APPENDIX 2

Animal Health Service

GTFS/INT/907/ITA

"Controlling Trans-boundary animal diseases in Central Asian countries"

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Animal Health Service

Background

- GTFS/INT/907/ITA project "Controlling Trans-boundary animal diseases in Central Asian countries" started its activities in 2004;
- Regional Project supported by the Italian Government with the following beneficiary countries: Afghanistan, Pakistan, Tajikistan, Turkmenistan and Uzbekistan (Kazakhstan, Kyrgyzstan and Iran invited as observers during regional meetings)

Animal Health Service

Background

- Phase 1 of the GTFS/INT/907/ITA was concluded on 31 December 2007;
- Main objective (in all countries but Pakistan): to demonstrate freedom from Rinderpest from the beneficiary countries;
- As a result during the last OIE General Session (May 2008) Afghanistan, Tajikistan and Uzbekistan have been recognized officially free (Turkmenistan is still pending), while Pakistan was recognized free in 2007.

Animal Health Service

Background

- Project has been extended until 31 December 2009 and phase 2 is focusing on FMD and PPR;

A shift on the approach:
demonstrating freedom from a given disease
vs
have a better understanding of diseases likely to be present

Animal Health Service

Background

- GTFS/INT/907/ITA annual meeting held in Ankara (March 2008) highlighted the issue of addressing FMD adopting a risk based approach

Animal Health Service

Background

- Some of the recommendations made at the meeting:
  - It is recommended that the project assist in training activities for field staff aimed at improving ability of field staff to recognize clinically diseases such as FMD and PPR in order to facilitate report and submission of appropriate samples to the Veterinary Diagnostic Laboratories;
  - It is recommended that the project will assist in introducing diagnostic tools, with specific reference to FMD, that can enhance the diagnostic capacity of the beneficiary countries of the GTFS/INT/907/ITA;

Animal Health Service

Background

- It is recommended that along with providing assistance to improve diagnostic ability, the project will promote the design and implementation of field activities in order to gain a better understanding of the epidemiological features of Trans-boundary Animal diseases (TADs), with a special focus on FMD and PPR, among the beneficiary countries;

Animal Health Service

Background

- Those recommendations led to:
  - Design and implement a surveillance program addressing FMD (GTFS/INT/907/ITA project staff technical meeting held in Ankara from 21 to 28 May 2008).
  - The design of the program is partially based on the lesson learnt from the study carried out in Pakistan in 2006 and 2007.

FMD in endemic settings

- In Pakistan, which was a step ahead as per the Rinderpest pathway, the project has supported field activities in collaboration with the National Veterinary Institute, Technical University of Denmark, Lindholm (period April 2006-April 2007);
- Those field activities have been carried out in the largest Dairy Colony in the world (Landhi Colony, Karachi) from April 2006 to April 2007.

FMD in endemic settings

Dairy farm in Landhi (from Soren Alexandersen)

- The dairy colony production system has some peculiar characteristics with the most important being a high turn-over of the animals (on average 10 to 12 per cent of animals in dairy colonies are replaced monthly);

FMD in endemic settings

- This system is dominated by the buffaloes because of the higher butterfat that is preferred by the customers;
- The animals are kept on individual farms for milk production but only for the period of their lactation (230-300 days), so recently calved and near-calving animals are purchased and brought onto the colony farms. The calves are generally not kept with and only high-yielding milking animals are maintained in this production system.

FMD in endemic settings

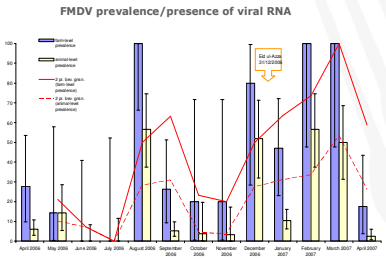
- The calves are generally not kept with and only high-yielding milking animals are maintained in this production system.

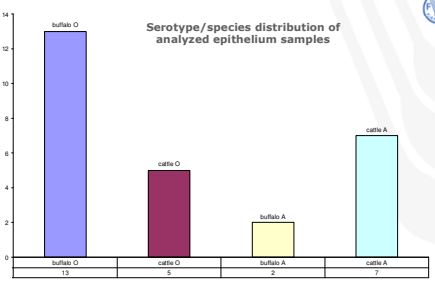
FMD in endemic settings

- The study design had two main components:
  - Detection of FMD antigen both from clinically and non-clinically affected animals (based on random monthly survey) which led to the collection of approximately 1,500 mouth swabs and 50 epithelium samples;
  - Detection of antibodies against both non-structural and structural proteins from slaughtered animals that were to leave the colony but that had spent at least one lactation period into the colony (180 blood samples collected and tested);

FMD in endemic settings

- Main results:
  - An average point prevalence of ~20% of animals being positive for FMDV RNA in mouth swabs (but without any clinical signs);
  - Point prevalence in farms having animals with old FMD lesions is ~50% and even higher in farms experiencing acute FMD (FMDV RNA positive mouth swabs of ~80-90%) indicating that all/most animals in the herd is exposed to FMDV within a period of ~3 weeks.





FMD in endemic settings

- Main results:
  - Out of 180 samples collected 176 (98%) had detectable levels of NSP antibodies. This finding was consistent with animals, sampled at any given point in time (slaughter) that had the common experience of having spent at least one lactation period (230-300 days) in Landhi

FMD in endemic settings

- The study carried out in the Dairy Colony provides a good indication of how the level of exposure to FMD virus may be strictly linked with a specific productive system. It is in fact suggested that this peculiar system could be targeted for a vaccination program which in turn should contribute to reducing the overall load of the FMD virus.

FMD in endemic settings

- Dairy Colonies are rather peculiar to Pakistan and no such productive systems are known to be present in Afghanistan, Tajikistan, Turkmenistan and Uzbekistan. [Of note, the Dairy Colonies were also considered as a key eco-system for Rinderpest virus to persist in Pakistan.];

FMD in endemic settings

- While for Pakistan, the Dairy Colony may be considered an important "hot spot" for FMD virus, other production systems with equivalent or significant level of risk may be identified and subsequently targeted for control programs in order to progressively reduce the overall load of FMD virus;

Live animal market (from Peter Roeder)

FMD in endemic settings

- Continue the study in the Landhi colony and extend it to other colonies present in Pakistan (Lahore, Islamabad);
- Evaluate the average level of exposure of animals entering for the first time into the Landhi colony (heads at their first parturition);

FMD in endemic settings

- Based on the approach and the results of the study carried out in Pakistan and on the recommendations received during the annual meeting, the on-going surveillance program designed for the GTFS/INT/907/ITA beneficiary countries has the following objectives:
  - Create more awareness among field veterinarians through training programs to facilitate sample collection and submission to the laboratory;
  - Detect the presence of FMD-RNA virus from non-clinically affected animals (cattle and buffaloes) in selected live animal markets (based on monthly sampling of at least 20 heads/market);

FMD in endemic settings

- Quantify how the overall risk of becoming infected with FMD virus may be distributed into different production systems. In this regard the following categories have been identified in the participating countries of GTFS/INT/907/ITA: (i) households animals; (ii) commercial sector - dairy; (iii) commercial sector - beef; (iv) genetic centers (usually government farms); (v) animals seasonally moved to pastures; (vi) animals at slaughterhouses.

FMD in endemic settings

- The level of exposure to FMD virus will be measured through the detection of NSP antibodies and the target species for the survey will be cattle and buffaloes, which are considered equivalently susceptible.
- The sampling design and criteria (age + productive system) adopted to conduct the study is a combination between what could be practically achieved while trying to achieve some statistical robustness.

FMD in endemic settings

- Serological component
  - The general criteria established for estimating the sample size aimed at: (i) maintaining the overall standard error of the estimated proportions for each category at an acceptable level (maximum tolerable error 11% at 95% confidence level); (ii) being able to detect (at 95% confidence level) the presence of at least one NSP antibodies positive animal if the proportion (in each age category) of positive is equal or more than 20% (with no adjustment for test sensitivity and specificity); (iii) verifying that the minimum detectable prevalence risk ratio between two independent proportions (with a type I error of 0.05 and a type II error of 0.1) would not exceed 3.2

FMD in endemic settings

Table 1: Minimum sample size in different categories per each country

Category	Household	Dairy	Beef	Genetic centers	Transhumants/ Pastoralists	Slaughtered	Colonies
N. units to be sampled	60	5	5	5	n.a.	n.a.	n.a.
N. Individual Samples	2880	240	240	240	300 (two rounds of 150 each)	300	300 (two rounds of 150 each)
Max SE (95%)*	3.2%	11%	11%	11%	8.2%	5.8%	8.2%
Range of Min. detectable PRR	1.36 2.7	1.52 3.2	1.52 3.2	1.52 3.2	1.38 2.5	1.22 1.7	1.38 2.5

FMD in endemic settings

- For the implementation of the surveillance activities on FMD the project has established partnership with:
  - Istituto Zooprofilattico in Brescia (Italy) that will assist mainly with the serological component of the activities;
  - National Veterinary Institute (Danish Technical University in Lindholm, Denmark) that will continue to assist for the bio-molecular component of the activities (this partnership has been established jointly with the EU-FMD Commission).