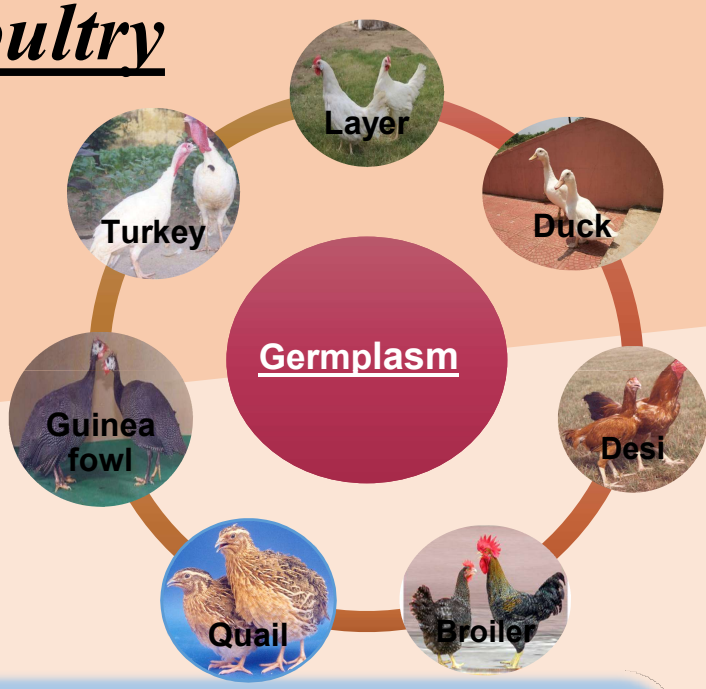
RESIDENTIAL WORKSHOP & TRAINING PROGRAMME

Farm Management In Poultry



Dr Jaydip Rokade, PhD,
Senior Scientist,
ICAR-Central Avian Research institute, Bareilly.

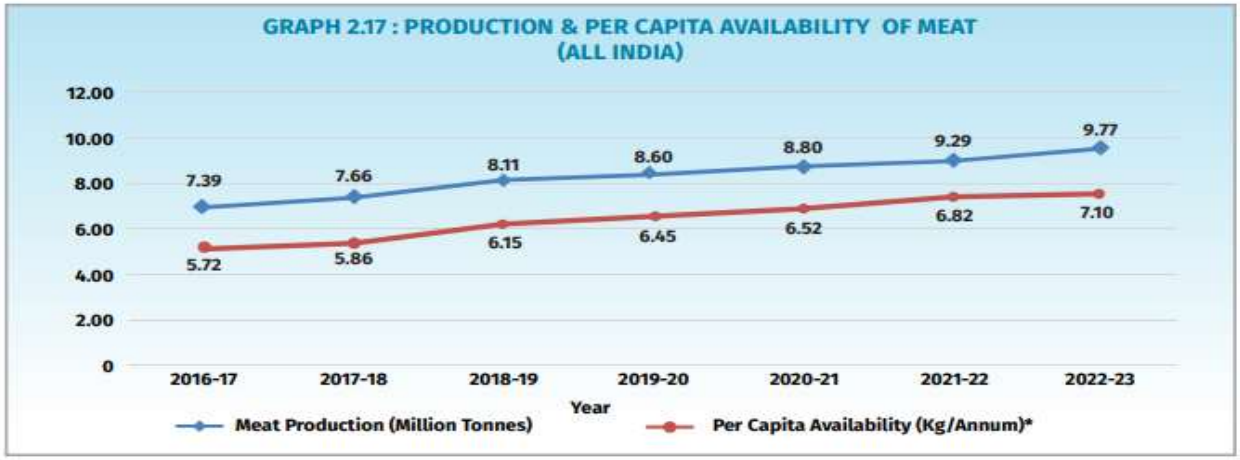
Poultry Production Prominence

Advantage India

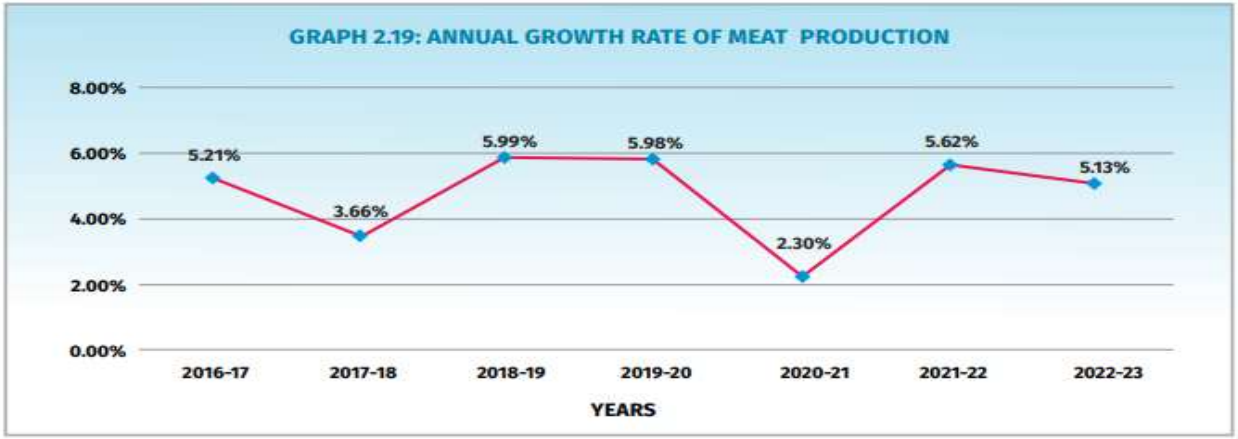
- Fastest growing economy in the world
- Largest producer of several agri commodities
- Second largest Consumer market
- Significant investments in world class ports, logistics & supply chain infrastructure
- Proactive Government policies
- Investor friendly incentives
- Highly skilled manpower pool

Why India for Meat and Poultry Processing?

- India has the world's largest population of livestock.
- India produces around 5.3 million MT of Meat and 75 bn eggs annually.
- India is the largest producer of buffalo meat and 2nd largest producer of goat meat.
- The current processing levels in poultry are 6%, while for meat it stands at 21%.
- Poultry is a highly vertically integrated industry in India and matches the efficiency levels of many western countries.
- Government of India has taken steps for modernization of municipal abattoirs to provide safe and hygienic meat to consumers.

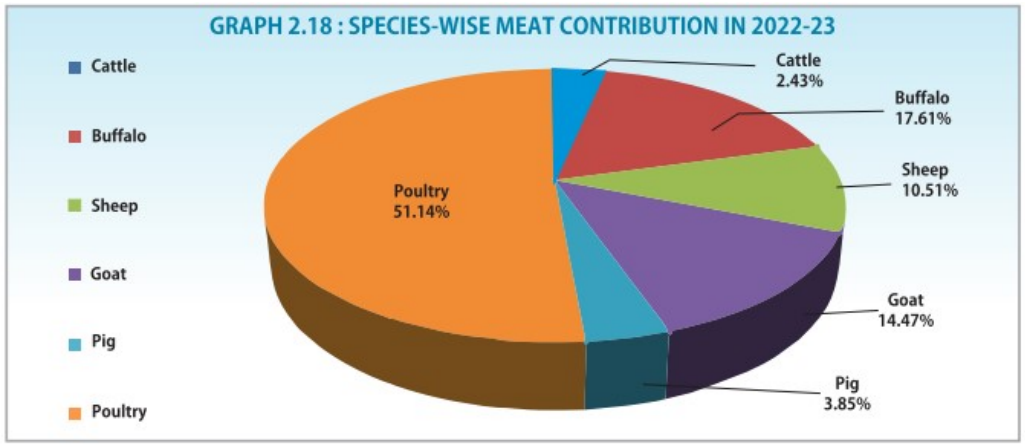


*Based on Projected Human Population according to Population Census-2011

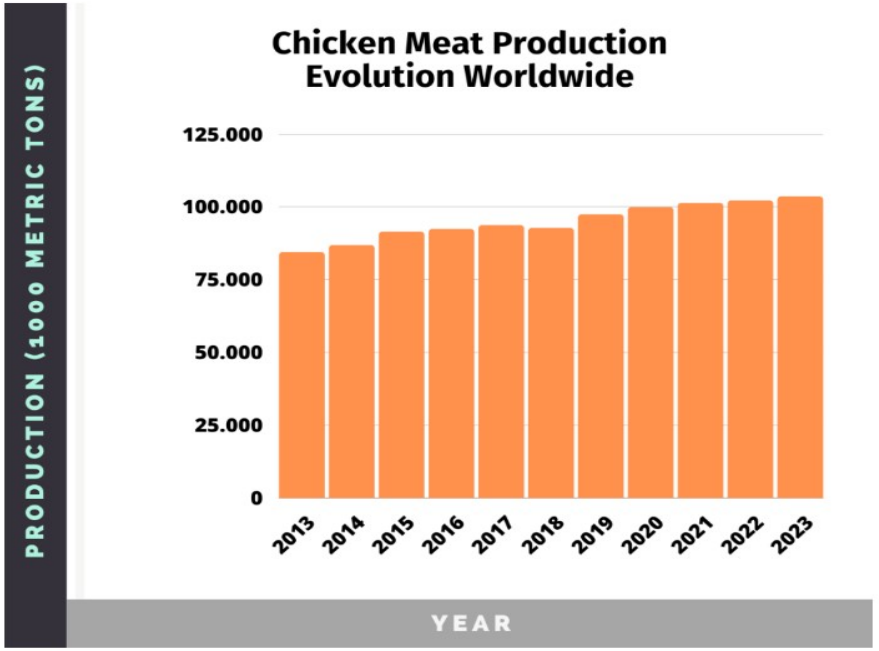


Meat production

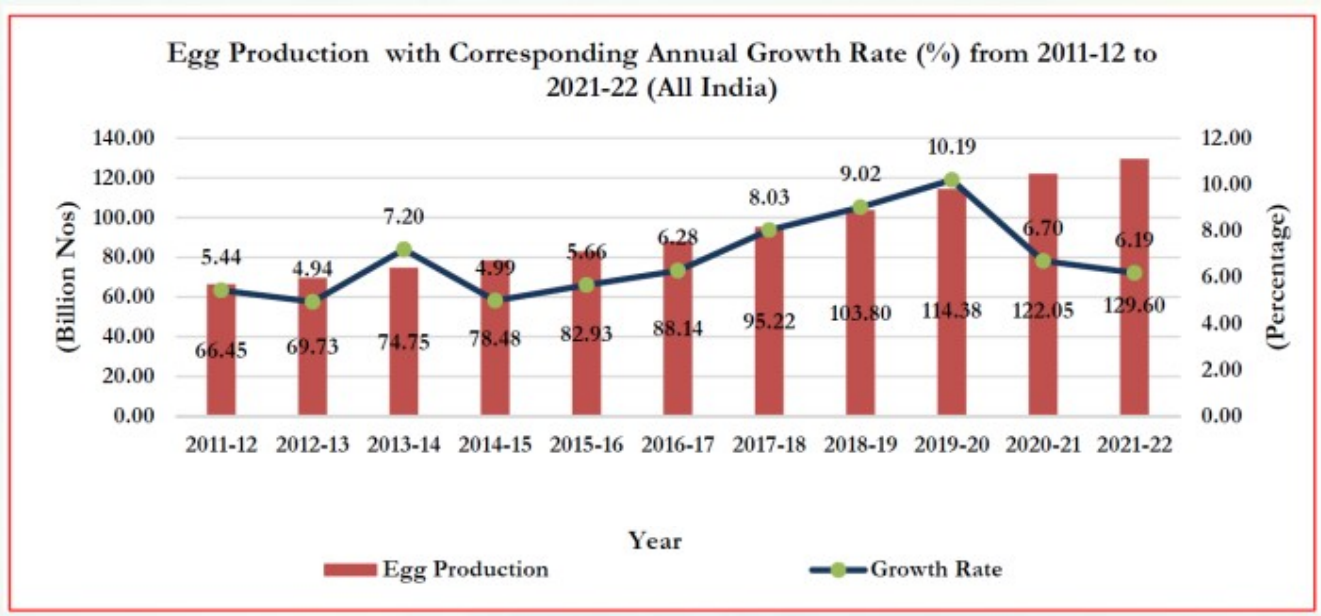
Species Of Animals	Number	Percentage Of Total Meat 2021-22	Percentage Of Total Meat 2022-23
Poultry	**3.06 Million**	**51.44 %**	**51.14%**
Buffalo	12.94 Million	17.49 %	17.61%
Sheep	69.56 Million	10.33 %	10.51%
Goat	111.32 Million	13.63 %	14.47%
Pig	8.88 Million	3.93 %	3.85%
Cattle	2.73 Million	3.18 %	2.43%



Chicken meat production - 103.4 million metric tons globally in 2023



Egg production



2022-23

<u>138.80 Billion</u>

Region	Hen egg production (million tonnes)	Share of global hen egg production (%)	Hen eggs produced (billion eggs)	Layers (millions)	Share of global layers (%)
World	**86.7**	**100.0%**	**1642.9**	**7,899**	**100.0%**
Asia	54.1	62.4%	1059.3	5,340	67.6%
Europe	11.1	12.8%	192.4	817	10.3%
Latin America*	10.4	12.0%	187.9	741	9.4%
USA and Canada	7.2	8.3%	121.6	424	5.4%
European Union (27)	6.3	7.3%	108.6	456	5.8%
Africa	3.5	4.1%	75.6	553	7.0%
Oceania	0.3	0.4%	6.0	23	0.3%

- ***Commercial* (85.40%) 118.16 billion**
- ***Backyard* (14.60%) 20.20 billion**

A planet under pressure: food

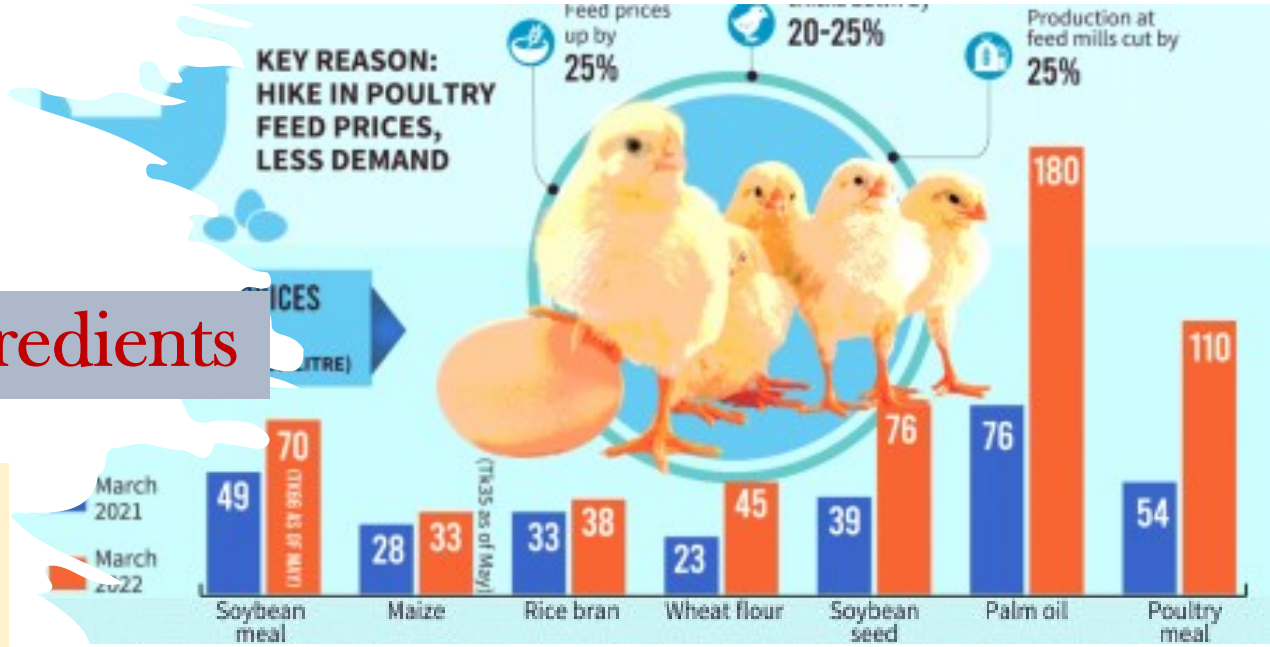
Over the next 40 years, we'll need to produce as much food as we have in the last 8,000 years of agriculture.

Source: Living Planet Report 2014. WWF in collaboration with Global Footprint Network, Water Footprint Network and ZSL Living Conservatio

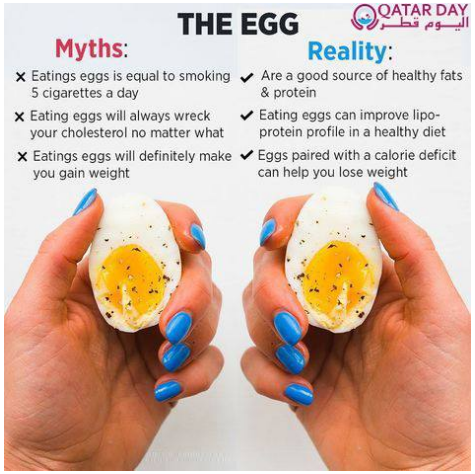
SUSTAINABILITY ????????????

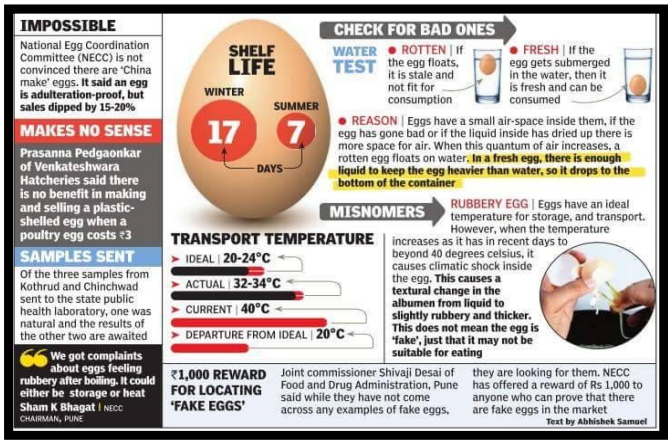
Increasing cost of feed ingredients

- Small-scale producers - **high feed and transport costs**, expensive vaccine costs, veterinary care services, and the **non-availability of credit**.

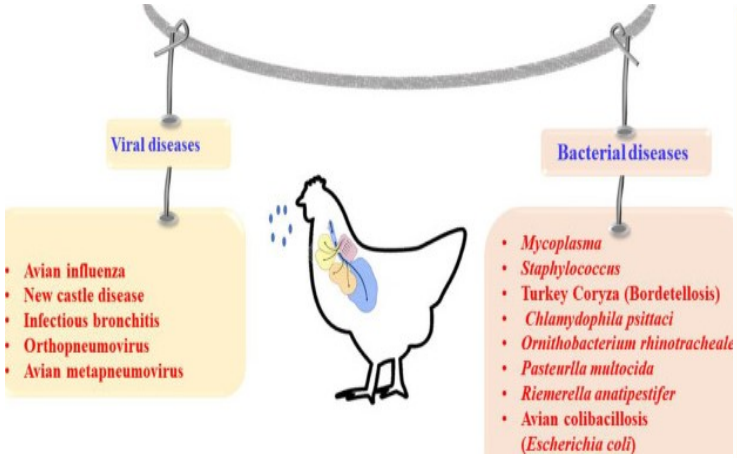


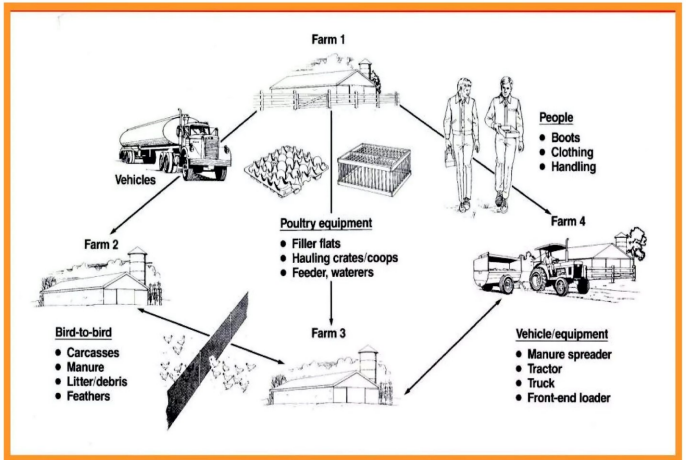
Myth vs. facts





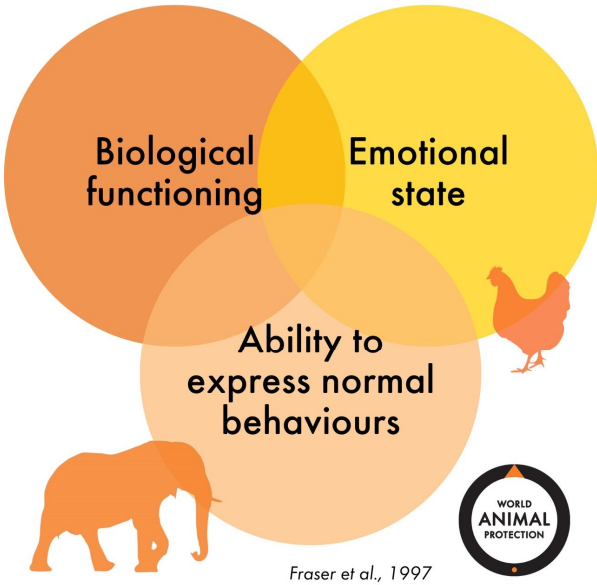
Disease & biosecurity Challenge





Welfare

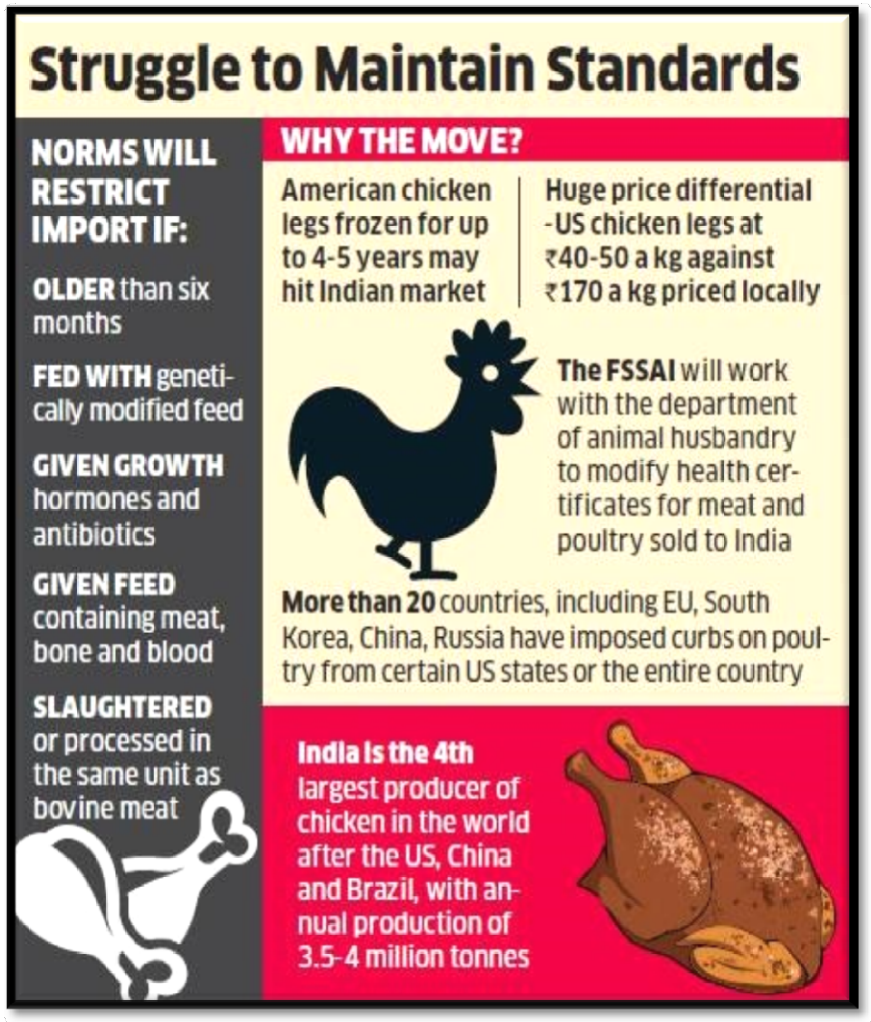
The concept of animal welfare includes...



Fraser et al., 1997

Food safety ??

Skilled Manpower



	FCR = 2	FCR =1.5
Cost of a chick	Rs 25	Rs 25
Cost of feed @ Rs 25 per Kg	Rs 100 (4 Kg)	Rs 75 (3 Kg)
Operational cost during the lifecycle	Rs 15	Rs 15
Total cost of chicken weighing 2 Kg	Rs 140	Rs 115
Saving per chicken due to less feed consumed	-	Rs 25
Saving per 100,000 chicken	-	Rs 25 Lakh
Per year saving for 100,000 chicken assuming seven cycles	-	Rs 1.75 Crore
Additional expenses on antibiotics in feed (AGP cost of Rs 100 per per tonne of feed)	-	Rs 2.1 Lakh

Its all about Profit???

SCHOOL OF SUSTAINABLE FOOD SYSTEMS

AAETI

32 Days

Broiler Farming

40 gm

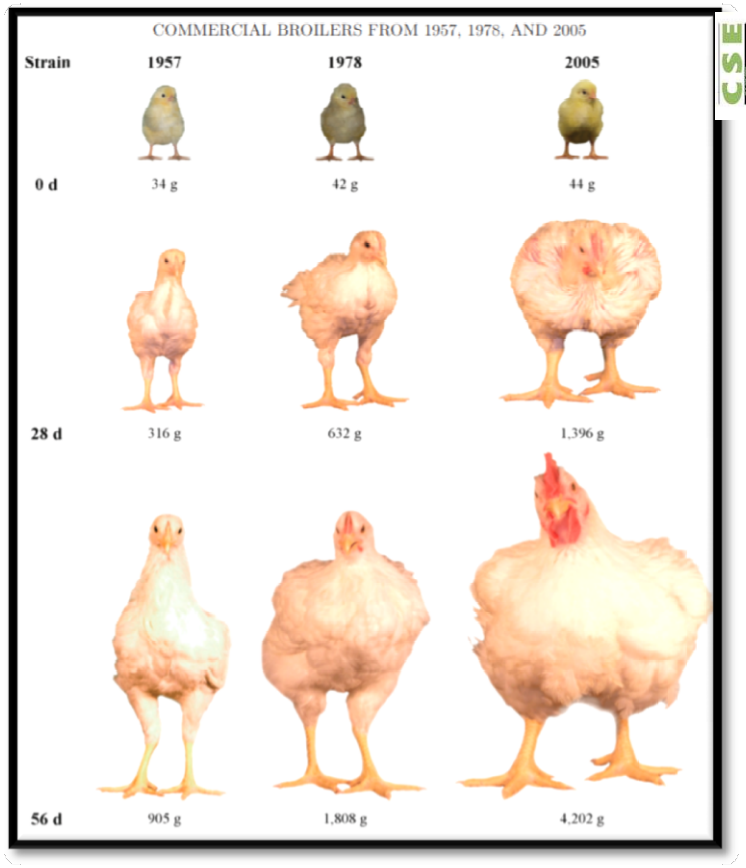
2 kg

BOILING UP

Average farm gate price of eggs and broilers

Period	Average farm gate price Egg (₹)	Broiler (₹/kg)
Oct 2013	3.30	70
Oct 2014	3.22	75
Oct 2015	2.70	55

Sources: NECC Namakkal and Barwala Egg Cluster (Haryana)



Zuidhof *et al.*, 2014

Broiler production dynamics

Site selection, orientation and housing

A good housing is essential to provide an ideal environment where birds can express their genetic potentiality in fullest strength.

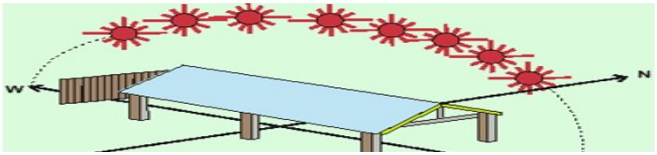
1. Location

The following points need consideration in selection of location poultry houses.

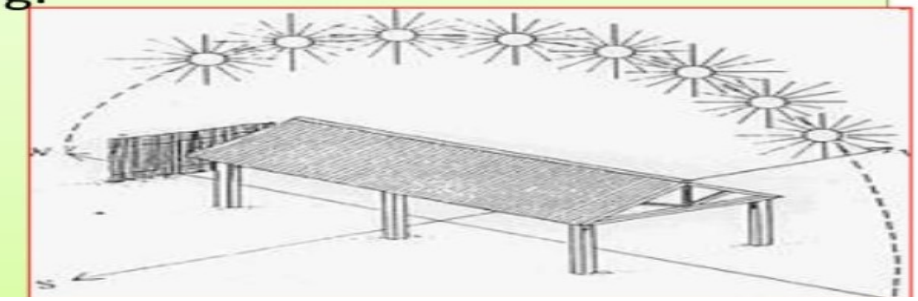
- Access to road service
- Future expansion needs & labour availability
- Drainage
- Exposure of the house
- Wind direction
- Distance between houses

2. **Open-sided poultry houses**

In hotter parts of country, the long axis of the house should be east to west and the sides should face north south to prevent direct sun shine falling in the house.



- constructed with their length facing E-W.
- To obviate direct sun light, draft and rain fall into the building.




भारत का राजपत्र
The Gazette of India

- **Width** - Less than 30 to 32 feet.
- **Height** - From foundation to roof line may be 8 to 10 feet. The higher height upto 12-14 feet helps to reduce the inside temperature
- **Length** - Depending on the terrain of the land.
- **Floor** - Moisture proof, free from cracks, easily cleaned, rat proof and durable. The different types of floor all-litter floor, all-slat floor, slat and litter floor, wire and litter floor sloping wire floor etc.
- **Sides:** Half to two-thirds area kept open and fitted with wire mesh.
- **Roofs:** Painted with a reflecting type of paint such as aluminium paint or infra-red reflecting paints. For low cost roofs - local materials such as bamboo, bamboo mat, polyphone sheet, scrap iron roof, galvanized steel roofing can be used as effective as roofing materials for small scale commercial poultry farming. Asbestos or cement board roofs also can be used.

Chapter Three -

Establishment/Erection and Operation of a New Poultry Farm or New House

. Location of Poultry Farm:

No license shall be granted for a New Poultry Farm, unless it fulfils all of the following conditions:

(1) It is removed a distance of at least 30 meters from a road connecting Poultry Farms for poultry of different species, branches or ages.

(2) It is located a distance of at least 12 meters from another Poultry Farm for poultry of the same species, branch or age.

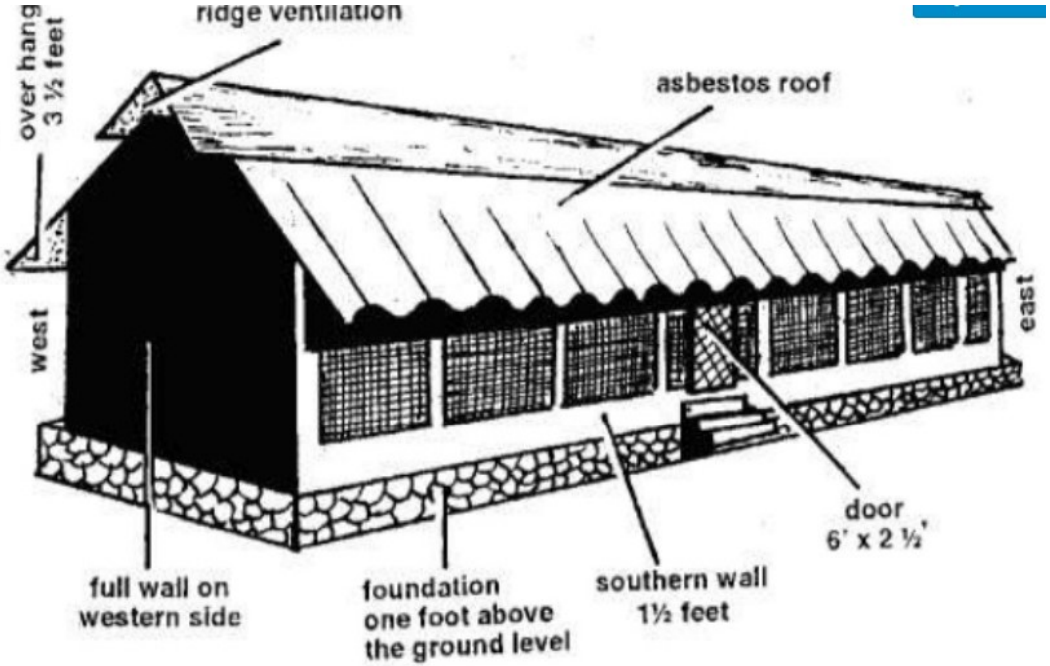
(3) It is located a distance of at least 300 meters from another Poultry Farm for poultry of a different species, branch or age.

. Location of House:

No license shall be granted for a New House on an Existing Poultry Farm, unless -

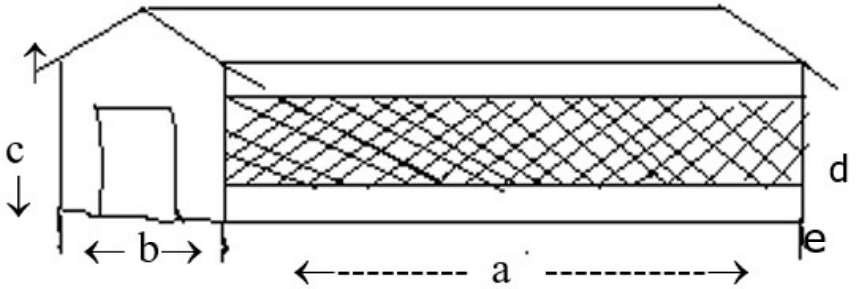
(1) It is located a distance of at least 12 meters from another House.

(2) The distance between the New House and the boundary of the farm is not less than 6



A model poultry house

Specifications for open sided house



a. **Length**- no bar,
b. **Width**- less than 30 ft,
c. **Height** (Side wall)- 8-10 ft (4-6 ft open)
   At center – 12-14 ft
d. **Over hang**- 2-3ft
e. **Floor height** : 2 ft

SCHOOL OF SUSTAINABLE FOOD SYSTEMS

AAETI

Open shed house

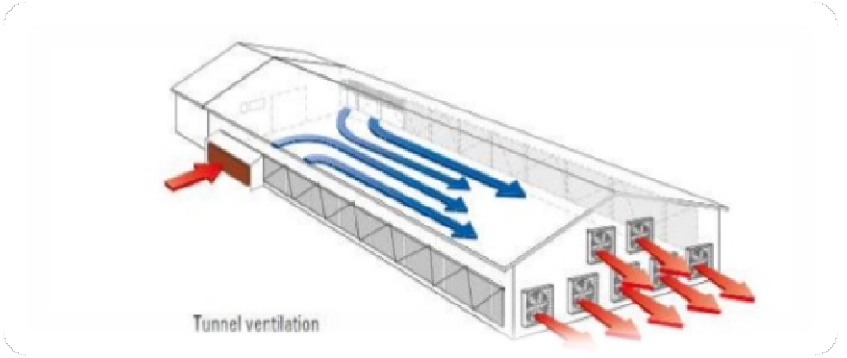

Broiler farm

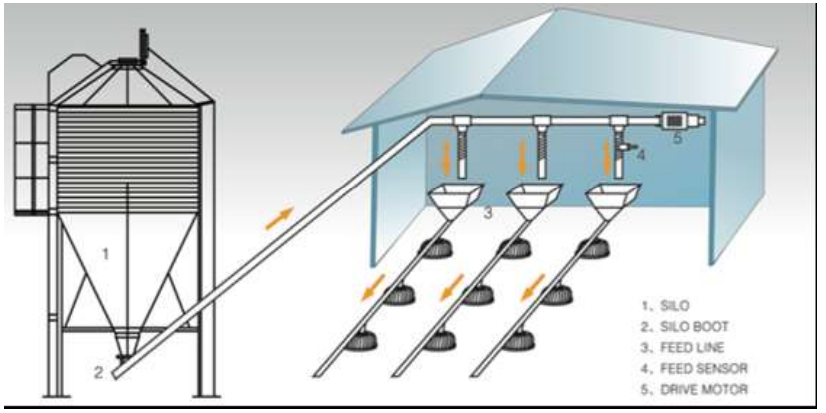
SCHOOL OF SUSTAINABLE FOOD SYSTEMS

AAETI

cari

Automated broiler farm





SCHOOL OF SUSTAINABLE FOOD SYSTEMS

AAETI

cari

Application of lime & fumigation

FORMALDEHYDE FUMIGATION FOR 100 Cft

STRENGTH	FORMALIN (IN ML)	POTASSIUM PERMANGANATE (In grams)
1 X	40	20
2 X	80	40
3 X	120	60
5 X	200	100

Treatments with chemicals

1. Chemical Treatment

Soak floor with strong solution of caustic soda for 12 to 24 hrs with pH above 12 in order to kill VV virus.

Dose of NaoH- 11 to 12 gm/lit of water or 1.4 kg/1000 sq. ft. (100-110 lit. water per 1000 sq. ft.)

- **Control of ticks, mite and lice** infestation by spraying any insecticide e.g. Cythion - 8 to 16 ml /lit of water.
- **White wash -** Lime stone (20 Kg/1000 cu. ft.) + 2 to 5% formalin + l% Copper Sulphate + 1% kerosine.

Commercial Disinfectant

Sr. No.	Disinfectant	Composition	Dose
1	X-185	Cresylic acid saponized, Ortho-benzyl para -chloropheno, ortho-phenylpheno, Bis-n-tributylin oxide	4ml/liter of water.
3	ATTACK	Benzalkonium chloride, Strong gluteraldehyde, Formaldehyde	3.00%
4	B-904	Didecyl dimethyl ammonium chloride, Alkyl dimethyl benzyl ammonium chloride, Tributylin oxide	5ml/liter of water.

Commercial Broilers

CARIBRO VISHAL (White plumaged)

6-wk B.wt : 1650 to 1700 g; DP % (6wk) : 75%;
FCR (0-6wk): 1.85

CARIBRO DHANRAJA (Coloured Plumaged)

6-wk B.wt : 1600 to 1650 g; DP % (6wk) : 75%;
FCR (0-6wk): 1.92

CARIBRO MRITUNJAI (White plumaged)

6-wk B.wt : 1400 to 1500 g; DP (6wk) : 74%;
FCR (0-6wk): 1.90

- Proper unloading
- Immediately opening of boxes.
- Counting of chicks.
- Dipping of beak in water.
- Electrolyte (5 g/100 chicks)
- Anti stress (3-5 ml/100chicks) drugs.
- Recording of temperature, humidity hourly.
- Record keeping

Chick Quality

Example of good quality chicks.

- Clean after hatch.
- Stand firmly and walk well.
- Alert and active.
- Free of deformities with the yolk sac fully retracted and have a healed navel.
- Vocalize contentedly.

Not less than 40 gm

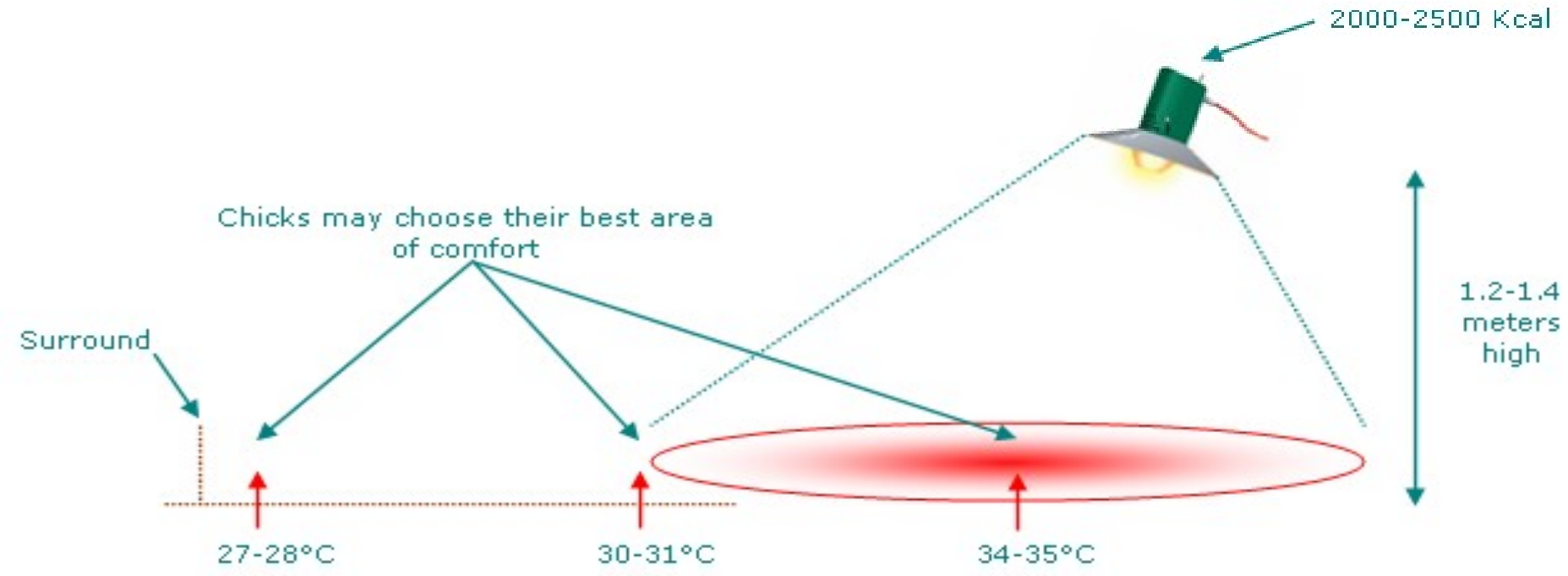
Age of birds (Days)	Space/bird (Sqr. ft)
0-3	0.22-0.25
4-7	0.33
8-14	0.5-0.6
15-21	0.6-0.8
21 onwards	Full Space

REQUIREMENT – SPACE, FEEDERS AND WATERERS

AGE	FLOOR SPACE	FEEDERS	DRINKERS
1st Week	4 chicks per square feet	Plates 1 for 60 Chicks (7 days)	2 for 50 chicks
2nd Week	2 chicks per square feet	Chicks Feeders 1 for 50 chicks	2 for 50 chicks
3rd Week	1 chick per 0.75 square feet	25 feeders for 1000 chicks	2 for 40 chicks (High temp & high humidity

BROODING – TEMPERATURE

It is of the utmost importance to warm up the house several hours before the chicks arrive




Bulb brooding


SCHOOL OF SUSTAINABLE FOOD SYSTEMS
AAETI
CSE
cari
Coal brooding

SCHOOL OF SUSTAINABLE FOOD SYSTEMS

AAETI

cari

Use of Bukhari


SCHOOL OF SUSTAINABLE FOOD SYSTEMS
AAETI
CSE
cari
Gas brooder


SCHOOL OF SUSTAINABLE FOOD SYSTEMS
AAETI
cari
Whole house brooding

Brooding large flocks

LITTER

- 5-7 cm of litter.
- Wheat/barley straw/wood shavings/coconut shavings (no sawdust)
- Dry, turned and sufficient.
- No wet patches.
- Litter test at field level
- Litter moisture <25%
- racking of litter start from 4th day

Litter material: LSP: Super phosphate(10:2:0.25) or use Litteron powder or ECOVIRON (NCH)

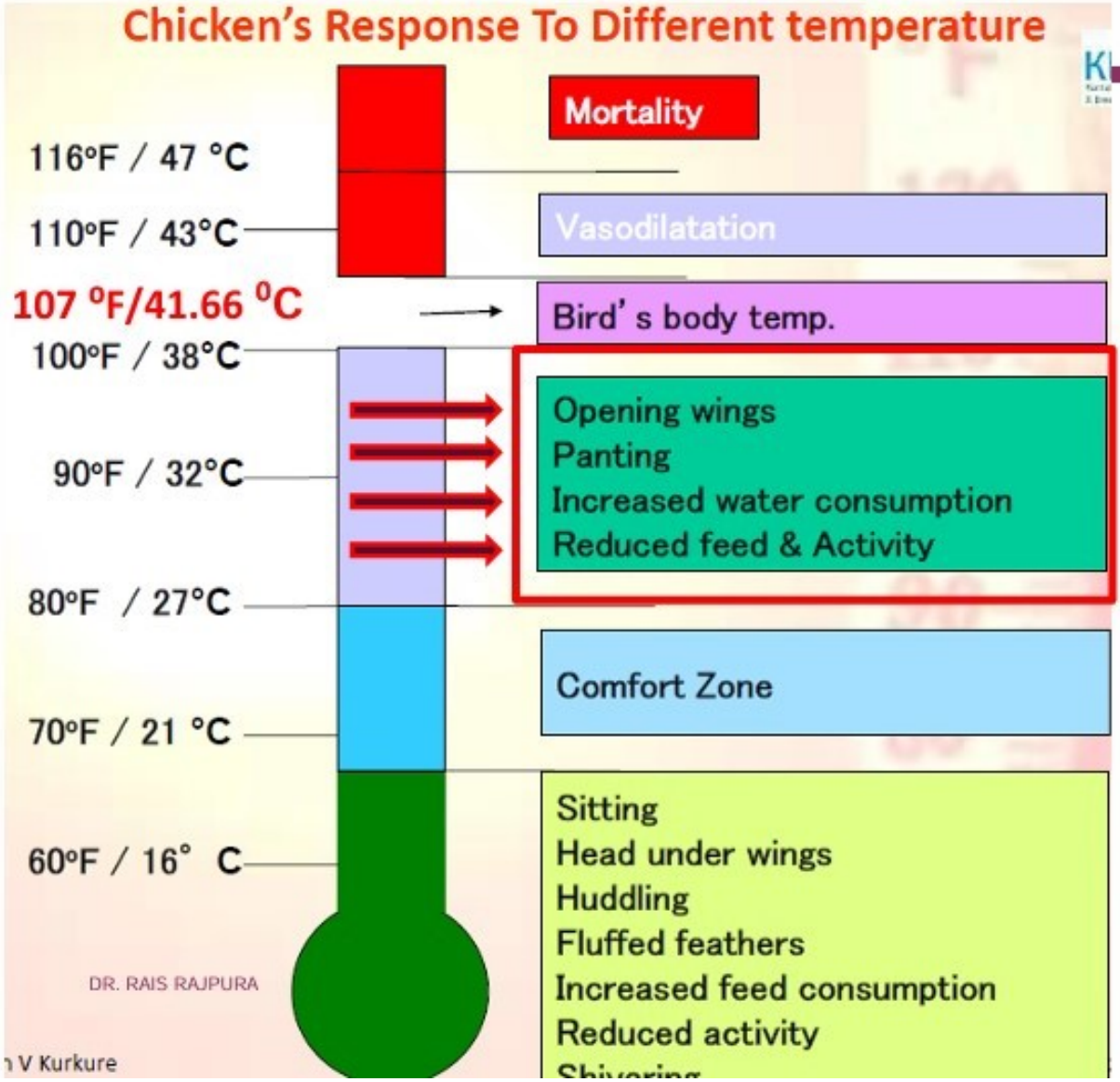
Feed and Vaccine

Feeding Programme

- Pre starter feed → 400-500g/bird
- Starter feed → 1000-1100g/bird
- Finisher feed → Up to liquidation

Sr No.	Age	Vaccine	Route
1.	1st day or 1-6th day	Ma5-clone30 or H120-clone30 Or ND Clone 30	E/D
2.	12th	IBD Plus	W/D
3.	21th	ND Clone 30	W/D

Chicken's Response To Different temperature



The thermoneutral zone of the chicken is generally between 18–25°C.

Within this temperature range, sensible heat loss is adequate to maintain the bird's normal body temperature of 41°C.

SCHOOL OF SUSTAINABLE FOOD SYSTEMS
AAETI

cari

Heat stress

Panting

Trachetis

Fibrinous plug

Fibrinous plug

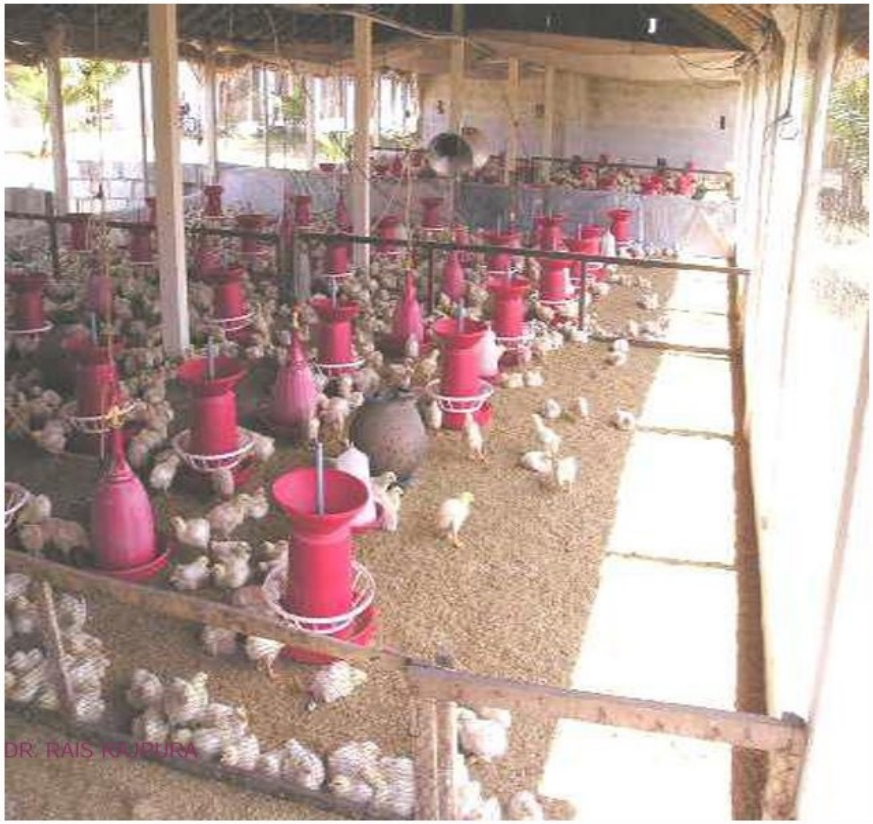
DR. RAIS RAJPURA

Farm Management- More space/bird

Space/Bird

- 1 week - 0.4 sq. ft
- 2 week - 0.8 sq. ft
- 3 week - 1.2 sq. ft
- >4 week - 1.40 - 1.50 sq. ft.

5-6 feet Side Pandal -- South side of shed – avoid sunlight falling inside the shed



SCHOOL OF SUSTAINABLE FOOD SYSTEMS
AAETI

Roof white wash painting-
Reduce shed temperature up to 2- 3 ^{o}C

- 10 Kg lime stone,
- 2 kg Cement and
- 10 lit water

DR. RAJS RAJPURA

Sprinklers on the shed- 15 ફુટ ના અંતરે

DR. RAJS RAJPURA

CSE

SCHOOL OF SUSTAINABLE FOOD SYSTEMS

AAETI

SCHOOL OF SUSTAINABLE FOOD SYSTEMS
AAETI

SIDE CURTAINS

- ✓6ft curtains
- ✓It appears to be better but if properly operated by sprinkling water.
- ✓It can reduce temp up to 2-3°C.

FOGGERS

- ✓Reduce temperature -- 3 to 5°C
- ✓Regular use for more than 10 hours also increases humidity.

WATER MANAGEMENT

Temp.	22°C	32°C
3rd wk	100 Ltr	210 Ltr
6th wk	280 Ltr	600 Ltr

WATER MANAGEMENT

- ✓ Maintain regular supply of cool and fresh water
- ✓ Water consumption increases 7% each 1oC above 21oC
- ✓ Normal ratio of water to feed intake is 2: 1 but get changed to 4:1 (>35°C)

DR. RAIS RAJPURA

Cover the water tanks with gunny bag

Prevent sunlight on water tank

- ✓ Addition of water acidifiers and sanitizers
- ✓ Electrolytes (10:00 – 6:00 pm) and
- ✓ Sugar (Evening at 4:00 pm- 8:00 pm)

DR. RAIS RAJPURA

FEED MANAGEMENT

- Feed in cool hours of the day
- Avoid feeding between 10:00 to 5:00 hrs
- Wet mash feeding
- 10-20% extra vitamins and trace minerals added to feed
- Reduce protein in feed and balance Amino Acid in feed
- Reduce maize in feed and add/Increase Vegetable oil, Fish oil
- Add Betaine @ 1 kg/ton of feed,
- Chromium @ 100 g /ton of feed,
- Vitamin C @ 100 g/ton of feed,
- Soda. bicarbonate @ 1 kg/ton of feed

CSE

SCHOOL OF SUSTAINABLE FOOD SYSTEMS

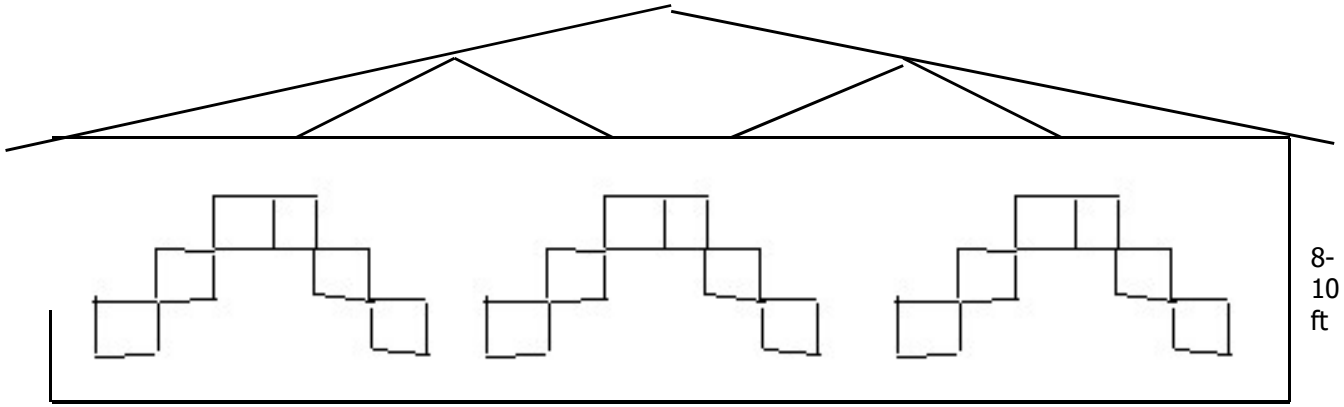
AAETI

SCHOOL OF SUSTAINABLE FOOD SYSTEMS
AAETI

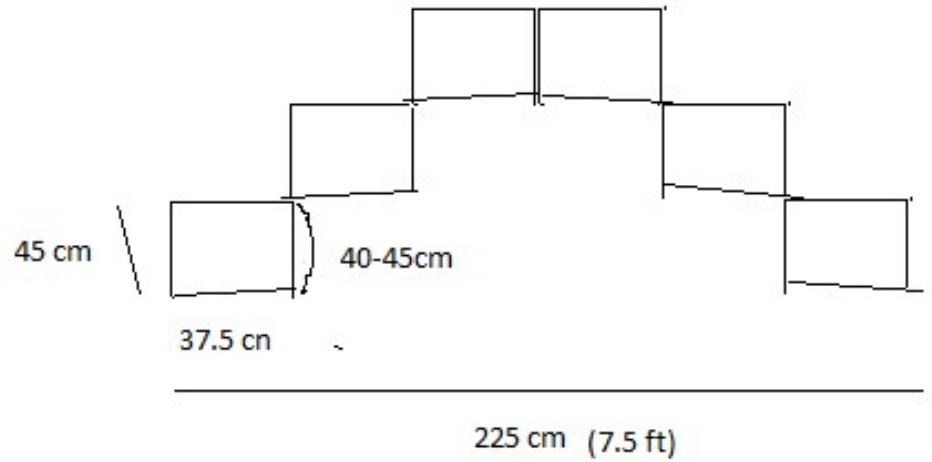
cari

Cage rearing

0-6 wk- 200 sq cm
8-16 wk- 400 sq cm
>16 wks- 600-750 sq cm



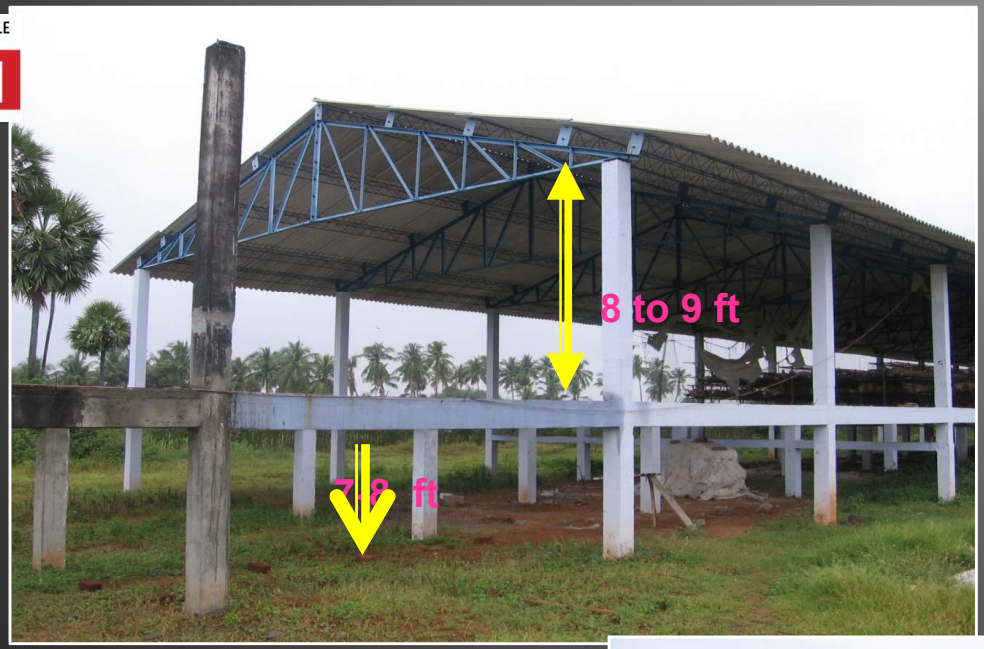
34.5 ft

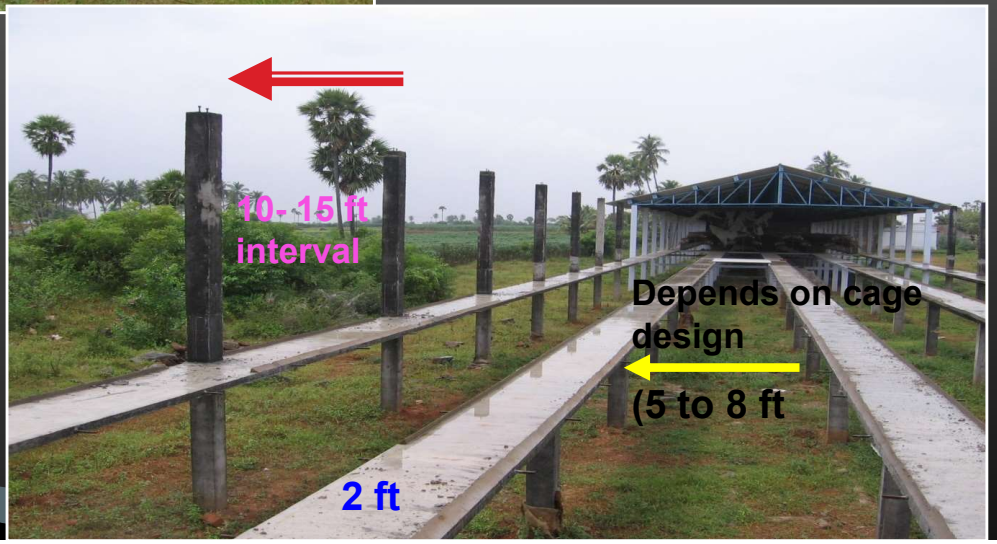


SCHOOL OF SUSTAINABLE FOOD SYSTEMS

AAETI

cari





SCHOOL OF SUSTAINABLE FOOD SYSTEMS
AAETI

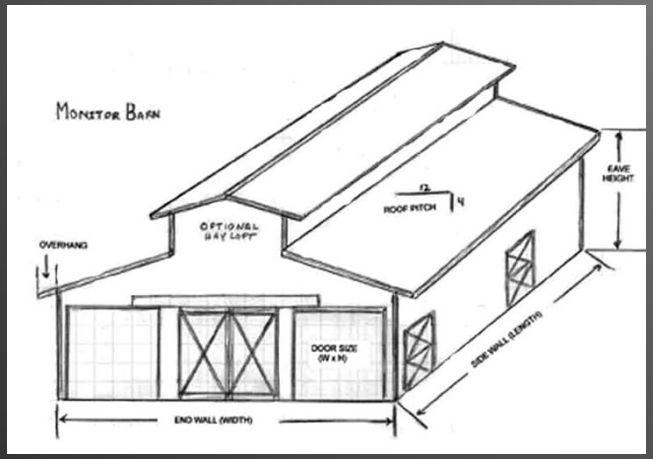
cari

- In case of cage houses, the height is decided by the type of cage arrangements (3 tier or 4 tier)
- Protects the bird from adverse climate and provides sufficient ventilation
- Cage- better wall are short
- EC houses should have solid side walls

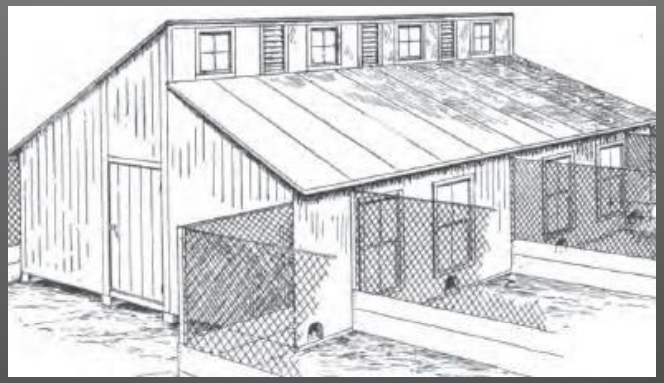
SCHOOL OF SUSTAINABLE FOOD SYSTEMS
AAETI

cari

Monitor style



Half-monitor style



Types of roofing material

Aluminium Sheet Roofing

Asbestos sheets

Asphaltic roofing material

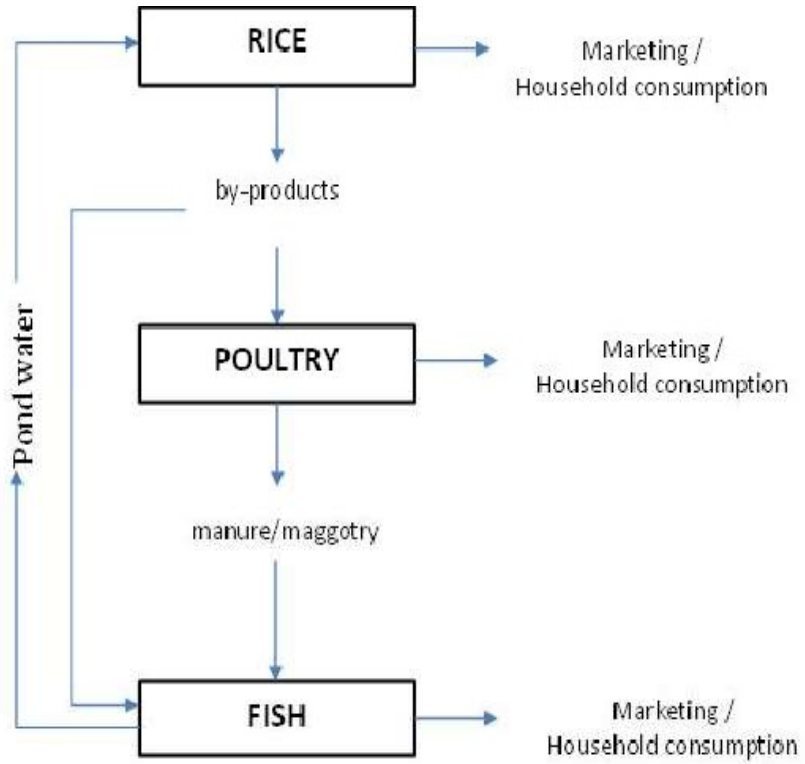
Thatched roof

Roof white washed

Spray polyurethane insulation

Rigid board insulation

Crop- Livestock-Poultry-Fisheries



Fishery-Duckery or Rice-Duckery farming system:

Raising ducks fits very well with the fish polyculture system, as the ducks are highly compatible with cultivated fishes.

Pond fertilizer and supplementary fish feed which accounts for 60 percent of the total cost in conventional fish culture.

Ducks are called "**biological aerators**".

Duck houses are constructed on pond dikes; hence, no additional land is required for duckery activities.

SCHOOL OF SUSTAINABLE FOOD SYSTEMS

AAETI

Transport vehicle and Crate

❑ **Tonic Immobility**: TI was assessed by the immobility reaction time as mentioned in Ghareeb *et al.*, (2008).

- The birds were kept on its back with gentle restraint from the sternum and neck of the chicken for a period of 45 seconds.
- After this period, the hand was removed gently and time was noted in stop watch till the bird regains to show mobility to revert back to its normal position.

❑ **Runaway (RA) test**: RA test was conducted as mentioned in Marin *et al.*, (2001)

- Iron corridor with L×B×H of 180×40×40cm
- The corridor was divided into start box, stimulus bird zone and end corridor
- Time taken by the bird to move out of the corridor was noted during a 10min test.

More than 4 hr – Stress
Watermelon
4 hr then rest

SCHOOL OF SUSTAINABLE FOOD SYSTEMS
AAETI

Heliyon 10 (2024) e27129

Contents lists available at ScienceDirect

Heliyon

journal homepage: www.cell.com/heliyon

Research article

Transportation stress: Impact on behaviour and welfare in meat-type chickens under indian scenario

M. Siddharth [a,1], Jaydip Jaywant Rokade [a,1], Subrat Kumar Bhanja [a], Jagbir Singh Tyagi [a], Madheswaran Monika [a,d], Beulah V. Pearlin [a], Akhilesh Kumar [b], Marappan Gopi [a,c,*]

[a] ICAR-Central Avian Research Institute, Izatnagar, Bareilly 243 122, UP, India
[b] ICAR-Indian Veterinary Research Institute, Izatnagar, Bareilly 243 122, UP, India
[c] ICAR-National Institute of Animal Nutrition and Physiology, Bangalore 560030, Karnataka, India
[d] ICAR-Indian Agriculture Research Institute, Hazaribagh 825405, Jharkhand, India

ARTICLE INFO

Keywords:
Behaviour
Transportation
Meat type
Tonic immobility
Welfare

ABSTRACT

In order to find standard transport time and its effect on the welfare, 480 marketable commercial broiler chickens (CARIBRO VISHAL; avg. 2.0 kg body weight) were transported for 2, 4, 8h and without transport in crates in three replicates in a completely randomized design. Transport affected welfare as well as behaviour of broiler chickens. Transport stretch impacted the gait score and tonic immobility with maximum aggravation with extended duration. Runaway results shown that 8h group exhibited more run-away time (279.20sec). Number of birds affected by physical injuries increases with the duration. Bodyweight change was significant among transported groups, especially 8h travelled group exhibited more (−8.21%) body weight loss. It is concluded that a transport period of more than 4h in Indian conditions is not recommended as its causing a significant level of stress in the birds leading to stress, production loss and hampering welfare of broilers.

1. Introduction

Poultry production, consumption and its demand is experiencing an increasing trend globally and especially in developing country. In production chain of boilers, transportation is considered as a critical point which involves pre-transport handling, long-term feed and water deprivation, social disruption, noise, over-crowding, motion as well as vibration, and thermal extremes leads to stress and

Scientific Reports: Decision on your manuscript

Scientific Reports 10:42 AM
to me

Ref: Submission ID 82122e5d-b531-49e8-b846-ae6f3a23b8ed

Decision: major revision

Deadline: 03 Sep 2025

Dear Dr Rokade,

Your manuscript, "Evaluating the Consequences of Pre-Slaughter Transport Stress on Broiler Welfare and Meat Quality in India", has now been assessed.

We invite you to revise your paper, carefully addressing the comments from the reviewers and the editor. Please ensure the results are accurately report

cari

Welfare Interventions in Poultry

CARI Comfort supplementation: @ 4.2 g/L prior to lifting reduces transportation stress with subsequent improvement in dehydration.

Lighting & stocking density standardized: @ 20 Kg/m^2 and natural white light - optimal for achieving better broiler welfare under Indian conditions in open sided deep litter houses.

Adopted by BIS

CARIEGG SHIELD: Phytobiotic based spray for improving shelf life of eggs.

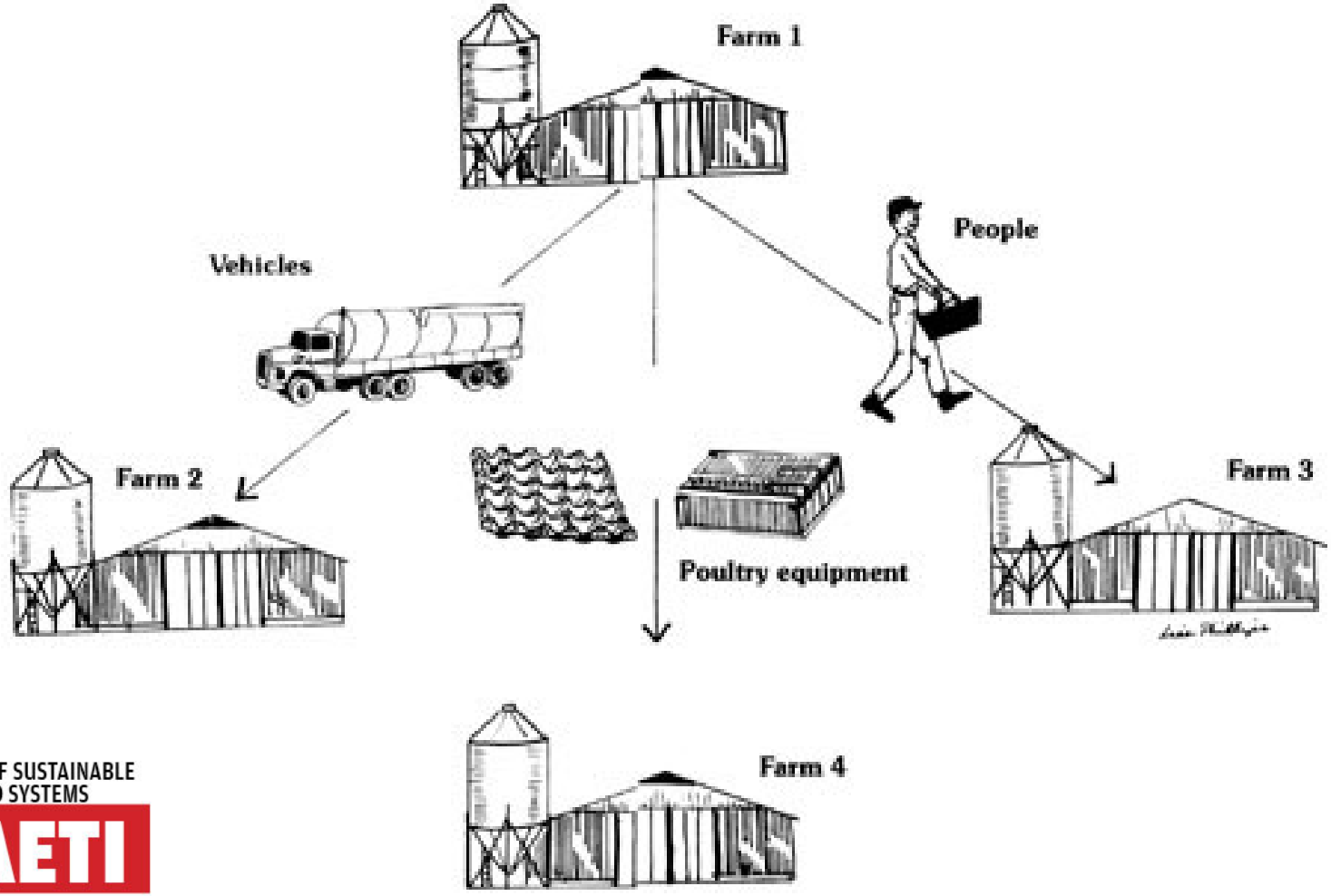
CARI Portable Poultry Incubator: A low cost portable 300W incubator capable of hatching 300 chicken and 800 quail eggs with broiler's hatchability ranging from 88.15 to 92%. (C

SCHOOL OF SUSTAINABLE FOOD SYSTEMS
AAETI

Best Management Practices is Key to Success
Less Diseases less antibiotic


MOTIVATION FOR MORE
HEALTH • SUCCESS • HAPPINESS
The key to success is to start before you are ready.
MARIE FORLEO
motivationformore.com

HOW DISEASE IS TRANSMITTED



THANKS

- **Medication care:**

Age	Medicines /Probiotics /Growth Promoters
Days 1 - 3	Antibiotic course (1g/lit) Vendox/Colis/Enrofloxacin-V: 1g/lit water
	Water sanitizer
	Electrolyte powder (1g/lit)
	Glucose powder (1g/lit)
	Warm water
Days 4 - 7	Liver tonic (1ml/lit)
Days 8 - 14	Vitamin supplement (Vimeral 1ml/lit)
	Immolyte (1ml/lit)

- **Water sanitation: For 3 weeks**

Hydrosafe (GLOBION): 1 ml/10 Lit of water for drinking.
Aquacare-P (VENKYS): 2ml/100 Lit of water for drinking.
Sokrena (VENKYS) 1 ml/30 Lit of water.

Disinfectants:

For farm premises, foot dip, vehicle dip:
VBFA: 5mL/Lit of water (Don't spray on birds)
ATTAK: 20ml/lit of water (Don't spray on birds)
Kahrsolin: 5mL/Lit of water in presence of birds/litter.
Coccidiosis: Suopercox: 1g/lit water
Respiratory tract infections: Meriflox/Enrocin-BH: 2ml/1 lit
Tylosin