

5.4 The whole system view of the transformation

The DWR area trends to reduce continuously since 1986. It has been replaced by FDR production system. Difficulty for FDR production during the transition is lack of appropriate technologies for FDR production system. Most of the farmer obtained technologies from nearby neighbors. A series of experiments is conducted to find out appropriate rice variety, suitable planting date and a good management, e.g., fertilizer application. However, rice varieties with short growth duration, resistant to lodging, cold temperature, and pest and diseases are needed. This is whole system view of transition from deepwater rice to flooded rice production system in deepwater area. The formulated appropriate managements from the research are transferred to the farmers to evaluate the adoption before implementation.

Variety

The farmers tend to eject PTT1 and CNT1 rice varieties, due to lodging problem before harvest, long growing duration, and susceptible to many diseases. Most of interviewed farmers tend to adopt PSL2 variety, due to short stem and resistant to lodging. However, some of the farmers tend to eject PSL2 variety, since it is susceptible to cold temperature, especially during the DS production period. The expected characteristics of FDR variety for planting in the deepwater area are short growth duration, resistant to insect pests and diseases, resistant to lodging and produce a high yield.

Planting date

Most of the farmer tends to adopt the May date for ERS, because of sufficient water supply throughout the growing season, and the rice can be harvested before flooding occur. All of interviewed farmers tend to adopt the planting date of DS in November for FDR production. They start to grow FDR as soon as possible after receding of flood water in the field.

Fertilizer application

The best chemical fertilizer alternative as a result of this research is to apply twice, one at the vegetative phase and at the panicle initiation stage with total nitrogen rate of 59 kg ha⁻¹ and the application mode of broadcasting. The farmers' interview showed that 80% of farmers agree with this alternative of fertilizer management. Some are interested in this fertilizer management technique and intend to conduct trial-and-error experiments on their fields.

5.5 Future research and suggestions for system development

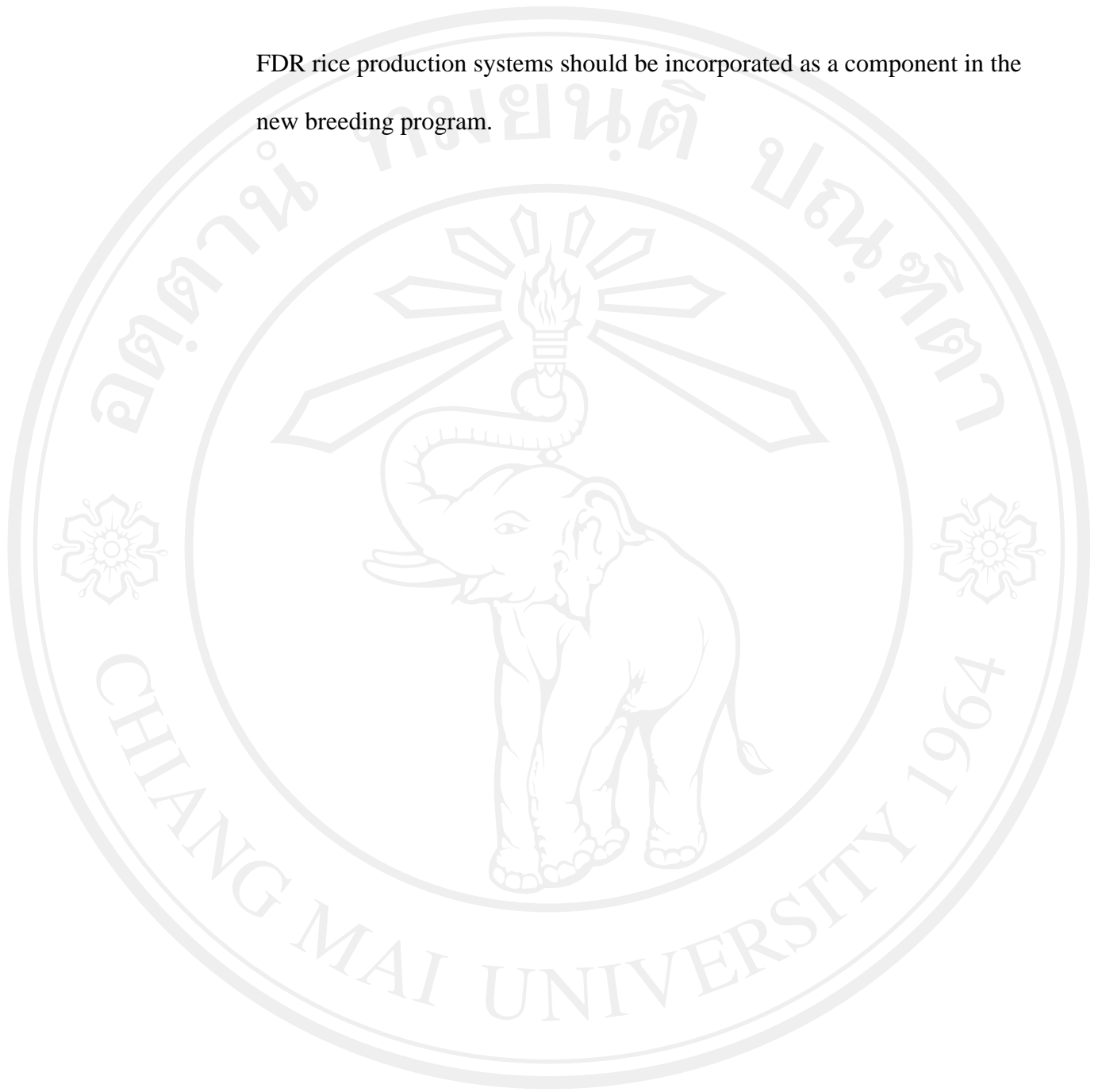
There are three research topics should be conducted to improve FDR production in deepwater area.

1. Water management for FDR production systems in newly transformed and developed deepwater rice areas is crucial for irrigation scheme operation and for on-farm water scheduling. Rain water during the rainy season should be stored and distribute for DS rice crop in the dry season. This will greatly reduce risk of floods in the rainy season and control coming sea water into in the dry season. In addition, the impact of salinity on the DS

crop and the risk of flooding on ERS crop is an obvious knowledge gap to be investigated at the field level. Knowledge of Thai rice scientists about FDR rice variety development and growth in these situations is needed and there are gaps where field experiments can be conducted to investigate the key processes.

2. A potential for utilizing the CSM-CERES rice model in evaluating and testing new rice improvement technologies generated under the directives of the Rice Department. The model allows rice researchers to generate outputs of various rice production technologies, which will stimulate discussion and selection of appropriate rice production technology. The model can also be used in combination with a Geographic Information System to produce recommendations for appropriate resource use, such as water management at irrigation scheme and on farm scheduling, in response to major changes to the rice farming environments, such as one that in its transition from DWR to FDR systems.
3. Rice variety for FDR production systems in the deepwater area, with short growing duration of less than 110 days, resistant to insect pests and diseases, resistant to lodging and produce a high yield is needed. Resistant to cold temperature during the DS crop is an additional criterion for flooded rice varietal improvement program. The participation of local rice farmers in future rice varietal breeding programs is important and will allow incorporation of farmer's criteria for breeding a specific rice variety for the area. Fertilizer application technique for improving efficiency of

FDR rice production systems should be incorporated as a component in the new breeding program.



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