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Profitability Analysis Based on Cropping System of the Land Use Changes in Paddy Field

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Abstract

The gross income of soybean and Italian rice (IRG) cropping system was 1,288,000 Won/10a. Sale price was 3,962 Won/Kg and its yield was 325kg/10a. The yield of IRG was 1,584kg/10a, and its selling price was 125 Won/Kg, leading to gross income of 198,000 Won/10a. The gross income of soybean was 284,000 Won/10a, and the income rate was 22.1%. Income of IRG was 30,000 Won/10a. It would be necessary to establish the technical cultivation system through the continuous researches with long term goals such as land utilization rate and grain self-sufficiency rate.

Keywords*: rice proper production, the rice field instead of rice, crop system, forage crop, economic analysis*

1. INTRODUCTION

Since 1999, the Republic of Korea has been supplying rice with an average production of 280,000 MT of rice per year for the last 10 years. As a part of rice supply and demand, the Ministry of Food, Agriculture, Forestry and Fisheries (Dec. 29, 2015) announced measures to stabilize rice supply and demand. Rural Development Administration - Rural Support Organization – Food Crop Industry Technology Service Division: 'Appropriate production of rice, 3 low 3 high exercise program' presentation materials.

In order to maintain the balance of rice supply and demand through appropriate production of rice and increase in demand, policy is changing to shift to increasing non-rice crops in order to reduce production of rice and increase self-sufficiency rate of crops. In order to increase rice farming income, interest in cultivation of double crops of other crops is increasing. Especially, the area of Italian rye-grass is increasing due to the increased Hanwoo farming farms and the spread of drones for the substitution of forage imports.

Therefore, this study compares and analyzes the farmers who newly introduced the cropping system of soybean and Italian rye-grass, which are other forage crops, and found implications and grasped technical solutions. In addition, this study examined the success, difficulties and profitability of each cropping system.

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In this study, economic analysis and profitability data were used to analyze the changes of farmers cultivating paddy rice to field cultivation, and to control the supply and demand of rice stock reduction and aptitude production. We hope that it would help the industry with basic data such as self-sufficiency.

2. SURVEY METHOD

The farmers of each cropping system were 10 farm households. The survey method was 1:1 interview. The self-reported method of agricultural income survey was applied by expert cooperation. The survey period was from June to November, 2018. The emphasis was on the comparison of the farms where the cropping system was established and the newly introduced farms, and the implications and technical solutions were identified. In order to compensate the variation of the survey results by year, region, and farm, the 3 year average standard, the main farming center, and the representative farmhouse were selected.

2. 1 Previous Research

Min Soo Park (2005) presented the problem of forage production and suggests ways of expanding production through economic analysis of forage production in cultivation of double crops of other crops. Pyeong Sik Park (2008) conducted a case study on the management status of substitute crops to rice and analysis of best practice cases and the case study of management performance of rice substitute crop introduction in regional specialty rice fields, respectively.

Ga Oak Cho & others (2011) proposed a plan to revitalize the paddy rice industry, centering on the development of a wintering system model for winter wheat-summer crops.

Pyeong Sik Park (2014) analyzed the management performance of the rice cultivation – oriented cropping system and the rice cultivation - oriented cropping system for the diversification of rice farming.

Ki Soo Kim (2014) investigated the growth characteristics and yield of forage crops in terms of technical aspect through the study of grafting the maximum production profit model of rice substitute forage crops in Jeonnam region and measured economic efficiency through empirical test.

Jong Ho Seo (2015) analyzed the application and profitability model of the rice cropping diversification system and analyzes the construction and operation of the Jungbu, Honam, and Yeong nam area complexes. Chi Jin Jang (2016) analyzed the economics of rice cultivation in rice paddy fields, For Bokbunja, he conducted profitability analysis based on price fluctuations.

2. 2 Main Results 1

The gross income of soybean and Italian rice (IRG) cropping system was 325 Kg/10a of soybean, sale price was 3,962 Won/Kg and total income was 1,288,000 Won/10a. The amount of IRG was 1,584 Kg/10a, the selling price was 125 Won/Kg, and the total income was 198,000 Won. The income of soybean was 284,000 Won/10a, and the income rate was 22.1%. Income of IRG was 30,000 Won/10a. The productivity of bean labor was 26,081 Won/hr and the productivity of land was 948 Won per 3.3㎡. The production cost of soybean was 4,879 Won/Kg, and the labor hour was 10.9 hours/10a. The production cost of IRG was 295 Won/Kg, and the labor hour was 2.4 hours/10a.

Table 1. Soybean and Italian Ryegrass (IRG) Profitability.

(Standard: year one mechanism/10a)

Division		Soybean	IRG	Explanatory
Gross Value of Production	Quantity (Kg)	325	1.584	
	Unit Price (Won)	3,962	125	
	Price (1,000 Won)	1,288	198	
Cost	Middle Ingredients (1,000 Won)	479	202	
	Operating(1,000 Won)	1,003	228	
Profit	Value of Production less Operating Costs (1,000 Won)	284	-30	Soybean (income rate: 22.1%)
	Value (1,000 Won)	808	-4	
Productivity of Labor	Labor Productivity (Won/Time)	26,081	-	value of production less operating costs ÷ working hours
	Land Productivity (Won/3.3㎡)	948	-	Income ÷ area under cultivation
Production Costs (Won/Kg)		4,879	295	
Labor Hours (Time/10a)		10.9	2.4	

2. 3 Main Results 2

The production cost of bean and IRG was 10,600 won for beans and 467,000 won for IRG. The beans accounted for 17.0% of their own labor costs, 16.8% of depreciation expenses, 16.0% of rents and 15.7% of employment costs. IRG accounted for 41.5% of self-labor costs, 14.8% of other materials, and 11.5% of inorganic fertilizer. Soybean labor input time was 4.6 hours for employment labor and 6.3 hours for self-employment. IRG labor input time was 0 hours of employment labor and 2.4 hours of self-employment.

List of the cost				soybean		Italian Ryegrass (IRG)		explanatory
				Price	important	Price	important	
Production costs	operating costs	Intermediate-mateial cost	strain·nursery garden cost	32,188	2.0	17,750	3.8	
			minerals Fertilizer	26,875	1.7	53,750	11.5	
			Organic matter Fertilizer	20,000	1.3	7,125	1.5	
			conclusion cost	57,813	3.6	0	0.0	
			fuel, lube and electricity	31,805	2.0	15,875	3.4	
			other material cost	4,063	0.3	69,000	14.8	
			cost of small farm equipment	2,102	0.1	0	0.0	
			capital recovery of machinery	263,783	16.6	24,841	5.3	
				2,167	0.1	0	0.0	
			repair·maintenance cost	34,004	2.1	12,813	2.7	
			office expense	4,508	0.3	1,000	0.2	
			Sun	479,306	30.2	202,153	43.3	
		hire		253,833	16.0	26,046	5.6	
		cost to entrust farming		21,875	1.4	0	0.0	
		Employment labor cost		248,207	15.7	0	0.0	Soybean(4.6hours) IRG (0hours)
		Sun		1,003,221	63.3	228,199	48.9	
	self-labor cost			269,396	17.0	193,575	41.5	Soybean 6.3hours) IRG (2.4hours)
	floating capital service cost			7,429	0.5	2,053	0.4	

Fixed capital service cost	101,941	6.4	9,266	2.0	
Land capital service cost	203,711	12.8	33,546	7.2	
Sum	1,585,697	100	466,638	100	

3. SUCCESS AND DIFFICULTIES

The success and difficulties of the cropping system are the following cultivation of soybean, and when it grows Italian rye-glass, dust and soybeans tend to get into Italian rye-glass grapevines and there is a tendency to avoid farm animals. This has led to an increase in the tendency to grow Crest or whole rice instead of Italian Ryegrass.

Because soybean yield is higher than rice, we grow soybeans in rice field, but there are many things such as weeding, and it is difficult to obtain manpower in the farming season, some farmers try to grow rice again. Growth and yield in soybean cultivation are also affected by rainfall conditions at the time of sowing, making it difficult to sow seeding, thus acting as a limiting factor in a stable growing system.

4. CONCLUSIONS

Various types of cropping systems such as income-type cropping system, forage production system, food self-sufficiency rate system, and climate change adaptation system have been developed as the type of cropping system. However, various farming system models are lacking in each region. The cultivation techniques of the type-specific cropping system should be systematically established. It can be said that it is necessary to establish the technical system of the cultivation system through the continuous study of the related research with medium and long term goals such as land utilization rate and grain self-sufficiency rate.

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