



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
<http://ageconsearch.umn.edu>
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

China Pear Value Chain: Implication for Smallholders

Zuhui HUANG

Professor and Director of China Academy for Rural Development (CARD), Zhejiang University, China

Email: zhhuang@zju.edu.cn

Tel (Fax): +86 571 86971646

Jing ZHANG

PhD candidate, China Academy for Rural Development (CARD), Zhejiang University, China

Email: zhangjing330@gmail.com

Tel (Fax): +86 571 86971646

Kevin CHEN

**China Program Leader and Senior Research Fellow
International Food Policy Research Institute, Beijing Office**

Email: K.chen@cgiar.org

Fax: + 86 10 62158579

Contributed Paper prepared for presentation at the International Association of Agricultural Economists Conference, Beijing, China, August 16-22, 2009

Copyright 2009 by [Zuhui HUANG et al] All rights reserved. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided that this copyright notice appears on all such copies.

China Pear Value Chain: Implication for Smallholders

Zuhui HUANG

Jing ZHANG

Kevin Z. CHEN

Abstract: Abstract: The objective of this paper is to describe different types of value chain, to capture value added activities of each chain, to discuss the organizational and institutional link in each value chain and its implications for the role of small farmers. We focus on two counties in Hebei and Zhejiang of China. Taking pear for example, analysis of value chain is conducted using data of representative samples of pear value chain. For each chain, value added activities, cost composition, profit distribution, organizational and institutional linkages are illustrated, and corresponding conclusions are indicated. After a systematic analysis of organizational and institutional linkage and value adding activities of every chain as well as cost-benefit analysis of smallholders, we found that: value-added of each value chain are different, smallholders hardly benefit from value chains of Hebei case. Farmer cooperatives are helpful for smallholders in terms of costs reducing and value adding. Influence of modern retailers such as supermarket in term of tradition fruit growers is limited in our cases. Downstream stage took most profit of value adding. Comprehensive supermarket is less competitive than professional fruit supermarket and even small fruit store in terms of procurement costs and operating costs. Taking household labor cost into account, net profit and labor compensation of large scale household are higher than that of middle or small scale farmers.

Key words: Value Chain, Smallholder, Pear

1. Introduction

1.1 Background

Pear is one of the largest fruit in China in term of yield and production area. It is also one of the most widely produced fruit in China which can be grown almost all over the country. China is the largest pear producer in the world with 12.6 million tons, and is challenging Argentina as the world's largest exporter. Although both the production and exports are raising fast in recent years, exports are only about 3 percent of production. Pear is still a typical traditional fruit in terms of production style for it is produced by smallholders rather than modern large scale organizations. It's important to understand that what challenges for small-scale producers' inclusion in markets in such a transition economy.

Most academic studies on pears paid attention to technique issues of pear production and few studies were undertaken for marketing such as an Italian report on production costs of fragrant pear in Xinjiang province (M.Sergio etc., 2005). No systematic study was undertaken yet for value chain study on pears. Although several studies were undertaken in relevant area in terms of linking small-scale producers to market, most of them only focus on one step of the chain. Research interests were focused on farmer cooperatives and the modern retail system. Scholars paid attention to modern retail system augured that modern retail system such as supermarket changed the plant structure as well as improved farmer's income through high value supply chain (Hu, 2006). However, other evidences rejected such points (Dong, 2006; Huang 2007). As far as farmer cooperatives are concerned, the same story happened.

It seems hard to tell whether smallholders benefit from restructuring market or not. Can we arrival at some conclusions through an anatomical way of case study?

1.2 Objective and Methodology

The objective of this paper is to describe different types of value chain, to capture value added activities of each chain, to discuss the organizational and institutional link in each value chain and

its implications for the role of small farmers. We focus on two counties in Hebei and Zhejiang of China.

Hebei is the largest province in terms of pear supply both for the international and domestic market as well as a traditional production zone of pears with a long history. Xinji is a traditional pear planting county (county level city) of Shijiazhuang city, the largest pear output area in Hebei province, with a history more than 1000 years. The total pear planting area of Xinji is 16,000 ha, and the main pear varieties are Huangguan pear and Ya pear. More than 20,000 tons of pears export to South Korea, Japan, Southeast Asia countries, EU countries, the States and so on by eight export companies in Xinji. There are 55 collection centers in our investigation villages through which over 90 percent pears were sold to both local and distant wholesalers.

Zhejiang province is chosen as a frame of reference not only for the reason that it is an example of higher level consuming zone, but also a province with developed farmer cooperatives. Tonglu is a county of Hangzhou city with annual pear production of 13,544 tons which ranked number 3 in Zhejiang province.

Value is not a new concept, but it is vital important to a supply chain, to every participants. Value chain analysis plays a key role in understanding the need and scope for systemic competitiveness. Taking producing and marketing activities of Ya pear in Xinji and Cuiguan pear in Tonglu for example, participants, value flow, value adding, costs and benefits are analyzed for each value chain. Except statistical ones, data used in this paper came from representative surveys conducted in 2007.

Characteristics of sample are as following:

Table 1: Characteristics of Sample

<i>Chain Link</i>	<i>Number</i>	<i>Chain Link</i>	<i>Number</i>
Producer	60	Exporter	3
Intermediary	8	Processor	2
Collection center	3	Retailer	10
Broker that takes property	4	Small fruit shop	6
Farmer cooperatives	1	Professional fruit supermarket	2
Wholesaler	8	Comprehensive supermarket	2
Local wholesaler(inside county)	4		
Distant wholesaler(outside county)	4		

2 Pear Value Chain Mapping

In order to get a general idea of pear industrial, we start with pear value chain mapping. In this paper, distant wholesaler are those who come from places other than sample counties while local wholesalers are those inside.

Table 2: Farmers and Value Chains in Hebei Province

NO.	Value Chain				Percent
1	Farmer—Collection Market	Center—Distant	Wholesaler—Distant	Retail	70.22
2	Farmer—Collection (Exporter/Supermarket)	Center—Local	Wholesaler—Small	Retailer	20.75
3	Farmer—Local Wholesaler—Processor				9.03

Source: project survey in 2007

As showing in Table 2, majority pears are sold to provinces all over the country, and the most common channel is Farmer-Collection Center-Distant Wholesaler-Distant Retail Market, which accounts for more than 70 percent of total pears output in our investigate county in Hebei. Ninety percent pears are sold through collection center, which plays a vital important role in pear market. Juice processors and pear concentrate processors are helpful for farmers to increase their income in terms of off-grade pear procurement.

However, pear value chains in Zhejiang province are totally different. Collection center, the most important intermediary in Hebei province, is replaced by farmer cooperatives which was developed in recent years and dominant in our investigate county. The channel of Farmer-Farmer cooperatives-Wholesaler/Group buyer/fruit supermarket became the most important one along with the development of pear farmer cooperatives. However, pears were mostly sold inside Hangzhou so far, few of them were sold by distant wholesalers to Wenzhou and even handful pears were sold to southern provinces such as Shanghai, Fujian and Guangdong. Group buyers, mainly private enterprises, were important clients for both farmer cooperatives and individual farmers.

Table3: Farmers and Value Chains in Zhejiang Province

No.	Value Chain		Percent
1	Farmer—Farmer Cooperatives—Downstream Clients		38.25
2	Farmer—Distant Wholesalers—Traditional Retailer		32.45
3	Farmer—Group Buyer		18.74
4	Farmer—Small Broker		10.56

Source: project survey in 2007.

Generally, pear supply chains in Zhejiang Province are shorter than that of Hebei province for of technological and institutional reasons. The majority pear variety of Zhejiang province called Cuiguan is a kind of early pears with inferior storage stability, and the total output of pears in Zhejiang is sharply less than that of Hebei, consequently, the distance between the pear orchard and terminal market is shorter in Zhejiang. Detailed description of each supply chain actor's role and function will be followed in the section of organizational and institutional linkages.

3 Organizational, Institutional Linkage and Value-added Analysis

3.1 Pear Value Chain of Hebei: A Small Broker Dominated Market

3.1.1 Organizational and Institutional Linkage

Collection center are linkages of small households to wholesalers in chains of primary importance as shown in Table2 and two tables followed. The so-called collection center is a place operated by villagers as a kind of intermediary between farmers and wholesalers. It's also a center of information and packing. Owners of collection center are "able person" who might be owners of cold storage at the same time or former transporters and wholesalers of pears, or village leaders.

Collection centers provide living place and meals to distant wholesalers who come from all over the country and purchase pears during the harvest season. Each collection center has their fixed relationship with wholesalers in and out their county.

The primary function of collection center is to gather pears from thousands of growers for wholesalers. Limited harvest of individual household is not too attractive to a large wholesaler, which will result in larger transaction cost.

Owners of collection centers call for commission charges according to pear amount of transaction, without reference to pear price and variety. In our investigated village, the commission charge is 0.06 Yuan per kilogram in 2007 which is lower than five years ago when there were less collection centers. Fierce competition between collection centers urges them to provide better services to maintain relationship with wholesalers.

Farmers select collection centers mainly depend on prices wholesalers provided since they are

mostly paid with cash and seldom with debt as five years ago.

2.1.2 Value Chains of Fresh Pear

There are two main chains for fresh sold pear in Hebei, namely, from farmer to collection center to distant wholesaler to distant retail market and from farmer to collection center to local wholesaler to small retailer (or exporter, or supermarket). Table 4 and Table 5 are cost-benefit analysis and value added data.

From Table 4:

Table 4 Value-adding: Farmer—Collection Center—Distant Wholesaler
—Distant retail market (Yuan/KG)

No.	Value-adding structure	Farmer	Collection Center	Distant Wholesaler	Distant retail Market	
					Fruit Store	Supermarket
a	Purchase Price	0.97	0	1.37	1.8	2.0
b	Sales Price	1.37	0.06	1.8 (2.0)	2.85	3.2
c	Value adding	0.4	0.06	0.43 (0.63)	1.05	1.2
d	Cost adding	0	0.01	0.37	0.78	0.85
e	Profit	0.4	0.05	0.11	0.47	0.35
f	Value adding ratio(%)	20.62	3.09	22.17	54.12	—
		17.47	2.62	27.51	—	52.4

Note: $c=b-a$, $e=c-d$, $f=c/\sum c$

- (1) Retail is the highest value adding stage while wholesale is the next and produce is the last. Value adding ratio of produce stage is about 20% and that of wholesale and retail is around 25% and more than 50% respectively.
- (2) As cost is concerned, circulation cost of pear is higher than production cost. Cost of wholesale stage and retail stage is around 1.16-1.23 Yuan per kilogram. As a contrast, production cost per kilogram is only 0.97 Yuan. Most pears are sold through traditional small scale fruit store which located all over the city. The reason, pear price in fruit store is the same as or even cheaper than supermarket, is that pears in both fruit store and supermarket are coming from wholesale market while operating costs of supermarket is obviously higher than that of small fruit store.
- (3) For profit distribution, retail is the most profitable stage and wholesale is the second best one. It seems farmer also benefit from value added at the rate of 47%, however, return of household

labor costs are not included in the production cost list here. Considering extensive work growers paid, some smallholders are in the red, or at least less profitable than non-farm work. We will discuss smallholders' cost and benefit in detail at the forth part in this paper.

Table 5 Value-adding: Farmer—Collection Center—Local Wholesaler—Small Fruit Store (Exporter/Supermarket) (Yuan/KG)

No	Value-adding structure	Farm er	Collec tion center	Local wholesaler	Retail/Export		
					Small Fruit Store (60%)	Supermark et (20%)	Export (20%)
a	Purchase Price	0.79	0	1.35	1.85	1.8	2.5
b	Sales Price	1.35	0.06	1.85 (1.8、2.5)	2.75	3.0	6.0
c	Value adding	0.56	0.06	0.5 (0.45、1.15)	0.9	1.2	3.5
d	Cost adding	0	0.01	0.2	0.62	1.03	2.04
e	Profit	0.56	0.05	0.24	0.28	0.17	1.46
f	Value adding ratio(%)	27.72	2.97	24.75	44.55	—	—
		24.67	2.64	19.82	—	52.86	—
		10.63	1.14	21.82	—	—	66.41

From Table 5

- (1) Value adding ratio of retail stage in domestic market through local retailer is highest, however, the ratio of wholesale stage is lower than produce stage. Fierce competition between numerous local wholesalers results in narrow profit.
- (2) Beyond our expectation, supermarkets didn't pay higher, however quality requirements of them are stricter than other retailers. Due to advantage of purchase quantity, supermarkets are still important to local wholesalers.
- (3) For cost composition, export is most costly stage, including various costs such as packing, cold storage, transportation, labor cost, and customs taxes and charges. However, export is still the most profitable way. Most of smallholders are hardly get the incremental value from the traditional channel to exportation. On the contrary, they are influenced by the price fluctuation of exportation. Only few growers who are shareholders of registration pear orchards can benefit from price increase of pear exportation. Local wholesalers who sell their pears to exporters can make stable profits while the latter get rich with taking huge risk of international trade. One of exporters we interviewed gained 7 million RMB in 2006 but lost 8 million in the next year.

2.1.3 Value Chains of Pears for Processing

Processors might be less important in terms of purchase volume but they do help smallholders to increase income as dealing with off-grade pears. It was difficult for farmers to sell their off-grade pears five years ago as there was not any pear processor nearby. Total income might increase as they sell their off-grade pears at the price of 0.2 Yuan per kilogram even if it is less than average production cost. On the other hand, processors can make great profit for higher added value. It seems a double-win for farmers and processors. However, it cannot be a fundamental solution for smallholder in long term unless the purchase price of off-grade pears increases or transaction cost resulting from intermediary decreases. Given same situation as present, farmers should try to increase proportion of high quality products by technological progress.

Table 6 Value-adding: Farmer—Local Wholesaler—Processor (Yuan/KG)

<i>No.</i>	<i>Value-adding structure</i>	<i>Farmer</i>	<i>Local wholesaler</i>	<i>Processor</i>
a	Purchase Price	0	0.2	0.5
b	Sales Price	0.2	0.5	4
c	Value adding	0.2	0.3	3.5
d	Cost adding	0	0.2	2.5
e	Profit	0.2	0.1	1.0
f	Value adding ratio(%)	5	7.5	87.5

3.2 Pear Value Chain of Zhejiang: A Joint Controlled Market

3.2.1 Organizational and Institutional Linkage

Different from market structure in Hebei which dominated by collection center and wholesaler, the number of participants in pear industry of Zhejiang are more than that of Hebei. Beside traditional wholesaler, farmer cooperatives, group buyer and professional fruit supermarket are active in Zhejiang pear industry.

Zhongshan Honey-pear Farmer Cooperatives founded in the year of 2002 with a registered capital of 390,000 Yuan. There are 104 shareholders at present with a minimum share capital of 10,000 Yuan for each member. Permanent assets of farmer cooperatives are 3.87 million, including office places, trading floor, automatic grading machine and refrigeration storage. Main pear varieties are

Cuiguan, Qingxiang, Xinshiji, and Huanghua. Pears are authorized as national level of pollution free product and some of which are A-grade green food. Sales volume of farmer cooperatives in 2006 was 2 million tons.

In order to control pear quality, farmer cooperatives provide fertilizer, pesticide and covering bag at wholesale prices which are 10 percent low than market price and organize technology training course. Farmer cooperatives start to sign a written contract with shareholders from 2007. Shareholders can sell their pears to farmer cooperatives at a higher price than non-shareholders. The price difference of the same grade is 0.1 Yuan per kilogram. Shareholders can also receive a profit of secondary allocation from the earnings of farmer cooperatives at the end of each year. The total number of that in 2006 was 588,000 Yuan.

Group buyers, mainly are private companies, schools, hotels and local governments, bought pears for conference or bonus use. Professional fruit supermarket came out in developed area as Hangzhou in recently years and developed rapidly. Qunfeng Orchard Fruit Company is one of the largest professional fruit supermarkets in Hangzhou. There are 7 branch stores in the city of Hangzhou and 2 stores in Wenzhou. Business area of each store is around 300 square meters and sales income of each store is about 10,000 Yuan.

3.2.2 Value-added of Farmer Cooperatives in Zhejiang

From the case of Tonglu, the most important chain is from farmer to farmer cooperatives to downstream clients. Value adding structure is listed in Table 7.

Table 7 Value adding: Farmer-Farmer cooperatives-downstream clients (Yuan/kg)

NO.	Value-adding structure	Farmer	Farmer cooperatives	Distant Wholesaler (30%)	Retail	
					Small fruit store (70%)	Supermarket (30%)
	Purchase Price					
a	Sales Price	1.01	1.81	2.43	3.5	3.5
b	Value adding	1.81	2.43	3.5	5.96	6.16
c	Cost adding	0.8	0.62	1.07	2.46	2.66
d	Profit	0	0.33	0.62	1.88	2.33
e	Value adding ratio(%)	0.8	0.29	0.45	0.58	0.33
f	Value-adding structure	15.97	12.38	22.55	49.1	—
		15.35	11.9	21.69	—	51.06
NO.	Value-adding structure	Farmer	Farmer cooperatives	Professional fruit supermarket (10%)		
a	Purchase Price	1.01	2.23	3.2		
b	Sales Price	2.23	3.2	5.0		
c	Value adding	1.22	0.97	1.8		
d	Cost adding	0	0.59	1.25		
e	Profit	1.22	0.38	0.55		
f	Value adding ratio(%)	30.58	24.31	45.11		
NO.	Value-adding structure	Farmer	Farmer cooperatives	Group Buyer (60%)		
a	Purchase Price	1.01	3.14	4.8		
b	Sales Price	3.14	4.8	—		
c	Value adding	2.13	1.66	—		
d	Cost adding	0	1.1	—		
e	Profit	2.13	0.56	—		
f	Value adding ratio(%)	56.2	43.8	—		

Table 7 indicated that:

- (1) The function of collection center and local wholesalers are replaced by farmer cooperatives, however, the relationship between farms and farmer cooperatives is no longer a simple relationship of buying and selling. Institutional arrangement of farmer cooperatives can save transaction cost in some degree at least for the part of commission of collection center in Hebei.
- (2) Farmers who sell their pears to farmer cooperatives can gain a gross profit of 1.1 Yuan per kilogram, which is 2 times higher than that of farmers in Hebei province who sell their pears to local wholesaler through collection center. Although price difference is partly because of pear

variety, the contribution of farmer cooperatives can't be ignored. Farmer cooperatives made afford to promote products by registering trademark, organizing countryside tourist, establishing a webpage on internet, and improving production infrastructure such as paved road, irrigation and cold storage. In 2006, 100 tons of Huanghua pears were sold during spring festival after refrigeration with a price two times higher than that in harvest season.

- (3) Thanks to a highly developed economy of private enterprise, group buyers are powerful client of cooperatives. Farmer cooperatives largely increase pears value by grading and packing into small gift package and sell them to group buyers.
- (4) Price of pears sold to supermarket is lower than that of group buyers even lower than that of traditional wholesalers. Farmer cooperatives hesitate to contact with supermarkets for the reason that they are asked for a small amount by daily delivery to supermarket and carrying the loss.

3.2.3 Value Chain of Group Buyer

Farmers with strong social ability or have networks with private enterprises also sell their production to group buyers by themselves. The selling price is lower than the selling price of cooperatives but higher than the price if they sell their pears to cooperatives. Farmers are allowed to purchase packed pears from farmer cooperatives with a value-add price for packing materials and brands and resell products at higher price.

Table 8 Value adding: Farmer-Group Buyer (Yuan/KG)

<i>NO.</i>	<i>Value-adding structure</i>	<i>Farmer</i>	<i>Group Buyer</i>
a	Purchase Price	1.1	3.76
b	Sales Price	3.76	0
c	Value adding	2.66	0
d	Cost adding	0	3.76
e	Profit	2.66	0
f	Value adding ratio(%)	100	0

3.2.4 Traditional Value Chains in Zhejiang

With the development of production scale in Zhongshan town and improvement of traffic condition, distant wholesalers come to the village to purchase pears here. Pears sold to distant wholesalers are unpacked pears with inferior quality and the selling prices are also lower than that of farmer

cooperatives. The quantity of sales of farmer cooperatives is limited therefore distant wholesalers are important buyer to smallholders. Similar with traditional value chain in Hebei, values are added in transportation and profits of intermediate carriers as showing in Table 9 and Table 10.

Table 9 Value adding: Farmer—Small Retailer—consumer (Yuan/KG)

<i>NO.</i>	<i>Value-adding structure</i>	<i>Farmer</i>	<i>Small Broker</i>
a	Purchase Price	1.02	1.11
b	Sales Price	1.11	2.5
c	Value adding	0.09	1.39
d	Cost adding	0	1.11
e	Profit	0.09	0.28
f	Value adding ratio(%)	6	94

Table 10 Value adding: Farmer-Distant Wholesaler-Distant Retail Market (Yuan/KG)

<i>No.</i>	<i>Value-adding structure</i>	<i>Farmer</i>	<i>Distant Wholesaler</i>	<i>Small Fruit Store</i>
a	Purchase Price	1.05	1.38	2.5
b	Sales Price	1.38	2.5	3.3
c	Value adding	0.33	1.12	0.8
d	Cost adding	0	0.57	0.42
e	Profit	0.33	0.55	0.38
f	Value adding ratio(%)	33.55	40.89	25.56

4. Cost-Benefit Analysis of Smallholders

4.1 Production Cost of Smallholders

Average selling price of each channel is different from others. However, individual smallholders are powerless for market prices. Regardless of market prices, we take a look at production cost of smallholders from view of scale economy. Although all households interview can be defined as smallholders because the largest one is less than two hectares, we can divide smallholders into 3 groups with 10 householders in each group sorted by area of pear orchard. As summarized in Table 11, we found that:

- (1) The scale of pear orchard in Zhejiang is larger than that of Hebei in each group. The average production scales of each group in Hebei province are only 1/3 to 45% of Zhejiang.
- (2) The degree of specialization for pear production is calculated by the number of pear production area over the number of total agricultural land for each household. Specialization degree of Hebei growers are under 50% which that of Zhejiang growers are higher than 85%. Owing to a

long history of pear production, most pear growers in Hebei province produced their pears in own land while growers in Zhejiang did that in leased land from a rental market.

- (3) Without respect to first cost of establishment of pear orchard, annual costs of pear production can be included as following: annual rent of land, fertilizers, pesticides, herbicides, packing materials, hired labor costs, maintenance of machines and other costs such as electricity, pollen etc. Same story happened in two provinces that production costs increased first and then decrease with increase of scale. Unless reaching scale effect, small scale is more effective than medium-scale.
- (4) Average annual production costs in Hebei province are 1.6 times higher than that of Zhejiang province. For lower and medium group, except for land rent and package materials, other production costs of Hebei growers are higher than that of Zhejiang growers. And for upper group, cost of hired labor is the only cheaper cost for Hebei growers.

Table 11: Production Cost of Smallholders in Hebei and Zhejiang Province

<i>Items</i>	<i>Lower 1/3</i>		<i>Medium 1/3</i>		<i>Upper 1/3</i>	
	HB	ZJ	HB	ZJ	HB	ZJ
Area	2.6	7.22	4.83	10.8	8.25	24.4
Specialization	30.66	91.86	36.45	85.58	47.14	97.13
Production cost	2002.8	1076.1	2122.46	1510.24	1487.79	984.48
Rent of land	0	42.42	0	90.66	275.55	89.56
Fertilizer	798.8	343.62	782.5	495.84	499.65	348.56
Pesticides	309.02	99.08	240.22	163.88	100.08	70.5
Herbicides	21.48	14.7	19.22	6.7	17.9	4.24
Package	490	515.42	477.8	562.4	322.6	309.26
Labor cost	265.84	60.86	380.4	175.26	131.75	161.96
Maintenance	23	0	52.65	15.5	21.93	0.4
Electricity et al.	94.66	0	169.67	0	118.33	0

Source: project survey in 2007. **Notes:** HB=Hebei, ZJ=Zhejiang, DR=Differential Rate **Unit:** Yuan/Mu, %.

- (5) As regards of composition of production costs, costly parts for Hebei growers in lower group are fertilizers and pesticides, that for medium group are fertilizers and hired labor costs, and for upper group are fertilizers and rent of land. Fertilizers are costly expenses for Hebei growers in each group for the reason that smallholders in Hebei mainly rely on chemical fertilizers which more expensive than organic ones and decrease of effect of chemical fertilizers results in an increasing amount of chemical fertilizers year by year. There are only 40% of smallholders in Hebei used organic fertilizers in limited amount at the year of 2007 while the number in Zhejiang are 90%. Consequently, there is not any pear orchard or pear production was

authorized as pollution free or higher degree up to the end of 2007 in our survey while 53 percent of pear growers in Zhejiang got pollution free identification and one thirds growers got green food identification.

- (6) Fertilizers, pesticides, packing materials and labor cost are top 4 costs for each group. Smallholders in Zhejiang province are benefit from the lower price of production materials providing by farmer cooperatives at wholesale prices, conversely, growers in Hebei province have to purchase them from private store at retail prices.

4.2 Benefit Analysis of Smallholders

As summarized in Table 12, we take out production costs along with transportation costs and costs for communication from sales income. The net profits are decreasing as scale added, which is constant with the rule of decreasing returns to scale. However total net profits are undoubtedly increasing.

Last but not least, more household labor were cost for extremely small-scale households, nevertheless, payments of household labor are lower than that of larger scale ones. For that reason, we found both in Hebei and Zhejiang province that growers of extremely small scale are turning to do non-farm work rather than paying more attention to orchard management.

Table12: Benefit Analysis of Smallholders in Hebei and Zhejiang Province

<i>Items</i>	<i>Lower 1/3</i>		<i>Medium 1/3</i>		<i>Upper 1/3</i>	
	HB	ZJ	HB	ZJ	HB	ZJ
Sales income	4221.17	2701.37	4101.35	3488.29	3006.2	2878.62
-Production costs	2002.8	1076.1	2122.46	1510.24	1487.79	984.48
-Transportation	80	111.76	79.62	61.14	48.09	40.44
-Communication	8.33	10.23	20.24	11.86	7.97	2.65
=Net profits	2130.04	2503.28	1879.03	1905.35	1462.35	1851.05
Household labor	126.16	264.76	125.83	79.85	40.9	15.77
Payment of household labor	16.88	9.45	14.93	23.86	35.75	117.38

Source: project survey in 2007. Notes: HB=Hebei, ZJ=Zhejiang, Unit: Yuan/Mu, Person. Day/Mu*

5. Conclusion and Policy Implication

- (1) Value-added of each value chain are different. Smallholders hardly benefit from value chains of Hebei case as degree of value-added in the middle and end parts are much higher than early stages. Value chains are shorter than that of Hebei and value-added of first stage in Zhejiang are higher

than that of Hebei so that smallholders can benefit a lot.

(2) Farmer cooperatives are helpful for smallholders in terms of costs reducing and value adding.

Influence of modern retailers such as supermarket in term of tradition fruit growers is limited in our cases. However, to improve pear quality is the demand of consumers.

(3) Downstream stage took most profit of value adding. In both case areas, retail stages are costly as well as profitable ones. Comprehensive supermarket is less competitive than professional fruit supermarket and even small fruit store in terms of procurement costs and operating costs.

(4) Taking household labor cost into account, net profit and labor compensation of large scale household are higher than that of middle or small scale farmers. Accordingly, specialized production with large scale should be encouraged if complementary conditions such as land policy and transfer of the surplus labor force are allowed. Otherwise, given the limitation of extremely small scale, it is urgent to organize farmers by cooperatives.

References:

- Ronnie S. Natawidjaja, Thomas Reardon (2007), The Tomato Value Chain from West Java Farms to Jakarta Retail, Regov Working Papers
- M. Sergio, H. Hulyeti, C. Maurizio (2005), Production costs of pears and apples in Xinjiang (China), DEIAgra Working Papers
- C. Pirazzoli, M. Canavari, H. Hulyeti (2000), An Economic Analysis of the Agricultural Side of Pear Supply-chain in Southern Europe and China, ISHS Acta Horticulturae 596
- Dinghuan Hu et al. (2004), The Emergence of Supermarkets with Chinese Characteristics: Challenges and Opportunities for China's Agricultural Development, Development Policy Review, Vol. 22 (9), 557-586.
- Xiaoxia Dong et al. (2006), The Development of Supermarket in Beijing and Characteristics of Producing and Marketing of Fruits and Vegetables of Farmers Nearby, China Rural Economy
- Jikun Huang et al. (2007), Influencing Factors for Restructuring of Vegetable Production, Agricultural Economics Issues
- David H Taylor (2005), Value chain analysis: an approach to supply chain improvement in agri-food chain, International Journal of Physical Distribution & Logistics Management; 35, 9/10; ABI/INFORM Global, pg. 744,