

Chapter 5

Animal Disease Control and Response

DLD works to prevent, control and eradicate both exotic and endemic notifiable diseases, to minimise the economic impact of such diseases, and to guarantee the safety of the food chain. DLD works with stakeholders to drive down risks related to animal health. During 2011, animal health issues continued to play an important role in maintaining a sustainable food and farming industry and in protecting public health. DLD staff worked hard to understand and meet the needs of our stakeholders around Thailand – both in managing outbreaks and in our wide range of other activities. DLD continued efforts to prevent, prepare for and manage outbreaks of exotic diseases. We successfully control an outbreak of H5N1 Highly Pathogenic Avian Influenza (HPAI) in Thailand since November 2008. Controlling endemic diseases continued to consume a large proportion of our resources during the year, in particular Brucellosis, Bovine TB (bTB), and Paratuberculosis. We significantly increased our level of surveillance by testing cattle, buffaloes, goats, and sheep during 2011. By DLD's efforts, several control and surveillance programs for poultry diseases especially Avian Influenza and Newcastle were implemented to ensure early detection, early warning, and early response.

DLD conducts regulatory oversight for the importation of millions of head of livestock including cattle, swine, horses, live poultry, hatching eggs, and commercial birds. DLD also conducts regulatory oversight for germplasm imports. DLD recognizes that animal health risks associated with the importation of animals and animal products may be tied to climatic, geographical, and biological factors that are not always defined by national boundaries. This approach is consistent with Thailand obligations under international trade agreements. Animal health emergencies have a major impact on the Nation's animal and public health, food safety, economy, and export markets. Animal health emergencies can include exotic animal disease and emerging infectious diseases (EID) incursions and natural disasters.

DLD by the Bureau of Disease Control and Veterinary Services (BDCVS) is the lead agency that is responsible for preventing or mitigating animal diseases in Thailand. All activities have been undertaken in cooperation with District Livestock Offices, Provincial Livestock Offices and Regional Livestock Offices in support of NIAH and regional veterinary laboratories. BDCVS leads the effort in preparing for and responding effectively to animal disease-related national emergencies. BDCVS develops strategies and policies for effective incident management and coordination of incident responses. During an emergency, BDCVS is responsible for deploying critical veterinary supplies and personal protective equipment to responders within 24 hours. Figure 5-1 shows the organization chart of BDCVS. BDCVS's strategic approach aligns tactics with the four components:

- preparedness and communication,
- surveillance and detection,
- response and containment, and
- recovery, compensation, and continuity of business for animal industries.

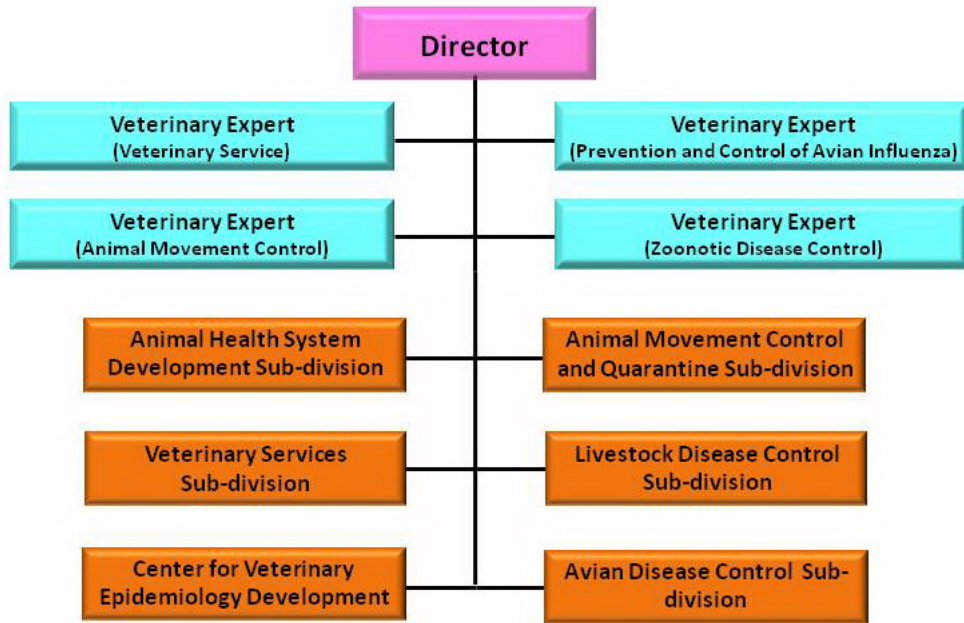


Figure 5-1. Organization chart of Bureau of Disease Control and Veterinary Services

BDCVS creates and facilitates partnerships among Regional Livestock Office, Provincial Livestock Offices, District Livestock Offices, veterinary laboratories, and all levels of government agencies to continually improve the approach to emergency management. Figure 5-2 presents the mechanism of emergency animal disease control operation.

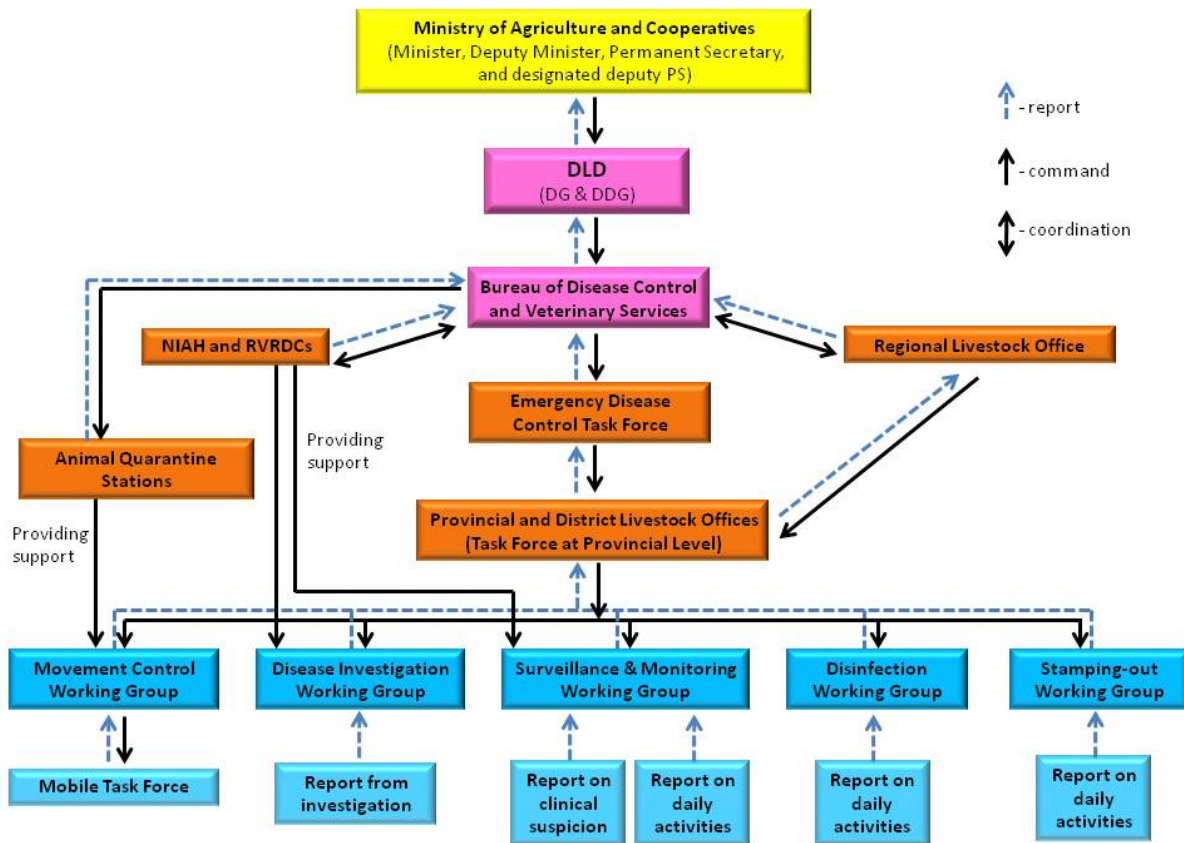


Figure 5-2. Emergency Animal Disease Control Operation

Animal Disease Prevention and Control

Disease prevention and immunization

DLD produces vaccines and provides vaccination campaign for farmers who keep livestock and poultry as follows.

Cattle vaccines - Monovalent Foot and mouth disease, Trivalent FMD (Type A, O & Asia I), Haemorrhagic septicaemia, Anthrax, Blackleg & Brucellosis (Strain 19 for young female cattle)

Pig vaccines - Trivalent FMD (Type A, O & Asia I) and Classical swine fever

Poultry vaccines - inactivated & live attenuated Newcastle disease (Lasota strain), inactivated & live attenuated Gumboro disease, Fowl pox, Fowl cholera, Duck plague and Infectious Bronchitis.

In addition, DLD launches an Annual Rabies Vaccination Campaign. The campaign provides rabies vaccination for dogs and cats on a regular basis during March and April. Castration or sterilization for population control in dog and cat are also conducted. DLD also established shelters for stray dogs. Table 5-1 and 5-2 show the number of routine vaccination programs in Thailand from October 2010 to September 2011 provided by DLD.

Table 5-1. Number of vaccines for cattle and pigs provided and sold by DLD from October 2010 to September 2011

FMD vaccine	Region 1	Region 2	Region 3	Region 4	Region 5	Region 6	Region 7	Region 8	Region 9	Total
FMD cattle	1,048,800	948,000	3,678,000	2,338,200	417,300	743,400	717,150	118,400	240,000	10,249,250
FMD Pig	2,443,125	4,229,475	1,574,025	956,325	1,396,800	1,310,625	6,199,950	533,550	642,600	19,286,475
HS*	41,040	60,690	460,140	366,480	90,510	59,160	8,460	6,510	7,530	1,100,520
Black leg	-	-	300	34,000	108,000	119,600	-	-	-	261,900
Brucellosis	14,000	14,000	61,000	40,000	10,000	30,000	14,000	10,000	2,000	195,000
CSF**	331,300	1,011,750	1,048,800	435,900	474,350	617,440	1,984,550	293,970	353,200	6,551,260

Remark: *Hemorrhagic septicaemia, ** Classical swine fever

Number of vaccines was not included vaccination programs administered by commercial farms.

Only number of vaccines provided or sold by DLD was presented in the above table.

Table 5-2. Number of vaccines for cattle and pigs provided by DLD from October 2010 to September 2011

Poultry vaccine	Region 1	Region 2	Region 3	Region 4	Region 5	Region 6	Region 7	Region 8	Region 9	Total
Newcastle disease & IB	1,304,323	1,164,003	2,356,494	2,903,118	3,870,227	1,802,959	1,550,905	1,774,457	300,176	17,026,662
Fowl cholera	1,163,840	645,661	2,673,421	2,823,247	3,115,737	1,853,575	939,822	999,562	239,007	14,453,872
Fowl pox	444,114	294,738	849,309	1,083,652	1,147,861	499,251	331,719	387,258	55,800	5,093,702

Remark: Number of vaccines was not included vaccination programs administered by commercial farms. Only number of vaccines provided by DLD was presented in the above table.

Various vaccine produced by DLD

Several bacterial and viral vaccines are locally produced by DLD's Bureau of Veterinary Biologics such as *Poultry vaccines*: Newcastle disease Lasota strain (ND), Infectious bronchitis (IB), Fowl cholera, Fowl pox, Duck plague; *Cattle vaccines*: Foot and mouth disease (FMD), Haemorrhagic septicaemia (HS), Brucellosis strain 19, Anthrax, Blackleg; *Swine vaccine*: FMD, Classical swine fever (CSF). Some diagnostic reagents such as Rose-Bengal Brucella antigen, Plate-agglutination, Tube-agglutination Brucella antigen and Pullorum antigen are also produced for laboratory diagnosis and surveillance activities (Table 5-3). Production of vaccines and reagents are based on OIE Manual of Diagnostic Tests and Vaccines for Terrestrial Animals. The following tables present quantity of vaccines and reagents locally produced in Thailand by DLD laboratories.

Table 5-3. Number of vaccines and antigens produced by DLD in 2011

Vaccine	Quantity (doses)
1. For Cattle	
1.1 Foot and Mouth Disease vaccine for cattle (Type O, A, Asia 1 Aqueous)	12,460,720
1.6 Haemorrhagic Septicaemia vaccine	2,747,880
1.7 Anthrax spore vaccine	16,500
1.8 Blackleg vaccine	127,080
1.9 Brucellosis vaccine	26,935
2. For Pig	
2.1 Foot and Mouth Disease vaccine for pig (Type O, A, Asia 1 Oil Emulsion)	18,528,450
2.2 Classical Swine Fever vaccine	6,614,970
3. For Poultry	
3.1 Live Newcastle Disease vaccine, Lasota Strain	44,750,800
3.2 Combined Newcastle Disease vaccine, Lasota Strain and Infectious Bronchitis vaccine	5,119,500
3.3 Fowl Pox vaccine	15,792,800
3.4 Infectious Bronchitis vaccine	30,507,800
3.5 Fowl Cholera vaccine	23,440,800
3.6 Duck Plague Vaccine	30,784,400
Diagnostic Antigen	Quantity (ml)
1. Pullorum Antigen	11,920
2. <i>Brucella abortus</i> Plate Agglutination Antigen	9,780
3. <i>Brucella abortus</i> Tube Agglutination Antigen	4,110
4. <i>Brucella abortus</i> Rose Bengal Plate Agglutination Antigen	9,830

Cleaning and disinfection programs

With respect to Highly Pathogenic Avian Influenza (HPAI) H5N1, free-ranging poultry, wild birds and live-bird markets (LBMs) have been identified as potential risk factors. Poor biosecurity enables the spread of HPAI through the numerous marketing chains and animal movement activities. The spread of HPAI is not only caused by bird to bird transmission but also by environmental cross-contamination. DLD and local authorities have been implementing cleaning and disinfection programs to reduce cross-contamination from birds to the environment and visa versa. Cleaning and disinfection of poultry houses, LBMs and high-risk areas not only reduces the spread of HPAI but also has a significant impact on people's attitude towards general hygiene and food safety (Figure 5-3).



Figure 5-3: Cleaning and disinfection campaign in poultry farms

Outbreak response

Apart from national notifiable diseases listed, there is animal disease notification system established, from an owner or a farmer in a village to DLD authority, in the line of command, up to the headquarters. Once the disease is suspected or outbreak reported, the local DLD authority has to conduct outbreak investigation as immediately as possible. The relevant investigative information will confirm appropriate intervention measures in order to eliminate the disease at source. When an outbreak occurs, control measures will be undertaken immediately to stop spread of the disease, comprised of:

- Movement control in the infected area (Figure 5-4) and/or within 10 km radius,
- Quarantine the infected premises and surrounding risk areas,
- Outbreak investigation and tracing backward to identify the source of origin (Figure 5-5),
- Stamping-out or depopulation,
- Compensation at 75% of the local market price
- Disinfection of houses, vehicles, farm equipment and materials in the infected premises,
- Disposal of carcasses, their products and infected materials (e.g. feedstuff, waste, manure, bedding, etc) (Figure 5-3),
- Ring vaccination practice for major livestock disease,
- Active surveillance during the outbreak (Figure 5-6)
- Routine monitoring prior to movement permission
- Biosecurity enhancement in all types of management
- Public awareness and farmer education
- National cooperation to all authorities concerned
- International Coordination (OIE, trading partners etc.)



Figure 5-4. Activities at animal movement checkpoints



Figure 5-5. Disease investigation carried out by DLD veterinarians



Figure 5-6: Sample collection

Public awareness and education

To achieve the rapid report and response to effectively control and eradicate exotic diseases, it is necessary to aim at awareness and understanding of the importance of such diseases. A public relation program and training including audio-visual materials/media are included in the program to improve the awareness not only of general public but also of related authorities (Figure 5-7).



Figure 5-7. Materials for public awareness

Application of Poultry Compartmentalisation in Thailand

In 2005, the World Organization of Animal Health (OIE) has developed the concept of compartmentalisation to allow managing specific disease and pathogen without unnecessarily disrupting trade. It means one or more establishments being under a common biosecurity management system and containing an animal subpopulation with a distinct health status, as defined by the Veterinary Services of an exporting country, for which required surveillance, control and biosecurity measures have been applied for the purpose of international trade. The DLD, as the National Veterinary Authority of Thailand, has considered that application of compartmentalisation to poultry farms can contribute not only to the control, prevention and eradication of AI in Thailand but also to safeguard the international poultry meat trade. DLD, therefore, has adopted the principles of compartmentalisation into its AI control policy. Furthermore, the concept of compartmentalisation could be appropriate to the Thai commercial poultry farms as most of the commercial poultry enterprises are vertically integrated system and those farms are located in several regions of Thailand.

DLD has implemented the NAI free compartmentalisation in commercial poultry farming industry in order to improve the farm biosecurity system to the same standards as well as to maintain AI free status of such farms. Poultry compartment will result in poultry meat trade facilitation and safety of consumers. Meanwhile, most of Thai commercial broiler farms and meat-typed duck farms have been constituted as compartment whereby their biosecurity management and disease surveillance protocol to confirm the AI free without vaccination compartment have been approved by the DLD.

Thailand is a pilot country who applied the OIE compartmentalisation concept. Since January 24, 2011 the DLD has expanded the scope of compartmentalisation covered the whole chain of poultry processing industrial such as poultry farms (broiler farms and meat-typed duck farms), poultry breeding farm (chicken and duck), hatchery, feedmill and slaughterhouse. A map showing farm locations of poultry compartmentalisation is illustrated in Figure 5.8.

The major objectives of this program are to prevent and control an avian influenza; to strengthen the biosecurity in poultry farms and maintain NAI free status, to reduce the risk of NAI reoccurrence in poultry farms while improving the overall health status on farm, and to facilitate international trade of fresh poultry meat. A conceptual pathway of poultry compartmentalisation applied in Thailand is shown in Figure 5.9.

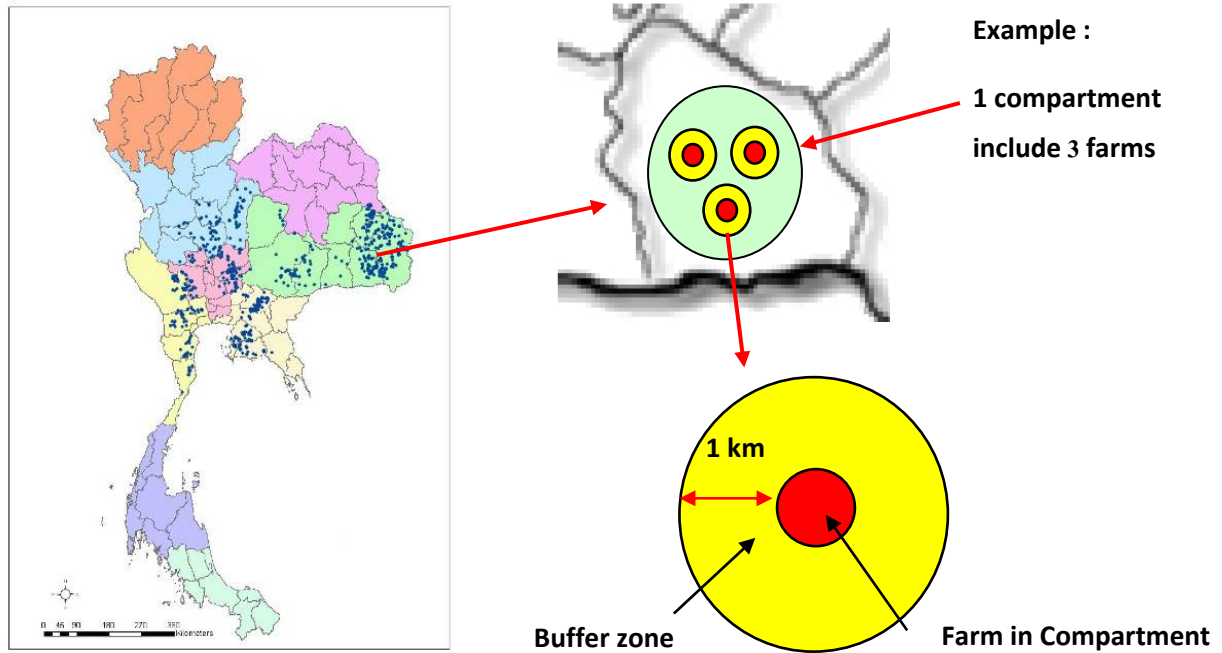


Figure 5.8. Concept of poultry compartmentalisation applied in Thailand and locations of poultry compartments

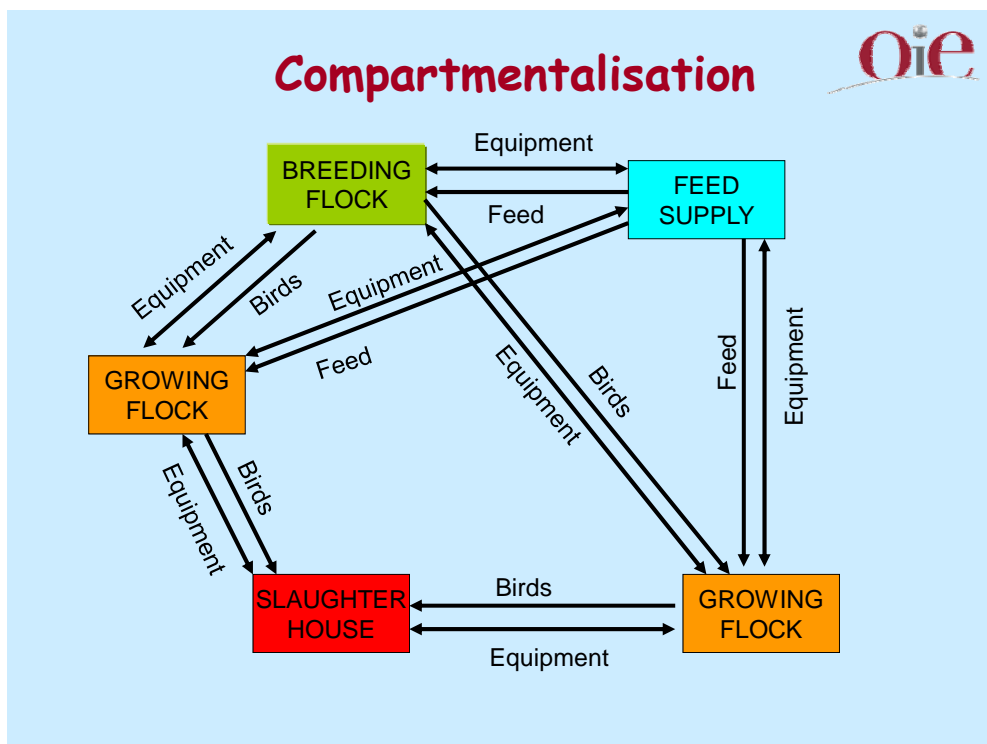


Figure 5-9. A conceptual pathway of poultry compartmentalisation applied in Thailand

Establishing Foot and Mouth Disease (FMD) free zone in eastern Thailand

DLD has attempted over the years in order to establish a FMD free zone in Region 2, the eastern part of Thailand (Figure 5.10), to comply with OIE international animal health codes. FMD surveillance in Region 2 has been conducted with 3 objectives:

- 1) Strengthening FMD early detection,
- 2) Assessing protective immunity through the titer analysis of FMD vaccination, and
- 3) Evaluating the FMD status.

Geographic Information System (GIS) has been used to identify locations of villages and farms. Additionally, the standardized questionnaires are used to interview farmers on their attitude, knowledge about FMD and their behaviors in disease prevention and control. All documents were returned BDCVS for further analysis for determine the basic knowledge in FMD and possible risk factor may be introduced into their farms.

In passive surveillance, all farmers are obligated by law to notify to veterinary authority of their sick or clinical signs of FMD. Any suspicions are further investigated by DLD Officers and appropriate samples are collected for laboratory diagnosis at the Eastern Regional Veterinary Research and Development Center and confirmation by the FMD Regional Reference Laboratory (RRL) at Pakchong, Nakhonratchasima province, Thailand.

A serological surveillance was conducted to estimate FMD prevalence in FMD free zone, i.e., the control and buffer zones. The prevalence will be estimated in 2 sub-population groups including the pig accredited farms and ruminants in that area. The two-stage sampling was used in selecting villages and/or farms, which is the primary unit, and randomizing the animals, which is the secondary unit, for serum sample collecting and testing for the evidence of FMD infection. The sampling plan is distributed to each provincial livestock office to proceed accordingly.

All serum samples from pigs in accredited farms and other livestock in buffer and control zones were collected with animals' history and were submitted to the Eastern Regional Veterinary Research and Development Center (RVRDC) in Chonburi province. The Eastern RVRDC conducted tests for any FMD evidence on sero-conversion by detection of the Non-structural Protein (NSP) and determining FMD titer by the Liquid phase (LP)-ELISA. All serum samples are stocked in the Serum Bank at National Institute of Animal Health (NIAH), Bangkok. The RRL later selects samples randomly from the serum bank for NSP and FMD titer of type O, A, and Asia1 testing for comparison.

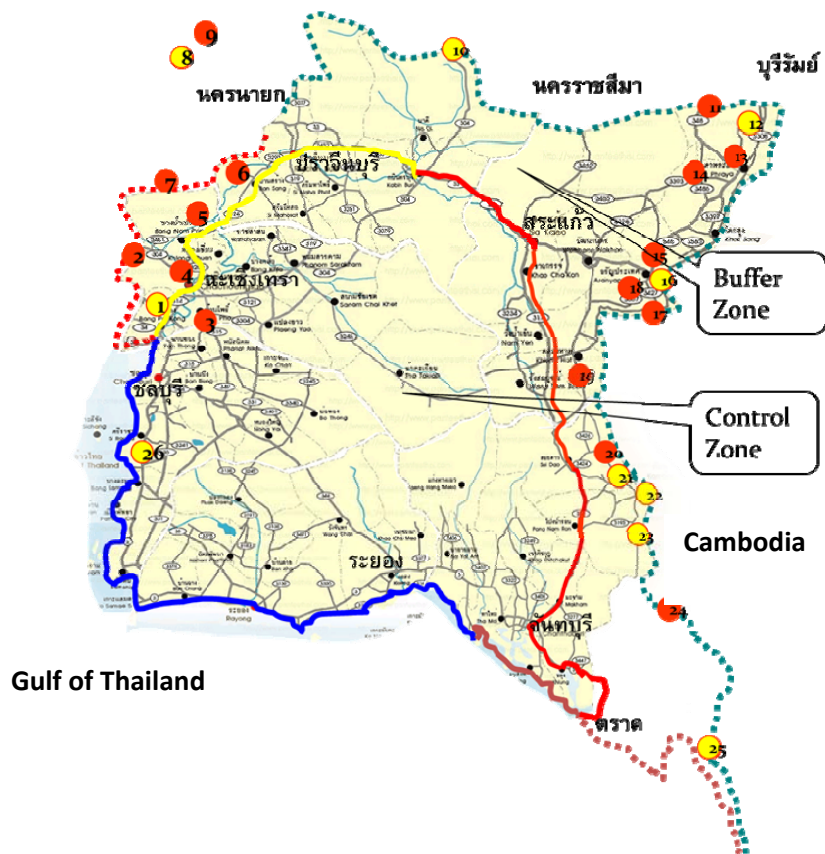


Figure 5.10. Map of FMD-free zone in eastern Thailand (Region 2)