

Investigation of the Standard System of Agricultural Product Traceability

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Abstract: The traceability of agricultural products plays an important role to ensure the quality and safety of agricultural products from field to table. Both domestic and foreign countries attach great importance to the traceability of agricultural products. At present, the agricultural products traceability industry in China develops rapidly. A standard system is needed to regulate this industry. This paper investigated the current national standards, industry standards, and local standards in the agriculture and food industry, and analyzes the standards types, standards issuing organizations, traceability products categories, age of standards, and main contents of standards, showing the status of standards in this field and providing references for relevant practitioners. At the same time, this paper analyses the potential problems of agricultural product traceability standards at present and puts forward corresponding suggestions.

1 INTRODUCTION

As a kind of food, edible agricultural products include planting products, animal husbandry products, and aquatic products, covering a wide range of categories (Wang, 2018). Agricultural products are essential for human survival and occupy a large proportion and an important position in the global supply chain. However, the supervision of agricultural products is difficult, "red duck egg", "toxic leek", "clenbuterol" and other agricultural product safety incidents occur frequently, indicating that there are still hidden dangers to the quality and safety management of agricultural products, which need to be guaranteed through certain measures. (Li, 2021)

The traceability of agricultural products is to collect and record detailed data on the production, processing, circulation, and sales, establish an information database for the entire supply chain of agricultural products and strengthen the quality and safety management of agricultural products. Both domestic and foreign countries attach great importance to the traceability of agricultural products. Since mad cow disease has caused great harm to food safety in Europe, the European Union firstly started to use the traceability system. In 1997, the European Union established a traceability system for beef products and subsequently promulgated *the*

Food Safety White Paper and Good Traceability Process. In 2002, the American Produce Marketing Association and the Canadian Produce Marketing Association jointly established *the Traceability Task Force* to issue *the North American Fresh Products Best Traceability Practices*. Japan promulgated *the Food Traceability Guidelines* in 2003 and *the Rice Traceability Law* in 2009. In 2012, Korea promulgated *the Agricultural Product History Traceability Management Standard* for the producers, distributors, and sellers of agricultural products. (Zhang, 2021; Chen, 2020; Jin, 2019)

The food safety traceability system has been established in China after we joined WTO in 2001 (Li, 2018). Article 41 of the newly revised *Agricultural Products Quality and Safety Law of the People's Republic of China* in 2022 added new requirements for the quality and safety of agricultural product traceability. At present, China has achieved positive results in the construction of the agricultural product traceability system. National and local public agricultural product traceability platforms have been built, such as the National Agricultural Products Quality and Safety Traceability Management Platform, and Aquatic Products Quality and Safety Traceability Platform in Guangdong province. At the same time, social forces and capital have invested in the construction of agricultural product traceability systems and achieved good results. For example, the

MAP beside system, a whole-process quality control traceability system of *Sinochem Agriculture Holdings*, controls the quality of agricultural products by the key growth periods, core environmental parameters, and quality inspection indicators. Through the blockchain traceability platform, the *MAP beside* system collects information on agricultural product planting, warehousing, processing, logistics, taste evaluation, and endorsement. The *MAP beside* system assigns this information to "three stamps and one index", that is, quality stamps, time stamps, geographic stamps, and green indexes, which are displayed to consumers.

With the rapid development of agricultural product traceability, there are also some problems, such as the difficulty in guaranteeing data authenticity and security. A complete standard system is required to regulate this industry. This paper aims to investigate the current standards of agricultural product traceability in China, and objectively display the status of agricultural product traceability standards, providing references for relevant practitioners. In addition, this paper analyzes the potential problems in this field and puts forward corresponding suggestions.

2 INVESTIGATION CONTENTS

The scope of this investigation is the current national standards, industry standards, and local standards that specifically regulate traceability in the agriculture and food industries. As of September 2022, a total of 157 relevant standards have been collected through the *National Standard Information Public Service Platform*. This article analyzes the standards types,

standards issuing organizations, categories of traceability products, age of standards, and main contents of standards.

3 RESULTS & DISCUSSION

3.1 Types and Standards Issuing Organizations of standards

Among the 157 standards in this investigation, 20 of them are national standards, 45 of them are industry standards, and 92 of them are local standards.

Among the national standards, most of them are issued by the State Administration for Market Regulation, with 15 standards accounting for 75%. The Ministry of Agriculture and Rural Affairs issued 3 standards. The All-China Federation of Supply and Marketing Cooperatives issued 2 standards.

Among the industry standards, 46.7% are agricultural industry standards and aquatic industry standards. As can be seen in Figure 1, The rest of the industry standards involve domestic trade, entry-exit inspection and quarantine, supply and marketing cooperation, and certification and accreditation. It shows that the traceability standard is of great significance in the circulation of agricultural products.

Among the local standards, a total of 18 provinces issued traceability standards for agricultural products or food. Inner Mongolia and Anhui ranked first and second in terms of the quantity of the standards. Inner Mongolia issued 18 standards, and Anhui issued 13 standards. Table 1 shows the quantity of the standards issued by each province.

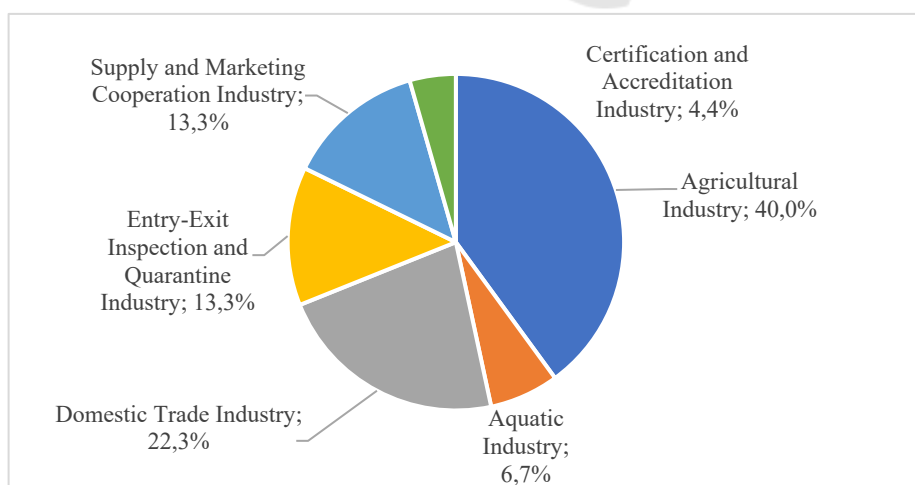


Figure 1: The proportion of agricultural product traceability standards in various industries.

Table 1: The quantity of the standards issued by each province.

Serial Number	Province	Quantity of Local Standards
1	Inner Mongolia	18
2	Anhui	13
3	Hebei	8
4	Jiangsu	7
5	Shandong	7
6	Henan	7
7	Jilin	5
8	Xinjiang	5
9	Guangxi	4
10	Tianjin	3
11	Zhejiang	3
12	Guangdong	3
13	Liaoning	2
14	Sichuan	2
15	Guizhou	2
16	Guangdong	1
17	Jiangxi	1
18	Ningxia	1

3.2 Traceability Product Categories of Standards

Agricultural products cover a wide range of product categories. This paper analyses the agricultural product categories involved in traceability standards. The statistical results of traceable product categories are shown in Figure 2. (There is a situation where one

standard specifies multiple products.) There are 51 standards for all agricultural products. The other standards aiming at a certain kind of specific agricultural product have covered the main types of agricultural products, involving fruit, vegetable, livestock and poultry, aquatic product, grain and its product, tea, etc.

The standard quantity is larger for livestock, poultry, and vegetable, which matches the actual situation that these types of products have more varieties and are easily polluted. In 2010, the Ministry of Commerce launched the meat and vegetable circulation traceability system construction project, which promoted the formulation of a large number of meat and vegetable traceability standards, such as *SB/T 10681-2012 Technical requirements for information communication of meat and vegetable distribution traceability system*, *SB/T 10682-2012 technical requirements for information sensing for meat and vegetable distribution traceability system*, and *SB/T 10684-2012 Technical requirements for information processing for meat and vegetable distribution traceability system*.

Some provinces have formulated special traceability standards for their characteristic agricultural products. For example, Inner Mongolia has formulated traceability standards for local specialty products such as oats, potatoes, beef, and mutton. Jilin province has formulated *DB22/T 2171-2014 Management specifications of special marks of use for Geographical Indication Products*. Ningxia province has formulated *DB64/T 1652-2019 Ningxia Wolfberry Traceability Requirements*.

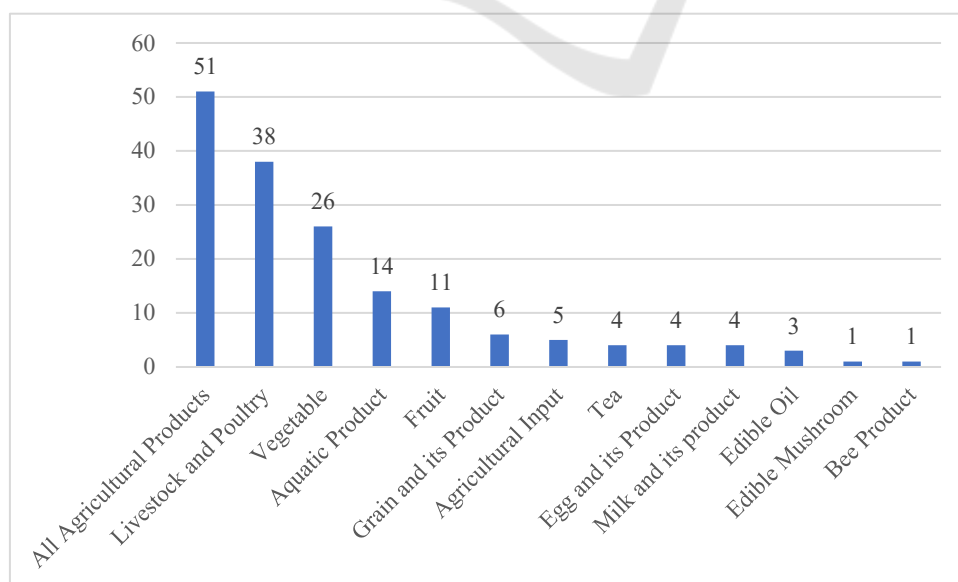


Figure 2: Product categories of agricultural product traceability standards.

It is worth mentioning that some standards provide requirements for the traceability of agricultural inputs. For example, the Bureau of Agricultural Means of Production of the All-China Federation of Supply and Marketing Cooperatives issued *GH/T 1223-2018 Seed Traceability System Construction Specifications*, *GH/T 1225-2018 Agricultural Material Quality Traceability System Construction Specifications*, and *GH/T 1200-2018 Agricultural material Traceability Electronic tag (RFID) Technical Specifications*. Anhui province has formulated *DB34/T 2211-2014 Specification for Agricultural Input Traceability Information*, which regulates the traceability information coding, collection, and management requirements of agricultural inputs such as seeds, seedlings, fertilizers, pesticides, veterinary drugs, feed, and feed additives. Such standards will extend standardization to the further front end of the agricultural product traceability chain, which is conducive to the sustainable, healthy, and stable development of the agricultural product traceability system.

3.3 Age of Standards

It can be seen from Figure 3 that 49.7% of the age of standards is within 5 years, and 38.9% is 5-10 years. And there are still many new national standards being formulated. This shows that although the agricultural products traceability system in China started late, it has developed very rapidly in the past ten years.

However, 11.5% of the age of standards is more than 10 years, indicating that some standards need to be reviewed and revised in time according to the development of the industry.

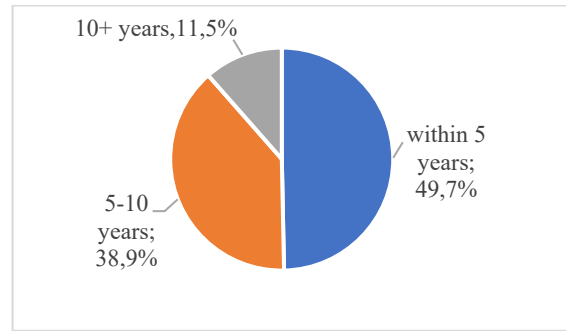


Figure 3: Age of Agricultural Product Traceability Standards.

3.4 Main Contents of the Standards

The traceability industry of agricultural products is an interdisciplinary industry involving agriculture, food, traceability, informatization, etc. With the development of the industry and the update of technology, other emerging technologies and demands will continue to appear. In addition, traceability has gradually become a relatively mature service, which requires the regulation of the agricultural product traceability industry from multiple fields. By sorting out the industry, this paper proposes an agricultural product traceability standard system, as shown in Figure 4. This standard system includes three sub-systems: basic requirements, technical requirements, and service requirements. This paper analyzes the main contents of the collected standards based on this standard system.

Table 2 shows the proportion of the main contents of the currently published standards. As can be seen from Table 2, the current standards mainly focus on traceability technical requirements. And there is no service requirement standard at present.

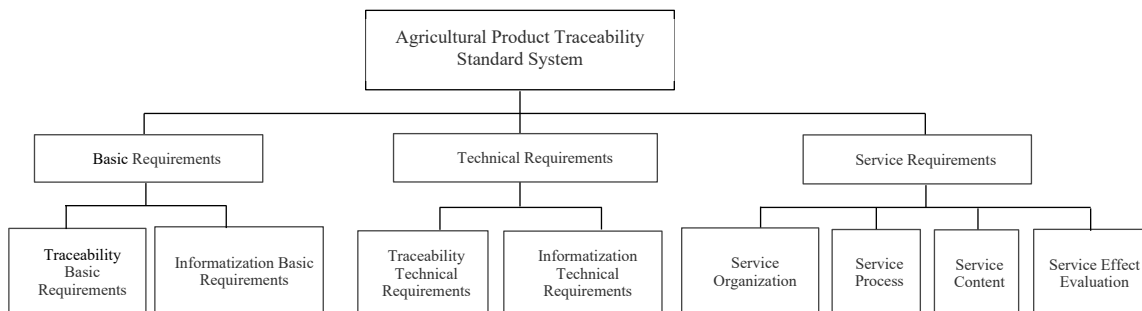


Figure 4: Agricultural products traceability standard system.

Table 2: Proportion of main contents of standards.

Sub-system	Part	Standard Proportion
Basic Requirements	Traceability Basic Requirements	0.7%
	Informatization Basic Requirements	3.8%
Technical Requirements	Traceability Technical Requirements	67.5%
	Informatization Technical Requirements	28.0%
Service Requirements	Service Organization	0.0%
	Service Process	0.0%
	Service Content	0.0%
	Service Effect Evaluation	0.0%

In the basic requirements sub-system, the traceability basic standard is *GB/T 38155-2019 Important product traceability—traceability terminology*, which defines the basic terms, technical terms, management, and service terms in traceability. The informatization basic standards include standards for regulating traceability core metadata, data sets, and data exchange.

In the technical requirements sub-system, traceability technical requirement standards account for 67.5%, including general traceability requirements, traceability requirements for specific categories of agricultural products, and traceability requirements for specific links. Informatization technical requirement standards account for 28%, including traceability system requirements, information equipment requirements, traceability information coding requirements, and traceability label requirements.

However, there is no standard to regulate the traceability service at present.

4 CONCLUSIONS

This paper investigates 157 standards for agricultural product traceability. According to the investigation, Agricultural product traceability standards in China developed rapidly in recent ten years. The standard covers the main categories of agricultural products. The standard contents cover basic requirements and technical requirements.

At present, more and more institutions begin to build agricultural product traceability service

platforms. Agricultural product traceability is a relatively mature agricultural service, but the service level is uneven. The effectiveness of agricultural product traceability is not only related to technology but also related to service, which decides whether the traceability can be implemented smoothly. At present, there is no standard to regulate the traceability service. Therefore, it is necessary to formulate agricultural product traceability service standards, regulating the service organization, service content, service process, and service effect evaluation.

Furthermore, now most of the traceability standards are for edible agricultural products, and few of them regulate agricultural inputs. As an important part of agriculture, agricultural inputs, such as seeds, fertilizers, and pesticides, have a direct impact on the quality and safety of agricultural products. Therefore, it is recommended to further regulate the traceability of agricultural inputs.

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