

# Preventive Tools in Poultry Production

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# Outline of Presentation

- Three facts
- Preventive tools in poultry production
- GAP
- Types of vaccines & Method of vaccination
- Chicken Immune System & Factors of successful vaccination
- Vaccination failure
- Biosecurity
- Feed additives
- Smart Poultry Farming
- Out of the work (Take-home messages)



# THREE FACTS

# 1. **Veterinary Medicine is a Preventive Medicine**

- The first mission of veterinarians is to prevent outbreaks and infections.
- After that comes their role in treatment.

## 2. Veterinary Medicine is the 1<sup>st</sup> Line of Defense for Human Beings

- Against more than 200 zoonotic diseases transferred from animals & poultry to humans.
- Veterinarian responsible for production and serving a safe, hygienic, palatable, and high-nutritive-value food. Free from microbiological and chemical hazards.
- And free from drug residues as well.

### **3. Veterinary Medicine is an Economic Medicine, so it is also looking for Profitability and contributing to our National Income.**

- Veterinarians responsible for improvement of all production parameters like FCR, production index, daily weight gain, mortality % etc., which directly affect profitability in poultry production projects.

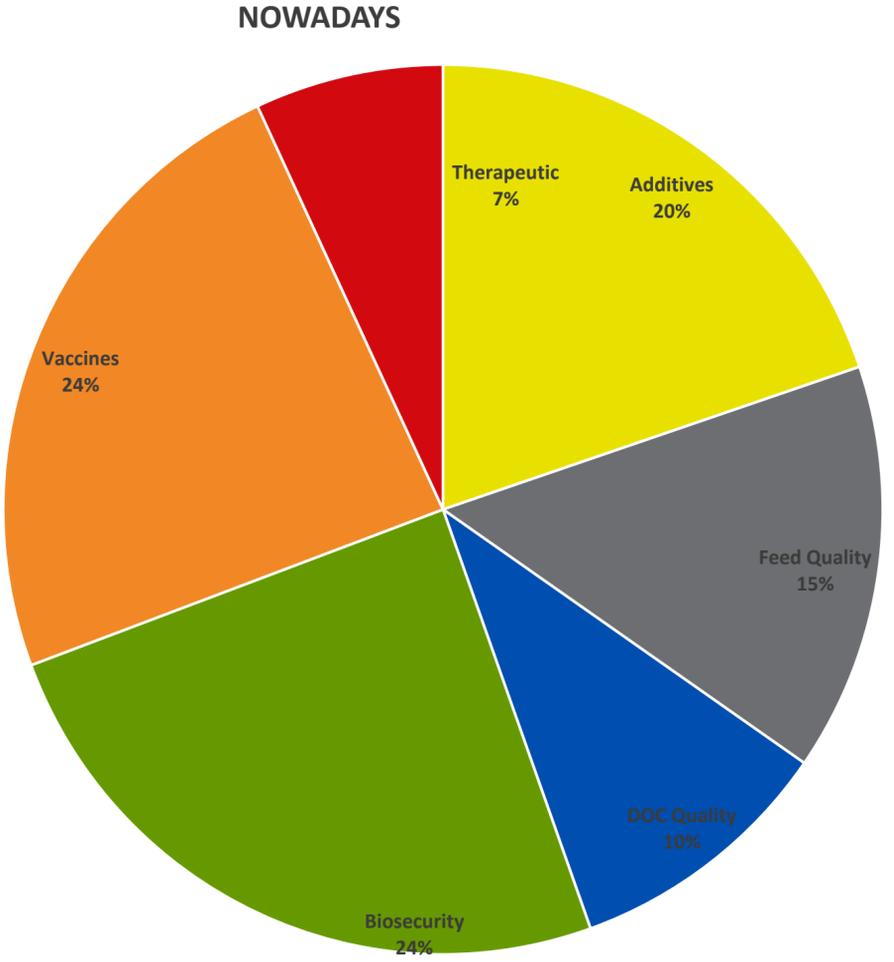
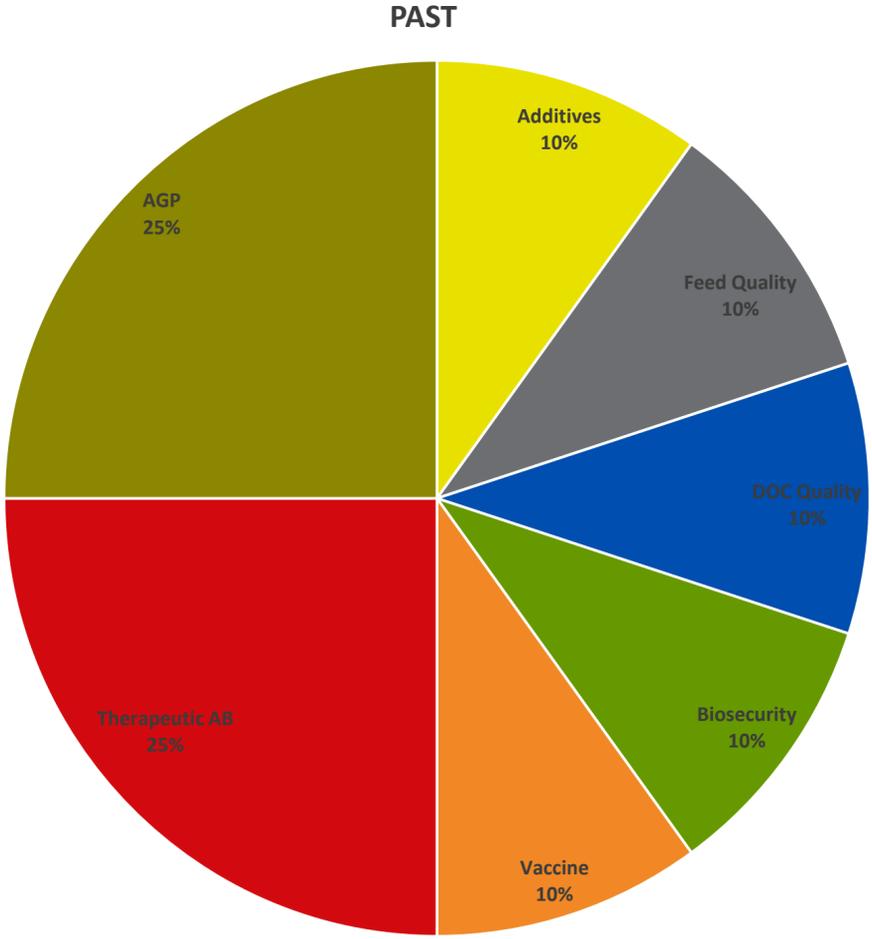


# PREVENTIVE TOOLS

# Preventive Tools Include

- GAP
- Biosecurity (Prevention)
- Vaccination (Protection)
- Feed & Water Quality
- Additives
- DOC quality
- Therapeutic & Prophylaxis program.
- Using new technology and innovation in prevention and early diagnosis

# Recently, there has been a shift in preventive tools



Source: FAO, 2019; OIE, 2021

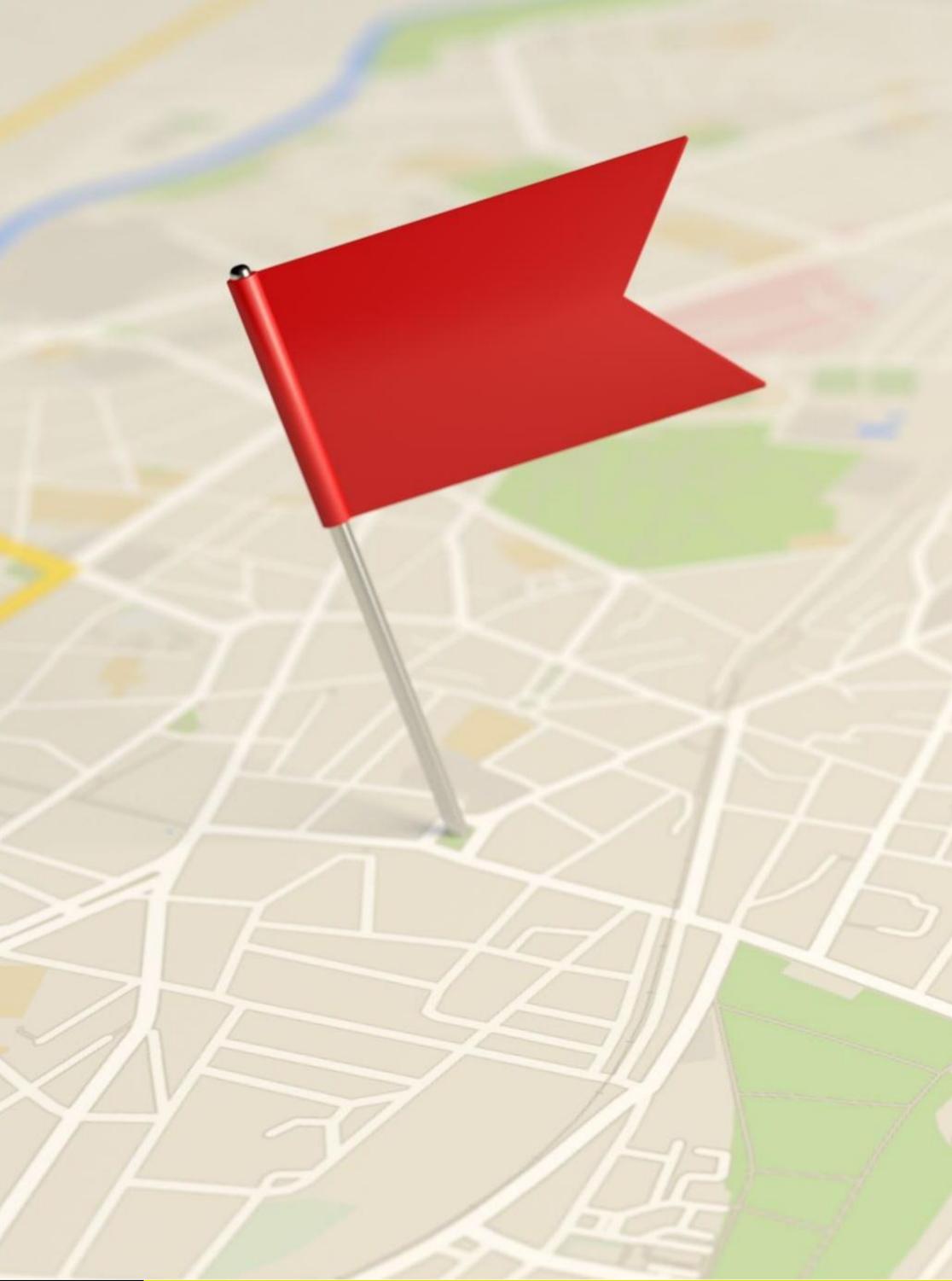
**GAP**



E, 2021; Gough, 2018

# **GOOD AGRICULTURAL PRACTICES**

# LOCATION AND LAYOUT





Far from the nearest poultry project by at least 5 km in all directions.



Away from population clusters and districts.



Near roads required for transportation (sales & suppliers)



Availability of water and electricity



Safety distance between each house 20m and between each farm in the same project 500 – 1000m, from all directions



Longitudinal axis should be East-West



Wind direction and wind load should be taken in our mind



Prefab, (high isolation materials) to enable maximum climate control



# PROPER MANAGEMENT



## **a) Pre-Placement Preparation**

- Check list related to temperature, humidity, feed, water, bedding material, equipment
- Stocking density

## **b) Brooding Management**

- Pay more attention and ensure best practices during the brooding period to achieve good health and a superior-performing flock.

**c) Daily /Weekly Monitoring of Production Parameters and Recording by using Standard Checklist related to :**

Temperature

Lighting

Mortality

FCR

Production index

Maintenance of equipment

Humidity

Ventilation

P.M

## **d) Litter Management:**

- Avoid wet litter to prevent
  - Intestinal problems (coccidiosis & clostridiosis)
  - Increase in ammonia, causing respiratory manifestations
- Avoid dusty litter to minimize respiratory diseases

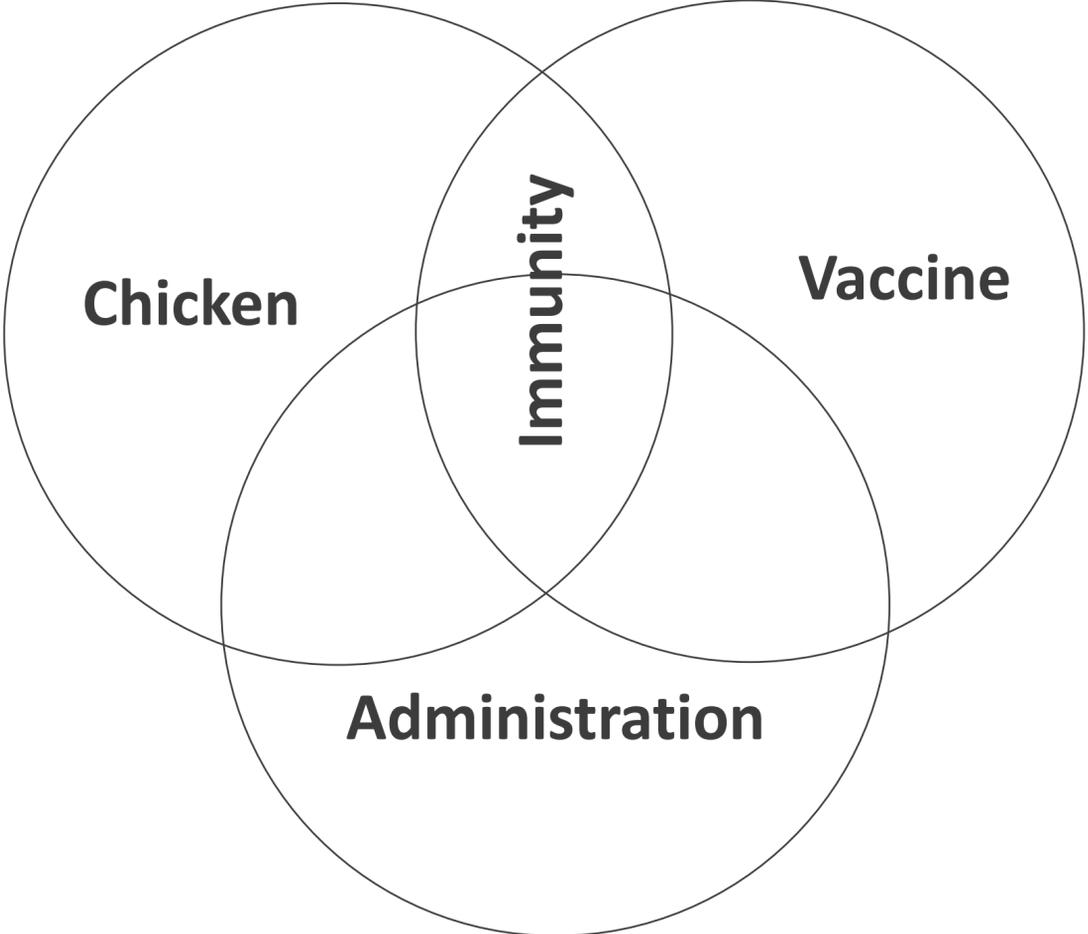
## **e) Waste Management**

- Waste management company contracting
- Water treatment/recycling
- Waste dumping / disposal in a hygienic way.

# VACCINE



# Key to Successful Vaccination



# Types of Vaccines

Live attenuated vaccine



Inactivated (killed) vaccine



Genetically engineered vaccines (vector)



Immune complex

# VACCINATION METHODS



# Classifications

## Classification according to Location

A- Hatchery vaccination

B- Field vaccination

## Classification according to Application

A- Individual vaccination

B- Mass vaccination

# Subcutaneous Vaccination



## Beak Dip Method

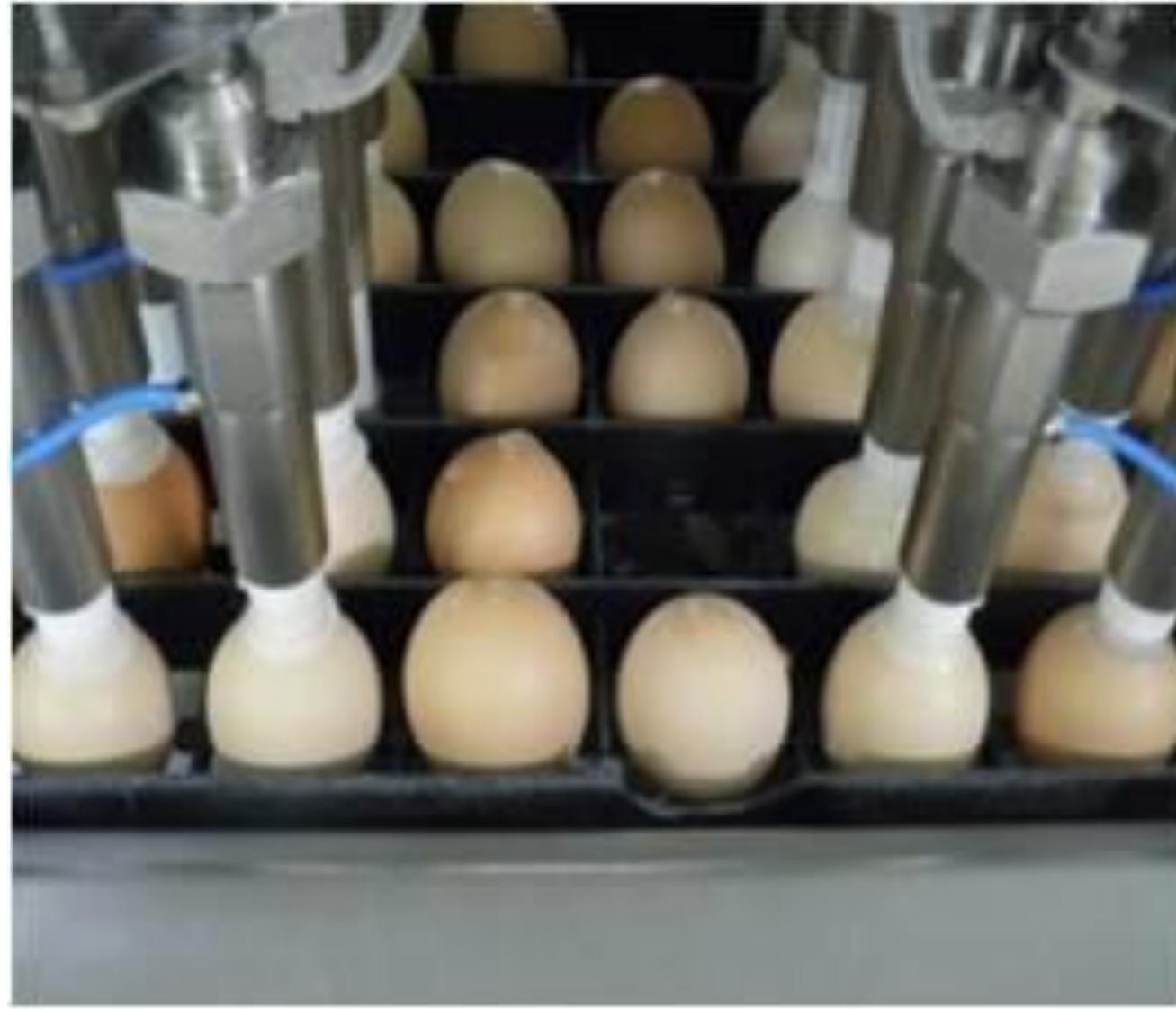
Source: OIE, 2021; Gough, 2018



# Cabinet Sprayer in the Hatchery



# In-Ovo



## Intramuscular Injection



## Eye Drop



# Drinking Water

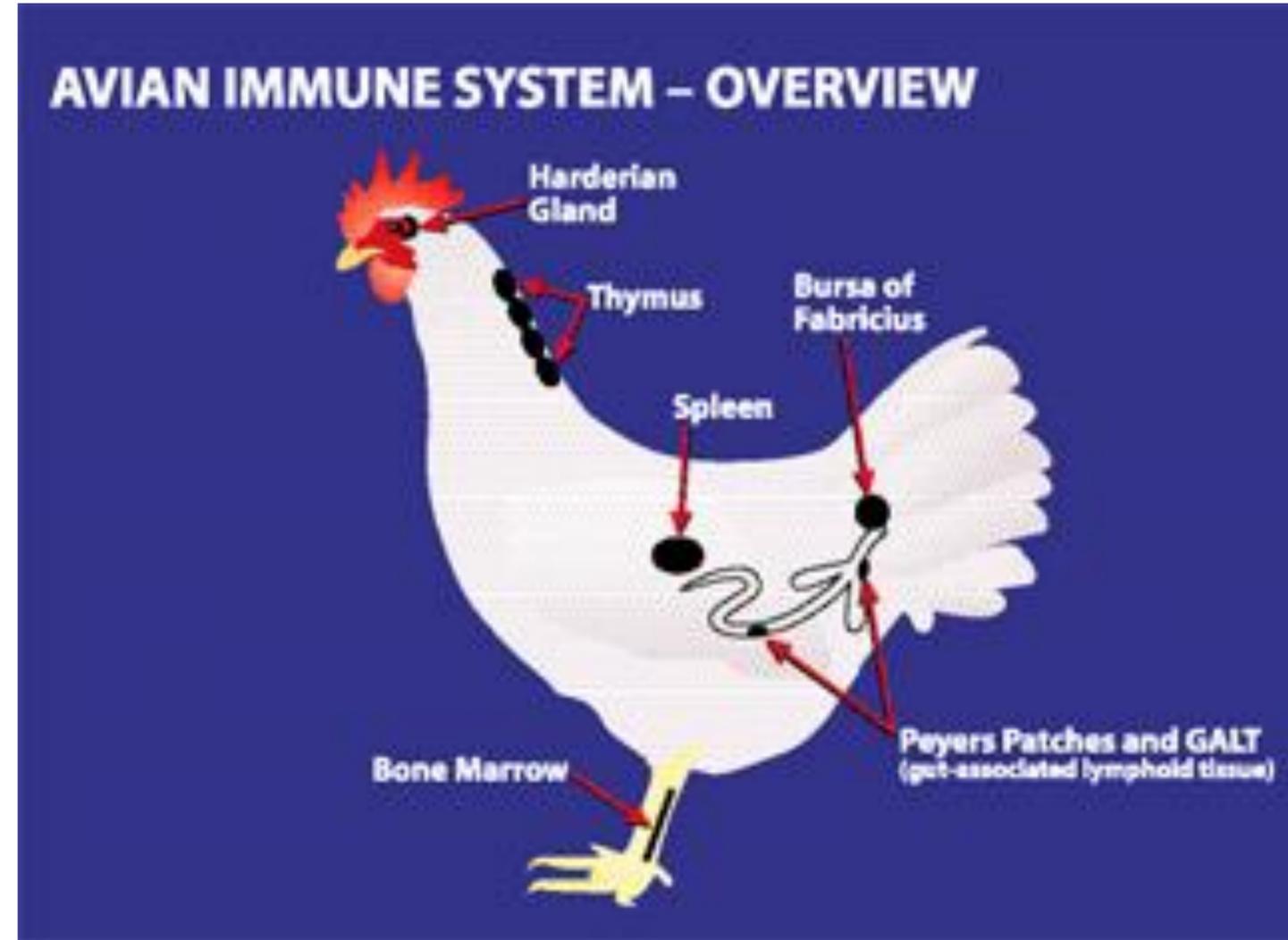


## Spray

# Spray



# Chicken Immune System



# Chicken Immune System

## Primary Organs

- Thymus gland
  - \* T-cell system
    - Cell-mediated immunity
- Bursa of Fabricius
  - \* B-cell system
    - Humoral immunity
- Bone marrow
  - \* Precursor blood cells
- Yolk sac
  - \* Maternal immunity

## ➔ **Peripheral Lymphoid Tissue**

- Harderian gland
- Cecal tonsillae
- Spleen
- GALT (Gut Associated Lymphoid Tissue), also called Mucosa ALT.

# Vaccination Failure

Means there is no development of an adequate antibody titer level in vaccinated chickens, so chickens are easily susceptible to field infection.



**Causes related to the chicken**

**Causes related to the vaccine**

**Causes related to the vaccination process (administration)**

# A. Causes related to Chicken

Maternal antibodies

Stress

Chicken may be in incubation period

Immuno-suppressed chickens

Strong field challenge

## B. Causes related to the Vaccine itself

Inactivation of live vaccine.

Vaccine does not contain proper strain.

Poor distribution of live vaccine.

Poor-quality vaccine.

## C. Causes related to the Vaccination Process (Administration)

Use of chlorinated water or water with disinfectant residues.

Inactivation resulting from keeping the reconstituted vaccine for a long time.

Using too little or too much water volume.

Using warm water for vaccine preparation.

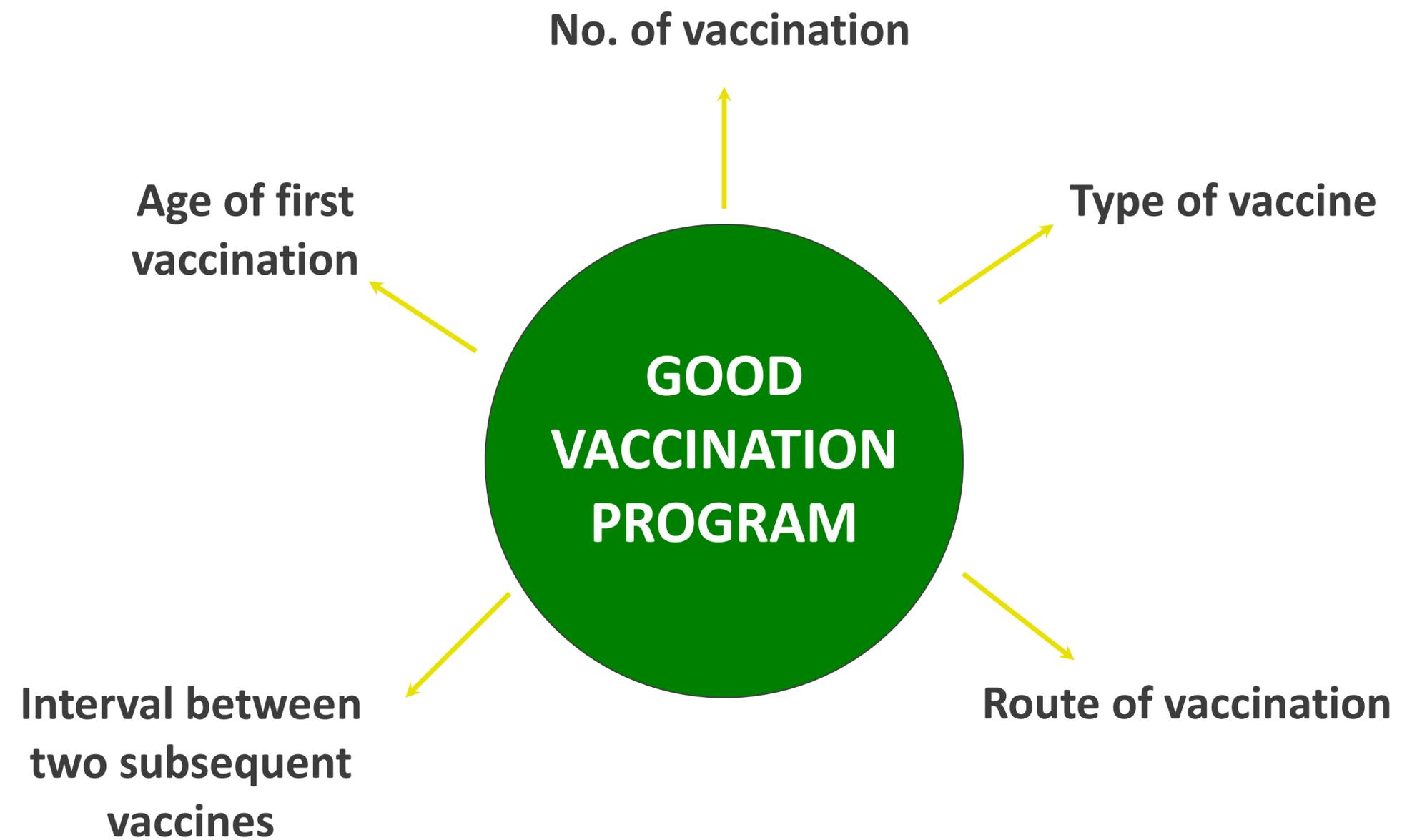
No water deprivation before drinking water vaccination.

Incorrect droplet size in spray vaccination.

## Importance of Monitoring

- To verify the efficiency of the vaccine itself
- To evaluate the vaccination process itself, whether it succeeded or failed
- To apply corrective action when we face vaccination failure
- To improve and optimize the efficiency of the vaccination program





**(Prevention is better than Cure)**

**Biosecurity, in simple terms, is the prevention of disease transmission**

# Guard of the Farm



 Wheel dipping

 Foot dipping

 Bedding material disinfection

 Visitor policy & restriction.

 Manure disposal

 Mortality disposal

Incineration  
Rendering  
Composting

 Verification and validation by regular swabbing and sampling



Probiotics, prebiotics, phytogenics, organic acids, and mycotoxin binders:  
Support gut health, improve FCR, reduce pathogens.



# WATER & FEED QUALITY



- Balanced nutrients, mycotoxin-free, good storage & handling.
- Quality feed accounts for ~70% of production cost, directly affecting growth & immunity.
- Raw material quality
- Physical and chemical composition of feed
- Well-balanced formula by using emulsifiers, toxin binders, and enzymes
- Meeting requirements of vitamins and minerals, EFA & EAA.
- Free from mycotoxins and other growth-inhibitory agents.



## Water quality

- Suitable TDS
- Free from disease-causative agent
- Suitable pH
- Regular water pipelines cleaning and sanitation by using organic acids,  $H_2O_2$ , and peracetic acid.



## DOC Quality

- Sourced from breeders free from vertically transmitted diseases
- Considering the age of the parents' stock
- Breed, which varies in performance
- Maternal immunity level
- Vitality and DOC weight
- Free from omphalitis



# Prophylaxis Programs

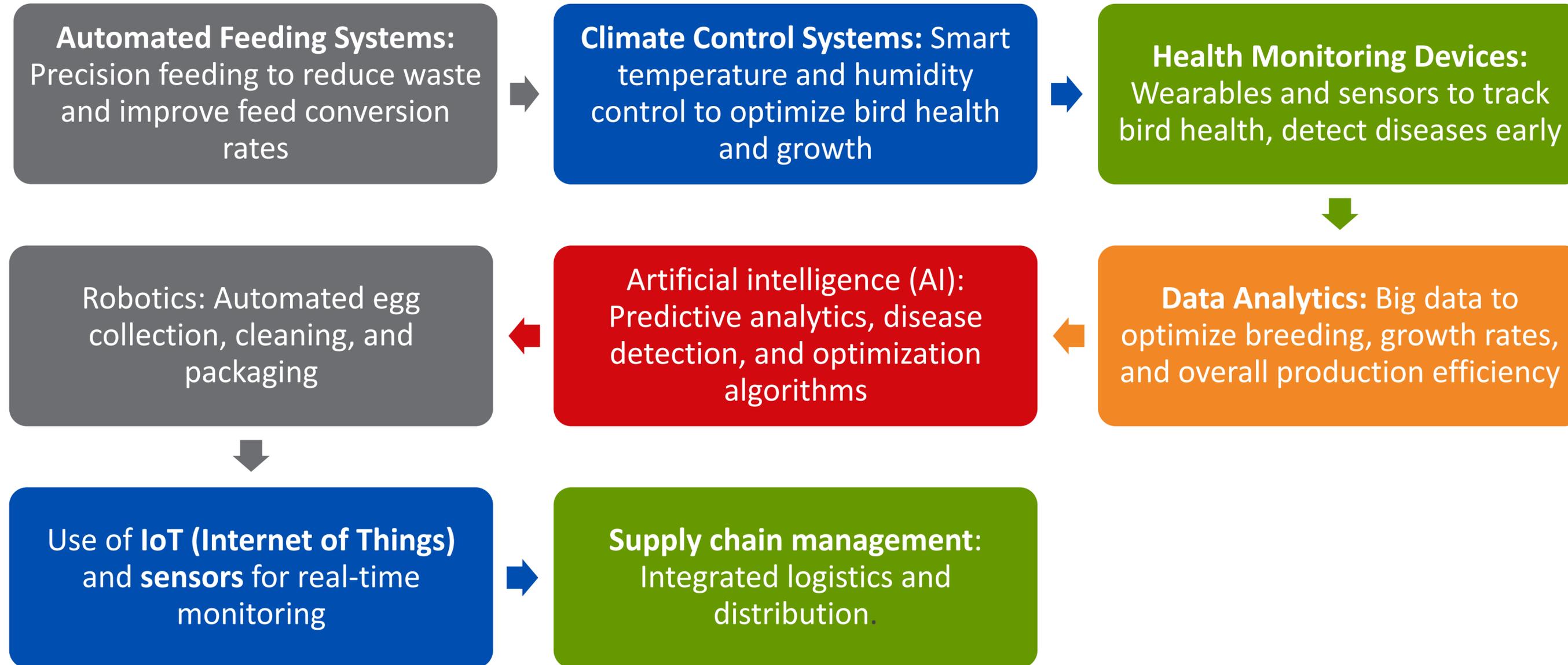
- Mycoplasma prophylaxis programs & other respiratory diseases
- Using shuttle programs against coccidiosis by using anticoccidial products in the feed
- Application of anti-clostridial products (necrotic enteritis program).
- Use of suitable supplements, vitamins, minerals, and amino acids
- Use of toxin binder and antimycotic agent in feed.



# Smart poultry farming

- refers to the application of advanced technologies and management practices to improve the efficiency, productivity, and sustainability of poultry production.

# Examples of Smart Poultry Farming Implementations



# Data Analytics: Descriptive Example

☰ Breeders
Yesterday  [Refresh Data](#) 

Production Farms Sort by age ▾

Breeder5 P

54w 4d

138.47		147.2	
Total eggs/HH		std	
3.97kg	3.99kg	0.03%	0.03%
Weight	std	Loss	std

Ross 308

Breeder5 Breeders ...

Breeder11 P Worst

52w 5d

114.63		138.6	
Total eggs/HH		std	
3.55kg	3.96kg	0.03%	0.03%
Weight	std	Loss	std

Ross 308

Breeder11 Breeders ...

Breeder6 P

49w 2d

95.78		123.8	
Total eggs/HH		std	
3.72kg	3.78kg	0.02%	0.03%
Weight	std	Loss	std

Cobb

Breeder6 Breeders ...

Breeder4 P

47w 3d

94.41		115.8	
Total eggs/HH		std	
4.1kg	3.87kg	0.8%	0.03%
Weight	std	Loss	std

Ross 308

Breeder4 Breeders ...

Breeder10 P

37w 3d

45.74		63.62	
Total eggs/HH		std	
3.8kg	3.72kg	0.03%	0.03%
Weight	std	Loss	std

IR

Breeder10 Breeders ...

Breeder7 P

32w 4d

18.6		35	
Total eggs/HH		std	
3.93kg	3.49kg	0.03%	0.03%
Weight	std	Loss	std

Ross 308

Breeder7 Breeders ...



**Poultry Sync**



Breeders



Hatchery

Dashboards, Reports, and Insights..

**%** ACTUAL YIELD  
**64.89 %**

MARKETABLE YIELD  
**64.89 %**

**KG** ACTUAL PRODUCTS WEIGHT  
**215,640.90 Kg**

MARKETABLE PRODUCTS WEIGHT  
**215,640.90 Kg**

**X** TOTAL REJECTS  
**3,734.10 Kg**

**LIP** ACTUAL LOST IN PRODUCTION  
**31.55 %**

MARKETABLE LOST IN PRODUCTION  
**31.55 %**

LIP Weight = 112,933.70 KG  
LIP = 31.55 %

**Left Over** -

Carried over to tomorrow (Whole):	1,025.00 Kg
Carried over to tomorrow(Cutups):	28,317.00 Kg
Carried over to tomorrow(Total):	29,342.00 Kg
Carried from yesterday:	0.00 Kg
Added from store:	0.00 Kg
Carcass Yield:	70.43 %

**Products** -

	Fresh Weight	Fresh %	Frozen Weight	Frozen %
<b>Whole:</b>	110,505.30 kg	51.25 %	73,323.00 kg	34.00 %
<b>Cutups:</b>	12,491.15 kg	5.79 %	6,600.00 kg	3.06 %
<b>Giblets:</b>	2,913.45 kg	1.35 %	3,088.00 kg	1.43 %
<b>ByProducts:</b>	0.00 kg	0.00 %	6,720.00 kg	3.12 %
<b>Total =</b>	<b>215,640.90 Kg</b>			

**Rejects** -

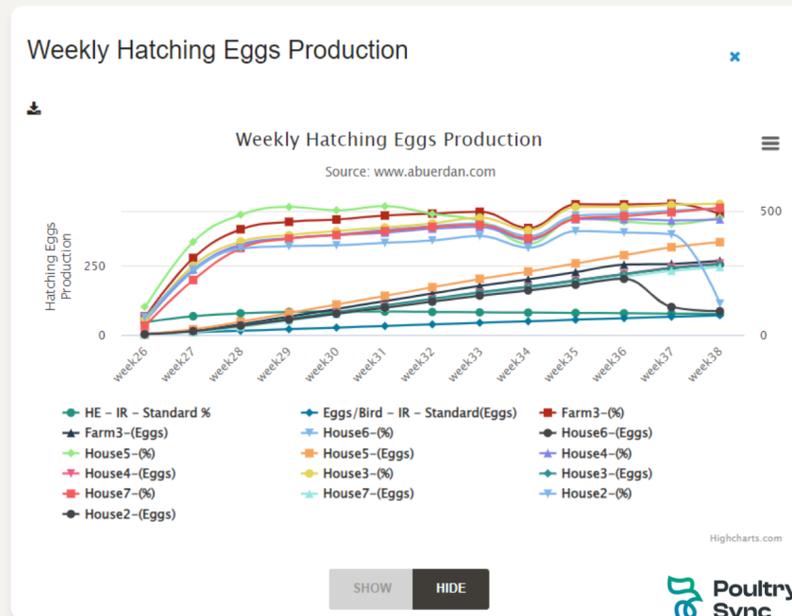
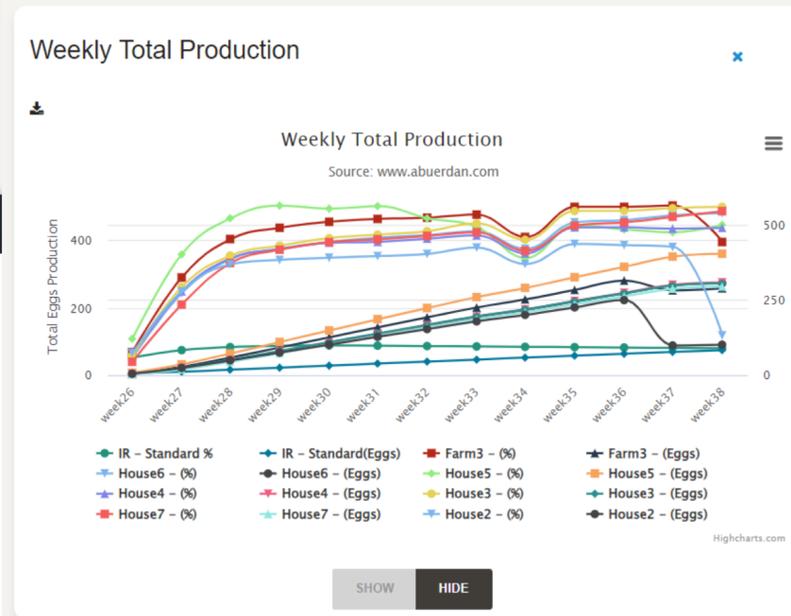
Primary Rejects:	2,805.50 Kg
Giblet Rejects:	928.60 Kg
Secondary Rejects:	0.00 Kg
<b>Total =</b>	<b>3,734.10 Kg</b>

**Yield (By Accepted Birds Weight)** -

	Marketable	Actual	Giveaway
Meat	56.70 %	56.69 %	-0.45 Kg
Giblets	1.68 %	1.68 %	-0.45 Kg
ByProducts	1.88 %	1.88 %	0.00 Kg
Carried to Tomorrow	8.20 %	8.20 %	0.00 Kg
<b>Total</b>	<b>68.45 %</b>	<b>68.45 %</b>	<b>0.00 Kg</b>

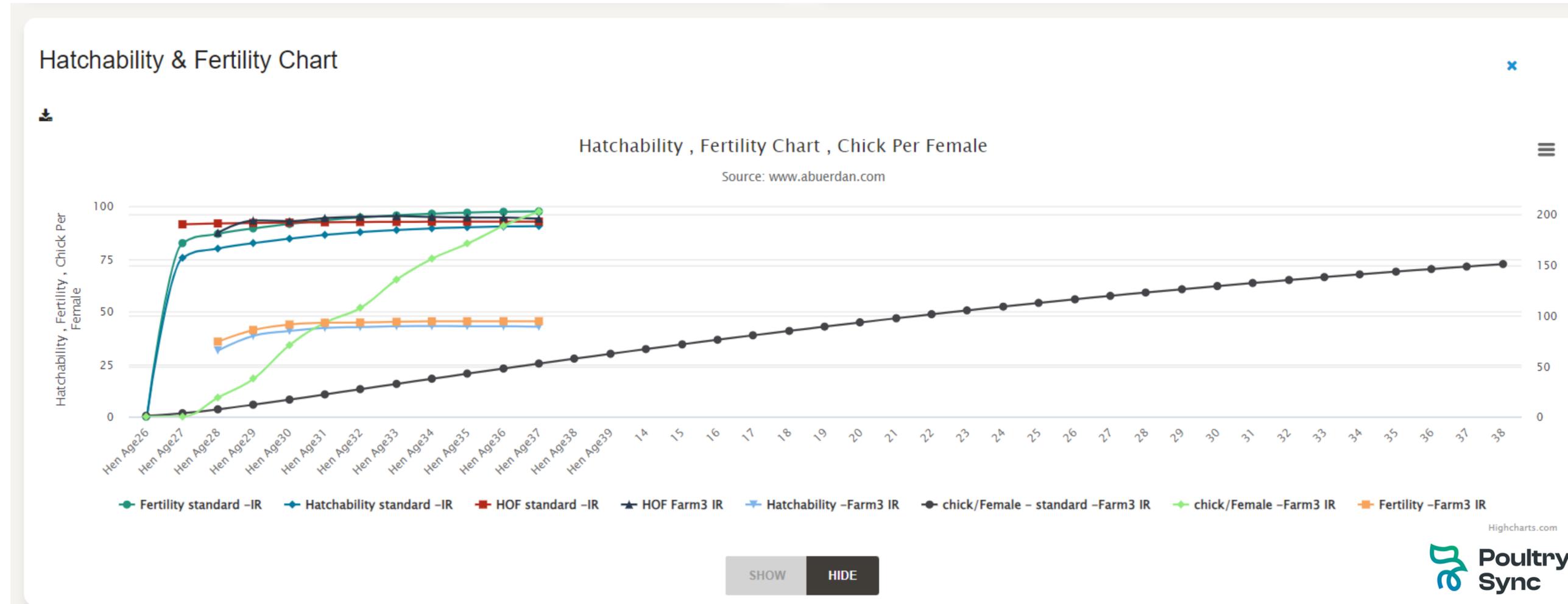
**Yield (By Hanged Birds Weight)** -

	Marketable	Actual	Giveaway
Meat	56.70 %	56.69 %	-0.45 Kg
Giblets	1.68 %	1.68 %	-0.45 Kg
ByProducts	1.88 %	1.88 %	0.00 Kg
Carried to Tomorrow	8.20 %	8.20 %	0.00 Kg
<b>Total</b>	<b>68.45 %</b>	<b>68.45 %</b>	<b>0.00 Kg</b>



# Data Analytics: Diagnostic Example

Diagnosing multiple measures to figure out the issue



# Data Analytics: Predictive Example

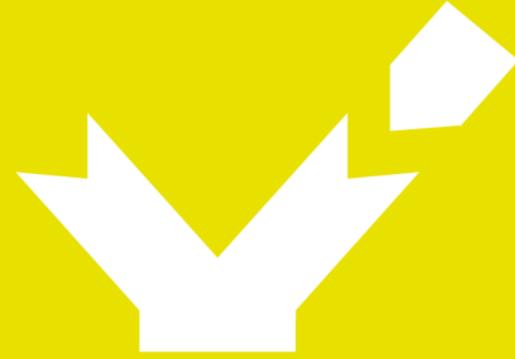


# Take Home Messages



- Biosecurity is the foundation and represents prevention
- Vaccines represent protection and work effectively if applied correctly
- Nutrition supports immunity
- Monitoring and reporting are necessary in poultry production
- Smart poultry production is a promising preventive tool (AI is the fourth industrial revolution)





THANK YOU

