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A typical case study of the impact of private standards on international trade

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Abstract. This paper expounds the definition and types of private standards, the background and development of the private standards, and analyzes the characteristics of private standard, its positive effects and restraining effects. Two typical cases of pears and meat products are selected, and investigation and study are carried on these two types of products, and it is found that the implementation of the private standard indeed improves the market competitiveness of the Chinese production and supply enterprises. At the same time, the implementation of the private standards has positive effects on improving enterprise efficiency, increasing profits and improving the social and environmental performance, etc. Finally, some policy suggestions on the impact of private standards on international trade are given.

1. Introduction
Private Standard, also known as Private Voluntary Standard (PVS), Private Food Standard or Private Food Schemes, refers to the voluntary standards, certification and measures established by non-government organizations to standardize the internal product quality and to meet the quality requirements of business organizations. Standard privatization is the basic development trend of standard, in which context enterprises become the formulators of standard. The promoters of private standard are the main market participants – enterprises, including manufacturers, retailers and so on. The standardization activities of enterprises produce a large number of private standards. The scope of private standards is very extensive, not only covers technology compatibility, but also involves product quality and safety, environmental protection and labor protection, and even standard provisions for bank, insurance, securities and other financial services. Compared with legal standard, private standard formulation process lacks corresponding democratic consultation procedure and open and transparent rules, and some of them are even closed, that is, only open to specific insiders. The motivation of private standards mainly comes from the market competence and technical advantages of promoters, which inevitably involve the factors of intellectual property right [1, 2]. As a result, private standards have strong influence on the related markets, and even become the de facto mandatory standards.

2. Private Standard and Its Development Trend

2.1 Types of Private Standards
The types of private standards include those in the field of information and communication technology, those in the field of retail and agricultural product, and those related to social and environmental aspects [3, 4].
(1) The Private Standard of Information and Communication Technology Sector (Consortia and Fora)

In addition to the formal international standards, regional standards and national standards, there has been another kind of standards that has been recognized for a long time and has been used for the internal enterprises, and between enterprises or when signing contracts with suppliers – standards of businesses (or enterprises). In order to meet the demand of their interest, some enterprises formulate their own standards. In the mid 1980s to early 1990s, "alliance" began to appear, mainly focusing on formulating industrial norms in the field of ICT (information and communication technology) [5].

In many cases, the first alliance was a close group formed by some ICT companies which jointly formulate and implement common norms as the main means of market competition. The alliance does not seek the participation of all stakeholders, nor does it fully disclose the standard to the public or accept public inquiry. However, many alliances have become more and more open. The ICT sector has reached a lot of consensus, and the standards they formulated have been widely recognized by the market and have become the de facto international standard.

In the mid 1990s, the ISO Council set up a special research team to assess the possible impact of establishing a de facto standard system beyond the formal standard system. The research team believes that the formal standard system should not pay much attention to the establishment of de facto standard system, because it is the inevitable result of ICT enterprises to seek for strategic interests, but should explore how to cooperate with de facto standard-making organizations. As one of the important achievements, ISO and IEC have established a joint technical committee in the field of information technology, which use a special procedure to transform the standards established by the alliance into the international standard of ISO and IEC through formal international standardization system.

This special procedure was not successful at the beginning. However, in recent years, some national governments issued a series of polices to support the use of the open and international voluntary standards formulated by the formal standardization system, making this special procedure much more effective. This special procedure has transformed some standards into formal ISO/IEC international standards, such as Linux operation system and OASIS open document format. It has also changed the "self-owned standard" PDF to ISO official international standard.

(2) Private Standards in the Field of Retail and Agricultural Products

In many aspects, the private standards of retail and agricultural products have many similar experiences in its early stage as that of the ICT sector, though the reasons are different. For example, in response to the demand of CEOs of food retailers, the Global Food Safety Initiative (GFSI) was established in 2000, mainly aimed at promoting continuous improvement of food safety system and ensuring stable confidence of consumers in food safety. Most of the initiative managers come from leading companies in the industry. However, due to the participation of high-level experts, such standards are effective. Their formulation does not necessarily conform to the principles of formal international standardization organization (such as transparency, openness, non discrimination, consensus negotiation, etc.), and nor does it comply with the specification of WTO/TBT’s annex 3CGP.

Some countries, especially some developing countries, expressed their concern, because some private standards of agricultural products (such as Global GAP is formerly the European GAP) sometimes raise higher requirements than the regulations or "international standard" (such as the limit of pesticide residue), and CAC usually develop international standards in this field. Meanwhile, the formulation of private standards does not comply with the principles of formal international standardization process, nor does it comply with the special domestic norms. Private standards must take special measures to win the support of regulators and stakeholders of relevant countries, especially developing countries, so as to effectively promote their acceptance and implementation.

In the recent years, through introduction of the serial standards of ISO22000 food safety management system, ISO and the formal standardization system has made some progresses in promoting the evaluation of basic food safety management system and promoting the compatibility in the field of agricultural products. The ISO22000 series of standards cover all food producers and
distributors, and also include good agricultural practices. The addition of pre project standard to the ISO22000 under formulation will further improve the serial standards, and the pre project standard emphasizes the adverse effect of incompatibility between standards upon producers (large or small) and the ultimate consumers. At the CAC meeting in May 2009, a paper on the numerous problems of private standards for agricultural products was delivered.

(3) Private Standards in the Social and Environmental Fields

The emerging of private standards in the social and environmental fields in recent years may be the most diverse private standards. They are usually initiatives, certification and labeling projects and focus on carbon footprint, eco-labeling, sustainable development management of natural resources (forest resources, fishery resources and bio-fuels), fair trade practices, organizational trust and social responsibility. This kind of standards is formulated by different private standards formulation organizations such as retailers alliance (for example private labeling program) and non-governmental social and environmental organizations. These organizations try to promote the realization of specific social and environmental reforms through developing and implementing standards and promoting certification activities, and they have quite different standard formulation principles. In the recent years, in order to support the formulation of private standards and the participation of related conformance evaluation projects (certification and labeling), a lot of efforts have been made to upgrade the formulation principles of such standards and their compatibility. A private organization engaged in global social and environmental standard system called ISEAL Alliance and its members are exploring to establish global, eco-sustainable and fair basic business rules in the world.

Many cases show that the private standard initiatives in the social and environmental fields need to compromise to each other, and sometimes, they need to be combined so as to prevent confusion and market division and undermine the influence of standards. The formal international standardization system builds a platform which can promote the complementation and compatibility of different standards and can provide a globally consistent solution, so that the market and regulators can accept the private standards in a large extent and the expected social and environmental influence is finally achieved.

For example, the formal international standard system provides important international standards which help to comprehensively solve key social and environmental issues. In the environment and related fields, the international standards provided by ISO focus on environmental management (ISO 14001/4), environmental labeling (ISO 14020/21/24/25), life cycle assessment (ISO14040/44), greenhouse gas measurement, certification and assessment (ISO14064/65) and drinking water and wastewater related services (ISO 24510/11/12).

In order to develop a new version of the ISO26000 social responsibility standard, ISO has established a working mechanism with extensive participation and joint efforts by the stakeholders. Participants of the project are 400 experts from 42 international intergovernmental organizations and non-governmental organizations from 91 countries. Meanwhile, that the ISO standard formulation process can solve complex social sustainable development problems is proved. The other standards that ISO is developing include the carbon footprint of products and services, sustainable standards for bio-fuels, sustainability in event management, and the water footprint of organizations.

According to the difference of formulators, private standards can be divided into three categories\[2, 6]\:

Collective Private Standards at the International Level

The collective private standards at international level mainly refer to the standards, norms, initiatives, and tools formulated by the international organizations, non-government agencies, industry associations or enterprises alliances, which are dedicated to solve some of the world's common problems, and the standards they formulate are promoted across the world. The collective private standards at the international level can further be divided into private standards formulated by international organizations (such as food safety management system international standard ISO22000 and ISO22005), private standards formulated by non-profit organizations or non-governmental organizations (such as the Global Food Safety Initiative (GFSI)), and private standards formulated by
international industrial associations or enterprises alliances (such as Global Good Agricultural Practices (Global-GAP) and the practice norms of toy industry developed by the International Toy Industry Association (ICTI)) \(^7,^8\).

### Collective Private Standards at the National Level

The collective private standards at the national level refer to the standards, codes of conduct, initiatives and tools formulated by the non-governmental organizations, industrial associations or enterprises alliances in a country, which applies to the products made or sold inside the country and may be promoted in the supply chain. One of the examples is the British Retailer Association (BRC) \(^9\). The social responsibility management system of the textile industry CSC9000T developed by Chinese Textile Industry Association is also considered as private standards. Although the association stressed it is not a standard but a management system, it has the characteristics of private standards. So it is collective private standards formulated by an industrial association \(^10,^11\).

(4) Enterprise Standards

The enterprise standard mainly refers to those made by the enterprise itself and is popularized within the enterprise and its supply chain. At present, the main multinational companies and international brands have established their own supply chain management standards, and are promoted in the supply chain. For instance, international retailers like WAL-MART, Carrefour and Tesco will make their own standards in addition to the collective standards at the international level \(^12,^13\).

#### 2.2 The Background and Development Trend of Private Standards

Private standard is a concept relative to official or state standards, and it is part of the effort by individual businesses, national alliances, international alliances and other non-governmental organizations to react to food safety crisis after the outbreak of BSE, foot and mouth disease and dioxin, with the aim of enhancing market competitiveness. According to the estimation of the United Nations Conference on Trade and Development, there are a total of more than 400 private standards in the world, while the private standards of EU account for a large proportion. They vary a lot regarding to systems, goals and focuses, and mainly pay attention to food safety, environmental pollution, social responsibility and animal welfare \(^14\). According to the WTO/SPS Committee, there are more than 10 main private standards in the international food trade. According to their formulators, they can be divided into private standards of individual enterprises, private standards under the national framework and under the international framework \(^15\).

Generally speaking, a region which has advanced private standard will have advanced official standards also, because private standards are initially designed to make up for the shortage of official standards, to achieve product differentiation and to enhance competitiveness, and later on they are accepted by government agencies and evolved into official standards, such as HACCP. In view of the relationship between private standards and official standards, the vast majority of private standards are stricter than the official standards. OECD's questionnaire on retailers (Table 1) shows that 85% of private standards are stricter than the government's official standards. Compared to the EU food safety law, the BRC’s standard exceeds the basic requirements of the law in many aspects, its food quality management system alone exceeds the basic regulations of the law in a dozen of requirements, and it has certain supplementary and more advanced requirements in factory conditions, product control and quality control. And as the PAN UK stipulates, when a plant protection product is not authorized for use in a commodity or no data can show the residual has no damage to the health of consumers, its residual in this commodity shall not exceed 0.01mg/kg, which means the limit is zero in practical operation. In addition, private standards break the limitation of food safety, and they mainly focus on the process and production methods, containing a wide scope such as HACCP, animal welfare, organic matter, transgenesis, traceability, environmental impact, labor standards etc.

| Table 1. Comparison of Private Standards and Official Standards (unit %) |
|--------------------------|--------------------------|--------------------------|
| Food Safety | Roughly the same as the official standard | Slightly higher than the official standard | Obviously higher than the official standard |
| | 12 | 44 | 44 |

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\(^1\) International Workshop on Renewable Energy and Development (IWRED 2018) IOP Publishing
\(^2\) IOP Conf. Series: Earth and Environmental Science 153 (2018) 032004
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From the perspective of the development of private standards, a trend of wide range and strict requirements is shown:

1. The requirements of private standards are becoming more and more stringent and complex. Due to income increment and life quality improvement, the consumers pay more attention to product quality, safety and production processes. In order to maintain market share and reach more customers, the suppliers need to make their products more competitive. Meanwhile, the government is intensifying its supervision on food production. All these factors have contributed to the stringent and complex features of private standards.

2. Private standards emerge in an endless stream. For instance, Europe has four types of private standards in poultry meat industry - IKB (Integrate Keten Beheersing) of Holland, ABM (Assured British Meat) of Britain, Certus of Belgium and Q&S (Qualitat und Sicherheit) of Germany. But they have different coverage in different sectors of the supply chain, and they dramatically raised the threshold of import of agricultural products.

3. The approach of the private standard management system is to monitor and evaluate the whole process of production, processing and sales, instead of the technical performance of the terminal products. For example, the Global Food Safety Initiative and Eurep GAP put forward many requirements for the production environment, process and processing methods of the supply chain.

4. The implementation is in fact mandatory. Although many of the private standards are voluntary in form, they are mandatory in implementation. For example, Eurep GAP, a voluntary standard, currently has 30 large retailers as members in 12 European countries, and controls 87% of European fresh agricultural products market (Grace L., 2006). The suppliers which do not comply with the standard are ruled out in the market. Private standards also have the characteristics of being predominant. Those who first set standards can control the market’s supply chain and lead the development of international trade and exclude enterprises outside the circle.

2.3 Characteristics of Private Standards

The use of private standards may be a way of protecting and improving the reputation of the company. For companies, the main economic motivation of standard setting is reputation. Providing the consumers with products that satisfy higher standards than the lowest quality and safety requirements is necessary for them to establish a reputation, and is also the key to increase the income at present and in the future. Subsequently, private standards are becoming more and more favored by suppliers and retailers, and are more frequently used in trade [16].

According to rough statistics, there are hundreds of private standard systems in the world now, with the focus ranging from production and processing to animal welfare, and from environmental protection to the health of workers. At present, the private food standards have the following characteristics:

1. The private food standards are mainly requirements of large retail organizations towards products, such as the requirements raised by Carrefour, Tesco, and British supermarkets in their procurement. Although the private food standards cover a wide scope, the requirement of the retailing industry on products is generally the highlight. And the standard represented by BRC is the most notable and the most discussed in the private food standard system.

2. The private food standards pay more attention to process control. Eurep GAP, the UK’s "Assured British Meat", SQF 1000 and SQF 2000 all incorporated production process control into the standard system. A lot of private food standard systems show that the method of monitoring and assessing the production process is the characteristic of most private standard systems in the food industry. Unlike many previous management requirements and standards, the performance standard of technological products is no longer the only standard for monitoring and evaluation.
(3) Private food standards are often more complex and stricter than the official requirements. The official food standards pay more attention to the safety of product consumption. However, in addition to consumer safety, private standards play a more important role in establishing brand reputation and creating competitive advantages and profits. Therefore, the private standards are more comprehensive, more complex and more stringent than the official requirements in the production process, quality grade, and environmental protection and so on.

(4) The private food standards have a wide range of formulators, including all links to the supply chain like the breeders, retailers and consumer groups. For example, Scotland's SQC and Holland's Tasty Tom (a standard on tomato) can be regarded as the standard set by producers, and the fresh product purchase standard of Carrefour and Tesco is a typical standard set by retailers.

(5) The actual binding force of private food standards. Unlike mandatory requirements, private standards are voluntary in theory. But in international trade, because of the trend of joint development of private standards and the increasingly high usage frequency, they usually become industrial requirements. Therefore, for the suppliers, the private standards are actually mandatory. Therefore, the mandatory feature of private standards does not come from the content itself, but from their economic effect.

2.4 The Positive and Restraining Effects of Private Standards
The positive effects of private standards include [17]: improving economic efficiency, promoting diversification, and protecting social and public interests. Currently, the prevailing low carbon standards are widely used in the fields of food, clothing, furniture, household appliances and buildings. These low carbon standards fall into the category of private standards, and they have made important contributions to guide green consumption, to protect the environment, to save energy and to promote the development of low carbon economy. In addition, the private standards also have a positive role in protecting the rights and interests of the labor and protecting the welfare of animals. For example, the rules for suppliers formulated by the retailer Wal-Mart contain many labor standards. WAL-MART regularly organizes evaluation on the compliance of suppliers to ensure that the contracted businesses continuously meet the standards and make improvement. A survey also shows that consumers are more willing to take the production process in line with the labor standards as one of the conditions for purchase choice.

The restraining effects of private standards: the high cost of compliance of the private standards makes it an obstacle to market access. Cost of compliance include the investment to meet the private standards (including upgrading infrastructure, establishing new procedures and related personnel training, and designing new management systems) and the inspection process of private standards (including regular review, personnel skill training and test, annual audit verification and detailed record). Private standards also cause reordering of export enterprises from the micro perspective. Private standards emerge one by one, but with no coherence among them, which makes it more difficult to comply with. Private standards exist beyond the circle of WTO rules, leading to new barriers to trade.

3. Typical Case Analysis of the Impact of Private Standards on International Trade
Since its development, private standards have generated far-reaching impact on the developed and developing countries in the world. As a developing country, China should pay attention to the types of private standards used in different export agricultural products, analyze their impact on the production and trade of agricultural products of China, so as to improve the share of agricultural products export and the benefits of export enterprises. Pear and meat products are the main export agricultural products of China. To analyze the implementation of different private standards in the businesses of pear and meat and to further understand the dual roles of private standards is of great practical importance to the government, enterprises, export chamber and professional associations from the perspective of long-term development and global vision [18, 19].
3.1 Selection of the Survey Target

Pear and meat products are the main export products of China to earn foreign exchange.

According to statistics, the global pear production is 25.06 million tons and the global pear consumption is 24.86 million tons in 2015/16. In recent years, the global output of pear has increased year by year, with the annual average compound growth rate reaching 2.36% from 2011/12 to 2015/16. The global pear output in 2016/17 is 25.45 million tons, and the global consumption of pear in this period will exceed 25 million tons. China is not only the main producer of pears but also the main consumer. In 2015/16, China consumed 18.31 million tons of pears, accounting for 73.7% of the total consumption of the world. The global pear consumption will continue to rise slowly in the future, with an estimate of more than 28 million tons in 2021/22. In recent years, the global pear export volume is relatively stable, with the number standing at 1.79 million tons in 2016/17. The main pear export countries and regions are China, Argentina and the European Union. In the year of 2015/16, China's export amounted to 400,000 tons, accounting for 22.73% of the total export of the world.

As for meat products, China is for long the largest consumer of meat products in the world. From the perspective of demand structure, it can be divided into family needs, catering needs, business needs and organizational needs. Among them, family needs are the main consumption forms of meat products. The market scale of the meat industry of China from 2011 and 2016 years: in 2016, the total poultry and meat output is 83.64 million tons, falling down 1.1% from the previous year. Among them, the output of pork is 52.99 million tons, falling down 3.4%, and the output of beef is 7.17 million tons, with an increase of 2.4%. According to the customs statistics, in the first half of 2017, pork import and export of China is 689,000 tons, falling down 12.2% from the same period of 2016, and the value is 9.3 billion Yuan, falling down 8.7% from the same period of 2016.

The private standards are largely used in developed countries and regions, pear and meat products are the main export agricultural products, and especially the export market of pears is mainly in Europe, America, Japan and other developed countries and regions. Therefore, the producers and suppliers of these two kinds of products are chosen as the target of the survey.

3.2 Basic Situation of the Survey Targets

For these two types of products, 50 questionnaires were sent out, and 45 were returned, of which 19 were about pears and 26 were about meat. According to the feedback of the questionnaire, the pear producers are mainly distributed in 6 provinces of Hebei, Shandong, Guangdong, Shaanxi, Xinjiang and Liaoning. Among them, Hebei and Shandong have the most producers, accounting for 31.6% and 47.4% respectively. Most enterprises have their products exported to the European Union, and some others to Japan and the United States (see Table 2).

| Product        | The nature of the enterprise | Production scale (less than 50 employees) | Production scale (50-200 employees) | Production scale (200-500 employees) | Production scale (500 employees and above) | Export volume (1-10 million US dollars) | Export volume (over 10 million US dollars) | Enterprises with export to EU |
|----------------|------------------------------|-----------------------------------------|------------------------------------|-------------------------------------|--------------------------------------------|--------------------------------------|-------------------------------------------|-----------------------------|
| Pear           | Mainly production and processing | 10.5%                                   | 73.7%                              | 15.8%                               | 0                                          | 42.1%                                 | 52.6%                                    | 94.7%                       |
| Meat products  | Mainly production and processing | 0                                       | 3.9%                               | 23.1%                               | 73.1%                                      | 38.5%                                 | 50%                                       | 88.5%                       |

Meat enterprises are distributed in 5 provinces of Jilin, Jiangsu, Liaoning, Fujian and Shandong. Among them, Liaoning has the most meat enterprises, accounting for more than 50%. The products of more than 40% of the enterprises are exported to the EU, and some others to Japan and the United States (see Table 2). The nature of the enterprises: state-owned enterprises account for 3.8%, private enterprises account for 53.8%, foreign enterprises account for 15.4%, Hong Kong, Macao and Taiwan
enterprises account for 19.2%, Sino-foreign joint ventures account for 3.8%, and other enterprises account for 3.8%.

3.3 Requirements Necessary to Be Met in International Trade

According to the returned questionnaires, the requirements on exported pear of foreign markets include traceability in addition to food safety and quality. Additionally, private standards such as GAP, environment and labor are common. According to their degree of influence on the product, the requirements are ranked as: food safety, quality, traceability, GAP, environment, labor health, animal welfare and others. Table 3 gives a detailed list of the analysis of the survey. The enterprises indicated that the main means to show compliance with these requirements are third party certification, state agency certification and factory supervision

Table 3. Requirements for Pear Export

| Quality | Food safety | Animal welfare | Environment | Labor | GAP | Traceability |
|---------|-------------|----------------|-------------|-------|-----|--------------|
| Number  | 19          | 19             | 11          | 16    | 16  | 16           |
| Percentage | 100%      | 100%           | 57.9%       | 84.2% | 84.2%| 84.2%        |

Specifically for pears, the main types of certification that need to be met are Eurep GAP, HACCP and BRC. In addition to the certification and percentage required for product export listed in Table 4, other types of certification include Global Gap [22], IFS [23], ISO 22000 and ISO 9001 and so on.

Table 4. Types of Certification for Pear Products

| BRC    | HACCP  | SQF1000 | SQF2000 | Eurep GAP | IFS | Other |
|--------|--------|---------|---------|-----------|-----|-------|
| Number | 8      | 15      | 2       | 0         |13   | 1     |
| Percentage | 42.1%  | 78.9%   | 10.5%   | 0         |68.4%| 5.3% | 21.1%

Judging from the analysis of the returned questionnaires, the meat export market has the most requirements in quality, safety and traceability, and environment and labor health requirements are also common. Table 5 lists the proportion of various types of requirements of export market achieved in the survey.

Unlike pears, the certification requirements for meat export are mostly national certification, accounting for 73.1% of the surveyed enterprises. The certification types are mainly HACCP, BRC and SQF2000 [24, 25], and the national certification is the most important (see Table 6). Other certification types include ISO 22000.

Table 5. Requirements for Meat Export

| Quality | Food safety | Animal welfare | Environment | Labor | GAP | Traceability |
|---------|-------------|----------------|-------------|-------|-----|--------------|
| Number  | 26          | 26             | 17          | 25    | 23  | 20           |
| Percentage | 100%      | 100%           | 65.4%       | 96.2% | 88.5%| 76.9%        |

Table 6. Types of Certification for Meat Products

| BRC    | HACCP  | SQF1000 | SQF2000 | EurepGAP | IFS | Other |
|--------|--------|---------|---------|----------|-----|-------|
| Number | 8      | 26      | 4       | 7        | 5   | 4     |
| Percentage | 30.8%  | 100%    | 15.4%   | 26.9%    | 19.2%| 1.54%|

SQF2000 (Safe Quality Food 2000) is the food quality and safety standard widely recognized and applied by international food industry (production and retailing), which is originated from the food safety and quality guarantee system formulated by the Agricultural Commission of Australia for related enterprises in the food chain. SQF2000 is a standard that integrated HACCP and ISO 9000.
3.4 Common Private Standard Systems
Based on the existing literature, the questionnaires list the current main private standard systems, and the respondents are asked to choose the most common private standard systems in their exports according to their business.

Table 7. The Most Frequently Required Private Standard Systems (Pear)

|                      | Eurep GAP | SQF 1000 | ISO 9001 | SA 8000 | ISO 14000 | Other |
|----------------------|-----------|-----------|----------|---------|-----------|-------|
| Number               | 9         | 2         | 10       | 0       | 0         | 5     |
| Percentage           | 47.4%     | 10.5%     | 52.6%    | 0       | 0         | 26.3% |

Table 7 shows that ISO 9001 is the most frequently required private standard system in pear export. Eurep GAP is also common, accounting for up to 47.4%. Other private standard systems include Global Gap, BRC, Sedex, HACCP, ISO 20002, ISO 22000 and FSMA.

Table 8. The Most Frequently Required Private Standard Systems (Meat)

|                      | Eurep GAP | SQF 1000 | ISO 9001 | SA 8000 | ISO 14000 | Other |
|----------------------|-----------|-----------|----------|---------|-----------|-------|
| Number               | 2         | 2         | 20       | 3       | 6         | 7     |
| Percentage           | 7.7%      | 7.7%      | 76.9%    | 11.5%   | 23.1%     | 26.9% |

Table 8 shows that more than 76.9% of the meat products surveyed are required to have ISO9001 certification in the export. In addition, the certification of SA8000 and ISO 14000 are also required commonly. SQF (Safe Quality Food) is a food safety and quality certification standard based on the HACCP principle and covers the main elements of ISO9000. It includes the key control system of products, quality management system and product control. As a certification project of the supplier, it serves the food industry, and SQF1000 is targeted for primary products.

3.5 The Impact of Private Standards on Enterprises
As the survey shows, many enterprises, whether engaged in pears or meat, have the experience of being rejected for not complying with the requirements. The reasons for the rejection include incompliance with labor standards and traceability standards apart from food safety and quality. For pears, it focuses on the labor welfare and traceability, while for meat, it is the traceability.

Previous surveys largely focus on understanding the impact of private standards on the trade and market access for enterprises. In order to understand the comprehensive impact of private standards on enterprises, the respondents were asked to assess the impact in eight aspects - profit, efficiency, competitiveness, contract signing, market share, contribution to local employment, labor health and safety, and environmental protection. The impact of private standards on enterprises not just lies in the sales of products. In terms of the impact of the eight aspects, pear products and meat products are different (see Table 9 and Table 10).

Table 9. The Impact of Private Standards on Production of Enterprises (Pear)

|                      | Enterprise profit | Enterprise efficiency | Enterprise competitiveness | Contract signing | Enterprise’s market share | Local employment | Labor health and safety | Environmental protection |
|----------------------|-------------------|-----------------------|---------------------------|-----------------|--------------------------|-----------------|------------------------|--------------------------|
| Number               | 13                | 12                    | 19                        | 17              | 16                       | 13              | 12                     | 11                       |
| Percentage           | 68.4%             | 63.2%                 | 100%                      | 89.5%           | 84.2%                    | 68.4%           | 63.2%                  | 57.9%                    |

Table 10. The Impact of Private Standards on Production of Enterprises (Meat)

|                      | Enterprise profit | Enterprise efficiency | Enterprise competitiveness | Contract signing | Enterprise’s market share | Local employment | Labor health and safety | Environmental protection |
|----------------------|-------------------|-----------------------|---------------------------|-----------------|--------------------------|-----------------|------------------------|--------------------------|
| Number               | 26                | 23                    | 26                        | 25              | 26                       | 22              | 22                     | 20                       |
| Percentage           | 100%              | 88.5%                 | 100%                      | 96.2%           | 100%                     | 84.6%           | 84.6%                  | 76.9%                    |

As the survey shows, the eight aspects are ranked as follows according to the impact of private standards on the production of pear enterprises: competitiveness, market share, profit, contract signing, efficiency, health and safety of the labor, local employment and environmental protection. For pears, the positive role of private standard in enhancing competitiveness and market share of enterprises has been recognized, which is reflected by respectively 100% and 89.5% of the surveyed enterprises. And
over 89.5% of the surveyed enterprises believe that private standards play a positive role in improving efficiency.

The impact of private standards on meat companies is more diversified. In terms of the impact of contract signing, 7.7% of the surveyed enterprises believe that private standards have no affect, 84.6% believe that private standards are positive, and 7.7% believe the impact is negative. 84.6% of the surveyed enterprises indicate that the private standards play a positive role in improving their efficiency and market share. 100% of the surveyed enterprises believe that private standards play a positive role in lifting their profit, and 100% of them believe that private standards can help strengthen their competitiveness.

3.6 Restricting Factors for Compliance of Enterprises with Private Standards

It can be seen that private standards cover various aspects. Do the producers and suppliers have any difficulty in meeting these standards and requirements? According to the survey, although the specific proportions are different, both the pear suppliers (100%) and meat suppliers (100%) generally believe that difficulties exist in meeting private standards and requirements, and technology, management, equipment and facilities and certification fees are generally thought to be the major restricting factors (see Table 11). For pears, the main restricting factors for meeting private standards are ranked as follows: equipment and facilities, management technology, audit and certification costs, communication / information, technology and files. For meat, they are ranked as follows: equipment and facilities, communication / information, technology, management technology, audit and certification cost, and files.

| Table 11. Main Restricting Factors for Compliance with Private Standards |
|---------------------------------------------------------------|
|                  | Equipment and facilities | Communication / information | Audit and certification costs | Technology | Files | Management technology |
|-------------------|--------------------------|-----------------------------|-------------------------------|------------|-------|-----------------------|
| Pear (%)          | 68.4                     | 52.6                        | 63.2                          | 47.4       | 10.5  | 68.4                  |
| Meat (%)          | 38.5                     | 38.5                        | 26.9                          | 38.5       | 7.7   | 30.8                  |

3.7 Analysis and Summary

According to the survey, enterprises of the two products differ in whether private standards improve their efficiency. 63.2% of the surveyed pear enterprises believe that private standards can improve their efficiency while 100% of the surveyed meat enterprises believe so.

Private standards aim to improve the compatibility between enterprises and to further improve their competitiveness. The survey shows that private standards have improved the competitiveness of enterprises and provided them with admission tickets to the international market. In the entire supply chain, purchasers and other core enterprises set quality standards and carry out necessary monitoring and certification, so that they can fully control suppliers in the effective range.

Most of the surveyed enterprises believe that private standards can help increase their profit: 89.5% of the surveyed pear enterprises and 84.6% of the surveyed meat enterprises believe that private standards have played a positive role in improving their profit. Also, private standards play a regulatory role in improving the operation and working conditions of enterprises. Since the access to the World Trade Organization, Chinese enterprises, during the process of integrating themselves into the world trade, actively adopt advanced private standards and regulations according to their own demand, so that their products have occupied a foothold in the world trade, have expanded international market, and have created good profits.

4. Policy recommendations

China is the world's fourth largest importer of agricultural products and fifth largest exporter of agricultural food products, with its agricultural food products mainly exporting to Asia, North
America and Europe. These regions not only have the most stringent official standards but also the most developed private standards in the world, which pose great challenge to the export of agricultural food products of China. At present, we should focus on the following points \cite{26,27}:

The government agencies should make efforts in the following four aspects: First, strengthen the standardization of our country and encourage agricultural production and processing enterprises and academic organizations to actively participate in international standardization activities, so as to improve our voice in international standard field; secondly, establish authoritative information publishing system to inform about the development trend of official standards and private standards of major trading countries, so as to form the early warning mechanism and provide timely information and corresponding technical support for industry associations and enterprises; thirdly, establish a special organization to study the official standards and private standards of the trade partners of China, especially the costs and benefits of compliance with such standards for Chinese enterprises, so as to provide guidance for the enterprises; fourthly, report the encountering of official standards and private standards of enterprises in their foreign trade to the related agencies of WTO through the special trade concerns, so as to solve trade disputes through dialogue and consultations \cite{28,29,30}.

The industrial associations should make efforts in two aspects. On the one hand, as a bridge between government and enterprises, they should actively help enterprises to deal with foreign official standards and private standards, provide enterprises with information, technology, inspection, testing and other help, and report difficulties of enterprises in the export to the government; on the other hand, they should actively establish and promote the development of industry standards, use private standards to safeguard food safety of China and provide precondition and basis for the establishment of official standards.

As for the enterprises, they should establish standardized production bases as quickly as possible in response to the change of international market demand, so that the source can be controlled, the process can be traced, and the quality can be guaranteed. Furthermore, they should communicate more with government agencies to reflect their problems encountered in foreign trade, and their suggestions and requirements, which will help them better express their voices on a wider trade platform and get help from the government as well.

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