Technological Approach for a Sustainable Future of Poultry Business

Wednesday, 8th February 2023

Kolkata

NOVACON

CONference on InNOVAtion

Agrivet Research & Advisory Private Limited

(Formerly known as Agrivet Consultancy Pvt. Ltd.)

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Overview of Poultry *Current Scenario & Future Projection*

- Chicken contributes more than 90% of the Poultry sector & fastest growing agricultural sub-sector in developing countries
- After China & USA, India is the Third-largest Egg Producer and the Fourth-largest Chicken Producer after China, Brazil and the USA
- Between 2021 and 2025, the global poultry market indicate a growth of 4.1%, reaching a production of 100.9 million metric tons
- China and India accounted for the most significant increases of Broiler feed production in Asia-Pacific
- The India poultry market reached a value of INR 1,70,800 Crores in 2021 and expects to reach INR 3,17,000 Crores by 2027, exhibiting a CAGR of 10.50% during 2022-2027
- India has produced 440 Lakh metric ton of livestock feed in 2021. About 10 crore farmers engaged in Animal Husbandry Sector
- The high cost of raw materials and low retail prices are among the biggest challenges for layer production
- The industry needs to lean into technology including digitization and IOT devices

FAO, UN, https://www.imarcgroup.com

Overview of Poultry *Current Scenario & Future Projection*

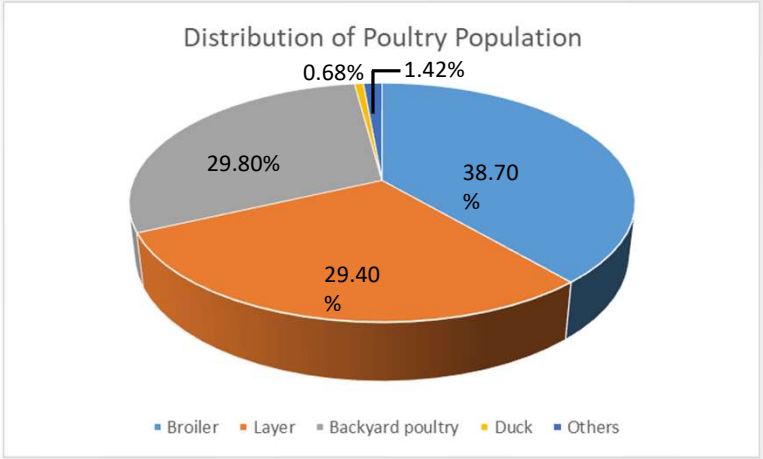
The per capita consumption of broiler meat in India is extremely low (3.35 kg per person per year), compared to Malaysia (63 kg), the United States (58 kg), Brazil (57 kg) and China (10.5 Kg).

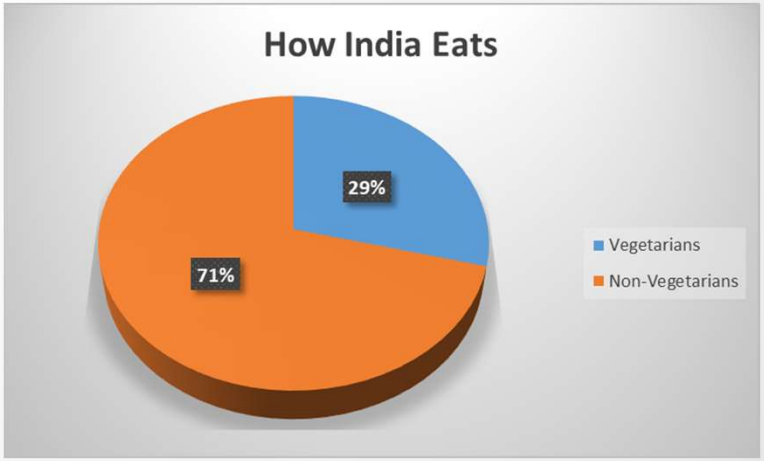
India's per capita consumption of Egg is around 90 per annum. Mexico reported 409 eggs, Japan consumes 337, and Colombians are now at 334 Eggs per person/year

Daily 1.2 Crores Broiler Chicks are produced in India

Daily 25 Crores table Eggs are produced in India

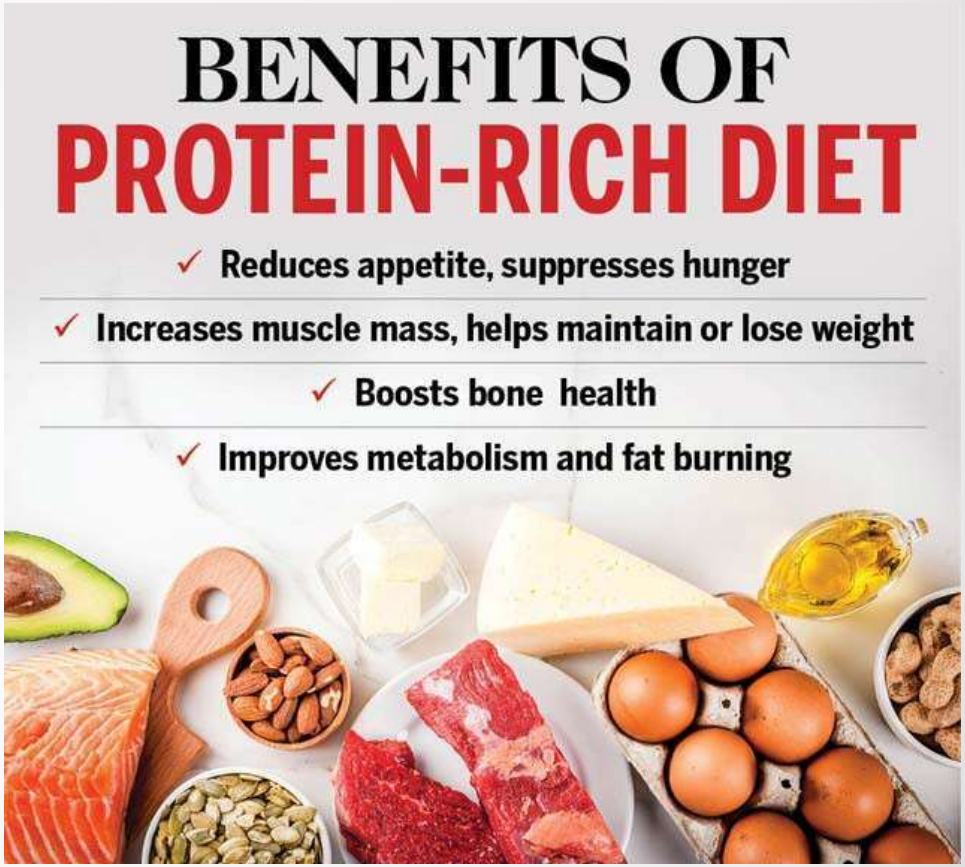
Nutritionists recommend a minimum of 180 eggs & 10 kg chicken per annum for a healthy adult human





Poultry Simplified

- "POULTRY" is a "HIGH QUALITY PROTEIN FACTORY"
- Poultry meat & eggs are nutritious and excellent source of PROTEIN & MICRO-NUTRIENTS
- Poultry meat and eggs has a protein component usually defined as 'HIGH QUALITY'
- Poultry is one of the LEAST PROCESSED FOODS across the food categories
- In India 73% OF URBAN RICH IS PROTEIN DEFICIENT
- 93% of them are unaware about what proteins to take and having no idea about their daily protein requirement
- Poultry meat & egg creates affordable protein for human consumption from by-products



Dietary Protein

Dietary Protein Requirement for an adult is 0.8 grams per kilogram of body weight

50 – 60 gm Protein is required daily for survival (~10%)

1 gm Protein = 4 Calories

Broken down into 20 different amino acids to build & repair cell components

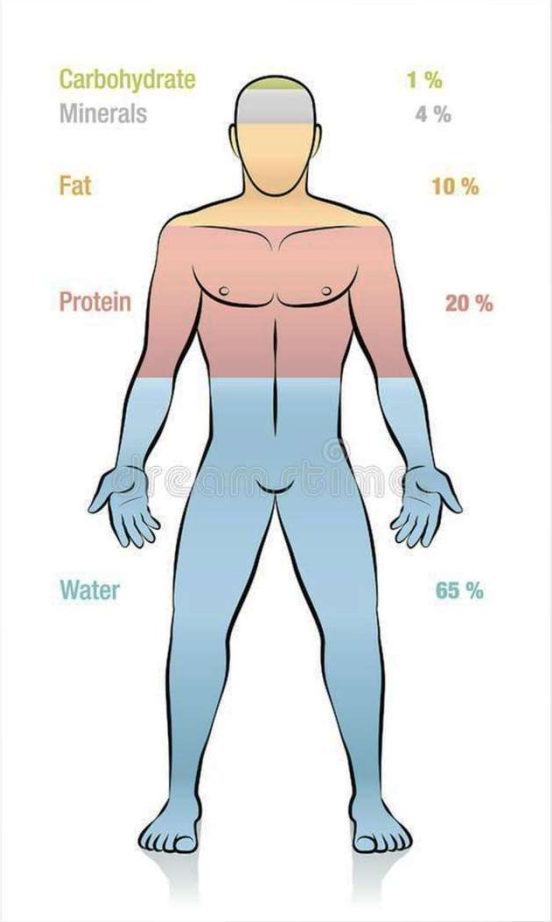
Almost 20% body mass is protein

Non-essential amino acids: Body can create these from other molecules

- Asparagine, Cysteine, proline, Tyrosine

Essential amino acids: Must get from eating foods containing them

- Histidine, Lysine, Methionine, Tryptophan



Poultry Simplified

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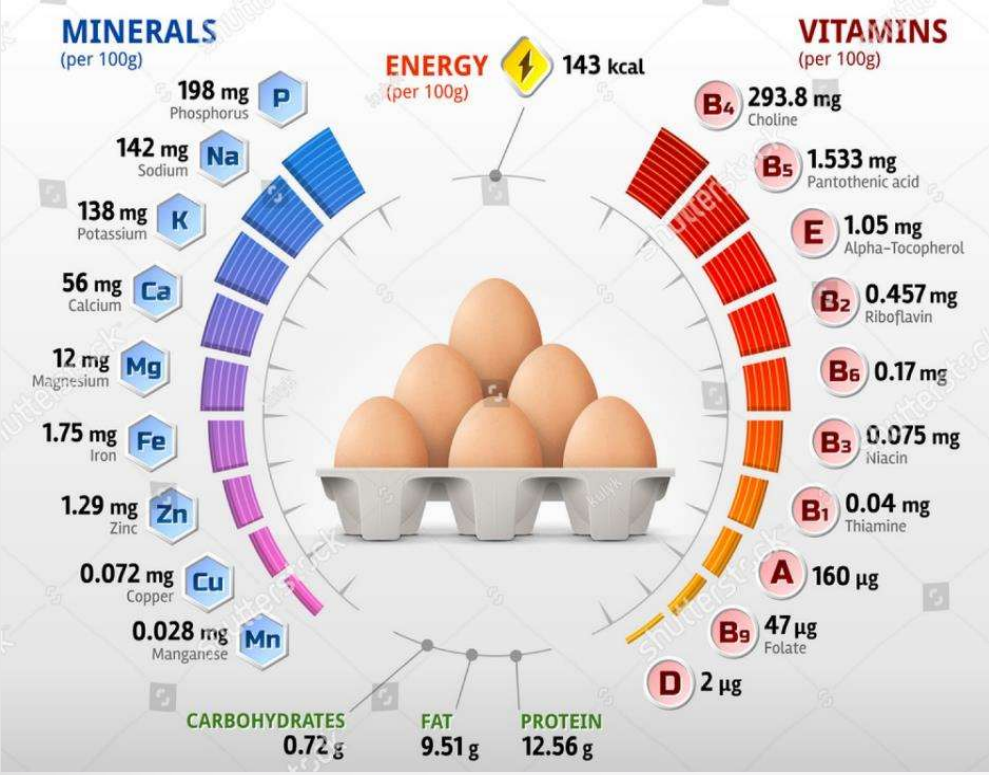

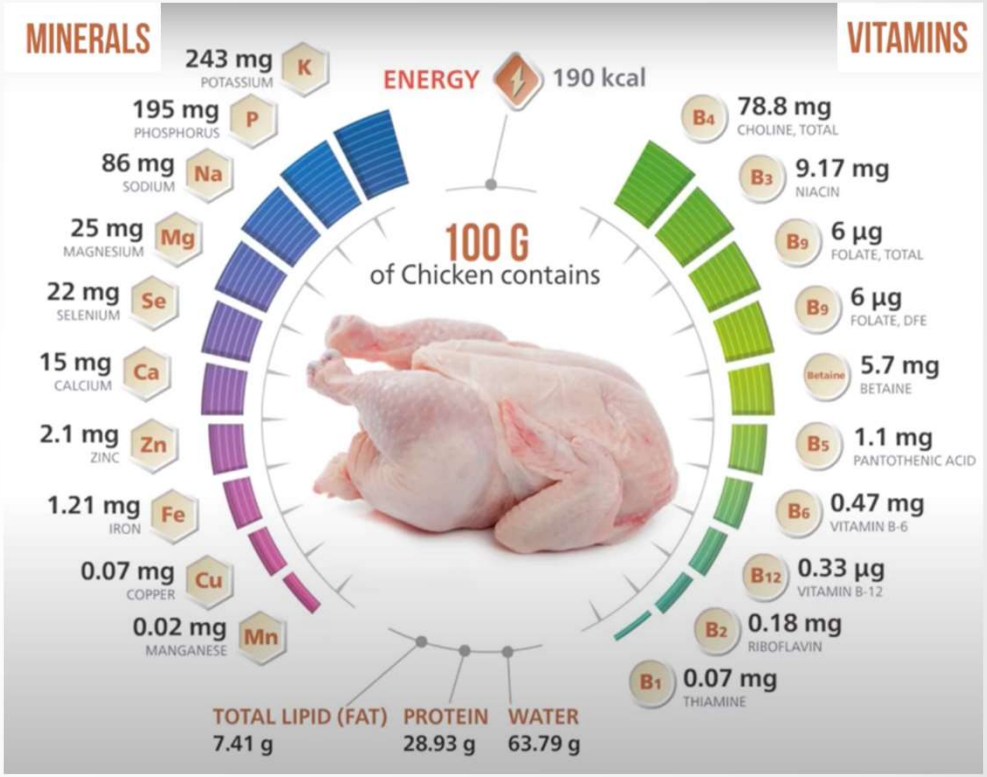

USDA

Opportunities

- More youth in population
- Affordability & Income Growth
- Availability of food According to customised need
- Awareness of hygiene
- Myth bursting on processed food
- Awareness on importance of Protein
- Nutritional Security & Healthy diets
- Changing food habits
- Large Unpenetrated Semi-urban and Rural Market
- Organized retail & Supermarkets
- Doorstep Delivery options
- Growth in the Food Services Market

What is Technology?

Oxford: The application of scientific knowledge for practical purposes, especially in industry.

Dictionary.com: The branch of knowledge that deals with the creation and use of technical means and their interrelation with life, society, and the environment.

Wikipedia: Technology is the application of knowledge for achieving practical goals in a reproducible way.

Britannica: Technology is the application of scientific knowledge to the practical aims of human life.

ChatGPT: Technology refers to the tools, methods, and systems developed by humans to solve problems, improve efficiency, and enhance quality of life.

Poultry Industry Structure

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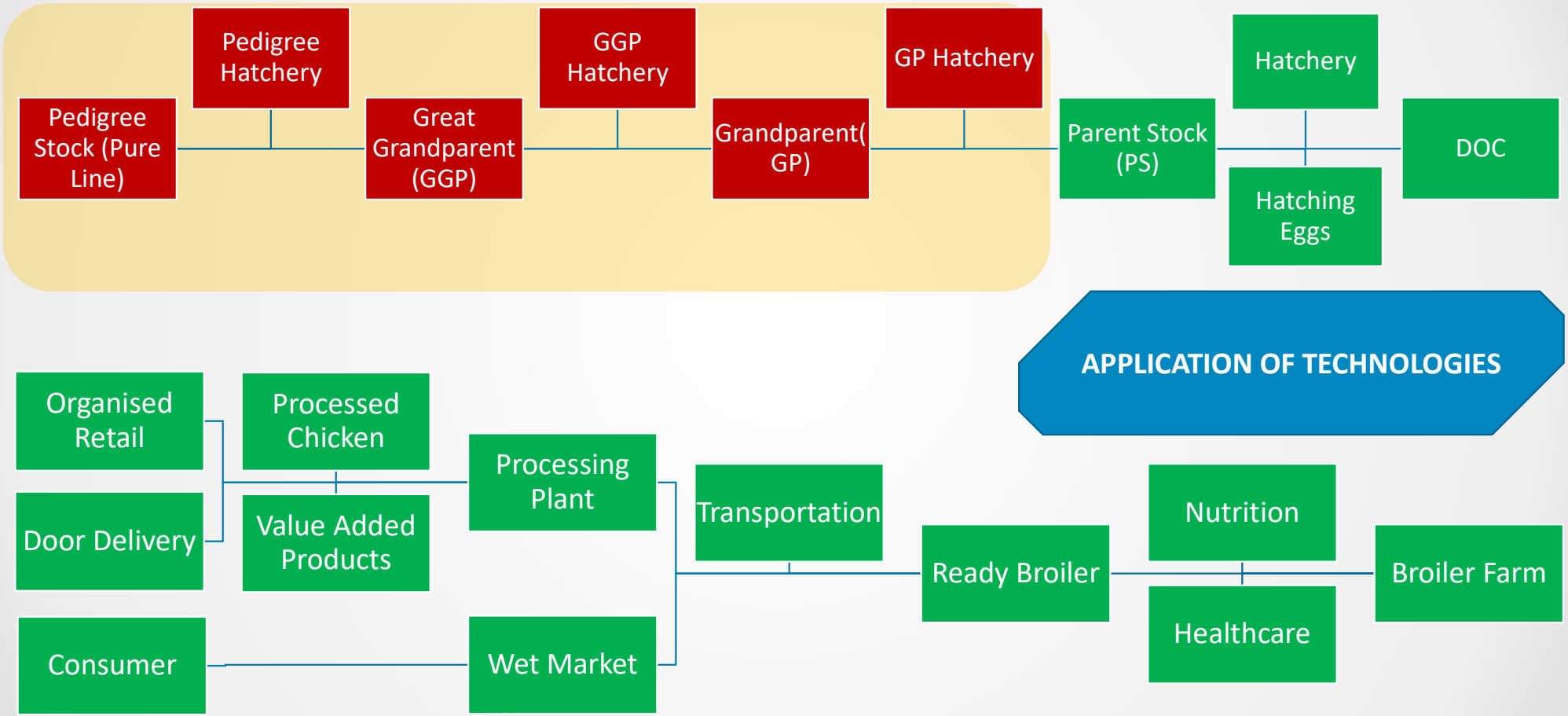

Technology options

Robots
Constant attention, Cleaning & sanitizing, Collecting eggs and Checking birds

Sensors
Control the climate in the house & Disease monitoring

AI
Chicken Processing, Micro Environment monitoring

AR / VR
Chicken Processing, Traceability

Biotechnology
Augmenting nutrient bio-availability, Genetic study

Genetic Engineering
Egg Sexing, Sex Altering

Blockchain
Food safety, Traceability, Digital record monitoring

IoT
Production, Sales, Data Management, Customer feedback

Big Data
Production, Sales, Data Management, Customer feedback

Technological Approach

Breeding: Tailored Selection, Genetic Engineering, Gene Editing, Big Data Analysis

Hatchery: Hatching Eggs Sexing, Incubation, Chicks Transportation

Housing: EC Houses, IoT based Farming Management, Robotic Surveillance

Feeding: GM Ingredients, Biotech Additives (Amino Acids, Minerals, Vitamins), Blockchain

Health Management: Predictive Big Data Analysis, Biosensors, Remote Sensing, Microbiome

Handling the Products: Chicken & Egg Transportation, Mechanized Processing, Sustainable Packaging

Selling of Products: Small Retail/Hyper Market, IoT based Home Delivery, QSR & Food Delivery, VAP

Technological Approach

Breeding

- Use of QTLs for selection - QTL is quantitative trait loci which can be defined as group of genes in the DNA
- Identification of genes for our trait of interest through microarray analysis
- Genetic Engineering processes like transgenesis, knocking down a gene and RNAi, Proteomics, Nanotechnology Epigenetics, In-ovo approaches and even CRISPR gene editing technology are used nowadays.
- New technologies of Gene Editing

Hatchery

- Fully automated hatching eggs handling system from farm to hatchery
- Microprocessor based sophisticated and precise incubators
- In-Ovo vaccination techniques and Live Embryo Detection
- Microclimate managed Chicks transport system

Housing

- Microprocessor and Sensor based environment control system, automated showers, cooling pads, humidifiers, Flicker free fluid LED light having specific illumination intensity, Dataloggers, Flock data collection
- Digital air quality monitors for monitoring ammonia and carbon dioxide level
- Battery Cages, EC Houses, moving belt system for manure collection
- Remote access livestock monitoring system
- Automation to reduce dependency on manpower

Technological Approach

Feeding

- Inteligent feed formulation software
- Genetically modified Corn, Soyabean and other essential ingredients
- Transgenic feed with more essential proteins and amino acids for poultry
- Probiotics and prebiotics are now becoming new substitutes for antibiotics
- Biotechnological techniques to produce amino acids and trace minerals
- Nanotechnology for nutrients

Health

- Digital Infrastructure for disease diagnosis
- Data collection and Predictive Data analysis
- Application of Biosensors to identify onset of diseases
- RT-PCR, ELISA & Rapid Diagnostic kits for precise diagnosis
- Usage of Pre and Pro Biotics for Antibiotic free disease management
- Immediate intervention by Vet's to remotely located farms has become possible using Digital Technology

Technological Approach

Handling the Products

- GPS Tracking and Data Logging during transportation of the products
- HACCP, ISO 22000, QMS, GMP, GHP
- Inclusion of AI technology and involving colour sorters, IR Imaging in chicken processing.
- Advanced packaging technology like Vacuum packaging, Gas packaging, Active and Intelligent packaging

Selling of the Products

- Processed and Value-Added products by automated equipments
- IOT based Doorstep delivery for urban youths has been successfully implemented
- Digitization of restaurants has given a huge boost to domestic consumption of fancy food
- Social and Digital media contributing in promotion of cooking and consumption of chicken

Technology adoption at AGRIVET

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Environmentally Controlled House: Microprocessor based automated environment control system

Pellet Feed Plant: Optimum nutrient availability for the birds

Fully Automatic Wet Chemistry Techniques: Proximate Analysis

Near Infra-Red Spectroscopic (NIRS): Tool for field level quality control of Raw Materials and Finished Feeds

Technology adoption at AGRIVET

www.agrivet.in

Enzyme-Linked Immunosorbent Assay (ELISA): Used to detect antibodies or infectious agents in a sample

Mycomaster Toxin Analyser : Rapid Quantitative Lateral Flow Immunoassay (LFIA) technique

Viscometer: Measurement of viscosity in intestinal content

qRT-PCR: Relative and absolute quantification of gene expression. Accurately Counting bacterial, viral and fungal load

Technology adoption at AGRIVET

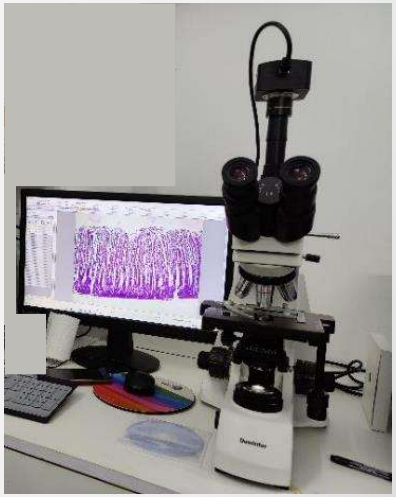
www.agrivet.in

Digital Egg Tester: Precision egg quality assessment

Feed Technology: PDI Testing, Mixing Uniformity, Particle Size analysis

Microscopic Imaging: Histomorphometry and histopathology

Arterial Blood Gas Analysis: Basic understanding of the health condition of the birds



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Technological Approach *Online Livestock Healthcare*

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- The on-farm health care and management service in the livestock industry is still at a nascent stage. The availability of experienced veterinarian advisory at the local level remains a key cause of concern for the industry. It is also critical to ensure a quick turnaround to address issues in the livestock farm.
- An **Online Platform** that connects the **Grassroot Level Farmers** with the **Veterinarians** with an objective to provide effective and scientific- technical assistance for Poultry, Dairy, Aqua and other livestock healthcare and management.

Technological Approach *Online Livestock Healthcare*

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India's first **Online Livestock Health Care Advisory Platform** – the first of its kind to serve the Livestock Farmers.

Technology-driven, Non-Physical, Real-Time, Expert Health Care advisory for Livestock farmers/Animal Owners of Rural & Urban areas.

The farmers receive these specialty services incurring **NO COST**.

Providing **Authentic Healthcare Advisory Digitally** to the livestock farmers residing in **Remote Areas**.

One-to-One Interactive Medium of **Healthcare Resolutions From Experienced Veterinarians**.

Disease Information Management on Livestock healthcare making us "future ready".

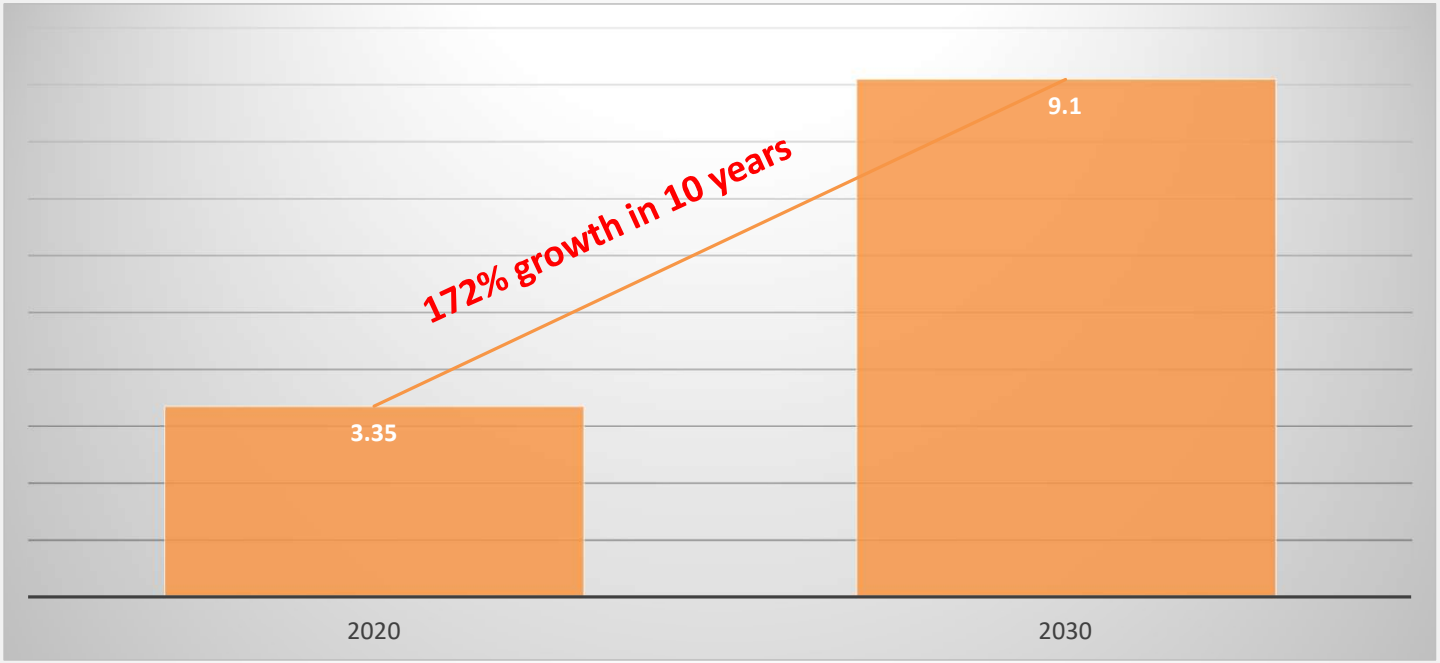
Alongside providing **"Quality Healthcare"** for animals, **"Human Health"** will also get benefited in terms of **Antimicrobial Resistance** and other zoonotic diseases, by neutralizing unregistered local practitioners.

Virtual Livestock Clinic, Veterinarians understand the medical concerns of the livestock and shares the **Prescription** through the platform

Mitigate the gap between demand and **availability of Veterinarians and Paravets**

Registered Users	GPS Downloads	FB Group Members	Panel Doctors
2500+	**4500+**	**9000+**	**16**

Fasten Your Seatbelt



According to a report by management consultants **McKinsey & Company**, as cited in the NAPEP, **India's per-capita chicken consumption** is set to grow from **3 kg to 9.1 kg by 2030**, on account of people's rapidly changing consumption behaviour. This suggests an even greater scope for backyard poultry to grow as an increasingly important part of India's poultry sector.

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