

2. 国連食糧農業機関（FAO）が提案しているプロジェクト（1）

**Strategic approach for the development of Animal  
Identification and Movement Control  
(traceability) systems for the APHCA  
countries**

**And the Linkage to Veterinary surveillance and other  
Agriculture and Livestock databases**

Base Paper

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1

**What means  
animal  
identification,  
Registration  
and movement  
control**

A system for identification, registration and movement control (I&R systems) is essential for adequate Veterinary surveillance (animal health and consumer protection) and can support different agricultural databases (selection centres, milk recording, subsidy payments)

The advantages of an I&R system will be explained in this paper. It will be particularly focussed on bovine animals. The system can be similarly used for sheep, goats and pigs. The recommendations of the EU Commission regarding I&R systems have been considered.

The application of the system as introduced in this paper is not restricted to a certain infrastructure of a country. The implementation requires, besides a legal basis, a well defined strategy, thoughtful planning and cooperation of concerned bodies and participants.

For preplanning, planning, and implementation of the system (see page 16) assistance is usually needed. EU Member States have learned from each other and eastern European countries are in favour to use previous experience of EU Member States.

The system should ideally be run not just for its own sake (animal identification, registration and movement control). It should be a part or better it can be a core of an integrated system which can comprise veterinary surveillance, breeding and other data ( see pages 8 and 9).

Access to the database can be granted via a password system so that each legal body or participant can use only the specific data for his purpose.

**In the past the standards of I&R systems might have looked like the following:**

- Nothing at all and/or
- Different methods of identification of cattle used in the same country; The means of identification range from a paper based description of the animal, marking with colours, hot and cold brand marks, ear tags in various types of forms, electronic marks like subcutaneous chips or ruminal boluses and genetic fingerprints.
- Campaign based temporary identification and registration of animals; Animal identification works very basically to help to identify an animal if a certain event (vaccination, treatment, disease surveillance, artificial insemination, etc. ) takes place.
- Different standards for registration of holdings and identification of animals (i.e. numbering system of ear tags);
- Registration only paper based (no computerised database) and client based (only for special holdings or breeding programmes);
- No records about events (birth, death, slaughter, movements) leading to databases which do not describe the real situation after a time period;
- No records about veterinary events;

**I&R standards in the future should be built up in line with:**

- Unified standards for holding registration
- Unified and unique method - including numbering - of identification of animals
- Registration of animals on a central database
- Registration of births, movements, deaths and slaughters
- Registration of veterinary events and other events

The application of markers (preferably ear tags see page 10) can be done by the farmer, or the field services (public and private veterinarians, technicians, breeding and selection centres, etc.).

Registration of animals and events can be done via a network or internet connection to the database (recommended for big holdings or slaughterhouses) or with help of a paper based notification card system and the field services. The most effective solution will depend upon the local technical infrastructure and the prevalence of computers.

The database should register all bovine animals, births, slaughters, deaths and movements. The most work intensive part is to register movements between holdings.

Movement recording enables the competent authorities, in the case of disease outbreak, to trace forward and backwards animals movements and to quickly find the locations of suspected animals or contact holdings. This is indispensable for the surveillance of diseases and for planning the appropriate measures in case of disease outbreaks.

Since registration of movements is work intensive the "holdings" should be defined carefully. Pasture systems, or villages with common grazing land can be defined as special "linked" holdings in order to avoid unnecessary movement announcements.

The EU has developed a system of identification and registration of equines as well, which is based on the description of the exterior of the animals.

**Expressions used:**

EU: European Union

Entity: fixed items and things to be recorded in the I&R database like, holding, owner, keeper, ear tag, animal,

Event: occurrence of birth, death, slaughter and movements of bovine animals;

Veterinary event: Disease outbreak, test, treatment, vaccination, herd health status;

Field service: organisation, state service or private veterinarians who are in charge for the field related work;

Holding: any establishment, construction or, in the case of an open-air farm, any place situated within the territory of the same State, in which animals are held, kept or handled;

Notification Cards: Cards, which are pre prepared for notification in case of an event;

I&R database: database for identification, registration and movement control;

2. Countries have implemented a system for identification, registration and movement control of animals considering:

**Basis of animal and movement control EU and other countries**

- Improvement of animal health
- Improvement of Public health and
- Improvement of the statistics and the development of the livestock sector particularly with a view to subsidy payments

2.1

**Animal health**

Recent disease outbreaks (BSE, FMD, ESP) have caused tremendous damage to certain national economies. . The reason for this is not the disease outbreak itself so much as the inadequate instruments for controlling the disease outbreaks which has made diseases so unpredictable and the eradication processes very expensive.

Livestock trade facilitates the spread of diseases within a very short time period over big distances. A calf traded from a market or a collecting point will have the possibility to contact many other calves and the agent can spread to different herds and holdings. Contacts with up to 90 holdings resulting from one calf or pig traded are not uncommon.

Effective control of fast spreading diseases depends therefore not on drawing a restriction circle around the first holding identified with the disease (in reality it might not be the first holding which has the disease, just the first identified). Effective disease control depends on a fast identification of all holdings and regions that might be infected. The fast identification of contact holdings to the first identified with the disease is essential.

The same applies for slow developing diseases like BSE.

A working I&R system with effective movement control could have lowered the damage during the 2001 FMD crisis in the United Kingdom drastically.

The economic losses due to inadequate disease control can profoundly harm the economic viability of farming, connected industry branches, trade and the whole rural economy. Estimates suggest that the recent UK Foot and Mouth outbreak costs the economy approximately 5 billion pounds sterling.

2.2

**Public health**

Consumers are concerned about food safety. BSE, Dioxin and several drug scandals have shown that competent authorities do not have appropriate instruments to find and exclude the sources effectively.

Consumers are concerned by insufficient information concerning the meat they buy. Public confidence in meat and meat products can be recovered if the production chain is transparent and open to regulatory measures if needed.

International trade with meat and meat products follows this rules as well

2.3

**Subsidy payment surveillance system**

Livestock development and subsidy payment will require accurate data about number of animals, holdings and owners. Preventing fraud in the subsidy payment scheme was a mayor stimulant for administrations and farmers to implement a streamline I&R system in the EU.

3.

**Key performance results of a system for identification, registration and movement control of bovine animals**

The I&R system will contribute to:

*The disease surveillance and eradication programmes.* The system will assist with implementing surveillance strategies for *Office International des Epizooties (OIE)* List A and B category diseases and zoonoses important for human health.

*The contingency planning and reaction to disease outbreaks.* In the event of an outbreak of an OIE List A disease the system will allow the Veterinary Services to identify infected animals, establish their immediate recent locations and movements and implement contingency plans based on this information.

*Assisting Trade* — Standardised disease surveillance and contingency planning will lead to a improved disease situation within the country and consequent markets will open for agricultural and livestock products.

*Livestock and Veterinary Sector Planning* -The system has the potential to be a valuable tool to assist with planning in the Livestock and Veterinary Sectors. Outsourcing of certain tasks within the system will support the Veterinary Sector to move towards privatisation.

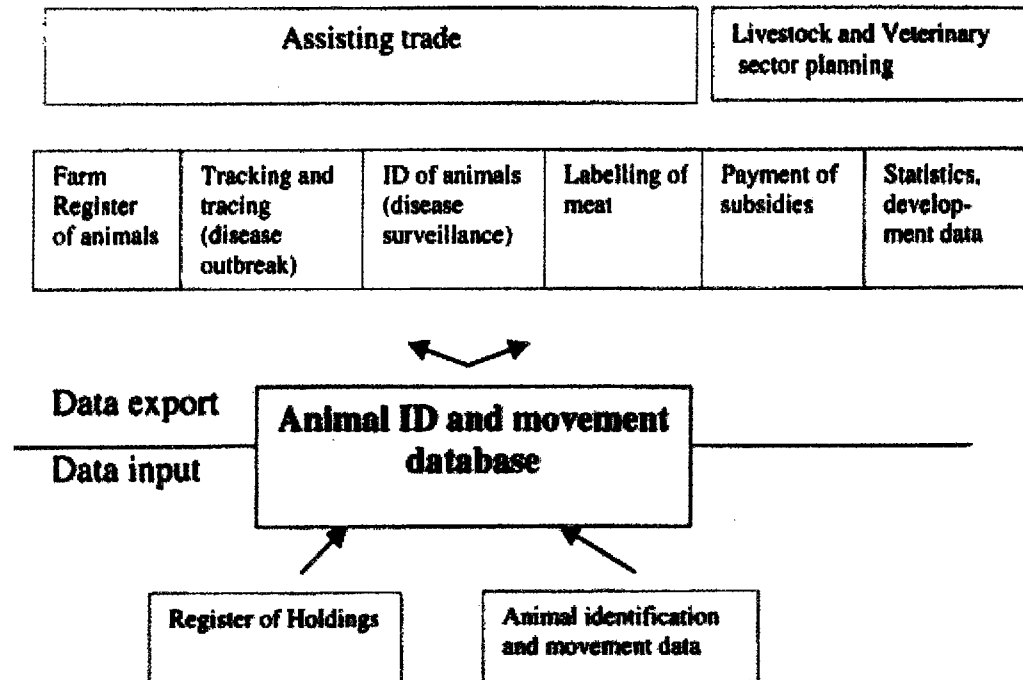
*Platform for Other Informatics Systems* - The scheme could provide the basis for other Ministry of Agriculture or Veterinary Services information systems such as Herd Health, Milk recording or breeding schemes.

### 3.1

#### The System itself

Diagram 1 shows the data registered in the I&R database and the use of the data for different purposes.

Diagram 1: Possible data export and benefits of the I&R system



The purposes of the database can be described as follows:

- to provide an up to date register of all holdings, herds, animals, owners and keepers;
- to provide records relating to all births, deaths, slaughters and movements;
- to provide records of all ear tags supplied to farmers;
- to provide records of the health status of individual animals, herds and holdings;
- to facilitate certification of animals for movements (in country trade and export);
- to track and trace movements of animals in case of disease outbreak;
- to provide the necessary data for meat labelling with regard to the animal and it's origin;
- to provide up to date common reference data (holdings, herds, individual animals) which can be supplied to a number of other databases, e.g. Selection Service;

- to provide data to subsidy payment schemes to assist with the prevention of fraud;
- to enable the farmer to keep his farm register on-line;
- to provide statistical information to Government Departments

### 3.2

#### As a key element for other database system

The I&R database can enrich and complete the functions of other databases as well. Veterinary data (tests, vaccinations, treatments, disease outbreaks, disease surveillance data, herd health status) must be linked to holdings and single animals. Therefore recording of veterinary events should be connected to the I&R database if the full benefits in surveillance and control are to be achieved.

But other agricultural data systems like selection and breeding databases or milk recording databases can benefit from the I&R database as well.

Diagram 2 shows databases which can profit from a I&R system.

Diagram 2: Core of the integrated database system (animal ID and movement database and elements suitable for possible integration)

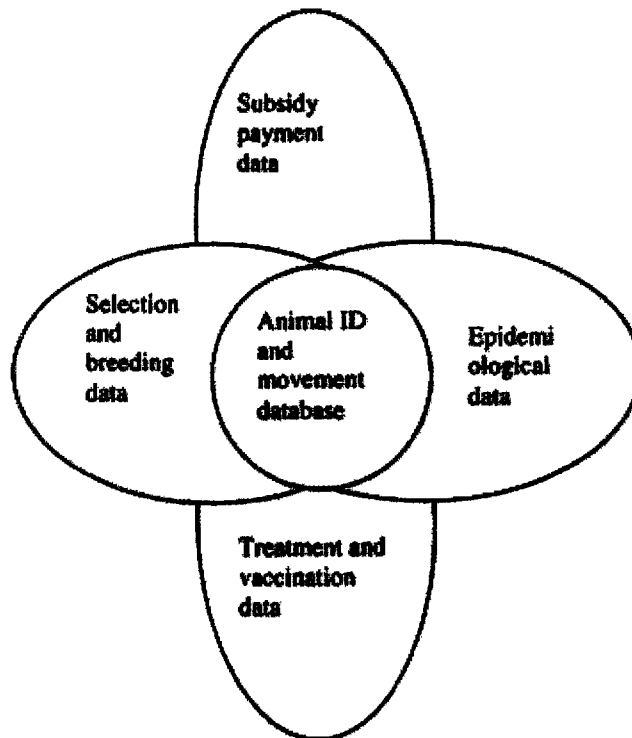
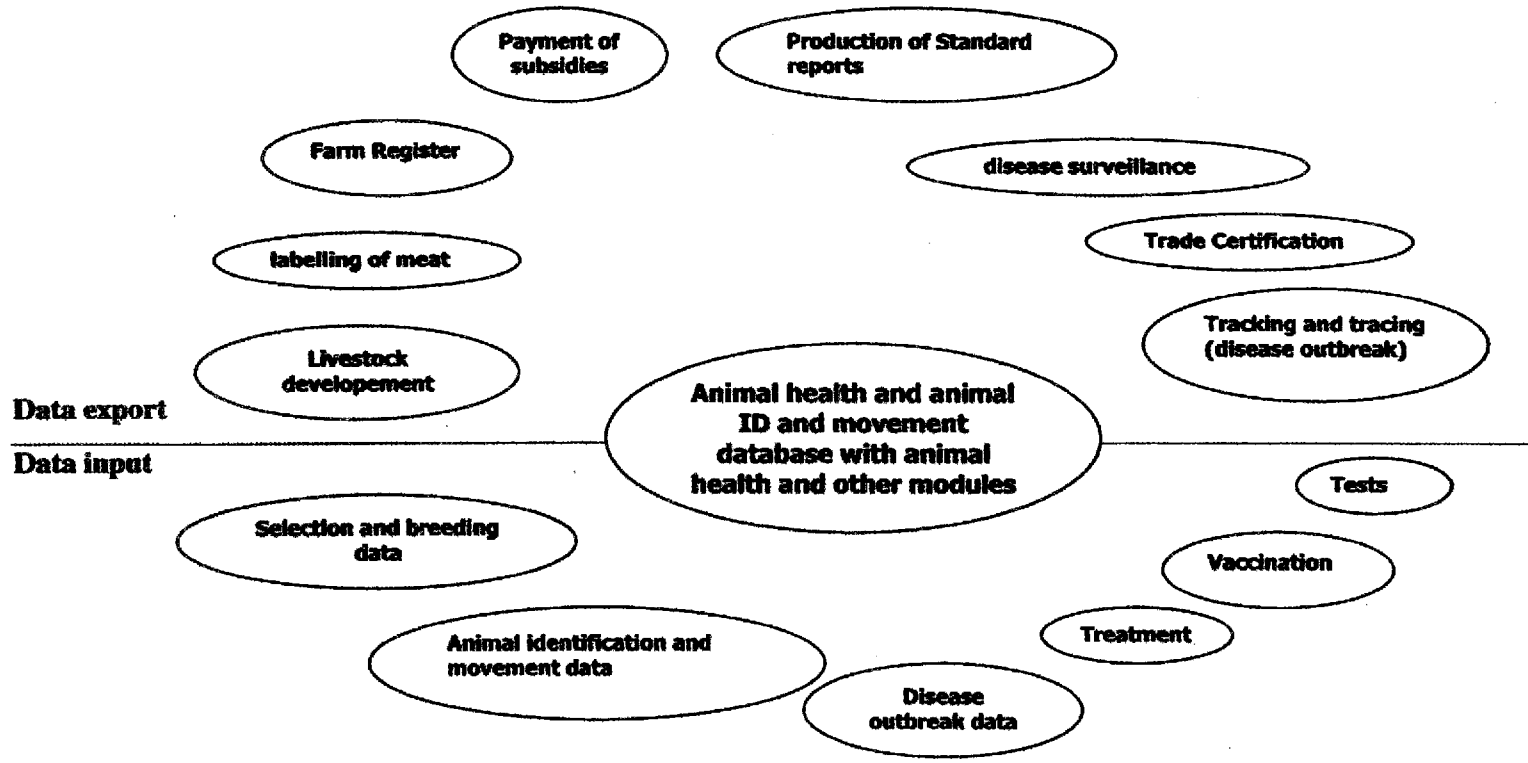


Diagram 3 shows the data input and data export from an integrated I&R database with different modules.



Diagram 3: Integrated animal ID and movement database with different modules



**The elements of the system**

The animal identification, registration and movement control system as recommended by the EU Commission consists basically of four elements:

- The ear tags as markers (with each animal having a unique lifetime number)
- The database (for recording entities and events)
- The cattle passports (which are issued after marking and accompany animals lifelong)
- On farm register of animals

**The Markers:**

The animals should be identified with simple means, which can be applied easily, which are cheap, which will stay permanently and which can be read without technical equipment.

Therefore ear tags as identification marks should be preferred to other animal identifiers (boluses, microchips). The advantages of ear tags are:

- Animals can be identified without sophisticated reading equipment
- Ear tag identification is used at the routine work with the animals (vaccinations, tests, artificial insemination, treatments, milk recording)
- Ear tags can easily be applied and replaced

The ear tags should comply with the following specifications:

- (a) They shall be of flexible plastic material;
- (b) They shall be tamper-proof and easy to read throughout the lifetime of the animal;
- (c) They shall not be re-usable;
- (d) They shall be of a design which will remain attached to the animal without being harmful to it;
- (e) They shall carry only non-removable inscriptions

Each animal should be ideally tagged with two ear tags with identical numbers. This is a safety measure in case one ear tag gets lost.

## **The Database:**

### **Software recommendations**

It is important that the national I&R database is compatible with related national databases and with similar systems in other countries; it must conform to certain standards. The EU has adopted software recommendations for animal identification, herd registration and movement control systems, with the future possibility to add animal health surveillance and public health monitoring capabilities. The recommendations specify that appropriate software should provide:

- a large centralised database, accessible on-line with a short response time (e.g. Oracle or equivalent);
- a fully relational database management system (DBMS) providing multi-site, multi-user, possible Internet access to all remote registered users across the territory, which can easily exchange data with other national databases, for example existing cattle production and milk recording databases;
- records of species other than bovines (porcines, ovines, caprines) should be possible later on the same database to allow user friendly access for mixed herd operators;
- individual registration of bovines;
- future extension to recording of disease outbreaks, pharmacovigilance monitoring and recording of veterinary activities (tests, vaccinations, treatments) should be possible;
- a tool for identification of holdings and herds by map reference, preferably with GIS capability;
- full backward and forward tracing from any specific date of individual animals and herds, herd reconstitution on specified dates, including contact animals and related animals/herds.
- automatic restriction on individual animals, herds, geographical areas and genealogical lines on animal health and veterinary public health grounds.
- The system to be adapted for multilingual use.

The database should store data on the following principle entities:

- Owners (unique identifier, address, contact details, etc);
- Keepers (unique identifier, address, contact details, etc);
- Holdings (unique identifier, address, contact details, map reference, etc);
- Herds (unique identifier, breed of animals, number of animals, health history, current health status, etc);
- Animals (breed, colour, purpose, etc);

The database should also record data on the following events:

- Birth of an animal (date of birth, date of identification, identification of sire and dam, etc);
- Meath/slaughter of an animal (date of death/slaughter, etc)
- Movement of animal (date of departure, date of arrival, holding of origin, holding of destination, identification of transport vehicle, etc)
- Disappearance of an animal (date of disappearance, etc);
- *Disease Outbreaks (dates, animals affected, etc).*
- *Vaccinations (date of administration, type of vaccination, batch number, dosage, etc);*
- *Health and Residue/Substance Tests (date of administration, type of test, results, etc);*
- *Treatments (date of administration, type of treatment, dosage, etc); (recorded in integrated — I&R and veterinary - databases)*

### **The cattle passports**

Cattle passports (stating date of birth, place of origin, sex, breed, identification number, ID of mother and movement data) are issued after the calf has been marked. The issuing authority must also be defined. The passport accompanies the animal lifelong.

Once the database is fully operational (all movement data are recorded) passports do not need to be issued anymore except for trade and export. The passport proves — beside a veterinary certificate - that the trade is legal.

An advantage of passports is that the ID and the movement of cattle can be followed up easy without access to a PC.

### **On Farm Register of Animals**

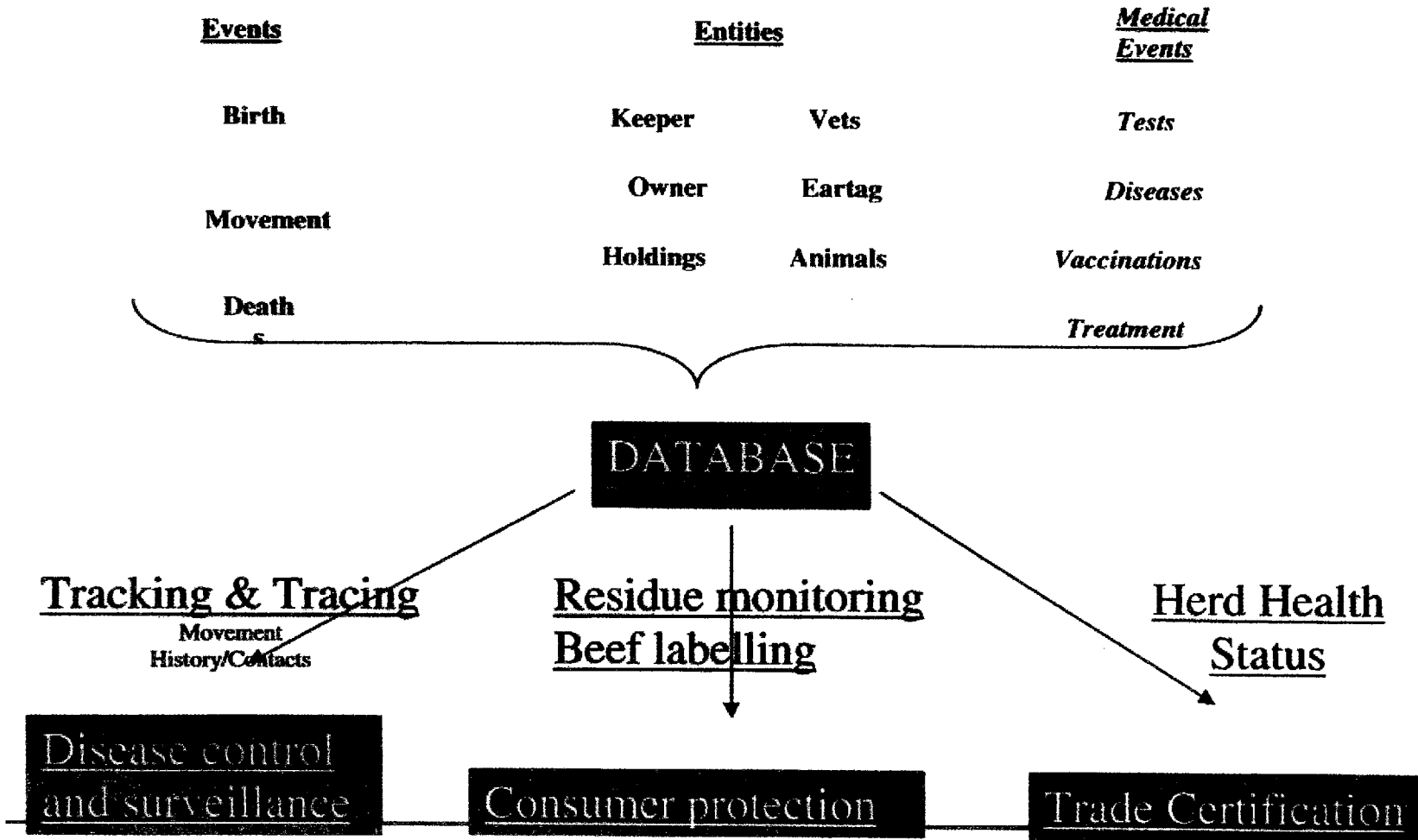
The on farm register should assure that there is always a list available about the animals present at the holding stating where they came from (if not born at the holding) and to where animals have been shipped from the holding.

The on farm register of animals keeps the same information as the database. Therefore the on farm register can be created on line and downloaded. Authorised field services can manage the on farm register if required.

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Diagram 4 shows the items to be recorded on the database and the purpose of the data. Medical events recorded in the database support the key performance results.

**Diagram 4: Events and entities to be recorded in the I&R database and key performance results**



**Implementation  
of the element**

The system can be implemented if the participants of the system (farmers, traders, slaughterhouses, markets, etc) are aware and prepared to contribute to the system. Farmers and other holders of cattle (traders, slaughterhouses, markets, etc) must report events (birth, death, slaughter and movements) to the database. Data collection procedures are briefly described below.

Operating procedures must be defined and an organisation (administrative body or organisation assigned for this purpose) must be in charge, trained and able to collect and record the required data and to run and maintain the database.

Field services must be defined for ear tagging and notification, if this is not to be done by the farmer.

The responsible Authority (see chapter 6.) must create and implement surveillance.

All those modalities depend on the local situation. Countries have to find a solution for operating the I&R system which is appropriate to the particular circumstances of farming, livestock services and the administrative set up.

**Procedures to be defined:**

- The organisation concerned with the order and distribution of ear tags (new and replacements).
- The application of the ear tags.
- The registration of births, slaughters, deaths and movements of animals

Generally three ways of registration are possible: Notification cards, telephone and the Internet; Cards can be filled by the field service and forwarded to the organisation in charge of the data collection and registration. Different models are possible and in use in different countries.

Collecting centres and slaughterhouses will usually send their announcements (animal arrived and dispatched, animal arrived and slaughtered) electronically as batch data or via the Internet.

The procedures must be exactly defined and preferably laid down in a manual. Information must be given to the involved parties within a specified time period.

- Issuing of cattle passports
- The operation and servicing of the central database
- The surveillance and review of the system

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In order for the system to be developed and implemented, certain essential elements must be in place:

**Precondition for the implementation**

**Responsible authority**

A competent authority must be defined, authorised and enabled to develop a strategy, a plan, implementation and surveillance of the system. Cooperation with concerned bodies must be ensured.

**Legislation**

Legislation must be drafted and passed to provide the legal obligation on the various parties to supply information and to participate;

**IT Strategy**

A strategy must be developed in order to find the appropriate structure of the database system and a basis of data exchange between different databases in order to use the resources most effectively and to achieve most cost-effective results.

**Funds**

Funds must be raised to pay for the system, e.g. purchase and maintenance of hardware and software, provision of ear tags, application of ear tags, announcement procedures, etc. It must be clear which part of the system will be financed by the Government and which part by the private sector. Funds must be found, not just to establish the system in the first place, but to pay for its continued operation;

**Staff**

The staff must be found to operate the system effectively and must be given sufficient training (some key staff should be exposed to the systems used by other countries). The types of staff likely to be involved with operating the system are veterinarians and computer specialists.

Computer equipment must be provided, i.e. hardware, software and communications equipment.

**Holding register**

There must be an up to date list of all existing holdings and locations where animals are kept, i.e. a farm register.

**Unification of Marks**

There must be a unified national system for identifying animals with each

animal having a unique lifetime number. The design of the ear tags for cattle should ideally comply with EU standards;

### **Sustainability**

Sustainability of the system must be ensured. It will predominantly depend on:

- costs of running the operating management structure for the database
- costs of the field services
- long term financing of ear tagging by farmers
- acceptance of the system by farmers, slaughterhouses and the trade
- future support of the system by Government funds
- evolution of the system from expensive manual data collection to an on-line data delivery system (long term)

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### **Roadmap for I&R Implementation**

Educational work and information provided in time to decision makers and to beneficiaries is vital in order to achieve broad acceptance and cooperation. The successful implementation of the system is very much depending on the information given to participants (farmers, veterinary and livestock services, meat industry) of the animal ID and movement system and to the public. The information will explain the benefits and necessity of the system for the Livestock Industry and trade development and also the responsibilities and duties of the participants.

The competent Authority must be identified and authorised to implement the system. It is recommended to break down I&R implementation in phases and to plan the phases thoroughly.

Furthermore preplanning, planning and implementation would be facilitated with assistance of experienced experts.

The following tools will be essential for the successful implementation of the system: Flexible planning, Change management tools, phased results and awareness by information campaign and training

#### **Flexible planning:**

A project for I&R implementation involves complex logistics. The timeframe for implementation must take into account that decisions and acceptance outside the control of the project planning cannot be fully assumed. Therefore a flexible project plan separating establishment and testing of the system from the operation of the system should be established. The critical path of project planning should allow extend phases if required.

#### **Change management tools**

The success of implementing a system involving change management requires the use of Quality Management tools. The essential enablers are:

- A competent Leadership coalition



- Team building and communication
- A clear strategy and goals
- Adequate resources
- Structured project management techniques (design, plan, review control)

The importance of this approach should be recognised and built into the project design to ensure effective and coherent implementation of the activities.

### **Phased results**

Before the system becomes operational throughout a country different components (like described in chapters 4 and 6) need to be established and testing must take place.

To ensure successful establishment of operational procedures the implementation should be split into two phases: one phase as system establishment, secondly system operation. The system operation will be tested at pilot level, reviewed and then rolled out through the entire country.

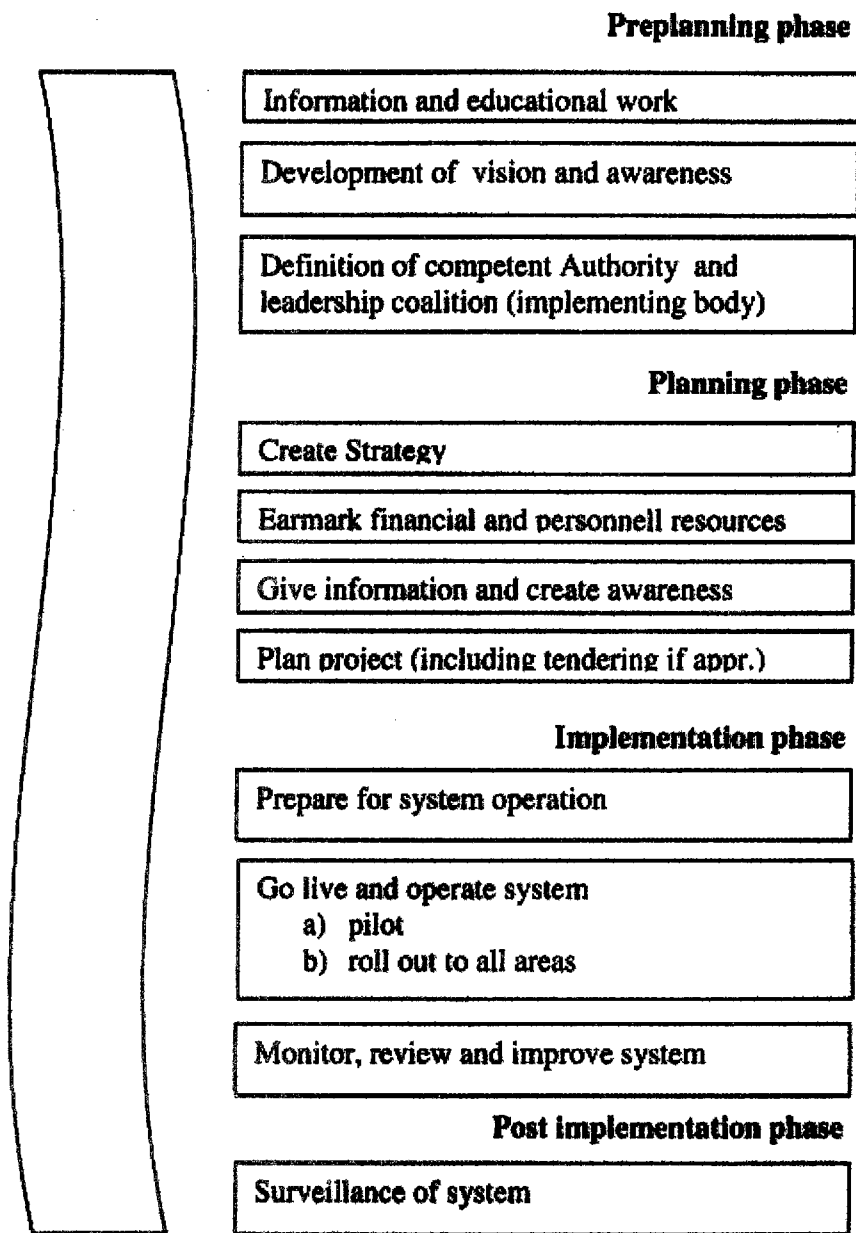
### **Awareness by information campaign and training**

The system must be accepted by the participants. Benefits and the necessity of this system for farmers and the livestock industry must be made transparent from the outset. Furthermore farmer and other keepers of cattle must be informed about their obligations for a successful and sustainable animal ID and movement system.

Staff must be well trained in order to run the system effectively and to avoid misunderstanding.

Diagram 5 shows the phases to be accomplished for achieving a full operational I&R database. Within the phases a short outline of the activities in each phase is given.

Diagram 5 : Phases with an outline of activities in each phase



2. 国連食糧農業機関 (FAO) が提案しているプロジェクト (2)

Country: **PEOPLE'S REPUBLIC OF CHINA, LAOS, THAILAND AND VIET NAM**

Project Title: **Strengthening Cross-Border Animal Disease Surveillance and Coordination between China, Laos, Thailand and Viet Nam + Myanmar**

Project Number: **TCP/RAS/0170 (T)**

Starting Date: **November 2001**

Completion Date: **April 2003**

Government Ministry responsible for project execution: **- Agriculture Ministry of PR China with Ministry of Agriculture of Yunnan Province of PR China  
- Department of Livestock and Fisheries, Ministry of Agriculture and Forestry, Laos  
- Ministry of Agriculture and Co-operatives, Thailand  
- Department of Animal Production and Health, Ministry of Agriculture and Rural Development, Viet Nam**

FAO Contribution: **US\$ 328 000**

Signed: .....

(on behalf of Government)

Signed: .....

**Jacques Diouf**  
Director-General  
(on behalf of FAO)

Date of Signature: .....

Date of signature: .....

## **I. BACKGROUND AND JUSTIFICATION**

The People's Republic of China, along with many neighbouring countries: Laos, Thailand and Viet Nam, are undergoing rapid development, economic and population growth. The challenges are to meet the nutritional needs of the people in a sustainable manner, through provision of animal products, as well as crops (for which draught power will remain an important component for the foreseeable future) and to provide means of generating income in poor rural areas. Accompanying the economic growth is a disproportionately increasing demand for meat. This demand for meat is often met by cross-border and inter-provincial trade in live animals, the direction of which at any one time is a reflection of demand, production levels and differential/fluctuating economic fortunes. In order to satisfy the demand for meat in Yunnan Province and other provinces, livestock production in the Province is being encouraged to expand, an activity which is also seen as a valuable means of providing opportunities for rural income generation. As one of the most important businesses, the output value of animal husbandry makes up 28% of the total production value of Yunnan provincial agriculture, with about 38 million domestic animals of different kinds. It is expected that the output value of provincial animal husbandry will reach as much as 20 billion yuan (currently US\$1 = 8.7 RMB yuan) in the year 2001. In the longer term, it is intended to access the markets in the more developed parts of the region, which are less favourably placed for cattle and small ruminant production. There is already an occasional informal trade in swine meat, both into and out of South China at times of special demand, and, as Viet Nam develops, there is a demand for high quality breeding swine which is partly met from China. There are also lucrative markets in the more developed countries to be tapped in the future.

Livestock production, primarily for meat, milk and the many facets of draught power, but also with significant contributions from fibre, fuel and fertiliser, is of major importance in all of the relatively poor and underdeveloped countries which surround China. Meeting the demand for increased livestock production in the long term, will undoubtedly involve increasing intensification of livestock production systems, which are more vulnerable to epidemic disease occurrence.

Livestock movement for trade is a dynamic process in the region comprising China, Middle Asia, South Asia and South-east Asia, with the direction and magnitude at any one time reflecting economic differentials between countries. For example, surplus buffaloes from Yunnan Province were, until recently, moving to the lucrative markets of Thailand and Peninsular Malaysia. Now, however, cattle and buffaloes are moving into Yunnan Province to meet the demand for meat generated by strong economic growth. There is a complex movement of swine for breeding and consumption across the borders. The volume of the trade is large and increasing; it is likely to increase further with overall economic growth and the emergence of new trading patterns. Accompanying this trade is a high and increasing risk of movement of major diseases, thus setting back the objective of modernisation of agriculture. In particular, FMD moves rapidly along trade routes and the risks for livestock production in China and the region are clearly increasing. Sound epidemiological understanding of the determinants of FMD occurrence is a prerequisite for effective control.

The risk of epidemic disease occurrence constrains trade in livestock and their products, both through the present, or potential presence, of diseases and through uncertainties of disease status, and impinges on food security, rural income generation, agricultural development and economic

growth. Increasing trade in livestock occurs over long distances in the region and brings contact between ecological zones of disease which in the past were relatively stable and distinct.

FAO supports technical and economic cooperation among developing member countries, as well as those in transition. This regional TCP will be used to provide a catalytic input in promoting "horizontal" cooperation. The assistance will focus on the transfer of cost-effective and appropriate technologies, based on the existing arrangements for sustained and longer-term cooperation among the participant institutions/countries.

This project relates to a problem common to the participating countries, and constitutes a priority for their governments and will be supported by them.

The countries concerned have already initiated, in the relevant technical field, long-term national programmes (at different stages of development), which already have at their disposal human, technical and financial means. This regional TCP will provide the early training and ensure the sustainability of this process.

Governments have accepted the principle of the free interchange of technicians, information, equipment, supplies, etc.

The Governments have agreed to cover, either entirely or in part, the local cost incurred during the exchanges (specialists' salaries, board and lodging, internal transport, national lectures, etc.).

This regional TCP will also be used to support research collaboration, twinning of institutions (especially the two laboratories in China and Thailand, etc.).

### **The transboundary animal disease context**

Rinderpest is a historic disease for China, South-east Asia and Middle Asia, yet there remains a significant, and possibly growing risk, of reintroduction to at least some parts. While the disease persists in Pakistan, there can be no cause for complacency, and the risk of spread into neighbouring and even distant countries will almost certainly persist in the short to medium term. Irregular trade in cattle from Pakistan is known to occur through Afghanistan into the southern CIS Republics, placing them at great risk. Only civil strife in Afghanistan constrains the trade at present. The risk of re-invasion of India and Nepal is one which also must be countered by vigilance, as must the potential for onward spread to China. Future trade prospects in cattle from China, an expected development, will require verification of freedom from rinderpest. A related disease of small ruminants (PPR) has become of increasing significance and incidence in the Near East and South Asia in recent years. There is a very real risk that the disease will move into Middle Asia, South East Asia and China, with devastating effects on small ruminant production.

Foot-and-mouth disease has devastated swine industries in several countries of the region in the last three years. One particular highly pig-adapted strain of the virus (type O), first detected in Hong Kong, has spread widely and progressively, invading the Philippines, Taiwan, Province of China and Viet Nam. The presence and dissemination of this strain of FMD type O, including into Viet Nam, has caused major concern in the last five years, as has another distinct type O strain, which is currently spreading widely, affecting swine, cattle, buffaloes and sheep. The sources need to be disclosed and eliminated. Other strains of FMD of types O and Asia 1 are prevalent in South East Asia, and types A regularly and C far less regularly, are detected. Yunnan Province has suffered repeated cross-border introductions of FMD from neighbouring countries and is considered to be the most important portal for entry of the disease. Trade in live

animals is of overwhelming significance in the spread of FMD. FMD is endemic, widespread and a constant problem in South-east Asian countries, where it is the subject of a recent regionally-coordinated control campaign, currently directed by OIE through its Regional Coordination Unit in Bangkok to promote its progressive control. FMD is one of the most serious constraints in the sub-region to livestock production, crop production, and trade in animals and their products. Thereby it damages rural livelihoods and impedes agricultural development. At least two other stereotypes, Asia 1 and A, with numerous and constantly evolving strains, have been present in the last year.

The spread of FMD infection into China from Myanmar and Laos has been an almost annual occurrence for some years, but it has mainly been contained in the extreme west and south of Yunnan Province. Outbreaks in Tibet in 1999 suggest another portal of entry from South Asia. In addition to the frequent problems encountered through transboundary spread of FMD into China, there is also reason to believe that the disease is endemic in parts of southern China, as judged by the incidence of FMD in Hong Kong, and it appears to have spread from there, particularly in the last five years, to other countries in the region. The limited molecular epidemiological data clearly indicates the linkages between outbreaks, however, one must have regular collection, storage and genetic characterisation of local strains to draw epidemiological conclusions.

All the countries of the region are interrelated in the maintenance of FMD, and international support for its progressive control through enhanced epidemiological understanding in a regional coordination context is urgently needed. China has a most important role to play in combating this disease. The project is made even more relevant by FMD events which appear to be evolving at present in China. With a little assistance, China could make a major contribution to FMD epidemiology in the region, including molecular epidemiology. However, molecular characterisation of strains is only of use when sequence data can be compared with a global archive of current and historical strains. Hence, there is a need to establish and strengthen linkages between the Yunnan Tropical and Sub Tropical Animal Virus Diseases Laboratory (YTSAVDL), the regional reference laboratory in Thailand and the FAO/OIE World Reference Laboratory for FMD. This would be a most valuable innovation for China and FAO.

FAO TCP projects have contributed significantly to building institutional capacity for FMD control in the sub-region. TCP/RAS/4452 and 6611 in 1995/96 and 1996/97, respectively, addressing disease control and epidemiological issues, both produced sustainable results which contributed significantly to the slow but steady progress being made in this under-resourced area. China has, however, never had a TCP assistance project in this area, and more needs to be done in all the countries of the region.

All of the diseases mentioned here are of major significance for livestock production and trade. Their control is dependent on vigilant surveillance to allow sound epidemiological analysis of disease occurrence, and thus, the implementation of cost-effective and efficient strategies for progressive control and eventual elimination. Powerful internationally-standardised technical tools are available to assist in this process. These comprise rapid detection of infectious agents by immunoassay and molecular techniques and their molecular characterisation, immunoassays for sero-surveillance; database management with disease mapping; and analytical epidemiological tools for decision support, including performance indicators of surveillance. Their adoption in this vulnerable part of China, and in this Institute, which is of such importance to transboundary disease control in China, would greatly improve disease intelligence and control.

China has a long history of effective control of epidemic diseases, but readily appreciates the value of adopting recent innovations in disease diagnosis, surveillance, epidemiology and control, and is actively seeking assistance to achieve access to, and develop linkages with, international reference centres. In this regard, FAO has the opportunity to play a most valuable role in initiating developments in the sub-region, and is uniquely placed to do so.

### **Relationship to other activities**

The project would be complementary to other international inputs in the region, favouring the success of both. For Middle Asia and Mongolia, project activities will enhance those of the Joint FAO/IAEA Division's IAEA-funded Coordinated Research Programme for Rinderpest Surveillance. For South-east Asia, the project will be complementary to the OIE-coordinated FMD Control Programme, the joint FAO/IAEA Division's Coordinated Research Programme for FMD Surveillance and ACIAR's Laos/Yunnan project for FMD, and hog cholera research and EC-funded animal health projects in Laos, Viet Nam and Cambodia. In South Asia, it will complement the national and regional components within the EC-funded South Asia Rinderpest Eradication Campaign, including the prospective FAO implemented Epidemiology Project. It will also relate to FAO project activities in animal health in Afghanistan and to TCP/PAK/8923(A) in Pakistan.

### **Comparative advantage of FAO**

FAO has a recent history of related effective activities in the region:

- The project will enhance surveillance of epidemic diseases in a part of the world from where there is a lack of regular information. China is an active member of FAO;
- FAO has a particularly good relationship with China, both through EMPRES and the Regional Office for Asia and the Pacific. FAO's recent contacts with the Chinese authorities indicate that they wish to improve their international position on animal diseases through FAO. Since a visit to China by an EMPRES officer in 1997, the Chinese authorities have undertaken reporting of FMD outbreaks to the international community through FAO. China has applied to FAO for recognition of the Yunnan Institute as an FAO Collaborating Centre for Tropical and Sub-Tropical Diseases of Animals;
- The objective of the project is within the mandate of EMPRES, a priority programme of FAO, and is in line with the WFS Plan of Action for effective prevention of transboundary animal diseases which effect food security, rural livelihoods and/or international trade;
- FAO has a network of reference laboratories and collaborating centres which would be accepted by China as operating for the UN, rather than national agencies;
- FAO, through the Joint FAO/IAEA Division, has established standardised technical packages for serological surveys for, *inter alia*, rinderpest, PPR and FMD;
- FAO, through EMPRES, has developed expertise in, and tools for, disease data management;
- FAO alone, or FAO/IAEA, already operates key complementary projects within the region. These include FMD serology in Viet Nam, Laos and the Philippines; AusAID funded FMD epidemiology and control in the Philippines; rinderpest surveillance and strategy development in Pakistan; and, rinderpest and PPR control in Afghanistan
- FAO is collaborating with the OIE in developing coordination mechanisms for FMD control in South-east Asia.

Thus, FAO is uniquely placed to implement the proposed project to guide the transfer of requisite technology and understanding within a regional and global context, and this is acknowledged by the Chinese authorities.

### **Relation to SPFS**

FMD and PPR affecting all ruminants and sheep and goats, respectively, are of direct relevance to the diversification phase of SPFS. Lack of effective control of these diseases greatly constrains production from these short cycle species and compromises development of more efficient production systems.

## **II. OBJECTIVES OF THE ASSISTANCE**

### Objectives of the Proposed Project

The prime objectives are to:

Strengthen diagnostic and epidemiological capability of all the participating countries, but in particular, to strengthen the capability of the YTSAVDL to act as a reference centre for China, for FMD, rinderpest and PPR and to strengthen the capability of the Thailand FMD lab to act as the regional reference laboratory. The prime activity is technology transfer and technical guidance for China in this area. Training will be performed primarily through developing a relationship between FAO World Reference Laboratories China and Thailand, through in-house training by visiting consultants.

Enhance epidemiological understanding in the participating countries as an aid to disease prevention and progressive control of epidemic diseases in the region; and support laboratory-based surveillance for FMD, rinderpest and PPR with the introduction of diagnostic reagent kits.

Enhance communication between participating countries and the international community.

Strengthening regional early warning networking and develop strategy for cross-border control in the participating countries by means of training workshops in this subject area.

Develop expertise in the region in the diagnosis, differential diagnosis and molecular epidemiology for FMD, rinderpest and PPR through staff exchanges and training exercises.

Training staff in epidemiological techniques, including standardised data capture, database management and disease mapping. Development of regional surveillance competence (FMD, rinderpest and PPR), and collaboration/coordination. This would include interacting closely with other projects such as the EC Project Laos, ACIAR Project Laos/Yunnan and Viet Nam Project in association with EMPRES and IAEA. However none of these projects in any way competes with this project or makes it superfluous.

Develop commonality of reporting.



### **III. PROJECT OUTPUTS**

1. A Reference FMD Laboratory in China will be operational with the potential to link to other countries in the Indo-China sub-region;
2. Working linkages established between the YTSAVDL, the OIE Thailand FMD Regional Reference Laboratory and the FAO World Reference Laboratory for Rinderpest, the FAO/OIE World Reference Laboratory for FMD (Pirbright Laboratory, UK) and the FAO Collaborating Centre for PPR (CIRAD-EMVT, Montpellier, France);
3. Standardised techniques of diagnosis, surveillance and reporting for rinderpest, PPR and FMD established in the region and the capability for PPR technology improved at the National Institute of Animal Health (NIAH) in Thailand;
4. The process of verifying China's freedom from rinderpest to OIE standard initiated, and early warning strengthened;
5. Freedom of regional countries proved and an early warning capability for its occurrence established as an aid to ensured early reaction;
6. The FMD virus strains which have been present in the region, and their relationship to available vaccines, will have been established;
7. Definition of the determinants of FMD virus flow within the border areas of participating countries will have been initiated;
8. Enhanced regional communication and understanding of FMD epidemiology.

### **IV. WORK PLAN (refer to Annex I)**

### **V. CAPACITY BUILDING**

The YTSAVDL is one of the key laboratories established by Yunnan provincial government during the National Eighth Five-Year Plan. It has been developed into a laboratory specialising in tropical and sub-tropical animal viral and related diseases. The laboratory has been well founded and is functioning actively for studying tropical and sub-tropical animal virology. In November 1996, it was nominated as the reference and open Laboratory of Tropical and Sub-tropical Animal Virology of the Chinese Agricultural Ministry, and is now designated as a FAO EMPRES Collaborating Centre for Transboundary Animal Diseases. It is expected to assume a central role for epidemic disease diagnosis and epidemiology in China and has potential to contribute in a sub-regional context. The laboratory has developed significant expertise in virus diagnosis and research, and has demonstrated its ability to take on new technology in collaborative projects with international laboratories to produce valuable research results. However, it has been relatively isolated from the international scientific community and rapidly developing technology. The value of employing internationally-standardised diagnostic and research techniques, and participation in internationally-coordinated research networks is well appreciated by the Chinese authorities. Not only will the strengthened capability for disease diagnosis and surveillance contribute to early warning of disease events which could threaten invasion of the rest of China, but improved knowledge of disease status and epidemiology will contribute significantly to regional progress in progressive control. Once established, the Chinese authorities will support the continued functioning of all activities, ensuring sustainability of project results and training of other staff from other countries.

The FMD laboratory in Thailand was established under the OIE/FMD RCU and is designed to serve the needs of the member countries in the region. The laboratory is due to be commissioned later this year. This TCP will ensure that staff proceeded to the laboratory by the Department of Livestock Development will get the appropriate training in diagnostic techniques.

The other countries Laos and Viet Nam will benefit from the training at both Kunming and Thailand and limited diagnostic capacity for the disease mentioned will be established.

## **VI. INPUTS TO BE PROVIDED BY FAO**

### **1. Personnel Services**

#### **International Consultants (Terms of Reference in Annex II)**

- (i) International consultant in FMD diagnosis and epidemiology (Lead Consultant) 15 days  
International consultant in FMD control 15 days

These consultants are required to conduct a split workshop on "Regional recognition, diagnosis and epidemiology of FMD and Prospects for Improved Control" in PR China and Thailand (5 days in each country). In addition, the consultants will review with the staff of YTSAVDL and the Regional Reference Laboratory in Thailand the laboratory facilities and work programme.

- (ii) International consultant in PPR diagnosis and control 15 days

This consultant is required to conduct a 'split' workshop on "Regional recognition, diagnosis and epidemiology of PPR" in PR China and Thailand (5 days in each country). In addition, the consultant will review with the staff of YTSAVDL and the Regional Reference Laboratory in Thailand the laboratory facilities and work programme.

#### **FAO Advisory Technical Services (ATS) (described in Annex III)**

- FAO (AGAH EMPRES) Officer - Expert in Transboundary Animal Diseases 30 days  
Two missions (15 days each) Rome-Bangkok-Kunming-Rome (month 3 and month 16)

#### **Supervisory Technical Services (STS) (see Annex III)**

Standard Supervisory Technical Services  
Supervisory Functions of LTU  
Field Visits by Technical Officers

- a) with specific TOR and clearly defined outputs in the project document:

FAO AGAH Officer, expert in epidemiology, recognition and diagnosis of rinderpest, PPR and FMD: 2 missions Rome-Bangkok-Kunming-Rome, 15 days each:

FAO AGAH Officer, expert in disease data management: 2 missions Rome-Bangkok-Kunming-Rome, 15 days each:

FAO Regional Animal Health and Production Officer: 1 mission of 3 days in Thailand and 1 mission of 3 days to China:

b) without specific TOR:

FAO Regional Animal Health and Production Officer: 2 missions of 3 days each in Thailand and 2 missions of 3 days each to China

#### Thematic Evaluations

### **2. Official Travel (up to US\$25,000)**

In-country travel in China and Thailand by FAO's international consultants and staff related to the project (e.g. in-country flights, etc.).

### **3. General Operating Expenses (up to US\$10,168)**

Including:

- Transport of samples to Reference Laboratory
- Preparation of the Terminal Statement

### **4. Materials, Supplies and Equipment (detailed in Attachment IV and V) (up to US\$102,000)**

Materials and Supplies (up to US\$87,000)

Consumables:

ELISA kits - FMD, rinderpest c-ELISA, PPR c-ELISA  
Reagents for molecular techniques  
PCR reagents

Equipment (up to US\$15,000)

- Minor items of ELISA equipment
- GPS units
- Miscellaneous minor items of ELISA equipment

### **5. Direct Operating Cost (US\$20,000)**

### **6. Training (details in Annex VI) (up to US\$50,000)**

Two in-country workshops:

- Workshop on "Regional recognition, diagnosis and epidemiology of FMD disease and prospects for improved control, to be conducted partly in PR China and partly in Thailand, month 3.
- Workshop on "Regional recognition diagnosis and epidemiology of PPR, to be conducted partly in PR China and partly in Thailand, in month 16.

## **VII. REPORTING**

The collaborating institutes will provide detailed reports of activities after each training assignment and travel of consultants to Thailand and Yunnan. A draft Terminal Statement will be prepared by the lead consultant in collaboration with both National Coordinator, under the guidance of the FAO RAP Regional Office in accordance with TCP procedures, for finalisation by FAO and further submission to the respective government. This Terminal Statement will include recommendations for any follow-up action or further support that might be considered, arising from the activities of this TCP project.

## **VIII. GOVERNMENT CONTRIBUTION AND SUPPORTING ARRANGEMENTS**

The Governments of China and Thailand will:

- assign a national coordinator from the YTSVLD and the Thai FMD laboratory to act as the main joint liaison for the project;
- make available the requisite number of qualified national personnel and the buildings, training facilities, equipment, transport and other local services necessary for the implementation of the project;
- render full cooperation of its FMD diagnostic laboratory and other associated facilities;
- cover the transport cost of local trainees to and from the training venue before and after the workshops and their daily allowance.

**PROJECT BUDGET**  
**FAO contribution in US\$**

Countries: **PR China, Laos, Thailand and Viet Nam**

Project title: **Strengthening Cross Border Animal Disease Surveillance and  
 Coordination between China, Laos, Thailand and Viet Nam**

Project symbol: **TCP/RAS/0170 (T)**

Accts	Input Description	Sub/Child Account	Main/Parent Account
5013	Consultants		15,750
5542	Consultants – International	15,750	
5021	Travel		91,750
5661	Duty travel others	25,000	
5684	Consultants – International	16,500	
5694	Travel – Training	17,000	
5692	Travel ATS	10,584	
5693	Travel STS	22,646	
5023	Training		33,000
5920	Training Budget	33,000	
5024	Expendable Equipment		87,000
6000	Expendable Equipment Budget	87,000	
5025	Non Expendable Equipment		15,000
6100	Non Expendable Equipment Budget	15,000	
5027	Technical Support Services		33,850
6116	Evaluation	1,000	
6120	ATS (Honorarium)	15,312	
6121	STS (Honorarium)	33,814	
6122	Standard Supervisory Technical Services	3,950	
6123	Supervisory Functions of LTU	1,276	
5028	General Operating Expenses		10,168
6300	General Operating Expenses Budget	10,168	
5029	Support Cost		20,000
6118	Direct Operating Costs	20,000	
	<b>Grand Total</b>		<b>228,000</b>

WORKPLAN Annex I

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Equipment and supplies procurement	■	■	■	■														
Major Training workshop FMD/ Epidem/ Control/ diagnosis			■															
STS training missions by RAP officer						■						■						
International Consultant PPR									■									
International Consultant FMD Control			■															
International Consultants FMD Diag/ Epidem. )			■															
ATS mission EMPRES Officer			■						■									
STS mission 2 AGAH officers			■						■									
Training Workshop PPR									■									
Backstopping RAP Officer Workshop Preparation and assessment.								■										■
Rinderpest serosurveillance*****				■	■	■	■	■	■	■	■	■	■	■	■	■	■	
PPR serosurveillance*****				■	■	■	■	■	■	■	■	■	■	■	■	■	■	
FMD epidemiological studies*****				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Analysis of results																■	■	■

\*\*\*\* After the first training workshop the two lead countries, PR China and Thailand, will instigate these programmes in their country and this will form a major part of the project. The training basically is how to set up, test and analyse such a programme. The other countries Viet Nam and Laos may also wish to start these programmes under the EU projects.

## TERMS OF REFERENCE

### International consultant on FMD diagnosis and epidemiology (Lead Consultant)

- Duty station:** Kunming, Yunnan Province, PR China and Bangkok, Thailand  
**Duration:** 15 days  
**Qualifications:** A veterinarian who is an internationally recognised expert in FMD diagnosis and epidemiology and with experience in the region.

Under the general supervision of the Chief, Operations Service, RAPR, the technical guidance/supervision of the Chief, Animal Health Service, FAO Headquarters, in collaboration with the Regional Animal Health and Production Officer, RAP, other consultants and the national coordinators and under the direct supervision of the project's Budget Holder, the incumbent will undertake the following activities:

- Lead in designing and conducting the workshop "Regional recognition, diagnosis and epidemiology of FMD and prospects for improved control"
- Lead preparation of a report on the outcomes of the workshop
- Assess the status of diagnostic and surveillance technology for FMD
- Review, with the staff of YTSVLD and the Thai FMD Laboratory, the findings of the project activities and their interpretation
- Prepare a report on the mission
- Prepare a draft terminal statement for the project in accordance with TCP procedures
- Perform any other related duties as required.

### International consultant on FMD control

- Duty station:** Kunming, Yunnan Province, PR China and Bangkok, Thailand  
**Duration:** 15 days  
**Qualifications:** A veterinarian who is an internationally recognised expert in FMD control and with experience in the region. Plus a sound knowledge of epidemiology

Under the general supervision of the Chief, Operations Service, RAPR, the technical guidance/supervision of the Chief, Animal Health Service, FAO Headquarters, in collaboration with the Regional Animal Health and Production Officer, RAP, other consultants and the national coordinators and under the direct supervision of the project's Budget Holder, the incumbent will undertake the following activities:

- Assist the Lead Consultant in designing and conducting the workshop "Regional recognition, diagnosis and epidemiology of FMD and prospects for improved control"
- Assist in preparation of a report on the outcomes of the workshop.
- Assess the status of emergency preparedness for FMD in Yunnan Province and Thailand and review control procedures
- Review, with the staff of YTSVLD and the Thai FMD Laboratory, the findings of the project activities and their interpretation
- Perform any other related duties as required.

## **TERMS OF REFERENCE**

### **International consultant on PPR diagnosis and control**

- Duty station:** Kunming, Yunnan Province, PR China and Bangkok, Thailand  
**Duration:** 15 days  
**Qualifications:** A veterinarian who is an internationally recognised expert in PPR diagnosis and control

Under the general supervision of the Chief, Operations Branch, RAPR, the technical guidance/supervision of the Chief, Animal Health Service, FAO Headquarters, in collaboration with the Regional Animal Health and Production Officer, RAP, other consultants and the national coordinators and under the direct supervision of the project's Budget Holder, the incumbent will undertake the following activities:

- Lead in designing and conducting the workshop "Regional recognition, diagnosis and epidemiology of PPR"
- Lead preparation of a report on the outcomes of the workshop
- Access to status of diagnostic and surveillance of the workshop
- Review with the staff of YTSAVDL and the Thai authorities, the findings of the project activities and their interpretation
- Perform any other related duties as required.



**DESCRIPTION OF ADVISORY TECHNICAL SERVICES (ATS) AND SUPERVISORY TECHNICAL SERVICES (STS)**

• **ATS**

FAO (AGAH EMPRES) Officer – Expert in Transboundary Animal Diseases (30 days)

Two missions (each of 15 days) will be timed to coincide with both split workshops in which the officer will actively participate. In addition, the officer will visit the Department of Animal Production in Beijing and Bangkok to review with Chinese and Thai officials the outcome of the project implementation and its implications.

- Assist the lead consultant organising the workshop " Regional recognition, diagnosis and epidemiology of FMD and prospects for improved control" to select participants, plan and execute the workshop.
- Assist in the preparation of a report on the outcomes of the workshop
- Assist with the assessment of the status of diagnostic and surveillance technology for FMD.

• **STS**

Two FAO AGAH Officers (one expert in epidemiology, recognition and diagnosis of rinderpest, PPR and FMD and one expert in disease data management) will each carry out two field visits (each of 15 days, visiting both Thailand and China during each trip) to:

- Assist to conduct both workshops in Thailand and China
- Effect additional training in data acquisition and management.

The FAO Regional Animal Health and Production Officer (RAPG) will visit the project sites in Thailand and China, each for three days, not during the workshops to:

- Conduct laboratory investigations on field material to validate the tests used in the workshops
- Train laboratory and field staff in the techniques of specimen collection and processing.

The FAO Regional Animal Health and Production Officer (RAPG) will also visit each project site in Thailand and China twice more, each time for three days, to backstop the project, assess project implementation and identify the issues which need to be addressed. The timing of these four trips will be determined later.

STS summary:      FAO AGAH Officer: 30 days  
                            FAO AGAH Officer: 30 days  
                            FAO RAPG Officer: 18 days

## ITEMISED LIST OF MATERIALS AND SUPPLIES

Item	Number	Estimated cost (US\$)
ELISA kits – FMD antigen detection and typing (O, A, C, Asia 1)	2	20,000
ELISA kits – FMD liquid phase blocking ELISA (O, A, C, Asia 1)	2	20,000
ELISA kits – rinderpest c-ELISA	2	20,000
ELISA kits – PPR c-ELISA	2	20,000
PCR reagents		7,000
<b>Total</b>		<b>87,000</b>

The kits and reagents will be shared between the laboratories in PR China and Thailand.

## ITEMISED LIST OF EQUIPMENT

Item	Number	Estimated cost (US\$)
4 GPS units	4	1,000
Miscellaneous minor items of ELISA equipment	2	12,000
Equipment interface	4	2,000
<b>Total</b>		<b>15,000</b>

The equipment will be shared between the laboratories in PR China and Thailand.  
Materials and equipment as above will be purchased by RAPG.

## DESCRIPTION OF TRAINING PROGRAMME

The project will implement two training workshops of ten days each; each workshop will be split into five days in Kunming, China, and five days in Bangkok, Thailand. This will result in four training events (two events in Kunming and two events in Bangkok) of five days each.

A "Workshop on Regional recognition, diagnosis and epidemiology of FMD and prospects for improved control" will be held for five days in Kunming, PR China, and five days in Bangkok, Thailand in month 3.

This workshop will be conducted by two international consultants on FMD, three FAO AGAH officers (one on ATS mission and two on STS mission) and an FAO-RAPG officer (STS mission).

The trainees at the 5-day session in China will be staff of the YTSAVDL, Thailand, Laos, Viet Nam and veterinary staff drawn from Yunnan Province (20 in all). At the 5-day session in Thailand, the trainees will be similar but with veterinary staff drawn from Thailand instead of Yunnan.

A "Workshop on Regional recognition, diagnosis and epidemiology of PPR" will be held for five days in Kunming, PR China, and five days in Bangkok, Thailand in month 16.

This workshop will be conducted by an international consultant on PPR, three FAO AGAH officers (one on ATS mission and two on STS mission) and an FAO-RAPG officer (STS mission).

The trainees will be selected in the same way as for the training workshop on FMD.

The Lead Technical Unit (LTU) will discuss the selection of trainees with the respective host country. The guiding principle will be the need to have both field and laboratory staff that are currently involved in disease diagnosis control or surveillance.

The estimated cost of each of the four training events is US\$12,500 and includes the following:

- a) US\$17,000..... for travel costs of six external participants (two from each of the participating countries)
  - airfare
  - daily allowance for 6-7 days
  - enroute expenses
- b) US\$33,000..... for direct training costs
  - reagents/kits for hands-on training
  - venue/equipment
  - lunches/coffee, transportation to venue etc.

The cost of local trainees will be covered by the host countries PR China and Thailand.

Additional training will be carried out during STS missions of the FAO RAPG officer in between the two workshops.

## ABBREVIATIONS

ACIAR	Australian Centre for International Agricultural Research
ATS	Advisory Technical Services
EMPRES	Emergency response for transboundary plant and animal pests and diseases
FAO	Food and Agriculture Organization of the United Nations
FMD	Foot and mouth disease
LTU	Lead Technical Unit
NIAH	National Institute for Animal Health
OIE	Office International des Epizooties
PPR	peste des petits ruminants
RCU	Regional Control Unit
STS	Supervisory Technical Services
TCP	Technical Cooperation Programme
WRL	World Reference Laboratory for Food and Mouth Disease
YTSAVDL	Yunnan Tropical and Sub Tropical Animal Virus Diseases Laboratory