In order to help meet development and sustainability goals, food must be safe and wholesome to consume. Effective, coordinated and proactive national and international food safety systems can improve plant, animal and human health. Agricultural knowledge, science and technology can play an important role when used within effective regulatory frameworks with sufficient resources.

Among the requirements for achieving human health and sustainability goals are greater investments in adequate food safety infrastructure, public health and sustainability capacity; legislative frameworks for identification and control of biological and chemical hazards; and farmer-scientist partnerships for identification, monitoring and evaluation of risks. The agricultural component of bilateral assistance for developing countries grew 16% in 1985, but had declined to 4% by 2010. Recently, however, there has been a renewed interest among donors to use agriculture to promote economic growth and poverty reduction.

Challenges

Human health

Foodborne disease is estimated to affect 30% of the population in industrialized countries at some time in a given year. In developing countries, foodborne disease accounts for an estimated 2.1 million deaths annually. Significant under-reporting leads experts to estimate that the incidence of foodborne disease may be substantially higher than the number of cases reported worldwide. About 50% of the health burden of malnutrition has been attributed to poor water, sanitation and hygiene, including food hygiene.

Plant and animal health

Plant diseases can be devastating for human health, both directly, if plant toxins are consumed, and indirectly, if plant disease results in crop loss and subsequent malnutrition. For example, the yield loss to wheat crops from one race of wheat stem rust (Ug99) typically ranges from 40% to 80%, with appreciable instances of complete crop failure. Some long-standing plant health problems, such as mycotoxins...
Chemical use in food production has increased worldwide. For example, in constant dollars, global expenditures on agricultural pesticide imports, summed across all nations of the world, have increased 400% since 1965. Raising chemical use in many countries, food safety programs have introduced Good Agricultural Practices to diminish harm to human health. Unfortunately, the majority of foodborne illnesses in most countries are caused by only a few pathogens, e.g., Salmonella and Campylobacter accounted for about 90% of the reported zoonoses cases in the European Union in 2015. For most foodborne infections, effective preventive interventions can be made despite a lack of comprehensive epidemiological knowledge.

Food safety:
Sources of food contamination may be either microbiological or chemical and may occur throughout the food chain, from the farm to the table. For example, many countries have experienced an increased risk of Salmonella contamination in soy meals, which constitutes an important route for introducing Salmonella into animal production when used as animal feed. Foodborne illnesses caused by chemicals and pathogens is difficult to link to individual foods; oftentimes the onset of the effects may be gradual and not be detected until chronic or permanent damage occurs. Food safety programs can also be acute, with immediate adverse effects including death, those caused by organophosphate pesticides.

Food safety programs attempt to control the consumption of agrochemical residues, growth hormones, antibiotics or genetically modified organisms (e.g., allergens) in foods by setting and enforcing Minimum Residue Levels for individual chemicals. Critical use levels for individual chemicals based on assessments of the risks that the chemi-
cals pose to human health.

Surveillance systems:
The timeliness and efficacy of preventative food safety, animal health or plant health interventions depend on accurate, complete and up-to-date surveillance information. For countries with weak surveillance and control systems, estimating the burden of foodborne illness is daunting, despite the assistance provided by the WHO, FAO and the World Animal Health Organization (OIE, e.g., aflatoxins) in foods by setting and enforcing Minimum Residue Levels for individual chemicals based on assessments of the risks that the chemi-
cals pose to human health.

Climate change is likely to further complicate food-
borne disease surveillance and prevention as new pathogens emerge, e.g., in fish and shellfish raised in degraded or contaminated water. Climate change also affects plant health and pesticide use patterns. For example, by modifying the encounter rate between pest and host plant, changing the ranges of the two species or producing new pests; and shifting land use patterns. Action to mitigate the impacts of cli-
mate change on crop production and plant health will require integrated strategies and improved coordination among farmers and policy makers. This partici-
ination should emphasize inclusion of non-traditional actors in agricultural research designed to meet the plant and animal health, as well as food safety needs of small-scale livelihoods-prone popula-
tions. To date, funding for adaptive research and pre-
vention measures remains far too low to effectively address these issues.

International regulatory frameworks:
The management of food safety, plant and animal health from the farm to the table requires coordi-
nation and integration that are not often provided by the current international policy and regulatory frameworks. International public health initiatives, e.g., the Codex Alimentarius Commission, the World Animal Health Organization and the In-
ternational Plant Protection Convention. These standards and related SPS measures are imple-
mented and enforced to a greater or lesser degree.

Animal health and welfare issues:
Animal health and welfare issues are increasingly moving into new areas, the BSE (mad cow) crisis, and the avian influenza pandemic have high-
lighted the importance of the animal–human link in the food chain and the need for capacity building for surveillance and control of zoonotic disease.


animal control. Source: FAO.

Classification of existing animal diseases

Major epizootics:

Other major diseases:

Endemic and neglected diseases:

2 Diseases endemic or absent. Elimination policy applied in case of outbreaks when significant costs may occur.

4 Not transmissible to humans.

Quality estimates of relative and cost
derived from cost-effectiveness studies.

Public sector

Producer cost

Animal health

Public health

Developed countries

Developing countries

Key

Policy options
• Strengthen or initiate regional foodborne, ani-
mal health and plant health surveillance, particu-
larly among countries whose national cir-
cumstances, including dietary patterns, agricul-
trade, and tourism, continue to add significantly to the human population, especially of infants, and cause widespread problems with basic foods. Particu-
larly vulnerable to these problems are the world’s approximately 850 million people who are not able to obtain sufficient food to lead healthy and produc-
tive lives.

Pathogens evolve both in terms of their prevalence and severity for human health. Pathogens featured in many food chains, such as Campylobacter jejuni and the Salmonel-
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cals pose to human health.
Chemical use in food production has increased worldwide. For example, in constant dollars, global expenditure on agricultural pesticide imports, summed across all nations of the world, have increased more than 400% from 1964 to 2002. Rising chemical use in many countries, food safety programs have introduced Good Agricultural Practices to diminish harm to human health. However, coordination problems among different ministries involved in such programs and reluctance to pay for food safety raises concerns that they often implement unsuccessfully the realization of these programs.

Additionally, private sector sanitary and phytosanitary (SPS) standards can result in market discrimination against resource-poor farmers for about 90% of the reported zoonoses cases in the European Union. For most foodborne infections, effective disease prevention can be achieved by changing behavior, but despite a lack of comprehensive epidemiological knowledge.

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Food safety programs attempt to control the consumption of agrochemical residues, growth hormones, and genetically modified and other substances (e.g., aflatoxins) in foods by setting and enforcing Minimum Acceptable Level of residues for individual chemicals based on assessments of the risks that the chemicals pose to human health.

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Chemical use in food production has increased exponentially. For example, in constant dollars, gross expenditures on agricultural pesticide imports, summed across all nations of the world, have increased between 1960 and 1998 by a factor of more than five. Chemical contamination in many countries, food safety programs have introduced Good Agricultural Practices to diminish harm to human health. However, coordination problems among different ministries involved in such programs and reluctance to pay for increased costs often prevent the successful realization of the programs. Additionally, private sector sanitary and phytosanitary (SPS) standards can result in market discrimination against resource-poor farmers for without affording the high cost of participation in programs that comply with international standards. The need for improved policies is clear.

**International regulatory framework**

The management of food safety, plant and animal health from the farm to the table requires coordination and integration that is not often provided by the current international policy and regulatory frameworks. International public relations issues include the Codex Alimentarius Commission, the World Animal Health Organization and the International Plant Protection Convention. These standards and related SPS measures are implemented and enforced to a greater or lesser degree, depending on available resources, through an array managed by various ministries in different countries.

**Animal health and welfare issues**

Animal health and welfare issues are major constraints to achieving the production of meat, milk and eggs. However, the condition of animal health throughout the food chain and the need for capacity building for surveillance and control of zoonoses, depending on available resources, through an array managed by various ministries in different countries.

**Plant health issues**

Plant pests are key constraints to achieving the production of crops, particularly in tropical and sub-tropical regions where conditions conducive to pest reproduction may be present year-round. Core services for traditional plant protection programs (PPP) include detection and control or management of plant pests of economic significance, register pesticides and plant disease managing import, export and domestic certification programs. These programs are being financed

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**Climate change**

Global warming, which results in vectors and diseases moving into new areas, the BSE ('mad cow') disease, and the avian influenza pandemic have highlighted the importance of the animal-human link in the food chain and the need for capacity building for surveillance and control of zoonoses, depending on available resources, through an array managed by various ministries in different countries.

**Public sector cost**

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**Country profile**

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**Informal economy**

In many countries, agricultural activities are carried out in the informal economy. The informal economy includes small-scale farmers, informal food producers, and informal food handlers. The informal economy is important in many countries because it provides employment opportunities and income for a large number of people. However, the informal economy is also associated with a number of challenges, including poor work conditions, lack of access to credit, and limited access to extension services.

**Policy options**

**Strengthen or initiate regional foodborne, animal, human and environmental surveillance**

- **Target countries**
- **Strengthen national, bilateral and international support for the Global Food Safety Initiative, is borne by primary producers and consumers.**
- **Policies that contain economic incentives are needed**
- **The timeliness and efficacy of preventative food safety measures may be compromised by a lack of comprehensive epidemiological knowledge.**

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Food Safety, Plant and Animal Health: Human Health and Sustainability Dimensions

In developing countries, foodborne diseases can cause or exacerbate malnutrition. Together foodborne diseases and malnutrition cause a estimated 12 to 13 million child deaths annually; survivors are often left with impaired physical and/or mental development. Of the approximately 200 infectious foodborne diseases emerging in both high and low income countries, 75% are zoonotic (transmitted between humans and animals).

Challenges

Human health

Foodborne disease is estimated to affect 30% of the population in industrialized countries at some time in a given year. Foodborne disease accounts for approximately 2 million deaths annually. Effective, coordinated and proactive national and international food safety systems can improve plant, animal and human health. Agricultural knowledge, science and technology can play an important role when used within effective regulatory frameworks with sufficient resources.

Among the requirements for achieving human health and sustainability goals are greater investments in adequate food safety infrastructure, public health and veterinary capacity; legislative frameworks for identification and control of biological and chemical hazards; and farmer-science partnerships for identification, monitoring and evaluation of risks. The agricultural component of bilateral assistance for developing countries grew 16% in 1985, but had declined to 4% by 2003. Recently, however, there has been a renewed interest among donors to use agriculture to promote economic growth and poverty reduction.

Plant and animal health

Plant disease can be devastating for human health, both directly, if plant toxins are consumed, and indirectly, if plant disease results in crop loss and subsequent crop failure. Some long-standing plant health problems, such as mycotoxins, can have a devastating impact on food security and the economy of developing countries. For example, the yield loss to wheat crops from one race of wheat stem rust (Ug99) typically ranges from 40 to 80% with strong instances of complete crop failure. Some long-standing plant health problems, such as mycotoxins, can have a devastating impact on food security and the economy of developing countries. For example, the yield loss to wheat crops from one race of wheat stem rust (Ug99) typically ranges from 40 to 80% with strong instances of complete crop failure. Some long-standing plant health problems, such as mycotoxins, can have a devastating impact on food security and the economy of developing countries. For example, the yield loss to wheat crops from one race of wheat stem rust (Ug99) typically ranges from 40 to 80% with strong instances of complete crop failure. Some long-standing plant health problems, such as mycotoxins, can have a devastating impact on food security and the economy of developing countries. For example, the yield loss to wheat crops from one race of wheat stem rust (Ug99) typically ranges from 40 to 80% with strong instances of complete crop failure. Some long-standing plant health problems, such as mycotoxins, can have a devastating impact on food security and the economy of developing countries. For example, the yield loss to wheat crops from one race of wheat stem rust (Ug99) typically ranges from 40 to 80% with strong instances of complete crop failure. Some long-standing plant health problems, such as mycotoxins, can have a devastating impact on food security and the economy of developing countries. For example, the yield loss to wheat crops from one race of wheat stem rust (Ug99) typically ranges from 40 to 80% with strong instances of complete crop failure.
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The International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD) provides information on how agricultural knowledge, science and technology can be used to reduce hunger and poverty, improve rural livelihoods, and human health, and facilitate equitable food and agricultural growth, while ensuring environmental sustainability.

The full set of IAASTD reports includes a Global and five sub-Global reports and their respective summaries for Decision Makers as well as a Synthesis Report, including an Executive Summary. The reports were accepted at an Intergovernmental Plenary in Johannesburg in April 2008.

The assessment was sponsored by the United Nations, the World Bank and the Global Environment Facility (GEF). Five UN agencies were involved: the Food and Agriculture Organization (FAO), the UN Environment Programme (UNEP), the UN Educational, Scientific and Cultural Organization (UNESCO) and the World Health Organization (WHO).

IAASTD Issues in Brief are taken directly from the IAASTD Reports published in 2008 by Island Press.

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