SYSTEM OF RICE INTENSIFICATION (SRI) PRODUCT VALUE ADDED AND DISTRIBUTION CHANNEL ANALYSIS
Case Study of Handling and Post Harvesting Processes in Sudimoro, Megaluh, Jombang.

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Abstract

Indonesia was been predominantly an agricultural economy in which rice was been the major crop and staple food. Great efforts were therefore being made to improve paddy production and post production practices. This research was aimed to: 1)identify the added value of paddy handling and post harvesting processes; 2) analyze profit margin gained by farmer from selling off the paddy with and without handling and post harvesting process; 3)describe the variability of distribution channel and marketing institution of rice, husk and bran. This research was conducted in Sudimoro village and used primary data collected form 70 SRI (System of Rice Intensification) farmers. Research findings showed that the amount of added value earned is less than 15%. The hulled rice added value is higher than added value of husk and bran. There were three kind of distribution channel. The marketing institution involved were farmers, brokers, rice milling unit (RMU), wholesaler, distributor and retailer.

Keywords: *value added, handling and post harvesting processes, marketing channel*

Introduction

Indonesia was been predominantly an agricultural economy in which rice was been the major crop and the staple food. Paddy *(Oryza Sativa)* cultivation had been held in almost of Indonesia region. Paddy productivity in East Java was approximately 5.734 kg/hectare with total production level was about 11.096.154 ton (BPS,2009). Paddy production in East Java tend to increase each year, but in the other side the number of rice demand was always increase too. Based on the size of population data, it could be estimated that Indonesia rice demand in 2010 was 31,06 million ton.

The increased of   paddy production and productivity was reached through agriculture intensification. Agriculture extensification couldn't be implemented in Java because of land scarcity. Those agriculture intensification operation in the long run gave negative impact on land fertility, and caused wider negative impact such as water pollution and other environment degradation. Under these circumstances, famers was directed to

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adopt alternative cultivation method. One of the alternative cultivation method suitable to be implemented was System of Rice Intensification (SRI).

SRI was remarkable not only in its origin and in the benefits that it could create, but also in the ways that it was being developed and extended as individual an civil society organization had taken responsibility for SRI promotion in ways not common in the agricultural sector. Proponents stressed that SRI was not finished yet. It was a work in progress, still evolving and improving. It is continuously being adapted for diverse environments as these environment and SRI become better understood (Uphoff,2003).

Farmers at Sudimoro Village, Megaluh Jombang had been implement SRI method since 2008. It had been reported that paddy productivity they cultivated was increased. When this research was conduct, farmers sold their rice at normal price level, approximatelly 5.300-5.900 IDR. Generally, farmers sold 50% their paddy yield immediately when they harvested. Farmers kept 20% paddy yield as family food stock and 30% as sold supply stock.

Efforts to develop and expand SRI as alternative agricultural system was regarded by many observers as creating new opportunities for improving paddy productivity. However, these efforts were not always followed by the increased of economic viability and farmers's income. At last, income level of farmers included who implemented SRI method, would ultimately be determined by product price and quantity of sold product. Meanwhile the percentage of paddy yield sold by farmers was influenced by post harvest loss and commodities value added.

Expanding local processing of agricultural products has been a rural development strategy for some time. For example, rice miling was long standing value added food manufacturing entreprises that sited their manufacturing facilities near the raw material source. The value added agriculture of today was developing in the context of vertically coordinated and integrated production system, or agro food value chains, that organize production to meet the quality assurance demands of specialized consumer markets (Cowan, 2002).

How the farmers sold their yield crop, affected handling and processing method they implemented. Farmers didn't do any post harvest activities on 50% paddy yield sold at field when they harvested. But they held post harvest activities for 20% and 30% yield crop kept for food and sold supply stoks. This research was aimed to:

1. Identify the added value earned by farmers from post harvest activities they implemented on their paddy yield?

2. Study many profit margin the farmers earned from selling off rice yield with and without post harvest activities?

3. Analyse the variaty of distribution channel and related marketing institution of rice, husk and bran

Literature Review

System of Rice Intensification as an Alternative Effort to Promote Paddy Productivity and Water Resource Saving

Worldwide, the agricultural sector made the largest demands of any sector on finite fresh water resources, and within this sector irrigated rice production was the largest source of demand for fresh water. Given the following trends, making substansial, not just marginal, reductions in on farm water consumption in rice farming would have far reacing, even urgent significance (Uphoff,2006):

1. As population continued to grow, with supplies of fresh water at best remaining constant water availability in per capita terms declined ecah year, until population growth ceased

2. As economic development proceeds, competing demands for water will made it imperative for agriculture to become more water economizising in its production methods. Both domestic consumption and industrial uses were already becoming stronger competitors with agriculture increase the demand for personal consumption of water, thereby augmenting total demand

3. Reduction in water quality were occuring in many places through variouse kinds of chemical and other pollution. The diminishing supplies of pure water affected the world's ecosystems as well as human health. Moreover, the cost of good water rose when water purification become more often necessary

4. Further, umpending climate changes were likely to adversely affected present patterns and amounts of rainfall distribution over time and space

System of Rice Intensification (SRI), was an unusual innovation in several ways, that its methods could rise, concurrently the productivity of the land, labor, water and capital invested in irrigated rice production. This positive sum diynamic violated precept

that there are no free lunches, which assumed that there must always be some tradeoff. Of course, there were costs involved with SRI adoption, particularly invreased labor from farmers during their initial learning phase; and there are some conditions where the methods will be inappropriate or impractical. SRI works by changing the management of the plants, soil, water and nutrient utilized in paddy rice production. Specifically, it involves transplanting single young seedlings with wider spacing, carefully and quickly into fields that are not kept continuously flooded, and whose soil has more organic matter and is actively aerated. These practices improved the growth and functioning of rice plants root system and enhance the numbers and diversity of the soil biota that contributed to plant health and productivity (Stoop et al.,2002; Uphoff, 2003, Randriamiharisoa et al., 2008; Mishra, et al., 2006).

Through implementation of SRI method, at Sudimoro village could increase their paddy productivity, enhance the quality of soil and water resources. Their production increased moder than 1 ton/hectare.

Post Harvest Practices of SRI's Product

The activity of post harvest was a measures or treatment which given on agricultural product after harvest until the commodity reside at their consumers (Mutiarawati, 2007). The paddy post harvest activities consist of grain threshing, drying, sorting, grading, transporting and storaging. The post harvest activities was carried out in order to increase the added value and the quality of product, upgrade farmer's income and expand the distribution channel (Soekartawi, 1991). The post harrvest system should be thought of as encompassing the delivery of a crop from the time and pace of harvest to the time and place of consumption with minimum loss, maximum efficiency and maximum return for all involved.

The term "system" denoted a dynamic, complex aggregate of logically interconnected functions or operations within a particular sphere of activity. The term chain or pipeline highlighted the functional succession of variouse operations but tend to ignore their complex interaction (CIRDAP,2010).

In considering the system or the agro food chains as a whole, harvesting can be seen as the hinge or as a ridge between the pre harvest slope, corresponding to production activity and the post harvest slope, extending form harvesting to consumption (CIRDAP, 2010).

Main elements of the post harvest system:

1. Harvesting

2. Pre harvest drying

3. Packing

4. Transporting

5. Post harvest drying

6. Threshing

7. Storage

8. Marketing

9. Distributing

Post harvest system rolling a sequence of activities and operations that could be divided into three groups, it was mentioning the first two as follow as :

1. Technical activities: harvesting, field drying, storage, processing

2. Economic activities: transporting, marketing, quality control, nutrition, extension, information and communication, administration and management

3. Consumption pattern: preparing food, cooking

Agricultural crops losses were measurable reduction in foodstuffs and might affect either quantity or quality (Tyler and Gilman, 1979). They arose form the fact that freshly harvested agricultural produce is a living thing that change during post harvest handling. Quantitative loss of agricultural crops was a loss in terms of physical substance, meaning a reduction in weight and vlume and can be assesed and measured. Qualitative loss, however was concerned particularly with the food and reproductive value of products and required a different kind of evaluation.

It had beed reported that SRI method implementation in research site not only could increase the productivity of rice but also enhance rice quality. Post harvest activity of SRI product was proven could improve product value added, increase farmer's income and enlarge distribution area (Soekartawi, 1991).

Distribution and Marketing Practices of SRI's Product

Rice had been considered as a trade commodity. The next activities had to be done after rice post harvest process was distribution and marketing practices.One of distribution

and markeing determinant factor was distribution channel. Distribution channel played important role to enhance time, place, form utilities and ownership.

Distribution and marketing practices gave different impact on post harvesting activities of paddy yield. Farmers who sold their yield crop to wholesale buyer, didn't do any post harvest activities, because these activities was done by wholesaler. Famers only gave post harvest treatment to their unsold yield crop.

Post harvest practices produced primary products such as rice, husk, bran and rice straw. Farmers sold their yield crop as unhulled and undried rice. There were several kinds of marketing participant of rice distribution namely merchants such as rice assemblers, wholesalers, millers/polisher, retailers and middleman or broker and facilitators.

Normally, there were two types assemblers involved in rice distribution and marketing practices local assemblers and assemblers-wholesalers. Local assemblers were usually local society, who had indepth knowledge of cropping pattern, quality of different rice vaieties and the production tranditions of local farmers. The assemblers could be farmers located in village who have a transportation vehicle and a small working capital at their disposal. They purchased paddy from farmers and transport it to rice milling unit or sell it to other local traders.

Assemblers-wholesalers usualy were middlemen, who lived near the market, so they could easily load the product they sold. Normally they had a truck, but didn't have own stalls. Assemblers-wholesalers bought a large amounts of paddy and sold it to wholesalers or private agencies.

A private wholesaler was a trader who owned stalls or warehouses located along main road or near rice milling unit. They perform wholesale functions. They usually had a long experience with paddy or rice trading, strong networking with other traders and good knowledge on rice quality and market prices. They bought a large amount of rice and sold to other province which was deficit rice regions through so called long distance trading.

Rice milling unit who were located near town purchased paddy from farmers, assemblers or wholesalers. Rice milling unit held milling activities and dilivering milled rice to wholesalers and retailers in the market. Someties they didn't purchase the product but just milled paddy or polished the brown rice and received payment as processing cost from farmer or trader.

Methodology

Data Collecting

This research was conduct at Sudimoro village, Megaluh, Jombang. On research site, farmers implemented SRI method. Observation area covered by the research was about 147 hectares paddy field.

There were two categories of data sources used in this research, farmers and marketing agents. Famers were chosen as data sample through simple random sampling method, whereas marketing agents as data source was explored by snow ball sampling design. The size of farmers sample was 70 person. Marketing agents used as data source was determined by distribution area they coverd.

Data Analysis

The method used to analyze the value added of post harvest practices was formulated by Hayami. This formulation could be used to obtain some information such as value added ratio, direct labor income, the share of direct labor on value added, profit rate and the magnituede of other inputs contribution on product value added.

Value added was defined as difference between the output and raw material values of paddy post harvest practices Whereas the value added ratio was percentage of product value. Direct labor income showed the wage of direct labor used to produce single unit of raw material in IDR. The share of direct labor indicates the percentage of direct labor income from added value. While profit (IDR) indicated the share received by famer who performed post harvest activities. The level of profit represented profit gained from product value added. Hayami formulation to calculated post harvested rice value added could be followed as below:

Table 1. Hayami Value Added Calculation Procedure

Variabel	Value
I. Output, Input, and Price	
1. Output	
• Rice	(1a)
• Husk	(1b)
• Bran	(1c)
2. Input (unhulled paddy, grain)	(2)
3. labor	(3)
4. Convertion factors	
• Rice	(4a) = (1a)/(2)
• Husk	(4b) = (1b)/(2)
• Bran	(4c) = (1c)/(2)
5. Labor coefficient	(5) = (3)/(2)
6. Output price	
• Rice	(6a)
• Husk	(6b)
• Bran	(6c)
7. Labor wage	(7)
II. Revenue and Profit	
8. Raw Material Price (Unhulled paddy)	(8)
9. Other Inputs Contribution (IDR/Kg unhulled paddy)	(9)
10. Output value	
• Rice	(10a) = (4a x 6a)
• Husk	(10b) = (4b x 6b)
• Dedak	(10c) = (4c x 6c)
• Total output value	(10d) = (10a +10b +10c)
11. Value added	(11) = (10d) – (9) – (8)
• Rice	(11a) = (4a x 11)
• Husk	(11b) = (4b x 11)
• Bran	(11c) = (4c x 11)
12. Value added ratio	(12) = (11)/(10) x 100%
• Rice	(12a) = (11)/(4a) x 100%
• Husk	(12b) = (11)/(4b) x 100%
• Bran	(12c) = (11)/(4c) x 100%
13. Labor's direct revenue	(13) = (5) x (7)
14. Labor share	(14) = [(13)/(11)] x 100%
• Rie	(14a) = (4a) x (14)
• Husk	(14b) = (4b) x (14)
• Bran	(14c) = (4c) x (14)
15. Profit	(15) =(11) – (13)
• Rice	(15a) = (4a) x (15)
• Husk	(15b) = (4b) x (15)
• Bran	(15c) = (4c) x (15)
16. Profit level	(16) = (15)/(11) x 100%
• Rice	(16a) = (4a) x (16)
• Husk	(16b) = (4b) x (16)
• Bran	(16c) = (4c) x (16)

Research findings

Based on research findings, there were three types of farmer's decision on distribution and marketing practices. The number of farmers who performed post harvest practices were 38 person (54.29% of respondents). While the number of farmers sold their product through wholesaler system and performed post harvest practices were 22 person (31.43% of respondents). The number of farmer respondent who decided sell their yield crop to wholesaler were 10 person (14.29% respondents).

The result of the research showed that the amount of added value earned from processing activity unhulled paddy, to be hulled rice, husk, and, bran is Rp. 492,60/Kg or 14,10% (< 15%). That added value was categorized of low added value because because less than 15% (Hubeis in Hermawatie, 1998). And the partial added value on hulled rice, husk, and, bran is Rp. 295,31/Kg; Rp. 98,44/Kg; Rp. 93,51/Kg. The hulled rice added value higher than the added value of husk and bran because the hulled rice is a main product of rice post-harvesting activity. Hulled rice have a higher price than husk and bran. Nevertheless, the process of post-harvesting give a profit about Rp. 452,60/Kg or 91,88%. That profit refers to the revenue received by the farmer on the activity of processing on the postharvesting.. The low added value occurred because the cost of raw materials and another input contribution almost reached total output value that earned. The production of hulled rice, husk, and, bran must be optimalism to increase the added value. If it was optimalism, the quantity of hulled rice would be maximal. The result of income analysis showed that the income of post-harvesting time was higher than the income on rice plant before its harvesting time. The amount of income on the activity of post-harvesting time was Rp. 2.070.603,00/ton, while for the income of rice plant before its harvesting time was Rp. 2.195.800,71/ton. The analysis of the Average Differential Test showed that significance value of tarithmetic (0,051) was bigger than t- table (0,05), which meant that there was non real difference on income between the farmer that made sales of rice plant before its harvesting time with the farmer that made activity of postharvesting time.

The study on marketing channel indicated that there were 3 distribution systems of rice. They are farmers-consumers; farmers-broker-fixed RMU (Rice Milling Unit)-whole saler-middel agent-retailer dealer-consumers; farmer-broker-whole saler-middel agen-retailer dealer-consumer. Besides that there are 3 distribution systems of bran such as farmers-consumers; famer-fixed RMU-consumer; an farmer-broker-middle agent-retailer dealer-consumer. And there are 2 distribution systems of husk. They are farmer-consumer;

and farmerbroker-f ixed RMU-consumer. The marketing institutions that involved in the marketing of rice were farmer, broker, fixed RMU, wholesale merchant, distributor, and retailer. Meanwhile, the institutions that involved in the marketing of bran were farmers, broker, fixed RMU, distributor, and retailer. And the institutions that involved in the marketing of husk were farmers, broker, and fixed RMU.

Conclusion and Recommendation

The investigation on marketing channel indicated that there were 3 distribution systems of rice. They are farmers-consumers; farmers-broker-fixed RMU (Rice Milling Unit)-whole saler-middel agent-retailer dealer-consumers; farmer-broker-whole saler-middel agen-retailer dealer-consumer. Besides that there are 3 distribution systems of bran such as farmers-consumers; famer-fixed RMU-consumer; an farmer-broker-middle agent-retailer dealer-consumer. And there are 2 distribution systems of husk. They are farmer-consumer; and farmerbroker-f ixed RMU-consumer. The marketing institutions that involved in the marketing of rice were farmer, broker, fixed RMU, wholesale merchant, distributor, and retailer. Meanwhile, the institutions that involved in the marketing of bran were farmers, broker, fixed RMU, distributor, and retailer. And the institutions that involved in the marketing of husk were farmers, broker, and fixed RMU.

There are some research suggestion, such as (1) the farmers can increase rice added value with optimizing production through the diversification of rice or rice processing into products such as rice flour, wine, rice kencur; processing into oil bran and bran cereals; use of chaff as compost, fuel, and charcoal husk. (2) for furthermore research is expected to analysis the addaed value in each marketing organization of hulled rice, husks, and bran; and analyze the differences of wholesale rice income and post-harvesting rice income on the other location which have a different socio-economic characteristics from this research location.

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