Livestock production is a major component of Bangladesh and goes well beyond direct food production. Sales of livestock and their products provide direct cash income to farmers. It is considered the living bank of farmers and has a critical role in the agricultural intensification process through provision of draught power, manure for fertilizer and fuel. Bangladesh is one of the most densely populated countries in the world with a high population growth rate. This huge population requires more meat and milk to meet up the need for protein requirement. In the national policy of the country, special importance has been launched for the development of dairy and meat production to fulfill the protein shortage of the country. However, disease control is the main constraint for the development of livestock sector. Among the diseases, foot and mouth disease (FMD) is one of the most threatening diseases to animal health seriously affecting economic and nutritional status of the rural population in Bangladesh. The disease severely impacts the productivity of small scale dairy farming, recently emerging as a promising economic sector. The disease also drastically reduces milk production and impoverishes poor farmers' diet. FMD also significantly reduces the value of cattle, one of the few sources of cash income available to cope with the emergency. The disease not only adversely affects the international trade in animals and animal products, but also has a potential major negative impact in ensuring global food security and alleviation of poverty. Effective prevention, control and eradication program of FMD can only help in saving our livestock population from the malady and would provide positive impact on international trade of its products. The present guidelines in the form of a brief proposal is aimed at developing surveillance and epidemiological network, virus identification lab, type specific FMD vaccines and vaccination, post vaccination sero-survey, animal movement control and contingency plan for the effective control of FMD in Bangladesh.

**FMD different from other viral diseases**

Foot and mouth disease is different from other viral diseases in several ways. Multiplicity of viral serotypes and infections to wide host ranges such as cattle, buffaloes, sheep, goats, deer, pigs and numerous wild animals. Therefore, immunity against one type cannot protect the other type of the agent. Out of 7 serotypes of FMDV, 3 are currently prevalent in Bangladesh: O, A and Asia 1 where serotype-O accounts for about 85% of the outbreaks followed by types A and Asia1. Types A and Asia 1 accounted for nearly 8% and 7% of the outbreaks, respectively (recent results). FMD is considered as a political disease in countries where the disease has not been controlled since international relationship in terms of trades with animal products and by-products is difficult to maintain. Therefore, for its prevention, control and eradication needs holistic approach.

**Project framework for the progressive control of FMD**

**Impact:**
The overall objective of the project is to control of FMD for the reduction of economic losses and consequently protection of animal health, improvement of milk and meat production in Bangladesh.

**Specific Objectives:**
1. Establishment of diagnosis, surveillance and epidemiology network system
2. Production of FMD vaccines and vaccination
3. Animal movement management and restriction of animal products from FMD prevalent countries
4. Emergency preparedness and contingency planning
5. Public awareness, communication and regional cooperation

**1. Establishment of diagnosis, surveillance and epidemiology network system**

Sound diagnostic, surveillance and epidemiology network system are the key tools to provide overall FMD control strategy. Bangladesh being an endemic country for FMD needs rapid detection, regular surveillance to strengthen epidemiology network system.
Output: Establishment of an updated FMD diagnostic laboratory

Activities:
- a) Setting up of FMD virus typing facilities using ELISA and PCR at suitable places in Bangladesh from where well communication network could be monitored.
- b) Regular surveillance for the determination of FMD status in different districts of the country.
- c) Establishment of epidemiological network to provide necessary technical inputs for policy making decision.
- d) Conducting training programs to support capacity building for appropriate sampling, sample shipment, test protocols and detection of FMD viruses.
- e) Writing of a laboratory manual that will cover field sampling, sample processing, test procedures, handling and use of lab equipment and overall quality assurance.

2. Production of FMD vaccines and vaccination

Output: FMD control

Activities:
- a) Production of FMD vaccines using fermentation technology.
- b) Technical and scientific support for strategic vaccination in high risk areas, ring vaccination and progressive zoning based on the outcome of surveillance and epidemiological pattern.
- c) Monitoring of vaccine quality and vaccination in the field by conducting serosurveillance (including NSP) and duration of immunity.
- d) Development of guidelines/field manual for strategic vaccination, ring vaccination, zoning and vaccine vaccination monitoring.

3. Animal movement management and restriction of animal products from FMD prevalent countries

Output: Prevention of FMD transmission

Activities:
- a) Implementation of animal quarantine act for the prevention of illegal movement of animals.
- b) Enforcement of quarantine law at air, land and sea port.
- c) Free vaccination for animals in bordering areas.
- d) Marking of FMD vaccinated animals using ear tag.
- e) Stop purchasing of animals and animal products from countries where FMD is prevalent.
- f) Development of guidelines in the light of Quarantine Act that covers strategy for effective control of animal movement, restriction of FMD infected animal marketing and strengthening of the activity of quarantine spots identified by DLS.

4. Emergency preparedness and contingency planning

Output: Rapid prevention and control of FMD outbreaks

Activities:
- a) Prompt identification of virus samples collected from outbreaks.
- b) Emergency vaccination, ring vaccination and progressive zoning in outbreaks areas.
- c) Prevent spreading of the disease through movement control, stamping out (if permitted) and disinfection.
- d) Writing of a contingency plan on the prevention of disease and emergency preparedness.

Fig. Typical sign in the hooves
Fig. Typical sign on tongue epithelium
Fig. Vaccination against FMD
5. Public awareness, communication and regional cooperation

Output: To make success of FMD control program

Activities:

a) Using all forms of media to create public awareness of FMD outbreaks.
b) Targeted communication to wide range of stakeholders in public and private sectors.
c) Development of a mechanism of communication with the neighboring counties at appropriate level to address the FMD control issue for cooperation.
d) Seminars, workshops with targeted groups to make the program successful.

Discussion

Rapid identification of FMD virus with recommended techniques like ELISA, PCR etc. must be performed within shortest possible time after receiving virus samples from FMD outbreaks. Accordingly, type specific vaccination should be performed in the form of ring vaccination and/or progressive strategic vaccination considering the prevailing conditions. It is well established that to implement this prerequisite, strong epidemiological network throughout the country should be well established. Traditional vaccine production cannot meet the present requirement (approximately 40 million doses) of vaccines in Bangladesh considering number of livestock population. Without using fermentation technology for the production of vaccine, the present requirement is difficult to be fulfilled. It should keep in mind that vaccination is not the only way to prevent FMD. Besides, the updated Animal Act Law is to be implemented carefully to prevent animal movement, management and restriction of animal products. In the context fundamental cooperation must be established with the neighboring countries especially restriction of animal movement, animal products and by-products through country-border areas. Prompt action in the case of emergency is prerequisite to control any infectious disease. Using epidemiological network, the system might be streamlined. Awareness through mass media and communication undoubtedly would play a vital role in all cases of all implementation strategies.

Conclusion

The proposed program for progressive control of FMD in Bangladesh is a brief guideline for cumulative approach. Comprehensive approach if undertaken as per following the guidelines would certainly help in prevention, control and eradication of FMD in Bangladesh. Vaccine production with fermentation technology would meet up the need of required effective vaccines in the country. It has been proved in many countries those were endemic of FMD, later on declared by OIE as sporadic or partially free or completely FMD free countries. However, it needs sincere and honest approach, stable plan, skilled manpower and overall political commitment.

References

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Author and Correspondence

Dr. M. Mostafizur Rahman
Professor
Deptt. of Medical Microbiology and Immunology
Faculty of Medicine, UKM, Cheras-56000
Kuala Lumpur, Malaysia
mnr@ppukm.ukm.my