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Efforts to Keep Forest Sustainability and Economic Improvement for the Community around Perum PERHUTANI through Product Design Approach.

Sumarno,[1]* Sri Hesti Heriwati,[2] Deni Dwi Hartomo.[3]

[1] Faculty of Visual Art and Design (FSRD), Indonesian Institute of the Art (ISI) in Surakarta, Jln. K.H. Dewantara No.19, Surakarta, Central Java, Indonesia.
[2] Faculty of Visual Art and Design (FSRD), Indonesian Institute of the Art (ISI) in Surakarta, Jln. K.H. Dewantara No.19, Surakarta, Central Java, Indonesia.
[3] Faculty of Economic and Business (FEB), Sebelas Maret University (UNS) in Surakarta, Jln. Ir. Sutami No. 36A, Surakarta, Central Java, Indonesia.

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Abstract

Defragmentation and deforestation will endanger forest as the producer of industry's raw materials as well as the sustainability of the industry itself. In Indonesia, Perum Perhutani is a state owned enterprise that has a responsibility to manage forest. The most laudable step that this enterprise has proceeded with is the formulation of cooperative forest management model (PHBM). However, PHBM model has not succeed in alleviating the poverty in the community around the forest. Because of that, a sustainable empowerment and optimalization for the utilization of forest products through product design approach is needed. This study is conducted in multiyear scheme. The first stage focused on the empowerment of the community around the forest through the utilization of twig in the production of high priced products. This study uses qualitative method with design approach. The samples are selected based on one stage sampling, or non-probability sampling. This study uses process design for handicraft and furniture from teak twig as a strategy in conducting the study. Therefore, the products must be well designed in order to be accepted by the market. This study is performed through following steps: analysis of potency and characteristic of the twig, designing as well as sketching, drawing working, prototype, intellectual property right registration, and socialization of study results to the community around the forest. The utilization of twig as a raw material of high priced handycraft and furniture products. The socialization covers twig based design, and production process and technique. Besides on the potency of twig, the socialization also provides the information about the danger of illegal logging for the environment and production sustainability.

Keywords: twig, empowerment, community around the forest.

1. Introduction

Generally, timber is a forest commodity that can be renewed. However, over and uncontrolled exploitation lead to the imbalance between the times needed to grow the timbers and the demand of timbers. If this condition keeps happening, it will disturb forest sustainability. The benefit and function of forest for human life is very strategic, besides it has an economic function, it also has climatology, ecology, and hydrology function (A. Sony Keraf; 2014, 31). These functions will be disturbed if defragmentation and deforestation keep increasing, and as we all know, the condition of forest in some parts of Indonesia is alarming. The main factors that cause the defragmentation and deforestation are forest fire and illegal logging. Considering the important role of forest for humankind, it s not surprising if illegal logging, corruption, and terrorism are categorized as extra ordinary crime.

Perum Perhutani as a state owned enterprise that has a responsibility to manage the forest in Indonesia has performed various steps to prevent illegal logging. Throughout the history of Indonesia's forest management, there are several models that have been implemented. One of these models is cooperative forest management/Pengelolaan Hutan Bersama Masyarakat (PHBM). Through this model, Perhutani manages the forest together with the community who live around the forest. The partnership is performed through Institution for the Community Around the Forest-Lembaga Masyarakat Daerah sekitar Hutan (LMDH).

Considering the social, economic, health and education condition of the community who live around the forest, which usually is far underdeveloped, the implementation of PHBM is quite rational. Ichwan Susanto et al. (2015) states that there are 34.000 villages that located in the edge of forest and in hinterland, while the number of people who live in this area is around 48 million people with 10.2 million people lived under poverty. The community needs to solve the problem so that they set free from the poverty, but still considering the function and sustainability of forest as 'world's lungs'. This is in line with President Jokowi's program, in which Indonesia economic development should be built from the outskirt areas. The effort taken is through the utilization of twig as forest product in the form of woods and is categorized as waste. This study is performed in multiyear scheme. The first stage focused on the empowerment of the community around the forest through the utilization of twig in the production of high priced products. At the same time, socialization on the result of design and the danger of illegal logging on the sustainability of forest is performed to grow people's awareness.

2. Research Method.

This study is a qualitative study that uses design approach. The samples are selected based on one stage sampling, or non-probability sampling. One stage sampling is a sampling technique from a population in which the researchers have an access on the names of population members (Creswell; 2010, 218). The samples in this study are the community who live around Perum Perhutani Telawa Unit through LMDH Wonolestari, village of Sambeng, Juwangi subdistrict, Boyolali district, Central Java province. The data are collected from informants from related parties, and literature review. This study uses interview, take note, documenting the data, and Forum Group Discussion (FGD). In performing the study with design approach we design handicraft and furniture using teak twig as the main raw material. The steps in design include sketch, drawing working, and prototype, which then followed by registering for intellectual property rights, and socialization of study results.

3. Literature Review

The historical story of teak forest in Java started with timber extraction, timber management, and social forestry paradigm. Social forestry paradigm was created due to the problems arise in timber management period. The involvement and participation of the community in PHBM social forestry model is a form of social forestry strategy, which stressed out the importance of stakeholder's role in forest management. The involvement of the community in forest management, from timber extraction, timber management, and management of forest resources, and environment management (Hasanu Simon, 2008).

Sumarna (2006) explains about the prospect, functions, and teak tree classification, as well as monoculture and intercropping as methods to cultivate teak tree. He also explains about its cultivation, pests and maladies control, as well as its harvesting. During the management process, logging activity may be performed as an effort to maximize the cultivation result. This activity may produce waste. Matangaran and Anggoro (2012, 89) explain that the waste from harvesting process includes split woods, rotten woods small wood from rough cutting, root and bark of branch, branch, twig, stump, and irregular wood such as *pakah*, uncylindrical wood, crokked wood (does not meet the minimum requirements for parquet wood materials).

Illegal logging is unauthorized logging actions are carried out individually or corporations, which resulted in the destruction of forests, which is unpredictable negative impact on forests after logging, because beyond the existing plan. Illegal logging is even equated with extraordinary crimes global bioterrorism. Handling illegal logging field conditions is very difficult to do, it is because it does not stand alone, but involves the networks are structured and massive. (Soedarsono, 2010).

Papanek (1995) proposes seven abilities of a designer that is the wisdom to anticipate the environment, ecology, economic, and political consequences of design intervention. A design that considers environmental sustainability will put an attention on material selection, production processes, product packaging, product finishing, transportation needed to market the product, and waste produced from the activity.

Ulrich and Eppinger (2003) states that product development is the set of activities that begins with the perception of a market opportunity and will end in the production, sale, and delivery of a product. The scope of design development includes product planning, identifying customer need, product specifications, concept, up to industrial design. The departments involved in product development are marketing, design, and manufacturing department.

4. Discussion

The modern-capitalist economic perspective put human resource, natural resource, and capital as three main factors of production which aims to generate as much profit as possible. The excessive exploitation of human resource will lead to social turmoil in the form of strike, demonstration, and other forms of worker's opposition. On the other side, the excessive exploitation of natural resources will lead to natural disaster. Floods, landslide, drought, forest fire, the decrease in the number of natural springs, the decrease in the number of certain species of flora and fauna, are the form of protest from the environment on human activity.

The industrialization era marks a new civilization for various countries in the world. However, in this era, an extreme natural and environmental destruction also take place. For centuries, industrial development is highly reliant on natural resources, both renewable and unrenewable resources. Forest sustainability gets global attention due to its strategic function for human life**.** Due to the urgency of forest sustainability problems, a global agreement on Sustainable Development Goals framework includes 18 goals that focused on forest protection. The goal number 15 mention about protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably forests management, combat desertification, and halt and reverse land degradation and halt biodiversity loss (Anne-Sophie Stevance; 2015, 3).

The deforestation and defragmentation phenomenon in forest has become more alarming, which makes the industries that heavily relied on the forest products become the spotlight in the media. For the sake of environmental sustainability, Indonesia should put more attention on this matter because most of the countries that become our trading partners are developed countries that are keen to environmental issues. It is estimated that 43.2% of Indonesia exports to OECD (Organization for Economic Cooperation and Development) come from the sectors that are affected by environmental policy (Indra Ismawan; 1999, 51). Pulp and paper industries, furniture are the industries that will be highly affected by policies on sustainability and preservation of forest. The examples of these policies are demand on the use of eco-labeling such as FSC (Forest Standard Council) and SVLK (Sertifikat Verifikasi Legalitas Kayu-Legal Verification Certificate for Woods).

There is no doubt about the concerns on the sustainability of forest . It's due to the widespread of the damage in forest, the decrease of forest coverage and the damaged forest will directly affect the volume of raw materials supply. The delays in raw material supply will also affect the sustainability of the industries that rely on woods as their main raw material. On the other side, the demand for round log on timber processing industry, plywood, wood of sawmill, pulp industry are always faced an increase each year (Suryandari, 2008, 24). Since 1975 up to 2005 the decrease in the demand of round wood only takes place in 1999 and 2005 due to the economic crisis. Following is a graphic that shows the demand for timber in the period of 1975 – 2005.

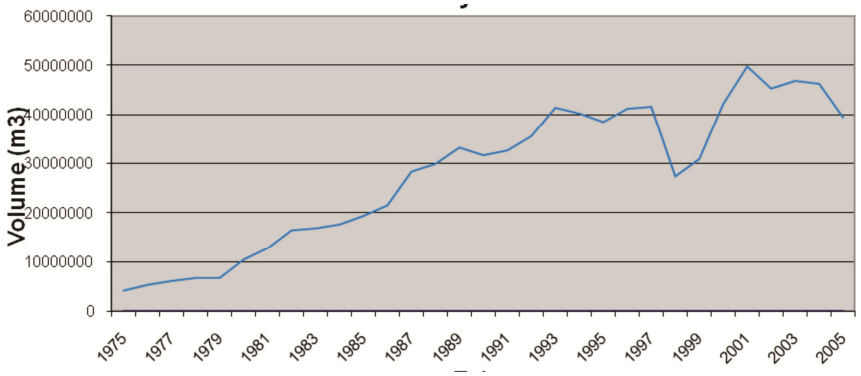

Table 1: The data of the demand on timber for the period of 1975-2005
(Source: Suryandari, 2008)

The demand for timber, forest availability, and the damage in forest are three matters that are contrasting. The preservation and sustainability of forest are the answers for the problem. The conception on forest preservation includes the preservation of forestry products, the preservation of forestry products potency, and the preservation of forestry resources in accordance with its ecology, social, and production (Nurtjahyawilasa; 8-9).

Woods as the commodity of forestry product have quality level; there are several timbers that are considered as special commodities such as sandalwood, ironwood and teak. The teak timber has a high value, so that it is developed or harvested in the forestry pattern protected by state, and is managed personally or by community. The classification system for teak timber is as follow: spermatophyte division, angiosperm class, dicotyledoneae sub-class, verbenales order, verbenaceae family, tectona genus, species Tectona Grandis (Sumarna; 2006, 10).

4.1. Community Based Forest Management

The rise of unrest various social problems lead to the emergence of PHBM or social foresty paradigm. The social aspect is one of its foundations, thus the participation of the community who live around the forest is an important requirement for forest sustainability. Community's participation in forest management is not a new concept because historically, human has a strong relationship with forest. This condition took place along period of hunting and food gathering but has decreased in the modern era and now the relationship between human and forest is an indirect relationship (Simon; 2008, 72-73).

PHBM as a forest management model is a forest resource management system performed together by Perum Perhutani and other stakeholders. The passion that Perum Perhutani wants to build is sharing culture on mutual interest so that the sustainable function and benefit of forest resource can be gained optimally and proportionally (Anonim; 2009, 2). The implementation of PHBM includes the utilization of terrain and the product of forest source with a mutual principle.

The forest products utilized by the community who live around the forest together with Perum Perhutani are in the form of timber and non-timber products. The forest products meant above among other herbs, spices, teak leaf, teak seed, and so, the wood of teak, the wood of jungle, the wood of *gali*, cattle food, tree food, honey, insects, and jungle animals, and share land, *rencek*(twig). The forest products may be used for personal need or to be sold to other parties. For personal needs, people do not commercialized the products. However for the commercialized products, the products are marketed by Prum Perhutani or the community who live around the forest. The sale of forest products performed by Perum Perhutani usually are in the form of trunk of teak tree and branch and teak fuel.

Decree of the Director of Forestry Public Corrporation No. 1148/Kpts/Dir/2011, that wood which is not included in the list price of a round wooden base teak wood ie under 4cm diameter and length less than 100cm, for firewood size is less than 2cm. Thus, the timber that excluded from the list of basic price for teak timber is in which directly cut down, because the timber is included in the category of waste. The benefits that the communities who live around the forest get from the forest are in cash or funds for community development and empowerment.

The fund from profit-sharing can be utilized by LMDH, an organization formed by the community who live around the forest as a media to implement PHBM. Together with PHBM Communication Forum, LMDH, and Perum Perhutani perform the sustainable forest management. The PHBM model is interesting to be implemented because beside it involves the community to create sustainable forest; it also empowers the community who live around the forest.

4.2. The Waste from Harvesting and Potency of Empowering the Community Around the Forest

PHBM Model has succeeded in decreasing social turmoil compared to the model implemented in previous period; however, the community is still entangled by sustainability and poverty problem. This happens because of the disproportionality between the number of people who live around the forest and the profit-share which usually highly dependent on the narrowness of forest coverage, volume of logging and long time of logging period. Therefore, direct actions are needed to raise the community's economy. The actions are, among others productive and prospective activities through optimizing the usage of forest products.

Stem is part of a tree that has the biggest function as well as having the highest economical value compared to other parts. We need to take a note that the main parts of a tree (kormus) consists of leaves (folium), stem (caulis), and root (radix). The derivative parts of teak tree kormus consist of leaves and teak, teak seed, twigs, branch, stem, stump, and root. The comparison of selling price between teak stem and other parts is very significant. For example, the selling price for wet teak leaves is around Rp. 5.000 – 10.000/bundle, dry leaves for

compos and fuel has selling price between Rp. 2.500 – 5.000/bundle. Teak twigs as fuel has selling price of Rp. 150.000 – 175.000/sm. Teak branches for furniture component has a selling price of Rp. 2.000.000 – 4.000.000/m.³ While the stem or timber, from the smallest in size up to the highest, from the lowest class up to the best class, has selling price around Rp. 4.250.000 – 30.000.000/m.³ The selling price for teak stump is around Rp. 2.000.000 – 5.000.000/m.³ Teak root has a selling price of Rp. 3.000.000 – 4.000.000/m.³ following is an illustration of teak tree kormus, its derivatives, and the percentage.

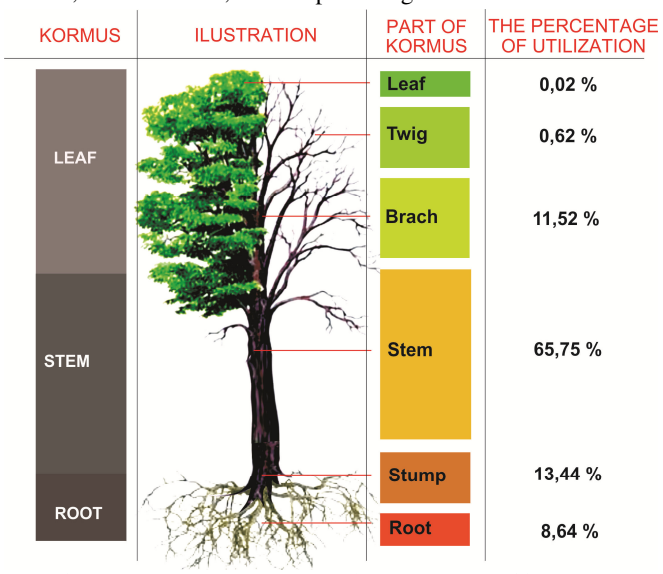

Figure 1: Teak tree parts and the percentage of its usage

The waste of timber can be categorized into two classes, the waste from timber logging and the waste from timber processing industry. Industrial waste timber in question is a residual solid waste wood/timber processing, production machinery operating result and the adjustment of the workpiece. Type of waste is the start of saw dust, wood pieces, until slice of wood. The waste from timber logging consists of the parts of the felled trees, start from its leaves up to its stump that have a low economic value. Matangaran and Anggoro (2012) mention the type of waste from timber extraction activities that includes pieces of bark wood, weathered wood, small wood from rough cutting, root and bark of branch, branch, twig, wood directly above the root, irregular wood such as *pakah*, uncylindrical wood, crokked wood (does not meet the minimum requirements for parquet wood materials). Nevertheless, some types of waste generated, the quality and quantity are not accountable for industrial purposes.

The quality and quantity of the waste from forest products is interesting to be further studied, especially for industrial interest such as the waste from teak twigs. The twigs as a waste from forest management process are a product from pruning, thinning, and logging. Pruning is an activity to cut the branches of a tree to increase tree's height and to reduce the number of branches from a timber that will be ready for processed. The pruning is performed since the third year of cultivation and is recommended to be performed on the lower half of a tree or 50% of total tree's height (Pramono; 2010, 45). Thinning also produced waste in the form of twigs because this activity is performed to widen the distance among the trees or reducing the number of trees so that the trees may grow evenly and thus increase the quality of timber produced. The waste of twigs may also produced during harvesting process, moreover, the twigs from the harvesting process has the best quality compared to the twigs from the others process.

The reason for classifying teak twigs as a waste is due to its very low economical value. The definition of waste is trash which its existence in a certain condition or place is unwanted by the environment because it has no economic value–low economic value (Kristanto; 2009, 169). Refers to above definition of waste, which stressed on the low economy aspect, there are steps needed to increase the value of a waste. A production or a process to produce finished products from raw materials or intermediate goods is a process that is considered will be able to add economic and utility value of a material. Furthermore, the level of increase in the economic value of teak twigs in very dependable on the utility value and aesthetic of the produced products. In this

condition, a unique design is needed so that teak twigs can be processed to a product with higher utility value and economic value.

4.3. Design for Product from Teak Logging Waste

Teak twigs have an enormous economic potency for the community who live around the forest because it is abundant in number and in certain size can be obtained for free. It is very possible to increase the economic value of teak twigs because for the community who live around the forest, these wastes only have one function; for firewood, either for personal consumption or to be sold to other parties. The existence of design to solve social problems; in this case illegal logging, community economy, and forest sustainability, belong to design sociology category. Design sociology as an approach to solve social problems is an approach that is worth to be pursued. This approach is a part of design department, a study that is related with design and social phenomenon as well as its implication and the alternative of solutions (Agus Sachari; 2007, 9-10). If pure sociology observes social problems emphirically through its symptom and community classification, sociology design focuses on human's creative activity, human's destructive activity, the formation of new values, or the grow of new culture.

The teak twigs that lie around in the middle of forest are categorized as waste from logging activity, and the twigs inside a hearth is a firewood. The teak twigs that are designed and processed through a certain step can produce wall decorations, pencil case, hat stand, shoe rack, etc. Thus the twigs have transformed into handicraft. We need to remember that; The value of utility will be proportionate with economic value of a material or product.

The utilization of teak twigs as a raw material for various handicrafts has performed by several industries in furniture and handicraft. However, whether a product will be still competitive or will be lagged depend on the designer in developing the product. Product development is the set of activities that begin with the perception of a market opportunity and ending in the production, sale, and delivery of a product. We need to note the departments that involved in product development consist of marketing, design, and manufacturing (Ulrich and Eppinger; 2003, 2-3).

4.3.1 Design Concept

Papanek states that designer must have eight capabilities and talents, among others is wise in anticipating design intervention on environmental, ecologycal, economical, and even political effects. Thus, in utilizing teak twigs to be processed into handicraft and furniture the researchers use (a) social approach, (b) economy, (c) and environmental. (Papanek; 1995, 8)

Then, the social approach, the utilization of branches in an effort to preserve and environmental sustainability to raise public awareness and industry players to better appreciate the raw material although only a twig. By using teak twigs as raw material for production phase will lead to a shift from the usage of timber as raw material, even if the shift is not material. This will assist in decreasing the consumption of timber.

From economy approach standpoint, the utilization of teak twigs as raw material for handicraft and furniture will increase the selling price of teak twigs. The utilization of teak twigs as an effort on raw material efficiency is also a form of market opportunity because curerently, there is no bigger issue that the environment sustainability issue. This is further stressed in the framework of SDGs (Sustainable Development Goals) that replace the MDGs (Millenium Development Goals). The efforts to preserve environment and its sustainability through the creation of environment friendly products will open an oppurtunity for marketing strategy. The specification of product development refers to the result of FGD that consists of researchers team, industry as market players or exporter, and community members who live around the forest as the prospective producers.

From social approach standpoint, community empowerment through teak twigs utilization. The production chain in the processing raw material from teak twigs into handicraft and furniture allows the creation of jobs for the community who live around the forest. The access to employment opportunity for the community who live around the forest is needed to increase their income. The majority of community members who become the member of LMDH Wonolestari Ds. Sambeng, Kec Juwangi, Kab Boyolali Jateng worked as farmer who utilize the rain entirely as a water source whose a very low income.

The planning and designing of teak twigs production process into handicraft and furniture is based on the abundant number of raw materials and its very low price. Twigs as residual waste timber that can be taken by community who live around the forest is the size of less than 3 cm. Utilization of branches into various handicraft products is to use stem twig with what or with short cut transversely or longitudinally. The utility of twig becoming handicraft and furniture products is a major component as well as two-dimensional supporting elements and three-dimensional, functional or decorative. Product development is an effort of problems solving for industry, environment, and socio-economy condition of the community who live around the forest. The community who live around the forest and people in general viewed that only teak timber has high selling price. Thus, community empowerment through design approach also grows the awareness on the importance of forest sustainability in its relation with forest product utilization and illegal logging.

4.3.2 Design Sketch

Drawing in a design can be classified into several different kinds and function. Drawing in a design usually consist of design sketch, working drawing, that consits of the drawing looks, drawing pieces, and perspective. The term sketch has generally the meaning of rough or unfinished drawing, and activity to setch is to give a brief account or general outline of samething (Olefson and Sjolen; 2005, 5). After conducting observation, literature review, and interview with various parties, the researchers sketch 150 products that consist of handicraft and furniture products. The branch-based product design as the main ingredient, supporting materials, all made from twigs and with additional components, round whole or in part, as a structural and decorative elements, functional and decorative, two-dimensional and three-dimensional. One of the sketch from 150 designs on teak twigs utilization manifested in design prototype is as a decorative element on gazebo wall.

Figure 2 : The use twigs for planter boxes, clocks and stool.

Based on community involvement and complexity while design chosen to translate into the design of the prototype is the gazebo. Utilization of twigs on the design of the gazebo is as decorative elements on the walls of the gazebo. Here below is a sketch of a gazebo by using pieces of branches.

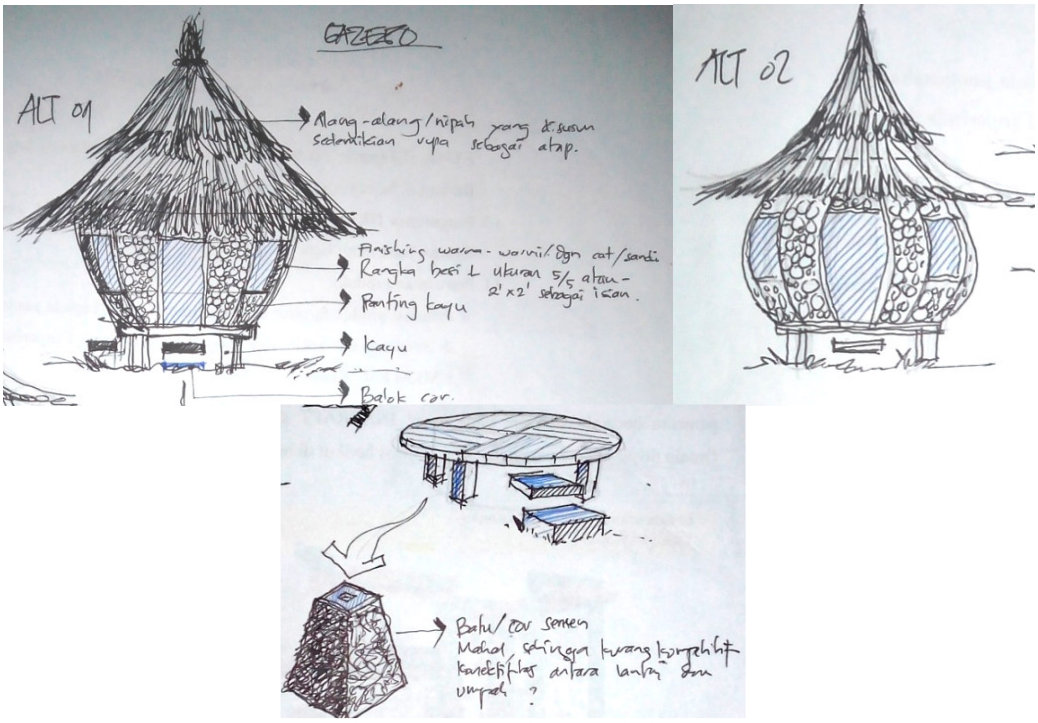

Figure 3: Sketch of gazebo design.
(Sketch: Sumarno, 2015)

4.3.3 Prototype

The manifestation or prototype is designed together with LMDH Wonolestari Sambeng village, Juwangi sub-district, Boyolali district through production assistance as well as introducing the production process to make handicraft and furniture from teak twigs waste. One of the designs that have been successfully produced is in the form of garden furniture for gazebo type. The utilization of teak twigs in gazebo design is manifested in decorative element of the wall. Following is the documentation from the process to build the gazebo together with the community around the forest.

Figure 4: Production processes and prototypes gazebo.
(Documentation: Sumarno, 2015)

The uniqueness of shape and utilization of twigs bits as decorative element of gazebo is then registered as intellectual property rights for industrial design category. Design right in on the researcher, while production

right is on the community who live around Perum Perhutani especially LMDH Wonolestari Sambeng village, Juwangi sub-district, Boyolali district, Central Jave province.

5. Socialization on Design and Counseling on the Danger of Illegal Logging.

The socialization on design is an effort to show the potency of teak twigs utilization by showing the result of design sketch and prototype to the community who live around the forest. The socialization functioned to explain the process of product design as well as creating cooperation with related institution that may have the ability to develop the production after all the activities is finished. The socialization through prototype is aimed to explain the issues related with production technique, the resources needed, materials, employees, and production tools. Together with the above socialization we also conduct a counsel on the importance to preserve the forest. The counsel is selected due to the fact that several parties, including the community who live around the forest, frequently become the illegal loggers. This has a negative effect on forest sustainability and oftentimes brings high fine and severe criminal penalty for the illegal loggers.

5. Conclusion

1. The people a round the forest are the people who directly interact with forests, preservation and destruction of forests is largely determined by the forest communities. Therefore, the involvement offorest communities need to be increased in the management of responsible forest.
2. The reorientation of forest products commodity for the community, both in general and the one who live around the forest, is very important for the conservation and sustainability of the forest. Twigs as one of forest products which up to this time considered as waste or having low economic value, with a certain design can be processed in to various products with higher selling price. The increase in people income that lives under poverty is also very important to improve their standard of living.
3. The socialization on design and economic potency of teak twigs has a side purpose that is to grow people awareness of forest conservation and sustainability. Persuasive approach through design provide an entry point for the counsel on the danger of illegal logging, forest sustainability, and fine or severe criminal penalty for illegal loggers.

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