FMD surveillance in Iran

A key to understand the regional situation

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International Coordinator
AGAH – EUFMD – MTF/INT/003/EEC

A. Animal population
   - 80 M Sheep and goat
   - 8 M Cattle
     - 2 M Pure Dairy cattle
     - 2 M Crossed breed
     - 4 M Others
     - < 2 M Horses
   - 200,000 Camels

1. Iran
   A. Animals population
   B. Animal husbandry
   C. Animal movement
   D. Vaccinal status

Sheep and Goat density
B. Animal husbandry

<table>
<thead>
<tr>
<th>Animal Type</th>
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Source: Dr. Otarod, GISVET system
C. Animal movements

Border movements - In

In country movements

Nomadic movements
D. Vaccine status

- **Intensive Dairy** cattle units
- **Villages** in high risk areas
  - vaccination every 4 months

- **Intensive Fattening** units
  - In vaccination program

- **Nomadic** herds
  - yearly program in high risk areas

2. FMD Surveillance results

A. Data analysis
B. Alert system
C. Proposed Actions in Iran
D. Project Program 2007
A. Data analysis

- Evolution of FMD during the past 4 years
- Evolution of FMD in 2006-2007
- Source of FMD outbreaks
- Farm investigations
- Sampling results

=> Conclusions
Evolution of FMD in 2006-2007

Sources of FMD Outbreaks

1. Focal prevalence of FMD in Iran
2. Focal prevalence of FMD in Cattle
3. Focal prevalence of FMD in Sheep and Goat
1. Focal prevalence of FMD in Iran

- Beef Farm
- Dairy and beef farm
- Dairy and sheep farm
- Dairy Farm
- Villages

2. Focal prevalence of FMD in Cattle

- Pasture
- Villages
- Sheep farm
- Dairy and sheep farm

- East Azar
- West Azar
- Ardabil
2. Focal prevalence of FMD in Sheep and Goat
FMDV results

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Farm investigations conducted in November, December 2006 and January 2007

- FMD is under-reported
- FMD virus circulates all over the year
- Vaccination coverage is insufficient and heterogeneously conducted
Industrial Farms

- Affected animals = young animals not vaccinated or vaccinated with only 1 injection
- No respect of biosecurity measures

Fattening Units

- Permanent animal movement = permanent source of various viruses
- Vaccination after entering without quarantine period not useful

Conclusion

1. FMD is highly endemic in Iran and villages and beef herds are FMD reservoir
2. High infectious pressure on non or not well vaccinated animals
3. Lack of Biosecurity

Endemicity + Existence of reservoirs + Existence of animal improperly vaccinated + No biosecurity

= Increase of the number of outbreak that could be caused by any FMD virus
B. Alert system

**Field Event definition**
- The occurrence of very severe FMD outbreaks in vaccinated animals which have a high level of immunity
- The occurrence of FMD in vaccinated epidemiological unit in the face of a strong immunity, e.g. 1 or 2 months after vaccination
- The emergence of important outbreaks (more than expected level) in vaccinated area,
- The occurrence of FMD outbreaks in area with no background of FMD outbreaks (no animal movement, e.g. in dairy cattle farms)
- .../

**Laboratory Event definition**
- Detection of a new subtype apart from already existing in the country
- Increasing number of samples received over a short period
- Increasing number of samples received over a short period
- Having unexpected test results
- Having more negative results rather than positive in virus detection tests
- .../

<table>
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| EVENT: | Continuous increasing of prevalence of type O from July, 15th, even in vaccinated herds |
| LOCALISATION (S): | West province of Azerbaijan, (2), Ardabil, and Khuzestan |
| Central provinces of Qom, Markazi, Qazvin, and Tehran |
| South East provinces of Fars and Sistan |

COMMENTS: Changing of virulence of type O?
C. Proposed Actions in Iran

1. To focus on cluster analysis
2. To set up a Serosurveillance program
To set up a Serosurveillance program

- To monitor herd immunity against FMD and the prevalence/incidence of FMD in vaccinated herds
  => preliminary experiments
  - Induction of NSP antibodies by vaccines produced by Razi and Merial
  - Induction of SP antibodies following the use of vaccines produced by Razi and Merial and according to the protocol used in Iran
  => pilot study to determine parameters

C. Program 2007

Project Program activities 2007

- Information
  - Booklets for Farmers, Animal Dealers and Private Vet.
  - Information day
- Training-Seminar
  - Workshop on Outbreak Investigation and Follow up
  - Seminar on FMDV circulating in the region
- Surveillance
  - Sero-monitoring preliminary experiments
  - Improving of GISVET Information system (contract)
  - Epidemiological data analysis (equipment)
  - Improving of CVL capacity (training + equipment)

3. Perspectives

- Iran experience
- Neighbouring countries
- Regional approach
  => demonstrate value of FMD surveillance implemented in Iran
  => extend the project to the neighbouring countries
  => use Tehran as a regional coordination point
Phase 1 ongoing in Iran 2007

Phase 2 (2008-2009) to be prepared and agreement signed between FAO and concerned countries in linked with the GFTS/INT/907/ITA project
Combating Foot-and-mouth Disease through enhanced and co-ordinated surveillance activities; the Central Asia FMD Surveillance Centre initiative” is an FAO Project, supported by the European Commission and conducted by the EUFMD Secretary via a French International Co-ordinator based in the Veterinary Services of Iran (IVO) – Tehran (see annex)

1. Objectives, outputs and capacity building

Objectives of the project

The main objectives of the project are:

Phase 1:
• strengthened national and local capacities for active surveillance of FMD, with effective and timely management of FMD risk in Iran

Phase 2:
• establish a regional network for FMD surveillance in the region, based on the Iranian experience, with National Focal Points and Regional Co-ordination Centre in Tehran.
• provide through this regional network an effective and timely information about patterns of FMDV circulating in the region

Outputs of the project

The specific outputs of Phase 1 are:
1. To train specific staff skilled in FMD surveillance, outbreak investigation, control measures planning and spatial mapping analysis
2. To strengthen FMD surveillance system in high risk zones, especially in border regions of Iran
3. To strengthen capacity for quarantine activities and develop animal movement mapping
4. To strengthen capacity for identifying risk of FMD spread in and from Iran
5. To strengthen Central Veterinary Laboratory capacities, including rapid characterization of the virus, virus identification and sero-monitoring
6. To train CVL in FMD vaccine quality control
7. To revise National Surveillance Programmes and contingency plans including updated surveillance methodologies.

1.3 Capacity building

Technical capability to rapidly identify the emergent FMD virus strain and to identify the most important causes and origins of FMD outbreaks and the routes by which they spread will be enhanced through training in outbreaks investigation, in active surveillance methods and in the development of laboratory skills.

Development of laboratory skills, focused on identification and typing of FMD virus field strains, virus genotyping, sero-diagnosis methods and vaccine quality control.

Establishment of sero-diagnostic capacity to monitor the vaccination performance in the field and to identify the possible reasons for vaccine success or failure.

Training of the IVO’ personnel in planning an implementing FMD surveillance and in long term progressive control of TAD.

Continuous interaction among the national staff at all levels to promote the concepts of priority of FMD and other exotic disease control and of early reaction in case of outbreaks.

The international co-ordinator is expected to work with the senior government veterinary staff to guide the development of national surveillance plans and the revision of national contingency plans.
2. Project activities and results
The project officially started in January 2006, when the EU support funding was notified to Iran Veterinary Organisation through FAO-REP in Iran.

2.1 Project activities
According to the work Plan adopted during the last General Session, the following activities were achieved.

Training in Europe

T1 - Short Term external training

T1.1 - Training on FMD serological and virological tests
Serology methods
Participant: 2 persons from CVL (Central Veterinary Laboratory) and Regional Laboratory
Duration: 2 weeks - May 2006
Duty station: Pirbright WRL

T1.3 - Training on vaccine quality control (Inocuity, Potency and Safety)

Potency Test
Participant: 1 person from Razi Institute (FMD vaccine producer)
Duration: 2 weeks - August 2006
Duty station: Pirbright WRL

T2 - Long Term external training

Training on FMD genetic typing and advanced molecular epidemiology

Sequencing method
Participant: 1 specialist of FMD Diagnosis Unit of CVL (Central Veterinary Laboratory)
Duration: 6 months attachment - November 2006/April 2007
Duty station: Pirbright WRL
Workshops in Iran

WT1 - Workshop on Active Surveillance and FMD Outbreak Investigation

Training in Outbreak investigation
Participant: official and private veterinarian involved in FMD surveillance in the 7 pilot provinces (15 persons)
Duration: 2 weeks (10 working days) - January 2006
Duty station: Tehran and Qazvin Province

WT2 - Workshop on FMDV circulating in the region (workshop organised due to the regional situation)

Exchange of information about FMV circulating in the region
Participant: Iraq, Turkey and Syria representatives
Duration: 3 days - June 2006
Duty station: Tehran Central Veterinary Laboratory
Regional meeting

RM1 - Turkey-Iran bilateral meeting (visit tour organised to reinforce bilateral ties between the 2 countries)

Regional cooperation on FMD field
Participants: IC + representatives of IVO, FMD Task Force and Razi Institute (7 persons)
Duration: 3 days - February 2007
Duty station: Ankara (Turkey)

RM2 - GTFS/INT/907/ITA regional meeting

Regional situation of FMD in beneficiary and observer countries – links between the 2 projects
Participants: CVOs (or representatives) and Epidemiologist of Afghanistan, Pakistan, Tajikistan, Turkmenistan and Uzbekistan, beneficiary countries and Iran and Kyrgyzstan (observer countries)
Duration: 3 days - March 2007
Duty station: Dushanbe (Tajikistan)

International meeting

IM1 - EUFMD Research group

Experience and lessons learned about AO5 virus type in Iran
Participants: IC + representatives of FMD Task Force and Razi Institute (2 persons)
Duration: 3 days - October 2006
Duty station: Paphos (Cyprus)

IM2 - OIE/FAO Round table on FMD control in the Middle East

Regional situation of FMD and Iran experience in FMD surveillance
Participants: IC + representatives of FMD Task Force and Razi Institute (2 persons)
Duration: 2 days - November 2006
Duty station: Damascus (Syria)

IM3 - EUFMD Executive Committee

Situation of FMD and risk assessment for Europe
Participants: members of the EUFMD Executive Committee + observers
Duration: 2 days - January 2007
Duty station: Roma (Italia)

Project results

The main results of the project during this first year of phase 1 (2006) were:

1. Set up a specific staff (FMD Task Force) skilled in FMD surveillance and outbreak investigation
   - An FMD Task Force has been set up in March 2006. This team, managed by an FMD Task Force manager, is working in the 7 pilot areas in the 3 high risk zones
   - 7 Provincial FMD Task Force Managers and an HQ-team trained during the first workshop on FMD surveillance organised by the project in January 2006 are working for the project.

2. To strengthen FMD surveillance system in high risk zones
   - The 7 pilot areas have been chosen according to the FMD risk analysis and the number of outbreaks declared during the last 4 years.
   - The 7 provincial FMD Task Force Managers conducts a reinforced FMD surveillance in their provinces.
   - Monthly reports of FMD situation in the country is send to EUFMD secretary
3. **To strengthen capacity for quarantine activities and develop animal movement mapping**  
   *This item has not yet be assessed*

4. **To strengthen capacity for identifying risk of FMD spread in and from Iran**  
   - FMD results analysis is conducted by the project every month.  
   - A "Field and Laboratory Event Alert System” have been set up after the first seminar on FMDV circulating in the region organised in June 2006.

5. **To strengthen Central Veterinary Laboratory capacities**  
   - 2 persons received a 2 weeks training course on FMDV serology diagnostic in Pirbright WRL in May 2006.  
   - 1 person has been trained on FMDV sequencing during 6 months in Pirbright WRL from October 2006 to April 2007.

6. **To train CVL in FMD vaccine quality control**  
   - 1 person received a 2 weeks training course on FMD Vaccine potency testing in Pirbright WRL in August 2006.

7. **To revise FMD National Surveillance Plan**  
   From July 2007, I am member of the National FMD Committee, with regular meeting every 2 Mondays.

**3. Project perspectives**

Based on the Iran experience, a regional approach for FMD surveillance can be set up in the region step by step, using Tehran as a regional coordination point for:

- **Training:**  
  - FMD surveillance and outbreak investigation and follow up  
  - FMDV diagnostic

- **Regional meeting and Seminar:**  
  - FMD situation in beneficiary and observers countries  
  - FMDV circulating in the region  
  - FMD surveillance, control and vaccine

Phase 2 of the project (2008-2009) must be rewritten and proposes to the neighbouring countries of Iran, in link with the phase 2 of the FAO regional project GTFS/INT/907/ITA “Controlling Transboundary Animal Diseases in the Central Asian Countries”.

Combating Foot-and-mouth Disease through enhanced and co-coordinated surveillance activities

Central Asia FMD Surveillance Centre Project

FMD OUTBREAKS REPORT: MARCH 2007

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**EVENT:**
- Continuous increasing of prevalence of type O from July, 15th, even in vaccinated herds
- Severe clinical signs in affected herds (calves mortality and tongue lesions in young cattle)

**LOCALISATION (S):**
- Central provinces of **Qom** and **Markazy**
- Province of **Isfahan**
- West province of **Kurdistan** and **Hamadan**

**COMMENTS:**
Changing of virulence of O type or new subtype?
**FIELD & LABORATORY EVENT**

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**EVENT:**
- Continuous increasing of prevalence of type O from July, 15th, even in vaccinated herds
- Severe clinical signs in affected herds (calves mortality and tongue lesions in young cattle)
- samples collected send to Pirbright for further investigation

**LOCALISATION (S):**
- West province of *Azerbaijan* (2), *Ardebil* and *Hamadan*
- Central provinces of *Qom*, *Markazy*, *Qazvin* and *Tehran*
  - South East provinces of *Fars* and *Sistan*

![Map of Iran showing affected provinces](image)

**COMMENTS:**
*Changing of virulence of type O?*
Combating Foot-and-Mouth through Enhanced and Co-Ordinated Surveillance Activities: The Central Asia FMD Surveillance Centre Initiative

1. Background and Justification

1.1 Regional point of view

Foot-and-Mouth Disease (FMD) types O and A have long been endemic in the Central Asia area with a continuing deleterious effect on the livestock sector. FMD is currently causing serious direct and indirect economic losses in both countries. In many cases, the control of Foot-and-Mouth Disease is directly linked to food security, such as with nomadic people and other groups whose nutrition is based on milk. A major consequence of the disease is a drop in milk production, which has a direct impact on their food security. FMD also causes losses in newborn animals that can contribute to the deficit in animal protein production and livestock capital in the infected areas. Aside from detriment in production, another major economic consequence affecting rural incomes is the loss of revenue from livestock trade, which is severely constrained by the presence of FMD.

In this area, the disease is perpetuated by FMD viruses moving into and between the countries through farming communities that span national borders and through trade-based livestock movements. The risk of the disease expansion is at present particularly high, given the severe political and FMD problems being experienced in some countries like Afghanistan, Pakistan and Iraq.

That is the reason why collaboration between the Central Asia countries to strengthen the control of animal diseases - including FMD - in the region, by means of such fundamentally important measures as the control of illegal transboundary animal movement.

1.2 European point of view

During the last years and very recently in Turkey and Iraq, this region has seen regular appearance of new strains of FMD virus, which spread widely and necessitated the development of new vaccines for their control. The emergence within a short period of time of two new variant strains of type A FMD virus was recognised retrospectively to have occurred in Iran in 1996, 1999 and 2005. At this time the virus became widely disseminated throughout Iran after its initial recognition in 1996, spread rapidly through Turkey during 1998, entered Georgia and Armenia and extended to the point at which it threatened to cross the Bosphorus into European Turkey and onward into mainland Europe. The occurrence in 1999 in Iran of type Asia 1 makes the situation more complicated, and it is essential that appropriate measures be taken urgently. Development of new vaccines for FMD is a lengthy procedure.

The newly emergent strains of virus have revealed deficits in coping with FMD emergency situations, both in terms of surveillance and virological monitoring and in technological capability with respect to the virus characterisation necessary to support effective vaccine production.

Taking in account those two points of view, the project is expected to strengthen the control of FMD in the region and to give updated and appropriate information to European countries regarding FMD situation in this area. It would also complement and assist ongoing FAO EMPRES activities in the region which promote the progressive control of transboundary animal diseases in accordance with the World Food Summit Plan of Action.

1.3 Iranian point of view

FMD is currently causing serious direct and indirect economic losses in Iran and, regarding the geographical situation of the country, the Iranian authorities thinks this...
initiative may contribute to solve the difficulties that they have to control the disease at the national level.

The Iranian authorities emphasize on the need of **regional approach** regarding the control of FMD in the next future and not only for the surveillance aspects.

They consider the following key-success for this project:

- Regional surveillance Centre to coordinate National surveillance Centres
- diagnostic laboratories well equipped
- adapted training period and permanent technical support for all human resources involved in the project
- efficient vaccine
- adapted regulation regarding FMD surveillance and control in all the countries concerned
- harmonised epidemiological data collection
- permanent viral strain surveillance

In this context, Iranian veterinary Organisation will contribute actively to the project through human and logistic resources given to the project.

2. **Objectives of the project**

2.1 to improve FMD surveillance system in the region to get early warning and updated information

✓ through a FMD surveillance centre able to centralise and disseminate FMD information in Central Asia

2.2 to strengthen the technical capability for FMD diagnosis including new variant identification in the region

✓ through a technological transfer between WRL, SAP Institute and Central veterinary laboratory of Karaj

2.3 to get a rapid alert system in case of risk of spread of the disease from the region

✓ through a regional FMD surveillance centre able to analyse collected data immediately.

3. **PROJECT STRATEGY**

3.1 to start with capacity building in I.R. Iran and focus initial activities in high-risk areas

✓ through implementation of a national dedicated FMD surveillance Centre set up progressively in 3 pilot areas, then in all the country, managing active and passive surveillance according to risk and typing of virus isolated

3.2 to demonstrate to neighbouring countries ability of this pilot scheme implemented in I.R. Iran for FMD surveillance in the region

✓ through technical visits related to the pilot scheme FMD surveillance system implemented in I.R. Iran

3.3 to extend to neighbouring countries (Afghanistan, Turkey, Pakistan, Turkmenistan and Uzbekistan) this pilot scheme and to establish in Tehran the regional centre for FMD surveillance in the region

✓ through workshops for harmonisation of data collection and virus diagnosis and establishment of national FMD surveillance point in each involved country

4. **PROJECT IMPLEMENTATION (INCEPTION REPORT PROPOSALS)**

The project will be implemented during 4 years, within 2 phases:

4.1. **Phase 1 – focalised in Iran** (2 years)

✓ establish regional epidemiological group in high risk areas, with specifically trained staff in surveillance

✓ strengthen regional diagnostic capacity and Central veterinary laboratory
4.1.1 **Phase 1-A (1 year)**
- strengthen provincial surveillance for FMD in 3 pilot areas (7 provinces)
- improve guidelines and forms for FMD investigation with field evaluation, adaptation and review
- set up an FMD Task Force team

4.1.2 **Phase 1-B (1 year)**
- extend provincial surveillance to other major areas of risk
- assess the Iran National Centre for FMD surveillance

4.2. **Phase 2 – extended in the region (2 years)**
- demonstrate value of FMD surveillance system implemented in Iran for animal production and trade systems common in the region
- extend the project to neighbouring countries
- use Tehran as regional co-ordination point for the project

5. **PROJECT OUTPUTS (RESULTS)**
The specific outputs are expected to be:
5.1. to strengthen field surveillance activity in high-risk areas of the region and improved reporting systems
5.2. to analyse the animals’ movement within and between the countries with adapted and updated technology, so G.I.S system (Geographical Information System)
5.3. to improve capability for laboratory diagnosis including serological testing, sero monitoring and characterisation of the virus
5.4. to enhance interregional communication and collaboration for transboundary movement control
5.5. to pave the way of a regional FM