

# Sustainable Energy in Poultry Value Chain



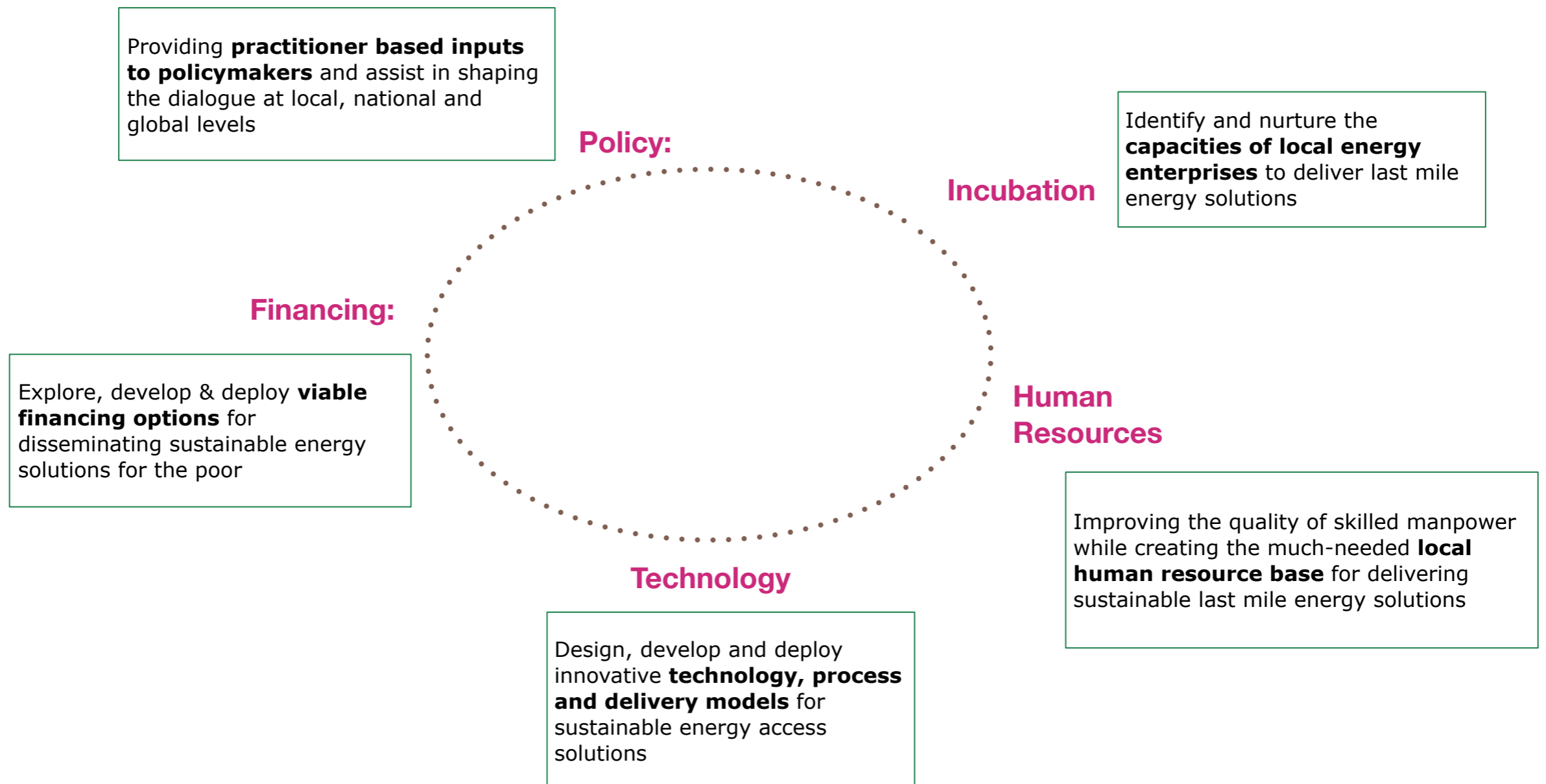
**SELCO Foundation**

# Sustainable Livelihoods through Ecosystem Approach

SELCO Foundation partners with micro and small entrepreneurs to provide sustainable energy solutions together with efficient technologies that are contextualised to their needs.

Additionally, access to livelihood solutions can be made sustainable only when it is developed around a specific user ecosystem. The ecosystem approach enables scaling and replication of technology solutions to larger user group.

## Ecosystem components:



# Sustainable Energy in Poultry Livelihoods

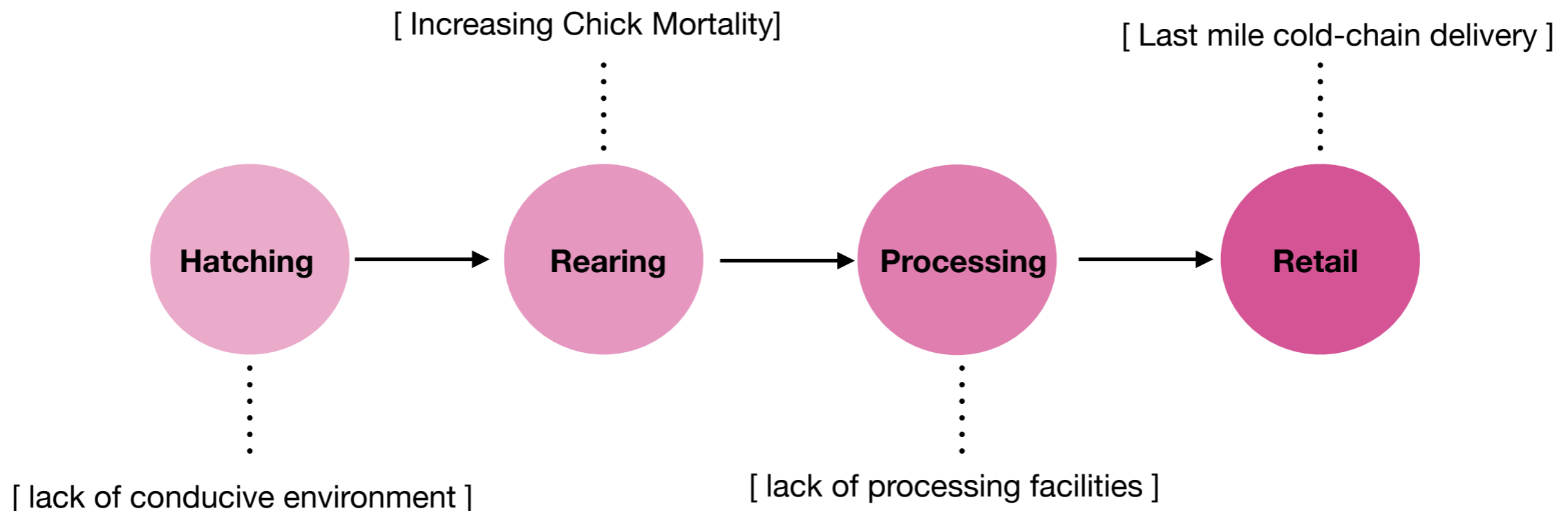
## Growth of Poultry sector

Poultry Industry is one of the fastest growing sectors in India. The production rate of poultry products - eggs and broilers has been rising at a rate of 8 to 10 percent per annum. Rapid growth of the poultry industry has been encouraging many farmers to adopt poultry farming as a main source of income. The poultry industry in India, at present, provides employment opportunities to more than 5 million people (especially in the lower income segments) with stable increasing production rates of poultry meat and egg.

However, in spite of various developments in modern poultry farming, small and mid scale poultry farms have been unable to address issues regarding sustainable energy use, efficient flock productivity and face a constant threat from vertically integrated farming companies.



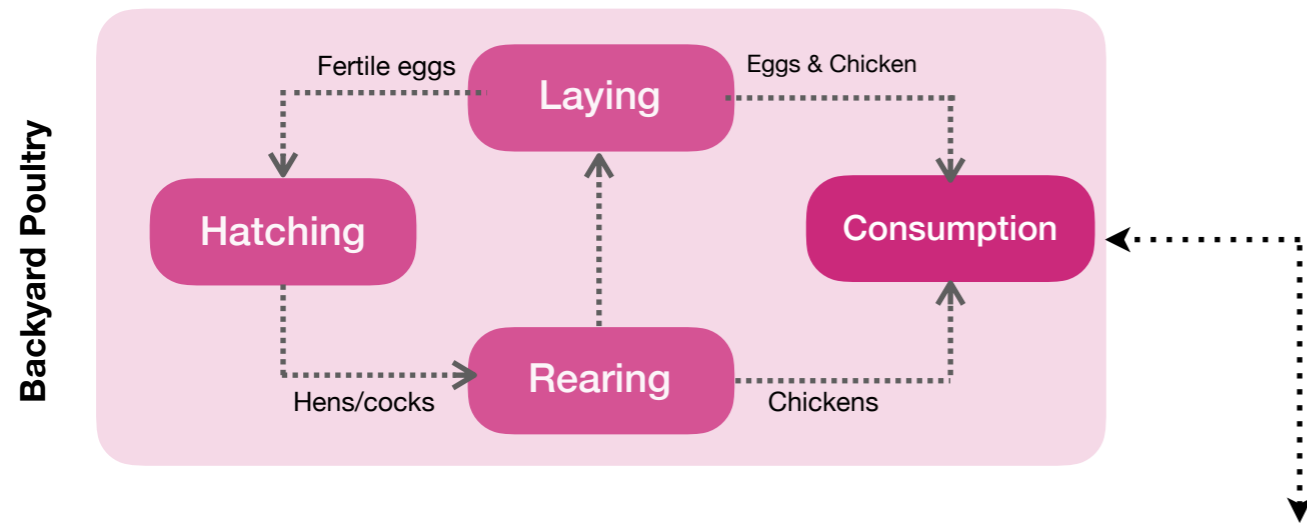
## Challenges in small scale value chain



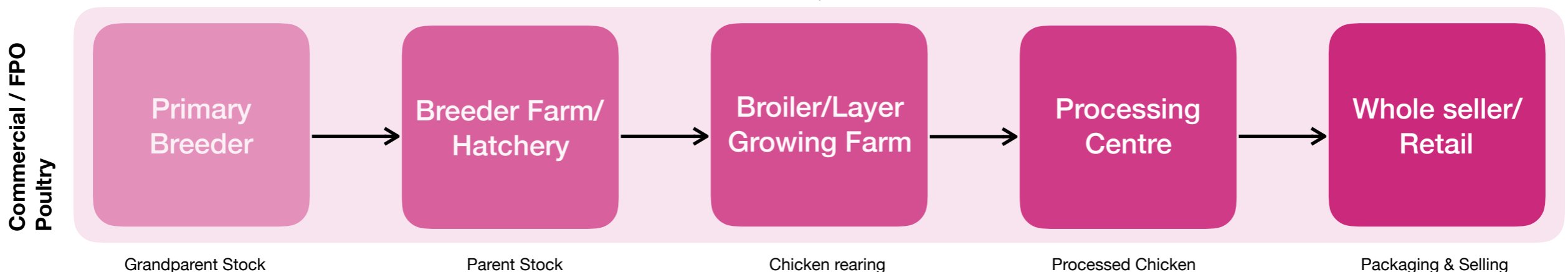
# Sustainable Energy in Poultry Livelihoods

## Inclusion of small holder farmers within centralized poultry systems

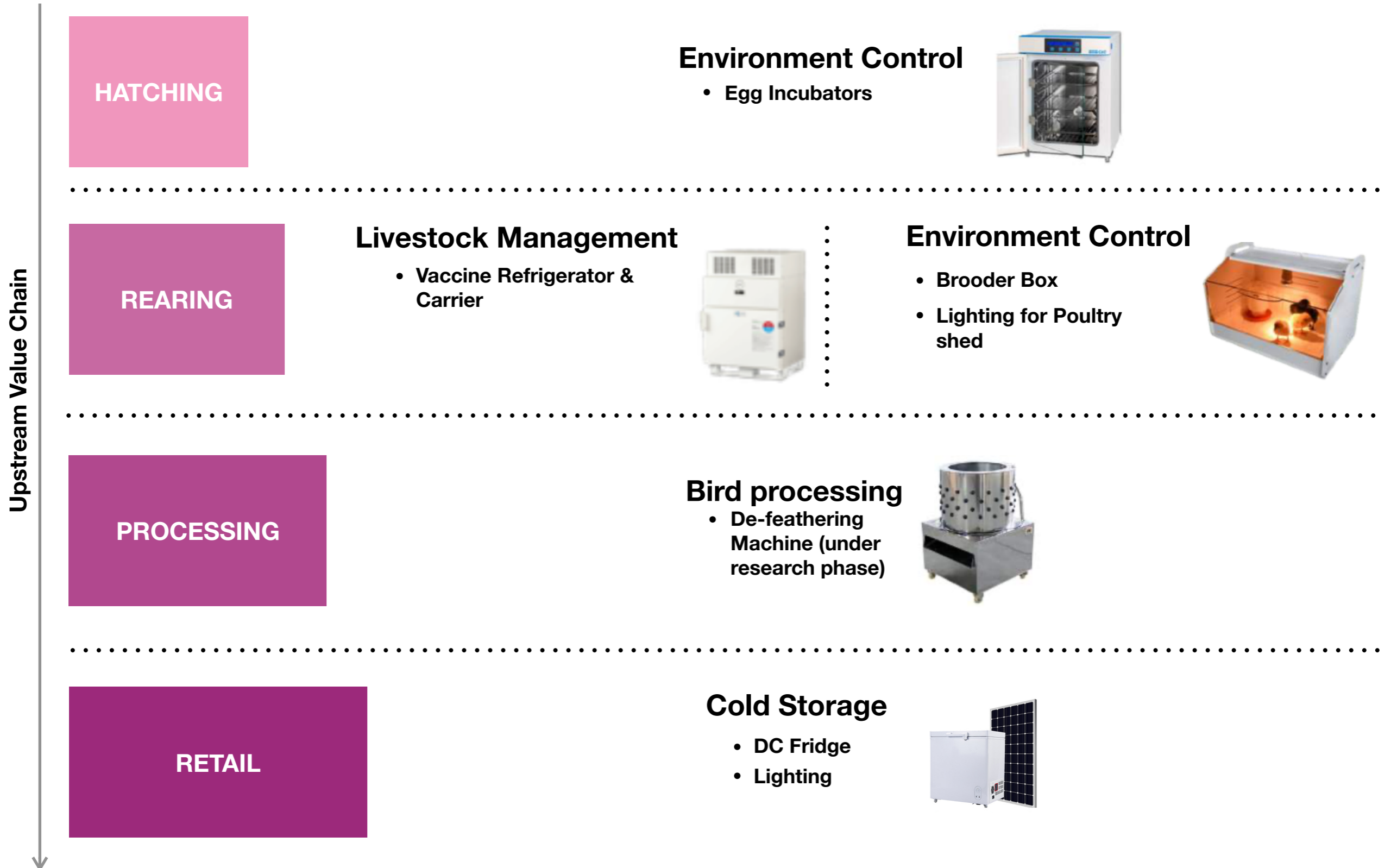
At one time, 30% of the eggs produced in India were produced in the backyards. Improved varieties of 'Low technology input birds', which are dual purpose, i.e., producing eggs and meat, were being bred in India for the purpose of backyard/family production. However, the scenario changed with export-oriented industrial production of poultry birds. This has left out the small poultry farmers to take advantage of the modern technologies that arrived with higher productivity drive. Farmer Producer Organization (FPOs) & Collectives are appropriately placed to exploit economies of scale in poultry farming and positioned for knowledge dissemination to small poultry farmers.



Various interdependency pathways can be created between backyard poultry and commercial/FPO value chain. This interlinkages ensures that small poultry farmers are included within centralized poultry system. The FPO can provide healthy pullet chicks (broilers/ layers) to backyard poultry to rear and at the end of the rearing cycle, sell back to the FPO at a profit. The FPO can provide inputs such as vaccination, poultry feeds to these farmers. In such a way, FPOs can decentralize the rearing stage to small poultry farmers. Decentralized sustainable energy will play critical role in this process.



# Energy+Tech Interventions in Poultry Value Chain



# Energy+Tech Interventions in Poultry Value Chain

## Hatching Stage

### Egg Incubator

A significant rural population continues to practise backyard poultry as a supplementary source of income. This economic activity is also collectively taken up by the community often breeding indigenous varieties which fetch higher prices. Certain indigenous breeds like the Indian Breed of Black Chickens do not sit long enough on its eggs for hatching; pointing to a need for an incubator.

#### Key Features:

- DC powered 100-egg incubator has a power consumption of 165W/h.
- The system comprises of a heating component, fan and egg rotator consuming 120W, 20 W and 25 W respectively.



*Solar powered egg incubator in use in Madhya Pradesh*

## Rearing Stage

### Vaccine Refrigerator

In areas with erratic power supply, effectiveness of vaccines reduces considerably even though vaccine storage is available. Solar Vaccine storage is an effective storage technology in these scenarios.



#### Key Features:

- Keeps at constant 4 degree temperature at all times
- It has holdover period of 4-7 days measured at ambient temperature of 43 degrees.
- They use mono crystalline solar panel with 470WP and 235 WP respectively.

### Brooder Box

To develop into healthy chicken, rearing of chicks requires controlled conducive environment for two weeks. An innovative low-cost energy efficient brooder box was tested by SELCO foundation.



#### Key Features:

- Usage of Mangalore tiles to improve insulation which keep the ambient temperature at 35C.
- It uses ceramic or IR brooding lamps with power consumption of 50W.
- A 50W, 300mm, 1100 cmh exhaust fan were installed for ventilation of toxic fumes released from the bird litter.

# Energy+Tech Interventions in Poultry Value Chain

## Processing Stage

### De-feathering Machine

Dressing or processing poultry birds is a tedious manual task and takes longer time. In contrast, defeathering machine makes processing faster and easier to do. Slaughtered and scalded bird is dropped inside the de-feathering machine, the rubber fittings or fingers will get rid of the feathers as the electric motor rotates and the body of the bird rubs against the rubber plucking fingers.

#### Key Features:

- It will employ motor size will be 1 hp or below.
- The process will take 45 seconds for defeathering single poultry bird.
- A 3 hours backup with hybrid solar system can be designed.
- 6 solar modules of 200 Wp will be required to power the system.



## Retail Stage

### Solar DC refrigerator

Most of the decentralized solar refrigeration solution were installed to strengthen the local value chain for the last mile retail delivery. Both poultry eggs and meat have to be refrigerated at or below 4 degree celsius. This also gave additional income to existing small businesses.

#### Key Features

- The retail fridges are available in three size segments: 100L-150L, 150L- 240L & 240L and above
- Based on sizes, the solar components are designed with panel capacity varying from 200 Wp to 1000 Wp.



# Energy+Tech Interventions in Poultry Value Chain

## Featured Case

### Egg Incubator for Women's collective, Ranapur

Ranapur is a Block in Jhabua district in Madhya Pradesh, India. The land in Ranapur is shallow hilly terrain (Dungarwala Jameen) and dry. Practicing rain fed, single cropping cycle, 80% of the population migrates to nearby cities and states for daily wage jobs.



Ranapur block is one of the original places of 'Kadakhnath' Chickens - an Indian breed of black chicken whose meat is popular for its high protein content; also fetching a price 3-4 times higher than a broiler chicken. Every family keeps a small poultry in their backyard. Due to the meat's alleged medicinal properties, the meat is also in high demand. The chicken sells per piece (instead of weight) in the local market. One Kadakhnath chicken depending on its size will sell at Rs. 700 – 1000. Women raising 5-10 chicks as a family backyard poultry have a reasonable income by selling kadakhnath chickens.

An intervention with multiple women SHGs (Self Help Groups) and JLGs (Joint liability group) and develop an income generating business out of egg incubation. A 100 egg incubator was installed, shared by 10 members of the SHG. Women as a group would operate and maintain the incubator. The project was designed such that they would buy kadakhnath eggs, hatch them and sell their chicks in the market. The local monitoring and hand-holding was provided by the NGO.

## Way forward

- ◆ Access to decentralized technology to small & mid scale poultry farmers
- ◆ Policy push towards development of Poultry based FPOs
- ◆ Improvement in storage, cold chain and transport of poultry products
- ◆ Network expansion for service and maintenance of DRE assets
- ◆ Prescribing quality standards for poultry farm management



*Poultry farmer reading brooder box temperature using digital Infrared Thermometer in Karnataka*