



## FAO to prevent threats to the food chain

By Mona S. Chaya

The human food chain is continuously threatened by transboundary hazards of animal or plant pest and diseases or food safety origin. Avian influenza, African swine fever, Peste des petits ruminants, locusts, wheat rust, cassava diseases, food contaminations with dioxin, salmonella and radionuclides from radiological or nuclear incidents affect human health, food security and livelihoods around the world. With the number of outbreaks constantly increasing – as well as the number of people and countries affected – preventing food chain threats represent unprecedented challenges.

[FAO's multidisciplinary approach](#) helps countries in the fight against threats to the human food chain. Below are some examples of how FAO supports countries to mitigate risks affecting the food chain, mainly through information systems, and monitoring and early warning systems.

### *Timely early warning on Transboundary Animal Diseases*

The increase in emergence of new pathogens and spread of transboundary animal diseases (TADs) in countries around the world poses a serious and continuing menace to livestock production, food security and the entire food chain.

Timely and reliable disease information enhances early warning and response to TADs and emergent zoonoses, and supports prevention, improved management and progressive approach to control.

To address the challenge, in 2004 FAO's Emergency Prevention System (EMPRES) designed and developed a web-based secure information system to support country level veterinary services by facilitating regional and global disease information: [EMPRES Global Animal Disease Information System \(EMPRES-i\)](#). Today EMPRES-*i* has become a global reference database for animal

diseases including zoonosis. In fact, it stores over 60,000 outbreak records of which more than 20,000 records of animal influenza from 2004 to 2014. It hosts information on disease monitoring and tracking for early warning activities. To date, over 4,000 events have been tracked.

The system has also a historical database on almost 950 records on rinderpest outbreak information (1827-2003). The global eradication of rinderpest was officially declared in June 2011; still EMPRES-*i* monitors and verifies suspected syndromic cases compatible with rinderpest cases. Additionally, EMPRES-*i* hosts and maintains a database on Rift Valley fever outbreaks, including animal and human cases, developed in collaboration with Oxford University.

The platform consolidates disease events worldwide using information that EMPRES receives from a wide range of sources, and generates and disseminates early warning messages on global animal disease distribution, disease risks and current threats at the national, regional and global level for priority animal diseases. EMPRES-*i* speeds up national, regional and global disease information sharing; supports the risk assessment process for existing and

emergent animal diseases; facilitates epidemiological analysis on specific disease events at regional and global levels and planning surveillance.

EMPRES-*i* is undoubtedly proving useful in facing the big challenge of the emergence of new diseases and enhancing rapid disease reporting and early warning activities of countries and regions.

### *Controlling Desert Locust*

The Desert Locust (*Schistocerca gregaria*) is considered the most dangerous of all migratory pest species in the world (Steedman, 1990)<sup>1</sup>. The primary reason resides in its ability to change behaviour and appearance, under particular environmental conditions (unusually heavy rains), and transform itself from an innocuous individual to part of a group of insects that form a swarm, which can cross continents and seas, and quickly destroy a farmer's field and his entire livelihood in a single morning.

In particular, it can easily affect more than 65 of the world's poorest countries. In this context, FAO [Desert Locust Information Service](#) (FAO DLIS) is the key monitoring and early warning tool in preventing Desert Locust plagues from devastating farmers' fields in Africa and Asia.

Since 1978, FAO DLIS operates an early warning system that monitors weather, ecological conditions, and locust infestations in the potentially affected area on a daily basis.

After 75 years of systematic Desert Locust monitoring and collaboration between locust-affected countries and DLIS, FAO DLIS has revolutionized the process shifting from camels to four-wheel drive vehicles, from telex to email, from map reading to GPS, from narratives to handheld data loggers, from manual plotting to GIS, and from weather station reports to satellite-based rainfall estimates and greenness maps.

At present, DLIS acts as a focal point and coordinator of a global locust information network; monitors weather, ecological conditions and locust infestations in Africa, Near East and Asia on 24/7 basis; uses GIS to analyse the current locust condition in each country; produces information on a daily basis for about 30 countries in the affected region; works with national locust information officers, and produces monthly situation bulletins and six-week forecasts for each country.

Today, locust-affected countries' ability to detect, respond to and contain Desert Locust outbreaks has improved as a result of

advances in technologies related to geo-positioning, spatial analysis, remote sensing and early warning. Thanks to the adoption of a preventive control strategy relying on early warning and early reaction by locust-affected countries and FAO, the reduction in the frequency, severity and duration of Desert Locust plagues and their associated food losses has been possible.

This global early warning system can be a model for other migratory pest early warning systems throughout the world.

### *Enhancing food safety early warning systems in East Africa*

Unsafe food causes considerable morbidity and mortality. More than 200 diseases are spread through food contaminated with bacteria, viruses, parasites, natural toxins, pesticides, and chemical or radioactive substances.

Exposure to these contaminants can lead to infectious diseases, acute toxicities, cancers and developmental defects. Millions of people fall ill every year and many die as a result of eating unsafe food or drinking contaminated water. For example, diarrheal diseases alone kill an estimated 1.5 million children annually (WHO, 2015)<sup>ii</sup>. FAO has estimated that at least 25 percent of the world's food crops are contaminated with

mycotoxins, which are fungal toxins in crops (FAO, 2002)<sup>iii</sup>. There is strong evidence of a link between exposure to aflatoxins –a foodborne mycotoxin – and liver cancer (WHO, 2003)<sup>iv</sup>.

Food safety hazards can also spread through distribution of unsafely produced, processed or handled food and result in food chain incidents. Such events can easily occur in two or more countries and sometimes result in regional or global food safety emergencies.

Food safety incidents, beyond direct public health consequences, can have significant food security and economic impacts in both developed and developing countries. This is due to agri-food trade disruptions, losses of food and incomes, and health care and productivity costs.

It is crucial to early detect and prevent spread of food safety hazards, and to mitigate promptly and effectively such incidents.

This is why FAO is supporting East African countries to strengthen their early warning systems for food safety. To that end, [FAO EMPRES Food Safety](#) is:

- developing surveillance and intelligence tools for prevention of food safety incidents;

- guiding and facilitating development of early warning systems in food safety, including rapid alert and communication networks;
- supporting food safety emergency prevention, preparedness and response capacity building;
- promoting inter-sectorial and trans-disciplinary synergistic partnerships and collaborations among key food safety stakeholders at all levels of the food chain, using the principles of a One Health approach.

The above activities will help East African countries develop food control systems, and implement operational protocols that clearly outline the roles, responsibilities and process for early detection, prevention and control of food safety incidents.

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<sup>i</sup> Steedman, A., (ed.) (1990). *Locust Handbook*, Natural Resources Institute, Chatham, U. K.

<sup>ii</sup> WHO, 2015. 10 facts on food safety. Available at [http://www.who.int/features/factfiles/food\\_safety/en/](http://www.who.int/features/factfiles/food_safety/en/)

<sup>iii</sup> FAO, 2002. *Evaluation of Certain Mycotoxins in Food: Fifty-sixth Report of the Joint FAO/WHO Expert Committee on Food Additives*, World Health organization, Geneva, 2002.

<sup>iv</sup> WHO Regional Office for Africa, 2003. *Fact Sheet 5°*