



*"Globalization is a fact of life. But I believe we have underestimated its fragility."*  
- Kofi Annan

In 1996 and 1997, more than 1,000 U.S. and Canadian consumers became ill after eating fresh raspberries imported from Guatemala. The cause was cyclospora – a parasite spread through the ingestion of contaminated water or food.

In response, the Guatemalan berry industry implemented improved on-farm water quality and sanitation systems. Nevertheless, the U.S. Food and Drug Administration banned imports of Guatemalan berries in the 1998 season. The effects were immediate, as 80 percent of all Guatemalan raspberries were bound for the U.S. market. Losses in 1997 and 1998 totaled more than \$13 million (USD).

Agriculture generates about 25 percent of Guatemala's \$61 billion GDP and employs half of its labor force. Guatemala's ability to compete globally without restrictions, a tarnished reputation and damaged trust is critical to its economy and its citizens' well-being.

The raspberry outbreak and similar episodes show that local populations are increasingly vulnerable to events that occur thousand of miles away. Advances in transportation permit the rapid movement of humans, animals and products, as well as the spread of pathogens and disease farther and faster than ever before. It creates a dangerous convergence within a global marketplace dire to meet consumer demand for food at cheap prices in any season from around the world.

### TRANSFORMING THE GLOBAL MARKETPLACE

For centuries, trade between countries has been a hallmark of the growth of human civilization. A supply chain infrastructure that accommodates differing climates and land resources, as well as patterns of settlement and colonization, has more recently been transformed by advances in transportation, trade liberalization, and "just-in-time" delivery. Transnational corporations and global distribution systems now provide developed countries with a buffet of global food choices. For instance, the average number of products carried by a typical supermarket in a developed country has grown from 15,000 to 50,000 since 1980.

Such advents let countries and regions leverage competitive advantages such as natural resources and labor pools, permitting them to do what they do best, whether

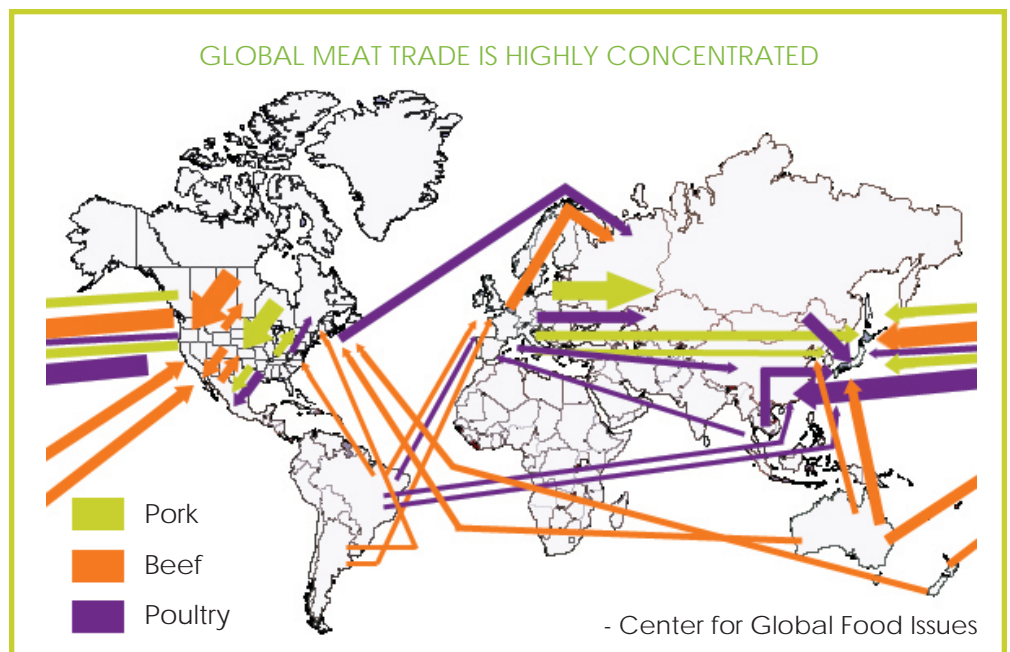
that is agriculture, electronics, heavy manufacturing, or services. The call center in India, soybean production in Brazil, and chemical industries in China are a global complement to fine cheeses and wine of Europe and the quick-service businesses of the U.S.

The food system relies upon this interdependence, with production concentrated in geographic areas with adequate soil nutrients and fresh water, processing moving to areas of low labor costs and amenable regulatory environments, and distribution centers centered at major transportation hubs to capture economies of scale. Many developed countries are now "net importers" of food, importing more than they export, fed by a year-round appetite for exotic fruits and regional delicacies and increased demand for protein as consumers' discretionary incomes grow.

### NEW VULNERABILITIES AND THREATS

This robust supply chain also creates new vulnerabilities, limitations and threats. Of those 50,000 supermarket items, many are not locally produced, having crossed many borders to arrive at the supermarket, and may have originated from relatively unchecked sources with questionable sanitation controls. Meat served in American homes, for instance, has traveled, on average, 1,000 miles from its farm of origin to the dinner table. One might question the awareness and appreciation of the influence of other nations upon our food safety, quality and availability, both positively and negatively.

Global distribution can also be credited for the number of products that lose their "identity of origin" as ingredients may be sourced from dozens of countries. A fast-food hamburger, for instance, has as many as 300



ingredients, each coming from a single supply chain that has tapped upwards of 300 farms to arrive at the restaurant where it was prepared.

Small accidents, processing errors, economic malfeasance or intentional contamination can affect consumers in far-off places as well as local producers seated at the origin of the event. The melamine contamination of pet foods is an example of how a potentially dangerous product can move across regional and national boundaries to reach thousands of animals or humans before the problem is recognized.

A similar occurrence in June 2007 prompted the U.S. Food and Drug Administration to urge consumers of toothpaste manufactured in China to throw away the product after discovering a poisonous chemical among its ingredients. The chemical, diethylene glycol, is used in automobile antifreeze and is toxic to animals and humans. Also used improperly in a variety of sedatives and medicines worldwide, contaminated cough syrup caused more than 40 deaths in Panama in 2006.

### REDEFINING THE GROUND RULES

Expanding international standards for safe trade represents part of the solution, but not all. Australia and New Zealand have a bilateral agreement allowing for joint regulation of food safety issues. As two exporters of food products geographically distant from other nations, both countries strive to keep out plant pests and animal diseases while maintaining a reputation for disease-free food.

When such arrangements do not exist, animals, plants, food products, drugs and vaccines move through illegal channels. Rampant organized smuggling may represent the primary movement channel for some high-value and high-risk items like bushmeat from Africa or certain experimental drugs.

The counterfeiting of consumables, including prescription medications, is also a threat. The U.S. Federal Bureau of Investigation calls counterfeiting the "crime of the 21st century." In 2004, it was a \$512 billion market, up 100 times over the last twenty years, accounting for 7 – 10 percent of global trade. Eight percent of all world trade is counterfeit, along with three percent of the 34 million annual U.S. drug prescriptions. Forty-three percent of all counterfeit medications seized per year contain no active ingredient.

Food is no exception. Counterfeiting techniques include substituting the contents of a product with another, mis-labeling or re-labeling a product, changing the expiration dates, and substituting unauthorized ingredients such as Sudan Red. Smuggled meat products are considered the source of the 2001 foot and mouth disease epidemic in England when food scraps from an ethnic restaurant were fed to pigs.

### MOVING PEOPLE, PRODUCTS AND PESTS

Our globalized world has lessened the time needed for transit between two points and expanded modes of conveyance now available. As international travel by humans continues to grow, showing increases of nearly five percent per year, it is one of the largest export goods. In the U.S., it ranks ahead of agriculture and automobiles at \$107 billion.

Rapid transit via varied means contribute to the risk facing animal and human health as local problems rapidly emerge as global problems. The transfer of severe acute respiratory syndrome (SARS) from China to other countries in 2002 highlights the ability for contaminated humans, such as the American lawyer infected with tuberculosis in 2007, to travel the globe unchecked.

Non-human travelers - pests, vermin and invasive species - can catch a ride in a shipping container, airline cargo bay, freighter's ballast water or even in the wooden pallet on which the product is shipped. These unwelcome immigrants may be pathogens themselves, disease vectors, or a new species that disrupts the ecosystem homeostatis.

The Asian tiger mosquito, *Aedes albopictus*, is an example that has posed one of the more significant health threats in recent times. Responsible for outbreaks of dengue, equine encephalitis and dog heartworm, it crossed the Pacific to North America, thriving in the stagnant rainwater captured in shipments of retread tires from Asia.

### SUMMARY

What once was local is now global, increasing the speed and complexity with which animal health and public health can converge. Goods and services move at record levels, and tourism and the globally mobile workforce add to this constant flux of agents, vehicles and hosts. Protecting animal and public health is no longer a national need but rather a global imperative for which civil society and our educational institutions have yet to fully comprehend.

