



# BOCI-Egypt: Brucellosis and Tuberculosis control

21 – 25 March 2011

**Participants:**

Arend Jan Nell – Centre for Development Innovation, Wageningen UR

Frits van Vugt – Food Safety Authority (VWA)

## Mission Report



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Project (BO-10-009-118) 'Impact of brucellosis and tuberculosis on animal production and public health'

This research project has been carried out within the Supporting Research for the Dutch Ministry of Economic Affairs, Agriculture and Innovation (EL&I), Theme: International Cooperation, cluster: Robust Systems

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Wageningen UR Centre for Development Innovation

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April 2011

Centre for Development Innovation, Wageningen University & Research centre

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# 1 Introduction and scope of the mission

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This is the report of the 1st mission to Egypt for the project: Impact of brucellosis and tuberculosis on animal production and public health (BO-10-009-118).

The objective of this mission was: to make an assessment of the current needs and problems in Egypt related to brucellosis and tuberculosis and to get to know the main stakeholders.

In practice an important objective of the mission was to make contacts with the main stakeholders in the Ministry of Health and Population (MHP) and the Ministry of Agriculture and Land Reclamation (MALR) and to investigate their interests in joining forces to design and develop a project on the control of brucellosis and tuberculosis.

During the implementation of the EU Twinning Project on veterinary services Frits van Vugt had already a good relationship with MALR, especially the GOVS (Government Organization for Veterinary Services) but contacts with the MHP had yet to be established. The basic idea for the project had to be introduced and explained to the main stakeholders.

The EU Twinning project for the Veterinary Services has been working in Egypt for 2 years and developed a national Strategic Plan for Animal Health. Based on the results of a workshop (May 2010) in which also the MHP participated brucellosis and tuberculosis were among the priority diseases which urgently needed more attention and improved control strategies. The Agriculture Office of the Netherlands Embassy in Egypt made seed money available for a 2 year preparation project to assess the impact of brucellosis and tuberculosis, to stimulate the collaboration between MALR and MHP for the control of zoonoses and to develop and design a project especially for control of these diseases.

Transboundary emerging zoonoses and other animal diseases pose increasing risks to animal production, public health, food security, income, and international trade in animal products. Particular threats for Egypt are coming from epidemic diseases such as Avian Influenza, and Rift Valley Fever but also from endemic diseases like brucellosis and tuberculosis. Several initiatives from international organizations like FAO, WHO and UNDP address HPAI and Rift Valley Fever, but tuberculosis and brucellosis are neglected diseases and their impact tends to be underestimated in Egypt. At the same time the Government of Egypt has prioritized the development of the dairy sector, which largely consists of smallholders with 2-10 animals. Milk from these smallholders is unprocessed often used for home consumption or traded through informal channels to consumers in the neighborhood. Growth of informal trade in unprocessed milk increases the risks of these diseases resulting in a negative impact on animal production and on the health of farmers, workers and the general public.

Control of brucellosis and tuberculosis requires an integrated approach where the human health services and the animal health services collaborate and join forces in the development of control policies and strategies for implementation. Such an integrated approach in zoonoses control forms the backbone of "One Health" concept promoted by international organizations (WHO, OIE and FAO). Working together under the "One Health" concept has potentially many advantages e.g. in making an estimate of the impact on animal production and on public health to support adequate and appropriate resource allocation. Through exchange of information and joining forces disease hotspots can be easier identified and controlled. Medical and veterinary professionals need to know the complete disease cycle, the role of animals and animal products and be able to integrate data collected from animals and humans. Similarly effective control might require inputs from the medical and the veterinary sectors or a coordinated joint effort. However, notwithstanding the logic of the "One Health" concept and the obvious need for

intersectoral collaboration in the control of zoonoses with the aim to reduce economic losses and human suffering, so far effective collaboration in most countries is rare.

Both the Ministry of Agriculture and Land Reclamation (MALR) and the Ministry of Public Health are facing the challenges in preventing, controlling and reducing the impact of zoonoses. Such a "One Health" integrated veterinary – public health approach is rather novel in Egypt. For control of brucellosis and tuberculosis it needs to start with assessing the impact and risks of these diseases for animals as well as for humans. This should be followed by a joint formulation of relevant policies and planning of implementation. Not only collaboration of veterinary services and human health services is required but also intensive cooperation with the other stakeholders is paramount. These diseases can only be effectively tackled in an integrated approach.



## 2 Discussions during the mission

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During the mission we met with the following people:

Dr Omar Abdin	Executive Director Ministerial group for Agricultural Policies and Projects, Ministry of Finance
Prof Dr Hasan Shafik Mohamed Osman	Chairman of the General Organization for Veterinary Services (GOVS), Ministry of Agriculture and Land Reclamation
Dr Amr Kandeel	First Undersecretary, Chief of Cabinet, Minister's Office, Ministry of Health and Population
Dr Mohamed Galal	Director Animal Health Research Institute
Dr Ir Hans van der Beek	Counselor for Agriculture, Nature and Food Quality, Embassy of the Netherlands (participated in most discussions)
Dr Ahmed Maher Wally	Senior Policy officer Economic Affairs, Agriculture and Innovation, Embassy of the Netherlands (participated in all discussions)
Broer van der Meer	Resident Twinning Advisor, EU Twinning Project for GOVS

In view of the main priorities in the animal disease control agenda and the sustainability of the project results several meetings were held with representatives from different organisations in the Egyptian government. The issue pursued were especially the set-up of a coordinated effort to control the zoonoses: brucellosis and tuberculosis.

From Netherlands side the objective of the (BOCI) project plan for brucellosis and tuberculosis was introduced. It was explained that the key issue would be to reach an integrated approach from both the veterinary and the public health authorities in Egypt. It will be important to draw up a risk based approach to the brucellosis and tuberculosis situation in Egypt, analyse jointly with the relevant stakeholders what the main risks involved are and how to tackle them. The zoonosis aspect is less likely to be a high risk in the sector of the large scale milk producers (organised in EMPA), because the milk is delivered to dairy plants and heat treated before marketing to the consumer. However also from their animals the low producing cull cows may be sold on the market to small farmers and especially these animals could be the risk animals regarding the diseases. The importance of the diseases was also discussed in relation to the insidious character: both tuberculosis and brucellosis infections in humans may give rise to long duration illness that severely affects health, welfare and productivity of the patients, without giving rise to obvious high acute death rates. This makes the diseases less 'visible' and as a result they may receive less attention and priority. In fact brucellosis and tuberculosis may become "new" emerging diseases because of the development of antibiotic resistance. In the future they may prove to become uncontrollable, notwithstanding the fact that the diseases are known already for a long time!

The first meeting took place with **dr Omar Abdin**, from the Ministry of Finance. Dr Abdin recollected his activities to support small and medium scale dairy farmers. A project which he initiated and is still actively involved with.

Dr Abdin shared the objectives and agreed with the need for an integrated approach, he commented that it is important to work towards tangible results on the shortest possible term. This will be needed to gain sustainable support from the Egyptian authorities. He suggested to develop in the project a proposal for a “pilot” scale project, that would be implemented by a private manager or company. To this implementer the necessary instruments in government hands should be made available: like vaccines, diagnostic capacity, veterinary support etc. The clients of such project would be MHP and MALR. An important point of attention is to assure confidence with the farmers and producers to cooperate and participate.

A pilot area may be one or more governorates that respond to specific characteristics or it may be a region. Adequate and meticulous identification, registration and movement control are basic elements for such a pilot region.

The Chairman of GOVS, **dr Hassan Shafik**, underlined the importance of a coordinated approach between GOVS and the human health authorities. He welcomed the idea of a project initiative to support and facilitate the set-up of a coordinated effort between both Ministries.

Dr Hassan Shafik immediately contacted his counterpart in the Ministry of Health to organise a further meeting for the mission team (we got an appointment for the next day).

Dr Hassan Shafik outlined the vaccination policy of GOVS, however the activities are hampered by lack of adequate funds. This results in incomplete vaccination coverage. Also the limited compensation to the farmers for condemned animals and materials is seriously compromising the efficacy of the control programs. He also underlined the importance of an adequate animal identification and movement control system as a prerequisite for adequate control of brucellosis and tuberculosis. It is concluded that there are serious defects in the control of the diseases. A strategy, which is well coordinated between the veterinary and human health authorities, would be an important step forward. The development of such strategy would also be an asset to improve the chances for obtaining adequate funding from either internal (Egyptian) or external (international) donors.

Dr Hassan Shafik also points to rabies as an important zoonosis, that requires a coordinated approach from public health and veterinary authorities. Rabies is a serious risk in Egypt (bites from stray dogs).

**Note:**

Dr Hans van der Beek invited dr Hassan Shafik for a visit to the Netherlands, which could take place presumably in May next. Dr van der Beek will send a formal invitation for dr Hassan Shafik and he is invited to take a colleague along with him. Dr van der Beek will also present a proposal for the issues to be covered during the visit. The objective of the visit would be to give dr Shafik an outline of the veterinary organisational structure in The Netherlands.

The meeting with **dr Amr Kandeel**, first undersecretary and Chief of Minister’s Cabinet at MHP proved very useful. Dr Kandeel is very interested in the BOCI project proposal and whole-heartedly supports the plan to bring together the relevant authorities and stakeholders on brucellosis and tuberculosis. Dr Kandeel is personally involved in the brucellosis issue and he mentions that about 5000 positive cases per year are found in Egypt in humans. Further information would be available for the project in due course. On tuberculosis he has no data by heart, but he will arrange that in a next meeting a colleague of the same Ministry will be available who is well informed on tuberculosis. For both diseases no accurate data are available because there is no systematic surveillance taking place. Analyses are performed on incidents and suspicions that arise. Tuberculosis falls under the responsibility of another department within the Ministry.

Dr Kandeel shares the view that both issues, tuberculosis and brucellosis should be attacked in a coordinated way between human health and veterinary officials. He also shares the view that these two diseases have in common that raw milk is an important risk factor.

Dr Kandeel also draws the attention to RVF (Rift Valley Fever) and rabies as important zoonotic risks, where cooperation between human health and veterinary authorities should benefit from each other and should find a coordinated approach. However, he acknowledges that the project cannot take all on board. Dr Kandeel mentions the CDC as an important source of data on disease occurrence. He also informs us that Egypt participates in the Global Fund on Tuberculosis control (WHO).

Dr van Vugt invites Dr Kandeel to the Closing Conference in April of the EU Twinning project and it is agreed to find soon a date for further contact especially to talk about tuberculosis. Dr van Vugt will make general information on the Twinning project results available to Dr Kandeel.

At the Animal Health Research Institute (AHRI) located in Dokki the mission team met with the newly appointed Director, **Dr Mohamed Galal**, and his staff. After the exchange of general information and introduction of the project outline, the staff of the Institute introduced their activities regarding tuberculosis and brucellosis. The Institute has standard testing for these diseases available and has in the country subordinated laboratories. For both diseases cooperation with the human health laboratories takes place on a sporadic and incidental basis, but not in a systematic way. In the discussion it is acknowledged that raw milk constitutes an important risk factor for both diseases' transmission to humans. This regards the milk produced in the small scale and subsistence sector, but since this comprises 85% of Egyptian animal production the impact of this fact is tremendous. It is noted that this also means that the problem is difficult to tackle!

With regard to tuberculosis it is noted that the percentage of tuberculosis infections in humans caused by *Mycobacterium bovis* is increasing as compared to the number of infections with *M. tuberculosis*. At present it is estimated that 10% of the tuberculosis cases in humans is caused by *M. bovis*. This communication underlines the importance of tuberculosis from animal origin for human health.

It is concluded that the director of the AHRI together with his staff are very interested to participate in the BOCI-project activities.

In the concluding meeting at the Netherlands Embassy the further development of the bilateral Egypt-Netherlands project is discussed.

The meetings with the Egyptian government officials clearly showed the keen interest from the veterinary and public health authorities to cooperate in the control of brucellosis and tuberculosis. They share the view that an integrated and coordinated approach will have an important added value to contribute to the control of these diseases in Egypt. They also share the view that the control of these diseases are linked through the risks involved in animal products, especially untreated milk and dairy products. The meetings clearly showed that the Egyptian counterparts welcome the catalytic role that the bilateral project with the Netherlands can play in the establishment of an integrated approach in the control of these diseases.

### 3 Follow-up and planned activities for 2011

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The objective of the bilateral cooperation project between Egypt and The Netherlands is to initiate and realise an integral strategic plan for the control and eventual eradication of brucellosis and tuberculosis for Egypt. Key issue for the strategic plan is the integral approach bringing together the coordinated input and control efforts of both MHP, MALR, government research institutes as well as the relevant stakeholders at private and NGO-level. The second important issue is to develop an effective, coherent, well-focussed and integral control and eradication strategy for brucellosis and tuberculosis, which is based on sound technical knowledge, taking into account the local situation and national and international experience.

The aim for 2011 is to make a shared risk analysis with all relevant stakeholders. Based on that shared risk analysis a coherent and coordinated strategy can be drawn up to be agreed by the Egyptian authorities. This should involve a detailed estimation of the impact of the disease and the damage caused to the Egyptian economy and from which a cost-benefit analysis can be made for an adequate eradication strategy.

The process for realizing the integrated approach and effective strategy follows the risk analysis model, which is based on the three interrelated principles of risk assessment, risk management and risk communication (FAO, WHO).

- The first step in the model is to make an assessment of the risks: starting with an overview of the factual information (incidence of the diseases, routes of transmission, evaluation of the information to identify and prioritise the risks involved). The risk assessment also involves an analysis of the possible options to control the risks and the feasibility of the control strategies.
- The 2nd phase, the risk management phase then identifies which options are available for coordinated strategies to reach an effective control of the diseases and what are the bottlenecks and constraints for the implementation of the measures;
- The third step the 'communication' phase initiates an interactive process of exchange of information and opinion based on the risk assessment and the risk management options between all relevant stakeholders. This could lead to further improving the risk assessment and the risk management components.

To realise the integral strategic plan through the risk analysis process a two tier approach will be followed.

The **first activity** is the organisation of a stakeholder workshop, which is scheduled for early June 2011. In this conference about 20 participants as representatives of the main stakeholders will be brought together as an intensive think-tank. The workshop aims in a one-day process to make an inventory of the relevant issues pertinent to the integral control of both diseases in Egypt. The workshop has to make clear what is the added value that can be expected from a coordinated and integral strategic plan: on the basis of the joint discussions and sharing of views the conference will need to bring about a clear commitment of the key stakeholders to the coordinated strategic plan and ensure that they take ownership of the process.

Presentations and topics to be discussed in the workshop:

1. Presentations of factual information on the disease in men and animals, prevalence in the Egyptian context;
2. Discussion on the evaluation of the information available and provided;
3. Identification of the main risk factors in the Egyptian context. This concerns the risks of spreading of the disease and the transfer to the human population;

4. Identification of the main options for risk management in the animal and in the human area;
5. Identification of bottlenecks and constraints as well as prerequisites in the strategy to overcome the disease;
6. Formulation of an integral strategy to reach control and eventual eradication of the disease incl measurable indicators of progress.

The workshop the beginning of June is shaped in the following program:

09:00h	Opening and explanation of the program (AJ Nell)
09:15h	Introduction into the substance, explanation of the objectives (FvVugt)
09:30h	Input from MALR-GOVS: data on prevalence of brucellosis and tuberculosis in the Egyptian animal population. (–)
10:00h	Input from Min of Health: data on prevalence of brucellosis and tuberculosis in the Egyptian human population (–)
1030h	Introduction and instructions for the group discussions: <ul style="list-style-type: none"> <li>- Evaluation of the data presented</li> <li>- Identification &amp; prioritisation of the risks of transmission</li> <li>- Options to control the risks</li> <li>- Prioritisation of the control strategies</li> <li>- Analysis of the resources needed and the constraints</li> </ul>
10:45h	Group discussions (in two groups) together with coffee break
12:00h	Reporting of group discussions
12:30h	Summarising results of group discussions (FvVugt)
13:00h	Plenary discussion & conclusion
14:00h	Closure of working session
14:30h	Lunch

The results from the June workshop will be summarised in a discussion paper in the form of a draft risk analysis (risk assessment and risk management options).

The **second activity** for 2011 will be a more extensive Conference planned for the end of September. The discussion paper prepared after the June Workshop on risk analysis and risk management will form the starting point of the conference. The Conference forms the communication phase of the risk analysis. The conference completes the risk analysis process and should further built and confirm ownership of the stakeholders for the integrated approach in a strategic plan and control programme to be developed during the second phase of the project.



# Appendix 1

## Overview of policy relevant information regarding brucellosis and tuberculosis in Egypt

The data presented below are a summary of general background knowledge as well as information received from the relevant Egyptian authorities.

### 1 Brucellosis

The disease is caused by infection with a bacterium and therefore has not a high spreading potential which is associated with viral diseases like Foot and Mouth Disease.

The causative organism is primarily *Brucella mellitensis*<sup>1</sup>. This is originally mainly an infection in small ruminants but is now in Egypt also the main causing agent in large ruminants.

It spreads from animal to animal through intrauterine infection and at birth. The organism is also present in adnexa (placenta etc.) and milk and it can be transferred to another animal (or a human being) through these materials. Males do not normally play a role in the transmission of brucellosis.

The animal health problem is:

- loss of production as the result of abortion (loss of offspring);
- loss of production capacity due to sickness of the animal.

The human health risk arises from:

- consumption of un-treated milk and milk products (cheese);
- infection through contact (eventually consumption) of lymphatic organs and reproductive organs of infected animals. This is an occupational risk for farmers, butchers and veterinarians.

The human health problem is:

- a chronic debilitating disease with regular fever attacks that seriously affects health, well-being and productive capacity of the infected person;
- economic loss due to reduced productivity and cost of treatment.

Brucellosis in men is difficult to treat with antibiotics.

When milk is pasteurised brucella bacteria are killed and in principle no problem exists. Large scale industrial producers will therefore not pose a risk because they produce for packed heat treated dairy products. However when these producers decide to cull animals due to low production, these animals may harbour the infection and therefore pose a risk to the next (often small scale) owner who uses the milk for home consumption and most likely also sells the milk untreated on the informal market.

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<sup>1</sup> In Egypt the first case of animal brucellosis was reported in 1939. *Brucella abortus* was isolated in cattle in 1943, but since 1970, *Brucella mellitensis* has been the more common species in large and small ruminants (Refaie, 1989).

WHO signals brucellosis as an important “forgotten” disease because it does not attract the attention through large scale deaths in an epidemic. The human disease is a chronic and generally inconspicuous epidemic.

***Epidemiological data in men (data from Ministry of Health)***

The total number of cases notified<sup>2</sup> is:

Year	cases
2007	5120
2008	5300
2009	3969

Geographical distribution:

Five governorates notified the most important number of cases: Behira, Munufeya, Sharkyia, Fayoum and Minia.

An older set of data on human prevalence:

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
148	287	299	256	309	490	872	1006	...	...	2902

... : no information available

The data suggest a considerable increase in human infections in the last decade.

***Epidemiological data in animals<sup>3</sup>***

Year	Tested animals	Positive	% positive
2005	339,850	2,945	0.87
2006	360,167	2,289	0.64
2007	331,716	2,264	0.68
2008	394,246	3,893	0.99

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<sup>2</sup> The cases of brucellosis in humans have to be notified by the hospitals to the Ministry of Health. In practice notifications only come from governmental hospitals but not from private health centres, clinics and hospitals, so the prevalence in human populations is surely underestimated.

<sup>3</sup> There are as yet no reliable data on the total animal population. The total animal population according to census data in Egypt is about 8 million for cattle and buffaloes, and 4 million for small ruminants.



The highest incidence of brucellosis in animals occurs in the Nile Delta.

About 90 % of the suspected sera samples are confirmed by the reference laboratory.

Distribution over animal species of positive sera in 2007 and 2008<sup>4</sup>:

Year/species	cow	buffalo	sheep	goat	positive	tested
2007	843	324	924	163	2264	331716
2008	1177	238	965	672	3052	397054

(discrepancy in total number and positives for 2008 is not explained)

#### ***Brucellosis control program in animals:***

According to Egyptian regulation N°1329 from 1999, all female animals of the age of 6 months and more of cattle, buffaloes, sheep, goats, must be sampled and tested by BBAT and Rose Bengal tests. The positive animals are, after the analysis is confirmed by the National Reference Laboratory, slaughtered and (limited) compensation is given to the owner. Vaccination of young females is performed with Strain 19 for cattle, and Rev-1 for small ruminants, but only a small percentage of the animals concerned is vaccinated.

The sampling program for Brucellosis is implemented depending on the availability of human and material resources. About 300,000 to 400,000 animals (all species in total) are tested each year which is less than 10% of all animals which need to be tested. The lack of a systematic approach in selecting the animals for testing does not allow the calculation of brucellosis prevalence neither for flocks nor for animals, in fact the rate of positive animals/ tested animals, by governorates over 2008, varies from 0 % to 2.44 % which is expected to be underestimated. Different field surveys implemented in Egypt indicate a much higher prevalence.

The question of the estimation of the prevalence in flocks and animals, by species and by governorates, is important: these data are necessary to perform an evaluation at medium and long term of the results of the control program.

It should be noted that a considerable amount of data are obtained after sampling and analysis in case of incidents: suspicion of human infections.

In case of sero-positive findings, the animal is slaughtered. Liver and lymphatic organs are removed from the carcass and destroyed. The rest of the carcass is in principle fit for consumption. The farmer is compensated with an amount of money defined in the law, and this represents about half the current market price of the animal. The owner is allowed to sell the rest of the carcass on the market.

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<sup>4</sup> These figures may be influenced by considerable underreporting in Egypt:

- in animals there is no systematic surveillance (due to lack of funds)
- Compensation of farmers (after identification of positive cases in test-and-slaughter programs) takes place only partly. Therefore there is considerable risk that farmers will not present suspected animals.

Compensations paid in three fiscal years are: (1 € = EGP 8)

<b>Fiscal year</b>	<b>Compensation paid (EGP)</b>
2006/2007	2,092,550
2007/2008	2,594,400
2008/2009	2,649,250

As a general measure preventive vaccination is applied for young animals. The vaccines are produced in the government laboratory in Abbassya. For cattle and buffalo S19 vaccine is produced at a rate of about 10,000 doses per year, for sheep and goats about 5,000 doses of Rev1. These vaccines are provided free of charge to small farmers and vaccination is done by GOVS veterinarians. Some large private farms import RB51 at a rate of about 15,000 doses per year.

Since the amount of vaccine that becomes available is falling far short of the need, there is no systematic vaccination campaign.

The need of vaccines against brucellosis on an annual basis is estimated at 1 Mio doses of S19 (for cattle and buffalo) and 1 Mio doses of Rev 1 (for sheep and goats). The present production capacity covers roughly a total of 15,000 doses. Two options exist to cater for the provision of vaccine in adequate amounts.

- Upgrade the production capacity at the Abbassiya Vaccine Production Institute. This would require considerable investment in equipment (mainly for fermentation and lyophilisation) and in expertise/manpower;
- Import the vaccines from outside sources;
- Encourage production in the private sector by pharmaceutical companies.

Each of these options will involve major investments and/or high annual cost. The Vaccine Production Institute needs to be modernised to increase production and guarantee quality; imported vaccines are expensive (around EGP 10 per dose); at present the potential of local pharmaceutical companies to produce the vaccine and antigen is unknown.

## 2 Tuberculosis

The disease is caused by a bacterium from the genus *Mycobacterium*. Several types exist but the most relevant in this context are *Mycobacterium tuberculosis* and *M. bovis*. Both types are pathogens for human beings. *Mycobacteria* can be transmitted from animals to man through air (cough and sneeze), through the ingestion of infected unheated milk and meat(products). It is noted that the fraction of *M. bovis* infections in the total of *Mycobacterial* infections in humans in Egypt is increasing (at present to about 10%).

The animal health problem is:

- loss of condition;
- loss of production.

The human health risk arises from:

- Consumption of unpasteurized milk and dairy products;
- Transmission by air (mainly an occupational hazard for farmers, butchers and veterinarians);
- Transmission by air and contact human to human.

The human health problem is:

- Chronic disease severely affecting health and well-being and economic productivity. General sickness and loss of production capacity;
- Economic loss through labour output and cost of medical treatment.

Medical treatment requires a one year course of antibiotics.

No accurate data on the occurrence of tuberculosis in animals are available since there are no systematic surveillance programs.

The number of positive cases in animals is very roughly estimated by the GOVS experts at about 0,3%. No regular testing of animals is taking place at the moment, only occasionally at an experimental basis.

Large scale testing could be implemented through skin test (tuberculin) and to some extent through meat inspection. Positive animals from the tuberculin test need to be culled, compensated for and slaughtered. Considering that a considerable number of animals is not slaughtered under official control, a number of infections may go unnoticed and enter the food chain. In case of positive animals tracing of contact animals (and farmer's family!) is important, but difficult for recently traded animals because of the lack of an adequate I&R system.

In recent decades more and more international attention is paid to re-emergence of tuberculosis as an important disease because of the increased occurrence of antibiotic resistant strains. On the longer term this is a threat to human health on international scale.

Egypt has a National Tuberculosis Programme (NTP) for control and treatment in humans, however in this programme not much attention is given to the prevention of infection from animals. In September 1997 the National Board for TB Control was established by Ministerial Decree from the MHP and all departments and sectors involved in TB control in Egypt are represented: the NTP; Health Insurance Organization; Ministry of Interior; Ministry of Defence; Ministry of Education; Ministry of Higher Education; Ministry of Social Affairs; Ministry of Religious Affairs; the Coptic Church; Private Sector; Non-Governmental Organizations; and the Ministry of Agriculture. However, at present the MALR does not seem to be actively involved.

The Netherlands has supported the National Tuberculosis Control programme for a period of 15 years from 1989 – 2003.

**Note:**

the mission was not able to speak to somebody in the MHP on tuberculosis; the right person was not available; more data and other information will be collected during a next visit of Frits van Vugt in April.

More information on the National Tuberculosis Programme in Egypt on the websites:

[www.emro.who.int/stb/egypt/NTP\\_introd.htm](http://www.emro.who.int/stb/egypt/NTP_introd.htm)

[www.usaid.gov/our\\_work/global\\_health/id/tuberculosis/countries/me/egypt\\_profile.html](http://www.usaid.gov/our_work/global_health/id/tuberculosis/countries/me/egypt_profile.html)

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