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Chen, Tinggui
College of Economics and Management, Shanghai Ocean University

Chen, Linsheng
College of Economics and Management, Shanghai Ocean University

Nanseki, Teruaki
Laboratory of Agricultural and Farm Management, Division of Agricultural and Resource Economics, Department of Agricultural and Resource Economics, Faculty of Agriculture, Kyushu University

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Effect of CHINAGAP on Agricultural Products Export: Evidence from Companies in Shanghai

Tinggui CHEN[1], Linsheng CHEN[1] and Teruaki NANSEKI[2]*

Laboratory of Agricultural and Farm Management, Division of Agricultural and Resource Economics,
Department of Agricultural and Resource Economics, Faculty of Agriculture,
Kyushu University, Japan
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The number of valid CHINAGAP certifications is counted at 410 on July 14, 2010, which range from crops to livestock and aquaculture. CHINAGAP covers all of mainland China except Qinghai province. The fruit, vegetables and combinable crops of CHINAGAP have completed the entire benchmarking procedure, and are now fully recognized as GLOBALGAP equivalent.

This article first classifies the certified companies according to region, the certification level, and the certification section and item, and then discusses the current state of CHINAGAP certification. In the second issue clarified by the article the export promotion function of the CHINAGAP is proven by two correlation coefficients. One is calculated with the money of agricultural products exported and the number of CHINAGAP certifications by region. While the other is calculated with the amount of agricultural products exported and the number of CHINAGAP certifications by the section and the item. Finally the author analyzes the export promotion function of CHINAGAP by the case of selected certification companies in Shanghai.

Keywords: CHINAGAP, agricultural product, export, certification

INTRODUCTION

With nearly 30 years of rapid development, China's per capita income levels have greatly increased. In 2008 per capita GDP reached 3,267 U.S. dollars, while the economically developed regions such as Beijing and Shanghai the per capita GDP is more than 10 thousand U.S. dollars, reaching the level of moderately developed countries. With the improvement of living standards, people's demand on food safety standards is increasing to a much higher level. Organic food, green food and pollution–free food have come into play in the Chinese marketplace. On the other hand, rapid economic development has caused tremendous environmental damage, the polluted environment is not only detrimental to agricultural production, also affected the sustainable development of agriculture. This is the reason that causes the low level of food safety. Food safety and environmental protection in contemporary society are the two most closely related issues that have been difficult to address. In this context, Good Agricultural Practice (GAP) has become widely accepted.

GAP originated in the late 1990s. In 2003, FAO defined GAP down to a more general concept: Broadly defined, GAP applies available knowledge to addressing environmental, economic and social sustainability for on–farm production and post–production processes resulting in safe and healthy food and non–food agricultural products (COAG, 2003). A lot of GAP codes, standards and regulations have been developed in recent years by the food industry and producers' organizations but also with the oversight from the governments and NGOs, aiming to codify agricultural practices at farm level for a range of commodities. Their purpose varies from fulfillment of trade and government regulatory requirements (in particular with regard to food safety and quality), to more specific requirements of specialty or niche markets. The objective of these GAP codes, standards and regulations include, to a varying level of importance:

(1) Ensuring safety and quality of produce in the food chain,
(2) Capturing new market advantages by modifying supply chain governance,
(3) Improving natural resources use, workers health and working conditions,
(4) Creating new market opportunities for farmers and exporters in developing countries.

Now the world's most influenced and popular GAP is GLOBALGAP initiated by Euro–Retailer Produce Working Group (EUREP), EUREP organized the retailers, suppliers and producers of agricultural products to make the standards in 1997. GLOBALGAP is a private sector body that sets voluntary standards for the certification of agricultural products around the globe. The GLOBALGAP standard is primarily designed to reassure consumers about how food is produced on the farm by minimizing detrimental environmental impacts of farming operations, reducing the use of chemical inputs and ensuring a responsible approach to worker health and safety as well as animal welfare.

The standard use of Hazard Analysis Critical Control Point (HACCP) approach is to make the control points and compliance criteria of good agricultural practices,

[1] College of Economics and Management, Shanghai Ocean University, Shanghai, China
[2] Laboratory of Agricultural and Farm Management, Division of Agricultural and Resource Economics, Department of Agricultural and Resource Economics, Faculty of Agriculture, Kyushu University, Japan
* Corresponding author (E–mail: nanseki@agr.kyushu–u.ac.jp)

make comprehensive requirements to agricultural planting and breeding process traceability, food safety, environmental protection and worker welfare. This will serve to enhance consumer confidence in products on the GLOBALGAP certification. COAG endorses the FAO approach to GAP that it should be non–prescriptive, voluntary and not create barriers to trade (COAG, 2005), but GLOBALGAP is different. Because most of the retailers in EUREP accept only GLOBALGAP certified agricultural products, the results is that GLOBALGAP becomes a de facto non–tariff trade barriers, which also contributed to GAP promotion in the world. The effect to countries exporting agricultural products to the EU is particularly significant.

China's food safety and environmental problems have become more severe. Improved food safety and strengthened environmental protection will become imperative, which is the inspiration for the implementation of the GAP in China. With the development of the benchmarking of the GLOBALGAP, it has already become the international standard (Nakashima, 2010). It is of great significance to help export enterprises across the foreign technical barriers and improve the international competitiveness of agricultural products. Therefore, the reasons for the promotion of the implementation of GAP in China are both to improve food safety standards, to enhance environmental protection, and most importantly to promote exports of agricultural products (Chen and Yokogawa, 2007).

There are some academic studies about the effect of CHINAGAP on the international trade, Li (2006), and Chen and Yokogawa (2007) primarily analyze the export promotion function of CHINAGAP from the institutional aspect, there is no statistical data analysis and no empirical evidence provided. Wang and Peng (2009) mainly analyze the export promotion function of CHINAGAP from a technical point of view. Xu *et al.* (2010) target the papers presented at two GAP forums that Certification and Accreditation Administration in the People's Republic of China (CNCA) sponsored, confirms the introduction, the certification, and the research of CHINAGAP which promotes agricultural products with a lot of export amounts, and point out that the major target of CHINAGAP is exportation of agricultural products. Song *et al.* (2010) analyze the effect of gap on minimizing food safety risk, and point out the enterprises who produce agricultural goods according to standards of CHINAGAP, mainly located in exporting regions, most of which are export enterprises based in the coastal area. This study is expected to improve the above studies through statistical data analysis and empirical research

This article first classifies the certification companies according to the region, the certification level, and the certification section and item, and then discusses current state of CHINAGAP certification. Next the export promotion function of the CHINAGAP is proven by calculating two correlation coefficients. Finally the author analyses the export promotion function of CHINAGAP by analyzing certification companies in Shanghai.

DEVELOPMENT OF CHINAGAP CERTIFICATION

April 2003, according to the advice of experts, CNCA proposed to establish GAP in the first stage of the food chain, and set up a "GAP conformity assessment system expert group" for preparing the draft of relevant norms and standards. January 2006, CNCA announced the "Good Agricultural Practices Certification Implementation Rules (Trial)", together with the State Standardization Committee to carry out GAP certification and standardization pilot practices in 286 Agricultural Standardization Demonstration Districts and registered hygiene food export enterprises in Shandong, Fujian, Shaanxi, Heilongjiang and 18 other provinces, municipalities. Having had more than a year of practice, CNCA issued a second edition "Good Agricultural Practices Certification Rules" in August 2007.

CHINAGAP began to certify in May 2006. The first

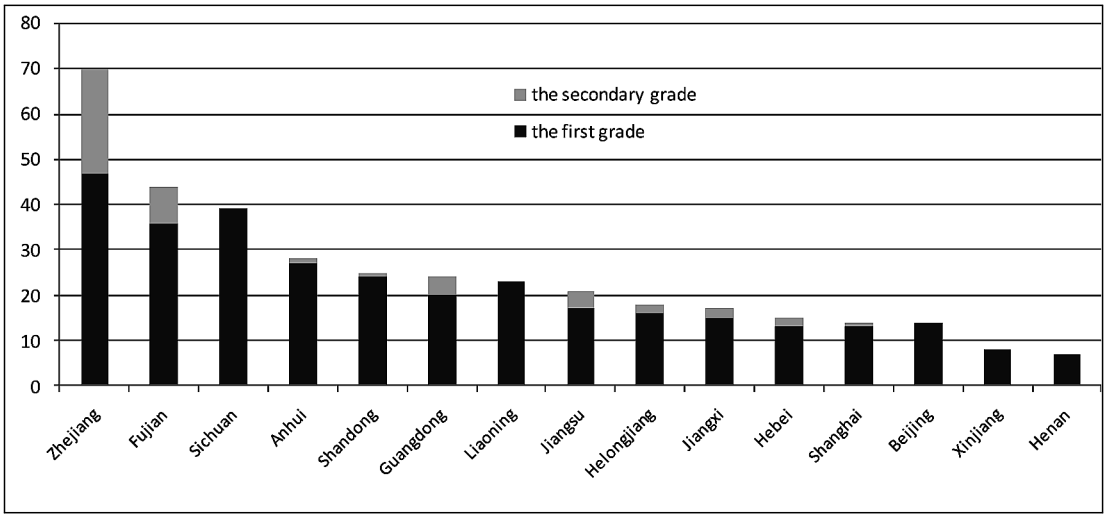

Fig. 1. Regional distribution of CHINAGAP certification.
Source: CNCA web site.

CHINAGAP certificate was certified to Luhua Foods Co., Ltd. in Laiyang, Shandong in June 2006. Valid CHINAGAP certificates have reached 410 as of July 14, 2010.

From a regional perspective, CHINAGAP certified companies are located in 30 provinces, autonomous regions and municipalities nationwide. This is nationwide except Qinghai. Fig. 1 shows the top 15 areas for certification, the top three being Zhejiang, Fujian and Sichuan, which received 70, 44 and 39 certifications respectively. The top 15 areas can be divided into three types: the coastal developed areas which include Zhejiang, Fujian; the central region with Anhui and Jiangxi; and inland areas including Sichuan and Xinjiang. Looking at this table 1 can see the coastal developed areas are in the majority.

Promoting the practice step by step, CHINAGAP is divided into two grades, the first grade and the secondary grade. The standard of the first grade CHINAGAP is equal to GLOBALGAP. In 410 valid certificates, there are 355 first grade certificates (accounting for 87% of the total), 54 secondary grade certificates and an additional certification that does not indicate the certification level. Fig. 1 indicates Zhejiang, Fujian, Guangdong and Jiangsu ranked as being the top four in the number of secondary grade certifications.

From the products type perspective, CHINAGAP certifications are issued in vegetables, fruits, livestock and aquaculture (Please refer to Fig. 2). In order to make the classification easy, the certificates were divided. This separation includes several types of products placed into several different certificates. So there are a total of 435 certified. This breaks down into 156 certifications of vegetables. This is the largest number, accounting for 36% of the total. This is followed by fruit, at 83, accounting for 19%. Fruits and vegetables account for 55% of the certifications; this was more than half the total number. In addition, there are 36 certifications in fish, 36 in cattle, 31 in tea, 26 in hog, 16 in grain and 10 in poultry. Other livestock mainly include hogs, poultry and cattle used in breeding. Finally there are other crops including beans, oil and cotton.

In order to promote the development of GAP in China, CNCA held "Good Agricultural Practices Application and Development Forum" in Qingdao in April 2008. To further promote GAP for international cooperation and exchanges, CNCA and the World Bank Group International Finance Corporation (IFC) jointly organized the "GAP International Forum" in Beijing in July 2009. Over 200 representatives attended the forum who were mainly from the Ministry of Agriculture, Ministry of Commerce, Ministry of Health and other national agencies in China, certification agencies, research institutions, GAP certification companies, and the United States, European Union, and the Australia Embassies. Also attending were the United States FDA office in China and the U.S. Chamber of Commerce. The Forum also invited the Asia–Pacific Economic Cooperation (APEC), the GLOBALGAP, Japan Association for Good Agricultural Practices (JGAP), CHILEGAP, KENYAGAP and other relevant international organizations to participate in.

After four years of practice, understanding of CHINAGAP has gradually expanded from the farm production stage to the stages of food consumption, throughout the entire food chain. According to CHINAGAP general regulation, the CHINAGAP logo may never appear on the product, consumer packaging of the product, or at the point of sale, with the exception of tea and the handling vegetables and fruit. However the company Mengniu uses the CHINAGAP logo on the consumer packaging of fresh milk, which is now the biggest milk company in CHINA. This is against CHINAGAP general regulation, but it can improve consumer awareness of CHINAGAP. A survey in October 2009 shows that in Shanghai, if the food safety is under warranty, 54% of consumers willing to pay 10% higher price to buy crabs with CHINAGAP certification than that without certification, even if they have no awareness of the purpose of CHINAGAP. (Yabe *et al.*, 2009).

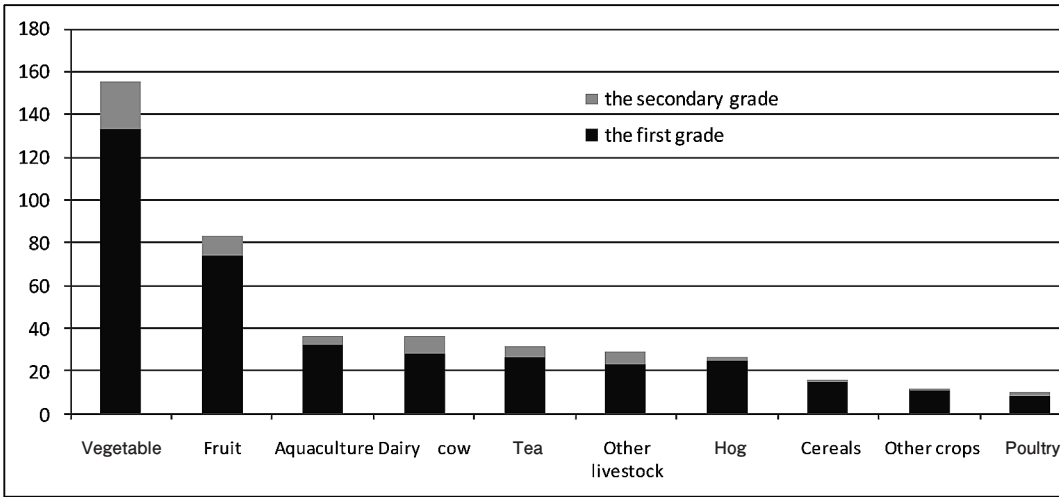

Fig. 2. Product Categories of CHINAGAP certification.
Source: CNCA web site.

EXPORT PROMOTION FUNCTION OF THE CHINAGAP

To promote China's agricultural exports, CHINAGAP put benchmarking with GLOBALGAP as an important objective from the preparatory phase. CNCA and EUREP signed the China National Certification and Accreditation Administration Committee and the EUREPGAP/FoodPLUS memorandum on technical cooperation in May 2005, and began standardized development and benchmarking cooperation. After nearly four years of hard work, CHINAGAP has completed the process of regulations, standard documents assessment, peer review evaluation, on–site witness on the mutual consistency and effectiveness with GLOBALGAP upon fruits, vegetables and combinable crops. EUREP announced the successful completion of the benchmarking of CHINAGAP against the GLOBALGAP reference code in February 2009, which means that fruit, vegetables, and combinable crops of CHINAGAP have completed the entire benchmarking procedure. This process was operated by accredited certification bodies (CBs). These standards are fully recognized as GLOBALGAP equivalent. Currently in China there are 5 accredited CBs which constitute the members of GLOBALGAP certification bodies. The CHINAGAP certification of these five CBs can be fully recognized as GLOBALGAP equivalent, and issue the certificates of CHINAGAP and GLOABLGAP together. The information of GLOBALGAP certified enterprise can be published through the web sites of GLOBALGAP to reach the world's leading retailers (Metro, Tesco, Ahold, etc.) and to gain broad international markets. This will, significantly improve the international competitiveness of China in the world market.

However, for several reasons, we need further confirmation of the relevance of CHINAGAP certification and the promotion of agricultural exports. First, as shown in Fig. 1, the top five regions of CHINAGAP certification are Zhejiang, Fujian and Shandong which are in coastal areas where agricultural exports are very strong, and Anhui and Sichuan which are major agricultural provinces, however the export of agricultural products are limited. Second, the secondary grade CHINAGAP can not be recognized by GLOBALGAP therefore they thus cannot directly promote exports. Still secondary certification also reached 54. A Third of the top 15 CHINAGAP regions, belong to China's more developed regions, CHINAGAP certification is mainly due to the demands of the consequences of food safety of high–income residents in China. In view of this, this section will prove the export promotion function of the CHINAGAP by two correlation coefficients. One is calculated with the money of agricultural products export and the number of CHINAGAP certification by region, the other is calculated with the amount of agricultural products exports and the number of CHINAGAP certifications by the section and item. The results are shown in Table 1.

From a regional perspective, CHINAGAP certification and agricultural products export show a positive relationship. The correlation coefficient of regional proportion of the total number of certifications and the agricultural products export rate for the region is 0.48, the correlation coefficient of regional proportion of the first grade certification and agricultural products export rate of the region is 0.50, both are at a 1% level of statistical tests significance. From a products perspective, CHINAGAP certification and agricultural export have a strong positive correlation. The correlation coefficient of the total number of certifications and the amount of agricultural products exported is 0.94. The correlation coefficient of

Table 1. The correlation coefficient between CHINAGAP certification and export

	regional proportion of total number of certification (%)[5]	regional proportion pf the first grade certification (%)[6]	the total number of ceritification by product	the total number of the first grade certification by product	the total number of certification by region	the number of the first grade certification by region
export rate of the region (%)[4]	0.48**	0.50**	–	–	–	–
the amount of exports (t) by product	–	–	0.94**	0.95**	–	–
GDP per capita of the rigion (yuan)	–	–	–	–	0.28	0.27

source: CNCA website,Chinese Ministry of Agriculture website, National Bureau of Statistics Website.

Note: 1, ** indicates 1% statistical test significant, -means there is no calculation of the relevant number.

2, GDP 2008 data, export 2009 data,CHINAGAP 2010 data.

3, regions include 31 provinces, antonomous regions and municipalities, products include vegetables, fruits, cereals, tea, livestock and aquatic products.

4, export rate of the region = the area ratio of exports to the country's agricultural products total exports.

5, regional proportion of total number of certification = the regional ratio of the total number of the certification to the country's total.

6, regional proportion of the first grade certification = the regional ratio of the first grade certification to the country's total.

the first grade certification and the amount of agricultural products export is 0.95. Both are at a 1% level of statistical tests significant. This can explain the purpose of actively promoting the implementation of CHINAGAP in the various regions of China is to improve the agricultural products export.

We also calculate the correlation coefficient of per capita GDP in different regions of China and the number of CHINAGAP certifications, the result is only 0.28 (the total number) and 0.27 (the number of the first grade certifications), and the statistical test is not significant. Therefore we can say at this stage CHINAGAP is mainly driven by the promotion of agricultural products exports, and China's current level of economic development is not directly related.

CASE STUDY ON THE CERTIFICATION COMPANIES IN SHANGHAI

Until July 14, 2010, companies in Shanghai have obtained 15 CHINAGAP certifications, including 11 for vegetables, and of which 14 were the first grade certifications. As CHINAGAP and GLOBALGAP are mutually recognized in the fruits, vegetables and combinable crops modules, we select four vegetables companies for the case study. Company A and B operate factory productions of mushrooms, company C produces cauliflower and asparagus, company D produces only asparagus. In addition, all the four have got green A–level certification. Company A and B also received ISO22000 certification, B also received ISO9001 and HACCP certification.

Company A and B have exports, while Company C and D do not. The export destination of company A and B include Europe, the United States, Canada, Australia, and Singapore, of which Europe has of the largest share. GAP certification for them is of considerable significance. This is especially the case company A. As exports account for 60% of its total sales, and European sales accounts for 30% of total sales, company A pays close attention to GAP certification. The purpose of GAP certification is very clear, first of all to open or expand the international market, and secondly to establish a corporate image to ensure product safety, not to satisfy the government's proposals or requests. Company A is also the first to obtain CHINAGAP and GLOBALGAP certification through the benchmarking process, its corporate information has been published on the GLOBALGAP website to the global buyers, while its export package has printed the visible GLOBALGAP logo label. Because they are certified as GLOBALGAP, Company A's exports have increased by 20%. The effect of boosting exports from GAP certification is obvious.

Compared with exports, products sold in domestic market do not increase price, sales volume, nor expand marketing area because of GAP certification. These four certified companies rarely used the GAP certification logo label in the domestic market, while company D has never used the certification logo label. This shows market awareness of CHINAGAP is still very low. The needs of business partners and consumers in GAP certification are small. The four also received green certification, but they do not use the green logo label either. In addition, except for some foreign invested supermarkets, the sales of organic vegetables and green food are uncommon in Shanghai. This is because the high price of green vegetables and organic vegetables make it difficult for regular consumers or enterprises to buy. Finally, a large proportion of high–income people do not trust organic foods or green food certification.

As company A needed the certification in a short time and obtained CHINAGAP and GLOBALGAP certification at the same time, certification costs were several times higher than the other three companies. Before the GAP certification application, these companies have received green food and ISO22000 certification. Therefore they did not need to do much more additional hardware investing for GAP certification. Still the environmental and product testing, staff training, and GAP production record–keeping will need additional funding. Particularly the annual review fee (12000RMB) was a significant burden on the business. Governmental subsidies can help absorb certified start–up costs, but that cannot be sustained. For the purpose of export promotion, and justified by increased exports returns, company A and B will renew the certification after the end of the certification period which will only be valid one year at a time.

Table 2. Basic data of CHINAGAP certification companies

Company name	date of certification	grade	products	area (ha)	sales volume (10000 RMB)	cost of certification (10000 RMB)	government subsidies (10000 RMB)	ratio of export	logo using
A	2010.3	first	king oyster mushroom	0.422	1200	10	8	40%	use
B	2009.6	first	brown and white beech mushroom	2.3	9000	2	50	20%	use
C	2009.4	first	cauliflower	200	900	2.2	10	0%	use
D	2009.1	first	asparagus	67	400	2.2	10	0%	not use

Source: author survey.
Note: 100 USD = 670 RMB, website of China Bank, http://www.boc.cn/sourcedb/whpj/, 2010.10.6

Company C and D are different. Since there is no return on sales, although the certification improves production management, the CHINAGAP certification creates negative returns but with positive externalities (Wang *et al*., 2008). After the current CHINAGAP certification period, Company D will not apply for a review. It can be seen, if there is no market mechanism to support, CHINAGAP certification is difficult to be sustainable.

CONCLUSIONS

After four years of development, until July 14, 2010, valid CHINAGAP Certificate issued has reached 410 certifications. CHINAGAP certified companies cover the country's 30 provinces, autonomous regions and municipalities (excluding only Qinhai), categories cover field crops, livestock and aquaculture. Through the correlation analysis, we found that both from the regions and from the products perspectives, CHINAGAP certification and agricultural products export have a positive relationship. Cases from Shanghai also show that CHINAGAP certification has the function of export promotion. Export–oriented agricultural production companies which have received the mutual recognition of CHINAGAP and GLOBALGAP certification are expected to be further developed in the future. However non–export companies, because of the cost of certification, may cease certification after the end of government subsidies. The result of correlation coefficients of per capita GDP and the number of CHINAGAP certifications also supports this point from the other perspective.

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