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Economic Feasibility of Organic Rice Farming in California

Shoichi Ito

Introduction

Organic farming has been receiving more attention among rice producers in California during the recent years. Although production growth rate of organic rice is smaller than other grains, organic rice is becoming an important food item for consumers. In fact, production of organic rice is said to be increasing by 10% each year.

Increment of consumer demand for organic food retains prices of organically grown food at higher levels than conventionally grown food. On the other hand, chemical application in agriculture have caused serious problems in food safety. Further, rice straw burning has been causing pollution, and the legislature is preparing a law totally prohibiting rice burning in California.

Accordingly, organic farming is receiving more attention from rice growers. In this research, economic feasibility of organic rice farming in california was analyzed. Does organic rice farming bring more profits than the conventional practices ? To analyze this, it was necessary to investigate not only output prices but also production costs and government subsidy programs. In the Californian rice producing areas, the Lundberg Family Farms are producing and marketing organic rice, while they also have contracts with other organic rice growers in the region. Ed Sills is one of the contractors working with the Lundbergs, and he sells his entire organic rice to the Lundbergs. Management of the Lundbergs organic rice production is well documented by Wiles (1989). The analysis in this research incorporates the report by Wiles and the results of the authors own ingestigation in California.

Organic Rice Farming and Production Costs

Ed Sills has been producing organic rice since 1986. It is necessary for three years of no chemical application for the land to be certified as organic agricultural land. Sills' process of organic rice production applies a two-year rotation for rice-vetch and vetch. Figure 1 shows the two year process of production. During the first year, vetch is grown until spring when rice is planted. The paddy is not tilled before rice planting. Instead, dry rice seeds are drilled into the vetch. Immediately after rice is harvested in the fall, vetch is again planted. Meanwhile, rice straw is not burned in contrast to burning for the conventional procedure. During the summer in the third year, vetch is harvested for its seeds. Then, the land is disked followed by another vetch planting. During the spring of the fourth year, the same process for the second year is repeated.

Production costs differ significantly between conventional and organic methods. Table 1 shows costs per acre for two methods, reported by Wiles (1989) for the Lundbergs experimental farms in 1985. Because plowing and chemicals applied are substantially less in organic agriculture, pre-harvest costs per acre for the organic rice production was $71.14, less than 40% of the conventional way at $184.43. In terms of harvest costs, the conventional and

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organic cost $134.24 and $79.82, respectively. The high cost of the conventional is due to its higher yields. Total production costs are $327.30 for the conventional and $171.23 for the organic per acre.

Feasibility of Economic Revenue

Costs for the orgenic rice production was neariy half of the conventional. However, yields and market prices between the two differed, also : Yields in roughrice were 74 hundredweight (cwt) and 44 cwt while market prices $7.90 and $11.75 per cwt roughrice for the conventional and the organic, respectively. Because farm price for the organic was $11.75 /cwt, nearly 50% higher than $7.90/cwt for the conventional, net return over cash costs turned out to be greater for the organic at $345.77 than $257.30 of the conventional.

Orgainc rice production is conducted employing two year rotation (rice and vetch during the first year and vetch for fallow during the second year), while it is allowed to continuously produce with the conventional method. Accordingly, Wiles divides the net cash return by 2 (years) for the orgainc, and he estimated the net return over cash cotst per acre per year to be $105.40, while the equivalent for the conventional to be $149.70 (Table 2). The conventional way has more profitable.

In our site visit interview with the Sills, the situation was somewhat different. First of all,as Wiles quotes as Lundberg's comment, yields vary depending on weather and location / management of the farms. While the Lundberg's yields for organic rice were 44 cwt and 27 cwt in 1985 and 1986, respectively, Sills earned 50 cwt, 81 cwt, 68 cwt, 45 cwt, and 75 cwt during 1986 through 1990 (Table 3). Although yields obtained by Sills vary greatly, they are, on average, as high as 85% of Caliornia standard levels during the past five years.

The organically produced rice grown by Sills is purchased by the Lundberg's at a pcice ranging from "25% to 75% above the market price" (site visit interview with Sills, 1991). In this research, therefore, it is assumed that the selling price of Sills' organic rice is 50% (the middle of the range) above the market price. The average market price that rice producers received during the first five months, August-December, in 1990 was $6.25cwt (USDA, 1991 ; and price of the orianic rice produced by Sills is approximately $9.37.

Regarding two year rotation, a fallow land for vetch is eligible for the 50/92 program in which the government pays deficiency payments on 92% of planting permitted acreage if at least 50% of the permitted acreage is planted with rice (Glaser, 1985 ; Lippke and Smith, 1986 ; Ito, 1988 ; and USDA, 1990). In 1990, the deficiency payment rate was $4.21 / cwt. Mathematically, it is not unreasonalle to estimate that 92% of the deficiency payment rate was paid to orgainc rice growers covering the permitted whole acreage including the fallow paddy field to which vetch was planted. Taking the Sills' yield of 75 cwt for organic, the payment of the 50/92 program would be $290.49 (=75*4.21*0.92). Therefore, it is estimated that Sills' net return would be $766.08 per acre of rotation per year, significantly more than the conventional method, $464.34 (Table 4 and the footnote of the table). Notice that this estimated total net return over cash costs does not include any profits incurred from harvesting vetch seeds which Sills conducts during the fallow year.

Conclusion

It has been controversial about whether organic agriculture is more profitable for the producers than the conventional method. The major concern for producers is the unstable yields of organic agriculture ; maybe quite lower than those of the conventional.Although yields vary in general, some producers have approached a level where organic agriculture is compatible and brings more profits due to higher market prices. After five years of

experience, Sills is confident of ent of estalilishing "70 cwt to 75 cwt of yields per acre," which is around 90% of the state wide average yields. Farm prices of organically grown rice are attractive to producers with a price of "24% to 75% above the market prices" of the conventional rice. In retail shops, prices of organic rice are approximaetly twice the prices of the ordinary rice. (See Appendix 1).

Further, the organic way of agcicultural production is considered to be far better in protecting the environment and the health of the human race. Rice straw burning, which is common for conventional rice production methods but polluted the air causing lung-cancer, may soon be phased out due to the fact that the legislature has been preparing a bill to totally prohibit rice straw burning. (See Appendix 2). If the economic positive externalities provided by organic agciculture is taken into consideration, benefits of organic agriculture must be enormous not only for producers but also for the society.

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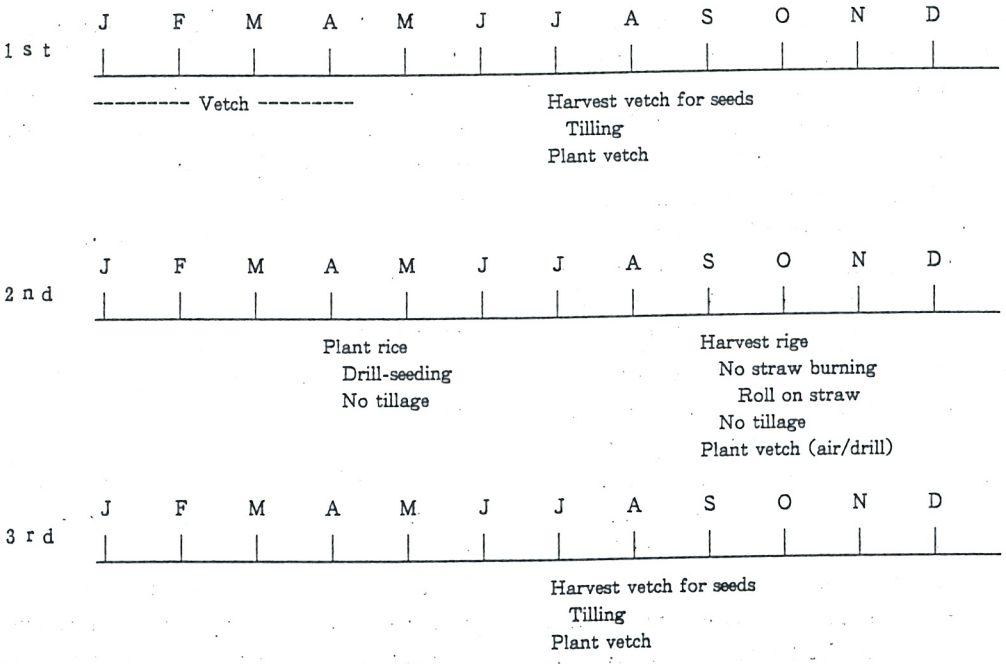

Fig.1. Crop rotation of rice with vetch for organic rice production in California.

Table 1. Pre-harvest and harvest costs of rice production in conventional and organic methods, Lundberg Family Farms in Richvale, California, 1985.

(Dollars per acre)

	Conventional	Organic
Rice seedbed preparation		
Chisel	5.94	5.94
Stubble dis plow	6.80	0
Disk harrow	13.60	0
Flail-chop vetch	0	2.00
Sub-total	26.34	7.94
Fertility management		
Preplant fertilizer		
16-20-0 (NPK)	25.00	0
Custom air	5.25	0
Nitrogen aqua ammonia	17.50	0
Custom ground	10.00	0
Zinc sulfate	2.00	0
Custom air	0.60	0
Plant purple vetch		
Seed	0	11.00
Aerial Planting	0	3.00
Topdress		
Postplant fertilizer		
Ammonium sulfate	4.37	0
Custom air	1.89	0
Sub-total	66.61	14.00
Pest control		
Rice water weevil		
Carbofuran 5G	4.02	0
Cutom air	1.80	0
Rice leafminer and/or tadpole shrimp		
Parathion	0.27	0
Cutom air	1.90	0
Barnyard grass (watergrass)		
Molinate 10G	18.72	0
Cutom air	3.24	0
Broadleaf weed		
MCPA	2.59	0
Cutom air	3.57	0
Blackbirds, muskrats, etc.	5.00	0
Sub-total	41.11	0

Continued ···

Table 1. (Continued)

(Dollars per acre)

	Conventional	Organic
Other pre-harvest costs		
Close amd ,aomtaom levees/boxes	3.08	3.08
Flood (6 acre-feet)	23.84	20.97
Plant		
Seed	14.85	14.85
Custom treat and soak	2.70	0
Custom haul seed	0.30	0.30
Custom air	5.60	0
Custom no-tillage drill	0	10.00
Sub-total	50.37	49.20
Total pre-harvest costs	185.34	71.14
Harvest costs		
Drain and open levees	3.26	3.26
Custom harvest, haul, and dry ($1.81/cwt)		
74 cwt for conventional	134.24	
44 cwt organic		79.82
Post-harvest costs		
Mow levees, clean around boxes	2.01	2.01
Burning rice straw	2.45	0
Rolling rice straw or chisel	0	15.00
Total pre-harvest/harvest costs	327.30	171.23

Source : Wiles (1989), pp.408, 409, and 414.

Table 2. Revenue of rice production in conventional and organic methods, Lundberg Family Farms in Richvale, California, 1985.

(Dollars per acre)

	Conventional	Organic
Revenue during crop years		
Conventional rice, 74 cwt $7.90/cwt	584.60	
Organic rice, 44 cwt $11.75/cwt		517.00
Fallow year costs		
Triplane (including move crawler)	5.49	0
Roto spike	0	30.00
Landplane (including move crawler)	0	20.48
Flush-irrigate	0	10.50
Laser level (custom hire)	60.00	60.00
Plant purple vetch	0	14.00
Total fallow costs	65.49	134.98
Net return over cash cost/acre/year	149.70	105.40

Source : Wiles (1989), p.414.

Table 3. Yields of organic rice relative to California's state-wide average.

(hundredweight, roughrice)

(1) The Lundberg's

	1985	1986
Lundberg (A)	44.0	27.0
California (B)	73.5	76.0
(A)/(B)	60%	36%

Source : Wiles (1989), p.404.

(2) The Sills'

	1986	1987	1988	1989	1990
Sills (A)	50.0	81.0	68.0	45.0	75.0
California (B)	77.0	75.5	70.2	79.0	76.0
(A)/(B)	65%	107%	97%	57%	99%

Sources : Site visit interview with the sills' by the author, and the USDA's Rice Situation and Outlook Report, April 1991 and previous issues.

Table 4. Comparing the net returns of conventional and sills' organic rice production, 1990.

(Dollars per acre)

	Conventional	Organic
Total pre-harvest costs	185.34	71.14
Harvest costs		
Drain and open levees	3.26	3.26
Custom harvest, haul, and dry ($1.81/cwt)		
74 cwt for conventional	137.56	
44 cwt for organic		135.75
Post-harvest costs		
Mow levees, clean around boxes	2.01	2.01
Burning rice straw	2.45	0
Rolling rice straw or chisel	0	15.00
Total pre-harvest/harvest costs	330.62	227.16
Revenue during crop years		
Conventional rice, 74 cwt $6.25/cwt	475.00	
Organic rice, 44 cwt $9.37/cwt		702.75
Fallow year costs		
Triplane (including move crawler)	5.49	0
Roto spike	0	30.00
Landplane (including move crawler)	0	20.48
Flush-irrigate	0	10.50
Laser level (custom hire)	60.00	60.00
Plant purple vetch	0	14.00
Total fallow costs	65.49	134.98
Deficiency payments($4.21/cwt)*	319.96	290.49
Net return over cash cost/acre/year	464.34	766.08

*Notice : Deficiency payments may not be paid for the whole yields depending upon the USDA Secretary's discretion. In this table, it is assumed that the payments were paid for the whole yields established.

Appendix 1.

Retail Prices for Organic and Conventional Rice in Dagis and Los Angeles, california, April 1991.

Aprice research was conducted for conventional and organic rice in California in April 1991. Prices are as follows :

Conventional rice

Los Angeles

Kokuho Rose	20Lb	$8.95
Tamaki-mai	20Lb	$11.75
Nishike-mai	20Lb	$8.95

Davis

Kokuho Rose	25Lb	$9.70
Tamaki-mai	20Lb	$8.50

(Reg. $9.70)

Nishiki-mai 25Lb $9.10
Hinode 2Lb $1.29

Organically grown rice

Los Angeles

Lundberg Organic California Short Grain, Brown rice

25Lb $20.99
1Lb $0.89

Long Brown Rice 1Lb $1.35

Arkansas White Basmati Rce

1Lb $1.89

Thailand White Basmati Rice (in Los Angeles)

1Lb $1.89

Judging from these data, it is obvious that prices of organically grown rice generally are two times as expensive as those of conventionally grown rice.

Appendix 2

A Bill to Prohibit Rice Straw Buring in California

Rice straw burning causes air pollution, and it has been a serious problem in Sacramento, in particular. The California State legislature has been preparing a bill to totally prohibit rice straw burning in California. The bill was compromised and amended as recently as May 6, 1991 resulting from negotiations among representatives of the rice industry, the California Air Resources Board (CARB) and Assembly Members Connelly, Areias, and Chandler.

The original author of this bill is State Senator Connelly. This bill would require a phase down of rice straw burning in the Sacramento Valley Air Basin starting September 1, 1992 to 25% of the acreage on which rice is grown, or 125,000 acres, whichever is less, by the year 2000 ; only if a documented disease problem exists. The details are as follows :

1. Rice straw burning would be schaduled to reduce by 10% each year from 1992 through 1996.
2. In 1997, 38% of rice acreage could be burned.
3. In 1998 and 1999, 25% of rice acreage could be burned.
4. All these percentages are equitably allocated among growers.
5. In 2000 and thereafter, burning would be limited to 25% of an individual farmer's rice acreage and no more than a total of 125,000 acres per year, only if a disease problem is evident in the field.
6. After September 1, 2000, no burning would be allowed, unless a disease problem is evident and verified by the County Agricultural Commissioner or due to extraordinary circumstances. However, if the CARB and CDFA determine that other cost effective disease control methods are available, burning will still not be permitted.