Rabies Prevention and Control Project for Bhutan

Implementing agency: National Center for Animal Health, Department of Livestock  
Funding agency: World Health Organization and Royal Government of Bhutan  
Project area: Samtse, Chhukha, Sarpang, Samdrupjongkha and Trashi Yangtse  
Duration: 6 months (July to December 2007)

1. Background:

Rabies is an acute viral disease, which affects all warm blooded animals including human beings. It is highly fatal and therefore considered as the most dreaded disease transmissible from animal to humans and animal to animal. It is transmitted mainly through the bites of rabid animals. In over 80 countries, rabies is still in its most dangerous reservoir, the dog population. It still remains an ongoing threat to human and animal populations. As per the World Health Organisation (WHO) estimates, between 35,000 and 50,000 people die every year around the world while more than 10 million people undergo post exposure treatment (WHO, 2004). Most of those deaths occur in developing countries where canine rabies is endemic and dog biting is the main mode of transmission.

In Bhutan sporadic cases of human rabies are reported from time to time. Three human rabies cases were reported in 2006. Rabies in animals occurred frequently throughout the country prior to 1992. The incidence of rabies decreased in the interior part of the country after the launch of a nationwide rabies control program in 1992. However, rabies is still endemic in those districts situated along the southern borders of four southern districts viz; Samdrup Jongkhar, Sarpang, Chhukha and Samtse. In 2005-2006, Tashi Yangtse, Trashigang and Mongar Dzongkhags in eastern Bhutan reported rabies outbreaks for the first time in a decade. It indicates that rabies is re-emerging as a problem of public health and economic importance.
2. Situation analysis

Temporal and spatial patterns

It was mandatory to report all cases of rabies in Bhutan. Ninety-six outbreaks of rabies are reported from January 1998 to March 2007. On average nine outbreaks of rabies were reported in a given year. Rabies outbreaks are reported throughout the year (Figure 1). Forty four of the 201 Bhutanese geogs reported outbreaks of rabies from January 1998 to December 2006 (minimum 1, maximum 17 outbreaks per geog). Most of the rabies-positive geogs were in the four southern Dzongkhags: Samdrup-Jongkha, Sarpang, Chhukha and Samtse (Figure 2). In the past, animal rabies outbreaks have spread into the interior of the country from southern Dzongkhags (Figure 2 (a) and 2 (b)). However, in 2005 there was an outbreak in Trashiyangtse Dzongkhag for the first time after a decade which was brought into the country through the entry of a rabid dog that migrated with Buddhist pilgrims from across the borders who came to attend a religious festival. The disease gradually spread to several places in Trashigang and Mongar Dzongkhag, and this spread to the interior parts of the country appears to be facilitated by stray dogs (Figure 2(g), 2(h)). Persistence of rabies in the east was mainly facilitated by an aversion to eliminating the reservoir of infection (dogs) on account of religious reasons unlike in the southern part of the country.

Figure 1: Epidemic curve of count of rabies positive geogs by month, January 1998 to December 2005.
Animal rabies control

Vaccination

Annual vaccination of dogs and cats is routinely carried out, however vaccination coverage varied to a great extent from place to place. Vaccination of the stray dogs is carried out in conjunction with sterilization campaigns using inactivated tissue culture rabies vaccine (Rabisin). Vaccination coverage carried out by the Dzonkhags varied in achievement and implementation. Annual vaccination coverage ranged from 6% in 1998 to maximum of 21% in 1999. Existing vaccination coverage is not sufficient to prevent rabies outbreaks. The study by WHO indicated that vaccination coverage up to 75% is sufficient to break the rabies chain. In addition to limited fund, large numbers of stray, ownerless dogs in Bhutan hinder the vaccination programme.

Dog population control by sterilization

Sterilization of male and female dogs to control the dog population is carried out from time to time. In most Dzongkhags, annual sterilization campaigns in towns and cities are carried out where the nuisance of the growing dog population is acutely felt. But the coverage and frequency of these campaigns vary between Dzongkhags based on the budget availability. They are carried out at different times in different Dzongkhags keeping in mind two factors; the breeding season of the dogs and an appropriate time for faster wound healing. The coverage of sterilization varied from one Dzongkhags to the other based on the budget availability and the individual initiatives. Annual rate of dog sterilization ranged from 4 to 20%. There was a strong correlation between the dog sterilization and vaccination as they were carried out simultaneously as part of anti-rabies campaign in the Dzongkhags. Low level of sterilization can be attributable to limited funds, large number of stray dogs, religious sentiment and poor awareness of the general public. Only surgical methods of animal birth control have been used in Bhutan to date.
**Population control through dog elimination**

The dog elimination program was carried out vigorously in the 1980s, but was neither socially acceptable nor sustainable. Moreover, culling of dogs during a sterilization and vaccination campaign may be counterproductive as sterilized and vaccinated dogs could be destroyed. Therefore it is not employed as a routine measure in Bhutan.

**Problems and constraints in the existing control strategies**

- **An insufficient budget** affects the success of rabies control as an effective rabies control program require a sufficient and sustained funding source. Sufficient funds are required for procurement of vaccine, for campaign expenditure and infrastructure development.

- **Poor awareness** of the general public about rabies hinders the implementation of a rabies control program. It is very important that the public are sensitized on the disease and the activities designed for the control of rabies in the country.

- **Religious taboo** is one factor which makes the success of a rabies control program more difficult. Since most people in Bhutan are Buddhists, dog elimination even at the time of rabies outbreak is strongly opposed. Some people are even against the sterilization of dogs and do not cooperate with the campaign team. This results in maintenance of the stray dog population which facilitates rabies transmission.

- **Lack of appropriate legislation** to backup the implementation of rabies control strategies leads to poor implementation of the control program. There should be a strict legislation that requires mandatory registration, licensing, vaccination and management of owned dogs.
- **Lack of proper coordination** and control programme on both sides of the border (Bhutan and India) result in difficulty to effectively control rabies. The main source of rabies in Bhutan is due to rabid dogs coming from across the border.

3. **Justifications:**

- Dogs are indicated as the main reservoirs of rabies in Bhutan as well as all the human casualties reported so far were due to dog bites, therefore the control of canine rabies would be crucial to control rabies in humans.

- Significant costs were involved in the post exposure prophylaxis (PEP) of humans following dog bites. The cost of post-exposure rabies vaccination of humans bitten by dogs has been estimated to be at least US$ 0.070 million per annum (Rinzin et al, 2006). During the 2006 rabies outbreak in Eastern Bhutan more than 500 people had received post-exposure treatment in Tashigang Dzongkhag alone where a substantial amount had to be incurred. These costs do not include other social and the incidental costs.

- Three human deaths due to rabies were reported in year 2006. Owing to very high public health risk as a result of dog bite cases, people in general had developed psychological trauma, which is far beyond measurable.

- Rabies also causes severe economic losses due to loss of valuable livestock. Tashigang Dzongkhag reported death of 80 domestic animals which caused financial loss of Nu. 700,000/-. In the towns of Gelephu, Deothang and Phuentsholing every year cattle, goat and pigs become victim to rabies.

- Because of the public health risk factor from the livestock products of the infected animals, markets for livestock products from the rabies endemic areas at the time of disease outbreaks is of major concern, which causes significant economic losses to farmers.
• Since post-exposure vaccination is not effective in domestic animals and dog is primary source of rabies infection in human and animal population, it is cost effective and sustainable to run a canine rabies control project with components such as KAP study, rabies awareness, mass vaccination, dog population management and national capacity building.

Rabies and dog bite cases are frequently reported in mass media and these are the interesting news items which describes well socio-economic impact of animal bites;

“Last Wednesday (February 1), a rabid dog has bitten five children, one adult, and ten cows in Yongphula, Trashigang, Bhutan. Since the January 2 outbreak in Khaling, 136 people and 34 cattle were exposed to the infection in the district. A mass vaccination campaign was launched in the area for cattle and more than half of the estimated 3,400 dogs in the district. “


“Health officials in Trashigang, Bhutan report that the number of people suspected to be infected by the rabies virus has increased to 129 from 126 in the past few days… Meanwhile, they report that some of the infected people have gone to other parts of the country to seek treatment.


“4 August 2006- The April 2004 rabies outbreak in eastern Bhutan, which is yet to be contained, claimed its first human victim this week when a 17-year old student died on August 2.

This is the second rabies death in the country this year, the first being the death of a nine-year-old boy from Pasakha, Phuentsholing, on June 8.”

Source:www.kuenselonline.com

THIMPHU: In the past five years the government spent more than Nu 5.878 million on Anti-Rabies Vaccines according to health ministry officials. Some of the treatment costs
could have been avoided because every dog bite victim is not necessarily a victim of a rabid dog say health officials. But this has not been possible because of the difficulty in identifying the dog responsible for the bite from the huge dog population which numbers around 7,000 in the capital alone....... In 2006 there were three deaths from rabies. A senior official of a corporate organisation also fell victim to rabies more recently..... The data recorded by ministry reveals that in 2006 Mongar, Trashiyangtse and Trashigang reported 107(129) dog bite cases with three cases of human deaths due to rabies in Trashigang and Chukha dzongkhags. Of 600 dog bite cases in 2005 one died from the disease. 2004 had 1,400 dog bite cases, the highest recorded, followed by 940 cases in 2002."

"9 August 2006- It was inevitable that we saw another rabies victim. Given the dog-human ratio in Bhutan, and the fact that many families do not know enough to take the victims for timely treatment, we could have seen - could still see – many more cases of rabies.

The death of a student last week brought back memories of the pain suffered by rabies victims and the dread of pre-vaccine societies over dog bites.

Editorial: The waiting game (kuensel)

4. Strategies and activities to be implemented

The disease is endemic in the southern border towns and there has been no frank rabies case in the interior of the country (Refer Figure 2). Therefore, the project would target those districts situated along the southern borders (Chhukha, Samtse, Sarpang, Samdrup-Jongkha) and Tashi-Yangse Dzongkhag in Eastern Bhutan (adjoining Arunachal Pradesh State of India). The project activities will be implemented as per the proposed workplan (Refer table 1). In order to optimise vaccination coverage within a limited time and launch focused rabies awareness campaign through mobilization of technical manpower and community volunteers, rabies week has been proposed. Vaccination, drenching and sterilization will be carried out during the rabies week. Rabies day has been planned in an
interval of one month after the week long vaccination campaign to vaccinate and sterilize leftover dogs and cats which will improve the vaccination coverage.

Table 1: Workplan calendar

<table>
<thead>
<tr>
<th>Activities</th>
<th>July</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
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<tbody>
<tr>
<td>1 Finalization of the project</td>
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<td>2 Preparation of questionnaire for KAP survey</td>
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<td>3 Preparation of extension materials</td>
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<td>4 Stakeholders workshop on rabies control</td>
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<td>5 Training of Lab. Technicians on RFFIT techniques</td>
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<td>6 KAP survey</td>
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<td>7 Sensitization of communities</td>
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<td>8 Training of field staff on surgical techniques</td>
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<td>9 First rabies week</td>
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<td>10 Second rabies day</td>
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<td>11 Procurement of lab. consumables, equipment etc</td>
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<td>12 Procurement of campaign materials</td>
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<td>13 Procurement of vaccines, medicines, instruments etc.</td>
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<td>14 Annual rabies day</td>
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<td>15 Visit of consultant for project finalization</td>
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<td>16 Visit of consultant for project monitoring evaluation</td>
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<td>17 Construction of dog pounds in the municipalities</td>
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4.1 Community based survey - Knowledge, Attitude and Practice (KAP) study

A successful rabies control project greatly depends on knowledge of dog ecology and community attitude towards the proposed programme. KAP study has been planned to determine dog population size, population turnover, degree of supervision of the neighbourhood and family dogs, proportion of dogs without the referral household, the origins of these dogs, and the accessibility of dogs for vaccination and sterilization campaigns, and the public attitude towards dogs and control measures. It is also important to understand the habitat with manmade resources (food, water and shelter).
that support the variable number of unsupervised dogs. Part of the information can be
gathered through questionnaire survey while part of it can be established by field
observation and focus group discussion.

The questionnaire will be designed and the stakeholders interviewed during the project
period. The size of the owned sector of the dogs can be estimated from the registration
records, while size of stray dog population can be estimated using a wildlife technique
i.e. mark and recapture technique during the rabies week.

4.2 Public awareness and education campaigns – Promotion of “Responsible
dog ownership”

Public awareness and education campaigns should be seen as an integral and important
element of disease eradication campaigns and crucial for their success. It is extremely
important that the general public is sensitized and made aware on the danger of the
disease and its consequences, and the activities designed for the control of rabies in the
country prior to actual implementation of the program as well as the importance of
keeping healthy dogs for the dog owners. The most appropriate means of getting the
message across to specific communities or general public should be used, such as radio &
TV broadcasts, print media or public/ DYT/GYT meetings, etc. Therefore specific
extension materials (leaflets, posters, banners and audio visual programs will be
developed for mass education of the public.

Mass vaccination – Break the rabies urban cycle

Mass vaccination campaigns have been the most important measure applied for
controlling rabies. More than 80% of the dog and cat population in the project area
should be vaccinated during the rabies week. In order to increase the vaccination
coverage we should also use the oral rabies vaccine for those stray and free range dogs
where the use of parenteral vaccination is not easily possible. Deworming will be carried
out during the vaccination campaign.
4.4 Sterilization – Maintenance of herd immunity

Although it is expensive, sterilization by castration and hysterectomy/ovario-hysterectomy is an effective way for dog birth control. As far as possible, 100% coverage of stray dogs in the project area should be targeted for sterilization during the conduct of campaign. Otherwise, there is every chance that the dog population will continue to grow and might reach the same population as the previous year when the next campaign is due. Although desexing of both sexes is important, emphasis should be given for the female dogs since it has direct implications on the population growth. Sterilization campaigns should be carried out during cooler months when there will be less post-operative complications. Therefore sterilization of dogs and cats will be carried out during the first rabies week in the month of October. Chemical sterilization method will also be applied wherever possible.

Establishment of dog pounds – Introduction of capture and release method

The main activities to immediately control the dog population involves the construction of dog pounds in each of the municipal towns/Dzongkhag HQ (Thimphu City Corporation has a separate plan) and remove all the stray dogs and impound them in the facility. There should be provision to manage the dogs in the pound and also provide them proper treatment and care at the centre. Two types of pounds, one for the colder climate and another for the warm climate is being designed. Also depending on the dog population the size of the pound will vary. The pound will have basically six compartments: two for the healthy, sterilized dogs, one for the puppies, one for the sick dogs, one for the new arrival unloading and one for the treatment/sterilization. In the first four compartments there will be a shed with roof and a run place in front.

Activities to be carried out at the pound;

- All stray dogs to be impounded in the pound
- Encourage adoption as pet by interested clients
- All dogs in the pound will be given anthelmintics, sterilized by appropriate method and vaccinated against rabies.
The dogs will be first brought into the arrival shed from where those requiring treatment and sterilization will be done so and then transferred to either the puppy shed or healthy sterilized sheds or the sick shed if the dog requires further treatment.

Adjoining the pound one unit or two unit quarters for the caretaker/s and a kitchen for cooking meals for the dogs is required. A biological pit and waste disposal pit is foreseen. The pounds will be also slightly different in that, for the cold places the sheds will have bamboo mat enclosures outside the chain link to protect from especially during winter.

The detail drawing and the cost estimate has been worked out by the engineering section for a 250 and a 500 dog capacity pounds.

The Municipality authority in the Dzongkhags will be responsible for the operation of the pounds and the Livestock sector will provide animal health and sterilization programmes for the dogs in the pound. The operation would include appointment of caretaker/s, purchase of utensils, arranging dog collection, managing the dogs in the pound including feeding and treatment, etc. The initial major task of operationalizing the dog pound would be to catch the dogs and impound them.

A very important component of the project would be to develop a mechanism to continuously catch any dog straying into the area after the campaign. This activity will have to remain as routine work of the municipality and it may be appropriate to have a small unit set up within the municipal office who will be responsible to remove any stray animal in the area all time round.

- 100% sterilization and vaccination in the pound to be implemented by Department of Livestock
- Treatment of sick dogs in the pound by the Department of Livestock
- Sterilization and vaccination in other areas strengthened
Legal framework

Apart from the operation of the dog pounds if the programme is to be successful legal backing to prevent keeping of stray dogs, providing habitat and proper care for the pet/utility dogs should be in place and enforced. For this, a legal framework involving the following activities should be put in place and adopted by all the Dzongkhags;

- Compulsory registration of pet/utility dogs and cats every year
- Compulsory registration of breeding pets/issuance of license
- Dog movement to be controlled especially from rabies affected areas to other free areas
- Translocation of stray dogs between Dzongkhags or between locations to be banned
- Pet/utility dogs are kept within the compound and should carry leash at all times while in the public places
- Vaccination and sterilization compulsory unless registered for breeding purpose
- Management of garbage disposal (habitat control)

5. Support Plans

5.1 Dog catching incentives

Catching stray dogs for sterilization is as usual the biggest obstacle in the successful implementation of the dog population control activity. Therefore incentive payments for stray dog catching @ Nu.30 per dog should be provided.

5.2 Rabies Vaccine

Imported rabies vaccine through WHO should continue to be used for assured quality and cheaper cost reasons.

5.3 Equipment and other accessories

To make the sterilization campaign more acceptable to the general public and also for the comfort, convenience and increased efficiency of the sterilization campaign team, basic equipment like portable operation table, garden umbrella, screen or enclosure, air
pressure gun, dog catcher, jab stick etc. are necessary. Therefore these items should be
procured and used in the field campaigns.

5.4 Rabies diagnostic facilities

Rabies diagnostic facilities are limited to only NCAH and few RVLs. In order to enhance
the rapid diagnosis and to guide the response of the control measures to be implemented
and more importantly to give timely advice for post exposure treatment of humans
exposed to rabid animals, another FAT microscope will be procured and supplied to
SVL, Deothang where the rabies is endemic.

Rapid Florescent Focus Inhibition Tests (RFFIT) which measures neutralizing antibodies
in the serum or CSF may be used for the quantitative assay of humoral immune response.
RFFIT tests may be initiated at the NCAH during the project period.

5.5 Human resource development (Training and workshop)

Training of field staff

The advantage of ovariohysterectomy over hysterectomy was well documented. However in Bhutan only hysterectomy is performed in the field. This lateral flank approach method is appropriate when an animal has excessive mammary development or in situations where a post-operative monitoring or examination may be limited. As such lateral flank approach has been suggested as an alternative to the conventional ventral midline ovariohysterectomy in dogs. Therefore training will be given to field staff on surgical techniques for ovariohysterectomy and lateral flank approach prior to the rabies week.

Training of Laboratory Technician on Rapid Florescent Focus Inhibition Tests (RFFIT)

In order to initiate RFFIT test in NCAH, one Laboratory Technician should be send for training on this techniques to National Institute of Communicable Diseases, New Delhi during the project period.
Inception workshop on rabies
It is necessary to conduct inception workshop to discuss issues related to rabies control activities in the field and to monitor the control program during the project period.

Sensitization of the communities
Since it is extremely important that the public is sensitized and made aware on the danger of the disease and its consequences, and the activities designed for the control of rabies in the country prior to actual implementation, the community leaders and stakeholders will be sensitized prior to the rabies week.

5.6 Pre-exposure immunization
High risk human group such as the clinician in the veterinary hospitals, laboratory veterinarians and technicians, dog handlers / catchers, animal attendants, should receive immunization regularly against rabies with approved rabies vaccine in line with the WHO regimen (Day 0, 7, 28) and regular re-vaccination.

5.7 Identification system
Identification of the dogs that are either vaccinated or sterilized is extremely important to avoid wasting of resources on catching dogs again, which have already been vaccinated or sterilized in the previous campaign. Identification system is also important to see the coverage of vaccination and sterilization. Therefore, a Dog Collar made of synthetic strap will be used for ready identification. Systematic application of identification system will be useful for estimating the actual stray dog population using a wildlife technique i.e. mark and recapture technique.

5.8 Licensing and registration of dogs
The Government would enact regulations as to make compulsory registration of pet and community dogs. The purpose of a licensing system is to give the right to a person to own a dog and the right may be taken away if the person is irresponsible to animals that he/she
owns. It shall be the duty of the pet owners to ensure that their pet animals are duly registered in their respective Veterinary hospitals or at the LEC/RNRECs. The regulation will ensure that the pet or utility dogs are either tethered within the owners’ compound and if taken out should be on leash.

5.9 Technical assistance

During the six months project period, at least three consultants are expected to visit Bhutan. The first visit will be for the finalization of project; second visit of the consultant will be for framing the livestock regulation and the final visit by the consultant will be for the monitoring and evaluation of the project.

6. Estimated Budget

The total budget required for running the project is 9.225 millions out of which the donor contribution is 3.720 millions and RGOB contribution is 5.505 millions (Refer Table 2).

Table 2: Estimated budget for proposed rabies control programme

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Activities</th>
<th>Fund source</th>
<th>Total (millions)</th>
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<td>RGOB</td>
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<tr>
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<td>Public awareness</td>
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<tr>
<td>2</td>
<td>Community based surveys (KAP)</td>
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<td>0.150</td>
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<tr>
<td>3</td>
<td>Dog family planning</td>
<td>0.810</td>
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<tr>
<td>4</td>
<td>Vaccination</td>
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<td>5</td>
<td>Laboratory diagnostics</td>
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<tr>
<td>6</td>
<td>Workshop and training</td>
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<td>Operational costs</td>
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<td>Dog pound constructions</td>
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<td></td>
<td>Total (Local currency in millions)</td>
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<td>Total (USD)</td>
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