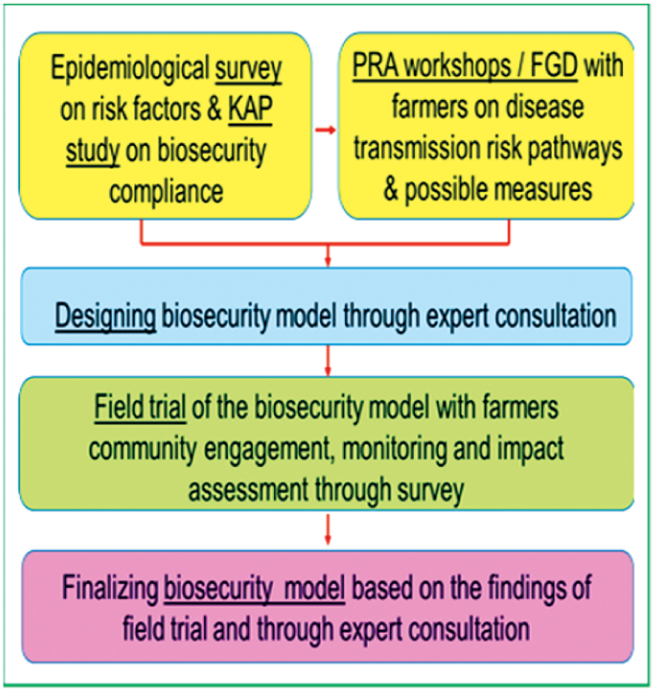
TECHNICAL BULLETIN

No. 19,2021

Prevention of Infectious Diseases of Poultry: Community Engagement in Biosecurity

Poultry is an important means of livelihood and a substantial contributor to food and nutrition security for the Bangladeshi populace. The present per capita annual consumption of broiler meat in Bangladesh is 6.3 kg which constitutes about 40% of the total meat consumption. In addition, the development of commercial poultry farming has generated considerable employment in the country. Currently, 16 grandparent farms belonging to 8 companies and 206 small and large scale breeder farms are producing around 10 million one day old chicks per week. About 65,000 to 70,000 commercial farms produce around 33 million table eggs daily. Unfortunately, outbreaks of different infectious diseases have been a major constraint on the growth of the poultry industry in Bangladesh. In modern poultry industry, biosecurity comprises the most important preventive measure against infectious diseases. Participatory programs with the engagement of farmer-entrepreneur communities in the development and implementation of biosecurity measures can be effective, long lasting and self-sustaining. The present project aimed at the development of a model of biosecurity with community engagement based on epidemiological risk analysis working with 25 participants (20 layer farms and 5 traders) each from the Bhaluka and Sakhipur upazilas of Mymensingh district. The study involved an epidemiological survey on the risk factors, knowledge, attitude and practice (KAP) study on biosecurity, PRA/FGD workshops and expert consultations for mapping disease transmission risk pathways for the development of a community engaged biosecurity (CEB) model and its field trial and impact assessment.



Systematic steps in CEB development

KRISHI GOBESHONA FOUNDATION
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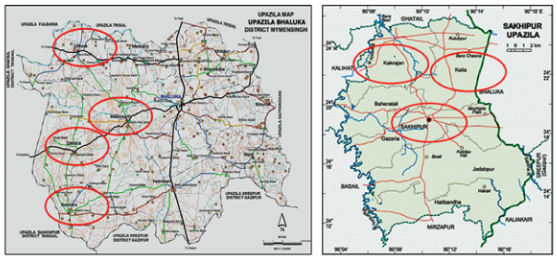
Results and Outputs

Biosecurity model for poultry

Based on farmers' inputs in FGDs, field surveys and recommendations of the expert workshop, a model of biosecurity for small and medium scale layer farms was designed that included 20 essential and practicable measures, 10 at the conceptual and structural level and 10 at the operational level. Hence the model was named as "10 + 10 Biosecurity" with the following features.



Selected study areas in Bhaluka and Sakhipur upazilas of Mymensingh

Conceptual and structural biosecurity

1. No free-range chickens, ducks or pigeons in the same household
2. Farm to be located at least 25 m away from a road, 100 m away from a residential house or a neighboring farm and 200 m away from a market place
3. Fencing (with gate) around the farm; wire-net fence should be on a 0.5-1.0 m high brick wall base
4. Minimum 15 m buffer zone between the gate and the shed
5. East-west direction of sheds and cages
6. 12 m spacing between two parallel sheds
7. 1 m overhang of the roof
8. Rodent and bird proof shed
9. Hand wash facility at the gate of each shed
10. Separate rodent-proof feed store room; in addition, there should be isolation shed for sick birds, compost pits or burial grounds for dead birds.

Operational biosecurity

1. "No Admittance" sign at the gate and maintenance of a register for visitors
2. Vehicle (including vans) parking outside the farm gate
3. Dedicated clothing and footwear for each shed
4. Hand and foot washing practices on entry to and exit from the shed
5. Regular cleaning of sheds and surroundings
6. Daily cleaning of waterer and feeder
7. Cleaning and disinfection of egg trays after use
8. Daily cleaning of floor (in case of cage system) and disposal of litter to a compost site or a biogas plant
9. Routine rodent control
10. Quick isolation of sick birds and disposal of carcass to a compost pit or burial.

Trial of the 10 + 10 biosecurity model

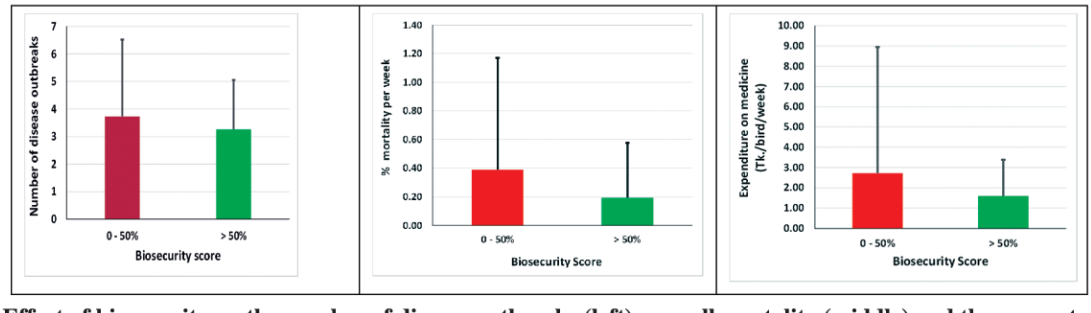
The biosecurity model was communicated to the farmers in the study areas through field-level training programs conducted by trained lead farmers. Remarkable improvements were noticed in the adoption of operational biosecurity practices. The areas of notable improvement were (a) use of separate shoes (and clothing) for sheds, (b) washing hands and feet at entry and exit, (c) regular cleaning of shed surroundings, (d) daily cleaning of feeders and waterers, (e) cleaning and decontaminating of egg trays after use, (f) regular rodent control, and (g) quick separation

of sick birds. However, no significant change occurred in terms of conceptual and structural biosecurity. The relative unwillingness of the farmers to improve conceptual and structural biosecurity was probably due to cost involvement and they were not sure if this extra investment would bring about any economic benefits. Moreover, an unexpected fall in the price of eggs also discouraged the farmers to invest further.

Disease surveillance

A total of 194 outbreaks were observed during the study period. Respiratory infections constituted 50.52% of the outbreaks and the rest included infectious bursal disease (10.82%), Marek's disease (3.61%), avian leucosis (1.03%), fowl pox (2.06%), egg drop syndrome (EDS-76) (1.03%), salmonellosis (fowl typhoid) (14.95%), fowl cholera (3.09%), necrotic enteritis (0.52%), coccidiosis (1.03%), mycotoxicosis (7.73%), visceral gout (0.52%) and fatty liver syndrome (2.58%). A total of 88 cases of respiratory infection were analyzed in the laboratory by qPCR and conventional PCR to identify the causal agents. Infectious Laryngotrachieitis Virus was detected in 14 cases, and Avian Influenza Virus and Newcastle Disease Virus in 5 cases each, *Avibacterium paragallinarum* in 2, and Infectious Bronchitis Virus and *Mycoplasma gallisepticum* in 1 case each as single infections, Mixed infections with 2-4 pathogens in various combinations were detected in 43 cases; 15 cases did not yield any of the tested pathogens. Among the 41 Avian Influenza Virus positive cases, 21 were H5, 6 were H9 and 14 were non-H5-H9 AIV.

The average mortality was remarkably less in farms with good biosecurity (0.19 + 0.38% per week) compared with that in farms with poor biosecurity (0.39 + 0.78% per week). Moreover, the farms with good biosecurity spent less money for prophylactic treatment (Tk. 1.60 + 1.78 per bird per week) than that spent in farms with poor biosecurity (Tk. 2.72 + 6.22).



Effect of biosecurity on the number of disease outbreaks (left), overall mortality (middle) and the amount of money spent for prophylactic treatment (right)

Benefits and Outcomes

- A biosecurity model for small and medium-scale commercial layer farms with essential and practicable interventions is available
- Enlightened and trained farmers with knowledge of biosecurity in poultry farms in the study area
- A complete picture of the prevailing disease situation of layer farms is available
- Lessons learned for future biosecurity intervention programs.

Expected Impacts

Improvement of biosecurity in commercial layer farms will help reduce disease and mortality and improve productivity. The biosecurity model developed in the study will help policy

makers in formulating and implementing policies regarding hygienic rearing of poultry. Proper implementation of biosecurity measures will help prevent pollution of the environment through poultry waste management.

Recommendations

- The "10 + 10 Biosecurity Model" should be implemented in layer farms across the country.
- Government agencies and NGOs should take the responsibility of disseminating and promoting this biosecurity model among farmers.
- Demo model farms should be established to encourage the adoption of biosecurity measures.
- Farmers should be provided with financial support (subsidy or soft loan) to hasten the adoption of conceptual and structural biosecurity measures that require investment.

This technical bulletin has been prepared on the basis of technical information available from a completed CGP project of KGF, the details of which are given below:

Project Code and Title: TF 19 - EM/15. Community engagement in biosecurity (CEB) for the prevention of infectious diseases of poultry based on epidemiological risk analysis

Principal Investigator: Prof. Dr. Md. Rafiqul Islam, Department of Pathology, Faculty of Veterinary Science, BAU, Mymensingh

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