Implementing Food Safety Management Systems in Ukrainian Food Processing Enterprises

A COST-BENEFIT ANALYSIS

IFC Advisory Services in Europe and Central Asia
IFC Ukraine Food Safety Project

In partnership with

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Introducing international food safety systems is often considered a necessary step in developing the agricultural sector and food processing industries. Food safety management systems based on Hazard Analysis & Critical Control Points (HACCP)1 open up new international markets for high value-added food products and increase efficiency of domestic markets.

Recognizing the positive impact of food safety enhancements in other developing markets, IFC launched the Ukraine Food Safety Project to implement HACCP principles at several pilot enterprises in Ukraine and facilitate implementation of HACCP in Ukrainian food processing industries overall.

The goal of the project is to increase competitiveness of Ukrainian food producers by improving their food safety management systems. One of the necessary steps in this direction is the provision of key decision-makers with hard evidence of cost efficiency of the standard implementation. This cost and benefit analysis of HACCP implementation serves this purpose.

The study of costs and benefits associated with the HACCP implementation in food processing companies was commissioned to Kyiv School of Economics.2 This report presents results of this preliminary study in three priority industries - dairy, meat and bakery.

This study was initiated with the aim to address the critical lack of knowledge of economic aspects of food safety among owners and directors in food industry in Ukraine. Moreover, because of insufficient understanding of cost and benefits there are many myths around systems, based on HACCP. In particular, in Ukraine there is a widely shared misperception of HACCP as a expensive and complicated instrument, even though the Ukrainian Food Safety Law mandates that each food enterprise must have HACCP system and/or any other food safety management systems in place (though without specifying enforcement mechanisms for their implementation).

This is the first attempt to analyze economic aspects of HACCP in Ukraine; there is practically no specific data available on the company level, as well as no reliable statistics on the aggregated national level that would help to identify and assess food safety—related expenses and subsequent gains for businesses.

1 HACCP (Hazard Analysis and Critical Control Points) – globally recognized food safety management system build on risk-based approach and potential hazards analysis and prevention along the production process.
2 Principal authors of the report are Denys Nizalov, Academic Director, Kyiv School of Economics, and Vladimir Dubrivnyi Senior Economist and the Member of Supervisory Board, CASE Ukraine.
2. Implementation of modern food safety management systems requires that an enterprise complies with basic sanitary and hygiene norms and practices – those are called ‘prerequisite programs.’

They cover equipment, infrastructure in facilities, personal hygiene rules, water and waste management etc.3

Prior to implementing the HACCP food safety management systems, it is key to ensure that a company has all prerequisites in place.

The total costs of prerequisite programs may vary significantly: in some cases the need for investments in infrastructure may be rather small – especially if production facilities are newly constructed and appropriately designed. This cost could be minimal if an enterprise already complies with the national standards and norms (existing sanitary and veterinary regulations).

However, this cost may be much higher if major construction or building remodeling, creation of stationary raw material collecting points, or advanced lab equipment acquisition is necessary.

However, in practice, for companies it is cheaper to pay fines or use unofficial ways of solving problems with controlling agencies than to comply with the existing regulations.

3. Based on expert opinion, the expected cost of HACCP development and implementation is around 50,000 - 70,000 Ukrainian hryvnyas ($6,000 - $8,000).

This cost may be larger if foreign consultants are involved. The expected first year operational cost is around 50,000 Ukrainian hryvnyas ($6,250). The total cost is expected to be higher for meat processing industry and lower for bakery, as the latter usually involves less food-related risks and hazards.

The operational costs tend to decrease over time by approximately ten percent after the first year and, in some cases, by another five percent after the second year. This decrease is associated with a decline in the number of the Critical Control Points and the learning effect.

4. Pay-back period may usually takes from one to two years, as evidenced by international practices of implementing the systems in the dairy industry.

In Ukraine there are cases of companies that experienced even shorter pay-back periods, of about six months.4

Another important aspect of benefits associated with robust food safety management system in place is the proven increase in revenues: anecdotal evidence was found in Ukrainian processing companies that overall growth of sales can range from 15 percent to 25 percent over a two-three years period.4 An expert discussions revealed, adoption of HACCP in the dairy industry in Ukraine may double the sales to this segment of the market. Such improvement of business results is possible due to enhanced cooperation with large retail chains domestically as well as because of expansion to new international markets.

And of course, potential losses of products that a company may face (be it a recalled batch/lot of products or termination of lucrative contract with a retailer) because of food safety problems may be higher than the money the producer would have to pay for implementation of the food safety management system in total.

3  See, for example, the Recommended International Code of Practice-General Principles of Food Hygiene. Codex Alimentarius Commission http://www.codexalimentarius.net/web/more_info.jsp?id_sta=23
4  Galfrost case, see IFC brochure “Upgrading food safety in your business: a Win-Win for your bottom line and your customers” November 2010.
5  Zhitomir Sweets company, Drygalo.
Implementing Food Safety Management Systems in Ukrainian Food Processing Enterprises

Issue of costs and benefits of implementation the HACCP-based food safety management systems at the company level became topical in 1990s-earlier 2000s in anticipation of or shortly after the system became mandatory in most developed countries.

The primary reason to implement HACCP by business was the legal requirement of the US and EU markets.

In US in 1995, the Food and Drug Administration (FDA) issued regulations (Procedures for the Safe and Sanitary Processing and Importing of Fish and Fishery Products) that made HACCP mandatory for fish and seafood products.

In 2001 FDA issued regulations for mandatory HACCP in juice processing and packaging plants (HACCP Procedures for the Safe and Sanitary Processing and Importing of Juice: Final Rule).

In 1998, the U. S. Department of Agriculture established HACCP for meat and poultry processing plants. Most of these establishments were required to start using HACCP by January 1999; very small plants had until January 25, 2000 (The Final Rule on Pathogen Reduction and Hazard Analysis and Critical Control Point (HACCP) Systems).

HACCP entered to regulations of Europe Community Countries with Council Directive 93/43/EEC on the Hygiene of Foodstuff in 1993, but implementation of self-control systems based on HACCP principles in all industries has become mandatory in EU since 2004 after adoption of EU Regulation 852/2004 on the Hygiene of Foodstuffs.

The largest cost item is related to the implementation of prerequisite programs (renovation and redesign of production facilities, upgrade in management, sanitation and hygiene practices).

There is a large variation in the cost of prerequisite programs (from $7,300 to more than $250,000). This variation is related to initial levels of hygiene and sanitation conditions. It is expected that stricter state controls are associated with lower additional costs for prerequisite programs.

In contrast, the HACCP implementation and operations come at a relatively low cost. The average design and implementation cost ranges from $5,300 to about $23,500. The annual operational costs range from $6,000 to $30,000, which include monitoring, record keeping, and review of records and the HACCP plan. The average total first year cost of HACCP implementation ranges from about $50,000 to more than $270,000.

However, direct reported cost items severely underestimate the true cost of the HACCP implementation. It was shown that each dollar of the reported costs is associated with the additional increase by $1.1 in total production cost for the Philippine seafood producers. Such unaccounted costs might be due to a loss in overall productivity, stops in production, etc (Ragasa, 2008).

The benefits may be divided into two main groups: quantitative (monetary) and qualitative.

The firms which have adopted the HACCP usually demonstrate better technical efficiency (Nganje and Mazzocco, 2000). However, this advantage could have existed before (so the firms with better management appeared to be more prone to implement the HACCP).

The data on the Philippine seafood industry shows that the HACCP-certified firms were able to access high-end markets (including the European Union) with higher prices (by $1.4 per kilo) and to increase exports to different markets by more than four percent.

At the same time, HACCP is credited with reducing product wastage by about 0.2 percent on average. There is also found a variation in the level of the benefits across firms of different sizes in the Philippine seafood industry.

6 Please refer to References to find the list of sources used.
Implementation of HACCP in Ukrainian enterprises

Selected sectors

There were three priority industries identified for the cost-benefit analysis: dairy, meat and bakery industries. Due to differences in the production process the meat industry is further divided into meat production (primarily slaughterhouses), meat processing, and poultry.

While considering all five sub-industries, primary attention was paid to the dairy industry at the stage of model validation and expert assessment. Peculiarities (if any) of HACCP implementation in meat processing and other sub-industries were considered in comparison with the dairy industry. The focus on dairy is driven by the fact that the structure of costs and benefits of the HACCP implementation is similar among all the sub-industries. This conclusion is based on the reviewed literature for different industries and expert discussion.

However, the level of vulnerability to safety-related hazards is very different among the sub-industries. Bakery is considered as low-risk industry because there are less food-borne diseases widely associated with bread than, for example, with milk. Slaughtering is normally not a source of risk in Ukraine (unlike the US and some other countries). Traditionally, dishes made of raw or semi-raw meat are not popular, and all meat is subject to a thermal treatment. Instead, dairy products are especially risky in Ukraine due to the poor quality and very complicated traceability of the raw materials, which, when coupled with the lack of cold chain logistics and storage, leads to an extremely low shelf life compared with European dairy products.

Identification of cost and benefit items associated with HACCP implementation in the priority industries (construction of analytical model) is the first and one of the most important steps in the cost-benefit analysis. This section of report presents the analytical model that has been constructed based on the lessons learned from international experience. The model was then validated during a workshop with experts (as described in the following section of this report).

Categories of benefits and costs

The costs in general can be put into three main categories:

1. Introduction of pre-requisite programs (start-up costs, variable costs for new equipment, renovation of premises)
2. Development and implementation of HACCP action plan (costs of developing HACCP action plan, staff training, evaluation of HACCP plan)
3. Maintaining HACCP system (costs of record keeping and verification of HACCP plan, corrective actions).

Together these categories include 26 most common cost items. More details on the cost items together with their expert valuation are presented in the Annex.

1. HACCP related benefits include the following categories: Increase in revenues (access to new markets, expansion in retail chains)
2. Decrease in overall cost (better management, staff motivation and responsibility, streamlined production process)
3. Increased product stability, shelf-life and product characteristics (lower wastage and spoilage processing)

Some of these benefits can be described as non-tangible, i.e. items that do not have clear values or cannot be easily assessed in monetary terms. In most cases, however, the tangible benefits would capture an overall firm-level effect of the HACCP implementation including the effect of non-tangible benefits.

For example, an increase in product shelf-life and increase in stability of product characteristics would be reflected in an increase in sales. For that reason, non-tangible benefits are not considered separately in the model.

The assessment of individual cost items was conducted for a representative average size (70-150 employees) dairy plant producing pasteurized milk. All comparisons between dairy and meat processing industries were performed for plants of the same size.

7 To verify the structure of costs and benefits and to assess their monetary values, an expert workshop was organized in April 2010. Results of the experts’ assessments are summarized in Annex.
Cost at the enterprise level

Assessment of Prerequisite Program Costs

Old Soviet and contemporary Ukrainian sanitary norms are quite stringent. Potentially, it could be relatively simple and inexpensive to adopt the HACCP for a plant that already complies with all the national norms. In particular, if production facilities were designed in a way that minimizes cross-contamination. In that case, no major reconstruction is usually needed.

In addition, if a plant complies with General Manufacturing Principles (GMPs) and/or General Hygiene Principles (GHPs), the costs of prerequisite programs may be relatively small. In practice, most of the production facilities do not comply with existing norms. It is more economical to pay a fine (or bribe) than to invest in proper quality control and management.

Similar to other countries, expenses for prerequisite programs is the largest cost item associated with HACCP implementation. The expected total cost for these programs is around 250,000 Ukrainian hryvnyas ($31,250) for an average dairy processing company.

However, this cost may be much higher if major construction or building remodeling, creation of stationary collecting points, or advanced lab equipment acquisition is necessary. Thus, the costs of prerequisite programs in Ukraine are typically closer to those in developed countries (e.g. the US) than in developing countries (e.g. Bangladesh, Philippines).

When comparing dairy and meat processing industries, local experts noted that most of the cost items are similar in size and frequency between the two industries. Differences were mentioned in the costs of construction, lab equipment, and cleaning/sanitation equipment, which are more expensive for the meat processing enterprises. In other industries these costs are expected to be lower.

Costs associated with HACCP development and implementation

Overall, HACCP development and implementation includes a set of low cost activities including, for example, developing documentation, setting up the HACCP team and conducting regular meetings, training staff. The expected cost of these activities is around 45-50,000 Ukrainian hryvnyas ($5,600-6,350). This cost may be larger if foreign consultants are involved. The development cost is not expected to be different among other industries.

Recurring (operational) HACCP costs

Similar to development costs, operational costs are also low. The expected first year operational cost is around 50,000 Ukrainian hryvnyas ($6,250) and is related primarily to the number of Critical Control Points (CCPs) that are established according to the HACCP plan.

The operational costs tend to decrease over time by approximately ten percent after the first year and, in some cases, by another five percent after the second year. This decrease is associated with a decline in the number of the CCPs and the learning effect. Operational costs are expected to be higher in the meat processing industry due to a larger number of people that have to be trained.

The overall expected cost of HACCP implementation in Ukraine is similar to other developing countries and usually is less than in more developed economies like the United States. The largest component is the cost of prerequisite programs.

Benefits for enterprises

The most important benefit associated with HACCP implementation is access to new retail chains and supermarkets. An expert from the dairy industry states that the widespread adoption of HACCP could double sales in this market segment. This benefit is stated as a primary reason for adopting HACCP by domestic enterprises.

Also, experts have mentioned that there is an increasing pressure from the supermarkets regarding adoption of HACCP by their suppliers. The chains of Metro and Fozzy have already started demanding HACCP from their suppliers of dairy and meat products. Others are likely to follow soon.

Increases in prices and profitability are often considered as another important motivation for implementing HACCP. Regarding other benefits, they are less important for the dairy industry in Ukraine. Access to international markets is thought to be not feasible for domestic dairy industry due to a lack of quality raw milk. While for other industries the pull of export markets is among the most important benefits.

Other benefits include decreased frequency of certification, lower insurance cost, improvement in control and overall management of production process. Liability for the damage caused by food-borne diseases is not thought to be an important cost/benefit factor in Ukraine. However, cost savings due to the early detection of unsafe (e.g. contaminated) products can be substantial if compared to the late detection or reclaiming and re-processing.

Food safety standards that significantly exceed government requirements (e.g., IFS, BRC, ISO 22000) can be a major discount factor when determining the premium price, terms and conditions for product liability insurance.
The study showed that the structure of costs and benefits of the HACCP implementation in Ukrainian food processing industries is similar to the structure in other countries. The expected cost of HACCP implementation in an average milk processing enterprise in Ukraine is around 350,000 Ukrainian hryvnyas ($43,750) during the first year, which is close to the lower part of the range typically spent elsewhere in the world.

The relatively low cost of HACCP implementation in Ukraine is explained by more stringent sanitary norms imposed by the government. As a result, it would be relatively simple and inexpensive to adopt the HACCP for a plant that already complies with national norms. Unfortunately in practice, most of the production facilities do not comply with existing norms. It is perceived to be more economical to pay a fine (or bribe) than to invest in proper quality control and management.

The most important benefit associated with HACCP implementation for the dairy industry is the access to new retail chains and supermarkets. Other industries may also expect better access to international markets, although much depends on reform of the food safety control system at the national level.

A comparison of costs and benefits across dairy, meat and bakery shows that the structure of costs is similar while the total cost may be higher for meat and lower for bakery. This difference is related to the number of people to be trained and the scale of prerequisite programs. The benefits are expected to be higher for the meat and lower for the bakery industry compared to the dairy industry.

A reliable assessment of cost-effectiveness of the HACCP implementation in Ukrainian food processing industries would help managers to justify an adoption of this standard. However, other stimuli for the HACCP adoption are also available.

Conclusions

Recommendations for Policymakers

1. The Government of Ukraine should develop a clear policy to encourage and support the implementation of internationally recognized food safety management systems at all Ukrainian food enterprises through various incentives, such as decreasing the frequency of inspection visits to facilities with HACCP-based system and building consultation capacities of control authorities to help to introduce best food safety solutions and practices.

2. Structural reform of the inspection system should be based on results of a public-private dialogue with the food processing industry, consumers, and exporting countries, especially the EU.

3. On the national level health statistics need more detailed breakdown of food-borne diseases and more efforts to ensure better reporting and monitoring system of food safety issues. That will help official control authorities to identify causes of food outbreaks and prevent them through support and proactive implementation of food safety management systems in food business operators. .
Experts were asked to provide an estimate of frequency and size of each cost item. Frequency was measured using a percentage scale from one to 100. The size of cost items was assessed using the following three-point scale:

(S) small – for items that would cost below 10,000 Ukrainian hryvnias ($1,250) per year;
(M) medium – for items that would cost from 10,000 to 50,000 Ukrainian hryvnias (from $1,250 to $6,250) per year;
(B) big – for items that would cost more than 50,000 Ukrainian hryvnias ($6,250) per year.

The expected cost is computed as a product of frequency and size of the cost items.

Table 1. Main cost articles and their quantitative estimates for a mid-size Ukrainian enterprise

<table>
<thead>
<tr>
<th>Cost items</th>
<th>Dairy Management</th>
<th>Meat Processing</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Analysis of gaps in quality management and control</td>
<td>90% S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2. Construction and remodeling cost</td>
<td>85% B, 0% for new facilities</td>
<td>B (for equipment) e.g. walls, ceilings, floor drains</td>
<td></td>
</tr>
<tr>
<td>1.3. Additional actions to improve GMP</td>
<td>90% M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.4. Purchase and installation of additional lab and monitoring equipment</td>
<td>0% for new foreign owned; 90% for the rest S-M</td>
<td>B (for equipment)</td>
<td>Lab testing may be outsourced: in such case no additional cost is paid</td>
</tr>
<tr>
<td>1.5. Purchase and installation of additional cleaning and sanitation equipment</td>
<td>10% for M and B cost items; 100% for small changes, e.g. hand washing equipment S-M</td>
<td>B (for equipment)</td>
<td></td>
</tr>
</tbody>
</table>

Expected prerequisite costs (if no major equipment and remodeling, no collecting points and new transportation, no export) 250,000 UAH ($31,250)


REFERENCES


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