



**PKM PRODUCT DESIGN DEVELOPMENT BASED ON BAMBOO MATERIALS IN NAGARI  
KUMANIS SIJUNJUNG, WEST SUMATERA  
(LOCATION: BAMBOO CRAFT SMES IN NAGARI KUMANIS, SIJUNJUNG REGENCY)**

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**ABSTRACT**

*The nature of West Sumatra, which is rich in bamboo, is a strategic environment for bamboo growth. Such dense bamboo clumps have utilization problems and lack scientific design development in product design. The phenomenon of bamboo has not been utilized optimally by the people of Nagari Kumanis Sijunjung is an opportunity for the author of this design project to provide ideas for the community and home industry owners. This dedication aims to design consumable products using bamboo material by targeting the market tastes of the Nagari Kumanis Sijunjung bamboo product SMEs. This service uses the lecture method, introduction of new designs, modeling, and prototyping. The results will be in the form of a 1:1 scale design or prototype. Based on the results of the dedication, the design of bamboo product designs is more focused on developing designs targeted to market tastes. In addition, the creation of bamboo products is stationary products, sitting lamps, and mirrors. This product is not materially hazardous because the finishing process uses water.*

**Keywords:** Nagari Kumanis, Bamboo, Design Development

**INTRODUCTION**

Nagari Kumanis is one of the villages selected as an outstanding Nagari at the West Sumatra Province level in 2018. Nagari Kumanis represents Sijunjung Regency as an Outstanding Nagari. It has various potential natural resources, including latex/rubber, palm sugar, palm, and bamboo (Statistik, 2019). Most of the producers of bamboo in West Sumatra come from Sumpur Kudus Districts in Nagari Tanjung Bonai Aur and Kumanis, Sijunjung Regency. This Nagari already has a craft group called Talago Bamboo Craft. Bamboo craft centers that have long developed in West Sumatra are Tanjung Bonai Aur and Nagari Kumanis.

The bamboo handicrafts of Nagari Tanjung Bonai Aur and Nagari Kumanis are unique in their processing and technique. However, in terms of the characteristics and identity of this bamboo product, it has not been appropriately exported and has not met the needs of market tastes. But society manages all these resources. According to one of the community leaders in Kumanis Sijunjung, Mr. Yul Firdaus, the Kumanis people work as garden farmers. On average, people in Kumanis have managed traditional rubber, oil palm, and palm sugar plantations except bamboo. Bamboo is not appropriately managed where bamboo only grows wild in gardens and forests. (Interview with Mr. Yul Firdaus on September 7, 2019, at 10.00 to 11.00 WIB). This problem is undoubtedly a concern for the dedicated team in developing bamboo product designs for SMEs in Nagari Kumanis Sijunjung so that the economy and bamboo product production of Nagari Kumanis SMEs do not work in place. The design of a product design certainly has management and the proper method. Regarding design management, the service team focuses on two special concerns for this bamboo product service, including investigating management issues and regulatory accountability from within (internal influence) that affects a product, then digging



up information about management methods and approaches. A design usually maintains product quality influenced by production, design, and cultural and environmental quality (Heskett, 1986).

Various factors undoubtedly influence the development of a product design; Karl T. Ulrich stated that design development is an activity set from the beginning with the perception of market opportunities and ends with the production, sale, and delivery of the product. This design development has five characteristics that are successful in design development, including: (a) Product Quality is a reflection of the distribution in the market and the price that consumers are happy to pay. (b) Product Cost includes the production process for producing a unit of the product, including main and supporting equipment. In addition, how much profit, sales, and selling price. (c) Development Time: how much time is spent and needed in product development, including technology development. This also concerns how much the bamboo artisans team can regain their capital. (d) Development Price is a cost that usually increases to achieve high-profit success. (e) Development Capability is the ability to calculate and think about future products through the experience of previous products. Then the ability to develop this product as an asset to develop more efficient and economical products in the future (Steven, 1995).

From the description above, it can be seen that bamboo is an economic booster in the Nagari Kumanis Sijunjung community. The people own and manage the bamboo plantations that grow in Nagari Kumanis independently. This bamboo plantation can be said as a side income for the people of Nagari Kumanis Sijunjung. The community has a dual role as rice and bamboo farmers, becoming the wheels of the community's economy.

The contribution of this service is to provide solutions by approaching a product design strategy in a conceptual way which is the new formula for SMEs in developing home industry businesses in handicrafts made from bamboo. This service is more concentrated on disposable bamboo products produced by artisans, which will be more varied with designs that suit the tastes and needs of the market in the form of lampshades, fruit holders, candy holders, clothes/hat hangers (accessories), shoe rack, and so on. This will indirectly increase the productivity of Nagari Kumanis Sijunjung bamboo artisans in West Sumatra as one of the creative industry centers.

Through bamboo for the people of Nagari Kumanis, the service team has the idea of using bamboo material as a product design development to achieve market tastes. The attentive service is developing bamboo designs made at SMEs Nagari Kumanis Sijunjung as a potential product with a product design development approach and strategy. Based on the site survey results, the bamboo material has not yet been specifically processed scientifically in product design where Natural Resources and Human Resources in West Sumatra are bamboo materials.

## **METHODS**

The implementation of this service activity cannot be separated from the coordination carried out by the dedicated implementation team from ISI Padangpanjang. The program steps/methods designed by the dedicated team are 1) Coordination with team members and MSME owners, 2) Counseling, and 3) Training. The initial stage that the team carried out in this training activity was coordinating with the service team regarding what needed to be prepared to start from the materials and tools required at the training time.

## RESULT AND DISCUSSION

Based on the problems bamboo artisans face in the MSMEs of Nagari Tanjung Bonai and Nagari Kumanis, as partners, the service team will develop product designs and create designs that follow market tastes and needs. It can increase the ability of bamboo artisans to produce product designs made of bamboo that have a selling value and value for the user's needs.

The flow of the implementation of the dedication activities carried out are:

### 1. Coordination with Team Members and MSME Owners

#### a. Coordination between Team Leader and Members.

Before carrying out community service, the team must prepare materials, tools, and other supports. The dedicated team leader distributes the members' duties according to the portions. The leader invites members to coordinate so that members know the steps or stages that will be carried out at the service location later (see figure 1).



**Figure 1.** Coordination between Team Leader and Members (Documentation: Ferry Fernando, 2019)

#### b. Coordination with Bamboo Owners and Craftsmen in Nagari Kumanis, Sijunjung.

The dedicated team that will carry out the service at Nagari Kumanis Sijunjung must coordinate first before going to the location to get permission so that the implementation of the service can run well. This coordination was carried out by sending a letter of permission to the head of SMEs Bambu Nagari Kumanis Sijunjung from the ISI Padangpanjang campus and verbally by reconfirming to reaffirm the service plan at SMEs Nagari Kumanis Sijunjung. (See figure 2).



**Figure 2.** Coordination with Leaders and Craftsmen (Documentation: Ferry Fernando, 2019)

## 2. Counseling

### a. Counseling and Socialization.

Artisans receive counseling regarding improving the quality of bamboo designs through developing product designs made of bamboo, product development, and online marketing of bamboo handicrafts (Malik et al., 2020).

Developing quality designs can increase the selling value of bamboo products produced at the Bamboo SMEs in Nagari KumanisSijunjung. In this implementation, the service team could not conduct counseling in the morning because the owners and artisans worked in the fields as farmers. Still, the activities started in the afternoon until the afternoon, hindering the service team when carrying out counseling. However, the author must carry out socialization and counseling personally or personally with the owner and artisans (see figure3).



**Figure 3.** Counseling and Socialization with Owners and Craftsmen (Source: Rahmad Washinton, 2019)

This stage explains the development of bamboo product designs that bamboo artisans must carry out at Bamboo SMEs in Nagari Kumanis Sijunjung. This gives a fresh idea; the seide as are adapted to market developments and current market needs. For thisreason, the market for bamboo products must follow the times and demands of today'stastes.

### b. Types of Bamboo used in Bamboo Products

The type of bamboo used is bamboo *betung*. In the book Bamboo, Anang Sumarja explains that bamboo *betung* is usually used as a vegetable in the shoots. The reeds are up to 12 centimeters in diameter with relatively thick walls, so they are commonly used for house poles, bridges, and other building materials (Sumarna, 1986). Since the establishment of the Bamboo SMEs in Nagari Kumanis Sijunjung, the artisans have used bamboo because it grows in their gardens and can be found in the forest.

Table 1. Specifications and criteria for bamboo to be used for product development. Bamboo specifications and criterias include:

**Table1. Bamboo Specifications and Criteria**

No	Types of Bamboo	Characteristic	Function	Note
1	Bamboo <i>Betung</i>	1. Diameter 12 centimeters 2. The walls are relatively thick. 3. Bamboo shoots can be used as vegetables.	1. Pole House. 2. Bridge. 3. Building Material	1. Strong 2. Used as materials for crafts.
2	Bamboo <i>Gombong</i> ( <i>Batuang/Buluah</i> )	1. Yellowish green in color. 2. Yellow stripes are parallel to the reed. 3. The high of the reed reaches 20 meters. 4. Diameters 10 centimeters	1. Building Material. 2. Materials for furniture 3. Household utensils.	1. Good for economy 2. Great economic potential. 3. Used as materials for crafts.

### c. How to Preserve Bamboo

The book "Ilmu Konstruksi Bangunan Bambu" (Science of Bamboo Building Construction)(Frick, 2004) explains that there are two ways to preserve bamboo, namely the traditional method and the chemical method.

#### 1. Traditional Method

The traditional treatment method is to soak the bamboo stalks before use for one month in fresh, brackish water or seawater that is calm or flowing so that the starch content will be washed away or lost. Then the freshly cut bamboo sticks should be leaned in a standing position, and bamboo that has not been cut should be placed in a shady place. While the treatment method uses fire, fire and smoke will eradicate pests inside the bamboo stems and harden the surface of the bamboo.

#### 2. Chemical Method

There are five ways of chemical preservation: preservation by immersing bamboo sticks or slats, drainage and pressing methods, storage in iron drums, and painting with insect repellents. The explanations are below:

##### a. Preservation by immersion

This is the simplest way. The bamboo stems (or blades) are soaked in preservatives with or without the stalks. Preservation by soaking can only be done with freshly cut bamboo (not dry). This method takes 2-5 days.

##### b. Preservation by flowing

This is the most efficient way. Freshly cut bamboo stalks (including stems and leaves) are joined together with the ends of the legs on iron drums containing preservatives. The preservative will flow in the bamboo stem until it reaches its peak. The remaining preservative that flows out at the peak can be reused as long as the concentration is guaranteed.

c. This is a faster way, so you don't have to wait 2-5 days, as mentioned above. In this method, the iron drum containing the preservative must be air-tight to be equipped with an air pump that will press the preservative into the bamboo stem.

##### d. Painting with insect repellent



The leaves of the neem tree are crushed and crushed to produce leaf juice. Because the juice contains natural insecticides, it can be painted on dry bamboo stems and constructions to repel insects. Bamboo building materials that are already dry must always be protected from rain or dew.

### 3. Training

#### a. Design Development Stage

This stage begins with creating design alternatives that have been digitized. Bamboo product development applications include wall clocks, sitting lamps, pencil cases, and stationaries. The purpose of this alternative design is to make it easier for artisans to understand the drawings and provide them with new ideas for imagination. Artisans are not familiar with sketching but prefer to see pictures or photos on the internet(see figure 4).



**Figure 4.** Bamboo Craft Alternative Design (Source: Kendall Malik, 2020)






#### b. Production Process (Prototype)


From the results of designing alternative designs, the production process is carried out by bamboo craftsmen, MSME Bambu Nagari Kumanis Sijunjung. In the production implementation, the bamboo artisans divide into two tasks according to their expertise, such

as one part craftsman cutting bamboo according to size. The second craftsman is in charge of assembling and finishing.

The production process for Community Dedication is divided into two stages because it uses different techniques, namely the bamboo cutting stage (see table.2).





**Table 2. Bamboo Cutting Stage**

No.	Activities	Document Evidence
1	Prepare the bamboo to be cut.	
2	Cut the bamboo using a cutting machine as needed.	
3	Cut the bamboo into small pieces using a knife according to the size that is already in the design.	
4	Connect the bamboos using wood glue evenly.	
5	Then wait until the glue on the bamboo dries.	




6	Then use the stamped of latten the bambooto make it easier when as ssembled.	
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The production process in the second stage of Community Dedication is the Assembling and Finishing stage (see table. 3)

**Table. 3. Assembling and Finishing Stage**

No.	Activities	Document Evidence
1	Smooth the surface of the bamboo until it is even.	
2	Then select and sort the same bamboo long, thick and short. And Arrange the Bamboo so you can see the flat and uneven surface.	
3	Glue using glue for wet wood so that the bamboo surface can be glued easily.	
4	Smooth the surface of the bamboo with a stamped machine to get maximum results.	



5	After the shaved results are precise and even, then the prototype measurements are carried out according to the sizes and parts that have been determined.	
6	Cut the detail elements on the parts that have been measured and marked.	
7	For the finishing process, use water-based WoodFiller wood putty to cover if there are open bamboo pores. Then use the water-based BioVernish to polish the surface of the prototype.	

#### 4. Final Design and Prototype

From this Community Service activity, four prototypes are produced that follow the achieved target market (see Figure 5), including:





**Figure 5.** Product prototype (Documentation: Kendall Malik, 2020)

## CONCLUSION

This community dedication is still not perfect due to the need for maximum attention to educating the artisans and the community. The implementation of community dedication activities lasted for six months in Nagari KumanisSijunjung, resulting in four prototype bamboo products: a mirror, which has three functions, a sitting lamp, and a pencil case. The product prototype had to be done in a wood workshop, ISI Padangpanjang because the equipment at the Nagari KumanisSijunjung Bamboo Product Craft UKM was still inadequate. This service aims to educate the public about bamboo processing and design with a scientific approach to product design and strategy. The development of bamboo handicraft products in KumanisSijunjung village into local products can be carried out in the design development stage for bamboo products. The results of the development of the Nagari KumanisSijunjung bamboo product design will increase the appreciation of the Nagari KumanisSijunjung bamboo artisans so that the need for Nagari Kumanis bamboo products will increase because its can be utilized for various uses. This is one of the right ways to develop bamboo handicrafts in the Sijunjung area, as well as positively impact the development of the Nagari Kumanis Sijunjung bamboo product craft industry.

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