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### **Abstract**

In Taiwan, the traceability system (TS) of whole food chain is in infantile time. Yin Chuan Organic Farm, constituted by the team of rice production and marketing (TRPM), is the first brand in Taiwan rice market. The leader of TRPM is not only to produce the promising rice quality, but also to implement the (TS) that was introduced by Taiwan government with a great result and could be a successful experience passed to other proprietors. The findings of this paper are listed as following: 1. The TS executed by the case is only emphasized on the production side that needs to build more detailed marketing side. 2. The key successful factor to get sound TS model is to have obvious purposes and system harmony.

Key words: traceability system, food safety, organic food, analytic hierarchy process (AHP)

### **Introduction**

In recent years, governments and consumers of lots of countries in the world all pay very close attention to the food safety (FS) issue due to some reasonable factors. Firstly, consumers take FS as a factor in their demand functions. Secondly, because some advanced countries like England, America and Japan had happened BSE (Bovine Spongiform Encephalopathy) event, consumers of those countries are lack of having confidence in FS operation. Thus, European Union (EU) actively introduces some related measures of FS. The third, after GATT was renamed to WTO, it positively emphasizes on the issues of food sanitation, label and production origin. Finally, based on the commercialization of Genetically Modified Organisms (GMOs), some people like religion, environmental production and ecology are concerning with GMOs food so as to push some advanced countries to give more weights on the relationship between GMOs food and food safety.

In Taiwan, there are some food safety events happened within these years, e.g., school lunch food intoxication, pesticide or medicine residuals of some fresh farm products (tea, vegetables, meat) and unsuitable processed food. It is worth noting that the case of some pork food made from “illness-died swine” had already shocked to Taiwan government and its people. So far, “Black-hart food” is a popular term to name insecure food at home. COA (Council of Agriculture) of Executive Yuan was forced to implement food traceability system (FTS) in 2004 to respond food safety dilemma

After the Black-hart foods news appeared, the volume of consumption must be reduced. Impact received of producer's end would reduce the profit of specific peasant households; even the whole industry might occur into degeneracy. Producers and consumers are stand in the situation of distrust. In order to remove the doubt of consumers, producers must expend more expensive cost but the results are always ineffective. COA started to carry out the TS in 2004 and expand the scope in 2005. In behalf of to build and construct the food security chain effectively, the main objectives of this research are as follows: 1. Distinguish the value of implementing TS; 2. Understand the performance of the TS that bring into practice; 3. Understand the key factor of execute TS; 4. Offer the suggestion for follow-up development of TS.

**Table 1.** The Analytic Hierarchy Framework

Objective (Level 1)	Aspect (Level 2)	Criterion (Level 3)
Key Factors of the successful implementation of TS	Purpose	Crisis management
		Consumer confidence management
		Build brand differentiate
		Improve the production procedure
		Expand and develop the market
	Inner environment	Product itself
		Procedure elements
		Packing of product
		Applying the information technology
		Control system
	Outer environment	Number of the fund
		Supply chain
		Change of the social environment
Change of the economical environment		
Change of the domestic law environment		
System harmony	Change of the foreign law environment	
	Environment of the international standard	
	Producers harmony (farmer)	
	Processor opening	
	Transporter harmony	
	Seller harmony	
	Consumer's cognition degree	
The government supporting degree		
	Supervisor's fairness	

Resource: Fixed from Gampl (2004).

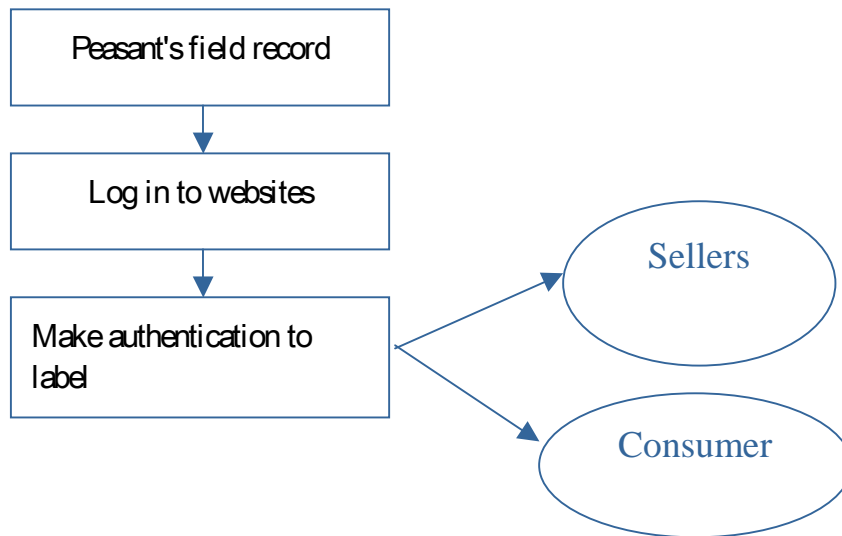
## Empirical Result and Discussion

### *Case performance*

Agriculture is in the weak tendency position after Taiwan entered the WTO. Consolidate the status of organic agricultural products in Taiwan would safeguard the farmland ecology of Taiwan and keep peasants continuing the right of organic cultivation. Transmitting life value with the connection with ecology, it is the strongest marketing way to set up a set of native country, ecology and rural culture. Yin Chuan Organic Farm with “organic law Safe agriculture is the niche for future Taiwan agriculture that could compete with the nations of low production cost. Safe agriculture can not merely improve consumer's loyalty to the domestic product, but can improve the additional value of agricultural products by a wide margin. Yin Chuan cooperate with the plan of COA, started the TS since July of 2004.

Utilizing PDA and the field server produce information in the record field in detail and the identification label of the products is stuck on selling the packaging. Note down the TS, coach to peasants and strengthen the work of field management. Keep and control the quality of the products, and strengthen the common degree of the brand.

Main participants participating in this system operation at present are farmers (producers), processors, marketing and sellers, transporter and consumers. The information that peasants offer is highest in proportion and before joining the farm system must taken the professional organic training that would helpful for the TS. Because of the lack of the information input device for marketing and selling, the TS of Yin Chung is shown as figure 1.



**Figure 1.** Traceability System Implemented by Yiu Chuan Organic Farm  
Source: Categorized by this paper

### *Key factor analysis*

This research is based on influence factor structure put forward of Gampl (2004) and through the document reviews; construct the framework after the depth interview of the expert and persons who assess. The analytic hierarchy is divided into three levels which contain 4 aspects and 24 criteria. We measure the comparative weight of pairwise comparisons by the principal eigenvector of pairwise matrix. The empirical result was extracted from two questionnaires that finished by the persons in charge of produce & manufacture and marketing & selling. The overall consistence ratio (C.R.) is .04 and match up the standard formulated by Saaty (1980). The detailed weights of each aspect and criteria and the order is shown as table 2. If we observe from the different side of produce & manufacture and marketing & selling, the most important aspect and the most 5 important criteria is shown as table 3.

**Table 2.** The Empirical Result of Key Factors

Aspect	Criteria	Local Weight	Local Order	Global Weight	Global Order
Purpose .464 C.R.:.04	Crisis management	.329	1	.153	1
	Consumer confidence management	.168	3	.078	5
	Build brand differentiate	.151	4	.070	7
	Improve the production procedure	.315	2	.146	2
	Expand and develop the market	.038	5	.017	15
Inner environment .166 C.R.:.07	Product itself	.243	2	.040	9
	Procedure elements	.078	5	.013	18
	Packing of product	.452	1	.075	6
	Applying the information technology	.086	4	.014	16
	Control system	.118	3	.020	11
Outer environment .057 C.R.:.05	Number of the fund	.023	6	.004	22
	Supply chain	.310	1	.018	13
	Change of the social environment	.314	2	.018	13
	Change of the economical environment	.180	3	.010	19
	Change of the domestic law environment	.143	4	.008	20
	Change of the foreign law environment	.025	6	.001	24
	Environment of the international standard	.028	5	.002	23
System harmony .313 C.R.:.04	Producers harmony	.365	1	.114	3
	Processor opening	.139	3	.044	8
	Transporter harmony	.046	6	.014	16
	Seller harmony	.111	4	.035	10
	Consumer's cognition degree	.251	2	.079	4
	The government supporting degree	.025	7	.008	20
	Supervisor's fairness	.062	5	.019	12

Source: calculate by this paper

**Table 3.** The Key Aspect and Criteria of Different Dimensions

Dimension	Aspect / Criteria (Global Weight)
produce & manufacture C.R.;G	System harmony .532
	Producers harmony .170;]
	Improve the production procedure .163;]
	Processor opening .134;]
	Consumer's cognition degree .078;]
	Consumer confidence management .077;]
marketing & selling C.R.;G	Purpose .530
	Crisis management .245;]
	Build brand differentiate .143;]
	Packing of product .126;]
	Improve the production procedure .079;]
	Consumer's cognition degree .060;]

Source: calculate by this paper

Originally discover arrange in an order of the first two are purpose (.464) and system harmony (.313), which mean that the person who execute the TS think must especially pay attention to the reason why adopt the TS and relevant system cooperate. Because of the case has worked a lot of the inner environment criteria before they execute he TS, so the weight is only .166. Yet, the out environment aspect just got .057 point that make the criteria belong it become meaningless. The reason that could explain the result is the power of consumer is not burst out and the government doesn't

From the data of table 3, system harmony would be the most important aspect for produce & manufacture because they will contribute to the improvement of the raw materials quality of the products and diversified manufactures of the products. Such would let the resources used in maximize. If observe in terms of marketing & selling, the purpose aspect could be the most significant and the reason is that the daily task of them are utilizing the characteristic of the products to set up the value of brands and accurate monitor system operation, in order to prevent the emergence of the crisis.

## Conclusion

According to the interview content from the proprietor, it would be suffered the impact of operating cost and operation procedure in the period of adopting TS. Nevertheless, from the point of view of long-term benefit, not only improve consumers' consumption confidence but let the producer and peasant participating in obtain the increasing income by management of the brand. To the implementer of operation of the TS, it would help to set up its standardized operation procedure, and then introduce the concept of the total quality control meanwhile reduce and cause the probability taking place in food security crisis because quality can not be controlled well.

The proprietor sees the key factor result of operation which implements the TS could substantiating the criterion intension of implementing the purpose as guiding hair food production and man's motive of introducing TS. And pass the cooperation of every stage participant in the system should improve the information integrality and efficiency of the tracing system. It should plan an unite institution charge the duties of food safety while promoting the TS in the future so that would efficiently examine and offer relevant information clearly under the care of enterprise's institute to guarantee consumers' security and the rights and interests.

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