

# **Key Elements for Creating a Zero Waste Community under a Circular Economy: A Case Study of Ban Pom Subdistrict, Phra Nakhon Si Ayutthaya, Thailand**

**By**

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## **Abstract**

The research article consisted of the following objectives: 1) to explore the best waste management practice of a zero-waste community model and a zero-waste community in Ban Pom Subdistrict; and 2) to present the key elements for creating a zero-waste community under a circular economy through a case study of Ban Pom Subdistrict, Phra Nakhon Si Ayutthaya, Thailand. The study employed a qualitative research approach by using in-depth interviews to collect data with 27 key informants from a zero-waste community model in 9 communities, as well as collecting qualitative data from volunteers from Moo 2 and Moo 3 of Ban Pom Subdistrict who participated in activities to create a zero-waste community organized by researchers from April to July 2022. The qualitative data were analyzed by content analysis.

From the study, the following findings are found: 1) The best waste management practice from a zero-waste community model in 9 communities includes key elements that are comprised of 4 indicators, which are: policy, leader, activity, and network. 2) The best waste management practice based on a zero-waste community in Ban Pom Subdistrict consists of 2 elements: (1) one involving 4 indicators namely policy, leader, activity, and network; and (2) the other involving the use of digital platform called 'Line BCG' as a tool to create a zero-waste community. 3) There are 2 key elements for creating a zero-waste community under a circular economy as follows: (1) the use of PLAN Model which is comprised of 4 indicators, namely policy, leader, activity, and network; and (2) the use of digital platform. Both key elements will have an influence on residents' mindsets and values about household waste management, resulting in enhanced community waste management and the capacity to establish a sustainable zero waste community management. The research findings will benefit waste management organizations, including manufacturers and consumers, who could apply this best practice to establish a sustainable zero waste community management.

**Keywords:** Key Elements, Zero Waste Community, Circular Economy, Ban Pom Subdistrict

## **Introduction**

Waste problems have been widely debated across the world in recent years, and dealing with them urgently requires coordination from many concerned parties. One of the primary causes is consumption behavior, namely the rise in the use of online meal delivery services,

which leads to an increase in single-use plastic-based solid waste. Only 16% of solid waste generated in Thailand is sorted at the source by garbage resellers (named saleng after the motorized wagons they ride), and households also sell it to local recycling shops. About 6% is handled by households and communities in remote areas. Only 78% is collected by local government entities or licensed private enterprises using solid waste collection trucks [1]. This shows that waste sorting at the source remains low, despite the growing popularity of buying consumer goods online.

Waste management has been emphasized by the Thai government as it has been put as “national agenda”. The Ministry of Natural Resources and Environment has mobilized plastic waste management in accordance with the "Thailand's Roadmap on Plastic Waste Management 2018-2020". Across the country, government entities have implemented waste reduction and separation strategies. The government has set a goal of reducing solid waste disposal by 30% by 2022, as well as reducing plastic bags, handles, thin plastic cups, and foam food containers by 100%. This also includes a request for private entities to voluntarily reduce and sort waste [2].

Phra Nakhon Si Ayutthaya Province is a significant tourism destination for both Thai and foreign tourists since it is an ancient site with ancient historical parks and attractions. As a result, the Province has set "Ayutthaya: a World Heritage Site and a Learning Source. A Travel, Stay, and Investing Destination" as its 5-year development goal (2018-2022) in order to address the increasing waste problem with the goal of creating urban communities and environments that are tidy and beautiful, support human wellbeing, and enhance the quality of life for citizens. The Province has implemented the 3Rs strategy (Reduce, Reuse, and Recycle) for waste management in communities [3].

Ban Pom Subdistrict of Phra Nakhon Si Ayutthaya Province features a semi-urban and semi-rural setting. Previously, the Ban Pom Subdistrict was a municipal open landfill with no sanitary waste disposal. Waste deposited in Ban Pom Subdistrict had grown to the size of a mountain, affecting residents; only later were these problems resolved [4]. The general view of Ban Pom Subdistrict still shows problems with waste management and increasing amounts of waste. During a field study to investigate the waste problem, it was discovered that there were overflowing garbage bins, no waste sorting, and villagers provided information that "Garbage trucks are insufficient due to the large population in Ban Pom Subdistrict with almost 7,000 inhabitants. In a tiny community like ours, there is a large amount of waste that delays the garbage truck every day, and there is also wet waste" [5]. These problems should be handled as soon as possible since Ban Pom Subdistrict is connected to historical tourist destinations in Ayutthaya and serves as a passageway for tourists; hence, such problems must be solved.

Based on such problems and the significance of zero waste management community, the researcher aimed at exploring the key elements for creating a zero-waste community under a circular economy through a case study of Ban Pom Subdistrict, Phra Nakhon Si Ayutthaya, Thailand. This research would give a set of knowledge for developing a zero-waste community within the context of a circular economy, which may be utilized to create a zero-waste community in other communities.

## **Research Objectives**

- 1) Exploring the best waste management practice of a zero-waste community model and a zero-waste community in Ban Pom Subdistrict.
- 2) Presenting the key elements for creating a zero-waste community under a circular

economy through a case study of Ban Pom Subdistrict, Phra Nakhon Si Ayutthaya, Thailand.

## **Research Method**

The study uses the following stages as part of its qualitative research approach:

Stage 1: Identifying a conceptual framework and designing research methods through examining related documents and research works on the concepts of circular economy, solid waste, and 3Rs-based waste management.

Stage 2: Designing the qualitative research, which began with interviews with leaders and villagers from communities awarded as "zero waste communities" by the Department of Environmental Quality Promotion. The interviews were done with 9 communities from a zero waste community model including: 1) Ban Don Kloy Community, Dan Khun Thot Subdistrict, Dan Khun Thot District, Nakhon Ratchasima Province; 2) Ban Rang Plub Community, Krub Yai Subdistrict, Ban Pong District Ratchaburi Province; 3) Ban Thung Si Community, Rong Kwang Municipality, Rong Kwang District, Phrae Province; 4) Ban Hua Thanon Community, Phra Lap Subdistrict Municipality, Mueang District, Khon Kaen Province; 5) Ban Non Kluai Hom Community, Ban Haet Subdistrict Municipality, Ban Haet District, Khon Kaen Province; 6) Ban Rai Community, Umong Subdistrict Municipality, Mueang District, Lamphun Province; 7) Karn Kha Nong Khaem Community, Nong Khang Phlu Subdistrict, Nong Khaem District, Bangkok; 8) Ban Pa Tueng Ngam Community, Pa Sak Subdistrict Municipality, Mueang District, Lamphun Province; and 9) Ban Pong Sri Nakhon Community, Rong Chang Subdistrict, Padad District, Chiang Rai Province.

The qualitative data were collected in Ban Pom Subdistrict in order to investigate the best waste management practice, as Ban Pom Subdistrict took part in the zero-waste community project organized by researchers from April 24 to July 11, 2022. The interviews were conducted with 15 volunteers from Moo 2 and Moo 3.

The zero-waste community project at Ban Pom Subdistrict involved activities on the use of digital platform called 'Line BCG' between May 14 to June 7, 2022, as well as the activities on the development of a zero-waste community model between June 12 to July 11, 2022. The activities included the following 5 topics: 1) household model; 2) pleasant frontage; 3) household income generation; 4) the recording of waste on a digital platform; and 5) a beautiful house and a clean city. Both the field researcher and the field research assistants were constantly monitoring the activities of a sample group via the village line channel and a digital platform known as 'Line BCG.' Following the completion of the activities, an evaluation was conducted to test the level of Buddhist zero waste community model based on the zero waste community criteria developed by the Department of Environmental Quality Promotion, Ministry of Natural Resources and Environment, as well as household criteria developed by the researcher based on indicators and goal-based evaluation.

Stage 3: Analyzing the qualitative data by content analysis with the following steps: (1) analyzing data collected from related documents and research works; (2) analyzing data collected from in-depth interviews with 27 key informants from a zero waste community model in 9 communities; (3) analyzing data collected from focus group discussions with 15 volunteers from Moo 2 and Moo 3 of Ban Pom Subdistrict who participated in the zero waste community project; and (4) analyzing data to provide an overall picture of key elements for creating a zero waste community under a circular economy through a case study of Ban Pom Subdistrict, Phra

Nakhon Si Ayutthaya, Thailand.

## Results

The best waste management practice of a zero-waste community model and a zero-waste community in Ban Pom Subdistrict could be divided into 2 parts:

1) From conducting in-depth interviews and non-participant observation on the best waste management practice from a zero waste community model in 9 communities, it is revealed that the key elements are comprised of 4 indicators, which are: (1) Policy in which communities establish waste management policies and communicated with related parties; (2) Leader in which communities have leaders to develop a zero waste community with examples of success that can be exchanged for learning and practice; (3) Activity in which communities organize zero waste management activities with the collaboration of community members; and (4) Network in which the communities develop network of collaboration, whether in providing knowledge, skills, or innovative work that can be utilized.

2) From conducting focus group discussions and non-participant observation with 15 volunteers from Moo 2 and Moo 3 of Ban Pom Subdistrict who participated in the zero-waste community project, it is discovered that there are two additional elements that play an essential part in zero waste community management: the use of a digital platform called 'Line BCG' as a tool for creating a zero-waste community. This platform consists of the following functions:

Function 1: Knowledge of zero waste community management, such as waste separation campaigns, waste management based on the 3Rs, problems caused by incorrect waste management methods, waste sorting and routing, waste management activities, and the advantages of ongoing waste management by communities.

Function 2: Recording of recyclable waste sorting by each household, which includes a screen for recording the amount of all 4 types of recyclable waste: paper, glass, metal, and plastic.

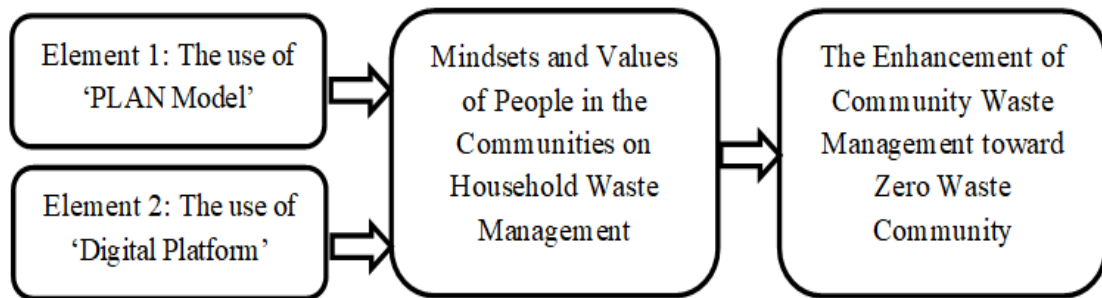
Function 3: Following up about the report on the quantity of recyclable waste recorded in the system, which is based on the 4 types of recyclable waste. Including, viewing data by household, by village, and by total quantity. Views of the data include total quantity, by village, and by household. PR poster for the digital platform called 'Line BCG' as shown in Figure 1.



**Figure 1:** PR poster for the digital platform called 'Line BCG' for a zero waste community management under a circular economy

It can be concluded that the creation of a zero-waste community under a circular economy by Ban Pom Subdistrict, which meets with the zero waste community criteria developed by the Department of Environmental Quality Promotion, Ministry of Natural Resources and Environment, as well as household criteria developed by the researcher based on indicators and goal-based evaluation, is based on the 2 key elements mentioned above.

Below is the figure of the key elements for creating a zero-waste community under a circular economy through a case study of Ban Pom Subdistrict, Phra Nakhon Si Ayutthaya, Thailand.



**Figure 2:** Key Elements for creating a zero-waste community under a circular economy

The figure describes 2 key elements for creating a zero-waste community under a circular economy which are as follows:

**Element 1:** The use of PLAN Model consists of 4 indicators, which are: (1) Policy in which communities establish waste management policies and communicated with related parties; (2) Leader in which communities have leaders to develop a zero waste community with examples of success that can be exchanged for learning and practice; (3) Activity in which communities organize zero waste management activities with the collaboration of community members; and (4) Network in which the communities develop network of collaboration, whether in providing knowledge, skills, or innovative work that can be utilized.

**Element 2:** The use of digital platform consists of 3 indicators, which are: providing knowledge, recording of recyclable waste sorting by each household, and analyzing waste quantity accumulated through digital platform reports, which can be displayed various ways e.g. displaying data based on the recyclable waste, displaying data by total quantity, by village, and by household.

Both key elements will have an influence on residents' mindsets and values about household waste management, resulting in enhanced community waste management and the capacity to establish a sustainable zero waste community management.

## Discussion

The first element: the use of PLAN Model consists of 4 indicators, which are: policy, leader, activity, and network. The formation of policies for people in the community to handle waste management based on 3Rs is the promotion of waste management activities and the utilization of household solid waste management such as the use of cloth bags instead of plastic bags, selling recyclable waste [6]. Network development and community leaders provide a positive example for people in the communities, as well as cooperation between government

agencies and civil society will lead to sustainability [7][8]. Selling sorted household waste will not only generate more income but will also reduce community waste [9]. The mobilization of waste management based on a circular economy via a cooperation network and co-learning is motivated by volunteers in the Line group sharing their success or 3Rs-based waste management activities since it raises awareness and the significance of waste management, leading in continued household waste sorting [10][11].

The second element: the use of a digital platform, which is the use of modern technology since every household can carry out activities on their smartphones, which is now a necessary for every home. The digital platform provides knowledge, recording of recyclable waste sorting by each household, and analysis of waste quantity accumulated through digital platform reports. This digital platform must be useful, simple, and provide content and illustrations so that users can easily comprehend [12], accept, and utilize it on a regular basis.

## Conclusion

The findings of the study reveal as follows:

(1) The best waste management practice from a zero waste community model in 9 communities includes key elements that are comprised of 4 indicators, which are: **P**olicy in which communities establish waste management policies and communicated with related parties; **L**eader in which communities have leaders to develop a zero waste community with examples of success that can be exchanged for learning and practice; **A**ctivity in which communities organize zero waste management activities with the collaboration of community members; and **N**etwork in which the communities develop network of collaboration, whether in providing knowledge, skills, or innovative work that can be utilized.

(2) The best waste management practice based on a zero waste community in Ban Pom Subdistrict consists of 2 elements with 4 indicators, which are: Policy, Leader, Activity, and Network. This is identical to the community model in 9 communities. However, a zero waste community in Ban Pom Subdistrict has additional elements that play an essential part in zero waste community management, which is the use of a digital platform called 'Line BCG' as a tool for creating a zero waste community.

Indicators of activity in all 5 topics in the first element can be used to develop a zero waste community management, as follows: 1) Household model activity by allowing households to properly sort waste and utilize it through composting or animal husbandry; 2) Pleasant frontage activity by each household keeping the space in front of the house or the common area of the community clean and beautiful with flowers and decorative plants; 3) Household income generation activity by selling sorted waste to buyers who buy directly from households; 4) The use of 'Line BCG' activity to record the sorted recyclable waste on a daily basis raises awareness about continuous waste sorting, which offers a waste quantity report that can be accessed in real-time via the digital platform; and 5) A beautiful house and a clean city activity allow people in the community to interact, share information, and participate in community development activities.

(3) There are 2 key elements for creating a zero waste community under a circular economy as follows: 1) the use of PLAN Model which is comprised of 4 indicators, namely policy, leader, activity, and network; and 2) the use of digital platform. Both key elements will have an influence on residents' mindsets and values about household waste management, resulting in enhanced community waste management and the capacity to establish a

sustainable zero waste community management. The research findings will benefit waste management organizations, including manufacturers and consumers, who could apply this best practice to establish a sustainable zero waste community management.

## Recommendations

The digital platform 'Line BCG,' which is a tool for promoting a zero-waste community, is a system that delivers knowledge through created media, records data about accumulated recyclable waste, and examines data from reports that can be presented in many ways such as displaying data based on the recyclable waste, displaying data by total quantity, by village, and by household. As a result, waste management organizations, particularly those involved in policy formation, should manage a zero-waste community by using digital platform, applying a 'PLAN Model' and together with specified waste management policy in order to enhance the waste community management and have better achievement.

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