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Agriculture-associated diseases research at ILRI: Safe foods in informal markets

Delia Grace

Safer food can generate both health and wealth for the poor, but it requires radical and evidence-based change in food safety in informal markets is assessed, managed and communicated.

Key points

- In poor countries, meat milk eggs and fish are mainly sold through informal markets;
- These markets have both positive and negative impacts on health and livelihoods;
- New risk-based approaches are essential for understanding impacts and managing food safety;
- Most risk is managed by value chains themselves and improvements in food safety must be owned by value chain actors and driven by incentives.

Animal source foods matter

- In poor countries, livestock and fish feed billions. In East Africa, for example, livestock provide poor people with one tenth of their energy and one quarter of their protein needs. Fish account for more than half the animal protein intake for the 400 million poorest people in Africa and South Asia.
- Meat, milk, eggs and fish are important sources of the micro-nutrients and high quality proteins essential for growth and health. Studies in Egypt, Kenya and Mexico have shown strong associations between eating animal source food and child growth and cognitive function as well as better pregnancy outcomes for women and reduced illness for all.



- Production and marketing of livestock and fish earns money for farmers, traders and sellers, many of them women. For example, in East Africa, almost half of rural incomes rely to some extent on livestock and fish. India has the largest dairy sector in the world employing more than 100 million rural farmers.
- On the other hand, excessive amounts of animal source food have been linked to heart disease and cancer and unsustainable production contributes to land degradation and green-house gas production. Animal source foods are also important sources of biological and chemical hazards that cause sickness and death.
- Making the livestock revolution work for the poor requires a two-pronged approach which grows the benefits while reducing the risks around animal source food.
- Food borne illness and animal disease is of growing concern to consumers and policy-makers alike. Consumers respond to scares by stopping or reducing purchases with knock-on effects on smallholder production and wet market retail. Policy makers often respond to health risks by favouring industrialisation and reducing smallholder access to markets. These changes are often based on fear not facts. Without evidence of the risk to human health posed by informally marketed foods or the best way to manage risks while retaining benefits, the food eaten in poor countries is neither safe nor fair.

Why informal markets matter

- Most meat, milk, eggs, and fish produced in developing countries is sold in traditional, domestic markets, lacking modern infrastructure and escaping effective food safety regulation and inspection.

By 'informal markets' we mean:

- Markets where many actors are not licensed and do not pay tax (e.g. street foods, backyard poultry, pastoralist systems);
- Markets where traditional processing, products, and retail practices predominate (e.g. wet markets, milk hawking system, artisanal cheese production);
- Markets which escape effective health and safety regulation (most domestic food markets in developing countries).

Neglect and unbalanced interest

- Much attention has been paid to the role of informal markets in maintaining and transmitting diseases but little to their role in supporting livelihoods and nutrition. Undoubtedly hazards exist in informal milk and meat including pathogens such as diarrhoeagenic *Escherichia coli*, *Salmonella* and tapeworm cysts; SARS came from, and avian influenza is maintained in, the wet markets of south east Asia. Concerns over informal food has been heightened by the landmark Global Burden of Disease studies which found that diarrhoea is among the most common causes of sickness and death in poor countries. Most of this is caused by contaminated food and water, and around half is linked to animal pathogens (zoonoses) or animal source foods.

What we have learned?

The International Livestock Research Institute and partners has been conducting research on food in informal markets over the last ten years. Some findings from past research with implications for the future include:

Informal markets are highly preferred and likely to persist

- Studies by ILRI and partners have shown that informal markets are the most important source of meat, milk and eggs for poor people in Africa and Asia and will continue to be so for at least the next decade.
- Informal markets often sell food at lower prices, but they have other desired attributes including: food freshness, food taste, livestock products from local breeds, trust in the vendor, credit or other services.

Food safety matters to poor consumers

- Studies by ILRI and partners across seven Asian and African countries show that most consumers (48 to 97%) care about food safety. They show it in purchasing behaviour: for example, consumers (20-40%) switch to alternative meats in the wake of animal disease epidemics. Willingness-to-pay studies indicate that consumers will pay a 5-15% premium for safety-assured products, and demand for food safety increases with economic development, rising income, urbanisation, increased media coverage and education level.

Hazards don't always matter, but risks do

- Hazards are things that can cause harm. Bacteria, viruses, parasites, chemicals, and fungal toxins in food all have potential to cause harm: they are hazards. Our studies from many markets in many countries show that *food sold in the informal sector often contains hazards*

- Moreover, research in West Africa and India suggest that as *value chains become longer, more complex, transport larger, more diversely-sourced volumes of food, and place larger distances between producers and consumers, so hazards increase.*
- Consumer and market value chain studies confirm the bulk of literature that suggests in some contexts *a high level of disease in developing countries is associated with food.* An assessment in Nigeria found a high risk from beef-borne pathogens and suggested beef-borne disease was costing Nigeria nearly US\$ 1 billion a year.
- However, a series of studies in informal milk and later meat markets showed that although *hazards are always common in informal markets, risk to human health is not necessarily high.* Stochastic models based on data from a number of sites in East Africa showed that milk had many hazards but less risk (mainly because of consumer practices in boiling). In Nigeria, however, there was a clear link between consumption of beef and increased illness. Risk cannot be assumed for informal markets: evidence is required.

Perception a poor guide

- Moreover, proper risk assessment is needed to understand the source of risk. For example, dairy cattle are the reservoir of cryptosporidiosis, a serious disease in people with HIV and infants. Yet in Nairobi, risk was associated with vegetable consumption and not milk. Similarly in Vietnam, although pork meat in wet markets had high microbial loads, increased diarrhoea was associated with consumption of vegetables, not meat.
- Risk assessment allows actions to be *targeted* to evidence and not misleading perception; i.e. directing scarce resources toward control or inspection of the actors, processes or steps in the value chain where most risk is created.
- Studies in East Africa, North-East India and Vietnam came to the surprising conclusion that food sold in formal markets, though commonly perceived to be safer, may have lower compliance with standards than informally marketed food. This emphasises that *food safety policy should be based on evidence and not perception* and failure to do this may be prejudicial to the poor who dominate and rely upon informal value chains.

Draconian food safety policy makes things worse

- A huge food sector that largely escapes regulation, the high level of hazards in food, and the massive

burden of gastro-intestinal illness all suggest that current food safety policy is not working.

- Yet, our situational analyses of food safety in 6 countries found that stakeholders often blame insufficient legislation or lack of strict implementation for poor food safety. In recent years there have been several attempts to improve food safety, but this ‘command and control’ method is less likely to work.
- Paradoxically, legislation can increase the level of risk. Our work in Kampala showed the importance of *poor dairy farmers as risk managers and the paradoxical effects of conventional policy.* Thirty practices were described which were used spontaneously by farmers that reduced risk. Moreover, farmers who had experienced harassment by authorities or who believed urban farming to be illegal used significantly fewer risk managing practices.

Values and cultures more important drivers than pathogens

- A study on the linkages between gender, collective action and food safety among retail butchers in Ibadan, Nigeria showed the *importance of gender as a food safety determinant.* The study found butchers’ associations with more women had better food safety practices, better quality of meat, and there was less gastro-intestinal illness amongst the people who consumed it.
- A study in West Africa found the Fulani believe that natural milk is pure, thus it could not be a source of disease. They boil the milk they sell to customers but not the milk they drink themselves.

Food safety is a fixable problem

- Studies on milk in Kenya and India, and meat in Nigeria, have shown that *simple interventions can lead to substantial improvements* in food safety. These interventions involved training, simple technologies (such as use of wide-necked vessels for milk which are easier to clean), social approval, tests for food safety which can be applied by traders and consumers (e.g. lactometers to check for added water) and certification of trained vendors.
- Economic assessment of the Smallholder Dairy Project in Kenya showed that recognising the informal sector and giving training and certification led to benefits worth US\$ 28 million per annum, thus showing the *high potential impacts of better ways to manage food safety.* This study and others focusing on the livelihood and gender benefits of smallholder value chains show the *importance of multi-sectoral approaches* to food safety that consider the

incentives for change in a given value chain and the aggregate benefits available to the whole sector by way of rewards being paid for quality, and spill-overs in terms of improved market function.

ILRI and food safety in informal markets

- A seven country project on building capacity for food safety in informal markets is finishing in 2011. This will generate numerous products including 25 proof of concept studies, briefs, situational analyses of food safety in 5 countries and training manuals.
- In south east Asia an ecohealth research project is looking at risks in poultry slaughter houses as well as food as a risk factor for zoonotic diseases causing diarrhoea in children and abortion in women.
- We also anticipate new research on mycotoxins in the feed-dairy chain in Kenya and pig value chain in Vietnam.

Future plans and way forward

Our work over the last decade confirms our hypothesis that food safety is an important and growing constraint to smallholder value chains because of its multiple burdens on human health, livestock production and product marketing. The new CGIAR Research Program on Agriculture for Enhanced Nutrition and Health is an opportunity to bring new resources to tackle this problem. Work will be closely aligned with other CRP value chains. Some of the strategies that guide this program will be:

Prioritisation and systems understanding

- **Comparative risk assessment.** We need to continue developing rapid, appropriate methodologies that can identify the food safety and zoonoses constraints to value chains and systems and the benefits of addressing these.

Risk and socio-economic assessment

- **Metrics.** Integrated measurement of multiple health and economic benefits and burdens is needed to raise awareness of the relative importance of problems and improve resource allocation.
- **Socio-economics.** Social and economic determinants affect behaviour of both consumers and value chain actors, and so are important drivers of food safety. Assessment of incentives at the individual, group and whole-chain levels can lead to better risk communication and management.

Risk management

- **Risk factor assessment.** Identifying risk factors gives give insights (often contradicting conventional wisdom) into food safety management and increase the effectiveness and equity of packages of interventions.
- **Innovation.** A substantial part of the risk associated with informally marketed food can be reduced by relatively cheap and simple innovations (technological, organisational or marketing) which are compatible with the incentives faced by specific individuals of coalitions within value chains.

Cross-cutting

- **Risk based approaches.** Current regulations and inspections based on presence of hazards rather than health risks to consumers are ineffective at assuring food safety and prejudicial to smallholder farmers and informal value chains. Risk-based approaches can lead to more effective and equitable food safety management.
- **Use of multi-sectoral approaches.** Integrated, multi-disciplinary, or trans-disciplinary approaches to food-safety can give added insights, increase ownership, improve effectiveness and generate efficiencies.

On 9 and 10 November 2011, the ILRI Board of Trustees hosted a 2-day 'liveSTOCK Exchange' to discuss and reflect on livestock research for development.

www.ilri.org

P O Box 30709, Nairobi 00100, Kenya
Phone: + 254 20 422 3000
Fax: +254 20 422 3001
Email: ILRI-Kenya@cgiar.org

P O Box 5689, Addis Ababa, Ethiopia
Phone: +251 11 617 2000
Fax: +251 11 617 2001
Email: ILRI-Ethiopia@cgiar.org

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