

# Eggciting Innovations

## A cost:benefit model for engaging smallholder poultry farmers in India

### Siddharth Tata

Co-founder, Purple Chilli, Bangalore, India

### Kalpana Beesabathuni

Global Lead Technology & Entrepreneurship,  
*Sight and Life*, Gurgaon, India

#### Key messages

- > More than 70% of egg production in India is by smallholders.
- > Eggs have an important role to play in the fight against malnutrition among children under the age of five.
- > Optimized feed for backyard poultry could improve egg production for farmers and deliver added nutritional value for consumers.
- > Investments in the egg value chain are very effective: The cost to save one disability-adjusted life year ranges from US\$30 to \$76, and an investment of \$1 has the potential to generate \$7.85 of sustainable income in the hands of rural women.

Eggs have an important role to play in the fight against malnutrition among children under the age of five. Naturally packaged, amenable to different cuisines, and rich in protein and micronutrients, the egg holds great potential. A review article<sup>1</sup> explores this in detail and makes a case that “eggs may be an uncracked part of the solution.” A recent study<sup>2</sup> on the impact of consuming an egg a day suggested a 47% reduction in the prevalence of stunting and a 74% reduction in the prevalence of underweight, confirming the long-held views of advocates for eggs in the global fight against child malnutrition. More than 70% of egg production in India is by smallholders. Poultry farming has many advantages: The birds are inexpensive to house, breed, and process, making their meat an economically viable protein source. Moreover, hens also produce eggs each day that can be eaten or

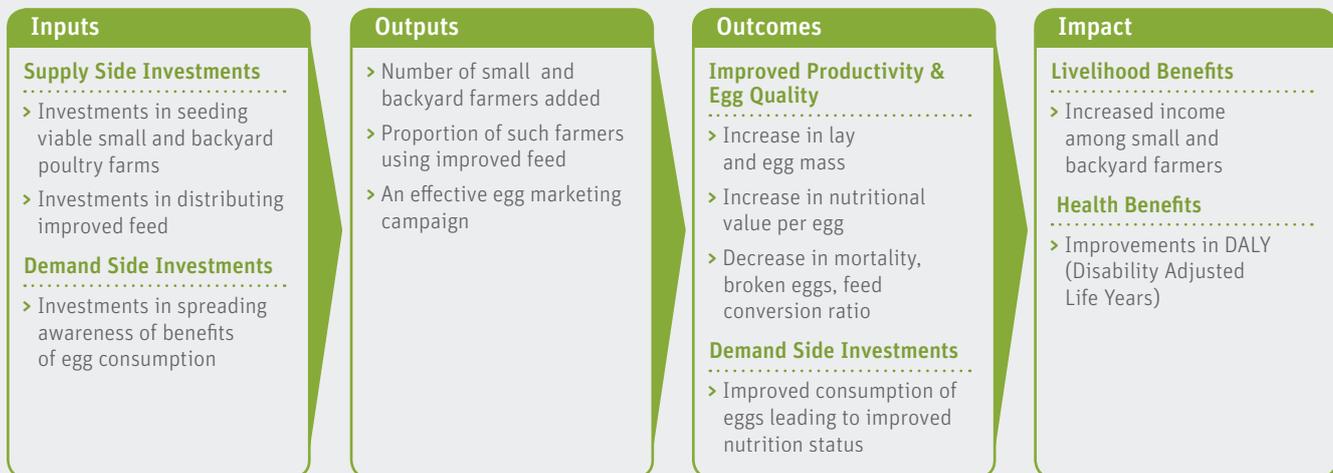
sold. Because of urbanization, economic growth and a change in consumption patterns in developing countries, the demand for eggs in these countries is projected to increase by 70%, and for poultry meat by 170%, between 2010 and 2050.<sup>3</sup>

“The demand for eggs in developing countries is projected to increase by 70% between 2010 and 2050”

The Forum of the Future<sup>4</sup> identified feed innovation as an area for immediate action to meet the demand for animal protein. This makes the idea of tapping into the potential of eggs extremely “eggciting.” Optimized feed for chickens could support farmers through improved egg production and benefit consumers by providing added nutritional value. The nutritional content of eggs is to a certain extent a function of the hen’s dietary intake, and optimal diets improve all phases of egg production: increased egg numbers, egg weights, percentage lay and increased feed efficiency.<sup>5,6,7</sup> In the case of many micronutrients, egg content responds to dietary changes within just a few weeks, providing an excellent opportunity to improve the nutritional value of eggs with only limited input in the feed. The transfer efficiency from feed to egg depends on the nutrient and can be high (vitamin A, selenium, iodine, and docosahexaenoic acid [DHA]), medium (vitamins D<sub>3</sub> and E), or low (folic acid, niacin, and iron).<sup>8,9</sup>

We present our findings here from a recent study in India on how to crack this potential, possible approaches, and likely costs and benefits of such an approach. Through literature review and interviews with eleven experts in backyard poultry farming models, we reviewed business models that engage backyard farmers through micro-leasing, community farming, micro-credit, and micro-distribution of inputs. We also reviewed rural marketing campaigns in India and nutrition education interventions. We found that these models could overcome several challenges that traditional backyard poultry farmers face: high mortality of chicks; low productivity due to high input costs; and limited access to resilient breeds, vaccines, feed, and extension services.

**FIGURE 1:** Theory of Change: Introducing improved feed for backyard poultry farming and a social marketing campaign to improve awareness of benefits of egg consumption.



### The theory of change

Findings from our primary research show that three areas require the most attention:

1. Empower small and backyard poultry farms that can address the issue of unmet demand for eggs among rural populations.
2. Extend the benefit of improved poultry feed to small and backyard poultry farmers.
3. Design compelling marketing campaigns to reinforce the benefits of eggs

For any approach to succeed, a coordinated effort is necessary to improve both the supply of eggs (by making them easily available and affordable to rural women with young children) and the demand for eggs (by increasing egg consumption among children under the age of five). In **Figure 1**, we describe the theory of change of intervening in the egg value chain.

### Supply-side investments in backyard poultry

In many parts of rural India, especially those with a high prevalence of child malnutrition, the supply of eggs is far below the market demand. Large commercial poultry farms with flock sizes in the thousands often neglect this customer segment and prefer to focus on meeting urban demand. Backyard poultry farming

**FIGURE 2:** Keeping and feeding backyard poultry



Backyard chickens in a coop

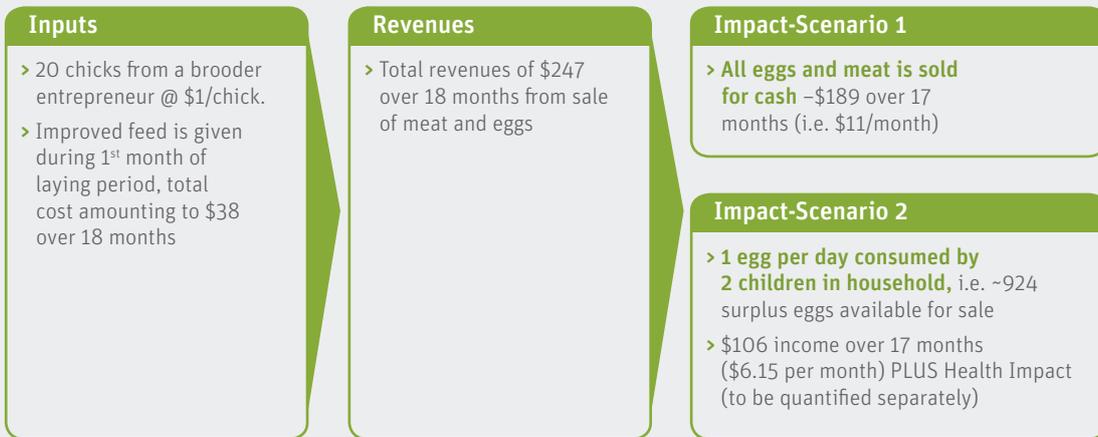


Mixing the feed for the chickens



Feeding the chickens

**FIGURE 3:** Economics of an Indian backyard farmer using improved feed



with small flocks of 5 to 20 birds often serve as a good alternative to meet this demand. The birds primarily scavenge on kitchen waste, agricultural waste, and insects. However, in some of the models we reviewed, purchased feed is given as a supplement during brooding and laying stages (Figure 2).

A well-managed flock of 20 birds can provide an egg a day for up to five children, serving the family as well as providing surplus for their neighbors. Our analysis shows that a woman farmer taking up backyard poultry can earn a monthly supplemental income of approximately US\$6 while also ensuring the nutritional needs of two children in the family (Figure 3).

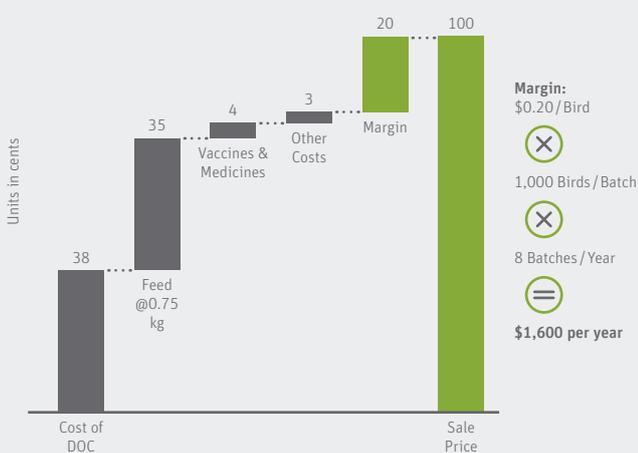
A critical element in the development of backyard poultry supply chain is the role of aggregators – local entrepreneurs who

provide chicks of improved variety, administer vaccines, and in some cases, brood the chicks to 30 to 45 days age, by which point they are hardier when introduced into a farmer’s backyard. These aggregators are local micro-entrepreneurs who, with an initial investment of around \$2,500, can earn \$1,600 in annual income (Figure 4). In addition to developing aggregators, offering small subsidies to women with children under five can also ensure better targeting.

“A critical element in the development of backyard poultry supply chain is the role of aggregators”

**FIGURE 4:** Economics of brooding aggregator

**Costs per Bird over a 30-day Brooding Cycle**



DOC: day-old chicken

**Demand-side investments to stimulate increased egg consumption**

One of the most common communication models used in rural markets is AICDA – Awareness, Interest, Conviction, Desire and Action. Any static or dynamic promotional elements should get the prospect’s attention, foster the consumer’s interest in the offer, build a desire (and conviction) for the product or service and generate a favorable action by the customer<sup>10</sup> (Table 1).

An effective rural marketing campaign to spread the message of the benefits of egg consumption should be built on the following pillars:

**1. Focus on three to four below-the-line marketing tactics:**

A message that is primarily addressed to mothers with young children is best delivered through the help of local influencers and participatory events, as well as broadcast vans.

**TABLE 1:** Rural communication model – AICDA

Promotional Element	Communication Objective or AICDA Level				
	Awareness	Interest	Conviction	Desire	Action
<b>Dynamic</b>					
Haat (rural open-air market) demonstrations	✓	✓			
Short campaigns	✓	✓			
Video shows	✓	✓			
Farmers’ meetings and village demonstrations	✓	✓	✓	✓	
Opinion leaders	✓	✓	✓	✓	
Personal selling			✓	✓	✓
<b>Static</b>					
Handbills	✓	✓			
Wall paintings	✓	✓			
Dealer signboards	✓	✓			
Audio jingles	✓	✓			
Caps, T-shirts, bags, calendars	✓	✓			

AICDA: Awareness, Interest, Conviction, Desire and Action

➤ Below-the-line marketing activities are broadly defined as those that offer direct, often personal communication to the target audience. These include advocacy channels such as salesforce; expert channels where independent experts engage with target buyers; and social channels consisting of neighbors, friends, family members and associates.<sup>10</sup> These channels are less expensive to use than mass media, easier for tracking return on investment, and more effective – especially in rural areas, where they provide a platform for experience (trial and use) and feedback on the part of the end-consumer.

2. Some above-the-line marketing spend may be required: Using radio and regional language television channels can help to reinforce the messages.
- Above-the-line is an advertising term used to describe advertising spend via mass media as a medium to promote and reach target consumers. This kind of advertising is usually aimed at reaching a larger number of consumers and is effective when the target group is very diverse and difficult to define. Commonly used mass media include broadcast media (television, radio); print media (newspapers, magazines, direct mail); and display media (billboards, signs, posters).
3. Continued engagement through technology can help message retention: the use of text messages or robocalls to reinforce messages can make them “stickier.” Investments in continued engagement can also be used to tap into referrals and improve coverage through word of mouth.

4. Use supply-side investments to reinforce messages: Point-of purchase displays on the supply side (i.e. aggregator’s shopfront, packaging material for improved feed) can also serve as secondary modes to reinforce messages.

.....  
**“The cost to save 1 DALY ranges from \$30 to \$76”**  
 .....

Our analysis shows that investments in the egg value chain are very effective, the cost to save 1 DALY (disability adjusted life year) ranges from \$30 to \$76, and an investment of \$1 has the potential to generate \$7.85 of sustainable income in the hands of rural women.

In conclusion, innovation in feed delivery models is needed to enable smallholders to improve their poultry-farming activities by using locally available resources combined with lower production costs, leading to improved yields as well as increases in the nutritional value of eggs. Social marketing campaigns focused on women and children will stimulate the consumption of eggs and hence improve the nutritional status of local populations, especially the most vulnerable.

.....  
**Correspondence: Kalpana Beesabathuni,**  
 9<sup>th</sup> floor, Infinity Tower A, Cyber City, Gurgaon, India 122002  
**Email:** kalpana.beesabathuni@sightandlife.org  
 .....

## References

01. Iannotti LL, Lutter CK, Bunn DA, Stewart CP. Eggs: the uncracked potential for improving maternal and young child nutrition among the world's poor. *Nutr Rev* 2014; 72(6):355–68. doi:10.1111/nure.12107:1–7.
02. Iannotti LL, Lutter CK, Stewart CP, Riofrio CAG, Malo C, Reinhart G et al. Eggs in early complementary feeding and child growth: a randomized controlled trial. *Pediatrics* [serial online] June 2017. doi: 10.1542/peds.2016-3459
03. Food and Agriculture Organisation. Mapping supply and demand for animal-source foods to 2030, by T.P. Robinson & F. Pozzi. Animal Production and Health Working Paper. No. 2. Rome: FAO, 2011.
04. The Future of Protein. Forum for the Future. Available at: [www.forumforthefuture.org/sites/default/files/The\\_Protein\\_Challenge\\_2040\\_Summary\\_Report.pdf](http://www.forumforthefuture.org/sites/default/files/The_Protein_Challenge_2040_Summary_Report.pdf). Accessed January 13, 2016.
05. Zang H, Zhang K, Ding X, Bai S, Hernandez JM, Yao B. Effects of different dietary vitamin combinations on the egg quality and vitamin deposition in the whole egg of laying hens. *Rev Bras Cienc Avic* [online] 2011;13: 189–196 (accessed 12 February 2016).
06. Nascimento GR do, Murakami AE, Guerra AFQM, Ospinas-Rojas IC, Ferreira MFZ, Fanhani JC. Effect of different vitamin D sources and calcium levels in the diet of layers in the second laying cycle. *Rev Bras Cienc Avic* [online] 2014;16(2):37–42 (accessed 12 February 2016).
07. Lin H, Wang LF, Song JL, Xie YM, Yang QM. Effect of dietary supplemental levels of vitamin A on the egg production and immune responses of heat-stressed laying hens. *Poult Sci* 2002; 81(4):458–65.
08. Naber EC. Modifying vitamin composition of eggs: a review. *J Appl Poult Res* 1993;2(4):385–393.
09. Scheideler SE, Weber P, Monsalve D. Supplemental vitamin E and selenium effects on egg production, egg quality, and egg deposition of  $\alpha$ -tocopherol and selenium. *J Appl Poult Res* 2010;19(4):354–360.
10. Kashyap P. Communication strategies for rural markets. 2nd ed. In: Kashyap P, Raut S (eds). *he rural marketing book*. Noida, UP: Dorling Kindersley; 2013: 204-205.