

# THE ROLE OF GUNUNG WALAT EDUCATION FOREST (FACULTY OF FORESTRY, IPB, INDONESIA) IN TREE PLANTING CAMPAIGN IN AREAS OUTSIDE THE TERRITORY OF EDUCATION FOREST <sup>3)</sup>

by :

Budi Prihanto<sup>1)</sup>, Cahyo Wibowo<sup>2)</sup>

( Teaching staffs, Faculty of Forestry, IPB, Indonesia)

## 1. Background.

Gunung Walat Education Forest (GWEF), Faculty of Forestry, IPB, Indonesia, is an Education Forest (University Forest) which has three main functions in relation with university mission, namely as media for education, research, and public service. As a forest, Gunung Walat Education Forest (GWEF) of course plays some role in relation with tree planting, carbon sequestration and anticipation of climate change.

## 2. Status and Potency of Gunung Walat Education Forest (GWEF).

Gunung Walat Education Forest (GWEF), Faculty of Forestry, Bogor Agriculture University (IPB), Indonesia, has area size of 359 Hectares, and is located in the territory of Sukabumi, West Java Province, at distance of approximately 100 km from Jakarta City, the capital of Indonesia. GWEF is managed fully by Faculty of Forestry, IPB where its Director and Board of Directors are teaching staffs of this School of Forestry.

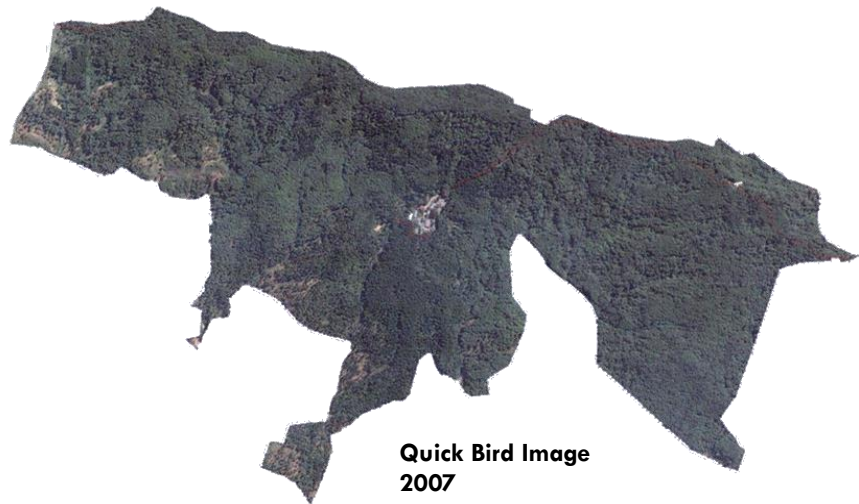
Inside GWEF there are plantation forests which were established since the year 1951, transformed from barren land. In the beginning, the tree species planted was damar (*Agathis lorantifolia*). Tree planting was conducted by forestry students of IPB (Bogor Agricultural University) in gradual manner, from year to year, from the year 1951 up to present. Condition of land cover was documented by aerial photograph and Quick Bird Image in Figure 1. At present (year 2009) forest cover in GWEF has reached more than 95 % with various plant species, namely damar (*Agathis lorantifolia*), pine (*Pinus merkusii*), puspa (*Schima wallichii*), african wood (*Maesopsis eminii*), mahogany (*Swietenia macrophylla*), rasamala (*Altingia excelsa*), rosewood (*Dalbergia latifolia*), *Gliricidae* sp, moluccan sau (*Paraserianthes falcataria*), meranti (*Shorea* sp), and mangium (*Acacia mangium*).

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<sup>1)</sup>Executive Director of Gunung Walat Education Forest (GWEF), Indonesia.

<sup>2)</sup>Director of Forest Resource Management of GWEF, Indonesia.

<sup>3)</sup>Paper presented in the 3rd symposium of Asia University Forests, in Seoul National University Forests on 13 – 14 October 2009.



**Figure 1. Gunung Walat Education Forest (GWEF) in the year 1982 and year 2007**

Because GWEF adopts zero cutting policy (does not conduct any tree cutting, and hence there is no any logging at all), some of the plantation forest stands in GWEF develop into uneven aged forest stand or approaching the structure of natural forest (*close to natural forest*). In GWEF, there are at least 44 plant species, including 2 rattan species and 13 species of bamboo. Beside that, there are medicinal plant species as many as 68 species. The potency of forest stand is  $\pm$  10855 m<sup>3</sup> damar wood, 9471 m<sup>3</sup> pine wood, 464 m<sup>3</sup> puspa wood, 132 m<sup>3</sup> moluccan sau wood, and 88 m<sup>3</sup> mahogany wood (with total of 21 040 m<sup>3</sup> of wood in area size of 359 hectares). Damar and pine trees also produce copal resin and pine resin as

one of the non timber forest products. In GWEF there are also found 100 plus trees of damar, pine, and maesopsis/ african wood as genetically superior seed sources.

With the presence of such forests in GWEF, there appear at least 7 water springs which produce water flow during the whole period of year, which are useful for fulfilling the needs of water for GWEF and the people around the forest, and irrigate the surrounding ricefields and farm lands.

Beside that, there are found various species of wild animals which are listed as follows, starting from the most easily found, to the most difficult to find in the forest: long tailed macaque (*Macaca fascicularis*), wild boar (*Sus scrofa*), squirrel (*Callociurus sp.J*), civet (*Paradoxurus hermaphroditic*), scaly ant eater (*Manis javanica*), wild rabbit (*Nesolagus sp*), and jungle cat (*Felis bengalensis*).

There are at least 30 species of bird, one of them is javan eagle (which is one of the rare and endangered bird species, whose habitat is the nearby National Park of Gunung Gede – Pangrango, but this bird is often seen also in the territory of GWEF). The reptiles found in GWEF are among other things monitor lizard, snakes (there are at least six species of snakes), and chameleon.

There are at least eight species of fish found in rivers flowing inside the GWEF, which is among other things *ikan lubang* (a kind of catfish which has reddish color).

In part of GWEF territory, particularly in the southern side, there is agroforestry area as large as approximately 100 ha, with commodities of coffee, cardamom, upland rice, cassava, chili, lemon grass and banana. This approximately 100 ha Agroforestry area is cultivated by 300 farmers.

Up to now GWEF is also known as area for ecotourism and Agro-Forest-Edu-Ecotourism (AFEE) (an ecotourism which include education and campaign of agriculture and forestry for the public). In relation with Agro-Forest-Edu-Ecotourism (AFEE), in GWEF there are among other things business of non wood forest products utilization in the form of utilization of resin of damar (*Agathis loranthifolia*) and resin of pine (*Pinus merkusii*) which involve as many as 45 workers as resin tapper. Potency of AFEE in villages around GWEF are among other things in the form of mangosteen plantations, husbandry of milk producing goats, fishery, home garden, ricefield, wood plantation owned by villagers, etc.

Landscape condition and scenery within and around GWEF attract people (particularly those from areas far from GWEF to come and spend the night for several days in GWEF for activities of Agro-Forest-Edu-Ecotourism (AFEE). This visiting people comprise common people, school students, university students, scientists, and researchers, from Indonesia, and from outside Indonesia. These activities of AFEE in GWEF are integrated with the potency of natural virgin tropical

rain forest which exist nearby GWEF, namely in Gunung Gede Pangrango National Park and Halimun National Park. This activity integration is possible due to the relative position of GWEF which is nearby the two National Parks, as can be seen in Figure 2.

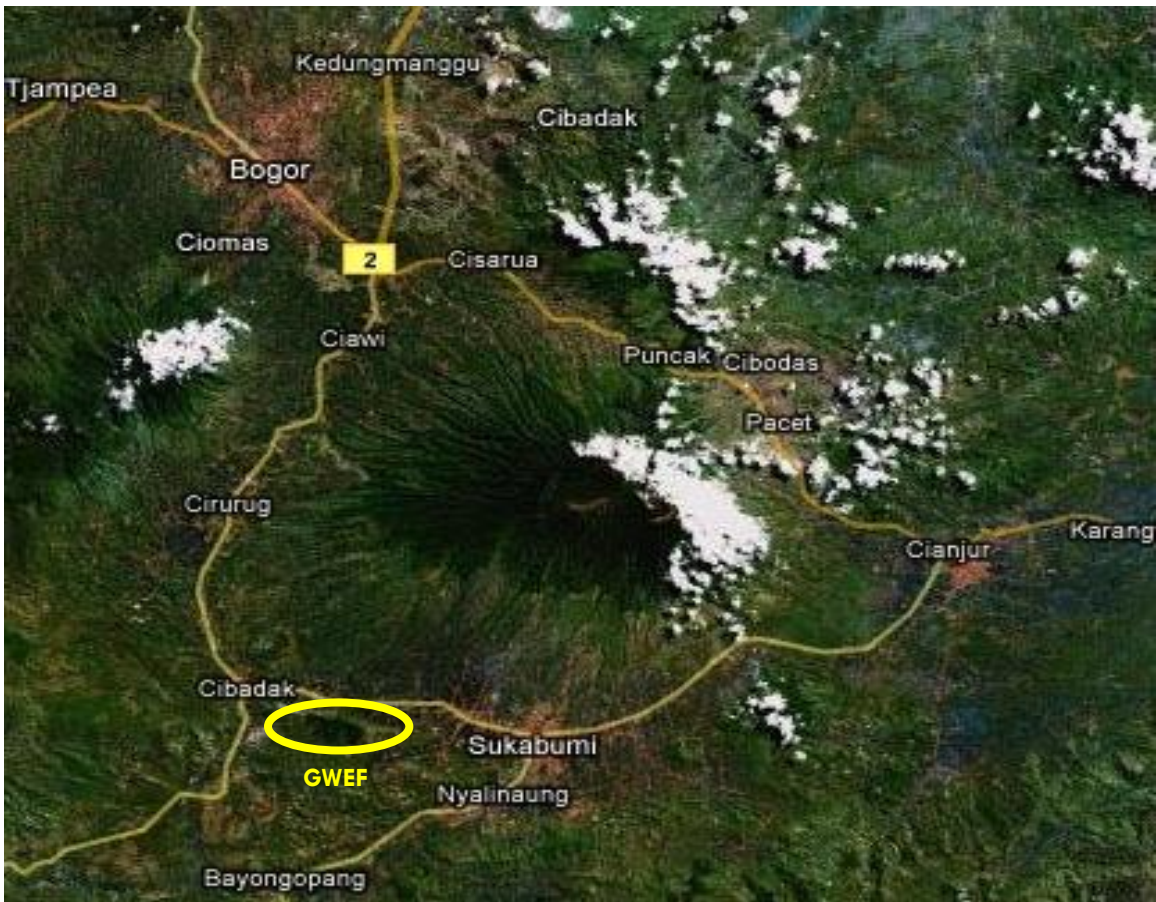


Figure 2. Sketch of GWEF location and its relative position to Gunung Gede-Pangrango National Park which constitutes the center of tropical rain forest biodiversity for high elevation areas.

GWEF is located at altitude between 460 - 715 m above sea level, with varying topography ranging from slightly sloping areas, to rolling topography. The tropical climate of GWEF has rainfall type of B (based on Schmidt and Ferguson classification) with annual rainfall ranging between 1600 – 4400 mm.

Soils in GWEF are complexes of podsol, latosol and lithosol soil types, and in some areas there are karst (limestone) formation which creates several caves. Some of the caves have attracted some people, student or researchers to explore them.

### **3. Condition of people community around GWEF and their interaction with GWEF**

Local people community around GWEF constitutes rural community which has the general characteristics commonly found around forests in developing countries in tropical region, where in some situations the people community interacts directly with the forests and creates impacts which are not always good to the forest. Sometimes, such interactions, to a certain extent, damage the forest. If interaction between local people and GWEF is not properly managed, there would be pressure from the people to the forest in the form among other things of wood theft, firewood theft, and excessive amount of fire wood gathering.

Residents around GWEF generally possess livelihood as farmers, animal husbandry farmers, motorcycle taxi driver, farm products traders, and factory workers. Ownership of farm land in the people community around GWEF is on the average less than 0.3 ha per family. Most farmers are tenant farmers who control only small area of land (on the average less than 0.5 ha). Land ownership and land control by the people, of these sizes, are relatively small, and this creates particular problem for the people's welfare, and affect their interaction with GWEF

#### **3.1. The need of people for firewood.**

Some people community (residents) around GWEF, besides in need for firewood to cook food, are also in need for firewood as fuel for brick making, because in the villages in the south of GWEF there are considerably large number of brick making factories which consume large amount of firewood. GWEF constitutes one of the sources of firewood which is sought and targeted by some of the people.

During oil crisis which affected Indonesia, around the year 2000, where the kerosene for cooking was difficult to find, and if the kerosene is found, the price is very high, pressure from the people toward GWEF was considerably large, in the form of stealing trees for firewood (firewood theft). In some cases, during that time, firewood theft in GWEF (with area size of 359 ha) could reach amount of between 5

– 10 m<sup>3</sup> per day. At present (year 2009), firewood gathering as much as that rate, does not occur. Regulation which is enforced at present is that people around GWEF are allowed to collect firewood in the form of branches or twigs which fall down naturally (fall down by themselves), and the people are not allowed to cut anything from standing trees. The people are allowed to take woods from naturally falling trees, but only those which have diameter of less than 5 cm. Currently, there is ongoing research by student of Faculty of Forestry, IPB (for undergraduate thesis) concerning firewood consumption by people around GWEF, and concerning the sources where they get the firewood.

### **3.2. Urgency of GWEF to manage areas around the forest (outside the GWEF territory).**

To relieve pressure from people around the forest toward GWEF, where the pressure could be in the form of firewood gathering, theft of wood from standing trees, etc; there is a need for efforts to plant trees (particularly firewood trees) in areas outside the GWEF territory, which will serve as a kind of buffer zone. Beside that, the urgency for planting trees outside the area of GWEF, is due to the very contrasting difference in terms of land use in the form of tree cover, between GWEF territory and the areas outside this territory, as can be seen in Figure 3. This extreme contrasting difference could make the GWEF more vulnerable for disturbance in the form of wood theft, because people around the forest always need wood.





**Figure 3. Aerial image of GWEF which shows extreme difference (contrast) between GWEF territory and the surrounding areas in terms of tree cover.**

#### **4. Management of GWEF and tree planting campaign outside the territory of GWEF.**

In the management of its forest resources, GWEF adopts zero cutting policy (there is no any logging at all in GWEF), because the existence of live standing trees is considered to have higher value (this value comprises among other things the financial value for environmental services, ecotourism services, etc) as compared with financial value of the wood itself.

This zero cutting policy is expected also to serve as example for people around GWEF, and for the public at large, that wood value from the forest, is only a small part of the total value of the forest. This adoption of zero cutting policy is expected also to suppress the desire of some of the people to steal wood from the forest. However, GWEF remains utilizing naturally falling timber (due usually to old age or diseases) for some purposes which will create some economic value, such as for the commercial production of violin. One timber species in GWEF, namely damar (*Agathis loranthifolia*) constitutes the best tropical wood for violin making.

In the past, around the year 2000, when GWEF has not been able to utilize effectively the naturally falling timber, the presence of naturally falling timber, laying down in the forest floor, became a communication problem with people around GWEF. This is because the people have natural desire to utilize the naturally falling timber (particularly for firewood), whereas the GWEF has not been able to utilize effectively the naturally falling timber. Communication message from GWEF which explained that the naturally falling timber which are left in the forest floor to decay, would be useful for maintaining nutrient sustainability of the forest ecosystem, could not be accepted, or difficult to be accepted by the people.

Utilization of physical resources of GWEF is among other things the utilization of non wood forest products in the form of pine resin and damar resin, which employ 45 workers as resin tapper. Those resin tapper constitute a partner for GWEF and play much role in safeguarding GWEF. The resin tapper, and also residents which are involved in GWEF agroforestry, could also serve as informant, when there are plans of wood theft from some people around GWEF.

#### **4.1. Problems in tree planting campaign outside the GWEF territory and the efforts to overcome them.**

Several problems in tree planting campaign outside the GWEF territory and the efforts to overcome them, are among other things as follows:

- Land ownership and area size of land controlled by each family are relatively small on the average (less than 0.3 ha per family). However, there are several individuals within the people community which control or possess relatively large area of land. Even, around GWEF there are companies which control large area size of barren land (around 600 ha), which is actually potential to be planted with trees. Efforts have ever been conducted (by villagers around GWEF and by the management of GWEF) to approach those individuals who own / control large area of land, and also the companies, to make them willing to plant their land with wood, with a certain scheme, for instance product sharing scheme with workers who plant and raise the trees. These efforts have not produced much good results, because it appears that those land owners or those who control the land (for instance the companies) are still in doubt, or have some fear, about the security of their land ownership / control status, if other people work and cultivate trees on their land. In other words, they have a feeling of insecurity for their land tenure status, if other people are active in their land.



- Financial income from wood planting activities will occur only after long period of time (at least 5 years), whereas people have financial needs for short term (for instance for daily meal), medium term (for instance for funding the school education of their children), and long term period. Therefore, in tree planting campaign in land owned by individual person who owns / controls small area of land, there are accompanying programs to fulfill their need for short term and medium term. This accompanying program are among other things in the form of activities of fish culture, tapping of pine and damar resin in GWEF territory, agroforestry in GWEF territory, and sheep / goat husbandry.

The number of goat / sheep livestock which are raised in villages around GWEF is around 1875 individual animals. If each individual sheep / goat needs about 5 kg of forage per day, then there is a need for forage as much as 9 375 tonnes per day. Such amount of forage is partly derived from GWEF.

The positive thing concerning animal husbandry around GWEF is that there are no goats/ sheeps which are released freely, wandering around and looking for forage by themselves (without being accompanied by the livestock owner) as occurring in various other places in Indonesia. In the case of area around GWEF, the sheep and goats are caged, and the owners are mobile searching forage for their animals.

In various other places in Indonesia, the presence of wandering sheeps, goats, cattle or other livestock, could constitute the main cause of failure for tree planting, because the livestock tend to browse on the young trees.

However, during particular situation in GWEF, where the availability of forage inside the forest is very little (for instance during dry season), the management of GWEF is obliged to impose some restriction on the amount of forages that can be taken out from the forest by the villagers. This limitation is implemented, and is necessary for the sake of sustainability of the forages themselves.

#### **4.2. Various forms of tree planting campaign outside the territory of GWEF.**

Various forms of tree planting campaign outside the territory of GWEF are integrated with other programs and activities, which are among other things as follows:

- Activities of *Agro-Forest-Edu-Ecotourism (AFEE)*, which always include the topic of the importance of tree planting and its technical aspects. Up to now, the activities of AFEE are followed by various parties, including for instance common people from

the public at large, school students, college students, and scientists from Indonesia and outside Indonesia. Forms of AFEE which have been conducted are among other things:

- 1). Environmental education for children at early ages (for school children, starting from the age of primary school student, up to junior high school student).
  - 2). Summer course for university students (from Indonesia and from outside Indonesia). This summer course in GWEF is integrated with visit and study in National Parks nearby GWEF which constitutes the biodiversity center of tropical rainforest.
  - 3). Outbound trainings which are conducted in the territory of GWEF and are followed by various group of people, for instance students, private company employees, civil servants, etc.
- Tree planting activities which are funded by private companies in the form of non binding donation, or funded by government project. These activities are in the form among other things of distributing tree planting stocks to people around GWEF, where the determination of species is preceded by consultation between GWEF and the people who are the candidates for receiving the planting stocks. After the planting is conducted, monitoring of the planting stocks is also conducted by GWEF.
  - Efforts of supplying genetically superior seeds for those who are interested to plant trees and are aware of the importance of using genetically superior seeds. The genetically superior seeds are taken from a number of plus trees which grow inside the territory of GWEF. Plus trees which are available in GWEF are of the species african wood (*Maesopsis eminii*), damar (*Agathis loranthifolia*), and pine (*Pinus merkusii*).
  - One prominent tree planting activity which is conducted by people around GWEF is mangosteen fruit tree cultivation by people in the subdistrict of Cicantayan (south of GWEF), particularly in the village of Hegarmanah, which constitutes the mangosteen producing village with export quality products. Number of mangosteen trees in Hegarmanah village is at present 12 800 trees, and the population of the trees will be increased further to reach 40 000 trees, in order to be able to be categorized as production center for this fruit. GWEF has some role in increasing the population of this tree (by distributing suitable planting stocks of mangosteen for the people), and in helping the sales promotion of this fruit product.