

CHAPTER 1

INTRODUCTION

1.1 Background and Significance of the Study

According to data regarding the production of corn for animal feed in Northern Thailand since 2003, the price of corn has rapidly increased. This is due to the demand in the livestock products for both domestic consumption and export gradually rising each year. This intense demand means Thai farmers earn more revenue from cultivating corn than from other crops, especially in the highlands in Northern Thailand which are mostly mountains. Planting other crops does not bring in as much revenue and the production processes are more complicated. The high revenue becomes a motivation for farmers to extend their planting area in order to plant corn and this leads to deforestation. The farmers also receive incentives or complete support from some companies who benefit from this business. These companies provide seed, fertilizer, and herbicides and buy products from the farmers. Thus, farmers in nine provinces in the northern part of Thailand including, Chiang Rai, Phayao, Phrae, Nan, Lampang, Lamphun, Chiang Mai, Mae Hong Son and Tak, extended their planting areas by double in order to plant corn. In 2003, there was 30,000 rai of cultivated area in Mae Chaem District, Chiang Mai Province, but in 2013, there was more than 100,000 rai of cultivated area. The production in other cultivated areas also increased. Forests have been destroyed so the farmers could have an abundant area for planting corn. This way, they could cultivate more corn with a lower expense of inputs which would lead to higher profits over planting other crops in the same area. This higher profit was a major motivation for the farmers and the deforestation was done by burning the forest, which was the cheapest way. The deforestation caused changes in the forest's ecosystem, flat-topped mountains and produced many disasters, such as floods in rainy season. In some areas with long and heavy rains, there have been floods and landslides.

There were also other disasters like droughts in summer which affected the basin area below Bhumibol Dam to the Thung Chao Praya area, and forest fires. Direct and indirect disasters which affected the community included haze pollution from burning all the biomass collected from the massive corn cultivation at the same time. These problems recurred in a cycle every year. Regarding the haze pollution which is hazardous to people's health, Dr. Pongthep Wiwatanadate, (2011) Head of the Department of Community Medicine, Faculty of Medicine, Chiang Mai Province University, said that the haze, which has an impact on our health, can be categorized into two groups: small dust and poisonous gas. According to the haze measurement over many years, we found that the amount of small dust and poisonous gas has rigorously increased.

The compounds in these hazes affect many systems in our bodies such as the respiratory, cardiovascular and nervous systems and can lead to acute symptoms such as bronchitis, coughs and sneezes and difficulty breathing. These hazes can also worsen diseases such as asthma and emphysema. The haze pollution affects the health of the environment and the people, is an annoyance, reduces both road and air traffic visibility and has an impact on the tourism economy.

Every year, the pollution caused by the deforestation for extending cultivated land and burning of the biomass from corn for animal feed leads to many problems during the dry season and the situation worsens each year. This problem was the background of this study. The author thought of a proper and permanent method to solve the haze pollution caused by biomass burning.

One interesting solution was adapted from the concept of waste management in the community. There was tons of waste from the consumption of the urban communities needed to be disposed of every day. Each community was responsible for the expense for the waste disposal. Nevertheless, some of the waste was valuable to the waste pickers. They could earn revenue from sorting out and selling the waste which could be recycled or reused. This reduced the amount of waste in the communities and some people earned

revenue from sorting out the waste, but here was still the public expenditure needed to manage the remaining waste that could not be reused or recycled. The local organization, powered by the government, would collect the waste and take it to the incineration facility for disposal. In Phuket, the government approved some funds to build an incinerator in order to solve the increasing refuse problem in the community. Along with the disposal of the waste, incineration produced thermal energy because in producing electricity. This method was a decent way to manage the waste without any impact from pollution on the community or the environment. From the above concept of waste management, the author adapted the managing method to biomass from agricultural products. The method was to add a proper value to the biomass waste. A proper value meant the price of the biomass, which was the waste from agricultural production, covered management costs and had an attractive profit for the operators.

Once the biomass had a proper value and was an economic benefit, then there would be people wanting to manage the biomass without further expense or management from any outside organizations. The idea was that when the biomass became a source of revenue for the farmers, there would not be biomass from planting corn left to dispose of. This was a way to add value to the biomass and was an incentive for the farmers to collect the biomass as goods. The biomass would become revenue for the family. So, how do we add value to the corn biomass?

According to documents from related research and development organizations, we found that, there were many ways to make use of the corn biomass. For example, it could be used to make compost for replacing the chemical fertilizers, fermented for the ruminant feed, used as the material for growing mushrooms, made into a paper pulp for replacing mulberry paper, used as a material for paving inside stables, could replace wood charcoal, could be used in the household as fuel for replacing the LPG, used as a dry fuel as pellets used in ceramic industrial plants and for replacing LPG and a gas fuel as well as in producing electricity in a gasification system.

After studying forms and methods of use, there were still some physical restrictions in making the corn biomass economically beneficial. Thus, the use of corn biomass has not been completely successful in practice and we have not achieved the goal of solving the corn biomass burning problem. The promoting of using corn biomass instead of burning it still had not worked. The farmers were still getting rid of the corn biomass by burning it during the dry season and when burnt at the same time has led to the haze pollution during the dry season every year.

Regarding the concept mentioned above, the author formed the hypothesis that if the corn biomass was totally used up, there would be no burning corn biomass and the air pollution would be gone.

There were three methods of use of corn biomass that the author studied. The author thought these three methods directly benefited the farmers and could completely use up the corn biomass. These three methods were the previously unsuccessful ones that the author improved on so that they were more suitable in practice. These three methods were using corn biomass to make compost, as a material for growing mushrooms which would replace rubber tree sawdust and used for cattle feed. These were ways to use corn biomass without transferring it to another place which might have increased the logistic cost in the whole economic system. The author solved this problem by finding a way to transform the biomass so that it would be more convenient to collect and be ready to use in the three methods mentioned above. These methods needed to be low-cost, properly done and allow the operators to make use of the biomass in an economic way. This would create a new market for corn biomass and reduce the burning of biomass in the cultivated area to zero. At last, the haze pollution problem would be permanently solved.

1.2 Purpose of the Study

1.2.1 To find the proper model of promoting a way of farming to reduce corn biomass in Mae Chaem District, Chiang Mai Province.

1.2.2 To test the quality of the model of promoting a way of farming to reduce corn biomass in Mae Chaem District, Chiang Mai Province.

1.2.3 To study problems and suggestions in promoting a way of farming to reduce corn biomass in Mae Chaem District, Chiang Mai Province.

1.3 Practical Application

1.3.1 To find the model and knowledge regarding the proper tools for promoting a way of farming to reduce corn biomass in Mae Chaem District, Chiang Mai Province.

1.3.2 The farmers would attend ‘Usage of Corn Biomass’ seminar and gain extra revenue from using corn biomass.

1.3.3 Reduce the corn biomass burning problem which was the major cause of air pollution.

1.3.4 Able to adapt the model to other corn cultivated areas.