CHAPTER 6
CONCLUSION

As increasing in living standard of Chinese people, there is substitution between quantity and quality of rice consumption since late of 1980's. For its low elasticity, per capita rice consumption for food will tend to reduce along with the improvement in food consuming pattern High demand of good quality grain is becoming emerging issue which breeders and producers must consider in future's rice production. Improvement in rice quality would provide benefits to all sectors of society.

At present, the diversified milled rice with various price are available in the domestic market in Yunnan. Market price reflect to quality characteristics as well as the preferences of consumers. Hedonic price model is a simple methodology for testing relationships between quality characteristics and market prices of rice. The result of this study has clearly demonstrated that consumers' preference are different among three regions, namely, Dali, Kunming, and Xishuangbanna. The price of rice paid by local consumers in all three regions was affected significantly by grain length, gel consistancy, and amylose content of grain. More quality characteristics significantly affected the price of japonica rice than that of indica rice. That is, the significant price determinants of irrigated japonica along with upland rice included grain length, amylose content, gel consistency, alkali spreading value, and protein content of grain. Accordingly, the nutritional value in terms of Zn and protein content in grain became important price determinants for upland rice. In indica rice, percentage of head rice was identified as one significant price determinant.

The implicit price estimation provide insights into how consumers obtain

information about chemical characteristics, which imply that: (1) Development of low to medium amylose rice and improvement of grain length provide benefit for both consumers and producers. (2) Potential head rice recovery is an important quality characteristics that should be considered in indica breeding program. (3) There was potential returns to high nutritional quality rice, in terms of Zn content in grain, and protein content of grain in some cases. (4) Upland rice and glutinous rice due to their high nutritional value could probably consider as a perfect stable or substitution food. (5) Upland rice could also be considered as potential sources for future's Zn rich rice genetic selection, because the genotypic variation in Zn content of rice grain was significant. Upland rice contained relatively high Zn content in grain, particularly in its black rice.

Results from the field experiment demonstrated the potential and limitation of nutritional status of Zn and P in grain yield and quality of various rice varieties. The field experimental results have shown that there is advantage in applying Zn and P, in terms of grain yield, protein content in grain, the total amount of protein content in grain, the total amount of Zn content in grain, and head rice recovery of total brown rice.

Results of field experiment revealed that: (1) Different yield responses to Zn and P applications among rice varieties were observed in field study. Increase of grain yield due to applying of Zn and P was more pronounced with Hexi 35 and Yungeng 34. (2) Amylose content of grain was mainly determined by genotype, showed a slight increase with Zn applied. (3) Protein content in grain was enhanced by increasing amount of P application regardless applications of Zn and genotype. Protein content in grain may be depressed by Zn applied depending on response of grain yield of variety to Zn and P application, an increase in grain yield due to applying Zn induced a reduction of protein content in grain. (4) Head rice recovery increased as increasing in level of P application.

(5) Protein content in grain evidently positively related to degree of hardness of grain, and this explains that increase in head rice recovery as a result of P application was due to an increase in hardness of kernel. (6) Degree of hardness of grain reduced when Zn applied regardless application of P and genotype. As the result, head rice recovery tended to decline with Zn applied. (7) Different cultivars exhibited various capabilities to absorb and translocate P and Zn into the seeds. Zn content in grain was negatively associated with grain yield, this indicated that higher grain yield due to applying Zn and P resulted in a reduction of Zn content of grain in Hexi 35 and Yungeng 34. However, total amount of Zn in grain of Hexi 35 and Yungeng 34 were increased as Zn applied.

Overall advantage of application of Zn and P in grain yield and quality was related to rate of P applied, and genetic effects responsible for Zn and P efficiencies. According to the experimental results, there is a trade-off between grain yield and grain quality need to be considered when applying Zn in Hexi 35 and Yungeng 34. P application as an intensive cultivation method to obtain higher grain yield, higher protein and higher head rice recovery in Hexi 35 and Yungeng 34, it should be further explored for different varieties. The finding of this study may also suggest that it does not necessarily indicate that higher rate of P application will induce Zn deficiency. However, to be economically feasible, the amount of P and Zn together with the effects of P-induced Zn deficiency should also be further verified in large scale experiment before general and long-term recommendation is readily made to farmers.

In summary, overall results of this research provided new insight into consumers' preferences for rice quality characteristics as reflected in market prices and impact of variety and crop management in terms of Zn and P application on improvement of rice quality. This study suggested that rice quality was mainly determined by variety, the

biophysical conditions and crop management with respect to Zn and P application also influenced on the economically important quality characteristics. Hence, evaluation and improvement of rice quality should take account of both economic as well as agronomic aspects. Identifying factors in rice that promote grain quality in terms of head rice recovery, amylose content, protein content, and Zn bioavailibility should receive greater attention among breeders, agronomists, economists, as well as nutritionists.