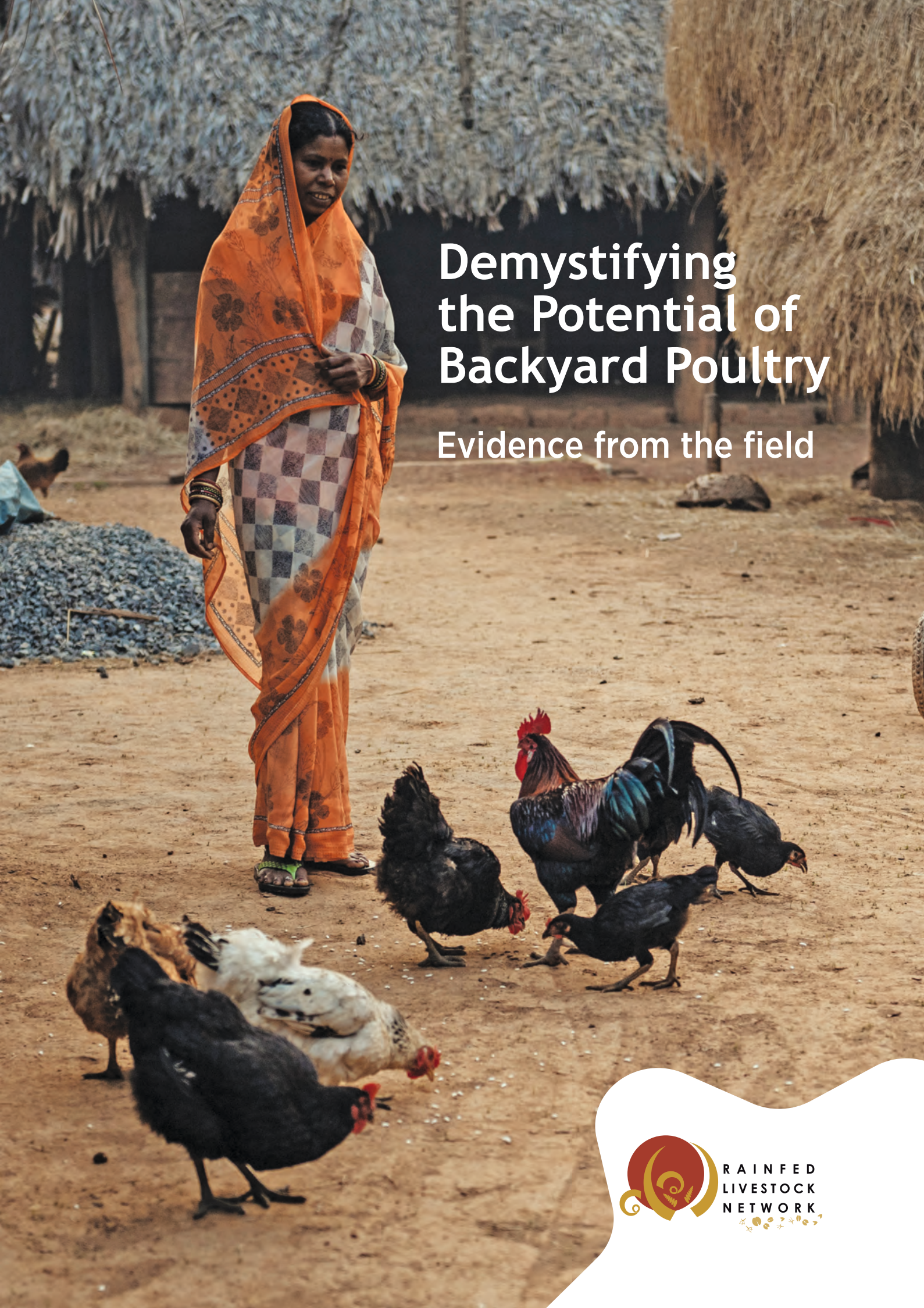
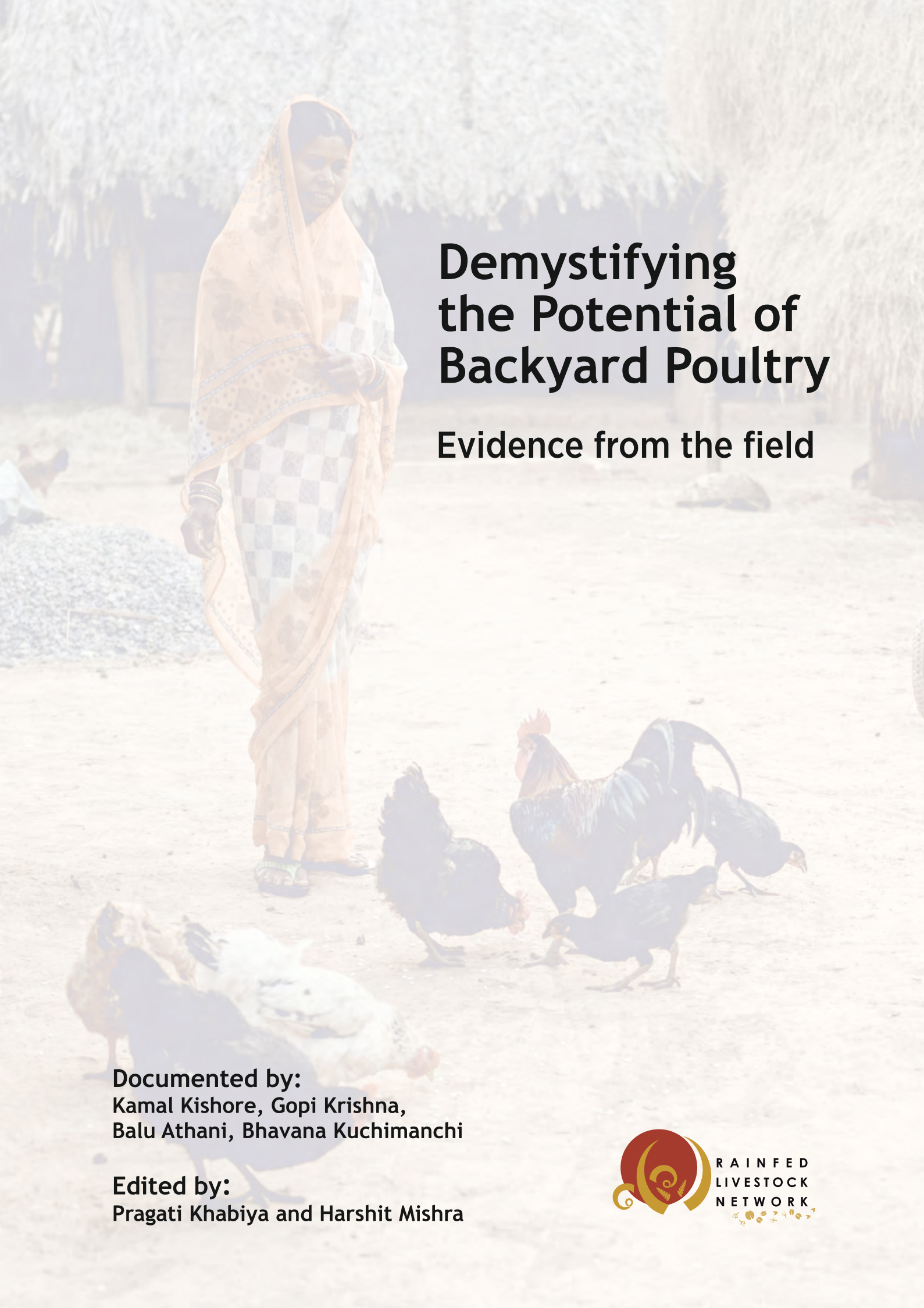


Demystifying the Potential of Backyard Poultry

Evidence from the field

RAINFED LIVESTOCK NETWORK



Demystifying the Potential of Backyard Poultry

Evidence from the field

Documented by:
Kamal Kishore, Gopi Krishna,
Balu Athani, Bhavana Kuchimanchi

Edited by:
Pragati Khabiya and Harshit Mishra

RAINFED LIVESTOCK NETWORK

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Introduction

Back Yard Poultry (BYP) is a traditional method of poultry production using indigenous bird breeds that forage for food. In current times, the term free-range is used more commonly to describe the same. The essence of backyard poultry is the negligible expense on feed, and involves the production of chicks in-house, independent of feed mills and hatcheries. As marginal and landless farmers, especially women have recognized its potential, it is emerging as a critical source of better livelihood for rural communities (Conroy, 2005).

Apart from the economic benefits, BYP also has enormous potential to improve food production systems from the health purview. Also, these methods do not depend on external antibiotics to improve quantity. Instead, the focus is on quality where the eggs and meat produced are high in protein and nutritional value (Gentile et al., 2024). In addition to this, this method is also ecologically sustainable as it requires minimum inputs and land, and when the poultry is reared in a free ranged environment, they add nutrition back to the soil through their droppings and keep the fields free from pests by feeding on them (Rainfed Livestock Network, 2010). From the social context, BYP has proved to be a perfect income generation opportunity for marginalized sections of society, including women, as they directly manage the operation (SA PPLPP, 2009). In livestock production systems, women's contributions often remain invisible. However, through BYP, there are instances where women have stepped to the forefront, making key decisions and driving innovative strategies.

The Rainfed Livestock Network (RLN) recognizes the crucial role of BYP in rural livelihoods and has been working on BYP-related initiatives for a significant period. The significance of BYP can be illustrated through a simple comparison: in just one year, a unit of four hens and one cock generates higher income for a farmer—without any external intervention. This income is more than an acre of dryland agriculture anywhere in the country. This is because the eggs from these birds sell for at least twice the price of commercial poultry eggs, while their meat fetches nearly three times as much (Rainfed Livestock Network, 2010).

No effort so far has been made to characterize and document the indigenous birds in Bagalkot district. The birds vary greatly in their plumage pattern, comb type and body confirmation. By appearance the bird has a short and broad breast, straight back and a close setting strong tail root. Its outstanding feature is its thick and long neck, long and slender face without feathers, short beak, short and small comb, ear lobes and the absence of wattles. Its legs are long, strong and straight and the bird has an upright and majestic gait.

To elaborate further, case studies from Karnataka are exemplified below to highlight the multi-dimensional benefits of BYP. After a thorough survey, it was found that Karnataka was selected as the state for the study because it has the largest number of indigenous poultry birds in the country. Even within the state, the number of indigenous birds is higher than the number of birds raised in commercial units (Livestock Census, 2019). About 50 per cent of all eggs consumed in the state are from these indigenous birds and there is a preference for their meat too.

Furthermore, many rural households in Bagalkot district in north Karnataka have adopted BYP in a more evolved form. A few households have even scaled it up using their own ingenuity and low-cost technology, resulting in doubling the incomes from BYP. Additionally, where all interventions are in place, traditional income has increased fivefold. In some cases, it has even become the primary source of income for the small and marginal farmer. In Bagalkot district, BYP has been scaled up from being a consumption-based production system to a micro-entrepreneurial one.

Through this document distinct BYP innovations developed by enterprising rural households can be used as examples and cases to replicate. It captures the nuances of the innovations and also provides possible improvements in the current systems that can double the income potential in current systems.

Direct interviews using semi-structured questionnaires and detailed field visits were used to collect information to ensure it is a mutual learning experience for both the study team as well as the Back-Yard Poultry producers. Cases 1, 2 & 3 are detailed studies, whereas cases 4 and 5 are explanations of new innovative systems of production found in Karnataka to rear BYP.

STORIES OF SCALE

Case Study 1

Adapting to modern times

History and Innovation

Raiamma Patil of *Narsapur* village in Bagalkot district owns 25 acres of agricultural land along with a sizable number of cattle and goats. Despite belonging to an affluent family, she continues to rear native poultry, carrying on the tradition of her family livelihood. In the past, special structures on their farmlands were built in the animal shed so the birds could perch there at night, she recalled. However, when cropping patterns started to change e.g. sugarcane production, a non-native crop gained momentum, predation of the birds became a big problem as the crop provided ideal conditions for predators to hide in. Raiamma's son also started to grow vegetables, and therefore keeping scavenging poultry near the fields became a problem. This situation coupled with the need to scale up poultry production due to the high market demand, Raiamma used her free time to innovate new ways in which BYP could be reared.

Raiamma's simple but effective innovation was to rear flocks in a village atmosphere in front of the house without any private spaces for enclosing the birds. The only investment she made was a shelter made of mud and bricks for the birds to be safe at night and provide a secure place for brooding hens. The need for a shelter to keep the birds safe in the night was critical as the birds were now raised in the village and in front of her house. *Raiamma's* son built a mud and stone shelter-12ft x 6ft- in front of the house which cost Rs.10,000/-. Mud and stones were specifically used to make the structure as it keeps the room cool for the birds. The shelter also had built-in shelves so the birds could perch. She leads the initiative and takes on the workload required to rear the birds. while spending 2-3 hours per day on managing critical tasks.

While the bird shelter helped, Raiamma shared that predation by dogs and cats in the village, as well as occasional hawk/kite attacks on the chicks, remained a concern.

Flock details, production and estimated losses

Currently Raiamma owns a flock of 102 birds which comprise of 30 hens, 50 cockerels/pullets, 26 chicks and 2 full grown cocks. Following the traditional method of production, Raiamma says the birds she rears give an average of 8-9 clutches[1]/year and each bird has the potential to produce 144-162 eggs/year. However, the broody hens[2] produce only 3 clutches a year producing about 54 eggs per bird (Table 1). In a year Raiamma is able to rear a total of 3,780-4,212 birds.

Table 1 : Flock details and production

Flock details	**Hens**	**Cock**	**Chicks**	**Cockrels /Pullets**	**Total**
Regular adult hens	24	2	26	50	102
Adult Broody hens	6				
Clutch details	**Clutches /year**	**Eggs/ Clutch**	**Eggs/Year /Bird**	**Production at flock level**	
Regular adult hens	8 to 9	18	144-162	3,456-3,888	
Adult Broody hens	3	18	54	324	

1 A clutch of eggs is the group of eggs produced by birds, amphibians, or reptiles, often at a single time, particularly those laid in a nest.

2 A broody hen is one that sits on an egg or a group of eggs in the hope that they will hatch.

She quotes,

"I spend only 2-3 hours per day looking after the birds, so I have ample time to think of new ways to adapt and improve my business".

Raiamma explains that she carefully selects birds with strong brooding qualities, rearing them separately as they are crucial for increasing her flock. She particularly favors birds that display aggressiveness while laying eggs, having observed that such traits are linked to better brooding performance. Special care is given to such birds, which are kept in a separate room for brooding. During this period, they are provided with clean drinking water and fed three times a day. The birds are manually fed and then placed back on their nests after each feeding. Raiamma typically assigns 12–15 eggs per bird for brooding and currently maintains 6–8 strong brooders in her flock. Following the traditional foraging system, she allows the birds to forage freely during the day and supplements their diet with crushed sorghum and maize grains once in the evening.

Raiamma is in charge of the entire business, from the decisions made to adopt a new, innovative model to the sale of chicken and eggs.

When asked about health care measures, she said nothing was done unless there was a disease outbreak. Two major diseases she has observed were identified as *Ranikhet*[3] disease and *Fowl Pox*[4]. With respect to diseases, Raiamma said that when the birds were reared near their farmlands the disease incidence was almost nil as there was more space for the birds to forage as well as better access to good food.

3 Ranikhet disease is a contagious viral avian disease affecting many domestic and wild bird species; it is transmissible to humans. Though it can infect humans, most cases are non-symptomatic; rarely it can cause a mild fever and influenza-like symptoms and/or conjunctivitis in humans.

4 Fowl pox is a highly-contagious, slow-spreading viral disease that affects all forms of commercial and domestic poultry, as well as dozens of other bird species. Transmission occurs from bird-to-bird and not bird-to-humans.

Economics

Raiamma calls two aggregators to collect the birds for sale whenever her flock size is increasing. The male birds are sold for Rs. 500/- whereas females are sold for Rs. 250-300. Eggs are also sold and often customers come to their doorstep to purchase them. The eggs sell at Rs. 5 per piece. According to Raiamma, the losses at the hatching stage amount to 13% for an average clutch size of 18 eggs. In the chick stage she loses about 30% to disease and another 30% to predation (Table 2).

Table 2 : Estimated losses in BYP production

Components	Loss Per clutch (nos)
For an average batch of 18 eggs for hatching, 13% loss is estimated	2 eggs
Predation of chicks is estimated at 20% (for every 16 hatched eggs)	3 chicks
Loss from disease in chicks born - 30%	5 chicks
Loss from predation of adults - 20%	2 bird
Loss from diseases in adults -30%	2 bird
Total loss of birds per clutch (out of 18 eggs)	**14 birds**

Despite this the estimated losses, Raiamma is able to earn Rs. 1,66,100.00/- per annum under the traditional method of rearing BYP with no investments (Table 3). This was by managing a flock of 24 adult hens which produced 8 clutches and 6 broody hens that produced 3 clutches of 18 eggs each.

Table 3 : Economics of the model

Components	Output/ bird	Income / bird	Output at Flock	Income at Flock
Total eggs produced by 24 birds in 8 clutches per year @18 eggs per clutch	144		3,456	
Production Broody hens (6 hens) in 3 clutches @18 eggs per clutch	54		324	
Total eggs	198		3,780	
15 Eggs kept aside for hatching @6 times per year	90		2160	
Total eggs consumed per year*			**600**	
Total eggs available for sale @Rs.5	88	440.00	1,020	5,100.00
Loss in eggs during hatching 13%	12		281	
Bird production per year (total chicks)	78		1879	
Loss due to Predation (20%) & Disease (30%) in chicks	39		940	
Total adult birds produced	**39**		**940**	
Loss due to Predation 20% & Disease 30% of adults	20		470	
Total adult birds produced and ready for sale	19		470	
Total birds per year female @300/-	9	2,700.00	370	1,11,000.00
Total birds per year male @500/-	10	5,000.00	100	50,000.00
Total income earned		**8,140.00**		**1,66,100.00**

Note * This is as per information provided by the HHs, this may vary as per how the household manages the eggs and egg consumption.

Benefits

For small and marginal households this BYP model is highly lucrative as it fetches a higher income as compared to irrigated agriculture. A vegetable cultivator earns Rs. 18,000 per season whereas sugarcane crop earns upto Rs. 40,000/- per acre per year. Looking at the above table, the current traditional BYP model fetches Rs. 1,66,100.00/- per year, which is higher than the income earned per acre from irrigated agricultural land. Under the same conditions, a small unit of 4 birds and 1 cock has the potential of providing the household Rs. 31,760.00/- per annum. Lastly, as demonstrated by Raiamma, this model is empowering women entrepreneurs. Spending 2-3 hours per day, she is able to generate substantial income which is also near her house and within the village. Typically, when systems are scaled up or intensified, women bear the brunt of additional work. The BYP model, however, avoids this, allowing women to earn significant income without increasing their workload, even at its current scale.

Case Study 2

Scaling up for meeting market demand

History and Innovation

Dongrisab is a farmer from Bagalkot and his family owns six acres of agricultural land. Apart from farming, he also holds a day job at the Bagalkot town municipality. His house is located in the center of his farmland, making it convenient for the family to actively engage in agriculture and practice mixed crop-livestock farming. Dongrisab's family have a keen interest in improvising with new techniques with their current agricultural farming practices. One such exploration was the benefits of BYP production on their farm. They initially started with a few indigenous birds (3-5), which gradually increased to 20 and in the last six years, to 100 birds (all ages). They decided to scale up production owing to better market prices, local traders picking up produce at the doorstep and a large weekly market in the nearby town of Bagalkot. Although the initiative was started by Dongrisab, his wife handled the whole production and sale of the birds.

The most striking feature of this model was the innovative housing and management of the birds to counter losses from predation. According to Mrs. Dongrisab, they first invested in a proper shelter for the birds. The shelter was made by themselves and measured 15 ft long and 8 ft wide and could accommodate approximately 150 birds. The housing was built on a concrete raised bed to prevent predation by mongooses and snakes. The shelter had three compartments that separated the adults, pullets[5] and cockerels[6] and birds with chicks. It was enclosed with chain-link wire fencing with a tin rooftop. The compartments where the adult birds (layers) were kept had shelves and wire baskets filled with soft hay/material for the birds to perch on or lay eggs. The baskets were mainly kept for brooding hens and the flooring of the shelter was made of granite stone and cement. The total investment for this housing was Rs. 40,000/-.

Mrs. Dongrisab quotes *"the predation of the chicks reduced significantly when the chicks are reared in the shelter with the mother for atleast three weeks before they were let out for foraging"*.

Such simple management innovations substantially reduced losses from predation, making scaling up more profitable.

While other family members also contribute, it is the women in the household who are well versed in selecting the eggs for hatching purposes and use their traditional knowledge in choosing the eggs. Moreover, cleaning the shelter, management of the birds, egg hatching etc. was all managed by the women of the household. They spend around 1-2 hours per day engaged in various BYP activities.

5 A young domestic hen, usually one that is less than one year old.

6 A young rooster.

Dongrisab's wife shares

"Raising male and female together as a flock, ensures egg fertility, allowing the system to sustain itself naturally."

Flock details, production and estimated losses

Dongrisab's family currently rears a flock of 98 birds in which 46 are adult hens, 42 are chicks and 10 are cocks. According to Mrs. Dongrisab the average weight of the adult birds, attained by the second year is around 1.42 kg for females, and 1.53 kg for males. The hen matures at 5-6 months, being fit to lay eggs. The brooding[7] hens lay three clutches[8] per year, while the non-brooding hens lay between 5 to 6 clutches per year. This is because the birds are made to spend the rest of their time hatching eggs and taking care of the chicks till they become independent. Each clutch has a range of 15-20 eggs which fluctuates in different seasons. During the summer months (i.e. April to mid-June) the production is the lowest. She keenly observed the hens' characteristics in terms of hatchability, broodiness, and their care for the young ones. Based on these observations, she decided which birds to retain in the flock. According to her, when the right number of eggs are available for hatching, she identifies the hens that are ready to brood. During this period, the brooding hens are fed twice a day and provided with clean drinking water as they tend to lose weight due to reduced foraging.

Mrs. Dongrisab quotes that *"good brooding hens are critical not just for the flock size to be maintained but also to have enough birds for sale"*.

7 Process of brooding is called incubating

8 The period of laying eggs is called clutch

Table 1 : Flock details and production

Flock details	Hens	Broody Hens	Chicks	Cock	Total
	39	7	42	10	98
Clutch details	**Clutches/ year**	**Eggs/ Clutch**	**Eggs/Year/ Bird**	**Production at flock level**	
Regular adult hens	6	20	120	4,680	
Adult Broody hens	3	20	60	420	

With the current flock size of 39 adult hens, about 7 hens were said to be good brooders (Table 2). These broody hens were used to hatch around 12-15 eggs as and when available. Eggs that are a day old were only used for hatching. The infertile eggs are around 20-25% of the production. As these are scavenging poultry, all family members help in aggregating eggs from the places around the farm.

Dongrisab quotes *"When there are eggs eaten away by rodents, the loss is seen as '**service to nature**' as I value the larger role of snakes and mongooses in protecting crops from harmful insects as they feed on it.*

Table 2 : Estimated losses in BYP production

Components	Loss Per clutch (nos)
For an average batch 20 eggs for hatching is 13%	3 eggs
Predation of chicks - 5% (for every 17 eggs put for hatching)	1 chick
Loss from disease in chicks born - 20%	3 chicks
Loss from predation of adults - 20%	2 bird
Loss from diseases in adults - 20%	2 bird
Total loss of birds per clutch (out of 20 eggs)	**11 birds**

The feed management in this system leverages the natural behaviour of the birds. Consequently, the feeding was organized through an open foraging system in the crop fields in the morning. While in the evening, broken grains and leftover kitchen greens were provided to the birds as they gathered into the shed towards the evening. For birds with chicks, however, the treatment was different. These birds were fed twice a day as they were kept in the shelter for 2-3 weeks. These small improvisations in management helped reduce predation, health issues and low weight gain due to excess scavenging with minimal investment in feed. Clean drinking water was provided both in and outside the shelter.

Regarding health care, a mix of simple traditional methods and some medication was used.

Whenever a disease outbreak is spotted, tetracycline powder is mixed in the drinking water. The main diseases reported by the household are *Ranikhet*[9] disease, fowl pox and lice in brooding birds. However, most of the time diseases were treated only after the outbreak occurred resulting in a loss. The treatment of lice was done using traditional methods; by dipping the birds in water and leaving them in the sun to dry. Alternatively, the birds were also exposed to tobacco fumes to remove the lice. Diseases were reported to be highest during the monsoon seasons. But in recent years, high summer temperatures are also causing some distress.

9 Ranikhet disease, also known in the West as Newcastle disease, is contagious and highly fatal. In spite of the notable work done towards its control, this disease still ranks as one of the most serious diseases in poultry.

"A critical observation by Dongrisab said that aggregators often spread diseases unknowingly as they carry birds across different farms while aggregating which needs to be managed."

Economics

Based on the interaction with Dongrisab's family, the losses were estimated in the production system (Table 2). Despite the loss of 11 birds per clutch of 20 eggs, the household was still able to make about Rs. 8,98,650/- per annum (Table 3). The high income was due to the huge demand for indigenous eggs and poultry meat in the district. Aggregators and individuals both picked up the stock at their household's doorstep , which was an added advantage. When in excess, some birds were sold at the weekly markets at Bagalkot town. Dongrisab added that there is a high demand for eggs due to specialized businesses like rearing Rams for the traditional village fights/competitions and rearing of the Mudhol breed of dogs. Currently, the prices of live birds is Rs. 300/- for adult hens and 1.53 kg of the cock is sold at Rs 450 to 600. The eggs are sold for Rs. 8 each locally.

Table 3: Economics of the model

Components	Output/ bird	Income / bird	Output at Flock	Income at flock (Rs)
Total eggs produced by 39 birds 6 clutches per year @20 per clutch	120		4,680	
Production Broody hens (7 hens) in 3 clutches @20 eggs per clutch	60		420	
Total eggs	180		5,100	
10 Eggs kept aside for hatching @ 12 times per year	120		5,520	
Total eggs consumed per year*	**80**		**240**	
Total eggs available for sale @Rs.8 after removing eggs for HH consumption	0	0	240**	1,920
Loss in eggs during hatching 13%	23		663	
Bird production per year (total chicks)	157		4,437	
Loss due to Predation 5% & Disease 20% of chicks	39		1,109	
Total adult birds produced	118		3,328	
Loss due to Predation 10% & Disease 30% of adults	47		1331	
Total birds per year female & male @450/-	71		1997	
Total income		**31,950**		**8,98,650**

Note this is as per information provided by the Hhs, this may vary

** Sale of eggs is not a priority, but the household tends to sell some eggs where the approximate amount is mentioned.

Benefits

The major benefit of this production system is the provision of shelter, which keeps the birds—especially those with chicks—safe during the evening. This significantly reduces predation during the cropping season, at night, and in the early stages when the birds are most vulnerable. The shelter also protects them from sudden weather changes and cold conditions during winter. Additionally, it allows the birds to be enclosed during sowing and germination periods, preventing damage to crops.

Further, as this system of production is on the farmland, therefore, in-situ manuring for crops is the hallmark of this model. For instance, while the birds forage in the fields, their faecal matter gets deposited in the fields. A rough estimate reveals that around 100 adult birds drop 2,500 Kgs of manure (on dry matter basis) every year in the field. This provides 30 kgs of Nitrogen, 20 kgs of Potash and 10 Kgs Phosphorus which enrich the fields every year. This results in enhancing soil fertility and crop production as well as reducing use and investment for inorganic inputs. This accounts for Rs. 9,300/- per annum. This system also promotes the organic way of crop production.

Another unique aspect of this system is that it ensures regular exercise for the birds and enables them to feed on a variety of herbs and insects, resulting in their better health. Further as traditional methods of health care are used to treat disease and lice outbreaks - the birds are devoid of unnecessary antibiotics, rendering the meat to be healthy while holding higher nutritional value

Case Study 3

Incorporating modernity in traditional methods

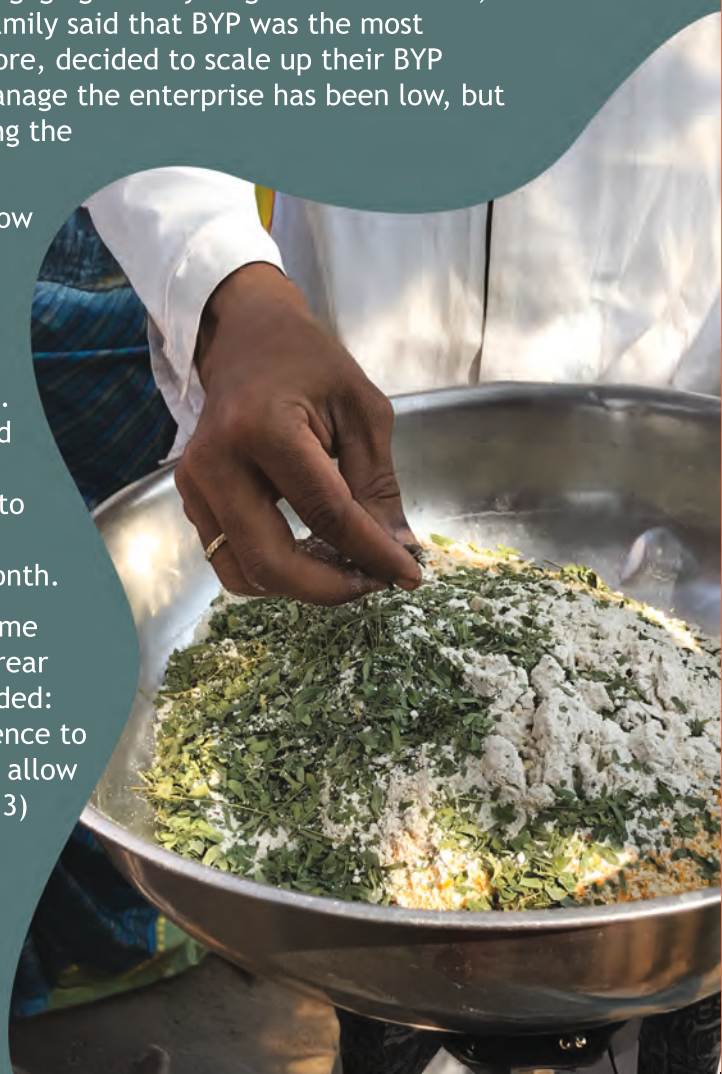
History and Innovation

Bhima Naik's family is from *Hiremaggi* Thanda in Bagalkot district. Although BYP rearing for the *Lambani* community[10] is a traditional occupation to meet subsistence needs, Bhima Naik's family has turned it into an innovative product to plate business model, earning them a significant amount of income per annum. In this model, the family not only rears and sells birds but also does value addition in terms of selling fresh meat slaughtered in-house and cooked products for customers as per the demand.

As they did not own land, and had to find alternatives to earn, the motivation behind this model was trying to earn a consistent and substantial income. Bhima Naik's family shared that they experimented with several other income-generating activities (e.g. mushroom cultivation, broiler farming, quail rearing) in their backyard along with engaging in daily wage work. However, from all the initiatives, Bhima Naik's family said that BYP was the most lucrative enterprise. His family, therefore, decided to scale up their BYP rearing program as time invested to manage the enterprise has been low, but the market value and demand for selling the indigenous birds is very high.

Standardising their production was a slow process which grew based on experience. For several years the traditional method of leaving the birds to scavenging and use of the brooder hens for chick production was followed. However, after six years of studying and experimenting, a few management strategies were changed. The aim was to reduce mortality of birds, workload for women and increase production per month.

The innovation included adoption of some modern poultry farming techniques to rear indigenous birds. These practices included: 1) enclosing the backyard space by a fence to prevent the entry of predators but still allow scavenging, 2) special homemade feed 3) good housing and 4) use of a self-built



10 Lambanis, also called Lambadis or Banjaras, were nomadic tribes who came from Afghanistan to Rajasthan and have now spread themselves across Karnataka, Andhra Pradesh, Rajasthan, Madhya Pradesh, Gujarat and Maharashtra.

incubator as a hatchery to increase production. The entire backyard, which was an area of about 100 sq ft, is used for rearing poultry. To control predation, low-cost fencing was built around the yard. While this reduced the predation, it also drastically reduced the scavenging area for the birds. As scavenging area was reduced in this system the birds needed to be fed three times a day. Naik's family came up with a homemade nutritious feed which consisted of a mix of wasted grain/flour from the mill or at home which was mixed with different types of finely chopped greens. Clean water is also kept as and when required. Feeder troughs used in commercial poultry rearing along with innovative feeding channels made by using plastic pipes were installed in the backyard to feed the birds.

"It is to be noted that Naiks' household has keen interest and high entrepreneurial capacity and hence this model is highly successful in their case. BYP production is also one of their main income sources being landless farmers and hence an effort in improvising the production system continuously is an unceasing effort."

Within the same backyard, a shed measuring 15ft x 20ft was built to house the birds at night. The shed was further compartmentalized to keep the chicks (2 weeks old) inside for a month, after which they are let out to scavenge. Shed maintenance was a critical task here due to the large flock size.

For egg production, initially, earthen pots were placed outside the shed, on the ground for brooding hens to hatch eggs. This traditional hatching method was however stopped due to increased predation and damage to eggs by other hens – as the flock size was large. As an alternative, another wooden structure with compartments was built outside the shed, 3 ft above the ground for brooding hens. The hens were trained to climb up, lay eggs and continue incubating. But this did not increase the production to the level they wanted. So Naik's son developed a "low-cost incubator" on his own by watching youtube videos! The only limitation it had was that the eggs needed to be turned manually every 8 hrs. To identify and manage this well, the eggs are marked on one side so that they know which side the eggs need to be turned.

As this system is slightly modified from the traditional foraging system, it was a family affair. Naik shared that everyone had a role as they needed to spend more time on the management of this enterprise. In a day around 4-5 hrs, is spent on managing the enterprise. While Naik manages the slaughter and sale of meat, his daughter-in-law, Jyothi Naik is responsible for all round management of the backyard, birds and some value-added products. Naik's sons (who work in other agencies) help in marketing and using new technologies for better production.

Flock details, production and estimated losses

Currently Naik's family has a flock of 202 birds out of which 50 are adult hens, 100 are pullets & cockrels, 50 are chicks and 2 are adult cocks (Table 1). Having a large flock size within limited space increased the disease incidence, which made Naik's sons' focus on the need for preventive health care and other modes of production.

Table 1: Flock details and production

Flock details	Hens	Cockrels / Pullets	Chicks	Cock	Total
	50	100	50	2	202

In this system, the production of chicks has been stabilized by the use of a low-cost incubator for systematic hatching. In every batch, 100 eggs were put aside for hatching, out of which approximately 85 chicks were obtained on an average. Mr. Somashekar (Naik's son) added that about five more chicks are lost due to predation, no matter how careful they were. Ultimately, 80 birds are reared and sold per batch. The household manages one such batch every month and hence produces a total of 960 birds per annum.

" Although the backyard was enclosed the birds still had space for scavenging and scope for chicks to get trained by hens still remaining as a partial free-range system."

Estimated losses in the production system with modern technologies was reduced to 20% from the earlier traditional system where it was estimated to be 40% (which includes losses from hatchability, chick and bird mortality through predation and diseases).

Use of the incubator replaced the use of brooding hens to hatch eggs. Naik's family also purchased eggs at Rs. 5/-/egg from other households in the village to get 100 eggs for production. These eggs are selected carefully and need to be 1-2 days old. They test the eggs by using a traditional system of floating the eggs in a bowl of water. Depending on how the egg floats and the direction it floats in, the eggs are selected for hatching.

To maintain a consistent egg supply and production, as production had been reduced in-house, Naik's son built an innovative rural fridge to store eggs for extended periods. The fridge comprises earthen pots strategically placed in a sand pit in the backyard in the shade. The mouth of the pot is sealed and protected with a wire mesh to prevent snakes and rodents entry. The temperature in the mud pot is maintained between 15-21 degrees Celsius. In summer, to keep the temperature even lower, water is poured around the pot at night when the birds are in the shelter.

Naik's family quoted " *Disease management is a very critical aspect". These five tried and tested practices can reduced disease in the birds to almost nil."*

1. Give boiled and cooled water for chick aged 1-20 days.
2. Give water mixed with turmeric and jaggery every 15 days to all the birds.
3. Administer Lasota vaccine for all birds once between the 15th-18th day of their birth.
4. Manage the feed properly.
5. For lice control tobacco smoke is used, and the back yard is watered occasionally to keep it dust free and hygienic.

Economics

A key feature of the model was its marketing. Somashekar (Naik's son) spent a considerable amount of time studying the market demand of live birds, eggs, meat and value-added products of native chickens. With this knowledge he has upscaled the flock size and planned other aspects of the production cycle. Apart from the sale of birds throughout the year, Somshekar also selects good male birds with good plumage for the traditional festivals the Lambani community celebrates. Although the festival is celebrated once a year, male birds sell at the rate of Rs. 2000/-. Apart from this, the value addition is also done by the family by selling fresh meat and catering to food orders that fetches them a weekly income of Rs. 1500/- throughout the year.

Due to this demand, Naik's family also rears quails and broiler chickens too. The income from these sources however, is not included in the table below.

Table 2: Economics of the model

Components	Output	Income (Rs.)
Total eggs for hatching with incubator per year	1,200	
Total Bird production @85% hatchability and 5% predation	960	
Income from adult birds @350 per bird	860	3,01,000
Income from Adult males @2000 per bird	100	2,00,000
Income from value addition @1500 per week		78,000
	Total Income	5,79,000

Benefits

For a landless household, BYP is a good source of income if managed in this way except for the low-cost incubator, as it requires keen interest and skills to maintain it.

Further, as native birds have a niche market and high market potential, adoption of key management practices, as seen in this case, seems highly lucrative. For instance, It is pertinent to note that Naik's household adopted a few modern techniques of production for indigenous bird production instead of commercial poultry rearing because:

1) Commercial poultry production needs basic infrastructure, space and high investments.
2) The waiting period for chicks/pullets to become layers[11] requires up to 6 months and is not a self-propagating system. This waiting period reduces the household's cash flow.
3) Commercial poultry breeds have higher pest (lice) and disease attacks as larger flocks are reared in smaller spaces.
4) Inconsistency in chick production and higher mortality levels in chicks is seen in commercial poultry as they do not have the inbuilt traits of protecting themselves or scavenging.
5) Difficulty in administering preventive health care –the most critical management practice if a higher number of birds are being reared in small spaces with reduced foraging activity.

Though this model looks like a modern version of poultry rearing, it still has key elements of the traditional production system i.e. self-propagating ability, no external dependence on eggs, lower input costs – thereby maintaining its ability to bounce back even after an environmental or social disturbance. This however, is not the case in commercial and improved poultry where the farmer has to depend on external sources entirely.

11 Layers are when hens actually lay egg

Key learnings from the case studies

Backyard poultry is zero to low input micro-enterprise with high replicability and most suited for small and marginal farm families. Cases indicate that adoption of simple management techniques has led to substantial reduction in mortality, with the survival rate of the birds improving from 30-40 per cent to 70 per cent. These systems are independent of hatcheries, chick suppliers, and feed mills, a key feature that ensures continuity and sustainability.

The improved systems ensure that the birds get regular exercise and still feed on a variety of herbs and insects, which has led to an improvement in the general health of the birds. Additionally, birds raised under this system comply with proper animal welfare standards, which is also important for urban consumers and niche markets.

In *situ* manuring that allows decomposition of poultry droppings and associated increase in crop yield is the advantage for small and marginal farmers; and a strategy that can be an integral part of the organic farming concepts.

Backyard poultry production was found to be highly lucrative for small and marginal households over crop production in *Bagalkot* district. Locally, farmers are earning an average income of Rs.18,000/- per season from one acre of vegetable cultivation and up to Rs.40,000/- per acre per year from sugarcane cultivation. However, average income from poultry production in all cases provides the household an average income of Rs. 1,15,000/- per year which is far higher than income earned per acre from irrigated agriculture.

Since the indigenous breeds are not prone to many diseases and require minimal medical care which can be addressed through herbal remedies, the consumption of this meat for humans is much healthier than the broiler chicken available at scale.

In all the cases women play an important and active role in the entire process of rearing native poultry. Their observations and knowledge gained through the process is what helps improve the methods applied. Hence, apart from work they also make important decisions to improve the production process. Being primarily a women-managed enterprise, the drudgery women face in comparison to other farm-based activities is negligible, and hence an effective and suitable source of livelihood particularly for women. Not only are they engaged in the entire production process, they also make important decisions based on their knowledge from the practice.

The new BYP models defy the logic that there are limits to generating income from indigenous poultry production beyond a certain level. The fact that rural women farmers are themselves finding innovative solutions to address the rising market demands, is proof of the need for state interventions.

INNOVATIONS FROM THE GROUND

Case 4

Exploiting the niche market, using the commercial poultry format

Introduction

Nagandera, a toddy tapper from Tumkur, currently manages a rented farm that was once a commercial poultry venture started by a road contractor but later failed. Drawing on his eight years of experience in backyard poultry, he revived the space by introducing improved backyard poultry chicks. Over the past three years, Nagandera and his family of four have been running this enterprise. They rent the commercial poultry facility for Rs. 15,000/- per batch and raise about two and a half batches each year, with each batch comprising approximately 2,040 birds. The rearing cycle for each batch—from eggs to fully grown birds—spans between 90 to 120 days.

The indigenous poultry chicks are hatched from eggs sourced from local households in the village that rear native poultry. These eggs are taken to a standard hatchery for incubation. Each batch consists of 2,000 chicks, with an additional 40 chicks included to account for possible transportation losses. The cost of each one-day-old chick, weighing between 32 and 35 grams, is Rs. 38/-.

Flock details, production and estimated losses

For rearing 2040 chicks per batch Nagandra invests Rs. 2,17,000/- for feed which consists of pre-stater broiler feed, starter feed and finisher feed. Along with this feed the birds are supplemented with a home cooked feed which consists of Ragi , horse gram sprouts, curd , milk, jaggery, water. Additionally, Nagandera also produces Azola to feed the chicken. To enrich the boiler feed he adds Amaranthus leaves to it in the ratio of 30:70 ratio. Neem leaves are also fed every 15 days to the birds. Adding all this, the cost of feed works out to Rs 100/- per day which would amount to Rs. 12,000/- per batch.

Further, for maintaining ideal temperature in the sheds, charcoal heaters were used. These heaters used 180kgs of charcoal for every batch of chicken produced. For the brooder hens 200-watt bulbs were used to keep the area warm. Paddy straw was used as a base for the brooders to nest upon.

Regarding health care, three vaccines are given on the 1st, 14th and 21st days, amounting to a total cost of Rs. 5000/-. Debeaking is done on the 12th day. He avoids overcrowding of the birds in the sheds to prevent Coccidia[12] and CRD[13]. After 40 days, he lets out the birds during the day to browse in an enclosed field around the shed, while simultaneously deworming them.

Table 1 : Feed & Maintenance costs per batch (120 days)

Items	Rate (Rs.) 50kg/bag	Quantity (bags)	Total (Rs.)
Pre-starter broiler feed (1st month)	1600	20	32,000
Starter feed	1500	30	45,000
Finisher feed	1400	100	1,40,000
Total			**2,17,000**
Supplemental feed			
Ragi powder		200 kg	
Horse gram		100 kg	
Curd		15 kg	
Jaggery water		8 kg	
Milk		15 l	
Azola			
Ameranthus leaves in Broiler feed		30 kg	12,000
Other costs			
Charcoal	100/kg	180 kg	18,000
Bulbs (200 watts)	12 /piece	4 nos	46
Paddy Straw	40/500 kg	500 kg	40
Health care			5000
Total			**23,086**
Total cost of production			**2,52,086**

12 Coccidia are a subclass of microscopic, spore-forming, single-celled obligate intracellular parasites belonging to the apicomplexan class Conoidasida.

13Chronic Respiratory Disease (CRD) CRD is one of the most common causes of disease in backyard fowls, occurring when chickens and turkeys that are infected with Mycoplasma gallisepticum are stressed.

Economics

Marketing of the birds begins when the birds are around 90 days and weigh around 1.4 kgs.

By 120 days, most of the birds are sold, with each bird costing approximately Rs. 180/ kg live weight. These birds are sold in the local market and at the farm gate. The loss incurred due to predation and disease is more or less covered by the extra chicks he gets. Hence, Nagandra saves Rs. 45/- for every bird he sells, after deducting all expenses. So, his annual income is approximately Rs 2,50,000/- lakhs. In the case of commercial poultry, one would save only Rs. 8/- per bird, which indicates the potential of leveraging his model. This model showcases that native birds can be reared at scale and is more profitable. It also has a niche market, which makes the venture less risky and is also more acceptable in comparison to broiler chicken.

Apart from this, Nagendra also works as a consultant, sharing his expertise on constructing 100/20 ft sheds that cost Rs. 25,000/- which includes setting it up. This is a 14-day training package where he charges Rs. 3000/- with on-farm training for the first batch for 2 hours in the beginning of 10 days. There are 17 such units in the area now and he earns an additional income of Rs. 4,25,000/- per annum.

Case 5

Moving back to the backyard is more profitable

Introduction

Veriangiri Gounder is from Manur village in Palani district, Tamil Nadu.

He started off as a commercial poultry breeder but lost everything to a Ranikhet disease outbreak. Soon after this, he shifted to backyard poultry farming four years back.

Flock details, production and losses

Currently, Veriangiri Gounder is rearing about 600 birds. While his flock produces the eggs, he uses an incubator with a capacity of 400 eggs for hatching. Alongside the incubator, he also relies on brooder hens for around 21 days to support the hatching process. The chicks are released when they are between 30 and 40 days old. Veriangiri manages to hatch 6 to 8 batches of 400 eggs each year.

Regarding feed, moringa leaves from his own trees (20 trees) which he grows on his farm are fed to the birds along with maize, pearl millet, rice and kitchen waste. To keep the predation low, Veriangiri keeps two watch dogs due to which the predation is very low despite the birds being let out to scavenge in the yard and the farm. No vaccination or healthcare is provided.

Economics

Veriangiri sells his birds both in the local market and directly from his farm. The selling price is Rs. 400/- per kilogram for males and Rs. 300/- per kilogram for females. At the time of sale, the birds typically weigh around 1.5 kilograms and are between three and a half to four and a half months old.

Conclusion and Way Forward

The Backyard Poultry (BYP) production systems described in this document challenge the conventional belief that income generation from indigenous poultry has a limit. The commonly held notion that improved breeds such as Giriraja are more efficient for backyard rearing no longer holds true. These improved varieties depend heavily on the regular purchase of chicks, external feed, medications, and vaccines (SA PPLPP, 2009)—making them unsuitable for small, marginal, and landless farmers. Moreover, such breeds often lack the adaptive traits necessary for thriving in free-range systems. With minor improvements in housing and measures to prevent predation, indigenous poultry can, in fact, outperform improved breeds in enhancing livelihoods and ensuring sustainability.

While there are schemes like the National Livestock Mission (NLM), where Backyard Poultry management is supported, these are for 1000 bird units which is a very large flock size that rural households with limited income cannot manage especially in the initial stages. Hence, support for smaller flock sizes (100 to 200) can also be provided to include the small, marginal and landless households as beneficiaries. In addition to this, the policy focus needs to expand from improved breeds like Giriraja[14] and include all local poultry breeds, and the extensive or scavenging-based production system should be incentivised. The system of indigenous poultry production is based on the motherly instincts of the birds that train their offspring to feed, and escape from predators. This behaviour cannot be inculcated in chicks bred in intensive production systems. BYP production, if dealt with in the right way, is an answer to the larger goal of ensuring sustainability in farming systems and is best suited to meet the government's intention of doubling the farmers' incomes.

Therefore, managing agro-biodiversity within the farms is the basis for generating sustained incomes in farming. Interestingly, markets exist for every agricultural produce in India, but the challenge is to build consistent supply chains to reach the end consumer. In this context, the way forward is to:

1. Recognise that indigenous poultry have the potential for higher levels of production and create adequate support systems for its production.
2. Impart training for sustainable crop-livestock production systems rather than crop-specific practices, where BYP models or small livestock are integrated.
3. Synergize with the programmes of the government and Farmer Producer Organizations (FPOs) to promote the models that are appropriate for the local climate and practices and create infrastructure that allow FPOs to connect with end consumers for local birds.
4. Evolve a dynamic pricing strategy for the most preferred indigenous poultry, ensuring transparency at every level.
5. Install a robust disease surveillance mechanism to support the enterprises towards risk reduction.

14 Cross-bred birds which are not pure backyard poultry

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