

# Role of Alternatives in preventing the occurrence of disease and reducing antibiotic use in poultry



**If you have a hammer,  
every problem seems like  
a nail**





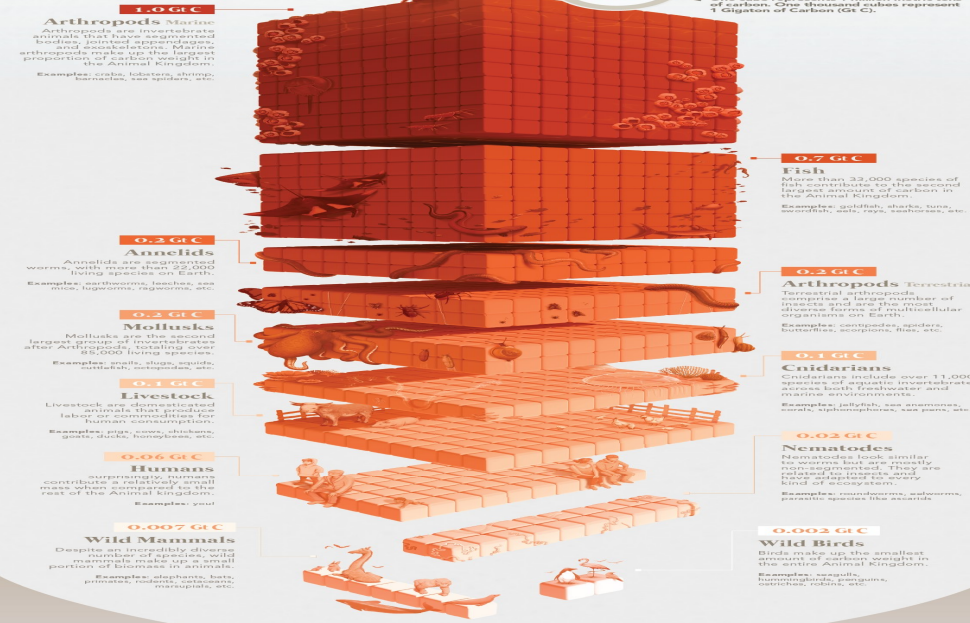
# Visualizing the Biomass of Life

Our planet supports over 8.7 million species, but it can be difficult to truly appreciate the scale of this incredible diversity. We break down the total composition of the living world in terms of its biomass.

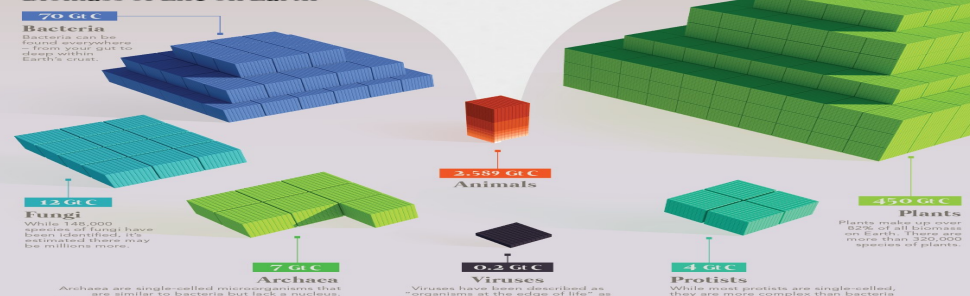
## The Biomass of Animals

Biomass is measured by the amount of carbon an organism contains. Carbon is a primary component of all known life on Earth, used to complex biological molecules and compounds.

One cubic centimeter is a million metric tons of carbon. One billion Cubic Centimeters represent 1 Gillion of Carbon (Gt C).



## Comparing All Biomass of Life on Earth



Humans make up approximately 0.01% of all biomass on Earth.

TOTAL BIOMASS 550 G TONS

PLANTS	450 G TONS	82%
BACTERIA	70 G TONS	12%
FUNGI	ARCHAEA	PROTISTS AND VIRUSES
27.41 GTONNS	5,5%	
ANIMALS	2.589 GTONNS	0.5%



## THE ANTHROPOCENE



**36% OF ALL  
MAMMALS TODAY  
ARE HUMANS**



**60% ARE LIVESTOCK**



**4% ARE WILD**



**70% OF BIRDS  
ARE POULTRY**



**30% ARE  
WILD**

Source: Bar-On et al., 2018

# Judicious use of anti biotics

## **Antibiotics Sales Drop By Rs. 1000 Crore In Kerala: Report**

The state of Kerala has reported a significant reduction in antibiotic drug sales over the past year, a report said. Antibiotics accounted for Rs. 4,500 crore of the Rs 15,000 crore worth of medicines sold annually in the state.

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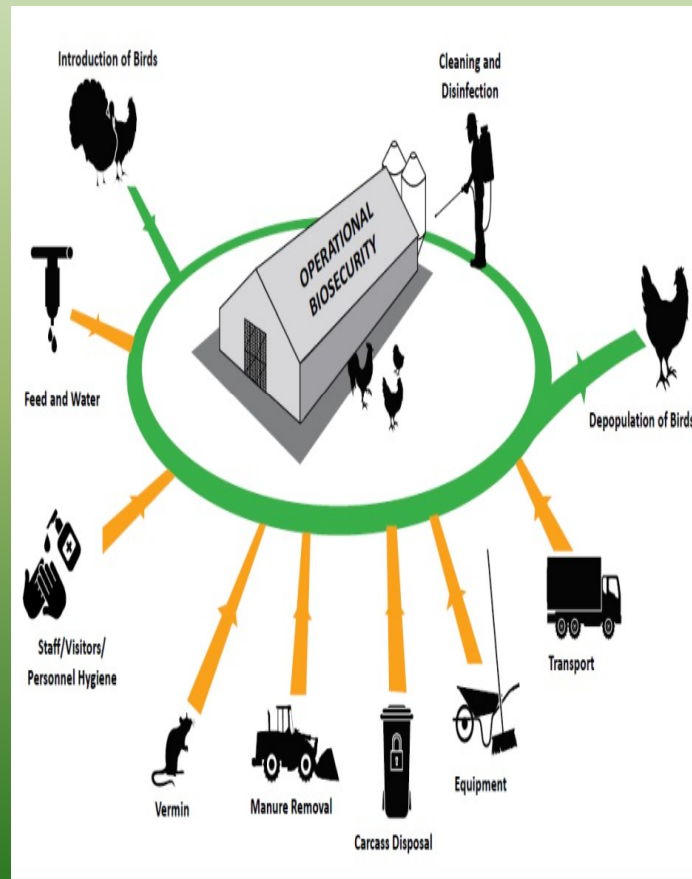


•INTENSIFIED FARMING SYSTEMS LACK OF SPACE, VENTILATION, QUALITY AND QUANTITY OF WATER,ENVIRONMENTAL/SHED HYGEINE/WASTE/MANURE HANDLING, ANIMAL RESTRAINTS, SANITATION ISSUES LACK OF CLIMATE CHANGE MITIGATION MEASURES, ANIMAL WELFARE MEASURES.....

ALL LEADS TO..... **STRESS.**

- DISEASE IS ONLY A MANIFESTATION OF STRESS**
- FEAR OF PRODUCTION/MONETARY LOSS ADVOCATES MISUSE/OVERUSE OF ANTIBIOTICS**

## ALTERNATIVES ...



**STRESS RELIEVERS** -VITAMIN AND MINERAL  
SUPPLEMENTATIONS, PHYTOCHEMICALS  
CURCUMIN,ASWAGANDHA,OCIMUM EXTRACTS

**IMMUNO MODULATORS**- PLANT BASED , PAMPs  
(PATHOGEN ASSOCIATED MOLECULAR PATTERNS) NATURAL  
AND SYNTHETIC PRODUCTS

**FARM HYGIENE SANITATION AND STOCKMANSHIP**-  
LITTER MANAGEMENT , BIOFILM MANAGEMENT, FLUSHING  
AND CLEANING OF EQUIPMENTS AND MONITORING AND  
SURVEILANCE OF FARM MANAGEMENT SOPs WITH HACCP  
PROTOCOLS WITH MODERN TECHNOLOGY LIKE SENSORS,  
CAMERAS AND ARTIFICIAL INTELLIGENCE SOFTWARES

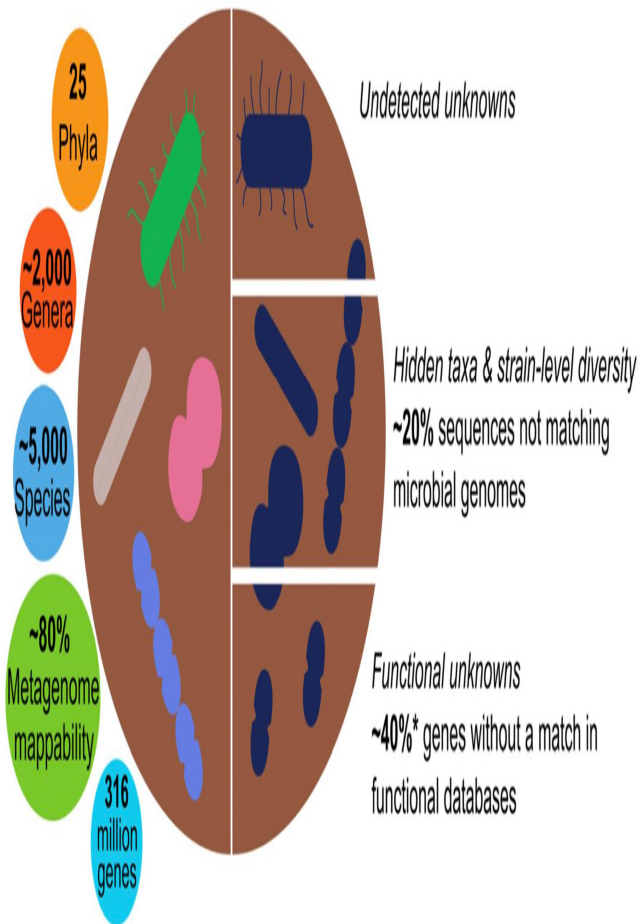
**BIO SECURITY**- INFRA STRUCTURAL AND OPERATIONAL

**VACCINATION**- WITH SERUM TITRE EVALUATION AND  
MONITORING FLOCK IMMUNITY

## The human microbiome

What is known?

What is unknown?



**MICROBIOME-** NURTURING A DIVERSIFIED MICROBIOME WITH DEEP LITTER SYSTEM

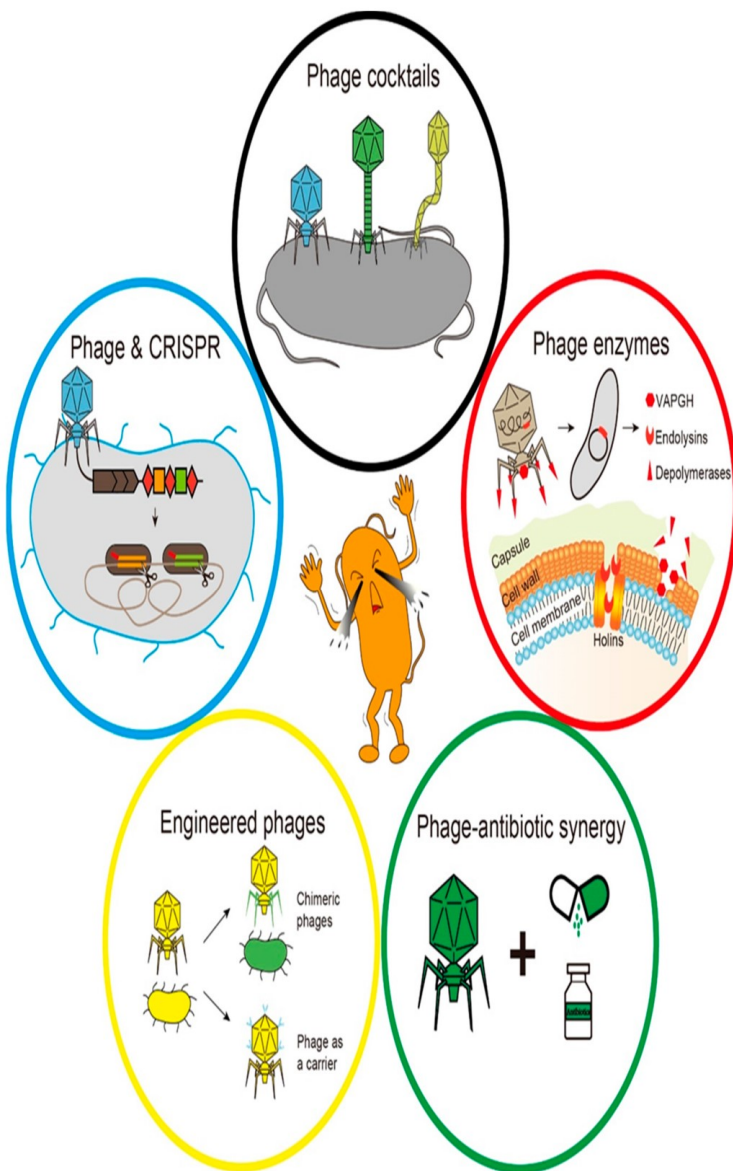
## FAECAL MICROBIAL TRANSPLANTATION

**PROBIOTICS-** HELPS IN NURTURING A DIVERSIFIED MICROBIOME ,FLOCK IMMUNITY,DIGESTION,ASSIMILATION OF NUTRIENTS,BETTER PHYSIOLOGY AND BIOCHEMISTRY OF BIRDS, COMPETITIVE EXCLUSION OF PATHOGENS ( QUORUM SENSING) AND BY PROVIDIND NECESSARY METABOLITES FOR HEALTH.

IT CAN BE SUPPLEMENTED IN WATER, FEED AND EVEN SPRAYED OVER BIRDS AND LITTER

**PREBIOTICS-** FEED INGREDIENTS WHICH FAVOUR THE ESTABLISHMENT AND MULTIPLICATION OF BACTERIA





**BACTERIOPHAGE THERAPY-** HIGHLY TARGET SPECIFIC IN KILLING THE SPECIFIC PATHOGENIC BACTERIA AND CAN BE EASILY EXPLORED FROM NATURE –THOUGH BACTERIA EVOLVES RESISTANCE AGAINST PHAGES THE NUMBERS ARE ON OUR SIDE CONSIDERING ANTIBIOTIC RESISTANCE

**COCKTAIL PHAGE THERAPY-** MIXTURE OF PHAGES WHICH ARE SPECIFIC TO A PATHOGENIC BACTERIA

**ADJUNCT PHAGE THERAPY-** SUPER BUGS WHICH ARE RESISTANT TO ANTIBIOTICS CAN BE TREATED WITH THE SAME ANTIBIOTICS BY USING SPECIFIC PHAGES ALONG WITH IT, AND ALSO BY SUPPLEMENTING MUCIN PRODUCTION IN GASTRO INTESTINAL TRACTS.

**PHAGE LYSIN THERAPY-** PHAGE LYSINS ARE ENZYMES WHICH CAN DISINTEGRATE BACTERIAL CELL WALL AND THEREBY KILL SPECIFIC BACTERIA



## ENZYME THERAPY-

MOST OF THE DISEASES INFECTIOUS OR NON INFECTIOUS STARTS IN THE GASTRO INTESTINAL SYSTEM . FAILURE OF DIGESTION AND ABSORPTION OF VARIOUS NUTRIENTS IN DIFFERENT COMPARTMENTS OF GASTRO INTESTINAL TRACT WILL LEAD TO DYSBIOSIS AND THEREBY DISEASES. ENZYMES LIKE PROTEASES,LIPASES, CELLULASE,AMYLASE ,PHYTASES ETC PRODUCED FROM MICROBES INDUSTRIALLY IN FERMENTERS IF SUPPLEMENTED WITH FEED AND WATER CAN NOT ONLY HELP IN PROPER DIGESTION AND PRODUCTIVITY BUT ALSO IN PREVENTION OF DISEASES OF VARIOUS SYSTEMS COCKTAIL ENZYME PREPARATIONS ARE AVAILABLE AT AROUND 100 -200 RS/KG AND THE LEVEL OF INCORPORATION IS IN GRAMS PER TONN OF FEED FARMER UPTAKE AND INDUSTRY UPTAKE IS STILL LACKING IN SCALING UP



## CHALLENGES

THE REAL POTENTIAL OF PROBIOTICS, ENZYMES, AND OTHER NUTRIENTS AND METABOLITES ARE NOT TAPPED BECAUSE THEY ARE ALL DESIGNED TO BE USED IN FEED INDUSTRY THE BOTTLE NECKS OF FEED INDUSTRY LIKE THERMOLABILITY OF ENZYMES VITAMINS AND PROBIOTICS ABOVE 55 DEGREE CENTIGRADE PELLETING TEMPERATURE

CONCEPT OF PELLET INTEGRITY

PROFITABILITY CONSTRAINTS

LACK OF AWARENESS AND WILLINGNESS ARE THE CONSTRAINTS





## WAY FORWARD

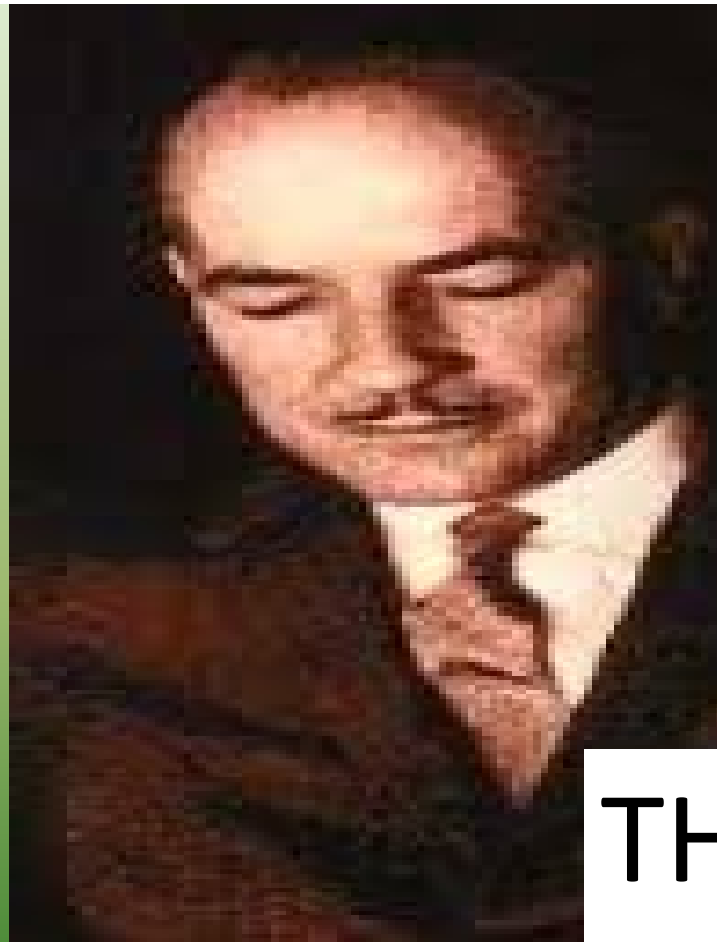
FARMER/FARM LEVEL ADOPTION OF TECHNOLOGY AND PRODUCTS

USAGE IN DRINKING WATER WITH MONITORING OF BIOFILMS

WETMASH FEEDING

UNIFORM MIXING IN THE FEED AND WATER WOULD BE A CHALLENGE

CALLIBRATED AUTOMATIC DISPENSERS FOR SUPPLEMENTS MUST BE INCORPORATED AT VARIOUS LEVELS OF DRINKING AND FEEDING SYSTEMS



Never  
underestimate  
the power  
of human  
stupidity

*Robert Anson Heinlein*

THANKYOU

DR SUDHI R