

# DEVELOPMENT OF WATER FACILITIES, FARM LAND AND LAND USE CHANGE IN SANJIANG PLAIN

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## 1. RESEARCH ACTIVITIES OF 2006

### 1) Schedule of field research

#### August 30 – September 6

Jilin University and North Eastern Asian research center: We gathered of socio-economic information of north western area, especially about agriculture developmental history of San Jiang Plain. We also discussed with Professor Yi Bao Zhong regarding relationship between the location of Manchuria exploitation team and current state farms.

#### September 7 – October 11

The General Bureau Bao Quan Ling Division of State Farm of Heilongjiang province, Xin-Hua Farm , Production Group 17: Preliminary preparation for the questionnaires research of 64 farms and information- recording research of 12 farms (time period: March 1, 2007 – February 28, 2008)

### 2) Details of research activities

#### (1) Targeted farm

The initial plan of the research area was Farm 291 of Hong Xing Long Division. However, due to internal problem of that farm, the research area was changed to be Bao Quan Ling Division Xin-Hua Farm. We focused our research to Xin-Hua Farm, Production Group 17. Farm area of this group is 552.6ha (100% rice paddy). In terms of the number of farms to be researched, questionnaire research has changed from 100 to 64 farms; and information-recording research has decreased from 30 to 12 farms.

#### (2) Brief overview of research area

Historically, the development of rice paddy up to 1968 was continuation of rice paddy introduced by ‘Japan Man Meng Exploitation Team’. Then, the area was converted to dry field until 1992 due to the lack of knowledge in cultivating rice paddy under Great Proletarian Cultural Revolution. Since 1994, the area become rapidly back to rice paddy.

Xin-Hua Farm, Production Group 17 consisted from 64 farms, and an average area of one household was 8.6 ha in 2006. Total income per farm from the rice paddy was 142, 489 Yuan (about 2,020,000 Yen), and income per farm from growing rice paddy was 66,114 Yuan (about 940,000 Yen).

### (3) Outline of questionnaire survey

Purpose of questionnaire survey is to understand the situation and problems of individual operation of rice paddy farm. All of 64 farm household of Xin-Hua Farm, Production Group 17 (farms) was surveyed (Table 1)

Followings are content of questionnaire survey.

1. Family structure
2. Issues concerning contract farming at state farm; career before operating the farm, distribution of land and machinery from state farm after contract, changes of area of farming after contract, location map of current farm land, pump drainage channel (handwritten)
3. Current state of farm operation; production and sales of major agricultural produce, machineries and facilities, revenue and expenditure, future plan.

*Table 1 Number of farmers in Production Group 17*

No. of farmers	Area of land	Age	Family size	No. of farmers	Area of land	Age	Family size	No. of farmers	Area of land	Age	Family size
1	10.45	40	4	23	6	28	3	45	18.3	32	5
2	9.1	45	4	24	11.6	50	4	46	7	52	4
3	4.95	30	5	25	5.4	30	4	47	7.95	32	4
4	10	42	3	26	3.8	45	3	48	7.9	56	5
5	5.5	45	3	27	3	35	3	49	13.65	46	5
6	5	44	3	28	5.5	51	2	50	10.8	37	5
7	7	52	5	29	4.1	33	3	51	3	41	4
8	3.85	46	3	30	10.1	42	5	52	4.7	37	3
9	7.15	46	5	31	8.25	48	5	53	4.7	42	3
10	9.1	47	3	32	9	38	3	54	4.7	37	3
11	9.05	37	3	33	9	26	3	55	12.1	41	3
12	8.5	48	4	34	8.95	38	2	56	5.6	41	3
13	11.7	37	6	35	13.85	24	4	57	5.8	42	3
14	6.4	51	3	36	9.2	31	3	58-1	10	33	3
15	6.95	35	3	37	8.5	47	4	58-2	7.4	29	3
16	5	40	3	38	15	33	3	59	8	29	3
17	9.9	26	3	39	14.3	41	4	60	9.7	39	3
18	13	53	6	40	16.55	35	3	61	10.9	43	4
19	4	35	3	41	17.4	41	3	62	8	41	3
20	7	45	3	42	9	26	5	63	9.5	50	3
21	12	40	3	43	6.4	57	5	64	6.55	51	5
22	5.25	56	3	44	10.6	50	4	subtotal	176.25	52	3
subtotal	170.85			subtotal	205.5			total	552.6		

Source: Submitted by Production Group 17.

NB: 58-1/2 are brothers, and so were counted as a single farm, though have since begun working independently.

### (4) Outline of record keeping research

Purpose of research; check the stability of rice paddy management and water usage.

Content of research; Ask 12 farmers to keep record their farming operations. Farmers were selected to cover various scale of management.

Research period; from March 1, 2007 to February 28, 2008

## 2. TENTATIVE RESULT OF QUESTIONNAIRE SURVEY

The questionnaires were still under analysis, but Tables 2 – 5 gave typical three example of household. Followings are brief overview of these farms.

### (1) Production of rice paddy, changes of technologies (Table 2)

In terms of work force, there is not so much difference among sample families. No.1 and No.2 are managed by two relatively young people, 32 and 31 years old, and 26 and 24 years old respectively, and No.3 is managed by a couple (44 and 41 years old) and their eldest son (19 years old). In terms of employment, No.1 has two employees for year-round and one seasonal employee; No. 2 has one employee, while No. 3 has no employee. This result showed that large scale farmers fulfill deficit of labor force by employees.

For raising seedlings, all the farmers owned greenhouse and managed individually. The seeds are provided by Seed Company every year. Seedlings are grown on mat, so it requires large amount of work force for seeding. Large and medium farmers employed worker for these operations.

No.1 and No. 2 carried out plowing and rotary operation by their own plowing machinery and tractor. As No. 3 does not own these machineries, ask contractor to do these operation. Water pumping for irrigation was done from April 10.

Rice planting is carried out by planting machinery, which was introduced in 1990s (No.1 has two and No.2 has one). Generally, the planting team is consists of one operator, four auxiliary worker, and two supplemental planters with a total of 7 people.

In terms of pest control, aerial spraying was tested in 1988 and has been applied since 1996 (rice blast fluid pesticide and fluid fertilizer). Usually, two times of aerial spraying in a year, at the end of July and middle of August. However, 2006, cost for spraying dramatically increased (80 Yuan/ha to 130 Yuan/ha), and most of the farmers refused to do it. So pest control in 2006 was applied by individual farm carrying the mist by each farm using portable spray.

Until 2-3 years ago, paddy was harvested and tied by hand. Currently, combine is commonly used for harvest operation. No.1 and No. 2 owned combine with width of 2.5 m, but No.3 borrowed combine from his relatives.

Production Group 17 irrigating paddy field using wells. All the farms own their own well. Until 4-5 years ago, average size of well was 20cm diameter with depth of 20m. However, recently, large and medium size farmers have begun to use wells with depth of 30m, to make do and mend wells. No.1 has three 20m wells; No.2 has two 30m wells; and No.3 has one 20m well.

As mentioned earlier, large and medium scale farmers have started using combine, tractor, and rice planting machinery, but small scale farm less than 5 ha has not own such machinery. It is also pointed out farming operation of large and medium scale farmers was made possible by employed workers. However, recently, work force has begun to moves urban area and it made difficult for large and medium scale farmers to have sufficient labor force.

Table 2. Summary of farm management (XinHua Farm, Production Group 17, three subjects)

No. of Farmers		No.1(No.17-45)	No.2(No.17-42)	No.3(No.17-6)
Name (Age)		Wang zhao guo(32)	Li zhi wei(26)	zhao yan(44)
Paddy area		18.3ha	9ha	5ha
Family size		m32,f31,m9	m26,f24,f2	m44,f41,m19
Farm working family members		m32,f31	m26,f24	m44,f41,m19
power tiller	HP	12hp (used)	12hp (used)	
	Date of introduction	1989	1994	
	price	2,600Yuan	6,500Yuan	
tractor	HP	25hp (used) 、 40hp	30hp	
	Date of introduction	1998, 2004	2004	
	price	13,000Yuan、 53,000Yuan	31,400Yuan	
raising seedling facility	size	180 m <sup>2</sup> ×2、 120 m <sup>2</sup> ×13	135 m <sup>2</sup> ×7	204 m <sup>2</sup> ×2、 144 m <sup>2</sup> ×2
rice transplanter	HP	6Lines(used) 、 8Lines	6Lines	
	Date of introduction	1992, 2000	1996	
	price	3,000Yuan,11,500Yuan	9,800Yuan	
harvester	size	combine harvester (2.5m)	combine harvester (2.5m)	
	Date of introduction	2005	2006	
	price	54,000Yuan	63,000Yuan	
wells		20cm×20m×3、 20cm×30m×1	20cm×30m×2	20cm×20m×1
employ		full time 2 (12,000Yuan)、 part time2	full time 1 (6,000Yuan)	

Source:Primary interview (Sep.2006).

## (2) Economic situation of farmers (Table 3)

Production Group 17 of Xin-Hua Farm introduced Kong Yu163 (breed in Hokkaido breed variety) in 2004, but harvest in 2005 was quite poor. So, the most of farmers stopped using Kong Yu163 and began to use breed variety called 'Ken Jian' which was bred in agricultural experimental station of General Bureau of State Farm. No. 1 grew 10 ha of Ken Jian No.6 and 8.3 ha of Ken Jian No.10. and. No.2 grew Ken Jian No.6. No 3 continued to grow Kong Yu163 as harvest of previous year was not so bad.

In this section, we will examine the economic situation of the farmers. As mentioned before, harvest in 2005 was poor, so we will examine the situation in 2004.

Table3 Summary of statement of income and expenditure (XinHua Farm, Production Group 17, three subject, 2004)

No.of farmers	No.1(No.17-45)	No.2(No.17-42)	No.3(No.17-6)
Name(Age)	Wang zhao guo(32)	Li zhi wei(26)	zhao yan(44)
Paddy area	18.3ha	9ha	5ha
type of rice seed in the year 2004	KongYu163 13.3ha	KongYu163 9ha	KongYu163 5ha
type of rice seed in the year 2005	KongYu163 18.3ha	KongYu163 9ha	KongYu163 5ha
type of rice seed in the year 2006	KenJian6 10ha, KenJian10 8.3ha	KenJian6 9ha	KongYu163 5ha
unit crop	8.5t	8.0t	7.5t
rice quota per hectare	4.5t	4.5t	4.5t
gross yield of rice	113t	72t	37.5t
rice quota(Liangyou Co.)	59.9t, 1.50yuan/kg	40.5t	22.5t
XinMian Co.	53.1t, 1.75yuan/kg	31.5t	15t
gross income (yuan)	192,100	115,200	56,210
cost (yuan)	89,995	62,200	33,380
management cost	74,795	52,100	23,040
production material	20,570	17,850	6,790
labor cost	9,800	4,500	0
land rent (2,250yuan per hectare)	29,925	20,250	11,250
etc.	14,500	9,500	5,000
family expenses (yuan)	15,200	10,100	10,340
surplus (yuan)	102,105	53,000	22,830

Sources: Primary interview, additional information submitted by production group 17 (Sep.2006).

No.1 farmed 13.3 ha and harvest was 113t (8.5 t/ha) in 2004. There was rice quota system, which obliged farmers to provide 4.5 t/ha to food company in lower price, and total amount of was 60 t in total. The rest was sold to Xin Mian Company. Total income was 192,100 Yuan, and cost was 74,795 Yuan. The labor cost was 13% of the total cost. Farmers have to pay rent, and it cost 2,250 Yuan /ha, the total was 29,925 Yuan (16 %). Profit was more than 100,000 Yuan, excluding domestic expenses. Using this profit No1 enlarge farm land for 5 ha.

No.2 farmed 9 ha, and harvest was 72 t (8 t /ha). The rice quota was 40.5 t in total and sale to Xin Mian Company was 31.5 t. The total income was 115,200 Yuan, and operating cost was 52,100 Yuan, including rent of 20,250 Yuan (18%). Domestic expenses were 10,100 Yuan and the balance of 53,000 Yuan was profit.

No. 3 farmed 5 ha and harvest was 37.5 t (7.5 t/ha). Rice quota was 22.5 t and the rest of the 15 t was sold to Xin Mian Company. The total income was 56,210 Yuan and cost was 23,040 Yuan, including the land rent of 11,250 Yuan (20%). Domestic expenses were almost same with No2- 10,340 Yuan, and the profit was 23,000 Yuan.

Currently, the price of rice is 1.60 Yuan per kg and even the small scale farmer, managing less than 5 ha, could get profit though tiny amount. However, it could also be pointed out that the ratio of quota and land rent was high, and especially land rent has been increased. These factors would become burden for farmers (Tables 4 and 5).

*Table4 Changes in procurement of rice quota (Yuan per kilogram, ton per hectare, ton, Yuan)*

year	unit price	quantity of procurement		total procurement price
		unit area	total procurement	
2000	1.16	4.5(2.5)	39,510	45,831.6
2001	1.14	4.5(2.5)	43,382	49,455.5
2002	1.03	4.5(exemption)	35,000	36,050.0
2003	1.03	4.5(3.0)	26,314	27,103.4
2004	1.52	4.5(4.0)	27,930	42,453.6
2005	1.54	4.5(exemption)	28,890	44,490.6
2006		2.5		

Sources: Primary interview (Sep.2006), additional information submitted by production group 17.

NB: The number in the () is from primary interview.

*Table5 Changes in land rent (Yuan per hectare)*

year	field	paddy
2000	1,570	1,890
2001	1,750	2,250
2002	1,750	2,250
2003	1,570	1,850
2004	1,850	2,250
2005	1,850	2,250
2006	1,850	2,890

Source: Submitted by Production Group 17.

### (3) Problem of rice paddy management of Production Group 17

#### 1) Potential deficit of water for irrigation

The lack of water for irrigation is serious potential issue. Farmers began to use 30m depth well sinking that is deeper than 20m depth in 4 or 5 years ago.

#### 2) Out migration of labor force.

Farmers has been depended their farm operation on workers who live around farm village. However they began to move urban areas to seek high salary.

#### 3) Increase of land rent

The charge of land rent cost is increasing remarkably. It was 1,890 Yuan/ha in 2000, but 2,890 Yuan/ha as 1.5 times in 2006.

### 3. RESEARCH PLAN OF 2007

- 1) Make further analysis on the questionnaire survey in 2006, and write a paper on operational problem of rice paddy farms in Plain, San Jiang China (tentative title)
- 2) Intermediate check of book keeping on August 2007. Collect account book, and conduct supplement research on March 2008.