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Farmers' Education on Advanced Rural Chick Production with Mini Incubator: A Sustainable Concept for Entrepreneurship Development in A&N Islands

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Abstract

The present study was to examine the opportunity of artificial hatching in rural areas for upgrading rural chicken farming into commercial level. Based on baseline survey, two concepts were devised. One is concept of collecting desi poultry hatchable eggs from community and hatching them using mini incubator. Second strategy is hatching those collected desi eggs at community based hatching unit at Livestock farm complex, ICAR-CIARI, Port Blair. These two strategies were implemented through capacity building programmes and with targeted farmers. The activities such as fumigation, setting and candling of eggs were carried out by the farmers who received hands on training on hatchery operation through capacity building programmes. A total of 481 chicks were hatched from 740 eggs in 6 batches. The incubators were operated under in-all-in-out system. The concept on ''Education of farmers on advanced rural chick production with Mini incubator'' has empowered farmers to produce and set the eggs and hatch out chicks using mini incubator. The hatchability of indigenous chicken at the core unit (CIARI) and at farmers hand was comparable. The handling skill of farmers on mini incubator was improved as their hatchability percentile that is on par with core unit. This concept has significant impact on development of farmers into entrepreneurs. Based on this study, it is concluded that the desi and native indigenous chicken farming in A&N Islands could be improved through sustainable desi chick production with mini incubator.

Keywords: mini incubator, skill development, local eggs from community,

Introduction

Livestock production is the backbone to ensure nutritional security for rural farming community of A&N Islands. The noteworthy component of livestock farming is rural poultry which is an important primary source for eggs and meat for rural farmers of these Islands. There is ever increasing demand for desi egg and its meat (Chowdhury, 2014). Further, the egg and meat of rural poultry played a significant role in these Islands in meeting out nutrient requirement during lockdown period due to COVID 19 pandemic. Desi chicken meat was sold @ Rs.500 per bird and eggs @ Rs.15 per egg. Poultry industry is one of the industries in India suffered from lockdown during COVID -19 pandemic though it is the significant contributor (3%) to the Indian GDP. Indigenous poultry plays a key role in the home economy and its increased production has the potential to improve food security, assist in poverty alleviation and mitigate the adverse economic impacts for rural people, in addition to improving the family's diet with eggs and meat (Dutta *et al*., 2013; Das *et al*., 2008). The total poultry population in A&N Islands is 11,65,363 /- out of which backyard poultry is 53.46 per cent and 68 per cent of which is desi birds. This signifies the dependency of rural farmers on backyard poultry for eggs and poultry meat.

The problems and issues related to large, medium and small scale poultry farmers who involve in broiler and layer farming are usually given importance and addressed However, the prevailing situation is completely different for rural farmers in A&N Islands that has been geographically separated and spread in various isolated packets. As with the rest of country, backyard poultry are maintained under free range condition and they are genetically less potent for egg and meat production as compared to hybrids and less number of desi chicks are being hatched out using broody hen (Bhuiyan, 2011). However, the production of desi eggs could be improved through scientific managemental practices Chowdhury

*et al. (*2006), such as low cost location specific balanced poultry feed, Herbal health care and artificial incubation of desi eggs which are highly essential now during the pandemic of COVID-19. Moreover, the national plan 2022 also underlines that backyard poultry needs fiscal intervention. However, their major constraint is non-availability of desi chicks. Natural incubation provides less numbers of chicks per year. Hatching of desi eggs using mini incubator is greatly appropriate for advanced rural poultry farming. Through this farmers can improve the number of desi chicks at less cost. Taking all these in view, this work was implemented on the existing rural poultry production system with the objective to promote the concept of ''improved rural chick production through community based collection of desi eggs'' using mini incubator which in turn facilitates availability of day old rural chicks at farmer's door steps and develops capacity for supplying day old desi chicks to other poultry farmers.

Thus, in the light of significant role of rural poultry in the livelihood and nutritional security of rural farmers of these Islands, it is the need of hour to improve the rural chicks production in a sustainable manner and thereby to support the nutritional security of rural farmers during any pandemic conditions. The only constraint for the sustainable chick production is lack of incubation technique for mass production of chicks. Hence, the present work was carried out to study the impact and sustainability of concept on collection of hatching desi eggs from community and artificial hatching them with mini incubator to increase the number of desi chicks in A&N Islands. Further the aim of the present study was to examine the opportunity of artificial hatching in rural areas for upgrading rural chicken farming into commercial level

Materials and Methods

Baseline survey was conducted in four villages Wandoor, Indiranagar. Kodiaghat and mameyo of South Andaman to quantify the availability desi chicks and knowledge on artificial hatching. A total of 40 farmers were surveyed and interviewed using survey proforma developed for this purpose. Based on the report from baseline survey, two concept/strategy were devised and implemented. One is concept of collecting desi poultry hatchable eggs from community and hatching them using mini incubator. Second strategy is hatching those collected desi eggs at community based hatching unit at Livestock farm complex, ICAR-CIARI, Port Blair. A total of 10 farmers were selected based on their involvement in the hatchery operation. Capacity building programme, hands on training and advisories was imparted to educate the farmers on how to handle the mini incubator.

Strategy was taught on collection of desi hatchable eggs from their community place/area and hatching them using the common hatching facility at the farm complex. Farmers who were affordable were guided to establish their own mini hatching unit. Rest of the farmers, the hatching eggs of indigenous poultry were set under setting conditions for 21 days and later shifted to hatching conditions. During the incubation period, the temperature was around 99-1020F and 97-980 F for the setting and hatching period respectively. The humidity was 65-72% and 75-80% during the setting and hatching period respectively as stated by Singh. R, A. (2001). Turning and candling were performed during incubation. After hatching, chick pull-outs were practiced. The total number of eggs set, percentage of live chicks hatched based on total eggs set and infertile eggs was recorded. Hatchability was calculated on fertile egg basis using following formula:

$$\text{Hatchability \%} = \frac{\text{Total number of chicks hatched}}{\text{Total number of fertile eggs}} \times 100$$

The data was collected from the beneficiaries through semi structured interview schedule and the information was statistically analyzed as per the methods of Snedecor and Cochran (1994).

Results and Discussion

Base line survey: The results (Table 1) revealed that major source of poultry were from rural poultry farming for both eggs and meat. However, shortage of chicks on routine basis was the major hurdle.

Table 1: Base line survey on duck farming of selected beneficiaries in South Andaman

1.	Average Land holding	20-30 Bigha
2.	Type of birds	Desi birds, nicobari fowl, vanaraja birds and local ducks
3.	Average size of family	4 numbers.
4.	Education status	VIII – XII
5.	Average no of hatchings per year	3
6.	Male Female Ratio	1:5 (1 to 15)
7.	Average Egg production %	50 to 60 eggs / hen / year
8.	Hatchability %	40 - 70% natural hatching using broody hen
9.	Feeding to duck	Rice & Wheat only
10.	Feeding and watering management	No knowledge on protein feeding.
11.	Brooding	Natural brooding
12.	Housing	Crude type / no housing
13.	Mortality	Severe mortality by outbreak of diseases 2-3 times in a year
14.	Utilization pattern of eggs	Hatching/household consumption/few eggs are sold
15	Income from duck	less
16	Major constrains	Unavailability of chicks for small scale rural poultry production

Self sustainable resource for chicks

The activities such as fumigation, setting and candling of eggs were carried out by the farmers who received hands on training on hatchery operation through capacity building programmes. A total of 481 chicks were hatched from 740 eggs in 6 batches. The incubators were operated under in-all-in-out system. Eggs were marked with farmers name before setting. The mean of fertility and hatchability are given in Table 2.

Table 2: Hatching performance of rural chicken eggs at core unit

Parameter	Mean ± S.E
Fertility percent	77.54 ± 2.56
Hatchability percent	65.47 ± 1.68

Entrepreneurship development

The concept on ''Education of farmers on advanced rural chick production with Mini incubator'' has empowered farmers to produce and set the eggs and hatch out chicks using mini incubator. The hatchability of indigenous chicken at the core unit (CIARI) and at farmers hand was comparable. The handling skill of farmers on mini incubator was improved which is justified by improvement in the hatchability percentile that is on par with core unit. This concept has significant impact on development of farmers into entrepreneurs. A total of 5 farmers have installed their own mini incubator and have their own source for the chicks (Table 3).

Table 3: Impact of concept on 'Education of farmers on advanced rural chick production with Mini incubator

Entrepreneurship development by the concept on '**Education of farmers on advanced rural chick production with Mini incubator'**				
Sl. No.	**Farmers**	**Before mini incubator**	**After mini incubator**	**Increase in availability of rural chicks**
	Unit size of farm (number of poultry)	25 – 50	80- 100	2 to 3 times
	source of chicks	Govt. poultry farm @ Rs.30/ chick	own	
	Hatchability %		245/336 = 73.21	

In artificial incubation system the average fertility and hatchability of indigenous chicken eggs were 77.54% and 65.47%, respectively. Hatchability of indigenous chicken has ranged (65-75%) with mini incubator which is in range of the present study (Msoffe *et al.,* 2004; Sonaiya and Swan, 2004; Rota *et al.,* 2010)). The hatchability found by Kalita *et al.* (2009) in Assam (70 - 81 %) and Portas *et al.* (2010) in Kenya (45 to 100 %, with mean hatchability of 81.5 %), Kirunda and Muwereza, (2011) in Uganda were also similar in present study. However, the the present study had lower fertility and hatchability as compared to Rahman *et al.* (2013) who recorded 96.33% and 91.35% fertility and hatchability. The respective fertility and hatchability for incubator hatched hilly, naked neck and non descript desi chickens were 92.59, 89.87, 94.39% and 79.81, 64.85, 86.38% (Faruque *et al.,* 2013) and Khatun *et al.* (2005) who recorded 88.09 to 94.86% fertility and 78.33 to 90.79% hatchability for non descript desi, hilly and naked neck poultry. The present hatchability was higher than Patrick *et al.* (2014) who observed hatchability rates of 51.58, 50.26 and 40.56% for Normal, Naked Neck and Dwarf strain. The fertility of the study although was lower, the hatchability was higher than Ahmad *et al.* (2013) whose fertility and hatchability on fertile egg basis were 77% and 34.70% respectively however the present fertility is higher than Faruque *et al.* (2011) (46.69%) in Hilly chickens. The fertility and hatchability of rural chicken eggs at farmers hand with mini incubator are relatively comparable to Islam and Nishibori (2009) who found 71.5-92.7% fertility and 52.4-87.0% hatchability for naturally hatched indigenous chicken. Present result of farmers operation of mini incubator is higher than natural hatching to Wilson (2010) where it was recorded 55% fertility and 75% hatchability of desi chicken. The fertility and hatchability of the study were lower than the natural hatching of other indigenous chicken such as the hatchability (%) of Naked Neck and Full feathered was 87.40% and 86.98% (Ahmed *et al.,* 2012), 85%-89% (Sumy, 2010), 80%-92% (Dunya *et al.*, 2014), 82.6% (Sankhyan *et al.,* 2013). However, present results were also lower than Bhuiyan et al. (2005) where fertility and hatchability of natural hatching was 83.0 and 87.0%. The variations in results of fertility and hatchability of indigenous chicken in the present study might be due to the cock in the area, egg storage time and condition before incubation and management system during incubation etc. The mean mortality during hatching period of 18-21 days with rural chicken egg was 21.65 % which is higher than Desha and Bhuiyan (2018).

Based on this study, it is concluded that the desi and native indigenous chicken farming in A&N Islands could be improved through sustainable desi chick production with mini incubator. Conservation of native/desi poultry germplasm could be strengthened through application of concept of education of farmers on advanced rural chick production with mini incubator in rural poultry production system among both rural farmers and tribal farming community of A&N Islands to sustain the socio-religious use of native poultry breeds and their superior adaptability in their habitat. Sustainable chick production with mini incubator is the future strategy for the production improvement of rural poultry and their conservation on community basis.

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