

## Haze Issues in Northern Thailand

Nobutaka Ito<sup>1\*</sup>

<sup>1</sup>Faculty of Engineering, 239 Huay kaew Rd. Suthep, Muang Chiang Mai 50200 Thailand.

Corresponding author: Nobutaka Ito. E-mail: ito@eng.cmu.ac.th

### Abstract

Around in 2007 the haze issue was not so much serious, however it was getting worse seriously year by year. It has been generally said that the problem is caused by forest burning by mushroom farmers, Or in some specified local area it is caused by sugarcane burning before harvest. The author was wondering for a long time what was the real cause of the problem, since he couldn't find any data to identify the real cause of the problem. Some numerical data was obtained recently to identify the cause of the problem. In this paper the real cause of haze issue is introduced and discussed including what should be done toward the future.

**Keywords:** Haze issue, Forest burning, New material production, Hillside smart agriculture.

### 1. Introduction

Haze issue was getting closed up almost 10 years ago. Ito submitted the proposal for improvement of the situation. Since those days nothing could be found to know what happened to the submitted proposals. Fig. 1 shows the major three areas seriously suffered by haze, 1) Northern area consisting of Chiang Rai, Chiang Mai & Mae Hong Son, 2) Khon Kaen area, and 3) Bangkok area. The most serious suffered area is Northern area.

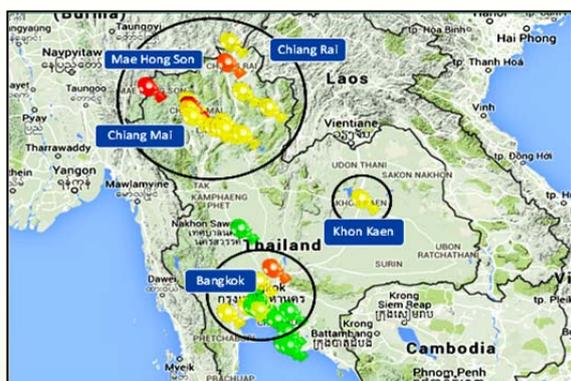


Figure. 1 Area suffered by haze issue in Thailand.

### 2. Author's proposal

The author introduced one practical idea how to solve this issue almost 10 years ago. Here shows the main summarized concept of it. One of the most important first priority issues is to stop burning irrespective to any reason. It was said that the haze problem was mostly caused by mushroom farmers. They burn the bushes and trees for growing mushroom for additional income. Some of the

explanation about the reason or cause of the problem may have been correct, however there was no data to trust so as to fully receive it. Based on the assumption that haze issue was caused by mushroom farmer's burning, the author organized and proposed his idea as follows.

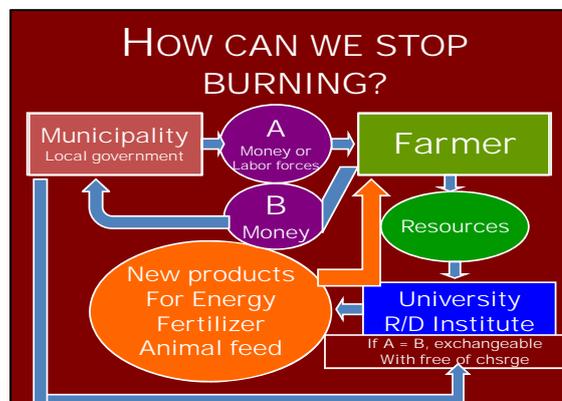


Figure. 2 Stop burning mechanism.

Figure. 2 shows the schematic concept how to control the mushroom farmers not to burn or give up the burning. Basic spirit is not to allow the farmers to burn even though the forest belongs to private mushroom farmer. The strict regulation & law requesting them to pay fine are prepared and legislated. Additionally farmers are requested to declare in advance before burning, however most of them don't follow this way due to nuisance. One of the most important points for solving this problem is to stop burning in any condition. Once it was burnt away, it's no use. Some sign or information must be obtained before they burn the

forest not to be late. Local government should send officer to negotiate the farmer not to burn. If difficult to let the farmer stop burning, government should prepare the money to buy those bushes and trees. If both agree, government should send workers to clean up without burning and take out the harvested resources. They should be carried to R/D industry or institute or similar organization to process and make new products from them. If new products could be sold with the price enough to pay back the paid amount for resource purchase, no one loses anything, but in case more benefits can be brought it's better to use bio-resources usefully. It depends on the final products made from those resources how much useful and value added. They must be value added with competitive marketing price. This idea is still highly considerable even after one decade passed, however the product competitiveness will be a key for hillside farmers. Recently new material science is closed up such as Cellulose Nano Fiber which is newly developed using bio-resources like tree, rice, cassava etc. The key is production cost how it can be competitive compared with the ones produced in normal flat farmland. Additional difficulty in hillside farmers is to maintain the basic infrastructure.

### 3. Cause of haze problem

The author finally found the data officially reported, as shown in Tables 1 to Table 3. They show the number of hot spot in Mae Jaem district in Chiang Mai province for three years from 2014 to 2016. Each table shows the hot spot number in seven sub-districts of Mae Sug, Mae Najoer, Ban Taub, Klong Kaeg, Pang Hin Fong, Chiang Keorg and Than Pha for six areas such as Forest conservation, National forest, ALR, Community & etc., Agricultural and Beside highway. It is obviously found that It was found that the national forest always shows a large numerical value in three years. The percentage of the number of hot spots in the national forest accounts for over 70% of the total area.

Table 1 Hotspots point of Mae Jaem Chiang Mai between 1<sup>st</sup> January-31<sup>th</sup> May 2014

Province	District	Sub district	Forest conservation	AREA					Total
				National forest	ALR	Community & etc	Agricultural	Beside Highway	
Chiang Mai	Mae Jaem	Mae sug	-	109	9	2	-	8	128
		Mae Najoer	1	121	7	1	-	1	131
		Ban Taub	60	23	-	-	2	-	85
		Klong Kaeg	9	23	12	1	1	2	48
		Pang Hin Fon	-	33	1	9	-	-	43
		Chang Keorg	-	8	1	1	1	2	13
		Tha Pha	-	6	7	-	-	-	13
Total Mae Jaem			70	323	37	14	4	13	461

Table 2 Hotspots point of Mae Jaem Chiang Mai between 1<sup>st</sup> January – 31<sup>th</sup> May 2015

Province	District	Sub district	Forest conservation	AREA					Total
				National forest	ALR	Community & etc	Agricultural	Beside Highway	
Chiang Mai	Mae Jaem	Mae sug	-	162	8	1	-	2	173
		Mae Najoer	-	94	12	1	-	-	107
		Ban Taub	49	26	-	-	-	-	75
		Klong Kaeg	10	14	12	-	-	1	37
		Pang Hin Fon	-	31	-	-	1	-	32
		Chang Keorg	1	9	-	-	2	-	12
		Tha Pha	1	2	4	1	-	-	8
Total Mae Jaem			61	338	36	3	3	3	444

Table 3 Hotspots point of Mae Jaem Chiang Mai between 1<sup>st</sup> January – 31<sup>th</sup> May 2015

Province	District	Sub district	Forest conservation	AREA					Total
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		Klong Kaeg	10	14	12	-	-	1	37
		Pang Hin Fon	-	31	-	-	1	-	32
		Chang Keorg	1	9	-	-	2	-	12
		Tha Pha	1	2	4	1	-	-	8
Total Mae Jaem			61	338	36	3	3	3	444

This trend is shown the same for three years and it is surprising to see how much incineration in national forests is occupying a large proportion. The national forest is a common property therefore the government should strictly preserve and manage. Some idea should be shown to cover the result of issue occurred. The author visited Mae Jaem and joined the startup ceremony of Forest Farm project at



the end of June, 2017. He felt important to take action promptly to the next step for further promotion as the new strategic project. Even at the ceremony, tree planting was included for reforestation. Selection of trees should be carefully made considering the value added and competitive production how it could be done.

#### 4. New Material Production

Material science is very much closed up and new material development information is updated day by day. As far as concerned with haze problem to stop burning the value added bio-resources should be grown up available for many purposes in various sectors such as food, energy, environment and material. Some of the examples in future use may be bio-plastics and cellulose nano fiber equipped with the following characteristic property that shows 5 times stronger & 1/5 lighter than steel metal and it costs 1/6 compared with Carbon Nano Fiber and the heat resistant is also higher. Most of the trees are grown up in the mountains and woods. It is very rare to see the trees growing in the flat farmland. The merit of growing the suitable trees in the forest can be found and flat farmland had better be used for food crops like rice, wheat, corn etc., even though CNF can be produced from them too. Important decision making should be always done considering the competitiveness of products based on the concept how it can be value added and cost effective.

#### 5. Conclusions

The followings are shown as the conclusion and recommendation for further study.

- The biggest number of hot spot was found from the national forest in Mae Jaem district, in Chiang Mai province. This was surprising discovery to wonder why and what happened to national forest which is a valuable asset to the people. The burning of national forest is strictly forbidden and most of the people couldn't believe this data. it must have been a big surprise beyond expectation to see the fact occurred to the national forest.

- 2) What and how we should do toward the future is the next stage to arrive. The optimum solution should be proposed as soon as possible for further improvement of the situation.

- What should be done for the reforestation is the key. Even for the afforestation, the tree selection should be strictly made from the viewpoint of what kind of trees should be planted for sustainable development of reforestation. Higher potentiality may be found in the area of bio-based new material production available for various sectors such as Bio-plastics and Cellulose Nano Fiber, Medicinal crop which are the value added products. Or mixed cultivation of long term forest trees like pine & cedar and rare medicinal crops/tree may be also one of the possibilities for value added product production, because the hillside products should be more competitive with the flat farmland one.

- Mechanization should be specifically promoted to make the products competitive and value added. Necessary and basic infrastructure should be settled first for easy transportation of harvested products safely and smoothly. Hillside smart agriculture may be one of the hopeful farming systems using high tech machine and equipment like drone for various use such as monitoring, information gathering etc.

- Organic agriculture products are also one of the options as the value added products. Freshness and safety are the points of sales for the consumers, however even for this type of farming, various micro nano bubbles such as oxygen/ozone nano bubbles and plasma technology may be usefully applied for making sure the sterilization of the products. Summarized major findings, opinion and resolution of the author may be discussed in the presentation, which can be drawn from the work.

#### 6. Acknowledgements

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#### 7. References

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