

Research Article

A Study of Green Logistics for Chinese Agriculture Products

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Abstract: Although agriculture plays an important role in China, the country is still suffering much from the weakness of the logistics system of its agriculture products, such as outdated facilities, lacking of logistics experts, weak information technology, etc. The weak logistics system causes the loss of many agricultural products in daily delivery and storing. This study addresses the problem by taking a study of green logistics for Chinese agriculture products. We take an SWOT method to analyze the different respects of logistics for Chinese agriculture products and then design several strategies for deploying and promoting green logistics in Chinese agriculture. We believe that green logistics is feasible in Chinese agriculture and these strategies can be effective in helping adapt green logistics to Chinese agriculture.

Keywords: Agriculture, green logistics, SWOT method

INTRODUCTION

With the global warming, environment deterioration and government regulations, it becomes necessary and important to considering the green strategies in logistics industry (Murphy and Poist, 2000). In today's highly competitive environment, green logistics issues are gaining interest (Ubeda *et al.*, 2011). In the past, organizations divided responsibility to ensure environmental excellence among activities in product development, process design, operations, logistics, marketing and waste management. Currently, trends call for integration of environmental management with logistics (Srivastava, 2007).

The progressive increase of agriculture products consumption due to growing world population and wealth stimulates higher agriculture products production (Soysal *et al.*, 2014).

Agriculture plays an important role in China, as China consumes a large number of agriculture products (Xu, 2012). In particular, the Chinese people are pursuing green, organic and natural foods along with the increase of GDP.

Meanwhile, the country is still suffering much from the weakness of the logistics system for its agriculture products. The weak logistics system causes the loss of many agricultural products in daily delivery and storing. For example, the logistics system in China results in 20 to 30% of fruits and vegetables, 12% of the meat to be wasted in each year, but the percentages of wastes in Japan and European Union are less than 5% (Wu, 2011). Furthermore, the logistics system brings out a lot of exhausts, such as over-packages, which also have negative impacts on the environments (Ren, 2013).

This study addresses the problem by taking a study of green logistics for Chinese agriculture products. We take a SWOT analysis method to analyze the quality of the logistics for Chinese agriculture products and then design several strategies for deploying and promoting green logistics in Chinese agriculture. We believe that green logistics is feasible in China and these strategies can be effective in helping adapt green logistics to Chinese agriculture.

MATERIALS AND METHODS

ASWOT analysis is employed in this study to analyze the logistics system for Chinese agriculture products. A SWOT analysis is a structured planning method used to evaluate the strengths, weaknesses, opportunities and threats involved in a business venture. By taking a SWOT analysis, we can discover the strategies for applying green logistics to Chinese agriculture.

Strength:

The government pays much attention on green logistics: The Chinese government pays much attention on sustainable development, which can be one strong point that pushes green logistics to spread. As the population still increases, there exist tremendous needs of consuming resources and keeping good environment, while it also requires development to be sustainable. Thus the Chinese government has made a lot of efforts on promoting any green engineering programs, e.g., encouraging enterprises to conduct green management.

On the other hand, much attention has also been paid to the logistics for agriculture products. Many recent policies have said that "we MUST improve the

market distributions and guarantee the sufficiency of agricultural products” and “we MUST construct modern logistics system for agriculture products, such as cold chains”.

Agricultural output is continuously growing: In 2013, the grain output in China was 601.938 million tons, 102.1% of that in 2012; the fruit output was 250.93 million tons, 104.3% of that in 2012; the meat output was 85.35 million tons, 101.8% of that in 2012 (National Bureau of Statistics of China, 2014). Continuous growth of agricultural output requires a robust logistics system, but also provides an opportunity of developing green logistics for Chinese agriculture products.

Modern logistics is in a rapid development: In recent decades, the modern logistics are developing rapidly. Many advanced logistics technologies have been proposed and applied in practice, which helps establish a strong foundation for green logistics for agriculture products.

Weakness:

The notion of green logistics has not yet been pervasively used: As the notion of green logistics is still new, organization, companies and consumers may know less about it. They may consider less about the pollution and wastes, but only the increase of the GDPs. Chinese farmers also concern about the output and selling prices of agricultural products, but few about green logistics such as warehousing, transportation, distribution and processing of agricultural products. Furthermore, some enterprises may take green logistics as burdens, as it does not provide with any direct incomes, but increases the costs; or they may regard that taking green logistics is only a responsibility of the government (Liu, 2014).

Policies and laws are inadequate: The applying of green logistics for agriculture products relies on government policies and laws which are not adequate in China. Although the government has made laws and some regulations for environment protection since the 1990s, no laws and rules are related with green logistics, making it difficult to promote green logistics throughout the whole country.

Facilities and equipment for green logistics are weak: In Japan, the government encourages individuals, organizations and companies to build facilities for green logistics, which facilitates the use of green logistics for agriculture products. Every year, EU countries develop new projects for green logistics for agriculture products. Comparatively, in China, the facilities and equipment for green logistics are relatively weak. For example, the cold chains for agricultural products have not yet widely

used in Chain, making agricultural commodities less protected and a lot of products wasted. The shortage of facilities and equipment make it difficult to employ green logistics for Chinese agriculture products.

Training is not enough: There should be more workers working on green agriculture. They should have more broad knowledge, such as green logistics concepts, modern logistics knowledge, information technology, financial and accounting skills and so on. At present, there are a lot of employees with practical experiences in logistics enterprises, but few of them have both theory and practical experiences about green logistics, no matter those who are focusing on green logistics for agriculture. Insufficient training makes it difficult to develop green logistics for agriculture products.

Logistics information technology is weak: Green logistics is somewhat advanced logistics, which requires information techniques to be supplemented. Although many companies have used Global Positioning System (GPS), Geographic Information System (GIS), Electronic Data Interchange system (EDI) and other advanced logistics technologies in their business activities, but the logistics information systems are still under construction in most companies. Thus many companies still lack of logistics information systems for cargo tracking, inventory queries and other logistics activities. It decreases the efficiency and service quality of logistics system for agricultural products and as well causes wastes of logistics resources.

Opportunity:

The economic environments are good: The Chinese economy environments are improving and the government is striving to provide better and better environments for developing domestic green logistics.

Being a member of WTO makes it necessary to develop green logistics: Since China has entered WTO, the global enterprises with advanced logistics ideas have begun their business in China. They are emphasizing on green production, green consumption and green circulation, which greatly promotes the development of green logistics for agriculture products. In addition, it also makes it possible to globalize Chinese agriculture products.

The demands of green agricultural products are increasing: As the dietary structure of consumers may change along with the increase of incomes, the demands of green agricultural products are increasing. People need fresh and green agricultural products and thus there exists a potential to develop green logistics for agriculture.

Threat:

There are competitions from international logistics enterprises: In recent years, international logistics

Table 1: SWOT matrix analysis of green logistics for Chinese agriculture

Strength	Weakness
<ul style="list-style-type: none"> • Agricultural output is continuously growing. • The government pays much attention on green logistics. • Modern logistics is in a rapid development. 	<ul style="list-style-type: none"> • The notion of green logistics has not yet been pervasively used. • Policies and laws are inadequate. • Facilities and equipment for green logistics are weak. • Training is not enough. • Logistics information technology is weak.
Opportunity	Threat
<ul style="list-style-type: none"> • The economic environments are good. • Being a member of WTO makes it necessary to develop green logistics. • The demands of green agricultural products are increasing. 	<ul style="list-style-type: none"> • There are competitions from international logistics enterprises. • There also exist competitions from foreign agricultural products.

companies with high management capabilities, abundant capital and advanced technology and equipment, such as Maersk, FedEx and TNT, have started their business in China, which brings huge pressure to the domestic logistics enterprises. Also, many international companies have invested food factories, distribution centers and temperature-controlled warehouses. The market competitions have heated up. Even though these international companies have provided Chinese customers with safe and efficient logistics services for agricultural products, they also threaten the domestic enterprises.

There also exist competitions from foreign agricultural products: As there exist advanced logistics systems for agricultural products in US and EU countries, green agricultural products can be sold throughout the whole world; it has negative impacts on Chinese agricultural products. It becomes another threat to green logistics for Chinese agriculture.

RESULTS AND DISCUSSION

After analyzing the strong points, weakness, opportunities and threats, we design some strategies to apply green logistics to Chinese agriculture.

Table 1 shows the SWOT matrix analysis of green logistics for Chinese agriculture products. With the analysis results, we can make four internal and external strategies: Growth strategy is a strategy relied on internal strengths and external opportunities to develop rapidly, which can be used when the internal elements and external environments are good (SO); Diversification strategy can reduce the risk and explore new areas, which is used when the internal elements are good but external environments are bad (ST); Reverse strategy is used to catch external opportunities and Overcome internal Weaknesses (WO); Defensive strategy focuses on saving energies and seeking a breakthrough when internal elements and external environments are bad (WT).

Green logistics for Chinese agriculture is immature and has many drawbacks. On the other hand, entering WTO brings many opportunities to develop green logistics and we also have good environments for developing green logistics. Thereafter, a reverse strategy

is feasible in China. It only seizes external opportunities and Overcomes their Weaknesses (WO) to reverse the negative factors such that we can ultimately promote the use of green logistics. The specific strategies are given as follows.

To make strict laws and regulations: Setting up laws and regulations and hand books is essential for developing green logistics for agriculture products. On one hand, the government must make some strict laws and regulations, such as “Quality Safety Law for Agricultural Products”, "Wholesale Agricultural Market Regulations" and other regulations and so on. In particular, "Quality Safety Law of Agricultural Products" should provide with the general principles for supervising the whole process from farm to table and ensure the quality and safety of agricultural products. On the other hand, the government should provide with policies to encourage enterprises and farmers to implement green logistics and as well to invest in its infrastructures, so that the loss of agricultural products can be reduced.

To build a green logistics system for agricultural products: It is important to build a green logistics system, which facilitates transportation, selling, storage and other logistics activities for agricultural products. In Japan, there exist such kinds of systems including containers, small crates, pallets, transport equipment and warehouses that can provide strong supports in using green logistics for agricultural products (Zhongguancun International Environmental Industry Promotion Center, 2005). Moreover, due to the globalization of green products, the quality of agricultural products is emergently important. The only solution is to build a safe, standard system for agricultural products, which can also increase the international competitiveness of Chinese agricultural products.

To developing IT for green logistics: We should integrate various kinds of information technologies, such as RFID, GPS, GIS and EDI systems. Information techniques do help monitor the whole logistics process, ensure the quality and safety of agricultural products and reduce the loss of agricultural products. IT also has potential to shorten the period of circulation and improve logistics efficiency.

To establish association for green logistics for agriculture products:

Once established, Chinese association for green logistics for agriculture products can play a very important role and also can be a representative of many companies in the industry. As a bridge between government and enterprises, the association can pull requests from the government while helping the government to make development plans and industrial regulations. In many western countries, there are such kinds of associations to drive the development of green logistics for agriculture products, including the American farmer federation, green retailers, green agents, green processors and storage providers and so on. They do help agricultural companies in green transportation, green storage, green packaging, green processing and information standardization (Xu, 2012).

To training workers: The green logistics for agriculture products needs more participators who can have professional knowledge. In order to achieve the goal, universities and colleges can train workers working on logistics. More experts should participate in education and training. Cooperation and collaboration between universities/colleges and companies is also necessary so that theory and practice can be combined tightly. By a multi-level education and training system, it is possible to train a large number of participators who are working on green logistics for agriculture products.

CONCLUSION

The weak logistics system causes the loss of many agricultural products in daily delivery and storing. This study addresses the problem by taking a study of green logistics for Chinese agriculture products. We take an SWOT method to analyze the different respects of logistics for Chinese agriculture products and then design several strategies for deploying and promoting green logistics in Chinese agriculture.

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