The Design and Concept of Agro-Edutourism Park Using Sustainable Agriculture Principle at Attaqie Farm

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Abstract. This study aimed to provide a better understanding of agriculture to the society through the implementation of design and concept of sustainable agriculture in Attaqie Farm agro-edutourism park. The research was conducted in November 2018 – June 2019 at Attaqie Farm, Tuban, East Java, Indonesia. The research procedures were concept formulation, designing, organizing detail drawings and implementation of desired site plan. The result showed that the concept and design prepared by using sustainable agriculture principle successfully to be applied in the agro-edutourism park namely Attaqie Farm. In term of economy, this farm had entrepreneurship activities such as the production of organic fertilizer, fresh star fruit and its derivates. In term of social, this farm educated visitors about leafy vegetable culture in verticulture method. It was ecofriendly farm because it had recycling activity of the waste of leaf and fruit into organic fertilizer and applied back to the orchard.

1. Introduction
Technological developments and civilization have shown unusual effects in various fields. In field of agriculture, there has been a growing need for understanding agriculture through different perspectives. The emergence of agricultural education through the concept of agrotourism has sprung up both in big cities and developing areas. This concept is proven to improve regional welfare and create better understanding of agriculture.

Agrotourism or even agro-edutourism is not a new phenomenon. In America, this phenomenon has increased since 2002. According to research conducted in Missouri and North Carolina, agro-edutourism is a concept of tourism that includes cultivation, education, entertainment, and of course involving visitors to be directly exposed by agricultural activities [1]. In addition, agro-edutourism is the utilization of agricultural business (agro) as a tourist attraction that aims to expand visitor knowledge in agriculture at the same time to do recreation [2]. The concept of agro-edutourism is very suitable to be used in introducing and developing regional agricultural products. This is because the concept is acceptable in our society. Furthermore, the emergence of agro-edutourism is encouraging farmers to maintain their cultural heritage and also contributing in the economic improvement of local society [3]. As the combination of agricultural, education and tourism, the agro-edutourism allow the transfer of information through non formal education condition so that the visitor could enjoy the tour at the same time with study the agriculture knowledge. This situation made the learning process of agriculture is more fun and attractive than formal concept.

Attaqie Farm is one of emerging agro-edutourism park located in Tuban District, East Java Province, Indonesia. This farm was located in the middle of start fruit orchard with the area for about 17 Ha in total and 2 Ha for the park only. The design and concept of the Attaqie Farm Agro-Tourism is directed to make enjoyable visiting experience and also to let tourists to love and care the environment.
The presence of agro-edutourism make so many benefits in terms of economy, ecology and social. Sustainable agro-edutourism provide a lot of benefits for the surrounding community such as the empowerment of the local society, opening new work opportunities and educating society in general and student from children to university level in particular.

As one of emerging agro-edutourism, Attaqie farm required the development of several spot for visitor attraction, such as garden and greenhouse. This development required suitable design and concept prior to implementation. However, there is a lack of study related to the design and concept in this agro-edutourism park. Thus, this study aimed to implement the design and concept of sustainable agriculture in Attaqie Farm agro-edutourism. Our hope is to provide a better understanding of agriculture to the society that is possible to have a highly profitable agribusiness if they followed sustainable agriculture principle and combined with edutourism activities.

2. Materials and Methods

2.1. Time and Place
This experiment was conducted in November 2018 - June 2019 at Attaqie Farm, Panyuran Village, Palang District, Tuban Regency, East Java Province, Indonesia. The Attaqie Farm was composed of 2 Ha of agro-edutourism park and 15 Ha starfruit orchard. The Attaqie Farm was geographically located at 6º54'22.53"S-6º54'26.62"S, 112º05'25.63"E-112º05'31.21".

2.2. Experimental tools
The tools used in this study included calculator, stationery (pencils, drawing pens, rulers), and surveying tools (global positioning system, roll meter, paper, board, computer and camera. Materials needed include, base map, and working paper.

2.3. Research method
This research was initiated by the preparation of design. The output produced from this study was a design (site plan) of garden which is equipped with detailed drawings (cutting images, perspective drawings, planting plans, and detailed drawings). The design became the basic reference for the implementation step.

2.4. Research stages
This study followed the stages of work proposed by previous study [4], namely the Planning Design Process included several stages, such as analysis, concepts, design construction drawing, implementation, and post-construction and evaluation and maintenance. In detail, this study stages were described below.

2.5. Field observation
Field observation was carried out directly in the Attaqie Farm. This activity aimed to see the general condition of the area. This activity was conducted by interview method to the relevant parties and the obtained information was confirmed by cross-check method directly to the field. Thus, there were 2 data collected, both from interview process and field observation itself.

2.5.1. Analysis
This stage was consisted of several activities such as data collection, inventory, site analysis and synthesis.

2.5.2. Design
The design stage was consisted of several activities such as (1) concept formulation; (2) design production that fitted with the prepared concept and the output was the siteplan; (3) detailed drawing was consisted of cuttings, viem perspectives, planting plan and other specification, so that this drawing served to explain the landscape design in order to be more easily understood.
2.5.3. Implementation
The prepared site plan became the basic reference during the implementation process to realize the site plan to the field

3. Results and Discussion

3.1. Analysis of visitor circulation at Attaqie Farm agro-edutourism Park
The analysis of visitor circulation pattern was intended to be able to connect the space and objects with one another in the entire park to be more effective and efficient. The pattern of visitor circulation especially for specific visitor from institutions or schools with the aim to have agro-edutourism experience was shown in Figure 1. It was initiated by the arrival, parking, entering through the beautiful iconic main gate (one of favorite photo spot), in door short course (rapid introduction of park), coming to garden, greenhouse for ornamental plant and also leafy vegetables that arranged in verticulture method, continued to the production house of organic fertilizer and harvesting the star fruit directly to the orchard. The visitor might rest in cafe and allowed the children to play in playground area or swimming pool. There was also praying room for visitors next to the cafe.

![Fig 1. The pattern of visitor circulation in Attaqie Farm agro-edutourism park for specific visitor from institution or school](image)

3.2. The object and attractiveness of agro-edutourism park
The attractiveness of an agro-edutourism park was the most important issues that should be monitored by the managerial team so that visitor got good and satisfy experience and they would return in near future. The development of agro-edutourism should pay attention to the social interactions between visitors, workers, and owners [5]. Attaqie Farm showed its own charm and excellence in its management, namely an integrated agro-edutourism park. Interactive education could be the concept of certain attractions such as the training to culture organic vegetable, fruit tree, ornamental and medicinal...
plants. The type of tourist who came in this park and their activities during the visiting period and the supporting facilities that they used was shown in Table 1.

| No | Subject                          | Activities                                                                 | Facilities                                                                 |
|----|----------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------------|
| 1  | General tourists                 | Relax in the gazebo, enjoy the garden, play in the playground and swimming pool, eat in the cafe | Swimming pools, land recreation facilities, cafe, prayer room, gazebo      |
| 2  | Specific tourist, for agroeducation and also out bond | In general, it was similar to the general tourist, but there were additional activities such as the introduction to organic vegetable, production of compost and liquid organic fertilizer, plant nurseries in the green house and star fruit picking | Swimming pools, cafe (hawker center), educational park, prayer room, gazebo, playground |

3.3. Design
In the field of landscape architecture, landscape design was a process after planning. The design process was a systematic tool for determining the expected initial state and the best way to achieve the expected state [6]. The process of designing an agro-tourism at Attaqie Farm should be in accordance with its objectives. The site plan of Attaqie farm agro-edutourism park was showed in Figure 2. According to [7], when designing an agro-edutourism park, researchers should understand the landscape features that attract visitors and perceptions of visitors who come from various educational backgrounds, gender, and its interest in agriculture after visiting the park. The production of educational garden Attaqie Farm was intended to educate visitors ranging from kindergarten children to the university student. Our hope was to share and let them to love more about sustainable agriculture and to be wise during the handle of waste.

Fig 2. Site plan of Attaqie Farm agro-edutourism park

The design and implementation of an educational park at Attaqie Farm also called as Taman Pintar that consisted of various vegetables medicinal and ornamental plants. Taman Pintar was built to introduce the knowledge and technology of sustainable farming to the community through non formal and fun method. This design concept was in line with the previous study [8] that the garden that was designed by allowing full participation of visitors would increase the visitor experience to the park.
Figure 3 was the design and implementation of the Attaqie Farm agro-edutourism park. The figures number 3a, 3b and 3c showed initial condition of the site that were empty area without any ornamental garden and not so much attractive. The figures number 3d, 3e and 3f were the prepared design for the garden and greenhouse. The figures number 3g, 3h and 3i were the start of the implementations by creating the frame of tunnel, the rack of verticulture, planting ornamental and medicinal plants.

Attaqie Farm agro-edutourism park applied several principles of sustainable agriculture. One of them was the commitment to apply organic inputs, such as liquid organic fertilizer and compost. After pruning season, the pruned leaves collected and then processed to be compost. While the drop fruit was used to produce liquid organic fertilizer. Both of organic fertilized were then applied back to the orchard. One of visitor attraction facilities in Attaqie Farm was a swimming pool. The wastewater from this pool was used for irrigation water and delivered to starfruit orchard.

One of educational site in Attaqie Farm was the combination of garden and verticulture inside the greenhouse. The garden was so beautiful and invited the people to take the picture. The leafy vegetables were planted in verticulture method. This method allowed the presence of multilayer bed for raising vegetable so that was more efficient in term of place. Vegetables and ornamental plants were applied organic fertilizer either compost or liquid organic fertilizer that had been produced. The greenhouse was used for educating visitors, mostly kindergarten children up to college student. The implementation of the design was depicted in Figure 4. Figure 4a showed the greenhouse before the design, while Figure 4d was the greenhouse after design implementation. Figure 4b was an empty area before implementation, while Figure 4f and 4h were the results of the design implementation. Figure 4c showed the documentation of verticulture racks production, while figure 4e and 4f showed the leafy vegetables on the verticulture.
Starfruit was a fruit that was easily damaged so that it had a low shelf life [9]. The innovation offered in this garden was the invitation to the visitors to harvest fruits directly to the orchard so that there was a short cut of product chain from farmer directly to customer. This situation also allowed visitors to select desired fruit so that they know exactly the fruit quality, even started from the plant to the table. The concept of Attaqie Farm agro-edutourism park was depicted in several programs as shown in Figure 5 below.

**Fig 4.** The implementation of design at Attaqie Farm agro-edutourism park

**Training center for agricultural education**

- Production of liquid organic fertilizer and compost from starfruit waste, ecofriendly and profitable planting system

**Agroedutourism**

- Providing better understanding to visitors about sustainable agriculture
- Attaqie Farm was designed by applying educational values to the concept of sustainable agriculture.
- Starfruit picking activity for visitor

**Entrepreneurship**

- Production of derivatives products such as juice, ice cream, organic fertilizer

**Fig 5.** The concept of agro-edutourism at Attaqie Farm
4. Conclusion
The concept and design prepared by using sustainable agriculture principle successfully to be applied in the agro-edutourism park namely Attaqie Farm at Tuban, East Java Province, Indonesia. This farm allowed visitors, starting from kinder garden children up to college student, to have agricultural education experience at the same time with recreational activities. This farm recycled the waste of leaf and fruit into organic fertilizer and applied back to the orchard. This farm educated visitors about leafy vegetable culture in verticulture method and also have entrepreneurship activities in term of production of organic fertilizer, fresh star fruit and its derives such as juice.

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