



# Transboundary animal and plant pests and diseases



## THE CHALLENGE

Transboundary animal diseases (TADs) and plant pests (PPs) have been affecting livestock and crop production from immemorial time. In fact, they were among the ten plagues of ancient Egypt. As a result of high mortality of productive animals and drastic reduction of productivity of surviving animals, livestock keepers and farmers were periodically confronted with famines, hunger and distress, but because of the extensive character of production systems and relative isolation of production areas and countries at that time, the magnitude of subsequent crises was relatively limited: the spread of pathogens was quite slow and most of the TAD were entrenched in well defined areas (enzootics) or contained in groups of countries in the same region (epizootics).

Nowadays, the movement of plant pests and animal diseases across boundaries has given rise to global threats to food security, agricultural, aquaculture and fisheries development and trade and often creates global concern on public health especially when such diseases and pests affect humans. Increased movement of people, terrestrial and aquatic animals, plants and products in the globalized economy on the one hand, and the concentration and intensification of production systems on the other, have accelerated and enlarged redistribution of animal diseases and plant pests with a clear tendency to expand to all regions of the globe (panzootics and pandemics). In addition, climate change

is creating new ecological niches for the (re)emergence and spread of pests and diseases. As a result, the impact of TADs, and PPs has considerably increased. There are indications that the poorest countries with vulnerable sanitary regulation and infrastructure carry a larger burden than others. The list of imported exotic diseases and pests has grown while no substantial progress has been made in the control of local entrenched pathogens. Poor countries and producers may perceive different risks and incentives associated with TADs and PPs, and it is essential to recognize these differences in the design and implementation of disease and pest prevention and control measures. It is in the interest of the international community to avoid creating country or regional reservoirs for TADs and PPs that will maintain the threat at global level.

## KEY ISSUES

Animal diseases and plant pests reduce the availability of food and affect quality. Although quantification of losses and potential losses due to transboundary pests and diseases is limited, historically, animal disease and plant pest introduction, establishment, re emergence and outbreaks have resulted in major food problems either directly through yield reductions of food crops and losses in animals (or spill over into humans), or indirectly through the reduction of yields of cash crops and lost of consumer confidence, e.g. HPAI, rinderpest, potato blight or locusts.

## ANIMAL DISEASES AND ZOOSES

Many animal diseases, including zoonoses, have been or can be at the origin of major regional or international crises. Rinderpest was a major cattle scourge in large parts of Europe, Africa and Asia for centuries, bringing about massive depopulation of livestock and wildlife. The rapid spread of the H5N1 avian influenza (HPAI) virus in Southeast Asia in 2004 and then into Europe and Africa in 2005, was accompanied by the fear that a human influenza pandemic might emerge from domestic poultry. More than 60 countries were affected by virus incursions, over 300 million poultry died or were destroyed, and millions of farmers and producers suffered losses running into billions of dollars. The current human influenza pandemic due to the pandemic H1N1/2009 virus has spread with astonishing speed worldwide. Given the dense populations and close contacts between pigs, poultry and humans in many parts of the world, there is serious global concern that re-assortment of viruses hosted by humans, pigs, or birds may catalyze the emergence of a more virulent strain.

Foot-and-mouth disease is endemic in most parts of Asia, Middle East, Africa and parts of South America. Vector-borne zoonotic diseases such as Rift Valley Fever continue to affect parts of Africa, threatening to spread to the Middle East, the Gulf countries and southern Europe. Trypanosomiasis and East Coast Fever are among the most devastating diseases in

sub-Saharan Africa. They affect more than 500 000 people and kill more than 3 million animals each year. Furthermore, other existing infectious diseases such as African Swine Fever, *Peste des Petits Ruminants*, Contagious Bovine Pleuropneumonia, Classical Swine Fever and Newcastle disease are widespread in Africa, Asia and Latin America and continue to be a major source of concern to the global community.

In aquaculture, the White Spot Syndrome Virus in shrimp is considered as the most serious pathogen of cultivated shrimp. Recorded shrimp viral epizootics show the range and distance that aquatic animals can travel alongside the movement of their hosts – the major pathway being movement of infected post-larvae, fingerlings and broodstock. At present there are more than 20 shrimp producing countries affected.

### CROP PESTS

The desert locust is the best known example of migratory crop pests because of the speed at which outbreaks occur and the scale that infestations can reach when plagues become fully developed.

Locusts may spread over about 30 million square kilometres and affect as many as 60 countries. In the last major desert locust plague from 2003 to 2005 the livelihoods of about 8 million people were affected in North and Northwest Africa. More than 13 million hectares were sprayed with chemical pesticides in order to bring an end to the plague. But investment in preventive emergency management systems is particularly advantageous. Through development of early warning, human capacity building and rapid response systems, at least three outbreaks and upsurges were successfully controlled in the Central Region before damage to livelihoods of the communities occurred. The development cost of the Emergency Prevention System for Transboundary Animal and Plant Pests and Diseases (EMPRES) Desert Locust programme in the Central Region has been USD 11.5 million over ten years; the cost of the control operations was USD 7 million. By contrast, the total cost of the campaign and rehabilitation in North and Northwest Africa in the absence of a preventive management system has been estimated at over USD 390 million.

### NEW AND EMERGING THREATS

New and re-emerging plant pests have raised fear of their potential impact on livelihoods, food security and global markets; some examples are:

- ▶ Recent locust outbreaks in Central Asia, Southeast Asia, and Central and Southern Africa surfaced raising concerns with regard to locust species other than the desert locust, putting the livelihoods of more than 15 million people at risk in Central and Southern Africa alone.
- ▶ A new cross-border bio-threat developed in 1999 when a virulent strain of the wheat stem rust disease (Ug99) emerged in East Africa and reached Iran in late 2007. The regions of the Near East, Eastern Africa and Central and South Asia at immediate risk account for 37 percent of global wheat production. This new rust strain is highly virulent to almost all wheat varieties and could cause devastating crop losses if its spread is not prevented.
- ▶ Armyworms are caterpillars that develop into nocturnal moths, capable of long-distance migration. Compared with locust



### SOME BASIC FACTS

- ▶ The livestock subsector supports food security and livelihoods of over one billion people. Production and trade in animals and animal products are important for the economic development of countries and represent a key income source for the rural poor worldwide.
- ▶ The livestock sector represents around 40 percent of the value of world agricultural output, and is one of the fastest growing subsectors of the agricultural economy.
- ▶ Livestock diseases impair livelihoods by reducing productivity and exclude countries from participating in the rapidly growing global trade in animals and animal products. Animal diseases are a major limiting factor for efficient animal resource use and sector development.
- ▶ With the growing intensification of animal production, incidence and risks of transboundary diseases, including zoonoses, are expected to rise. The higher density of domestic animals and humans, the projected increase in transcontinental movement of people and animals, and changes in ecosystems create a conducive environment for the rapid emergence, amplification and spread of pathogens.
- ▶ Crop production provides about 84 percent of global food, feed and fibre needs and virtually all other human endeavours depend on food security. Crop pests, including diseases, insects, and weeds should be overcome to meet future needs.
- ▶ Global crop losses due to transboundary pests are estimated at more than 50 percent of potential crop output. Insect pests are estimated to have caused the destruction of 15 percent of crops, and 13 percent each by pathogens and weeds, and post-harvest

outbreaks, armyworms usually occur first on a smaller scale but may extend over several hundred square kilometres. The losses caused to cereals and sugar-cane in sub-Saharan Africa are estimated at 20 to 60 percent.

- ▶ Unlike migratory pests, quarantine pests and diseases can be introduced to a country mainly by trade and movement of people. Fruit flies, for example, aphids, cassava mosaic virus, banana wilt, are increasingly important as transboundary pests. Economic losses due to fruit flies alone are estimated at more than USD 1 billion per year.
- ▶ The larger grain borer originally arrived from Central America in the 1980s, first in the United Republic of Tanzania and then Kenya. During the last 20 years, this storage pest has spread over many countries in West, Central and East Africa. The beetle is causing devastating post-harvest losses of up to 90 percent on stored maize and on dried cassava, both primary staple foods in most African countries.
- ▶ The encroachment of humans and livestock into areas not previously used

in agriculture increases the contacts between domestic and wild animals and their pathogens.

- ▶ The lucrative trade in exotic animals and in bushmeat increases the risk of the spread of transboundary animal diseases and the emergence of zoonotic diseases that have previously not been identified.
- ▶ The spread of aquatic animal diseases can be aggravated by globalization, intensification of farming practices, introduction of new species, expansion of the ornamental fish trade, unanticipated interactions between cultured and wild populations, climate change and other human-mediated movements of aquaculture commodities.

## POLICY CONSIDERATIONS

Transboundary animal diseases and plant pests represent a serious threat to global food security in all of its dimensions – availability, stability, access and utilization (safety). They reduce production and productivity, disrupt local and national economies, threaten human health and

exacerbate poverty. They can also result in huge financial losses and require prevention and control measures and eradication programmes.

### DISASTER PREVENTION

More cost effective, livelihood saving and ecologically less devastating prevention strategies require timely and coordinated reaction from national, regional and international partners and the ability to mobilize resources at short notice to address both life and livelihoods risks as well as environmental concerns. Emergency prevention can be defined as actions taken in anticipation of an emergency to facilitate rapid and effective response to a threat and aims at:

- ▶ Early warning and detection systems providing relevant and timely information and analysis for effective decision-making.
- ▶ Governments and relevant partners prepared to prevent, mitigate and manage threats to agriculture, food and health.

### CAPACITY DEVELOPMENT

Strengthening the capacities of national veterinary and plant health services and

**pest infestations another 10 percent. Losses of 100 percent occur in specific circumstances, creating enormous variability in productivity and risks to the livelihoods of farm families.**

- ▶ **Most threatening are outbreaks of migratory pests because of their sudden emergence, often without or with limited warning, triggered by changing ecological conditions or agricultural practices which favour an explosive increase in the pest population and its rapid spreading into neighbouring areas. The unexpected appearances of such massive pest outbreaks hit the countries which in most cases are ill prepared, with no or only poor capacities to effectively cope with rapidly evolving and fast moving threats.**
- ▶ **The aquaculture sector is being challenged by infectious diseases that are constraining the development and sustainability of the sector through direct production losses, increased operating costs, restrictions of trade and impacts to the environment and**

**biodiversity. Estimates of losses due to aquatic animal diseases range from USD 17.5 million (White Spot Disease of shrimp in India in 1994) to a global estimate of more than USD 3 billion resulting from shrimp diseases. Movement of aquatic animals has been recognized as a major pathway for the introduction and spread of aquatic animal diseases.**

- ▶ **In forestry, due to climate change, the mountain pine beetle, a pest of North American forests, is expected to decrease in generation time and winter mortality, which will increase the risk of range extension into vulnerable ecosystems.**

systems should be a top priority in coping with transboundary bio-threats in a more effective manner. This includes development of self-reliant training capacities, development of appropriate legal and policy frameworks, introduction of economic and environmentally sound coping technologies, building national surveillance and diagnostic systems, support to adequate infrastructure and tools, and practised contingency plans and field exercises.

### PROTECTING LIVELIHOODS

To address the challenges of large-scale emergencies caused by transboundary bio-threats more effectively and to provide better coordinated and timely assistance to the affected countries, several considerations are critical to protect livelihoods, health and nutrition, and food security:

- ▶ Disaster risk reduction and prevention should have priority and should ensure cross border multistakeholder programmes and coordinated approaches.
- ▶ The international community and the public need to be made aware that investment in emergency and disaster prevention is economically beneficial and reduces pressure on already vulnerable communities.
- ▶ Support should be given to build human capacities, enhance networking among stakeholders, regional and interregional cooperation between affected countries, and to develop self-reliant surveillance systems, knowledge bases, tools and standards to implement transboundary management concepts.
- ▶ Regional organizations and research institutes should play a more active part to systematically address transboundary animal and plant health issues.
- ▶ The scientific community and industry should be involved in developing environmentally friendly control technologies and strategies.
- ▶ All stakeholders, including producers at all levels and capacities, must be engaged in the design and implementation of disease and pest prevention and control measures to protect their livelihoods and to ensure their participation.
- ▶ Partnerships and coordination among relevant international, regional and national organizations as well as financial institutions should be encouraged and fostered.

#### For further information



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