

Value added for Elephant Dung to Create New Environmentally Friendly Products in Ayothaya Community, Phra Nakhon Si Ayutthaya Province

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Abstract

The objectives of this research and development are 1) to create a model for adding value to elephant dung by constructing boilers and blenders to make paper and new products. The boiler used in the study was 200liter steel oil tank due to its durable and generates heat quickly with the capacity for boiling of 30 kg at a time. The blender was 304stainless steel to reduce corrosion and can be used for a long time with capacity of blending of 30 kg at a time by taking 2-3 hours for each blending; 2) to create 3 paper products from elephant dung paper namely paper bags, picture frames, and handle bags to sell in Ayothaya Floating Market in order to generate more income in the community and 3) to survey consumer satisfaction towards new environmentally friendly products by collecting the questionnaire from 200 tourists. The research results revealed that most of the informants were female, aged 20-30 years and have their own business. They are satisfy with new environmental friendly product and have environmental liability at 4.36, be environmentally and socially responsible when purchasing environmentally friendly products at 4.56, participate in the promotion of career in the community at 4.43, aware of environmentally friendly products at 3.79, have a positive attitude towards environmentally friendly products and, socially and environmentally responsibility at 4.01, concern and aware of environmental issues at 3.88, feel satisfy with environmentally friendly products in overall at 4.30, feel interested in innovative products developed from elephant dung at 4.52 and feel happy to participate in environmental protection by using natural products at 4.45. The Ayothaya community wants to develop a wide range of products to create sustainable careers and income in the community.

Index Terms— Added value creation, New product, Environmental friendly

I. INTRODUCTION

Currently, Thailand has several target destinations for sustainable tourism development. The tourism trend that aims to conserve resources has made tourists continue to pay attention to travel. “Floating Market” tourism is one of the most popular forms of tourism because it allows tourists to experience the traditional way of life and culture of the waterfront community. Most of the floating markets are located in Bangkok or its vicinity, making it convenient for travelling. Floating market is the name of a place where goods are traded with each other in the water by using boats as a vehicle. Originally, besides being called a “flea market”, it was also called “Boat Market” or “Floating Market” and eventually became a “Floating Market” (Kamonphiphat Chanasit and Narin Sangraksa, 2018).

Phra Nakhon Si Ayutthaya Province is an ancient tourist city with a tourist attraction that is an important floating market that makes many tourists interested in coming to visit. Most of the tourists come to visit the ancient monuments along with the Ayutthaya Floating Market to buy souvenirs and take an elephant ride to see the ancient sites in the nearby Ayothaya Floating Market. Ayothaya Floating Market is a spacious area which is divided into floating markets for boat tours; and an elephant raising area for elephant feeding with elephant rides to see the beauty around the ancient monuments of tourists. However, due to the large number of elephants, there is a problem of pollution. The management of elephant dung is not systematic and there is no use of elephant dung. As the amount of elephant dung increased,

elephant herders had to hire outside agencies to collect and destroy the elephant dung, resulting in unnecessary expenses. Elephants in the Ayothaya community are fed on grass, leaving a large amount of residue from digestion. Fertilizing elephant dung has not been successful because fertilization takes a lot of time. Fertilizers for sale are not cost-effective for moving and managing storage facilities and require increased staff wages, leading to increased costs. Participatory action research as a way to build community-based economic strength by using community business development stems from a systematic integration concept that must be driven holistically: knowledge, learning, participation, operations, monitoring, and evaluation. Local higher education institutions are leading the movement together with the community to achieve the mission of each sector (Tawee Watcharakiatissak, 2016). Community and researchers have an idea to add value to elephant dung by brainstorming with researchers from the Faculty of Industrial Education who specialize in designing tools and equipment to value added for elephant dung to achieve results and develop into environmentally friendly products. Researchers of the Faculty of Business Administration have put two concepts in research and development to complete the research results. This study is a combination of experimental and quantitative research. The findings are complemented to provide a clearer answer than using a single quantitative or experimental research model. In addition, mixed research may yield new findings. Although mixed research can take many forms, it can be used in simultaneous research

(Kanokporn Krajangsaeng and Prasopchai Phasunon, 2019). Mixed research makes research more efficient.

This research and development aimed to create a model for value added to elephant dung and to study the need for value added from elephant dung to a new environmentally friendly product of the elephant community, and shop operators in Ayothaya Floating Market. Moreover, there was also a survey of tourists' satisfaction with products developed from elephant dung, which led to income generation for people in the elephant community and shop operators in Ayothaya Floating Market. In this regard, it was considered to create a unique identity and image in promoting tourism to Phra Nakhon Si Ayutthaya Province. This approach was consistent with Thai tourism policies and strategic plans that focus on the development of quality tourism, sustainable tourism and environmentally friendly tourism, as a trend for future tourism models (Ministry of Tourism and Sports, 2017).

II. RESEARCH OBJECTIVES

1. To create a model for value added to elephant dung
2. To generate value added from elephant dung to new products
3. To study consumer satisfaction towards new environmentally friendly products.

III. EXPECTED BENEFITS

1. Communities can apply boiling machine and blenders to other raw materials other than elephant dung.
2. The community has a career and income from selling products from elephant dung, a waste material.
3. Shop operators in Ayothaya Floating Market have unique products of Ayothaya Floating Market.

IV. RELATED THEORETICAL CONCEPTS

Concept of participation

Vroom and Deci (1970) said that involvement means that individuals are involved in decision-making and that individuals are satisfied with their performance. Individuals develop work engagement and ability to perform well, as well as expand the goals of a good and effective organization. Consistent with Keith's philosophy of non-organizational self-control (1972), the mental, emotional, and emotional involvement of one person in a group situation results in such involvement as a provocative reason to achieve the group's aims to create a sense of responsibility for that group. Sutee Worapradit (2010) said that community participation arises from the need to participate in any activity in order to affect the needs of the group in accordance with the social lifestyle. In order to achieve true community participation, participatory activities must take into account the lifestyles, values, traditions, and attitudes of individuals to enable voluntary participation because people in the community differ in personal characteristics, economic characteristics, and information acquisition. Community participation can be summarized in 5 steps: 1. Analysis, and synthesis of community problems 2. Appropriate planning and in accordance with the way of life 3. Determination of activities 4. Activities 5. Activity Assessment.

Participation process focuses on community-centricity with relevant agencies to assist, advise or facilitate.

Cohen and Uphoff (1980) proposed four participatory models below.

1. Decision-making participation: In the process of decision-making, the first is to define needs and priorities, followed by policy selection and related populations, early decision making, decision - making during the planning action, and decision making during the plan implementation.

2. Operational participation: As part of the project implementation elements arise from the question, "Who will benefit the project and how will it benefit, such as resource support, administration, coordination, and asking for help"

3. Benefit participation: In terms of benefits, in addition to the importance of quantitative and qualitative benefits, it is necessary to consider the distribution of interests within the group, the benefits of this project, as well as the positive and negative benefits of the structure, which can be both beneficial and harmful to the individual in society.

4. Assessment Participation: It is important to note that opinions, preferences, and expectations can influence changes in the behavior of individuals in the group.

Design techniques of natural products

Initially, the green market is a movement of corporate social responsibility leading to processes such as reduction in use, recycle, and re-introduction of new products (Kotler & Armstrong, 2008). In the past 20 years, Thailand has started to increase the availability of environmentally friendly products such as non-dyed clothing, solar self-degradable plastic bags, and recycled products (Pongwipha Losomboon and Supraanee Jongdeepaisan, 2006). In the industry, the focus is on recycling and environmentally friendly waste disposal and disposal tools that take into account the design of environmentally friendly products (Office of the National Economic and Social Development Board, 2006). Design scholars commented that designing environmentally friendly products must start from the product design process because product design determines the cost structure by 60-80 percent. Importantly, the operation must pay attention to every phase of the product life cycle, starting from the production planning, product design, production process, consumption, including destruction after use. The more every phase of a product's lifecycle can reduce our environmental impact, the more sustainable we can be in the future (Santana Amornchai, 2009)

The concept of design and development of environmentally friendly products is caused by human consumption behavior that tends to consume faster, thus causing a lot of waste problem even if the product is not damaged, or partially damaged which can be repaired and reused. According to this concept, it leads to the systematic design process. The key points for choosing a designer's approach to product design and development can be summarized as follows.

1. It is designed to be disassembled for easy disassembly, transportation, and reuse.

2. Actions are taken with the environment in mind by selecting materials that can be recycled or biodegradable as an ecological solution and protection.

3. Local materials are selected to reduce the energy consumption of moving, energy in production and the impact on resource use.

4. Human consumption behavior should be adjusted to slow down.

5. Products are designed to be durable and last longer such as waterproof, impact resistance, and partial modifications instead of leaving the whole piece.

6. One product can be converted into another product or multipurpose use.

7. Products that focus on sentimental values, such as typography, symbols, texts, etc. are designed to be able to remember or associate with good memories.

The elements of sustainable design have many dimensions, social, economic and environmental. To balance the three elements is difficult because it is not only necessary to maximize the benefit of all parties, but there are countless approaches to sustainable design (Singha Inthachuto, 2009).

Suwit Wongruchiravanich (2014) classified the concept of sustainable design into 3 main categories as follows:

1. Low-Impact Materials refers to the selection of chemical-free resources, the invention of new materials using natural resources instead of synthetic chemicals, as well as the selection of resources that can be recycled easily and with the lowest energy consumption.

2. Reduce means to reduce the number of resources used in production as much as possible, in other words, the most cost-effective use of the available resources. Reducing consumption must not compromise the quality or usability of the product, including reducing fuel consumption, and finding ways to use clean energy.

3. Reuse, Recycle and Upcycling", these 3 words have different meanings. Reuse refers to reuse without undergoing transformation. Recycle refers to the conversion of scrap materials and reuse, most of which will cause the material to deteriorate in quality. Upcycling refers to the process of converting waste materials into new materials or creating new products that are higher quality, more beautiful, and generate higher commercial value.

Trakulpan Patcharametha (2014) said that, in general, product design focuses on returns, consumer and producer needs, cost, usability, and aesthetics, as well as profit. Eco-product design ideas lead to sustainable product concepts, so other product design concepts need to be further developed such as environmental, social, and ethical concepts, thus resulting in eco-product design. Design needs to take into account three factors for consumers (Trakulpan Patcharametha, 2014):

1. Material and production method: Materials and methods are first and foremost in design. Designers must understand the types and properties of materials used to design each product and must comply with the reduction of material usage to minimize the impact on natural resources. Moreover, consideration should be given to recycling the product at the end of its useful life, or "Is the product biodegradable or not?"

2. Functionality: All products must have functionality, and ease of use, whether they are psychological or functional. Importantly, it should be in line with social conditions and consumers must be mindful of their economy. Sometimes a single product can be useful in many ways.

3. Appearance shape: The design must take into account the aesthetics and functionality of each type of product. Products must be attractive to consumers as well as design the shape to be easily repaired or modified.

Concept of value added

Value added for products or services plays an important role in attracting the attention of new consumers and retaining existing consumers for a long time. In the past, if a product or service was to be successful in the market, the most important thing was that the product or service had to be of superior quality than the competition and able to better meet the needs of customers. Even though the quality of a product or service is very important nowadays, the issue of "value added" is also important. Value added attracts consumers to be interested or make a decision to purchase a product or service. It can be seen that today's business is not only selling the core product or service, but also value added that makes consumers feel more profitable. Those products or services will be as successful as they should be (Poonlarp Thipchatyothin, 2010). Value added can be generated in many ways, such as creating value added from product design, and manufacturing processes. Sometimes it may be necessary to take action simultaneously to achieve the ultimate goal of obtaining "value-added" products and services for the target consumer.

Principles for considering ways to generate value added are as follows:

1. Value added must be determined primarily by the needs and tastes of consumers. However, it is important to understand "what is the consumer's attitude towards the consumption of that product or service in terms of physical, emotional, and emotional?" and "What factors affect consumers' decision to buy goods or services for the living?" Once the information has been thoroughly studied, it considers various opportunities to generate value added to meet consumer demand.

2. Product or service consideration is the most important concept in strategic business management. In this respect, a basic knowledge and understanding of the consumer, product, and product context is required and creative, strategic thinking is required to create a different and distinctive concept.

3. The raw material consideration should be related to the story of value added, such as the selection of local raw materials with a distinctive and valuable story.

4. Processes or production methods should be considered in terms of modifications to create more value.

5. Packaging or presentation should be considered to make consumers aware of the value of the product from the first touch. Packaging design may create value added in terms of convenience, and preserving product quality or aesthetics.

6. Value added is considered as a service of the product or the addition of a product to a service such as managing distribution channels to make it easier for consumers to buy, delivery services, additional information services or return services when buyers are dissatisfied.

7. Branding is the most important aspect of enhancing product value, which must go hand in hand with brand communication. Branding reinforces the identity of that product and service. In short, the value added is transformed into value for consumers to know.

8. Value added consideration is given to bringing the products and services to reach the target consumers as value added to the consumers in terms of convenience.

-The importance of value added in today's business operations is intensely competitive and consumer behavior

has changed. Therefore, businesses need to improve their ideas and strategies to keep up with the changes that occur. The value-added strategy gives businesses a competitive advantage. The value added is essential to the following business operations.

1. The value added that is superior to competitors can meet the needs and make consumers more satisfied. The value added may be achieved by offering the desired benefits to consumers.

2. The value added is the best way to build consumer confidence and trust because consumers have confidence in the quality of the product or service received.

3. The value added makes a business different from competitors in a competitive environment and creates a competitive advantage.

In short, the value added is something that gives you a competitive advantage through creating customer value and better production or service processes to become a leader in that product. In addition to differentiation in the market, value added helps to create higher perceived value among consumers, leading to more confident decision making in the next purchase of that product and service.

V. RESEARCH METHODS

The research and development combine the concept of engineering and business management by building a boiling machine and a blender for elephant dung to create new products from elephant dung. It was carried out by collecting a new product satisfaction questionnaire from tourists in the Ayothaya community as follows:

Sample selection: In this study, samples were selected using purposive sampling. According to Patton (1990), the purposive sampling is a unique method. The sample group was Ayothaya community as it was an elephant herdsman community and had a floating market for tourism in the same place. The dung blender tools were built by experts in engineering and design of eco-friendly products. In this regard, an accidental sampling was used which consisted of 3 design experts and 200 respondents from a sample group who visited Ayothaya Floating Market.

Research tools: The dung mixer, product design, and questionnaire were designed. Then, quantitative data were analyzed using descriptive statistics, frequency values, percentages, and standard deviations.

Data Collection: Data collection could be classified into two types: 1) Brainstorming between community leaders and researchers to determine the design of the boiling machine and dung blender, the researchers scheduled contributors in advance of each brainstorming session and the collection of relevant documentation to support the data. 2) Data collection from a questionnaire from 200 tourists in Ayothaya Floating Market using accidental sampling, the details were as follows.

Community Engagement: Researchers prepared in advance of the field visit by studying the community environment and the amount of elephant dung, as well as searching for information from various published channels, and a literature review related to environmentally friendly product design. In addition, a model for brainstorming was created in a systematic and standardized manner so that the information was completely in accordance with the objectives.

Brainstorming Techniques: In this regard, an audio recording method was used by asking the informant's permission and taking notes during the brainstorming session. During the process, permission was requested to take still images without seeing the participants. The prepared topics are followed in accordance with the objectives. General questions were asked to alleviate participants' concerns. Participants were willing to provide information willingly (Pongnarin Pitijatturat, Sodchuen Utamart, and Suparada Pimpan 2020).

Data analysis: Methods of interpretation and analysis of the collected data were used. According to Strauss & Corbin (1998) concept, there were 3 steps: 1) Encoding 2) Data link 3) Integration. At this stage, the essence of the matter was sought and the systematic analysis of the data was demonstrated. A statistical program was used to supplement the data analysis processing to ensure the accuracy and precision of the given statistics.

To verify reliability, the researcher applied Triangulation based on the concept of Maxwell (1996) which consisted of 3 techniques: 1) Different researchers: This was done using the perspectives of at least two researchers who were analyzed and interpreted several times to obtain the same information. 2) Different sources: Data was collected from a variety of sources to obtain comprehensive information for the given objectives through interviews with Ayothaya community leaders and merchants in Ayothaya Floating Market. Three interviews were conducted and each time did not exceed 1 hour for further interpretation and analysis. 3) Different methods: Data were analyzed on the construction of the boiling machine, the elephant dung blender and the method of designing environmentally friendly products. Research results could be described in two ways: Method 1) A descriptive lecture was provided to describe research findings related to the prototyping methods of boiling machine and dung blender. Method 2) Numerical data were analyzed to explain the results of collecting data from 200 tourists in Ayothaya Floating Market. The research was quantitative analysis. The questionnaire obtained from 3 experts was used to determine the acceptable IOC values for questions from 0.5 onwards, indicating that the questionnaire in the research was consistent with the acceptable content (Kalaya Wanichbuncha, 2017). It was found that there were 20 questionnaires. The IOC value was between 0.81-1.00, which was greater than 0.50, indicating that the tool could be used for qualitative research and efficient data collection.

VI. RESULTS

Research and development results

Value added of elephant dung to a new environmentally friendly product requires building an elephant dung blender to meet the needs of the elephant herdsman community. In addition, new environmentally friendly products should be designed and developed in order to satisfy environmentally friendly products. The details are as follows.

1. Ayothaya community is an area where many elephants are reared for tourists' sightseeing. As a result, there is a large amount of elephant dung and the cost of disposal, resulting in environmental problems. Therefore, elephant dung is intended to be useful and valuable, which includes income generation and employment within the community.

The researcher consulted with experts and made suggestions for using elephant dung to create new products for the benefit of the community and Ayothaya Floating Market. Importantly, it helps to reduce the environmental impact and reduce the cost of disposal of elephant dung.



The frame sheet is made by using nylon netting stretched with the wooden frame to make the paper evenly smooth, and good drainage. Importantly, the paper does not adhere to the nylon too tightly and is easy to maintain and clean. When dried in the sun, the paper is ready to be developed into a new product.

2. There are 2 types of tools making results: Boiler and elephant dung blender.

The elephant dung boiler uses a 200-liter steel oil tank because it is heat resistant and generates heat quickly. Elephant dung is boiled 30 kg per time at 100 liters. The boiling method starts with washing the elephant dung thoroughly and boiling it in 20 percent water in the boiler for 2-3 hours to soften the fibers from the dung. The water was then washed again to remove the smell of grass and the smell of elephant dung and left for one night to allow the dung to cool and ready to be blended.

The blender is made of stainless steel 304 material, which can reduce corrosion and have a long service life. The dimensions of the elephant dung blender are width 800mmx length 1200mmx height 1300mm. It takes time to spin 30 kilograms of elephant dung each time. The method of spinning elephant dung is as follows: The boiled elephant dung is spun for 2-3 hours so that only the grass pulp remains. The paper mulberry is added and then blended to help bind grass pulp to be softer and stickier. Blending is powered by AC 220V50Hz and a 1HP motor and spins at a speed of 1400rpm/rev. The blade rotates at a speed of 500rpm/rev. The elephant dung was washed with clean water by immersing it in a large bath and using a rectangular frame to scoop the dung pulp to dry in the sun.



3. The result of product design and development from elephant dung paper to new environmentally friendly products is divided into 4 categories: Plant pots, small storage bags, picture frames, and handle bags. The researchers consulted design experts and concluded that three types of bags could be produced: small storage bags, picture frames, and handle bags. Plant pots cannot be made because they need to compress the elephant dung to the desired shape, but in this research, the researcher did not have such a compactor. The product model is as follows.



4. The assessment results of consumer satisfaction with new environmentally friendly products of 200 people, found that

Gender	Number	Percentage
Male	78	39
Female	122	61
Age	Number	Percentage
Less than 20 years	25	12.5
20-30 years	71	35.5
31-40 years	68	34
41-50 years	12	6
51-60 years	11	5.5
More than 61 years	13	6.5
Occupation	Number	Percentage
Student	35	17.5
Private company employees	54	27
Civil servants/State enterprises	43	21.5
Self-employment	68	34

The majority of the respondents were 122 women (61 percent), age between 20-30 years of 71 people (35.5 percent), and most of the 68 people are self-employed (34 percent).

Table 1 shows mean, standard deviation, and social responsibility.

Environmental responsibility	\bar{x}	SD
1. The feeling of being an environmentally responsible person when purchasing environmentally friendly products.	4.56	0.43
2. Elephant dung products are an environmental booster to bring people back to environmentally-friendly products.	4.22	0.38
3. You feel that you are involved in environmental responsibility.	4.25	0.35
4. You feel that you are part of a community-based career promotion.	4.43	0.42
Total	4.36	0.39

Table 1, the overall environmental liability satisfaction averaged 4.36. Feeling of being an environmentally and socially responsible person at the time of purchasing this product averaged 4.56, followed by a feeling of being part of the community with an average of 4.43.

Table 2 shows mean, standard deviation, and awareness of environmentally friendly products.

Awareness of environmentally friendly products	\bar{x}	SD
1. Protecting the environment should start with oneself in order to reduce environmental and social problems.	3.74	0.34
2. The use of environmentally friendly products is a concern or awareness of environmental issues.	3.88	0.40
3. You have a green product attitude in terms of making you feel that you are a socially and environmentally responsible person.	4.01	0.45
4. You are aware of environmental issues, so you support environmentally friendly products, making you feel special in society.	3.54	0.35
Total	3.79	0.38

Table 2, the overall perceived satisfaction with environmentally friendly products was an average of 3.79. Positive attitude towards environmentally friendly products as a socially and environmentally responsible person averages 4.01, followed by the use of environmentally friendly products with concern or awareness of environmental issues with an average of 3.88.

Table 3 shows mean, standard deviation, and satisfaction with environmentally friendly products

Satisfaction with environmentally friendly products	\bar{x}	SD
1. You are happy to be involved in protecting the environment.	4.45	0.47
2. You are impressed with the innovative product developed from elephant dung.	4.52	0.56
3. You are proud to support community-oriented products.	4.01	0.42
4. You are contributing to the promotion of the community for a sustainable career.	4.25	0.45
Total	4.30	0.47

Table 3, the overall satisfaction with the eco-friendly products of the tourists was an average of 4.30. Impression of the product developed from elephant dung as a new innovation was an averaged at 4.52, followed by happiness of participating in environmental protection with an average of 4.45.

VII. DISCUSSIONS

The research titled “value added of elephant dung to new environmentally friendly products” could discuss the results as follows.

1. Survey on the need to create new products from elephant dung, most of the elephant herders and shop operators in Ayothaya Floating Market cooperated at a good level because it was the use of waste and environmental awareness as well as creating a unique identity for the community. According to the opinions of the informants in accordance with the research of (Wassana Sirimongkol, 2012) who studied the awareness of environmental pollution problems of ceramic industry entrepreneurs, the use of waste to optimize the benefits was considered to protect the environment within the organization and generate income for the community through the sale of paper products from elephant dung. Consistent with the concept of Phataporn Srikotaphet (2017), there were two aspects of product value creation: the product refers to the value delivered to the customer through the product and the form of the gift that met the customer's needs appropriately, and the image was the value of the customer's feelings towards the product and the gift format. Consistent with the concept of Kotler, P. & Keller, K. (2012) who studied marketing about product identity to made it easier for customers to remember the product, identity was a selling point to allow more tourists to

visit the community, which resulted in the community having more revolving income.

2. The construction of a boiling machine and a blender to obtain paper for the creation of new products from elephant dung, found that the elephant dung boiler used a 200-liter steel oil tank because of its ability to withstand heat well and generate heat quickly. It should be boiled 30 kg at a time and must be boiled before blending to soften the elephant dung. Consistent with the concept of (Raewat Termkla, 2016), the efficiency of the technology used to produce paper from elephant dung must consist of pressurized pulpers and pulpers and paper plate forming machines to ensure quality paper.

3. Product design from elephant dung paper to new environmentally friendly products was designed according to the needs of the community of elephant herders and shop operators in Ayothaya Floating Market. Products could be classified into 3 types: small storage bags, photo frames, and handle bags. Products made from elephant dung paper create a unique identity for Ayothaya Floating Market as a tourist attraction, both ancient sites and souvenir markets that meet the needs of the community. Consistent with the research of Rewat Termkla (2016), the community would like to produce multi-purpose boxes, paper carry bags, and paper envelopes for documents because they are general-purpose and harmless products. Consistent with the research of Phataporn Srikotaphet (2017), the community products could be produced for commercial sale. Consistent with the research of Chaiwit Muangmee (2019), creating an image of a tourist attraction helped to impress tourists and their repeat visits. Consistent with the research of Nawaporn Rattanaburi (2020), successful entrepreneurs needed creativity and the ability to create a wide range of products to meet the needs of their customers.

4. Consumer satisfaction with new environmentally-friendly products were found that the majority of respondents were women (122 percent), 71 people aged between 20-30 years (35.5 percent) and most of the 68 people run their own business.

Overall, satisfaction with environmental liability was averaged 4.36. The level of being environmentally and socially responsible when purchasing environmentally friendly products was averaged 4.56, followed by a mean feeling of being part of the community at 4.43.

Overall, perceived satisfaction with environmentally friendly products was averaged 3.79. Positive attitude towards environmentally friendly products in terms of being socially and environmentally responsible averaged of 4.01, followed by the use of environmentally friendly products in terms of concern or awareness of environmental issues with an average of 3.88.

Overall, tourists' satisfaction with eco-friendly products were averaged 4.30. The impression of the product developed from elephant dung in terms of innovation was averaged 4.52, followed by the happiness of participating in environmental protection at 4.45.

VI. Suggestions for further research

1. The production of blenders and elephant dung boilers is large and heavy, so small blenders and boilers should be produced that are easy to move.

2. A variety of products should be created to meet the needs of customers/tourists who prefer environmentally friendly products.

3. The results of this research found that a qualitative study of elephant dung should be used to generate income for the community in another channel, such as soil/fertilizer

production from elephant dung to add value to elephant dung. Most importantly, the community can use it for the cultivation of vegetables.

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