CHAPTER 7

DISCUSSION, CONCLUSION AND RECOMENDATION

7.1 DISCUSSION

7.1.1. Production environment and efficiency of rice production.

The diversity of production environments as well as farmers' criteria in selecting the various cultural practices in each production system have resulted in farmers' attempts to overcome their constraints in the individual farm. However, because of limited cultivated area in the irrigated and the rainfed lowland in Thua Thien Hue province, farmers have integrated crop, livestock and small trade in the rainfed area, and crop-livestock and waged labor in the irrigated area. The diversity of farming systems is a better way to increase and stabilize farm incomes.

Rice production in Thua Thien Hue province is not enough for consumption. The high yield is first criteria on selecting variety, in which the high yielding varieties IR17494 and CR203 occupy larger planting areas as compared to other varieties in the irrigated area, even these varieties susceptible to diseases and and low culinary quality, but they produce higher yield. In the rainfed area, big problems are water shortage, high water level in spring season and poor soil fertility. Local rice varieties are more suitable than the modern rice varieties. This is main reason why farmers in the rainfed area allocate small area for modern rice varieties.

The results of the study show high yield variation among farmers. A few farmers in the irrigated area, could achieve 8 ton/ ha while the average is 4.5 to 5 ton / ha .in the spring season. In the summer season the highest yield is 7 ton/ha and the average is 4-5 ton/ha. These results indicate that farmer have the potential to increase the rice yield to cover the demand for consumption in Thua Thien Hue province. In the rainfed area the highest yields of the local rice varieties are 3 ton/ha and 3.2 ton/ha in the spring and summer season respectively, but most of rainfed farmers achieve 1.7 –2.0 ton/ ha. Some even have less than 1ton/ha. The differences in rice yield across farmers indicate that there is ample scope for improving rice productivity by enhancing soil fertility, and fine turning the technology such as investing on manure, phosphorus, improve seed quality and pest management. In the summer season in the rainfed area, the yield differences across farms are smaller in broadcasting rice than that of transplanting rice, because the former case largely involves adoption of improved varieties and better management practices such as weed, fertilizer, and pest management. The high variation of rice yield would suggest the necessity to assess the risk of rainfed rice production system and to focus research on new cash crops.

With respect to sustainability of production systems, the irrigated farmers show intention in investing fertilizer use in both planting seasons and planting methods but the current rate of nutrient use are not appropriate. The results from input factors such as manure, nitrogen, phosphorus and potassium are highly responsive to rice yield.

The contribution of herbicide to yield of transplanting rice in the irrigated area is not significant . The irrigated rice farmers use both manual and chemical methods for weed control but only about 47 % farmers have invested on herbicide to reduce weed population in their field. Water management has also been used for of weed suppression. The water stand level in the transplanting plots is retained usually over 10 CM and can be increased following the pace of rice development. Therefore, the contribution of herbicide input to yield of transplanting rice is small. This result suggests that farmers could reduce herbicide cost and use other methods such as manual, and water management for weed control on the transplanting rice. On the contrary, the results from analysis of production functions show that herbicide applied for broadcasting rice strongly contributes to rice yield, adding one thousand VND of herbicide could increase rice yield from 3 to 9 kilogram per sao. Thus weed control measure is important cultural practice for increasing yield inbroadcasting rice. Moreover, the result also reveals that land preparation that involves leveling after puddling by tractor is good method for weed control.

Pesticides input shows negative response to rice yield in both planting seasons and planting methods in both production environments, even when frequency of pesticide application is high. Over 90 % of the irrigated farmers spray more than three times in one crop which cost 5,000 to 50,000 VND for pesticide, but the use of pesticide appears to have little impact on rice yield. The result suggests that improvement of farmers' technical knowledge in the pest management is necessary to reduce pesticide costs. Most of the farmers in the rainfed area do not invest pesticide

for transplanting rice in both planting seasons. It may be due to low severity of pest attack on local rice varieties.

Labor used for rice productions in the irrigated area are not significantly different for all of the planting methods and planting seasons. The average of laborrequrement ranges from 5.5 to 6.8 manday per sao, labor used for transplanting rice and spring rice are higher than broadcasting rice and summer rice respectively. The higher labor used for transplanting rice is taken for seeding and transplanting. Usually transplanting one sao ($500m^2$) must invest at least 2 mandays, while broadcasting requires only 0.5 manday per sao.

In the rainfed area, the contribution of labor to transplanting rice productivity is significant. Rainfed farmers spent less labor for weed and pest management. This can partly explain why the yield of local rice is different among the farmers and reasonably still low. This result showed that rainfed farmers could increase rice yield by attempting to take care of the crop.

According from economic analysis, the net profit of transplanting rice and broadcasting rice are not different in the spring season in irrigated area. This result suggested that irrigated farmers could use either transplanting or broadcasting methods. In the summer season, broadcasting rice generated higher profit than transplanting rice. This is advanced of short duration varieties in the summer season in the lowland of Thua Thien Hue province. Given the current situation, the recommendation to increase rate of broadcasting rice in summer season is imperative to reduce labor.

7.1.2. Can we improve the rice productivity to meet the population demand?

To improve the rice productivity, the experience from this study suggests an improvement of soil fertility in both production environments. Nearly 65% irrigated farmers and 100 % rainfed farmers indicated low soil fertility to be the prime reason for low yield. In this problem, the return of crop residues and increased livestock production to improve the humus and nutrient content in the soil could be considered. On the other hand, crop rotation with other crops such as peanut or legumes is one way to increase cash income and improve soil fertility.

Low seed quality is also the major concern of the irrigated and the rainfed farmers. The selection of rice varieties and improvement of seed quality as well as the production of quality seed by the commercial companies should be promoted.

Severe disease incidence is also a main constraint of lowland rice production in Thua Thien Hue province. This situation calls for improvement of the agricultural extension network and open more training courses to transfer the technology of pest management to farmer. Moreover the agricultural extension officer should timely monitor the prevalence of disease and pests in the growing seasons. So that timely assistance on proper pest management practices could be offered to the farmers.

7.2. CONCLUSION

7.2.1. Rice production system

In both irrigated and rainfed lowland ecosystems of the Thua Thien Hue province, two rice growing seasons, spring and summer are common. Two planting methods, transplanting and broadcasting are used, with the exception for spring rice in the rainfed area, where rice is only transplanted. This is because during the spring season, water level is high and flooding is common in the rainfed lowland, transplanting method is used to avoid risk due to flooding.

The average farm size in the rainfed area is larger than that in the irrigated area, having 0.63 ha and 0.44 ha respectively. However, proportion of rice planting area and number of rice plot in the irrigated area are higher than in rainfed area (83 % and 3.3 plots compared with 61. % and 2.8 plots respectively).

About twenty rice varieties are used by the farmers. The irrigated area is planted to all modern rice varieties, notably the variety IR17494; while the rainfed area, the farmers continue to grow local rice varieties, the most common are Heo and Chum.

Buffalo is still used for land preparation, but tractor is found to be used together with animal for land tilling, harrowing and puddling.

Farmers in the irrigated area use herbicides for weed control, while in the rainfed area, manual control technique is used instead.

For nutrient management, farmers in the irrigated area apply higher rate of nitrogen fertilizer and manure, particularly for broadcasting rice. However, farmers in the rainfed area use very little manure and chemical fertilizer.

The average rice yield of modern varieties could reach 5.1 tone/ha (IR17494) while the average yield local rice varieties such as Heo and Chum ranges from 1.5 to 2.4 tone/ha.

7.2.2. The constraints to rice yield.

High disease infestation, devastation caused by rats, and low temperature at the flowering stage of spring rice are the most serious constraints to rice production in the irrigated area. In addition, farmers in the rainfed area indicate that high temperature at flowering stage of summer rice, poor soil fertility and poor seed quality are strongly affect rice yield. Results from the survey indicate that nearly 40 % of the farmers are lack of capital for rice production in both production environments.

7.2.3. Economic of rice production

The economic analysis showed that total production cost and family income of transplanting rice are higher than that broadcasting rice in both planting seasons. Total cost of spring rice is higher than summer rice in both planting methods. Total revenue, benefit as well as return to labour of spring rice are higher than that of summer rice, but in summer season, broadcasting rice has higher benefit than transplanting rice. The economic results demonstrated that farmers received positive

net benefit from rice production in two planting seasons and two planting methods except for transplanting rice in the spring season in the rainfed area.

In the irrigated area, cost of material, labour and machinery contribute about 41 %, 42% and 20 % of the total cost respectively for transplanting rice and about 41, 37, and 22% respectively for broadcasting rice. In the rainfed area, increase labour cost is observed about 52% for transplanting rice, while machinery cost accounts for 24 to 26 % to the total cost.

Rice yield positively respondes to inputs such as manure, nitrogen, phosphorus and labour, but does not respond to pesticide input for all production systems. The results also confirm that adding more potassium, phosphorus and manure are more efficient than adding nitrogen. Farmers in the rainfed area should reduce the rate of nitrogen used for transplanting rice in the spring season.

7.3. RECOMMENDATION

Based on the outcome of this study, the following recommendation could be made.

1) To improve the productivity of rice, farmers in the rainfed and irrigated area should emphasize on proper nutrient management such as adding more phosphorus, potassium and manure, especially investing on phosphorus in rainfed rice production would result in higher retern.

2) Soils fertility improvement such as crop rotation with legume crops needs to be considered for rainfed farmers; Extension of peanut area is deemed to be the best way to enhance green manure source which can increase humus content in sandy soils.

3) Agronomist and extension officers should pay attention to evaluate rice varieties and introduce suitable varieties in the varying environments.