The Waste Management of the Local Administrative Organization in Khao Kho District, Phetchabun Province, Thailand

Rudklaw Pampasit
Department of Sociology and Anthropology, Faculty of Social Science, Naresuan University, 65000, Thailand,

*rudklaw@yahoo.com

Abstract: In Thailand, the responsibility for waste management has been decentralized to the local administrative organizations. However, presently, it is still observed that most of the local administrative organizations fail to fulfill this duty due to the insufficiency of budget, and the limited area for managing waste. This study conducted the interviews with 410 sample households in 5 local administrative organizations. It was found that Khao Kho District currently and increasingly faced with waste problem as a consequence of both the expansion of the tourism and the growth of the community itself. In spite of this, 60% of the local administrative organizations within Khao Kho District possessed no process to manage the waste. Thus, the huge amount of accumulated waste has been left without properly handling. The limitation of these local administrative organizations was due to their mountainous landscape situated in the National Park area. And, according to the Thai law, this specific area was classified as a Conservative Forest (Zone C) and Watershed (Tier 1 & 2) implied that waste management could not be done without official permission. However, the households within this area were aware of the problem and collaborated with the local administrative organizations in applying 5R Principle to decrease the amount of waste from its source.

1. Introduction
The trend on world development nowadays has been significantly focused on sustainable development goal. With this background, the emphasis is then prioritized on the participation of all stakeholders as well as the significant of the economic, social and environmental development. As for the government administration, the concept of decentralization of both authority and responsibility to the local administrative organizations has been implemented in order to allow the people to get more chance to participate in the state affairs such as the public services. According to this concept, the central government will decentralize its authority through its local mechanisms such as the local government and the local administrative organization etc.

Thailand is among one of those countries bringing the concept of decentralization into developing her own country. Formally, the central government exercise its power via its central units (ministries) and also regional units (provincial offices) – these were the main mechanisms utilized to develop the country. Until 1999, the central authority has been officially decentralized to the local via the units called “Local Administrative Organization (LAO)”. According to this execution, the authority and responsibility in managing the public service, such as the waste management, has been transferred to the LAO. This has been specified in Determining Plans and Process of Decentralization to Local
Government Organization Act B.E. 2542 (1999)[1]. In order to solve the country’s problems effectively and sustainably, the decentralization to the local thus mainly aims to have as much as possible the participation from the people in administrating and developing the country[2]. This paper sheds light on the concept of decentralization and the change occurred at the community level in Thailand by providing the case study of LAO in managing the waste to support the explanation.

The country’s development in the past causes the expansion of income as well as the increase in consumption of both household and business sector. As a result, the level of waste has also risen accordingly. The most recent situation of waste management in 2016 found that the total amount of waste in Thailand was approximately 27.04 million tons (or about 74,073 tons per day), from Bangkok 4.20 tons, and from the rest of 76 provinces 22.84 million tons, increased from that of 2015 about 190,000 tons (0.7% growth). Averagely, 1 person generated 1.14 kilogram of waste. However, only 4,545 out of 7,777 Local Administrative Organizations could provide the waste management service. Hence, only 9.59 tons of waste (36%) were managed properly, while another 11.69 tons (43%) were not hygienically treated: burning in the open space, dumping into the old garbage ponds or the wilderness areas. Only 5.76 tons (21%) of waste were sorted and brought to recycling process[3].

The situation mentioned above shows that Thailand is facing with waste management unquestionably and needs to solve this problem urgently. The National Council for Peace and Order (NCPO) then has set this critical issue as a one of the national agenda and managed to have the Master Plan for Managing the Waste in Thailand (2016 – 2021). This operation is intended to be in line with the direction of the 12th National Economic and Social Development Plan (2016 – 2021) which includes the concept of waste and hazardous waste management: reducing waste or hazardous waste at its original source, recycling waste and reusing it. It is also expected to help decreasing the production cost as well as the amount of waste, and finally leads to the sustainable waste management. While some wastes from sorting process will be reused, those unwanted will be handled properly in order to lessen its effect to the environment. And as for waste-to-energy concept, in spite of being considered as the by product, it could be operated by encouraging the private sector or state enterprise to make an investment or a joint investment[4].

Equipped with legal authority and responsibility, the LAO thus urgently needs to manage the waste effectively and sustainably. However, in reality it was found that the LAO in several areas are facing with waste management due to the insufficiency of the budget and also the limitation of land, especially for those LAOs located in steep and mountainous areas, and also those in Conservative Forest (Zone C) and Watershed (Tier 1 & 2). As for the latter’s constraint, according to the Thai law, the waste management in those areas is prohibited[5]. This issue then could be seen in especially LAOs situated in the Northern Region of Thailand. This paper reveals how LAOs managed the waste by using the case study of Khao Kho District in Phetchabun Province that located in the lower part of the Northern Region of Thailand.

Khao Kho District is well known for its tourism aspect; its tourist destination includes agro tourism, natural scenes, cultural and historical places. In 1968, Khao Kho was where the fight against the communist terrorists, mostly the Hmong people, took place. The Thai government at that time employed the strategy for national stability by allocating the land for those who help fighting against the terrorists and also those who changed their mind from being terrorists. Finally, the Thai government won and could completely reclaim all Khao Kho area back from the communist terrorists in 1982[6]. With this background, Khao Kho District is now where the largest Hmong community located. However, the land allocation strategy also affects the land use and land ownership nowadays. Besides, Khao Kho District is also where many of Phetchabun’s significant agricultural products are cultivated. It is thus suitable for those tourists interested in agro tourism; they would enjoy selecting various varieties of produces, and also experiencing agricultural production process such as strawberry, temperate vegetable and fruits. With this kind of landscape and all year-round cool temperature, Khao Kho is so called “Switzerland of Thailand”[7]. Khao Kho is also where Thung Salaeng Luang National Park and Khao Kho National Park located; the ecosystem and biodiversity here possesses some very rare species such as fresh water jelly fish (Craspedacusta sowerbyi)[8]. And
it is the only one location in Thailand where ones could observe the Savanna[9]. With high level of popularity among the tourists, Khoa Kho District is then facing with the dramatic expansion of the community and the tourist business in the past 30 years. However, as a consequence of development, the waste management of the LAO and of each community under the given limited area and the law is needed to be aware of.

2. Objective
To present the study result on Waste Management of the Local Administrative Organizations in Khao Kho District, Phetchabun Province, Thailand

3. Research Concept
The zero-waste paradigm is a social mechanism employed to change the people’s behavior and the pattern of their consumption; to avoid creating waste and to practice the following 5R principles.

- **Reduce**: To decrease the amount of waste by reducing the usage of those products with excessive packaging.
- **Reuse**: To use again those reusable products such as glass bottles, paper boxes, reverse side paper etc.
- **Repair**: To fix things and continue using them.
- **Reject**: To avoid using those products potentially causing pollution.
- **Recycle**: To process through a new production before bringing back to use again

However, in order to enter into the waste-free society, the systematically and sustainably holistic management process is required. Practically, it should start from changing the people’s consumption behavior. At the same time, the local administrative organizations must be able to recycle the waste within their areas up to 100%. Besides, the producers of good and service need to be responsible for the consumers by utilizing renewable resources for the whole process of their production. Also, the waste management law related to the landfill and incineration must be effectively enforced[10].

4. Methodology
- 5 Local Administrative Organizations located in Khao Kho District, Phetchabun Province including 1) Khek Noi SAO, 2) Camp Son SM, 3) Thung Samor SAO, 4) Khao Kho SAO, and 5) Nong Mae Na SAO.
- Population and Sample, this study collected the data from the below 2 groups
  (1) 5 Local Administrative Organizations: Interviewing the mayor of the municipality, the head of the Local Administrative Organization, Plan & Policy Officers, and Officers who responsible for waste management.
  (2) The study on community’s waste management collected the data from those household located in Khao Kho District: the total number of population in 2016 was 12,685 households. The Simple Random Sampling technique with Non-Probability was applied, while the questionnaires were used to collect data. With the calculation technique by Louis M. Rea and Reichard A. Parker[11], it was found that, at the confident level of 95, the sample size must be at least 384 households. However, to avoid unforeseeable mistakes, this study has collected data from 410 households. The sample’s distribution was shown in Table 1.

| Local Administrative Organization | No. of Village | Population (Household) | %  | Calculated No. of Sample Household | No. of Sample Household from the Fieldwork |
|----------------------------------|----------------|------------------------|----|-----------------------------------|------------------------------------------|
| Khek Noi SAO                     | 12             | 3,502                  | 27.61 | 106                               | 110                                      |
| Camp Son SM                      | 14             | 2,487                  | 19.61 | 75                                | 82                                       |
5. Results and Discussion

Considering the waste management of the Local Administrative Organization (LAO) in Khao Kho District after being transferred the authority and responsibility from the central and regional government, it was found that Khek Noi SAO, and Thung Samor SAO (considered 40% of LAO in Khao Kho District) possesses the complete process of waste management: ranging from storage and collection, transportation, processing, and disposal with mixed method (dumping + sorting + composting). In addition, the Mechanical and Biological Waste Treatment (MBT) has been applied for sorting process. These two SAOs has started this practice for only about 1 year and still need improvement and development continually in order to standardize the process and prevent the negative effect on environment. However, another 60% of LAO in Khao Kho District, including Camp Son SM, Khao Kho SAO, and Nong Mae Na SAO, manage to handle the waste without treatment system. Within these areas, it was thus witnessed much waste littered around (see Table 2). The limitation mainly stemmed from their geographic location that covers with steep and hilly areas of the National Park of Conservative Forest (Zone C) and Watershed (Tier 1 & 2) implied, according to the Thai law that waste management could not be done without official permission. The waste problem increasingly affected both the environment and the life quality of people in the community. In 2016, the number of population in Khoa Kho District was about 12,685 households. The land use of people in this area includes for resident, agriculture, and tourism etc.

Table 2 Amount of Waste and Waste Management System of Local Administrative Organization in Khao Kho District

| Local Administrative Organization | Amount of Waste (Ton per Day) | Waste Management System |
|----------------------------------|-------------------------------|-------------------------|
|                                  | Storage and Collection | Transportation | Processing | Disposal | Decreasing Waste at the Original Source Principle |
| Khek Noi SAO                    | 4.00                         | ✓                  | ✓          | ✓        | ✓        | R5        |
| Camp Son SM                     | 5.32                         | ✓                  | ✓          | ✗        | ✗        | R5        |
| Thung Samor SAO                 | 3.78                         | ✓                  | x          | ✓        | ✓        | R5        |
| Khao Kho SAO                    | 8.97                         | x                  | x          | x        | x        | R5        |
| Nong Mae Na SAO                 | 2.63                         | x                  | x          | x        | x        | R5        |

Note: 5R Principle includes Reduce, Reuse, Repair, Reject, Recycle

As a result of tourism development and the continuous increase in number of tourists, Khoa Kho District was left with 9,015.5 ton of waste per year[12]. With limitation mentioned above, in case Camp Son SM and Khao Kho SAO wish to operate waste management, they need to have an Environmental Impact Assessment (EIA) required by law. In practice, they opted to bring waste to have a treatment in Lom Sak District instead: 60 kilometers away for transportation with cost of treatment about 600 baht per ton.

As for the waste management within the area of each community, people were concerned about the standard of the operation and the effect to the environment from the existing waste management. Thus, so far Khao Kho SAO and Camp Son SM still had no clear conclusion about how they could utilize their own community areas as a place for treating the waste. Besides, for the time being, their people

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1 Data from the Waste Management 5-Year Plan of Phetchabun Province (2015 - 2019)
were still lack of knowledge and understanding about waste treatment technology. After all, if rule and regulation has been enforced up to the standard strictly, there would be no effect to environment as well as life quality of the people living in each community.

Moreover, those LAOs in Khoa Kho District managed to solve the waste problem by campaigning and supporting the community to apply 5R Principle to decrease the amount of waste from the original sources. In line with this, various activities have also been introduced: educating community and youth the knowledge about waste management, supporting each school to establish “waste bank”, promoting the use of compost fertilizer (from waste) in farming, and encouraging the private sectors to buy waste from the community. From the study of 410 households, it was found that 96.6% of the sample group accepted the application of 5R principle for the community, while 53.0% considered the 5R principle as a cumbersome issue and the behavior of the people in the community is required time for the change. Reflecting on the work of LAO in campaigning and supporting the application of 5R, the sample groups felt the lack of continuity and inaccessibility to the villages in remoted areas. (see Table 3)

| Local Administrative Organization | Acceptance of 5R Principle | 5R Principle is difficult in practice |
|----------------------------------|---------------------------|------------------------------------|
| Khek Noi SAO                     | 101 (91.8)                | 52 (47.3)                          |
| Camp Son SM                      | 80 (97.6)                 | 40 (48.8)                          |
| Khoa Kho SAO                     | 114 (98.3)                | 65 (56.0)                          |
| Thung Samor SAO                  | 66 (98.5)                 | 38 (56.7)                          |
| Nong Mae Na SAO                  | 35 (100.0)                | 23 (65.7)                          |
| Khao Kho District                | 396 (96.6)                | 218 (53.2)                         |
|                                  | Total                     | Total                              |
|                                  | 110 (100.0)               | 82 (100.0)                         |
|                                  | 116 (100.0)               | 67 (100.0)                         |
|                                  | 35 (100.0)                | 14 (3.4)                           |
|                                  | 410 (100.0)               | 218 (53.2)                         |

Table 3 The Acceptance and Opinion toward 5R Principle of the Sample Group

Note: Figures in parenthesis shows the percentage

However, in overall, the study on the level of the households’ participation in Khao Kho District found that the sample households’ level of acknowledging and operating was “medium”, while that of planning and evaluating was “low”. The people in the community would like to participate more in planning the waste management of the Local Administrative Organizations via Sub-District Development Planning and the village’s civil society. This could be witnessed clearly in Khao Kho SAO, Camp Son SM, and Nong Mae Na SAO where currently were facing with unsolved waste management problem and still had no clear conclusion about how to cope with. As for Khek Noi SAO, to build the people’s awareness on SAO’s working process and to encourage the participation from them on planning and evaluating through the working committee and community committee are highly recommended. For Thung Samor SAO, the full process of waste management has been operated for about 1 year and was still on the process of learning and developing the system. However, the operating and participating trend has been gradually improved. The people living in Thung Samor SAO wished their SAO to make sure that the waste management meet with the accepted standard and generate no harm to the environment and their life quality. Moreover, in the next phase, they even aimed to be a role-model community in waste management in Khao Kho District by applying the zero-waste concept to be their operating direction (see Table 4).
Table 4 Level of Participation of each Community in Waste Management

| Participation Format         | Local Administrative Organization |
|-----------------------------|----------------------------------|
|                             | Khao Kho SAO | Camp Son SM | Khao Kho SAO | Thung Samor SAO | Nong Mae Na SAO | Khao Kho District |
| Participate in Acknowledging| 3.37 (Medium) | 3.55 (High) | 2.78 (Medium) | 2.79 (High)      | 3.55 (High)     | 3.16 (High)      |
| Participate in Planning     | 1.62 (Low)   | 2.27 (Low)  | 3.45 (Medium) | 2.54 (Low)       | 2.30 (Low)      | 2.48 (Low)       |
| Participate in Operating    | 1.83 (Low)   | 2.37 (Low)  | 3.45 (Medium) | 2.58 (Low)       | 2.51 (Low)      | 2.58 (Low)       |
| Participate in Evaluating   | 1.51 (Low)   | 1.86 (Low)  | 3.44 (Medium) | 2.69 (Low)       | 2.16 (Low)      | 2.37 (Low)       |

Table 5 The Waste Sorting Behavior of the Sample Group

| Data                                      | Local Administrative Organization |
|-------------------------------------------|----------------------------------|
|                                           | Khao Kho SAO | Camp Son SM | Khao Kho SAO | Thung Samor SAO | Nong Mae Na SAO | Khao Kho District |
| Sorting Waste before Dumping              |                |              |              |                |                |                |
| Always                                    | 72 (65.5)     | 63 (76.8)    | 98 (84.5)    | 49 (73.1)       | 32 (91.4)       | 314 (76.6)      |
| Sometimes                                 | 20 (18.2)     | 17 (20.7)    | 16 (13.8)    | 12 (17.9)       | 3 (8.6)         | 68 (16.6)       |
| Never                                     | 18 (16.4)     | 2 (2.4)      | 2 (1.7)      | 6 (9.0)         | 0 (0.0)         | 28 (6.8)        |
| Total                                     | 110 (100.0)   | 82 (100.0)   | 116 (100.0)  | 67 (100.0)      | 35 (100.0)      | 410 (100.0)     |
| Selling Waste in Order to Generate Additional Income for the Household |    |              |              |                |                |                |
| Always                                    | 70 (63.6)     | 64 (78.0)    | 101 (87.1)   | 53 (79.1)       | 33 (94.3)       | 321 (78.3)      |
| Sometimes                                 | 26 (23.6)     | 17 (20.7)    | 15 (12.9)    | 9 (13.4)        | 2 (5.7)         | 69 (16.8)       |
| Never                                     | 14 (12.7)     | 1 (1.2)      | 0 (0.0)      | 5 (7.5)         | 0 (0.0)         | 20 (4.9)        |
| Total                                     | 110 (100.0)   | 82 (100.0)   | 116 (100.0)  | 67 (100.0)      | 35 (100.0)      | 410 (100.0)     |
| Utilizing the Waste from Food, Vegetable, and Fruit for Making Compost |    |              |              |                |                |                |
| Always                                    | 18 (16.4)     | 11 (13.4)    | 39 (33.6)    | 12 (17.9)       | 10 (28.6)       | 90 (22.0)       |
| Sometimes                                 | 23 (20.9)     | 26 (31.7)    | 29 (25.0)    | 27 (40.3)       | 12 (34.3)       | 117 (28.5)      |
| Never                                     | 69 (62.7)     | 45 (54.9)    | 48 (41.4)    | 28 (41.8)       | 13 (37.1)       | 203 (49.5)      |
| Total                                     | 110 (100.0)   | 82 (100.0)   | 116 (100.0)  | 67 (100.0)      | 35 (100.0)      | 410 (100.0)     |
| Using Fabric Bag or Basket in Substation of Plastic Bag |    |              |              |                |                |                |
| Always                                    | 14 (12.7)     | 14 (17.1)    | 23 (19.8)    | 14 (20.9)       | 5 (14.3)        | 70 (17.1)       |
| Sometimes                                 | 36 (32.7)     | 34 (41.5)    | 40 (34.5)    | 27 (40.3)       | 19 (54.3)       | 156 (38.0)      |
| Never                                     | 60 (54.5)     | 34 (41.5)    | 53 (45.7)    | 26 (38.8)       | 11 (31.4)       | 184 (44.9)      |
| Total                                     | 110 (100.0)   | 82 (100.0)   | 116 (100.0)  | 67 (100.0)      | 35 (100.0)      | 410 (100.0)     |

Note: Figures in parenthesis shows the percentage.

The study of household’s sorting of solid waste found that the majority of sample households sorted the waste before dumping. Some of the household generated extra income from selling waste. In case of Khek Noi SAO, it should strongly encourage each household to sorting & selling waste since the people in this SAO were less likely to do so when compare to those in other LAOs. Optionally, Khek Noi SAO could support the private sector to buy solid waste or even establish waste bank in its community. This will then be easier for each household to sell its waste and also help reducing the amount of waste in the community. After all, it would help LAO to save cost for managing the waste.
Furthermore, the study also found that most of the sample households (49.5%) have never brought waste from food, vegetables, and fruits to make compost, and 44.9% have never use fabric bag or basket in substitution of plastic bags. These figures reflected the household behavior that LAO needs to bring into consideration and find solutions, according to 5R principle, to reduce the use of plastic bag of each household and to prepare it for becoming the zero waste society in the near future.

6. Recommendations

The central government should amend the law related to the environment in order to allow the Local Administrative Organizations, esp. in Conservative Forest (Zone C) and Watershed (Tier 1 & 2), to manage the waste effectively. This could be done by registering those areas to be special zones for national development and security. Furthermore, the law enforcement is also a strictly imperative process in order to regulate the waste management up to the accepted standard and generate no harm to the environment and the community.

(1) The Local Administrative Organizations should prepare EIA report in order to ask for the area within its responsibility from the Cabinet and to use these areas for managing the waste properly. They should also strictly follow the accepted standard and build confidence on safety and waste management within their community.

(2) The Local Administrative Organization should apply the Zero Waste and Sustainable Development concept to create the vision and development plan for each sub-district, and should also bring this concept to prepare/make the strategic plan equipped with specific timeline and clear target in order to develop the community to be waste free society and led to the sustainable development.

(3) The Local Administrative Organizations in Khao Kho District needs to promote 5R principle continually and accessibly with all groups and in all areas, such as the households, the temples, and the schools, in order to decrease amount of waste from the original source, change the household behavior (in waste management), and encourage the people to more participate in planning the waste management for LAO – via sub-district development plan and civil society of the village to fix the waste problem.

(4) LAOs should encourage people to participate more in planning and following up the waste management by LAOs. This could be done through the Sub-district Development Plan, the community’s civil society, and the community committee’s operation process.

(5) To encourage the private sector to buy more waste from the community, the LAOs should design incentives for those environment friendly enterprises by reducing the tax or the admission fee that LAOs currently collects, according to the law.

(6) To cultivate the youth’s behavior on waste sorting and at the same time generating additional income from selling waste, LAOs should continually support the waste bank activities in the schools within the responsible areas. Besides, the use of fabric bag in substitution of plastic bag should also be promoted.

References

[1] Office of the Council of State (Thailand) 1999 Determining Plans and Process of Decentralization to Local Government Organization Act BE 2542

[2] Therdchai Choibamroong 2009 Roles of Local Administration Organization for Sufficiently Philosophy-Based Sustainable Tourism Development Bangkok: King Prajadhipok’s Institute

[3] Pollution Control Department (Thailand) 2016 National Master Plan for Waste Management B.E.2559 – 2564 (2016 – 2021) Bangkok: Active Print CO.,LTD

[4] Office of the Nation Economic and Social Development Board 2016 The Twelfth National Economic and Social Development Plan (2017-2021) Bangkok, Thailand: Office of the Prime Minister

[5] Notification of Ministry of Natural Resources and Environment 2012 Re: Specification on Types and Sizes of Projects or Activities requiring preparation of Environmental Impact Assessment Reports and the Principle, Method, Procedure and Guideline for Preparation of
Environmental Impact Assessment Reports

[6] Khaoko.com [Internet] 2017 (in Thai) Yon Roi Samoraphum Khao Kho (Looking back on Khao Kho Battlefield). Online. Available from Internet, http://www.khaoko.com/, accessed 2 September

[7] Rotsukhon Pradit and Rudklaw Pampasit 2014 Potentials and Opportunities in Tourism Development of Khao Kho Sub-district Phetchabun Province *Journal of Social Science* **10**(2) 127-149

[8] Khaoko.com [Internet] 2017 (in Thai) Ma Hat Sa Jan Peun Bpa, Nong Mae Na, Maeng Ga Prun Nam Jeut (Wonders of the Forest, Nong Mae Na, Freshwater Jellyfish). Online. Available from Internet, http://www.khaoko.com/, accessed 2 September

[9] Travel.kapook.com [Internet] 2017 (in Thai) Tieow Tung Sa Laeng Luang, Chom Wiw Tung Yaa Sa Wan Naa, Lae Bpaa Son Meuang Tai (Tung Sa-laeng Luang Trip, Savannah View and Coniferous forest in Thailand) Online Available from Internet, https://travel.kapook.com/view148588.html, accessed 2 September

[10] Atiq Uz Zaman and Steffen Lehmann 2011 *What is the “Zero Waste City Concept. Zero Waste SA Research Centre for Sustainable Design and Behaviour*

[11] Louis M Rea and Richard A 1997 Parker, Designing and Conducting Survey Research *San Francisco: Jossey-Bass Inc*

[12] Offices of Natural Resources and Environment 2017 Phetchabun Province, Phetchabun Province’s 5-Year Plan on Waste Management (2015 – 2019) Online Available from Internet, https://goo.gl/JzTgg8, accessed 18 January