran primarily to Vietnam, Cambodia, and Thailand, and it is used majorly as pig feed in these countries.

Source: Informist Media

## Problem of Plenty in Telangana's Poultry Industry

Over the past nine years since state formation, the annual egg production has risen by over 65% from 1,061 crore in 2014-15 to 1,767 crore in 2022-23, as per the data from the state planning department's report.

But the industry is finding it tough to keep pace with its increasing capacity as local consumption has been stagnant and there is stiff competition in other states.

With a share of 13%, Telangana occupies the third spot in the country behind Tamil Nadu (22%) and Andhra Pradesh (16%). Rise in egg consumption can only

save business

The state produces about 3.7 crore eggs daily and out of this 1.7 crore goes to other states, mainly Maharashtra, Madhya Pradesh, Bihar, West Bengal and Uttar Pradesh

The consumption within the state is half an egg per person daily. Though this is within the NIN recommendation, it is not a healthy figure for the egg industry. Growing the domestic market is a herculean task, industry sources said.

In some states daily egg production is merely in lakhs. According to animal

husbandry department officials, commercial poultry egg constitutes for a large part of production and backyard poultry accounts for only a minor portion. The other avenue is the international market. But only Tamil Nadu has the required infrastructure and it is exporting it to West Asia, industry sources said.

The government there gives lot of subsidies to poultry farmers. We would also be able to better with that kind of support," a poultry farmer said.

Source: Times of India



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- Rice Doc



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Image Source: Urban Vine

# Unveiling the Nutritional Marvel: Silkworm Pupae as a Super food for Livestock and Beyond

by **Ankit Alok Bagaria**, Loopworm



**Ankit Alok Bagaria**

India, with its diverse silkworm varieties, is uniquely positioned to offer a spectrum of nutritional products, addressing specific dietary needs across the global animal husbandry landscape. With five unique farmed silkworm varieties in its arsenal, India possesses the keys to unlock a new era of sustainable, nutritious animal and pet feed. India's prowess in sericulture lays the foundation for a thriving industry in silkworm-based nutrition. Imagine a scenario where the vast landscapes of Karnataka, Andhra Pradesh, and West Bengal transform into hubs of sustainable silkworm farming. The potential is not just in silk

but in the under explored treasure trove – the pupae. Silkworm pupae, with their exceptional nutritional content, can be processed into high-quality protein supplements for livestock, poultry, and pets.

## **Silkworm Pupae in Chicken Diets: A Feathery Feast**

Integrating silkworm pupae into chicken diets presents numerous advantages owing to their impressive nutritional profile. Rich in protein, silkworm pupae play a vital role in muscle development, feather growth, and overall body maintenance in chickens. Protein, an essential component in poultry diets, includes crucial amino acids such as lysine,

addressing a limitation in many plant-based feed ingredients. Adequate lysine supply is vital for optimal growth and feather development.

Beyond protein, silkworm pupae boast omega-3 fatty acids associated with heart health and immune function. Their inclusion in the diet contributes to eggs with a favourable omega-3 fatty acid profile. Maintaining a balance between omega-3 and omega-6 fatty acids is crucial, and silkworm pupae provide the latter, ensuring a harmonious fatty acid profile. Xanthophylls, natural pigments found in silkworm pupae, enhance egg yolk colour, a desirable trait when

natural pigments are preferred. The essential minerals calcium and phosphorus contribute to bone development and eggshell formation in laying hens. The palatability of silkworm pupae encourages chickens to consume feed more readily, especially beneficial for picky eaters or during stressful periods.

### **Silkworm Pupae in Ruminant Diets: Revolutionizing Nutrient Utilization**

Insects, including silkworm pupae, serve as a rich protein source in ruminant diets. When replacing traditional protein sources like soybean meal, insects alter the microbial population in the rumen. Studies suggest that insect meal may reduce methanogenicarchaea activity in the rumen, contributing to lower methane production—a significant environmental benefit.

Nutrient-rich silkworm pupae enhance overall nutrient utilization efficiency in ruminants, showcasing their potential to revolutionize livestock nutrition.

### **Silkworm Pupae: A Delight for Fish and Birds**

Silkworm pupae prove to be a nutrient-rich source for the growth and health of ornamental fish and birds. Packed with essential nutrients, including proteins, fats, vitamins, and minerals, silkworm pupae support the development of tissues, muscles, and organs in fish and birds.

The taste and texture of

silkworm pupae make them attractive to ornamental species, enticing even finicky eaters to consume a well-rounded and nutritious diet. Providing calcium for bone development in fish and eggshell formation in birds, silkworm pupae serve as a valuable addition to a varied and well-balanced diet.

Dry pupae contain 50-70% crude protein and 24-33% crude lipids and are a high-quality insect protein source with a rich, balanced content of essential amino acids. The works of various researchers on various fish species have led to the development of recommended inclusion levels of silkworm pupae meal in the diet of the following aquaculture species: 30-50% for major and minor carps, 5-15% for trout, 50-60% for masher, 75-100% for catfish, 30-40% for ornamental fishes and 5-20% for shellfishes that has the potential to give similar growth performance compared to fish meal. Black soldier Fly larvae protein and silkworm Pupae protein between 5-10% inclusion levels proved beneficial for white-legged Shrimp Diets. Beyond physical benefits, silkworm pupae contribute to enhanced coloration in ornamental species. The natural pigments and nutrients in silkworm pupae foster vibrancy and coloration, while the included vitamins and minerals support the immune system, making fish and birds more resilient to diseases and stress.

### **The Global Shift: Insect-Based Pet Foods**

Insect-based pet foods are gaining traction globally, with various insect species finding their way into formulations. Silkworm Pupae, alongside other insects like Black Soldier Fly Larvae, Mealworms, Crickets, Grasshoppers, and Locusts, is becoming a staple in pet food formulations. Dedicated pet food, treats, and supplement brands, including industry giants like Nestle and Mars, are investing in insect-based ranges.

While several reasons advocate for the superiority of insect-based foods for dogs over traditional meat sources, the primary challenge lies in pet parent acceptance. Silkworm Pupae, with its unique 1-DNJ content, offers a compelling proposition, potentially revolutionizing the perception of insect-based dog foods.

In conclusion, Silkworm Pupae emerges as a nutritional powerhouse with far-reaching implications in livestock, pet, and even human nutrition. Its multifaceted benefits, coupled with sustainability advantages, position it as a frontrunner in the ever-evolving landscape of animal nutrition. As we continue to explore innovative sources of nutrition, the unassuming silkworm pupa proves that small insects can indeed make a big impact on the well-being of our feathered, finned, and furry companions.

Image Source: Innovation News Network



## Gujarat Advocates Adoption of Modern Technologies to Boost Fisheries Sector Potential

Gujarat, with the longest coastline of 1,600 km in the country, is deeply rooted in the bounty of its waters, producing an annual average of 8.5 lakh tonnes of marine fish in the last four years.

The state, which has also contributed to 17% of India's total fish exports at INR 5,000 crore, is now urging its traditional fishing community to adopt modern technologies to harvest the potential of deep-sea fishing, which provides immense possibilities for growth.

"Gujarat has the longest coastline of about 1,600 km. It is at the forefront of fish production. Today, Gujarat is exporting fish worth more

than INR 5,000 crore, taking the state's contribution to 17% of India's total fish exports," Chief Minister Bhupendra Patel said at a recent event.

When Prime Minister Narendra Modi was the chief minister of Gujarat, he started the Sagar Khedu Sarvangi Vikas Yojana for the overall development of the fisheries sector, which has been very successful. Today, the blue economy sector of Gujarat is growing very fast," Patel said.

From fishing operations to processing, the industry plays a crucial role in generating employment and contributing to the state's

economy, officials and fishing community members said.

Jitu Kahada, a leader of the fishermen community in Gujarat's Gir Somnath district, said the central and state governments have come up with a scheme to provide new gas machines to small traditional fishermen, something that is benefiting them in many ways.

As per the data provided by the state government in July this year, the provisional marine fish production in 2022-23 is likely to be 6,97,151 metric tonnes, and the inland fish production at 2,07,078 metric tonnes.





lakh to Rs 10.89 lakh in the last five years. Machine boats by far outstrip the traditional boats, with the former being 28,355 in number compared to 8,625 traditional ones, as per the data provided by the state government. Now, the focus is also to tap into the potential of deep-sea fishing, with both the central and state governments jointly providing support to traditional fishermen in this transition by helping them acquire deep-sea fishing boats, Union Minister of State for Fisheries, Animal Husbandry and Dairying L Murugan said at the Global Fisheries Conference India 2023 organized here recently.

The government said it has undertaken several initiatives to promote the fisheries sector, such as a reduction in the VAT rate on diesel, subsidy on kerosene and petrol, improving the infrastructure of small fishing ports, and construction of four new fish harbors at Madhwad, Navabandar, Veraval-II, and Sutrapada. The government has also worked to create weather and safety awareness in coastal areas, which has also contributed to improving the fisheries sector. The efforts of the government have led to a change in the lives of the state's fishing community members. According to the state government, the average annual income of a fisherfolk family in Gujarat has seen a steady climb from Rs 6.56

This support will be extended through the Centre's schemes, namely the Blue Revolution and the Pradhan Mantri Matsya Sampada Yojana, he said. Under the scheme, the government provides up to 60% financial assistance to traditional fishermen to convert their vessels into deep-sea fishing boats. Additionally, loan facilities are also available to facilitate this transformation, according to an official release. Deep-sea fishing is undertaken beyond the limit of territorial waters, which is 12 nautical miles from the shore and within the Exclusive Economic Zone (EEZ) of 200 nautical miles from the shore. It involves catching fish that live in deep parts of the sea.

Deputy Commissioner of Fisheries, Government of India, Sanjay Pandey, said the 'Indian Ocean yellowfin tuna', a fish variety, has an end value of more than USD 4 billion. According to World Bank consultant Dr Arthur Neiland, despite the promising potential of yellowfin and skipjack tunas in India's EEZ, with an estimated harvest of 1,79,000 tonnes, the actual catch is just 25,259 tonnes, indicating the utilization rate of only 12%. He has emphasized the need for investment from public and private sectors in deep-sea fishing which could generate economic, social, and environmental benefits. Source: Money Control

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