Combating climate change through community participation in preserving the environment: a case from Hutan Organik (Organic Forest) in Megamendung, Bogor Regency, Indonesia

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Abstract: According to Hansen and Biringer, environmental threats like climate change require that we extend conservation planning beyond the boundaries of protected areas, and into a future in which ecosystems and biomes may be quite different than they are today. One of the important ecosystems to be conserved in efforts to overcome climate change is forests. Forests can be managed to mitigate climate change because forests fulfill many important environmental functions and services. According to CIFOR, forests are important in determining the accumulation of greenhouse gases in the atmosphere. Although it has a very important role, forests have big problems as a result of deforestation, including in Indonesia. This paper tries to discuss how community participation has an important role in improving environmental conditions, especially in maintaining forest sustainability. The case discussed is “Hutan Organik” or organic forest that is an effort from the community in making forests in a critical area in Megamendung, Bogor. Hutan Organik is an artificial forest made and managed personally by Bambang Istriawan and family organically and currently has an area of approximately 27 hectares. Through this paper is expected to provide an overview of the importance of conservation efforts by the community as one of the strategies that must be optimized by the government in building environmental resilience in combating climate change.

Keywords: climate change, Hutan Organik, Megamendung

1. Introduction
Climate change occurs as a result of increased greenhouse gasses in the atmosphere such as carbon dioxide, methane, and several other artificial chemicals. Regarding carbon dioxide, according to the United States Environmental Protection Agency, carbon dioxide accounts for 82.2% of the greenhouse gas emissions in the United States by 2015 [1]. The composition of carbon dioxide according to Pittock increases as a result of human activity primarily derived from the burning of fossil fuels such as coal, oil and natural gas, forest destruction and carbon-rich soil and the manufacture of cement from limestone [2].

Associated with forest destruction as one of the causes of increasing carbon dioxide content in the atmosphere, according to Hansen and Biringer, environmental threats such as climate change require that we extend conservation planning beyond ecosystems and biomes may be quite different than they are today [3]. One of the important ecosystems to be conserved in efforts to overcome climate change is forests. Forests can be managed to mitigate climate change because forests fulfill many important
environmental functions and services. According to CIFOR, forests are important in determining the accumulation of greenhouse gases in the atmosphere [4]. Although it has a very important role, forests have big problems as a result of deforestation, including in Indonesia. The average deforestation is occurring in Indonesia from 2000 to 2012 ranges from 0.8 million hectares/year [5]. This figure is of course very worrying to see the role and function of forests that are very important in storing carbon. Forest ecosystems around the world include its soil storing approximately 1,200 giga tons of carbon in which this amount is estimated to exceed the amount of carbon currently in the atmosphere [6].

Increased carbon dioxide composition that causes increased greenhouse gases is a result of human activity. Therefore, efforts to reduce the carbon dioxide composition associated with forest conditions will not be released from efforts related to human activities as well, one of them through reforestation. In other words, it is necessary to encourage community participation in preserving nature, especially forests. Related to community participation in reforestation, then in Megamendung Bogor, there is a very extraordinary effort made Bambang Istiawan and his wife Rosita Istiawan in converting the critical land into an organic forest. The forest that was built in August 2001 by Istiawan and his wife is then known as "Hutan Organik" or organic forest [7].

What is done by Istiawan and his wife is a best practice undertaken by individuals in making forests from a critical land. This effort, of course, needs to get attention and can be an inspiration for other people who want to contribute real in coping with climate change. Therefore, this paper tries to discuss how environmental participation is important in improving environmental sustainability so that it can contribute to tackling climate change. Through this paper is expected to provide an overview of the importance of conservation efforts by the community as one of the strategies that must be optimized by the government in building environmental resilience in combating climate change by learning from the making of artificial forests organically as done by Istiawan and his wife.

2. Methods of research
To achieve the intended objectives, this paper uses a qualitative approach through literature studies on some publications, reports, and news on Hutan Organik. Also, data and information are also obtained from the in-depth interviews of Bambang Istiawan and his wife Rosita Istiawan and by visiting and seeing the conditions in the Hutan Organik area.

The data and information obtained are analyzed qualitatively and then used to describe how community participation in maintaining the environment especially in reforestation can be done as well as the challenges and obstacles it faces. The analysis will also be linked to efforts that can be made by central and local governments in encouraging the emergence of community initiatives to voluntarily conserve the environment through tree planting activities to become forests.

3. Results and discussion
Results will be discussed in two parts. The first section will describe "Hutan Organik" and its current condition as a best practice of individual contribution in creating a forest that can make a significant contribution to climate change. While the second part will analyze the efforts that can be done by both central and local governments to optimize community participation in protecting the environment so that it can contribute in efforts to tackle climate change, especially by endorsing the making of forests by private individuals.

3.1. Hutan Organik: a best practice of nature conservation by private individual
Hutan Organik is the official name of a human made forest which is a voluntary initiative from Bambang Istiawan and his wife Rosita Istiawan located in Megamendung Sub-district, Bogor Regency. Currently, the area of Hutan Organik is estimated to reach 27 hectares consisting of 2 parts of 12 hectares in the area that goes into the area of Megamendung Village and 15 hectares in the area of Bojong Koneng Village.
The making of Hutan Organik begins with the Istiawan's dream to spend his old age on the edge of the forest, where his dreamland no longer exists forests, which eventually builds his forest in Megamendung. The activity of the “Hutan Organik” started from August 2001 until today in making "Ecosystem and Critical Rehabilitation Model" and implemented in the "Voluntary Initiative" pattern independently. In general, the beginning of this forest is built on instinct and spirit of desire to find a way to live on the side of the forest as soon as possible, without following the formal rules and aspects of science related to the field of forestry.

At the commencement of the initiative, the area for which the forest is made is an area with damaged environmental conditions and can be categorized as critical land. This region has an extreme contour from 15 degrees to 80 degrees, so it is shaped like a bowl. In 2002/2003, there was one dead spring in this area, 70% of the area was reeds with very little vegetation, soil acidity condition had pH 2 ½ - 4, and no worms were found on the soil in that location. A description of the condition of the area at the commencement of the initiative can be seen in Figure 1 below.

![Figure 1. Initial condition at the location of Hutan Organik (source: presentation of Istiawan)](image)

In developing its artificial forest, the method employed by Istiawan is a combination of frontier trees with endemic trees where the composition is more frontier trees than endemic trees. The chosen frontier tree is African wood (Maesopsis eminii) while the endemic tree is Rasamala (Altingia excelsa Noronha) or Puspa (Schima wallichii). African wood is chosen as a frontier with consideration of the growing speed as well as the absorption capacity of the leaves as well as the strength of its roots in the soil. Also, African wood is also selected because the seeds are easy to obtain, the nursery is very easy, the speed grows very well, and the leaves can be used for goat feed. In tree planting, fertilizer method used is to use organic fertilizer and then allowed to grow naturally. The use of this method which then makes this artificial forest initiative is named as Hutan Organik or organic forest. In the period of tree growth, agroforestry activities also take place in the Hutan Organik.

The initiative undertaken by Istiawan in their journey is a very significant one in the effort to tackle climate change. The forests created by them have contributed to absorbing carbon dioxide as well as...
improving critical land conditions into an ecosystem environment that has an impact on the lives of living things. Regarding carbon dioxide absorption, a study conducted by a student from the Bogor Agricultural University in 2009 for example, provides information on the contribution of Hutan Organik where within 4.2 hectares of land can absorb an average carbon dioxide of 84.9 tons [8].

In addition to contributing to efforts to tackle climate change, the presence of Hutan Organik is also able to contribute to the improvement of environmental conditions. During the first four years (2001 - 2005) the speed of the reforestation process looks quite good, but there has been no significant change in soil quality. Nevertheless, the ecosystem improvements that occur are significant, among others, in the functioning of re-spring of dead springs and the emergence of new springs, whereas this area has no vein/water flow in the soil. Therefore, the return of springs is the impact of vegetation. A picture of significant vegetation development of Hutan Organik can be seen in Figure 2 below.

![Figure 2. Vegetation development of HutanOrganik (source: presentation of Istiawan)](image)

The existence of Hutan Organik has also led to the emergence of various types of fauna found in the location of various insects, reptiles, birds, rabbits, mouse deer and others. Also, according to Mr. Istiawan, Hutan Organik is also visited by wild animals that prey on goats that he raised as many as two times of arrival, last on October 3, 2014. It is estimated that goats are eaten by "Meong Congkok" / Felisbengalensis type of cats may even be a root tiger.

The participation of Istiawan in preserving the environment is certainly an example and imitated by other components of society so that it can participate significantly in overcoming climate change. Related to this, then based on the observation and analysis of the author, some things became the key to the success of Istiawan in making and developing Hutan Organik, as follows.

First, because Istiawan has a passion so willing to voluntarily use their own money to acquire land and then plant trees on the land that has been mastered. Acquiring the land and then planting it with trees is not a low-cost thing to do. Therefore financial ability is of course very decisive. Because of the passion they have, they have a high commitment and consistency to carry out the agenda that they have designed to create forests and save critical lands.

Second, the existence of good networking with various circles. Tenure of land in the Hutan Organik location at the commencement of the initiative is also not an easy thing to do. Given the large number
of land brokers who offer land to other parties. However, by building good networking with various circles, Istiawan able to overcome various obstacles faced both related to the control of the land and various other obstacles.

Third, in establishing Hutan Organik, Istiawan also use the advancement of science and technology and by building an etwork with some academics from various universities. These academics then helped them to analyze some of the physical problems they faced Istiawan also have a willingness always to learn including about crops, forestry, agroforestry and other knowledge that is very supportive in the development of Hutan Organik.

Fourthly, Istiawan also learn from nature and then choose the method of planting using frontier trees, a combination of planting, organic methods and planting endemic trees. They also have the willingness to share experiences so that then start many parties who visit and learn the activities that exist in Hutan Organik. By sharing this experience, they are also able to add networking and support from various parties who visit the Hutan Organik.

3.2. Optimizing community participation in preserving the environment to combat climate change by endorsing private individual contribution in forest making

Based on the experience of Mr. and Mrs. Istiawan which is the best practice of community participation in preserving the environment, there are a number of things that can be done by the Government both in the Central and Regional so that it can grow the community participation as done by Mr. and Mrs. Istiawan in making Hutan Organik.Related to that, the author sees the Government can do some thingsin the following description.

First, the government must build a common awareness in the community that carbon dioxide is a common enemy and planting trees is the main weapon to be used against the enemy. Community groups that should be the main targets are middle-class groups with knowledge, capital, and passion. This middle-class group is usually a group that has sufficient financial ability, so that if awakened awareness will be easier to move and uses their funds. Other groups of people should also be concerned, so that awareness of climate change becomes the main consciousness of the community.

Second, to plant trees requires land, so the government should grant access to land and land use for environmental conservation purposes and not just for the sake of the economy. The government should map the landowners who let their land not be used to force it than to plant trees. The approach is a land function instead of land ownership. Anyone who owns the land is obliged to plant trees as long as the land has not been used for other designations.

Third, the government also needs to provide support and guarantees through various programs including through community forestry programs that are currently being promoted. Another program that can be done is a critical land improvement program.

Fourth, campaigning through social media to the success of the program is also very necessary to do as well as to build community integrity that the main purpose is to save the environment and not for economic interests. Even if there are economic benefits such as from agroforestry and livestock, then that is not the main factor.

4. Conclusions

In conclusion, it can be concluded that community participation in preserving the environment can have a significant impact on climate change. The case of Hutan Organik can provide confidence to us that efforts to encourage community participation to preserve the environment among others through the creation of artificial forests by individuals are an important strategy that must be done by the government. The existence of Hutan Organik has provided important information on the contribution of artificial forests in tackling climate change.

To encourage massive participation of the community in the effort to address climate change, some advocacy from the Government is required. One of the advocates that can be done is to campaign carbon dioxide as a common enemy and the effort to plant trees as the main weapon to overcome the enemy. The government should also provide support through its various policy instruments such as regulating
land tenure and use as well as incentives and disincentives for the community. Campaigns on social media also need to be strengthened to reach many potential communities to participate.

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