

CHAPTER VI

CONCLUSION AND CONTRIBUTION OF THE STUDY

VI.1. CONCLUSION

The simulation Baduy's shifting cultivation model generally has provided some important points concerning the dynamics of shifting cultivation systems in Baduy, West Java, Indonesia. The results, however, still need validation, sensitivity analysis and refinement. From the experience of the researcher who has conducted intensive case study in Baduy area, these results at least are close to actual conditions in Baduy area, West Java, Indonesia.

The results of the analysis indicated that:

Population in Baduy increases rapidly over time. However, after 23 years, population decreases, because food supply to support population decreases after 11 years. According to results of the base run, population in 50 years will approach zero or in other words, total collapse of the Baduy society. In this model, it is assumed population is responsive to food surplus having affect on birth, death, in-migration, and out-migration rates although the responses are kept at a low level (0.1 per cent). An alternative run has also been tried where there is has no relationship between population growth and food supply. The result shows

that population increases rapidly over time higher than base run. In 50 years the population is recorded at 13,000 people. Food supply in the first, second, third and fourth ten years subsequently also increase rapidly over time higher than base run simulation due to ladang area increases at the first ten years subsequently in accordance with increasing population rapidly over time. Increasing of population can also affect on off-farm income, which increases over time. But the food surplus within 50 years is negative due to decreasing of land use system over time.

These results, however, do not adequately manifest real conditions in the Baduy area. In the Baduy ecosystem, there is an interrelationship between Baduy people and their environment, particularly natural resources, such as food supply. The people can affect as well as be affected by their environment. The population increases will put a greater demand in food consumption. The quantity as well quality of food supply can affect the health condition of the people. Accordingly, the alternative run in which there is no relationship between population growth and food supply is less satisfactory. While, according to base-run simulation, the results showed that an increase in population causes parallel increase in the demand for food and agricultural land as well as other land uses. Therefore, agricultural land use is not only scarce but also it varies in fertility. As long as fallow time is reduced and there

is no use of some inputs like organic fertilizers or an improvement on agricultural fields in Baduy's shifting cultivation, soil fertility will decrease over time. In this base-run simulation, yield decreases at very high rate, i.e 10 per cent every 4 years. Base-run simulation shows that at the beginning, food increases over time until 11 years, thereafter decreases, until food surplus is zero after 23 years. In this case, if population will not make adaptation and efforts to change or improve their environment, the system will collapse in 50 years. This case can be considered an example of a classical Malthusian case where population growth triggered deficit in food, hunger, death and out-migration.

However, the Baduy's shifting cultivation is not static, it is dynamic over time. By changing and improving the environment as well as natural resources, the population tries to pursue the ecological equilibrium over time, such as by the introduction of new technology. In Baduy area, particularly outer Baduy tends to adapt with to many changes of their natural resources. For example, they have tried in selecting and introducing new cash crops, with more benefits to the cultivators. They grow coffee and clove in their land, although some times be destroyed by informal leader of inner Baduy, because those crops are not allowed to be planted in agricultural land. Besides, the people have developed some traditional home industry, such as making

palm sugar industry and making handicrafts which use local materials, such as wood fiber and bamboo. Palm sugar plants in Baduy area, particularly in outer Baduy are usually tapped for making brown sugar. In inner Baduy, however, the tapping palm sugar is usually only for making traditional beer (tuak). It is not allowed to be prepared for making brown sugar industry. The people have also sometimes worked to get off-farm jobs, particularly during the time when they rent land in non Baduy area. The Baduy women also often work in traditional weaving.

By the development of mixed gardens in Baduy area, the intensification of agricultural land use by selection and introduction of new crops, particularly, economic crops, will help easing the shortage of food as well as changing and/or improving their environment. By this development, it is hoped that although secondary forests, particularly mature secondary forest (reuma) areas decrease due to conversion of land into mixed gardens and other land uses, food supply can be enhanced. In terms of production, particularly cash income, mixed gardens has higher income than mature secondary forest. Therefore, in the long run, mature secondary forest area is assumed to disappear and may be converted into other land use sectors, such as mixed-garden areas. The development of mixed garden in Baduy area poses some benefits in terms of socio-economic and environment and it tends to be developed into permanent.

agriculture by the modification and improvement of shifting cultivation in the future. It must be considered, however, according to base-run simulation, although mixed-garden are developed rapidly, as long as soil fertility can not be managed or improved, food supply in supporting population growth in the future can not be sufficient. Therefore, the improving of soil fertility in accordance with the developing of mixed-garden both spontaneous by the Baduy people themselves and the accelerated action by government must be desirable in the future.

The other effort in solving the shortage of food as well as destruction of their environment are out-migration of the Baduy people to other areas in non-Baduy areas to practice shifting cultivation. They stay there temporarily within a certain time, and they will come back to their area, if the secondary forest and soil fertility are ready be cultivated again. This strategy can be used for maintaining soil fertility in their area by having enough fallow time. In this way, agricultural production and food supply can also be maintained or managed. It has been proved by the simulation, for example, by changing the base line data of in-migration of the model from 0.05 to zero. It means that the outer Baduy people can stay for contemporary in non-Baduy area, and in-migration rate will be zero. The result shows that food supply in supporting population in Baduy area can be enhanced higher than base run simulation.

On the contrary, if they are forbidden practice of shifting cultivation in non-Baduy area or out-migration will become zero. The result of simulation shows that food supply, agricultural land and soil fertility level in Baduy area will be less than base run simulation to support population in the long run. Therefore, sustainability of Baduy's shifting cultivation can be determined by the dynamic process not only in both inner Baduy area and outer Baduy area itself but also in non-Baduy areas or villages surrounding Baduy areas of West Java, Indonesia.

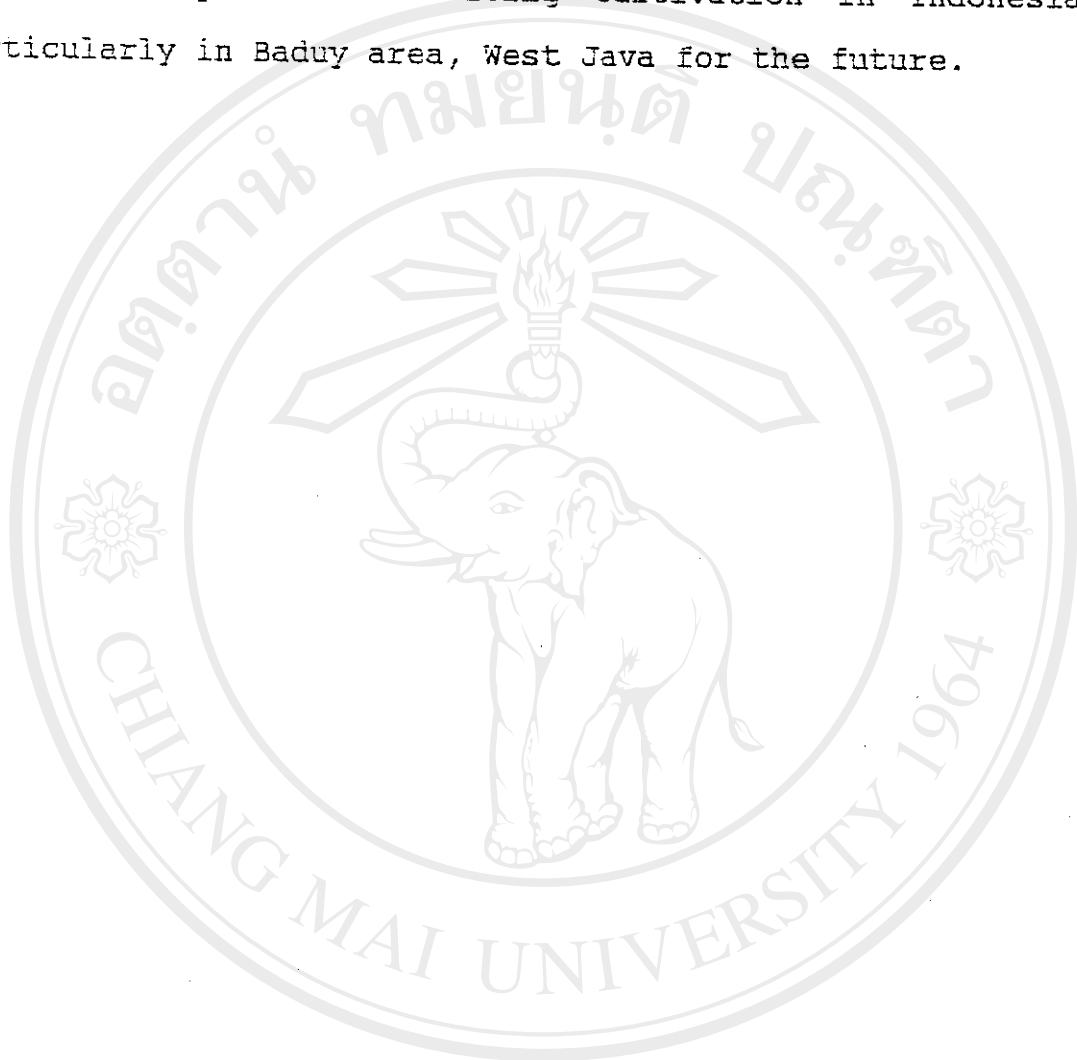
VI.2. CONTRIBUTION OF THE STUDY

Generally, the system modeling of Baduy's shifting cultivation is an important method of providing relevant information for policy makers. By using system modeling, what actually may happen in the systems depending on a variety of different scenarios, it includes possible effects on both natural and social systems. Information and data regarding the Baduy use system has been divided from direct measurement and literature study. This information is then applied in constructing conceptual and mathematical models. The model is analysed through the use of a computer simulation from which results are obtained and predictions made. These results can be employed by policy makers in decision-making process regarding appropriate courses of

action to facilitate sustainable development in Baduy. It should be recognized, however, as mentioned earlier, that validation of the result and improvement and tested under new assumptions or employment of up-dated measurements are highly desirable. Nevertheless, this analysis should provide new insights for policy makers in their analysis of Baduy shifting cultivation in West Java, Indonesia.

This study should be a start in the attempt to further analyse shifting cultivation practice in Indonesia. This model as developed has not yet considered specific issues as well as specific government policies. Accordingly, in the future the specific issues in critical aspect of the Baduy's shifting cultivation should further be analysed by system modeling, in order to get as accurate results as possible for decision making in developing shifting cultivation. For example, what would happen precisely in the practice system of Baduy's shifting cultivation, if the Baduy people do not get subsidized land rent in non Baduy area. Why are the outer Baduy people more interested in developing mixed-garden?. Why do the inner Baduy people can not accept the commercial cash crops in their area?. Socio-cultural aspects must also be considered and evolved in model because in this community, traditional laws are still practiced. Government policies can not be applied very well in this area due to strong traditional law of the Baduy community. With further refinement, these issues can be investigated in similar

studies as this. Accordingly, it hopes that by introduction and development research of shifting cultivation model in Baduy area can help policy makers to improve the sustainability of the shifting cultivation in Indonesia, particularly in Baduy area, West Java for the future.



ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่
Copyright© by Chiang Mai University
All rights reserved