The impact of environmental issues in the supply chain for a natural resource: the case study of Arnica Montana from Romania

CAMELIA IOANA UCENIC
Department of Management and Industrial Systems
Technical University Cluj Napoca
Address: Muncii Boulevard 103-105
ROMANIA
cameliaucenic@yahoo.com

NIKOS MASTORAKIS
Military Institutes of University Education (ASEI)
Hellenic Naval Academy
GREECE
mastor@wseas.org
http://www.wseas.org/mastorakis

Abstract: - Nowadays, Southeast Europe is one of the most essential European source regions of medicinal plants harvested from the wild. Bulgaria, Albania, Croatia and Romania supply the European market with significant amounts of raw material. The project "Conservation of Eastern European Medicinal Plants: Arnica montana in Romania" intended to establish a model for sustainable usage of medicinal plants. Echoherba is the economic instrument of the association "Ecoflora" that was also initiated in the project. Ecoflora and Ecoherba will develop the conservation strategy of Arnica Montana as an example for other species and regions and will take care to implement them. Ecoherba managed to create a philosophy as an ethical company that implemented from the beginning a redistribution of revenue within supply chain. The study may represent a starting point for businesses based on medicinal plants that have as major tasks the sustainable development as well as the improvement of standard of living from rural areas.

Key-Words: - arnica Montana, medicinal plants, sustainable development, supply chain, WWF

Acknowledgements: The authors are grateful for the help of WWF and team members of the project. Special thanks for Mr. Klemens Michael and Razvan Popa, who were directly involved in the study of supply chain and ecological certifications.

1 Introduction

The political changes of latest years had encouraging effects on the condition of Romanian environment. One of the constructive results was that environmental protection became institutionalized with the establishment of the Ministry of Environmental Protection and other environmental institutions. Other benefits occurred from the novel potential for international cooperation, the information exchange and experience connected with such openings.

Economic changes had main impact on ecological protection and on the general public as an entire. Important reductions from manufacturing output and as a consequence a decrease in air and water pollution from this sector were noticed. Worldwide buys and sales were also registered as having a constructive outcome of creating modern, additional environmentally friendly technologies which are accessible nowadays.

Privatization as well had impacts. The working of land for agricultural production has diminished. Was stated that with privatization the title-holders started to appreciate how contamination reduces the value of their properties. Some of the owners began stressing polluters for compensation. Privatization will definitely play a more important role in the future.

The social changes also had unfavorable impacts on the environment. The poverty that increased in some rural areas, determined people to exploit their natural background for survival purposes and

economic expand. Citizens were worried with protecting their economic benefit to the omission of other concerns.

2 Environmental aspects and Romanian natural capital

Romania is an amalgamation of natural, undamaged natural features with principally various fauna and urban areas which have been destroyed by unprofessional conduct in the communist epoch as well as enduring industrial pollution.

Several Romanians regions remained for the most part free from contamination. The country is full of many areas of great natural value. Extensive woodland areas are present, and the variety of flora and fauna is significant. A number of areas of particular natural importance by now have protected position. There are declared twelve National Parks.

Conventional standards and routines are still frequent in countryside areas. They also benefit and reveal a manner of environmentally friendly and beyond doubt sustainable development which has occurred for centuries.

Next to water quality, issues of nature security and re-establishment obtained the largest part of awareness. Biodiversity, natural resources and beautiful sites are exposed by a multitude of factors among which are unregulated commercial and inhabited expansions that wipe out environment and is aesthetically unattractive.

A large amount of the Romanian landscape remains unharmed, and its fauna ranks between the most varied in Europe. Dense forests keep on covering more than a quarter of the country's terrain. These elements stand in severe gap to other parts (in particular inner-city region) of the country which have suffered remarkable environmental degradation over the last 50 years.

Industrial plants discharge great amount of noxious waste into the air, the water is polluted by manufacturing and metropolitan wastewater releases, agricultural runoff, and unsatisfactory management of toxic pollutants discharged by industry into the drain system.

Whereas a large amount of the environment damage has its beginning in communist past, still after the shift to democracy, the country did not make environmental protection a main concern.

The parliament adopted the Environmental Protection Law in December 1995. It provides the central structure for the security of the natural resources. The main administration agency charged with environmental topics is the Ministry of Agriculture, Forests, Waters and Environment. Progress has to be made after the join the European Union

In latest years, Romania has a stronger loyalty to environment protection, but the wavering transition to market economy made the enforcement easier said than done. The Sofia Initiative on Economic Instruments at the Regional Environmental Center for Central and Eastern Europe notes that Romania suffers from: a lack of social interest in the connections between economic and environmental policies; an insufficiently mature set of protective institutions; and a lack of the political will necessary to levy unpopular charges on dirty technologies. All of these factors made complicated to apply economic mechanisms planned to reduce environmental damages. (EIA)

3 Value chain – supply chain

Michael Porter established a basic value chain model for the first time in 1985 in his work "Competitive advantage". The model consists of a succession of activities found to be widespread to a great variety of firms. He identified two activity categories: primary and supporting.

The activities carried out by a specific organization can be analyzed into primary activities and supporting activities. The primary activities directly add value to the venture's production factors, which are collectively named as the "value chain". They consist of those concerned in the production, marketing delivery and servicing of the product. Support activities take account of those providing purchased inputs, technology, human resources, or overall infrastructure functions to sustain the primary activities.

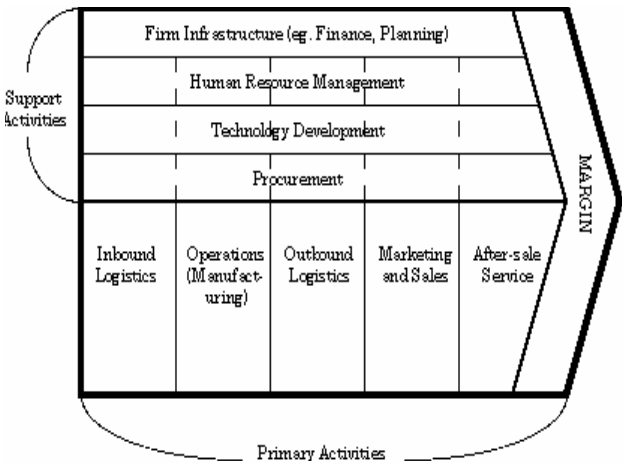


Figure 1: Value Chain (Source: Porter, 1985)

A supply chain, logistics network, or supply network is a synchronized system of businesses, people, activities, information and resources involved in moving a product or service in physical or virtual manner from supplier to customer. Supply chain activities transform raw materials and components into a finished product that is delivered to the end customer. Supply chains link value chains. (Nagurney, 2006) There are a variety of supply chain models, which address both the upstream and downstream sides.

The primary objective of supply chain management is to fulfill customer demands through the most efficient use of resources, including distribution capacity, inventory and labor. A variety of optimizing aspects of the supply chain include acts as a go-between with suppliers to reduce bottlenecks.

Sales and operations planning is becoming a requirement for doing well supply chain implementation. With globalization of sourcing and manufacturing, shifting resources, facilities and inventories across the world, a greater extent of corporations are relying on effective supply chain planning to accurately coordinate supply, based upon actual and forecasted demand.

Keys to accomplishment consist of a committed governance model, an integrated, networked and formal sales and operation planning process from sales and marketing to the supplier base, with an added interest of innovation and vision. (IBM Institute for Business Value)

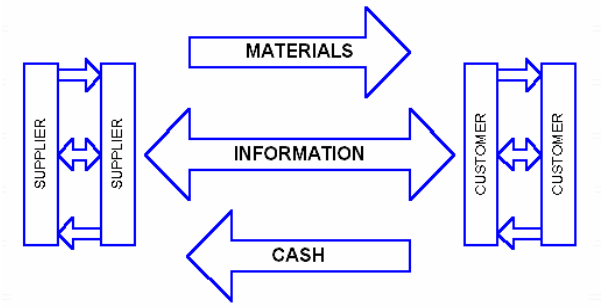


Figure 2: The complete supply chain (Croker, 2003)

4 WWF

WWF is one of the world's largest and most qualified independent conservation organizations, with approximately 5 million followers and a worldwide net active in more than 100 countries. Its mission is to prevent the deprivation of the planet's natural environment and to construct a future in which human beings live in harmony with nature:

- conserving the world's biological diversity;
- ensuring that the use of renewable natural resources is sustainable;
- promoting the reduction of pollution and wasteful consumption.

What do the initials WWF stand for?

WWF was founded in 1961 and the initials stood for the "World Wildlife Fund". The organization grew over the 70s. Starting with the 80s, WWF began to enlarge its effort to preserve the environment as an entire, reflecting the interdependence of all living things, rather than focusing on selected species in isolation. The legal name became "World Wide Fund for Nature" in spite of the fact that the initials remained the same. The only exception was in North America where the old name was maintained. In order to avoid misunderstanding and mixed messages across borders and languages, WWF is known as simply "WWF, the global conservation organization."

To carry on with the developing features of conservation and environmental movement, WWF did not grown only in size and but it also matured in its understanding of what was wrong and what was required to put things right.

Its center of attention evolved from restricted efforts in favor of single species that distinguished WWF in the 1960s, to new perspectives on all sides of national, regional and global scales of complexity.

The formal general director of WWF International, Dr. Claude Martin, declared:

"Our objectives have never been clearer - slow climate change, reduce toxics in the environment, protect our oceans and fresh waters, stop deforestation, and save species. Our great achievement over the past forty years is spreading the message - through us people know that nature counts."

In the future years WWF will keep on assuming its responsibility as a trustworthy and prominent global leader influencing at the maximum achievable levels and at the same time continuing firmly in contact with the realities. WWF is about "doing conservation", not simply talking about it!

The first WWF's mission in Romania was in 1990 and targeted the Danube Delta. The projects of association include the preservation of species which disappeared from other European countries as well as the untouched conservation of the rural style of life. Other two programs focus on the sustainable administration of natural parks and private forests.

Last but not least, the representatives of WWF Romania encourage the perpetuation of traditional habits from rural areas, including the projects related to the exploitation of medicinal plants from Apuseni

Mountains, ecological agriculture and ecotourism - Andreas Beckmann vice director of WWF Danube – Carpathian program (Olivotto and Borza, 2007)

5 Case Study – Arnica Montana Romania

Nowadays, Southeast Europe is one of the most essential European source regions of medicinal plants harvested from the wild. Bulgaria, Albania, Croatia and Romania supply the European market with significant amounts of raw material. More than 36000 tones of pharmaceutical plants are exported from East and Southeast Europe every year (Lange, 2003). At the beginning of this millennium, the international market of products which contain medicinal plants increased by 10% in average, according with Hamilton's report.

Following an extended tradition, the local countryside inhabitants collect and use a diversity of natural plant and mushroom types for medicinal, cosmetic and nutritional rationales, are it on subsistence level or for trade. Arnica Montana is one of these natural plants. There are 700 species out 3400 from the Romanian flora, which are considered medicinal and/or aromatic plants. (Ciulei et all, 1993).

The scientific name of Arnica Montana is Arnica montana Asteraceae. The species is a traditional medicinal plant and an endangered species. Arnica is used since the middle age as medicinal plant Mostly dried flowers are used (Arnicae Flos) to manufacture phytomedicines. Tincture and oil macerate are the basic to prepare lotion, cream or gel.

Figure 3: Arnica Montana Asteraceae

The habitat type (Code 6230) is listed in the EU-FFH-directive (92/43). The species *Arnica montana* is listed in Annex V (92/43). The maintenance of *Arnica* populations is narrowly bound to conventional farming systems. The habitats are endangered by transfer to more intensive agriculture or by conversion to uncultivated. The nowadays habitats are suited in typical cultural countrysides. They are made by man. Shifting land use as fertilization and crop-free modify or destroy the habitats.

The devastation or transfer of habitats and an escalating requirement for raw material putted pressure on medicinal plant resources. WWF underlined its concern related to this development, which is probable to be supplementary aggravated in countries that recently accessed to European Union.

The World Wide Fund for Nature (WWF) and the University of Agriculture and Veterinary Medicine (USAMV) began the project "Conservation of Eastern European Medicinal Plants: Arnica montana in Romania". The goal of the project was to make the problem well-known and establish a model for sustainable usage of medicinal plants. The project was scheduled for a three years' interval: April 2004 – March 2007. It was carried out at field level with the community of Garda-de-Sus from Apuseni Mountains, Transylvania.

Among the goals of the project there were:

- ecological sustainability of Arnica and link to farm management and tenure rights;
- socio-economic context and community attitudes at Garda-de-Sus;
- analysis of the supply chain for Arnica flowers from Garda-de-Sus;
- analysis and development of adequate drying and storage methods for Arnica flowers.

The firm "Ecoherba" was set up as a result of the project. Its mission was the sustainable exploitation of the natural resources from project area by promoting an ethical commerce. Echoherba is the economic instrument of the association "Ecoflora" that was also initiated in the project. Ecoflora and Ecoherba will develop the conservation strategy of Arnica Montana as an example for other species and regions and will take care to implement them.

One of the first tasks is to establish collaboration with a German important plant that produced cosmetics. This plant supported financial by 50% the dryer that was built up in Ghetari village, in the nearest area of regions with Arnica Montana. Due to the existence of this dryer, the quality of raw materials will increase as a result of the immediate dry of plants after they are collected by the villagers. Ecoherba will be the main supplier of raw vegetal material of Arnica Montana, for the German partner

in the following five years.

6 Methods and materials

The present study is a market research which intends to identify the particularities of the market segment of Ecoherba. An ethical commerce will be promoted.

The companies that where analyzed sell medicinal plants as raw vegetal materials and/or processed products which includes them – tea, creams, lotions, gels in the national and international markets. The investigation was focused on Romanian organizations that have in their portfolio products with Arnica Montana.

The information sources that were used are primary and secondary. They completed one to the other, making possible the proper mapping of supply chain for Arnica Montana.

The first step was the identification of the main regions with Arnica and most important players from the medicinal plants market. According with the studies, there are two core source regions for Arnica in Romania.

Figure 4: The collecting areas for Arnica Montana 2000-2006

The collecting centers for Arnica Montana identified among 2004-2005 are presented in the following figure.

Before 1989 the activities related with cultivation, harvesting and fabrication of products which contain medicinal plants was coordinated by Plafar Trust using its subsidiaries from all counties. Plafar had monopole position in Romanian market. After 1990, it was one of the most important brands but lost in time 70% from Romanian market and was eliminated from external markets.

Figure 5: Collecting centres 2004-2005

Its competitors excelled because are more flexible and are able to adapt faster at the market changes. In addition, the investments in production capacities and infrastructure make them more competitive.

The procedure of collecting Arnica Montana suppose the establishment of collecting points in different villages from the mountains, where vegetate Arnica. The collectors pay a commission according with the number of kilos they intend to buy. The fresh plants are stored in the evening of each day and transported at the drying points.

According with the information provided by the specialists in the field, Romania exported in last 15 years in only four countries: Germany, Italy, France and Switzerland. Germany is the main buying country, about 80% of Arnica Montana going there. When the Romanian companies do not want or are not able to export by themselves, there are other firms which do it in the basis of a percentage from the transaction value.

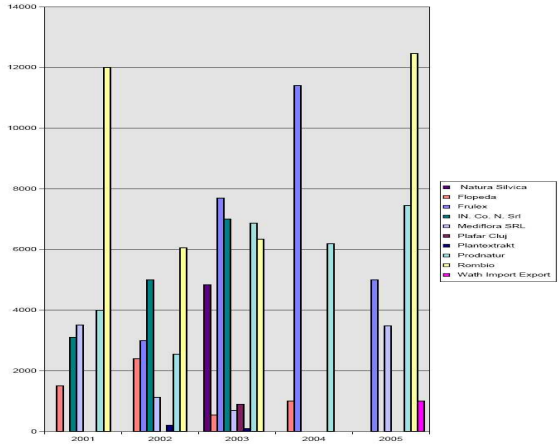
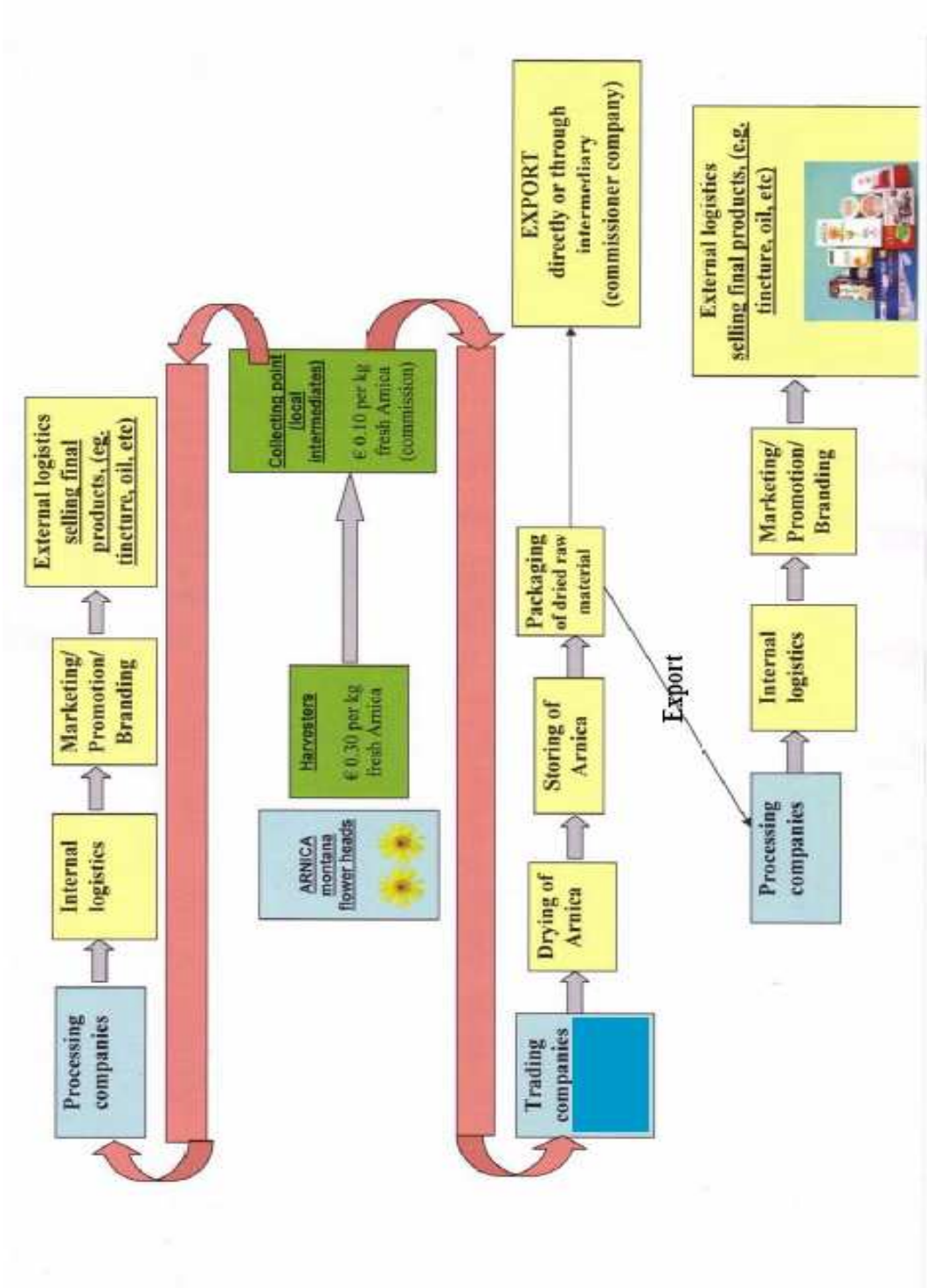


Figure 6: Export of Arnica Montana 2000-2005 (Source: Environment Ministry)

The trend of exports shows that the demand for raw vegetal material presents a high commercial potential for one or two years, and after decreases. In addition, the demand is not constant, fact that generated incapacity to satisfy it from the stocks and determined great harvesting in the following time interval after big orders. This was the case of the years 2002-2003. The demand for Arnica Montana has a great elasticity related to the price. The main reason for the high variation is the lack of commercial contract for medium and long run.

In the following figure is presented the supply chain of Romanian Arnica Montana resources. At the base are the reapers which earn only about 0.3 euro/kilo for fresh plant. The sale price varies among 12-15 euro according with the demand.



7 Conclusion

The decline of Plafar Trust demonstrated the failure of each firm that is not able to adapt at a dynamic competitive environment. The market globalization opens the competition for the international companies which target greater market shares. Due to the particularity of medicinal plants as resources, the commercial transactions have to be done without affecting biodiversity or local communities. The market for products which contain Arnica Montana is increasing.

Ecoherba managed to create a philosophy as an ethical company that implemented from the beginning a redistribution of revenue within supply chain. The study may represent a starting point for businesses based on medicinal plants that have as major tasks the sustainable development as well as the improvement of standard of living from rural areas.

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