DESIGNING A SUSTAINABLE DISTRIBUTION SYSTEM FOR THE CEREAL FARMS

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Abstract

Environmental protection is a matter of national and global interest in order to preserve the overall biocenotic balance, maintaining and improving the quality of natural factors, ensure a living conditions and better working conditions for current and future generations.

The distribution links together the production centers with the consumption ones, taking into account the importance of intermediaries, means of transport, storage capacity and intervention on products (packaging, assembly, etc.) so that the products to be provided to the consumer, as close as possible to the consumption place.

The purpose of the paper is to create an efficient distribution system to ensure a sustainable growth to the agricultural units with cereal profile and at the same time, to have a minimal impact on the environment, being able to provide a better quality of life to the future generations.

The research methods used in the paper are: observation, benchmarking and case study.

The case study analyzed the existing situation and proposed a sustainable distribution system for cereal products sold on the market.

The considerations in designing the system relates to: the environment (adaptation to climate change, increased air quality, waste management), economics (economic growth, competitiveness, reducing costs) and society (health and safety food).

The study emphasizes the importance of: efficient waste management, reverse distribution, grain transport optimization in terms of distance traveled and energy consumption, cooperation in the distribution, etc.

By implementing the research results will reduce pollution levels in cereal farms, ensuring sustainability of agricultural ecosystems, with a positive impact on quality of life.

Key words: distribution, cereals, sustainability, safety food

INTRODUCTION

Many companies faced in recent years, increase expenditure in the distribution chain links. Therefore, most of them want to implement the principles of sustainability, in each link in order to benefit from a competitive advantage on the market and at the same time, contribute to environmental protection.

A sustainable supply chain management involves managing the flow of materials and information, and cooperation between companies along the supply chain (Karpak B., 2009).

Sustainable distribution takes into account the decrease of CO2 emissions in all chains, in a way that supports economic growth, together with environmental protection, thus providing a better quality of life for future generations (IGD Research, 2009).

Penfield Patrick C. (2008) developed a general model of sustainable distribution, called “Sustainable Green Supply Chain ".

This type of distribution goal is to be environmentally friendly, in terms of materials and processes used, to eliminate any waste in the supply chain. In this way, companies will have possibility to reduce costs and maximize their profits (fig. 1).

MATERIAL AND METHOD

In this paper were used research methods such as: observation, comparative analysis, case study. The case study was conducted at SA Agroind Berezeni,Vaslui County, where it was analyzed the existing situation and was proposed a sustainable distribution system for cereal products sold on the market.

To create the system, it was considered a series of elements relating to the environment (adaptation to climate change, increased air quality, waste management), economics (economic growth, competitiveness, reduce costs) and society (health and food safety).

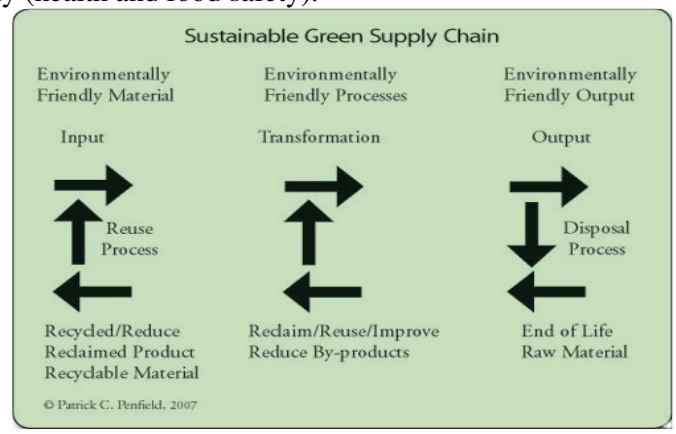

Fig. 1 Sustainable distribution channel
(Source: Penfield Patrick C. (2008))

RESULTS AND DISCUSSIONS

In cereal farms were identified some general principles of sustainability, such as (fig. 2):

Optimizing resource consumption. Excessive surpluses of nitrogen can be a threat to the environment, leading to water, air and soil pollution.

Nitrogen losses in the environment can be minimized if it is used a reasonable fertilization, with the use of sustainable agricultural practices, such as: crop rotation, crop residue incorporation, etc. Also, fertilizing should be done in good weather conditions (to prevent leaching), in an

appropriate stage of plant growth (for a fast absorption) and correct doses. Groundwater presents a major risk to pollution with nitrates, which in excessive concentrations are considered a health risk (Pau Vall Maria, Vidal C., 2011).

Prevention and control of pollution (water, air, soil). The main agricultural pollutants are pesticides, odors, heavy metals, smoke, dust, pollen allergen and waste.

Pollution can be prevented by adopting environmentally friendly practices in the technology culture.

Efficient waste management. Improving water quality can be achieved by building special facilities for storage and handling of waste.

Using renewable energy. Biogas production through anaerobic digestion is considered optimal treatment for animal waste, as well as for a wide variety of organic waste suitable for this purpose (plant residues, energy crops), because, these substrates are converted into renewable energy and organic fertilizer for agriculture.

Nutrient flow through biogas production process - from raw material production to the application of digestate as fertilizer is a closed one. Carbon compounds (C) are reduced by anaerobic digestion process, methane (CH4) is used for energy, while carbon dioxide (CO2) is released into the atmosphere, where the plant is taken during photosynthesis (fig. 3) (Al Seadi Teodorita and co., 2008).

Quality and safety of products - it is necessary to reduce pollution to levels that minimize adverse effects on human health, paying special attention to environment.

Reverse distribution - the collection of components remaining after use (packaging, outdated products, etc.) and send them back to suppliers (for example, the SCAPA program - The Collection of Pesticide Packages System of AIPROM - a mechanism for collection, transport and waste recovery from plastic packaging, paper and metal from plant protection products).

In this way, it can be protected natural resources, especially non-renewable ones.

Traceability – ability to trace products for consumption, through all stages of production, processing and distribution, to identify potential risks.

A sustainable distribution system requires special attention to the environment, from raw materials purchased by farmers, until the last stage, of sale finished products to consumers.

Thus, for every stage (acquisition of raw materials, culture technology, grain storage, transportation, sale to distribution centers), have been identified the main environmental issues (fig. 4).

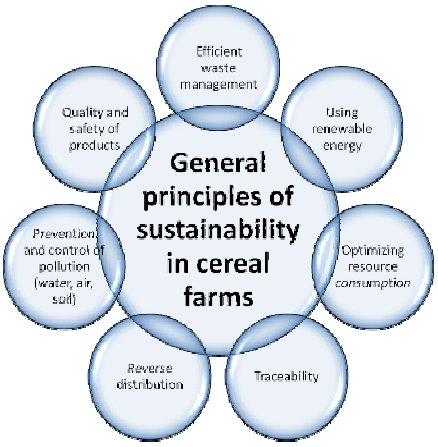

Fig. 2 General principles of sustainability in cereal farms

Case study conducted at S A Agroind Berezeni, Județul Vaslui

S.A. AGROIND Berezeni was founded under the Law 36/1991.

The society has 686 associates and a Board of Directors consists of 11 members. It meets once a month in council meetings and make decisions for the effective exercise of the unit.

General Meeting of Shareholders is held once a year.

The main activity of S.A. AGROIND Berezeni is growing cereals and livestock. In 2011, the SA AGROIND Berezeni, Vaslui County grown approx. 2000 ha of cereals.

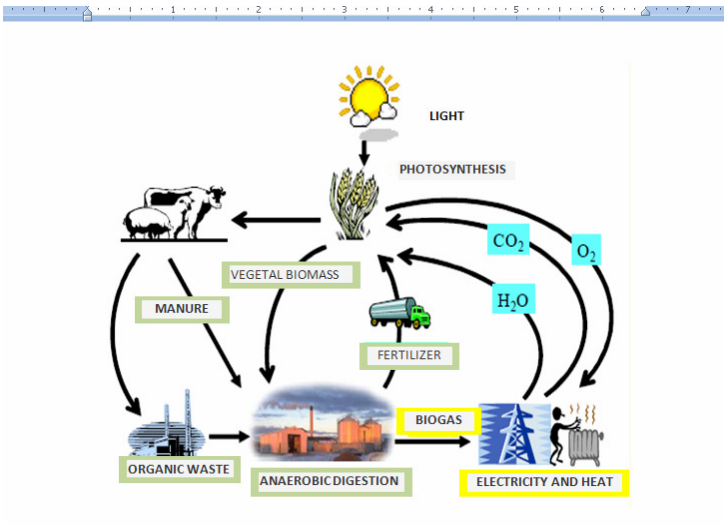

Fig.3 Sustainable biogas circuit from anaerobic digestion
(Source: Al Seadi Teodorita and co., 2008)

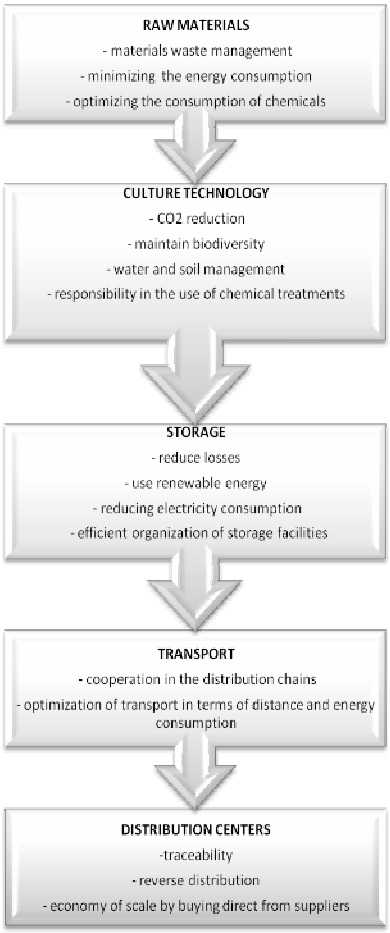

Fig. 4 Sustainable distribution system in cereal farms

In the unit, it is respected, environmental protection measures, such as: fertilizers are applied on soil surface with incorporation; the quantity and type of applied fertilizer chemical takes into account soil testing (once at 4-5 years) and the plant nutrient requirements; on the farm, a part of chemical fertilizers are replaced with manure, approx. 40 tons / ha, in order to reduce costs with cereal fertilizer and also soil and water pollution; fertilizers and pesticides storage in farm is done inside a building with concrete floor, designed with a isolation systems to eliminate leakage; fuel is stored in sealed tanks; farm resulting waste are sent to authorized deposit for hazardous management waste, or to recycling programs; wastewater is discharged into a retention pond built inside the farm.

In the farm, capitalizing of cereal is made directly to consumers at a rate of approx. 70% and the difference of 30%, through authorized deposits.

To reduce the amount of CO2 emissions from all distribution chain, it can be applied the following measures: biodiversity maintaining, to provide the system for life support and development of socio-economic systems; the use of renewable energy to conserve natural resources and improve environmental conditions; planning and permanent optimization of transport in terms of distance and energy consumption; cooperation in the distribution chains, to increase bargaining power and reduce costs; implementing a traceability system to identify potential risks along the entire chain of distribution.

CONCLUSIONS

A sustainable distribution requires special attention to the environment in all stages of technological process, but also in terms of capitalization the products.

In the paper, it was design an effective distribution system with minimal impact on the environment, which can provide a competitive advantage to cereal farming units.

In the S. A. AGROIND Berezeni, Vaslui County, it is respected some environmental protection measures, in the culture technology of cereals, such as: periodic testing of soil to determine fertilizer needs correctly, replacing chemical fertilizers with manure etc.

In the capitalization phase of production, it is recommended the cooperation with other companies, to increase bargaining power and reduce costs, and also implementing a traceability system to identify potential risks.

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