



Scientific backyard poultry farming: A potent tool for socio-economic stability and nutritional security in Sikkim Himalayan

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Rearing local or indigenous breeds in backyard is a traditional activity of large number of rural households, the landless, small and marginal farmers of Sikkim Himalayan. It is a low input or no input venture that provides ready cash and food. Rural/backyard poultry farming with improved chicken varieties is slowly gaining popularity as a potential tool to alleviate protein deficit and provides subsidiary income among the rural and tribal people across the country. The changing climate scenario which increases the chances of crop failure and farmers in this region mostly practicing mono cropping on terraces in such situation rearing scientific backyard poultry not only stabilise farm income but also provide nutritional security. Apart from this they can enrich their arable lands with poultry manure to boost farm production and that will strengthen the socio-economic stability of the farmers. Massive tourist inflow in this region tremendous scope to the farmers to fetch good returns from eggs and meat of backyard chicken.

Scenario of poultry in north Eastern region:

North Eastern region of India has total of eight states

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(Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura) representing 8 per cent of area and 3.9 per cent of population of the country. The region is one of the mega bio-diversity hot spot zones. The society is predominantly agrarian with around 80 per cent of them living in rural areas (Bujarbaruah and Gupta, 2005). The total poultry population of NE region is about 28.5 million of which Assam share is 55 per cent. More than 80 per cent of the poultry population of the north eastern region are indigenous fowl and are owned by the rural farmers (Rajkumar and Rao, 2014) and only smaller number of improved birds distributed mostly in peri urban area and cities owned by few farmers.

In Sikkim, more than 70 per cent people are from agricultural background and 80 per cent of them maintaining livestock of different species as a supplementary source of income (Nath *et al.*, 2012a). The state is in mission mode to achieve the target of fully organic agriculture by 2015, where the role of livestock and poultry sector will be the key in supply the organic manure. Therefore, unless the livestock growers are supported well to effectively convert the 'know-how' into 'do-how', the livestock sector shall not be playing its role efficiently. The enormous demand of poultry in the state is also due to increase flow of tourist every year (Pathak and Nath, 2013). A wide gap exists between demand and supply of poultry products. In the field of poultry development, emphasis is laid on the development of high egg laying layers, dual purpose breeds and fast growing broilers and promotion of private entrepreneurship by providing required inputs to

the producers including credit, training, processing and marketing facilities ensuring remunerative prices to the producers (Bhutia, 2012). This will not only give job opportunities to educated unemployed youth but also prevent their migration to other parts of the country along with nutritional security.

By initiating scientific backyard chicken rearing, will integrate and diversify farm production for increased household food production and income. Poultry farming has enabled farmers to make use of chicken manure to improve the soil fertility of their farms and as such will continue improving the environment through nutrient recycling. Crop harvest will also increase and improve in terms of quality and quantity.

Why scientific backyard poultry farming?:

Though this region is characterised by complex, diverse, fragile, risk prone and resource poor. Farmers usually have small land holding in the form of terraces and mostly rain fed mono cropping pattern is followed. Backyard poultry farming requires less input to start and farmers would profit adequately if they start in scientific manner as a small scale business.

Stabilize farm income and quick return:

Farmers may experience crop failure due to unfavourable weather condition under climatic variability but backyards poultry raised as small business has the capacity to stabilise farm income. Additionally it generates subsidiary income and supplies fertilizer at no extra cost. After the operations are over, nothing will be wasted will picks up the grains which would otherwise go waste. Here return is quick as laying hens start laying eggs when they are about 22-24 weeks of age and broilers get ready to be marketed for poultry meat at the age between 6 to 10 weeks.

Source of rich fertilizer:

As we know the eastern Himalayan region has largest stretch of acid soils leading to poor fertility of the land due to combination of mineral toxicity (Al and Mn) and deficiency of the essential nutrients (P, Ca, Mg, B and Mo) (Hazarika *et al.*, 2014) and addition of animal manure *viz.*, poultry, pig and cattle to acid soils can directly neutralize soil acidity and increase the soil pH appreciably (Hue and Amien, 1989). Poultry manure is an extremely rich source of nitrogen and organic materials. A laying hen produces about 220 g of fresh dropping (75% moisture) every day. The poultry dropping are higher in nitrogen, phosphorus and potassium content than cow dung. Manure also in the form of used, old, built up litter which are cleaned either early or once in a year. This litter is balanced fertilizer containing 3 per cent nitrogen, 2 per cent phosphorus, 2 per cent potash and humus.

Poultry for nutritional security:

Nutrition from egg:

Poultry farming is not only for its economic benefits but also praise worthy for its nutritive value. Malnourished resource poor farmers of this region where majority of population consumes less than the minimum requirement of the protein and calories. Which lead to protein calorie deficiency and imbalance (Mapiye and Sibanda, 2005; Miao, 2005). Egg can be an answer to this increasing problem. It is finest of all known sources of protein and is easily digestible. Egg contains almost 12 per cent protein, 11 per cent fat and 1 per cent carbohydrate. Egg protein is an excellent source of nine essential amino acid. Most of the mineral and vitamins found in the yolk of the egg.

Table 1: Percentage composition of egg

Particulars	% composition by wt
Shell	11
Albumen	58
Yolk	31

Nutrition from chicken meat:

Among the commonly edible meat broiler is the lowest in the fat content and contains more protein as well as

Table 2: Nutritional value of chicken egg and broiler meat per 100 g

Nutrient	Chicken egg whole, hard boiled	Chicken, broiler meat and skin, cooked, stewed
Energy	155 kcal	219kcal
Carbohydrates	1.12g	0.00g
Total fat	10.6g	12.56g
Saturated fat	3.3g	3.50g
Poly unsaturated fat	1.4g	4.93g
Monounsaturated fat	4.1g	2.74g
Cholesterol	373mg	78mg
Protein	12.6g	24.68g
Water	75g	63.93g
Vit. A equiv.	149µg	21IU
Thiamine (B ₁)	0.066mg	0.1mg
Riboflavin (B ₂)	0.5mg	0.1mg
Folate (B ₉)	44 µg	4 µg
Vitamin B ₁₂	1.11 µg	0.3 µg
Choline	294mg	85.3mg
Vit. E	1.03mg	0.3mg
Sodium	124mg	74mg
Potassium	126mg	256mg
Calcium	50mg	15mg
Magnesium	10mg	29mg
Phosphorus	172mg	228mg
Iron	1.2mg	1mg
Zinc	1mg	1mg

Source: USDA Nutrient data base; Wikipedia, in egg shell (12%) not included and in chicken 35% bone not included

essential amino acids as compare to other meats. The cholesterol content of the poultry meat is very low. Poultry meat is also an excellent source of minerals and vitamins. The broiler meat is best natural source of niacin.

Essentials of scientific backyard poultry farming:

Backyard poultry farming can be converted into highly profitable venture by imparting the rural people with skill for scientific rearing of backyard poultry and at the same time keeping the input cost low by using locally available environment friendly materials for shelter as well as natural food base.

Introduction of high performing birds:

In rural areas of India, chicken reared in the backyard are mostly desi type with low egg and meat production (Ghosh *et al.*, 2005) and there is need of introduction of improved dual purpose birds having capacity to lay more eggs and gain higher body weight than the local or desi birds. Few chicken varieties developed by DPR (formerly PDP) Hyderabad with their multicoloured plumage resemble the native chicken in

their feather pattern; produce more meat and eggs than the natives *e.g.* Vanaraja, Gramapriya and Srinidhi. Due to these advantages the improved varieties of birds gained wider acceptability across the country especially tribal area of North eastern region. For improving the rural poultry farming with improved birds, ICAR Sikkim Centre, Gangtok is also distributing improved chicks of Vanaraja and Gramapriya as well as hand on training to the farmers about scientific backyard poultry farming.

Shelter like deep litter type:

In Sikkim, the temperature during the daytime ranges from 15°C to 28°C, while during winter the minimum temperature is as low as 6°C to 7°C. Poultry chicks mainly die due to cold, therefore, winter management of poultry is of utmost important. So, farmers were advised to place rice husks, wooden dust etc. on the ground to form a deep litter. During the first week, the husks are covered with paper to prevent chicks from eating the husks, which can block/tear their digestive tract. Up to three four day chick feed is spread

Table 3: Economic analysis of 50 nos (20 broiler+30 layer) high yielding chicken

Particulars	Rate	Rupees
Expenditure		
Cost of chicks	Rs. 30/- per chick x 50	1500
Cost of brooder, feed and water trough etc.	Rs. 15/- per chick x 50	750
Cost of medicines	Rs. 5/- per chick x 50	250
Cost of vaccines	Rs. 3/- per chick x 50	150
Cost of electricity	Rs. 3/- per chick x 50	150
Cost of feed		
For male (20):		
Day 1 to up to 6 week	3.5kg/ chicks x Rs. 25/-per kg x20	1750
Weeks to 13 weeks	4 kg/chicken x Rs. 25/- per kg x18*	1800
For female (30)		
Day 1 to up to 6 week	3.5 kg/chicks x Rs. 25/- per kg x 30	2625
6 weeks to 72 weeks	40kg/chickenxRs.25/-per kg x 27*	27000
Miscellaneous cost	Rs. 5/ per chicks x50	250
Total expenditure		36225
Return		
Sale of male birds	2.25 kg x Rs. 180/- per kg x 18	3240
Sale of eggs	155nos/Rs. 9/ per egg x27	36450
Sale of female birds	2.5 kg x Rs. 170/- per kg x 27	11475
Sale of gunny bag	@ 10 per gunny bag 35X5	175
Poultry manure	60 gm /day/birds =100 kg X @10 Rs	1000
Gross return		52340
Total profit (B-A)		16115
Cost benefit ratio 1:1.44		

on the paper and afterwards feed can be given in new feeding troughs or in bamboo trench. A cheap source of heat for the chicks is provided through homemade heater. Shelter should be dry, rainproof and protect from predators of the birds.

Health aspect of the poultry:

Due to lack of scientific management of the chicks during the initial 4 to 5 weeks in the village conditions is the major hurdle for success of the backyard farming. The birds need to be protected against Ranikhet disease. The earlier reports also indicated that the most of the early chick mortality was due to Ranikhet disease (Bell, 1991). Protecting the chicks with inactivated vaccine is the effective way to the control the disease in rural poultry production (Bell, 1991). Realizing the importance of initial brooding and vaccination. Chicks supply for rural/backyard system should be at an age of about 4 to 6 weeks of age after protecting the chicks with Marek's and Ranikhet disease. This will increase the survivability up to 97 to 98 per cent under field conditions. In addition to prescribed vaccination schedule the farmers are also advised to practice routine deworming of the birds at every 35 to 40 d interval.

Feeding schedule:

During the process of scavenging on grass fields these birds will have an access to insects, white ants, green grass, grass seeds, waste grains etc., there by the supplemental feed requirement is much less than those reared under intensive poultry farming. Feed supplementation in the form of scratch usually given in the morning / or evening to develop habit of returning to the owner's place for laying eggs and night shelter. Depending on the availability of free range area and also the intensity of vegetative growth, the requirement of supplemental feed varies between 25 to 50 g / bird / day and for better shell quality, shell grit or marble stone chips needs to be supplemented @ 5-7 g / bird / day during laying period. Back Yard Poultry farmers can manage to prepare poultry ration by mixing following proportion:

-Cereal grains	40-60%
-Cereal; by products	20-40%
-Vegetable protein	18-22%
-Animal protein	5-8%
-Mineral supplement (for layers)	5%
-Common salt	0.5%
-Standard vitamin AB ₂ D ₃ complex.	

Breeding management:

By following simple techniques Backyard poultry farmers can improve and maintain a healthy and productive flock. The cock should be replaced annually by other good breeding bird of same breed or improved breed taken from other flock or area or other village. This policy increases production ability of the offspring as well as eliminates few inherent diseases in the

flock.

Economics:

Backyards Poultry farming with low input and scientific management practices can gives good income throughout year with employment to educated rural youth, more over the farmer start getting return very early.

The demand for organically produced egg and meat is increasing over the years. Small holder's backyard poultry production is one of the major potent resource for producing eggs and meat organically. Hence, Backyard Poultry producers can fetch premium price for their products.

Conclusion:

Scientific backyard poultry farming is viable subsidiary activity along with horticulture and aquaculture in the Sikkim Himalayan region. This sector has got immense scope for growth in North –Eastern India where most of the population are non-vegetarian and prefer to keep few birds in backyard. This venture not only provides nutritional security to the people of the region but also serves as an avenue for enhancing the income of small and marginal rural farmers. The development of backyard poultry through the application of modern science and technology will greatly contribute to improving the socio-economic condition of the poor farmers by making poultry farming more productive and remunerative. The introduction of better stock and efficient husbandry practices with well organised marketing system would give socio-economic stability as well as nutritional security to the poor and marginal farmers of the north eastern region of India.

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