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Logistics Information Support for Environmental Management for Organizations in the Food Chain

Abstract: With the establishment of an environmental management logistics system, organizations in the production chain of food products should provide evidence of their ability to control safety and environmental dangers. Logistics systems should be applicable to all organizations, regardless of their size, which are involved in any aspect of the food chain, from production preparation to waste management..

Keywords: Logistics system, Environmental management, Organization, Food chain.

1. INTRODUCTION

The logistic concept for environmental management (from production preparation to waste management) is being developed by organizations directly or indirectly involved in the production of food products. The basic idea behind the development of the logistics system for environmental management is to prevent production of food products from damaging the environment during preparation and/or use of the product for the intended purpose. This means that production, processing, distribution, storage and handling of food products and their ingredients from primary production to consumption should contribute to environmental protection.

2. ESSENTIAL CONDITIONS AND INFLUENTIAL ELEMENTS IN THE PRODUCTION OF FOOD PRODUCTS

All food production activities should eliminate or prevent the spread of food safety and/or contamination dangers in products or in

a production environment.

The elements affecting food products for food safety and environmental protection purposes are given in Figure 1.

3. THE IMPORTANCE OF THE ENVIRONMENTAL MANAGEMENT LOGISTICS SYSTEM

The environmental management logistics system should:

- a) plan, implement, operate, maintain and update an environmental management system aimed at providing products that, according to their intended use, are safe for the consumer,
- b) effectively communicate environmental protection issues to suppliers, customers and relevant interested parties in the food chain,
- c) ensure that the organization conforms to its stated environmental protection policy,
- d) seek certification or registration of the environmental management system by an external organization.

Every organization engaged in the food chain should establish, document, implement, maintain and when necessary update an efficient environmental management system. The essential steps to be taken include identification of products or product categories, processes and locations of production requiring

environmental management, as well as definition of the framework for the environmental management system. To provide evidence on the harmonisation with conditions and on efficient operation of the

environmental management system, adequate records should be kept, including the establishment of an appropriate procedure for a closer determination of the manner of realisation of this process.

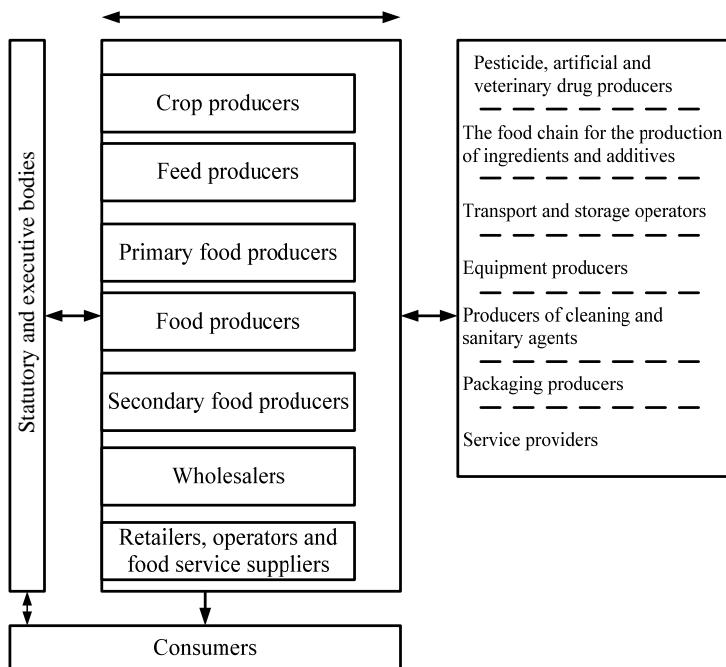


Figure 1 - Elements affecting food products for food safety and environmental protection purposes

4. THE IMPORTANCE OF THE LOGISTICS INFORMATION SYSTEM (LIS) FOR ENVIRONMENTAL MANAGEMENT

In order to provide availability of a sufficient amount of information on environmental protection issues throughout the food chain, the organization should establish, implement and maintain efficient communication with suppliers and contractors, customers or consumers, legal and executive bodies and other organizations affecting or to be affected by the efficiency or the updating of the environmental management system.

Adequate logistics information system (LIS) should inform on environmental protection aspects in terms of products and inter-related organizations in the production

chain of food products.

To maintain the efficiency of the environmental management system, the organization should provide timely information using the LIS for food safety and environmental protection on changes in products or new products, raw materials, ingredients and services, production systems and equipment, production facilities, location of the equipment, surroundings as well as in a multitude of other conditions affecting food safety and environmental protection.

Each organization should reexamine the environmental management system in the organization at planned intervals to secure its continued adequacy and efficiency.

Each organization involved in the food chain should create its LIS through the following:

- a) design and construction of buildings and their accompanying utilities;

- b) design of facilities, including work and employees' facilities;
- c) supply of air, water, energy and other resources;
- d) accompanying services including waste disposal and sewerage system;
- e) adequacy of equipment and its accessibility for cleaning, maintenance and preventive maintenance;
- f) management of purchased materials, supply, additional systems and handling of products, as well as other adequate aspects.

Any raw material, ingredient and material coming into contact with products, as well as the characteristics of final products should be documented as needed for analysis of environmental dangers.

A monitoring system must include relevant procedures, instructions and records involving: measurements or observations providing obtainment of results over an adequate period of time, used monitoring devices and frequency of monitoring.

Every organization should enable handling of non-harmonised products by taking measures to prevent the non-harmonised product from entering the food and environmental protection chain. Each influential factor inducing the emergence of non-harmonised products should be eliminated.

5. REENGINEERING OF PRODUCTION SYSTEMS FOR ENVIRONMENTAL PROTECTION PURPOSES

The redesigning i.e. reengineering of processes is carried out if considerable changes have been made in output requirements, control or the technological platform supporting the business process.

Ecology has become a major aspect of human lives. Hence the obligation to provide evidence for products used by man as food or medicine of the environmental suitability of the production process i. e. the soil used in production, cultivation, harvest, sale or processing of any food product. Management bodies are in charge of the development and incessant improvement of the environmental protection system within the production system.

The production systems in the past used to resolve environmental pollution problems generally reacting to external pressures coming from non-governmental organizations, groups interested in the environment or citizens. Resolution of environmental pollution problems was taken by companies as a source of costs as opposed to profit increase.

This manner of thinking has been substituted today with the view that environmental protection management is a constituent of business operations. Companies have become more efficient, more responsible and more adequately run. Consequently, companies without an environmental management system will be less successful than their competitors. Leading world companies have defined investment amounts of environmental preservation costs and are using an environmental management system (EMS) to control the costs. The EMS is leading the company towards permanent improvement of environmental protection. This system is, at first, engaged in essentials: providing harmony and boundary reliability factors, and then it can advance above minimum regulation standards and focus on pollution prevention, waste reduction and higher substance and energy utilisation efficiency. Key EMS components include continued development, pollution prevention and integration of environmental management principles in all management fields.

The environment quality is drastically affected by the manner materials, products and energy are being used, as well as by production processes, products and services resulting from these processes. The majority of products, processes and services, depending on their nature and complexity, have a certain effect on the environment during their life cycles. The effect is reflected in gas emissions into the atmosphere, liquid and solid waste discharges into water or soil, irrational consumption of natural resources etc.

Environmental management realisation in production systems should have the following stages:

- taking responsibility and formulation of environmental policy guidelines;
- planning i. e. definition of environmental objectives and measures;
- implementation of the environmental management system;

- measurement and evaluation of company effects on the environment;
- reexamination and improvement of eco-management system functioning.

It is through these stages that the production system can improve its effect on the environment.

The new approach related to the standardised environmental management system requires producers to take care in the future not only of their own environment-relevant actions, but also of environmental characteristics of previous and following activities. This means that evaluation of the life cycle includes "a systematic group of procedures for the integration and examination of material and energy inputs and related environmental effects directly induced by functioning of products and services during their entire life path".

5.1. Waste management process in the food chain production systems

The producer of waste-generating food products is responsible for the selection of the most environment-friendly solution based on product characteristics, production technology, product shelf life and available technology.

In the process of harmonisation with European legal regulations, there should be a breakthrough towards a proactive and preventive approach to environmental protection and resource saving. Previous activities were reactive and focused on waste processing without giving any concern to resources.

Waste management is a broader term than the waste handling term. It includes direct operation and organization of waste operations, but also operations which are being performed or which are to be performed by governmental bodies and organizations of regional and local administration and self-administration.

- Everybody engaged in waste management
- should not jeopardize human health,
 - should engage in waste management by avoiding damage to the environment (sea, water, ground and air pollution risks, noise occurrence, bad odour occurrence, plant and animal world endangerment, harmful effects on areas with cultural and historical, aesthetic and natural values, explosions or fire occurrence).

The waste management strategy in Serbia

should define and provide long-term guidelines for waste management. The purpose of this strategy is to establish a feasible framework within which Serbia would be able to reduce waste generation and conduct sustainable management of generated wastes in conformity with EU norms.

Waste Management Strategy as a constituent part of the Environmental Protection Strategy should involve:

- evaluation of the current waste management situation,
- basic waste management objectives and measures,
- hazardous waste management measures,
- waste usage and disposal guidelines.

An Act on Wastes should regulate the following: waste management methods, waste management principles and objectives, planned waste management documents, waste management authorities and responsibilities, waste management costs, waste management information system and other related activities essential in waste management.

5.1.1 Waste Flows

Waste transport from the place of origin to the final disposal site: the collection, transport, utilisation, processing and final disposal process is referred to as the waste flow. Waste flows are dependent on waste properties, places of origin, as well as on obligations and responsibilities of the ones in charge of waste disposal.

Legal and physical entities generating waste by their activities are involved in the waste management system (Figure 2) at state, regional and local self-government level, depending on the manner and level of organization, knowledge, consciousness and information.

Wastes are classified into municipal and technological wastes by their place of origin, and into hazardous, non-hazardous and inert wastes by their properties.

The waste management process can be divided into five basic subprocesses, as presented in Figure 3.

A waste management plan must be drawn up by a waste generator generating certain amounts of non-hazardous and/or hazardous wastes on an annual basis.

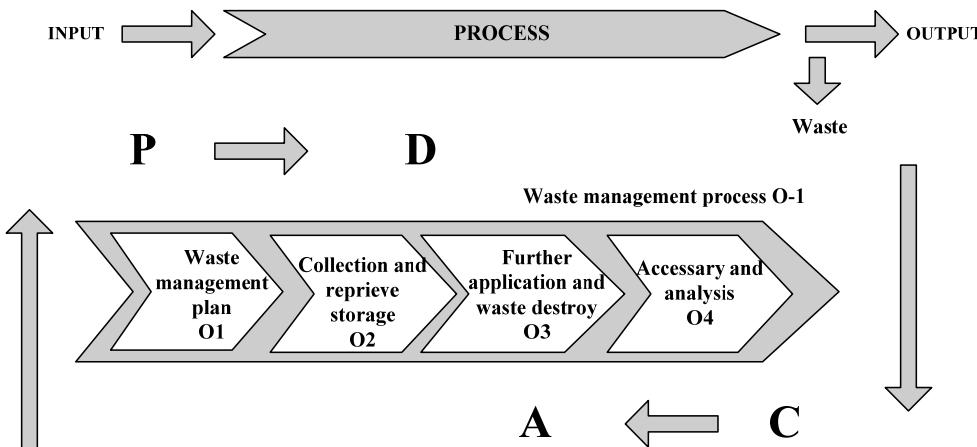
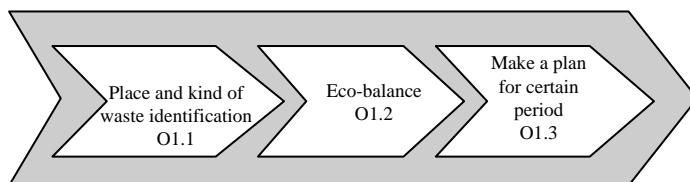
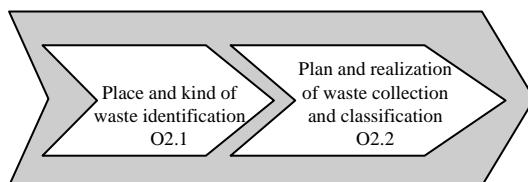


Figure 2 - Waste management process

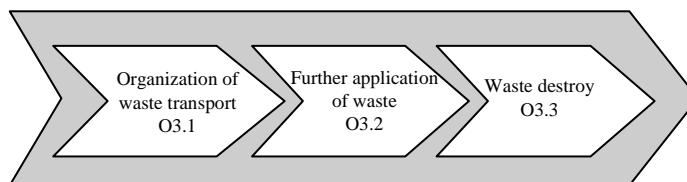
Subprocess: Waste management plan O1



Subprocess: Treatment with waste O2



Subprocess: Further application and waste destroy O3



Subprocess: Accessory and analysis O4

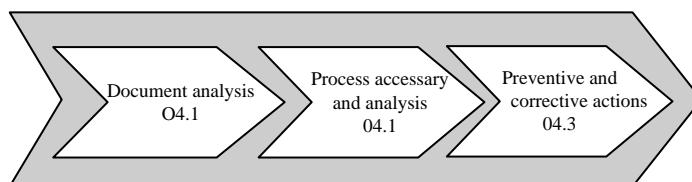


Figure 3 - Waste management subprocesses in the food production system

The plan, elaborated for a certain period of time and submitted to an authorised organization, should include data on:

- the waste type, amount, place of origin and the amount change tendency
- the existing and future waste management methods,
- one's own waste management facilities and devices.

6. CONCLUSION

All production systems engaged in food production should secure environmental protection. With the establishment of the logistics information systems (LIS) for

environmental management, organizations provide evidence of their ability to control safety and environmental dangers. Waste generation is a modern civilization problem and a key one in environmental protection. Integral waste management includes obtainment of positive effects in terms of environmental protection throughout the total environmental balance of all environmental effects, from raw material and energy utilisation to products, their use and waste disposal. Priority-oriented rational and responsible waste management will provide upgrading of the eco-efficiency level and social development in conformity with sustainable development.

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