Strategies for Information Dissemination of Quality and Safety Crisis of Tropical Agricultural Products

Haidong ZHANG, Xiaojun XU, Lijuan ZENG, Jihua SUN∗, Dongjie HUANG
Institute of Science and Technology Information, Chinese Academy of Tropical Agricultural Sciences, Haikou 571101, China

Abstract The quality and safety crisis of agricultural products on the one hand is the crisis of harm of agricultural products, and on the other hand is the crisis of information dissemination. This paper analyzed the characteristics of content of the quality and safety crisis information of tropical agricultural products. On the basis of these characteristics, it came up with strategies and recommendations for solving the problems of quality and safety of tropical agricultural products, including establishing the emergency response system for quality and safety crisis of tropical agricultural products, bringing into play the social responsibilities of scientific research institutions, and bringing into play authoritative effect of scientific experts.

Key words Quality and safety of agricultural products, Crisis, Information dissemination, Strategies

1 Introduction
Risk is a probability or threat of damage, injury, liability, loss, or any other negative occurrence that is caused by external or internal vulnerabilities, and that may be avoided through preemptive action. Crisis is an critical event or point of decision which, if not handled in an appropriate and timely manner (or if not handled at all), may turn into a disaster or catastrophe. A risk is not equal to a crisis but can be transformed into a real crisis or disaster in a certain case of risk, while the crisis is generally characterized by urgency, harm, and emergency. Once there is a crisis, it is likely to be accompanied by catastrophic consequences. As a result of long industrial chain, many production processes, decentralized management, weak supervision force, tropical agricultural products are very prone to quality and safety crisis. As the only tropical province in China, Hainan is frequently hit by quality and safety crises and public opinion crises. Over the past 10 years, from cadmium content in Sauropus androgyns exceeding the upper limit in the end of October 2005 to "saccharin jujube event" in September 2015, the crisis occurred almost every year, every crisis is the information dissemination of quality and safety of agricultural products, or the rumor caused by the information dissemination crisis of agricultural product quality and safety. Therefore, it is of great practical significance to explore information dissemination strategies for the tropical agricultural products quality and safety crisis. This will have great realistic significance for Hainan fruits and vegetables, anti-seasonal vegetables transforming from the general supply to the high-end characteristic supply, and realizing healthy development of modern and characteristic high-efficient tropical agriculture.

2 Quality and safety crisis of tropical agricultural products
2.1 Harm crisis of quality of agricultural products On March 31, 2015, the column "Qingdao Today" of Shandong Qilu Evening News reported that three people got hospitalized by poisonous watermelon in Jimo market, which opened the curtain of Hainan Wanning watermelon quality and safety crisis. The crisis of quality and safety of agricultural products is first manifested as harm crisis of products, which refers to the occasional and widely disseminated event that a product is defective or harmful to consumers[1]. Coombs divided harm of products into minor harm and serious harm. Regardless of the degree of the harm to consumers, Wanning poisonous watermelon products reduced the market share of Hainan watermelon, caused sharp decline of production area and market sales in a short term, and harmed reputation of Hainan watermelon and erode brand assets of Hainan melons and vegetables. The harm crisis of agricultural products is closely related to the supply chain of agricultural products. Response for harm crisis of agricultural products is a systematic project involving production, initial processing, storage and transportation, wholesale and retailing. The actual production and marketing model, circulation and market expansion of agricultural products in Hainan tropical region increase the probability of harm crisis of agricultural products; the organization form of agricultural product supply chain is closely related to the critical control link of harm crisis of agricultural products. This harm crisis of Wanning poisonous watermelon is not only directly related to the safety of 12 consumers in Qingdao, Shandong Province, but also related to watermelon cultivation enterprises of Hainan and the sustainable development of agricultural industry. The harm crisis of agricultural products is sometimes related to the development of a country’s economy and social stability, which has aroused great attention of

Received; November 10, 2016 Accepted; December 26, 2016
Supported by Special Project of Fundamental Research Funds for Central Public Welfare Research Institutes in Chinese Academy of Tropical Agricultural Sciences (1630012015021); Project of Natural Science Foundation of Hainan Province (714282).
∗ Corresponding author. E-mail: zhangkong08@163.com
governments of all countries.

2.2 Information dissemination crisis of agricultural products

The crisis of agricultural product quality and safety is manifested as a harm crisis of agricultural products accompanied with information dissemination crisis. As the smart phones and other mobile terminals and functions of a variety of social media become more and more advanced, they not only greatly increase the speed and breadth of information dissemination and enrich the content of information, but also makes the public opinion becomes more diverse, and people’s attention to information and access to convenience has reached an unprecedented height. In the crisis, the information of agricultural product quality safety will exert an enormous influence in the society. According to statistical data, the per capita GDP of China was about 7485 USD in 2014. From the perspective of international development rules, China has entered the stage of occurrence of prominent contradictions and social conflicts. The frequent occurrence of contradiction and social conflicts is the result of one-sided social development. In recent 10 years. The quality safety rumor of agricultural products such as melons, vegetables and fruits of Hainan lead to a number of information dissemination crises. A large quality and safety information crisis of agricultural products may easily evolve into a blasting fuse for mass incident and other events affecting the social stability. Information dissemination crisis not only affects the consumers’ perception of the quality of agricultural products and the reputation of agricultural enterprises, but also erodes the brand equity of agricultural products, and causes losses to the production and marketing enterprises. Zeng Wangming et al. found that the crisis-related information of products will increase the level of public perception of losses and risks, thereby reducing loyalty of consumers to the agricultural product with crisis.

3 Characteristics of information dissemination of quality and safety crisis of tropical agricultural products

3.1 Characteristics of content of information of agricultural product quality and safety crisis

Food comes first to human, so does safety to food. According to Maslow’s demand theory, safety demand of human beings is the second demand following the physiological demand, while the information of agricultural product quality and safety crisis directly touches human’s safety demand and people’s fragile chord. Through overview of the quality and safety crisis of tropical agricultural products in Hainan in recent 10 years and analysis on the information dissemination, we found that the content of crisis information is simple and clear; illegal additives, highly toxic pesticide residues, and heavy metal pollution are threatening the health of consumers (as listed in Table 1). The exclusive report of saccharin jujube event in 2015 was included into the top 10 food safety cases in the whole country. Illegal addition of saccharin sodium in jujube exerted an extreme hidden trouble for the growth and development of children; girls may have problem of sexual precocity, and boys may have problem of not obvious sexual characteristics and other issues.

Long-term consumption of contaminated foods or illegal use of the state banned high-residue, highly toxic pesticides in vegetables will cause chronic poisoning and acute poisoning; acute poisoning have more obvious symptoms, for example, Wanning poisonous watermelon led to miscarriage. The total volume of pesticide use in China reached 1.83 million tons in 2013, but the structure of pesticide products was not reasonable. It takes 8 – 10 years to degrade such pesticides in the soil; in other words, one time of application results in many years of serious pollution.

3.2 Theoretical characteristics of information of agricultural product quality and safety crisis

In 2013, Hainan was hit by the information dissemination crisis of the quality and safety of betel nut. The information dissemination of quality and safety crisis of agricultural products had its theoretical basis. On July 14, 2013 "News Broadcast" and "Morning News" of China Central Television reported that Hainan; high incidence rate of oral cancer, patients love chewing betel nuts, betel nut poison is like arsenic, no national production standard, and no sales warning. This news led to dramatic decline of price of betel nuts which were just at the picking season. According to the report, the carcinogenic theory of betel nut was based on the World Health Organization Cancer Research Center, which pointed out that betel nut with the addition of tobacco may lead to oral cancer, pharyngeal cancer and esophageal cancer, while the tobacco betel nut without addition of tobacco may also cause oral cancer. Betel nuts contained in betel nut products may cause oral submucous fibrosis, and may be converted into cancer at any time. From this example, we can see that the quality and safety information of agricultural products had its scientific basis, but the public did not understand the truth of the report was not absolute, in fact it was only a relative concept. The theoretic basis of agricultural product quality and safety information was concrete, while the characteristics of the information dissemination of the media often create a proliferation of pseudo-environment, and the setting and focusing function of media agenda often create public panic.

3.3 Characteristics of media of information of agricultural product quality and safety crisis

The information dissemination activities of mass media not only spread to every corner of society, but also penetrate into all aspects of social life. The characteristic of information dissemination in the crisis of quality and safety of agricultural products is no longer one-to-many communication, but many-to-many communication. High popularization rate of smart mobile terminals and forwarding mechanism of WeChat and other application technologies have greatly increased the efficiency of information transmission, which is another characteristic of dissemination of information of agricultural product quality and safety crisis. WeChat has a strong viscosity, the forwarding function of Moment in WeChat may transmit information already screened by friends conveniently and rapidly. Such network communication application technology of WeChat combines the traditional media and interpersonal communication characteristics of information dissemination, forming a distributed network communication structure.
4 Strategies for information dissemination of quality and safety crisis of tropical agricultural products

4.1 Establishing emergency system for information crisis

The fundamental way to eliminate the crisis of agricultural product quality and safety and its associated information dissemination crisis is to establish an emergency system for the agricultural product quality safety crisis, strengthen the industry chain of supply and sales of agricultural products, and improve related information services. Only sound and normal supervision of the production, supply and marketing industry chain may eliminate harm events and crisis of the quality and safety of agricultural products. From the perspective of information dissemination, the key for eliminating the impact of agricultural product quality and safety crisis lies in rebuilding the trust of consumers in the quality of agricultural products in and after crisis. In the context of many links, large scale, and wide range of harm crisis of agricultural products, it is recommended to try to get rid of serious situation of market contraction and brand assets damage faced by agricultural enterprises. Agricultural production and distribution enterprises, government, media and other relevant monitoring departments should strengthen the control of harm crisis of agricultural products, to provide market driving force\(^6\). Many laws and regulations have been formulated, such as Food Safety Law of the People’s Republic of China, Law of the People’s Republic of China on Quality and Safety of Agricultural Products, implementation methods for Law of the People’s Republic of China on Quality and Safety of Agricultural Products in each province, Overall Emergency Preplan for National Sudden Public Incidents, Emergency Preplan of Agricultural Department for Quality and Safety Accidents, Emergency Preplan of Agricultural Department for Public Sentiment about Quality and Safety Sudden Events of Agricultural Products (for Trial Implementation), Guiding Opinions of Food Safety Commission Office of State Council on Treatment of Food Safety Public Sentiment (for Trial Implementation). These constitute the basic framework of response to information dissemination.

4.2 Bringing into play social responsibilities of scientific research institutions

Scientific research institutions should bring into play their social responsibilities, in the new world of building the Internet, they should meet social demands of the people for scientific knowledge. The information quality has a positive effect on the trust of consumers after the harm crisis of agricultural products. Therefore, in order to reduce the consumer panic caused by the harm crisis of agricultural products, the scientific research institution has the responsibility to improve the agricultural product information quality through the relevant media. Chinese Academy of Tropical Agricultural Sciences enjoys a high reputation both at home and abroad, and has more than 100 experts, including those who enjoy special government allowances, outstanding contributions at the national level, the central direct contact senior experts, the national candidates for new century millions of talents project, outstanding contribution young and middle-aged experts of the Ministry of Agriculture, and winners of the Chinese agricultural excellence award\(^7\). As of 2015, the total number of in-service

### Table 1 Quality and safety crisis of agricultural products in Hainan in 2004–2015

<table>
<thead>
<tr>
<th>Year</th>
<th>Crisis event</th>
<th>Characteristics of information content</th>
<th>Harms</th>
<th>Adverse effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>Shrimp breeding using contraceptives</td>
<td>Using contraceptives in shrimp breeding</td>
<td>Infertile</td>
<td>Low sales of shrimps and finally it spread to the entire aquaculture</td>
</tr>
<tr>
<td>2005</td>
<td>Cadmium content in Sauropus androgyns exceeding the upper limit</td>
<td>Cadmium content exceeding the upper limit</td>
<td>Cadmium will stimulate the respiratory tract, resulting in olfactory loss, mucular gum</td>
<td>Destructive blow to Sauropus androgyns industry of Hainan</td>
</tr>
<tr>
<td>2006</td>
<td>Watermelon injected with mercurchrome</td>
<td>Mercurochrome solution</td>
<td>Mercurochrome solution contains mercury, which is poisonous</td>
<td>Hainan watermelon declined in both the price and sales, with losses up to 100 million yuan</td>
</tr>
<tr>
<td>2007</td>
<td>Banana cancer</td>
<td>Eating banana may get cancer</td>
<td>Banana was infected with Panama virus in a large area</td>
<td>One million banana farmers in Hainan suffered losses up to 822 million yuan</td>
</tr>
<tr>
<td>2010</td>
<td>Hainan toxic cospea</td>
<td>Prohibited pesticides: Isocarboxphos and triazophos</td>
<td>Highly toxic, prohibited</td>
<td>No consumption of Hainan cospea and doubt about anti-season vegetable</td>
</tr>
<tr>
<td>2011</td>
<td>Etephon ripening banana</td>
<td>Etephon ripening banana, food safety concern</td>
<td>Irritating the skin and eyes, and having acid erosion on the mucosa. Taking by mistake may bring about burning sensation, nausea, and vomiting</td>
<td>Hainan banana purchase price dropped from 1.9 yuan / kg fell to the current 0.1–0.15 yuan / kg, much lower than the production cost</td>
</tr>
<tr>
<td>2013</td>
<td>Eating areca palm (betel nut)</td>
<td>Eating areca palm may get cancer</td>
<td>After chewing betel nut, it may form nitroso compound, which is carcinogenic. Also, when chewing, it easily leads to mechanical trauma to oral mucous membrane</td>
<td>2.3 million betel nut farmers in Hainan suffered losses up to 3 billion yuan</td>
</tr>
<tr>
<td>2015</td>
<td>Wanning poisonous watermelon</td>
<td>Residue of aldicarb (Temik) exceeding the upper limit</td>
<td>Aldicarb is a carbamate insecticide, acaricide, and nematicide, is the pesticide with highest toxicity and may cause phosphorus poisoning</td>
<td>12 people were poisoned, dull sales of watermelon, both sales and price dropped</td>
</tr>
</tbody>
</table>
scientific and technical personnel reached 1562, including 562 senior professional and technical personnel and 374 doctors. The talents are distributed in tropical cash crops, tropical food crops, tropical marine biological resources, tropical animal husbandry, tropical winter vegetables and tropical agricultural products quality and food safety research fields. These high-end authoritative talents can provide authoritative information in crisis. They have undertaken the "973" plan, "863" program, the National Science and Technology Support Program and the FAO, UNDP and key fund projects of other international organizations, and achieved more than 1,000 scientific and technological achievements. They have been authorized with nearly 500 patents, 400 national and agricultural industry standards, and more than 200 kinds of science and technology products. They play an active role in breaking down and curbing rumors, which is not only a manifestation of knowledge and credibility, but also a manifestation and embodiment of the responsibility of state-level research institution for people’s livelihood.

4.3 Bringing into play the authoritative effect of scientific research experts  Negative information dissemination is the third important factor influencing consumers’ trust after the harm crisis of agricultural products. It shows that the greater the dissemination of crisis information of agricultural products, the lower the trust may the consumers have. Rumor brings the public only one-sided information. If scientific research experts and the authority of knowledge disclose scientific knowledge to the public promptly, it is able to inform the public about the crisis, which is an important measure to promote the scientific spirit. The power of knowledge depends not only on the value of its size, but also depends on whether it is spread and the depth and breadth of spreading. The information dissemination of scientific research experts is a long-term responsibility. It focuses on the long-term effects of communication and the popularization and promotion of scientific quality of the masses. The correct dissemination of knowledge not only can prevents the occurrence of crisis, but also can mitigate the harm caused by the negative information transmission in the crisis, so that scientific researches can realize the purpose of serving the people’s livelihood. In addition, correct information dissemination can improve the impact of science on the public and help researchers to obtain the public support. Scientific research institutions and other professional authoritative organizations in crisis disclosing the authoritative information will realize win-win of three parties, the public, scientific research institutions and the society. However, scientific research institutions and scientific and technological personnel should accumulate reputation and credibility in the long-term popularization of science and technology, to create favorable public relationship. A series of accidents including "carcinogenic betel nut", "poisonous watermelon", and "saccharin jujube event" tell us that the public needs scientific knowledge, it needs cultivation of scientific quality and knowledge structure of food safety and quality. In such crisis, scientific research institutions should take the initiative to launch an attack, to realize the purpose of feeding back to the public.

References


(From page 4)