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Social-cultural Functions of Rice Farming Systems

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Abstract

This study examines social-cultural function that arise on wet-land rice cultivation system. The observations and data analysis showed that employment absorption and emergence of social cohesion among farmers that enhance the technological innovation of organic rice cultivation were felt due to the application of organic farming system. Organic rice farming systems tend to gave higher economic value as labor absorber, but this study found that organic rice farming system did not guarantee farming tradition maintenance and increasing of farmer women participation.

Keywords: Rice, farming systems, social function, cultural function

Introduction

Rice is one of the most important crops produced in Indonesia. As a country endowed with a wealth of unique tropical biodiversity, abundance of sunlight, water and soil, as well as the culture of the people who respect nature, Indonesia has a tremendous capital base to develop organic agriculture. A strategic option to accelerate development realization of the agribusiness competitive, sustainable and environment-ally farming to improve the farmer's welfare, organic agriculture program had been initiated since its launched "Go-Organic 2010" program by the Ministry of Agriculture in 2000.

Organic agriculture concept is not only speak about economic criteria and safety environmental insights, but also encourage social and cultural values. Culture has traditionally been viewed as a component of the social dimensions of sustainability or as part of discussions on social capital, and has largely been unexamined. As Pike (2003) in Duxbury and Gillette (2007) observes, while there has been much written in recent years about social capital, there has been comparatively little said about cultural capital. According to the Indonesia Organic Alliance (2009), organic agriculture is considered to encourage farmer groups become more dynamic, and even became one of the efforts to restore farmer women rights, it also contains the socio-cultural values of farmers.

According to De Vries (2000), farming practice always had roles and functions that are interrelated to each other, between economic, environmental, and social/cultural aspect. European Council

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(1998) mention that agriculture is in itself a multifunctional activity because multiple outputs are provided for when agricultural activities are carried out. A much-used working definition of multifunctionality has been developed by the OECD (2001): multifunctionality refers to the fact that an economic activity may have multiple outputs and, by virtue of this, may contribute to several societal objectives at once. This concept means that organic farming has economic, environmental, and social/cultural functions, which some studies conclude the organic farming system gave better performance than conventional, but social and cultural functions were still not widely discussed.

Social and cultural aspect were giving contribution on sustainable agriculture, and both were mutifunctionality aspect of agriculture. Social and culture function gave influence to empowering communities action. Empowering communities was one of the agenda of the United Nations 'Agenda 21', a principal outcome of the United Nations Conference on Environment and Development (the Rio Conference), which sets the agenda "to reverse the effects of environmental degradation and to promote environmentally sound and sustainable development in all countries" (Robinson, 1993).

Social ties are commonly viewed as important assets, a form of capital at par with physical, financial, human and political capital, and a potential instrument for building the other forms of capital. Within the community development field, cultural considerations often emerge through discussions about social sustainability or community capital; in both contexts, culture is just now emerging as a topic of inquiry. The pattern is similar: community sustainability continues to be most commonly seen as a way to improve a community "well-being" in social, economic, and environmental terms, with culture gradually forming a part of this vision.

The main objective of this paper was to give an overview social-cultural function of organic and conventional rice farming system at reserach area. Simple model was made to describe the role of social-cultural function of farming system to rural development.

Research methods

The study was conducted at Pereng village, Mojogedang, Karanganyar district, and Sukorejo village, Sambirejo, Sragen district, Central Java Province, Indonesia. These districts were chosen for two reasons. Firstly, they are typical of intensive rice-growing areas in Central Java Province. Secondly, the two area were consistently expand the organic rice cultivation until now, 3 times in a year. Respondents were classified into 2 group, i.e. organic rice system farmers group which apply organic input technique (without chemical inputs) at wetland, with a number of 37 farmers which is saturated sample, and the group of conventional rice system farmers (using chemical inputs), 80 farmers were randomly selected. Data were collected using interview list and analyzed by percentage, frequency, and t-test.

Social-cultural function analysis include employment absorption, social cohesion, farmer women's participation, and tradition aspect. Social cohesion among farmers and participation of farmer women based on farmers perception that measured by several indicators in the questionnaire, where the indicator set had met the requirements of a research instrument, validity and reliability.

Tradition aspect was measured by the frequency of farming ritual done by farmers. The rice farming system determination about employment absorber function value (NFTK), based on the formula:

$$NFTK = \sum_{i=1}^{n} (LxTxW)$$

L = farm area (ha)

T = farming labor requirement (work-days/ha)
W = wage (Rp/work-days)

Result and discussion

Farm labor characteristic

Table 1 describe farmer characteristic from the sample. Generally, likewise found that organic farmer characteristic did not different with conventional farmer, except farming experience of farmer.

Table 1: Sample characteristics

No.	Characteristic	Organic Farming System		Conventional Farming System	
		Total	%	Total	%
1	Age (year)				
	a. ≤ 29	0	0	0	0
	b. 30 - 39	2	5.41	9	11.25
	c. 40 - 49	17	45.95	17	21.25
	d. 50 - 59	9	24.32	26	32.25
	e. > 60	9	24.32	28	35
	Total	37	100	80	100
	Mean	51		53.93	
	St. Dev.	10.19		11.12	
	t-test	1.357^{ns}			
2	Education				
	a. No education	1	2.70	9	11.25
	b. Elementary school	21	56.76	36	45.0
	c. Junior high school	6	16.22	14	17.5
	d. High school	8	21.62	18	22.5
	e. Diploma	1	2.70	2	2.5
	f. Undergraduate level	0	0	1	1.25
	Total	37	100.0	80	100.0
	Mean	9 year = Junior high school		9 year = Junior high school	
	St. Dev.	2.89		3.49	
	t-test	0.573^{ns}			
3	Household size (person)				
	a. 1- 2	3	8.11	17	21.25
	b. 3- 4	22	59.46	35	43.75
	c. > 5	12	32.43	28	35.0
	Total	37	100	80	100
	Mean	4.19		3.99	
	St. Dev.	1.19		1.59	
	t-test	0.759^{ns}			
4	Farming experience (years)				
	a. 2 - 3	8	21.62	0	0
	b. 4 – 5	3	8.11	0	0
	c. 6 – 10	23	62.16	13	16.25
	d. > 10	3	8.12	63	83.75
	Total	37	100	80	100
	Mean	7.30		>26.34 (since child)	
	St. Dev.	2.97		13.51	
	t-test	11.99***			

Source: primary data (2012)

Employment absorption

Farm labor in the research area include family labor and hired labor. Hired labor was widely used in rice farming in land preparation, planting, and harvesting. Agricultural mechanization in cultivation process using tractor for tillage stage and tresher for harvesting, which speeding the work of farming but potentially reduce the absorption of human labor.

Rice farming includes man and women workers, while children labor was not found in the study site. Usually hired labor paid by a wage system or wholesale system ("*borongan*"). Labor used in organic and conventional rice farming systems in general were relatively similar between planting seasons, but there were some difference in labor requirements on some of the activities. Differences in farm labor requirements in every stages of organic and conventional systems are shown in Table 2.

Table 2: Labor utilize of organic and conventional rice farming systems

No	Activities	Organic Farming System (workdays/ha/planting season)				Conventional Farming System (workdays/ha/planting season)			
		Hired labor	Family labor	Total	%	Hired labor	Family labor	Total	%
1	Nursery/ seedling	0.10	4.39	4.49	3.05	1.60	2.29	3.89	3.15
2	Tillage	21.43	2.88	24.31	16.51	20.36	4.33	24.69	19.97
3	Planting	52.16	0.00	52.16	35.43	42.58	0.00	42.58	34.44
4	Fertilization	0.45	3.27	3.72	2.53	0.46	3.62	4.08	3.30
5	Weeding	3.74	21.68	25.42	17.27	7.80	3.46	11.26	9.11
6	Harvesting	37.13	0.00	35.13	25.22	37.13	0.00	37.13	30.03
	Total	115.01	32.21	147.22	100.00	109.93	18.65	128.58	100.00
	St dev.			39.10				48.64	
	t-test					2.587***			

Source: primary data analysis (2013)
Note: *** there is a difference between organic and conventional systems at 5% error level

Labor used for both types of farming was allocated most on tillage, planting, and harvesting activities. Almost at all stages of farming systems showed difference in labor used, where the biggest difference was weeding activity. Organic farming system requires more labor than on comparable conventional farming systems, in the other words, organic farming systems lead to the labor intensive. Surprisingly, in contrast to the results Offermann and Nieberg (2000) study the resource endowment of family labor per ha is almost always lower on organic than conventional farms. There is no clear explanation for this phenomenon. It might be related to the different sociological characteristics of organic farms. Possibly, as organic farms in Europe contries are more often managed by younger, better educated farmers, the spouse is more likely to have an off-farm job and may thus not be counted as farm labor.

Labor is one factor that has a major influence on farming cost, therefore farmers should be held accountable in their use. Total cost of organic farming system in this study was slightly lower on average than on comparable conventional farming system. Cost share on labor in organic systems tend to be higher than spending for other farming resources, but in the conventional system, expenditure on fertilizer closed to labor cost. Supadi (2008) concluded that the largest

share of rice cultivation cost was labor cost. According this study result, nowadays fertilizer cost share seems getting larger in rice farming cost structure, and labor cost share became decline. The high share of cost of fertilizer in conventional rice farming cost structure, partly due to the use of excessive amounts of fertilizer by farmers, exceeding the government dosage recommendations. Figure 1 and figure 2 describe labor cost share in cost structure of rice farming systems.

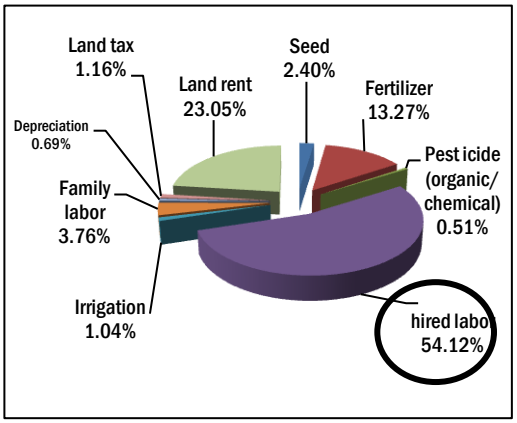

Figure 1: Labor share in cost structure of organic rice farming system

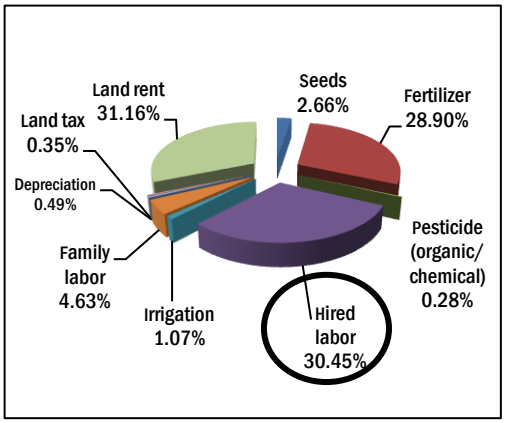

Figure 2: Labor share in cost structure of conventional rice farming system

Based on the research results, the organic rice farming system absorbs labor 144.35 workdays/ha/planting season or 433.05 workdays/ha/year, while the conventional rice farming systems absorb 128,58 workdays/ha/planting seasons or 385.71 workdays/ha/year. Function value of rice farming system as a labor absorber showed at Table 3. When the working day for 1 year 260 days/year, the opportsocial cohesion of working with one hectare of rice field cultivation with organic systems is equivalent to 1.67 people, while the employment of one hectare of rice field with conventional cultivation systems equivalent to 1.48 people. A conversion of fields cultivated with organic rice farming systems at Pereng village, Karanganyar, will eliminate farmers employment and farm workers with higher economic value than the conversion of land planted with conventional systems at the same location. Employment loss is also higher in case of conversion of rice fields with organic systems in the Sukorejo village, Sragen, than if rice fields planted with conventional systems. Table 3 describe economic value of labor absorption function of organic and conventional rice farming in Rp/ha/year at research areas.

Implementation of agricultural mechanization on rice farming nowadays affect the economic value of job opportunities, which it will reduce employment level in rice farming.

Social cohesion among farmers

Social cohesion measured from 4 indicators that had met validity and reliability criteria. The indicators based on farmers perception during farming activity shown in table 4, which showed that custom mutual helps, involvement in farmer group, involvement in agricultural activities, and need for searching in agricultural information of organic rice farming systems tend to be dynamic than conventional systems.

Table 3: Economic value of labor absorption function of organic and conventional rice farming in research areas

No.	Region	Economic Value of Labor Absorption Function (Rp./ha/year)		t-test
		Organic Rice Farming System	Organic Rice Farming System	
1	Pereng Village, Mojogedang, Karanganyar District	154.086.836.914,87	124.977.379.016,80	0.968^{ns}
2	Sukorejo village, Sambirejo, Sragen district	140.701.050.773,51	149.940.051.633,89	0.495^{ns}
	t-test	0.968^{ns}	1.254^{ns}	

Source: primary data analysis (2013)

Table 4: Social cohesion among farmer of organic and conventional rice farming systems

No.	Indicators	Organic Farming Systems		Conventional Farming Systems		t-test
		Mean	St. Dev.	Mean	St. Dev.	
1	Custom mutual helps in farming	2.162	0.374	1.588	0.609	5.284*
2	Involvement in farmer group meeting	2.784	0.417	2.075	0.854	4.786*
3	Need for cooperation in searching for agricultural information	2.757	0.495	2.138	0.759	4.533*
4	Involvement in agricultural activities	2.459	0.605	1.688	0.722	6.025*
	Mean	2.541	0.366	1.872	0.551	7.767*

Sources: primary data analysis (2013)
Note: (*): there is a difference between organic and conventional systems at the level of 5% error

Information needs of agriculture and farmers 'involvement in farmer group activities of organic rice farmers tend to be higher than conventional system. Organic farming has not been done and understood by every rice farmers in the countryside, therefore farmer group activity was one way to seeking the information on how organic farming systems works. Organic farmer's will increase the ability of individuals or farmers group to participate in the development of organic rice farming, because the social cohesion become a social capital that will give effect to the surrounding communities as well as rural development.

Farmer women participation

The results of this study, the organic farming system encourages the participation of farmer women, showed in table 5.

Table 5: Participation of farmer women in organic and conventional rice farming systems

No.	Indicator	Organic Farming Systems		Conventional Farming Systems		t-test
		Mean	St. Dev.	Mean	St. Dev.	
1	Involvement in the farming	2.081	0.795	2.000	0.796	0.513ns
2	Involvement in farm	1.946	0.575	2.050	0.614	0.891ns

	management decisions					
3	Involvement in product value/marketing	2.378	0.681	2.288	0.715	0.661ns
4	Involvement in the organization/farmer groups	1.216	0.479	1.275	0.551	0.588ns
	Mean	1.9054	0.41396	1.9031	0.45265	0.026ns

Sources: primary data analysis (2013)
Description: (ns) there is no difference between organic and conventional systems at the level of 5% error

Table 5 shows there weren't differences in participation of farmer women between two farming systems. Farmer women in rice farming in this study tend to be passive in farmer groups due to the position of women farmers in the farming only help her husband. The presumption that husband is responsible for the success of farming, puts farmers women not as a prime position in farming system. There weren't differences in the farmer's wife's participation stages of farming activities, explained by the farmer woman involvement at farming stages in table 6.

Table 6: Involvement of farmers women in farming

No.	Activity	Women farmer involved in organic rice farming		Women farmer involved in conventional rice farming		t-test
		workdays	%	workdays	%	
1	Tillage	0	0	0	0	-
2	Nursery/ seedling	0.13	18.92	0.28	21.25	1.97 ns
3	Planting	42.97	86.49	41.58	98.75	0.22 ns
4	Weeding	4.78	72.97	7.52	77.50	1.30 ns
5	Fertilizing	0.008	2.70	0.43	18.75	3.47 *
6	Harvesting	0.11	5.41	0.13	3.75	0.176 ns

Sources: primary data analysis (2013)
Description: (ns) there is no difference between organic and conventional systems at the level of 5% error

There weren't differences in women's involvement in organic and conventional rice farming system, except at fertilization stage. Fertilization stage of conventional rice farming system performed twice in one planting season. The first fertilization is done when the plants mature approximately 12 days at a dose of fertilizer-third of the overall demand for fertilizer, while the rest of the fertilizer is given in the second phase which is approximately at 40 days old plants. Some farmer who only narrowly control the land, tend to involve his wife to help. Unlike farmer at organic system, because the amount of manure applied to the crop tends too much, so the fertilization of rice organic system usually done by man.

Tradition maintenance

Tradition and culture is gradually emerging out of the realm of social sustainability and being recognized as having a separate, distinct, and integral role in sustainable development. Within the sustainability field, culture is discussed in terms of cultural capital, defined as "traditions and values, heritage and place, the arts, diversity and social history (Roseland *et al*., 2005). The stock of cultural capital, both tangible and intangible, is what we inherit from past generations and what we will pass onto future generations.

Until now, the process stages of rice cultivation at Java, has not lost its religious

nature and was celebrated with accompanying slametan. Certain ceremonies that long ago regarded as a means of an application to the regulator of the universe in order to keep the fields to avoid disastrous crop failures, more and more were not believed by farmers. Slametan" or ceremony which was held related to Dewi Sri (rice Goddes) respected by making offerings include "wiwit", "tingkeb tandur", and "methik". Tabel 7 describe some rice farming ritual at research area.

Table 7: Rice farming tradition at research area

Type of tradition	Time implemented	Symbols	Farmer motivation
Wiwit	When will grow rice. Offerings of rice cone, boiled chicken, with vegetables	Aware of farming depends on the natural environment, wiwit ceremony to hope that when early farmers planting lots of water so that the rice can be grown either	As an individual responsibility to parent advice and as cultural education towards next generations
Tingkeb tandur	When rice plants 'mrekatak' (panicle out together) and then pregnant	When rice grow and started out the grains of rice in panicle, regarded by farmers have given sustenance and protection to farmers	As an individual responsibility to parent advice and as cultural education towards next generations
Methik	The first rice harvest, offerings of rice cone with egg, rice stalks and storage in the barn / house.	Tribute to Dewi Sri, who has been keeping rice since birth to harvest, and expected savings from the rice harvest in the next harvest bountiful results.	As an individual responsibility to parent advice and as cultural education towards next generations
Bersih desa/ sadran	After the rice harvest season-2, the collection includes food and prayer together villagers	Villagers expressed their gratitude for the rice crop has been harvested and managed to produce a satisfactory crop. There are socio-cultural values, the mutual cooperation, sacrifice, equality of social / economic	As a public responsibility and cooperation in rural community

Source: interview result (2012)

The results showed only a small number of farmers do farming tradition, at figure 3.

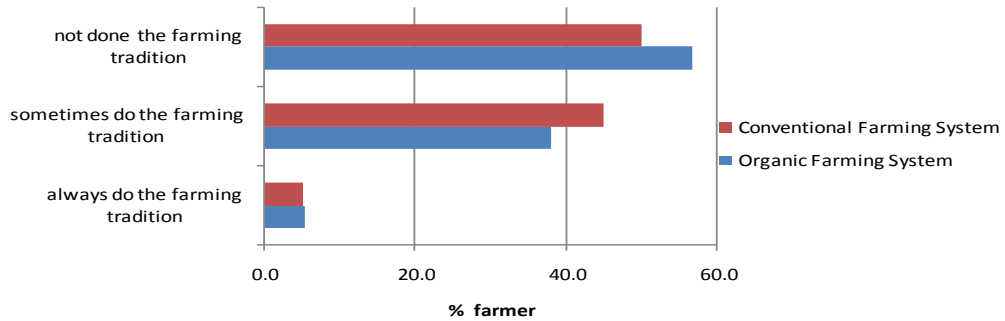

Figure 3: Distribution of farmers based on rice farming tradition activity

Only about 5% of farmers still do "slametan" tradition in the farming process, which is carried out by farmers who are relatively old, because they feel obliged perform their parents message. Simplicity reason and lack of farmer confidence were the reason that affects the abandonment of farming tradition. The majority of rice farmers do not do the traditions and ceremonies because cost savings thinking and the belief that the tradition of farming will not prevent natural disasters, because disaster is the cycle of the seasons that cannot be avoided. The results conclude that rice cultivation with organic system does not ensure the maintenance of rice farming tradition.

Tradition regurlarly do by farmer can increase quality of life, suporting positive norms, such as cultural understanding and free expression, and also fostering trust between farmers and relationship, because they do the ritual together.

Simple construction model social-cultural potential to rural development

Social cohesion among rice farmers is ongoing social capital for rural development, the same with human and culture capital, which referring to Sakurai (2006), social potential can gave influence on rural development. Figure 4 is simple model to describe the role of human, social, and culture to rural development.

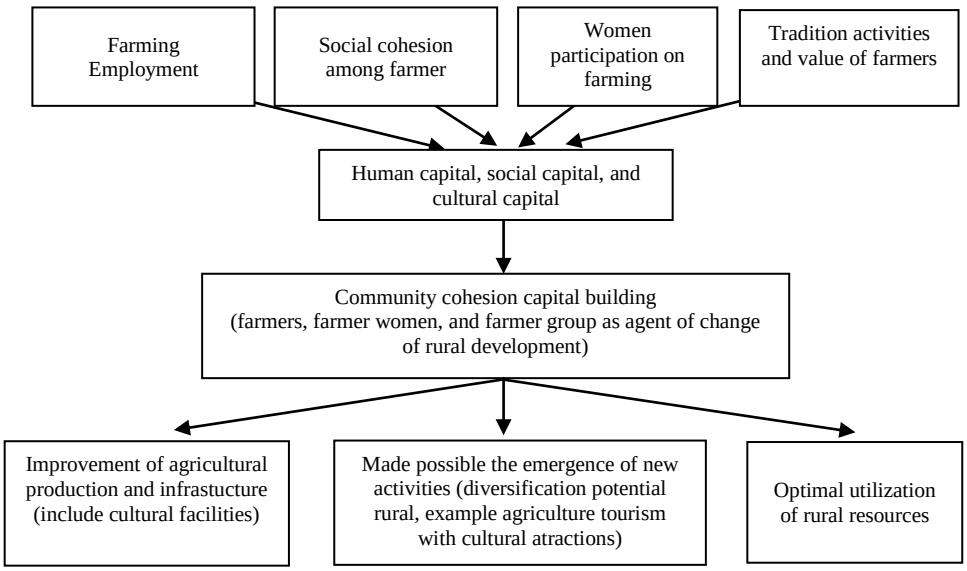

Figure 4: Social and cultural role in rural development

Social cohesion among farmer, farmer women participation, tradition, are support community capital building, so it can give contribution on rural development. Today, professionals and academics in the field consider sustainable community development to be an appreciation of many types of community capital and/or assets within a community, as "all forms of capital are created by spending time and effort in transformation and transaction activities" (Roseland *et al*., 2005). Social sustainability reflects the capability and character of a society; at its core is the capability and character of its individual members. This human capability also pertains to the human capital which is also a component of economic sustainability.

Sustainable rural development must be achieved at every level of society. People's organizations, women's groups and non-governmental organizations are important sources of innovation and action at the local

level and have a strong interest and proven ability to promote sustainable livelihoods. Social capital has increasingly gained recognition in many aspects of agriculture, natural resource management and rural development in developing countries due to its perceived positive consequences for development and opportunity for those who lack possession of and access to financial, human or natural capital. Social capital theory provides a useful framework for explaining social connections or relationships that can generate collective action advantageous to a group (Meinzen-Dick *et al*., 2004 in Ouma and Abdulai, 2009).

Conclusions

This study analysis showed that organic rice farming systems was labor-intensive, and the economic value as labor absorbers and social cohesion were better than conventional rce farming system. Organic farming improved cooperation between famer, dynamic farmer groups, also encourage cooperation among farmers, increase the activity of extracting information together, as well as agricultural activities following the activity. Application of organic rice farming system is no different from conventional rice farming systems in encouraging the participation of women farmers, also in the maintenance farming tradition.

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