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Semarang, 02 Desember 2024
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Challenges, Opportunities and Strategies to Reduce Carbon Emissions: The Case of Indonesia Social Forestry

Co-authored by

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Challenges, Opportunities and Strategies to Reduce Carbon Emissions: a Case Study of The Indonesia Social Forestry

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Background

- This study aims to investigate strategies of carbon reduction in the Indonesian social forestry context, a bold presidential program giving a right society to utilize state forests
- Forests have a significant role in reducing carbon emission and mitigate climate change. Issues of carbon and climate change have been discussed in the last decade by some scholars (Busch et al., 2022; Li et al., 2021; Nunes et al., 2020; Pan et al., 2022; Shrestha et al., 2022; Wibowo & Diaz, 2024) .
- Improved forest management for carbon reduction(Haya et al., 2023) , barriers of carbon trading(Pan et al., 2022; Wibowo & Diaz, 2024), the role of forests in offsetting carbon (Shrestha et al., 2022) and carbon storage (Nunes et al., 2020), and effect of carbon reduction to company performance (Busch et al., 2022; Li et al., 2021).

Background

- Limited studies have investigated the challenges and opportunities of carbon exchange schemes between companies and forests in a developing country, especially related to social forestry.
- Social forestry is a bold government policy to give formal utilization permits of state forests to local communities surrounding forest for over 35 years.
- State forests have been damaged due to deforestation and conversion.
- Forest farmers plant, grow and maintain plants and trees in social forests.
- The farmer's activities in the social forestry will increase the economic level of the farmers and be able to conserve biodiversity, water and soils.

Background

- Forest plays an important role to mitigate climate action with their abilities to store carbon (Nunes et al., 2020; Pan et al., 2022; Shrestha et al., 2022).
- They provide valuable natural resources and have capability to sequester carbon from the atmosphere. Moreover, they also provide important ecosystems and functions, such as water, soil, and biodiversity conservation (Jenkins & Schaap, 2018).
- Indonesia is known as one of the countries having abundant tropical forests. It gives opportunities for Indonesia to hold a better position among other countries in terms of carbon commodities. Indonesia is the second country having the biggest forest area after Brazil and has potential contribution to reduce carbon emission through carbon trading schemes.

Literature Review

Leadership is important to contribute to the governance of an organization including society-based organization. Social forestry is a society-based organization which involves collective-action by forest farmers. The nature of the leader in social forestry is voluntary will. Voluntary and unselfish leadership can trigger group consensus, social movement and support self-governance organization (Andersson et al., 2020

Literature Review

- Carbon trading mechanism is an agreed mechanism in Kyoto Protocol and Paris Agreement giving countries to buy and sell carbon.
- Carbon trading is activities to buy and sell carbon (carbon credit) where the buyer produces more emissions.
- There are two types of carbon market i.e. mandatory and voluntary carbon market. Mandatory carbon markets are regulated by governments while voluntary carbon markets otherwise. In the mandatory market, companies issue certain carbon credits annually and they must fulfill it. Mandatory market limits the carbon credit that can be sold (cap and trade). It is regulated under national, regional and international carbon reduction schemes.
- Voluntary carbon market provides opportunities for individuals or companies to sell carbon credit and make profit from it. Carbon market may accelerate the emission reduction. Some companies prefer to apply carbon offset resulting in the strong impact of the voluntary carbon market. Previous studies investigate the function, challenges and of voluntary market (Bellassen & Leguet, 2007; Corbera et al., 2009), the legitimacy of voluntary carbon market (Blum & Lövbrand, 2019) and the potential of voluntary carbon market to combat climate change (Streck, 2021).

Literature Review

- Carbon credit is the right for the entity to emit carbon emission in its industrial process and it can be commercialized. One unit carbon credit is equivalent to reducing carbon emission of 1 ton of carbon dioxide which is sold to companies whose emission exceeds its limit. Net Zero Emission has grown since 2018. It is a concept and frame to combat climate change where the carbon emission released in the atmosphere will be absorbed in the same amount (Fankhauser et al., 2022).
- The ongoing emission should be balanced, and Indonesia set the target for the net zero target in 2060. Net zero is used to describe emission trajectories consistent with 1.5 C. Major worldwide companies have been putting a lot of effort into achieving net zero emission. Net zero emission can be achieved by rapid decarbonation by aligning political, social and technological aspects. It can be done by shifting to renewable energy and making industry less carbon intensive. Simultaneously, global society must put the best effort to capture more carbon through some practices i.e. planting forests and applying technology to capture carbon. This research focuses on the efforts conducted by social forestry and companies in reducing carbon.

	Code	Roles
1	Interviewee 1	CEO of Indonesian company
2	Interviewee 2	Academic
3	Interviewee 3	Head of Carbon Reduction Implementation of Indonesian company
4	Interviewee 4	ESG Lecturer and Consultant
5	Interviewee 5	Advisor of GEMA Social Forestry Organization
6	Interviewee 6	Advisor of GEMA Social Forestry
7	Interviewee 7	Committee of GEMA Social Forestry
8	Interviewee 8	Academic
9	Interviewee 9	Academic
10	Interviewee 10	Head of RD of Indonesian company
11	Interviewee 11	RD team of Indonesian company
12	Interviewee 12	RD team of Indonesian company
13	Interviewee 13	RD team of Indonesian company
14	Interviewee 14	RD team of Indonesian company
15	Interviewee 15	RD team of Indonesian company
16	Interviewee 16	RD team of Indonesian company
17	Interviewee 17	Program Director of Indonesian Company Foundation Environmental Action
18	Interviewee 18	Head of Forest Agriculture Project Implementation of Indonesian company

Methodology

- Interpretive qualitative approach and applies case study in Indonesia Social Forestry to identify strategies of carbon reduction, with the focus of forest inclusion in the scheme. Interviews are semi-structured, recorded and transcribed.
- Interviews are conducted in person or online and last from 45-120 minutes. Interview questions are open ended,
- Participants of research involve some parties. First, company's practitioners such as those having roles as managers or staff explaining about the company's efforts in combating climate change. Second, social forestry committee members. They will provide information about the operational and/or business process of social forestry. Third, academics who will explain about the academic's view of carbon reduction and carbon trading.

Methodology

- First, data is transcribed from audio recording into written.
- Second, this study conducts data coding to generate patterns from the interviews. Data patterns will be grouped into some themes which provide findings. This study uses interview guidance based on the objective of the study.
- However, this study allows some improvements during the interviews which enrich the data and add important information

Methodology

List of the interview questions are as follows:

1. How do you decrease carbon emission?
2. What are the challenges and opportunities of carbon reduction?
3. How do you calculate the amount of carbon emission reduction of your organization?
4. What strategies to continue the carbon emission reduction?
5. How effective are strategies to reduce carbon emission?

Results

Indonesia has committed to achieving net zero carbon emissions by 2060. Since 2017, the government has introduced regulations related to carbon reduction and trading mechanisms. One key initiative is the push for renewable energy development, aiming for 23% of the nation's energy to come from renewable sources by 2025. Additionally, tax incentives are being prepared to reward companies that successfully reduce their carbon emissions (Limanseto, 2022). These efforts require the collective support of various stakeholders, including regulators, corporations, and society at both national and global levels. In 2023, the Indonesian government also launched a carbon market as part of the Indonesia Stock Exchange, further underscoring its commitment to combating climate change.

"In order to adopt carbon trading, we already have a regulation. There is even a body that handles this funding, namely the National Climate Change Council. So, for what purpose is it arranged there? Anyone interested in one of the countries, this is the second largest forest after Brazil, namely Indonesia. Of course, advanced industrial countries really need it. So, who wants to sell? It turned out that Indonesia was chosen. […] *So, how to reduce the Environmental Law? then what was mentioned earlier was issued, namely PP or Government Regulation 46 of 2017. And in the sub-chapter it regulates how it is related to the process of buying and selling carbon plus its derivatives, there is a Ministerial Regulation related to this matter. If I'm not mistaken there are two Ministerial Regulations, 2022 and the newest one is 2023". (Interviewee 8- Academic and Environmentalist)*

Results

Indonesia is home to vast rainforests, covering 125.8 million hectares of land and water (BPS, 2024). This makes the country a key player in global climate change efforts. However, deforestation has led to significant environmental damage. Social forestry presents a promising solution to these ecological challenges. Through this program, forest farmers are granted the right to cultivate trees, fruit plants, and other cash crops for 35 years, a right that can be passed down to their children. Communities, particularly forest farmers, can responsibly use the forest for tree planting, agricultural tourism, farming, and fisheries.

In Java, millions of trees and cash crops have already been planted under social forestry initiatives. One of the largest organizations driving this effort is the Gerakan Masyarakat Perhutanan Sosial (GEMA PS) [Social Forestry Society Movement], with over 200,000 members in Java. The movement's large-scale tree planting has proven to be one of the most effective ways to enhance carbon capture and reduce carbon emissions

"If you plant, your plants will be carbon sequestered. You may want to plant bananas or plant anything. The only problem is which plants have the highest carbon sequestration. Whatever is planted, it will absorb carbon for sure" (Interviewee 1_CEO of Indonesian Company)

Results

Many issues related to forest conservation and plantation can be addressed through social, cultural, and even mythological approaches. Cultural beliefs have been shown to play a significant role in preserving forest biodiversity, demonstrating the power of these non-traditional methods in supporting conservation efforts (Aerts et al., 2016; Huang et al., 2020).

“ We seem to have defined the forest problem wrongly, we define the forest problem as ecological, the forest is deforested, there are fires, various things, we only see it as ecological, we don't see that the forest is a social problem, a cultural problem, so the approach should be social , the approach is cultural. What you mentioned is a cultural approach through culture, people have permission to enter the forest, there is a time schedule, at certain times at certain times, at certain times you have to leave, at certain times to enter, that's cultural. In fact, it is actually community management in managing forest areas, the scientific language is like that, but community management in managing forest areas is made by them culturally, with an early approach, at such an hour it must be like this, at such an hour it must be out, that's cultural.” (Interviewee 5-Advisor of GEMA Social Forestry)

Results

Myth is also useful to encourage societies to do some forest activities. (Huang et al., 2020) analyzes how old large trees have become cultural symbols and nature worship culture. Java forests have been under Dutch colonization which controls Java forest in the period of 1814-1940. Perum Perhutani inherits forest based on Dutch governance which ignores the existence of local land tenure systems and the benefits needed by local humans and animals. Moreover, it only prioritizes commodity crops that generate profits and are controlled by the state. Human interaction with forests disregarded from the state's view

"Java people are also guided by a myth that has been internalized a hundred years ago. So we have to explain this social thing through cultural and mythical methods, this is the land of Java that you claimed and promised to return to the Javanese people, but in what way? by way of the government giving permission for Javanese people to work on it again, well because this is land that belonged to your parents, your ancestors, it has been returned by the state in the form of social forestry then you have to maintain it, well that's the myth that we use as anthropologists, so that's our anthropology. use it, because it's impossible for us to ask people, we have one million farmers, how are you going to tell one million people? limited

Results

Many problems related to forest plantation and conservation can be solved through social, cultural and even myth approaches. Indonesia has diversity in ethnicity and culture; hence many beliefs and taboo things go around the societies. Local beliefs have directed Javanese people to maintain forests leading it to ecological conservation.

“ We seem to have defined the forest problem wrongly, we define the forest problem as ecological, the forest is deforested, there are fires, various things, we only see it as ecological, we don't see that the forest is a social problem, a cultural problem, so the approach should be social , the approach is cultural. What you mentioned is a cultural approach through culture, people have permission to enter the forest, there is a time schedule, at certain times at certain times, at certain times you have to leave, at certain times to enter, that's cultural. In fact, it is actually community management in managing forest areas, the scientific language is like that, but community management in managing forest areas is made by them culturally, with an early approach, at such an hour it must be like this, at such an hour it must be out, that's cultural.” (Interviewee 5-Advisor of GEMA Social Forestry)

Results

In leading site-level communities for ecological purposes, governance is needed so that community trust can be maintained. Forest governance is significant to make the organization accountable and credible. In the era of internet of things, governance can be supported by the digital system, including in forest governance (Gabrys, 2020).

"With the help of digital systems, social forestry governance can improve. We can find out the type and number of plants, forest location, when to plant, when to harvest. This also allows us to know the potential for carbon that can be absorbed by the plants we plant".(Interviewee 5-Advisor of GEMA Social Forestry)

Results

Digitized systems can identify the number and type of plants, planting location, harvest estimation and finally calculating economic scale and carbon storage capacity. Smart forest to mitigate environmental change. By knowing the number of plants, we can know the economic potential and carbon absorption

> *"...the superpower is the accountant who must understand how to calculate it (carbon footprint), and how this calculation can be consolidated into an integrated accounting system". (Interview 17-Program Director of Indonesian Company Foundation Environmental Action)*

Results

Carbon emissions can be produced by companies conducting unsustainable business. They cause harm through their operations and through the lifecycle of their products. They produce carbon emissions that can increase greenhouse gas emissions. Therefore, companies must also have policies and strategies to reduce carbon emissions and work together with various parties including forest managers and farmers so that these efforts are successful.

> *"Our company started a reforestation project in an area that was previously savanna with minimal land cover, replacing it with sengon plants, which are known as fast-growing species. Sengon is not only able to rehabilitate deforested land, but also has high economic value due to the high market demand for sengon wood". (Interviewee 3-Carbon Reduction Implementation Head of Indonesian Company)*

Results

Companies can reduce carbon through some mechanism, such as calculate carbon footprint, use renewable energy, reduce energy consumption, reduce waste and forest conservation and planting. Several companies are starting to realize the importance of planting trees as a real action against climate change. Another company conducts tree planting as part of their mission to save their “home”. This movement continues to this day and it turns out that this simple vision is able to make a big contribution to the issue of climate change.

“....How do you make sure this house doesn't dry out? Plant trees, so that this house doesn't get hot, so it's more beautiful, cooler and tastier. So the answer at that time was "Wow, you have to plant more trees in Kudus City" So at first Actually, it's not like there's official devotion or anything, but it's more like just a common reaction, it's logical. So it started from there, and at that time we were still small. So start by planting trees in your own city, in your own home. But the bigger we get, the bigger the company gets, of course the responsibilities and calling also get bigger. So, starting from planting in the city of Kudus, finally it started to be developed, the planting program was also developed”. (Interviewee 17- Program Director of Indonesian Company Foundation

Results

The development of the global world which is starting to pay attention to climate change has caused companies to calculate the carbon that can be bound by the plants planted by the company. Planting these trees is very effective in reducing the effects of greenhouse gasses

"..Carbon calculations in companies are currently in progress, in process, and I also see that we will continue to progress in accordance with the times, technological developments, developments in standards for carbon calculations". (Interviewee 17- Program Director of Indonesian Company Foundation Environmental Action)

Results

The company's efforts to improve farmers' living standards through programs also use cost and benefit considerations. The company still hopes for profits from all collaborations carried out so that the company can continue its operations on a wider scale.

"*That's an economic calculation, ma'am. If it is not embedded like that, we ourselves as a company cannot carry out operations. Our costs are not covered. That's what we combine with the farmers' wishes. The farmer's land is this much, the land is only this much, and there are those who maybe only go to the land once a week, there are those who go to the land every day. So that's the dynamic in the field". (Interviewee 18- Head of Forest Agriculture Project Implementation of Indonesian company)*

Results

Companies that collaborate in the form of partnerships and capital assistance with social forestry encourage and facilitate forest farmers to plant. They also become off takers and find markets. So, the company functions from upstream to downstream. This effort provides a guarantee that farmers will plant in accordance with the company's mission and vision, whether the mission is ecologically or economically oriented.

"In 2016, Indonesia ratified the Paris Agreement, an important step in global efforts to reduce emissions. This commitment is followed by Presidential Regulation no. 98 of 2021 which strengthens Indonesia's emissions targets. One initiative emerging from this commitment is a project in Central Kalimantan by our company, which sees huge potential for mitigating climate change through reforestation. (Interviewee 3- Carbon Reduction Implementation Head of Indonesian Company)

Results

Companies can reduce carbon emission by applying renewable energy to supply its elasticities. They also produce products which are environmentally friendly. Companies can reduce emissions through business processes and through the company life cycle. This can be done, among other things, by replacing the energy source with electricity and replacing it with solar power. In addition, companies can make environmentally friendly products. Companies also can use carbon trading mechanisms to offset its carbon emissions. However, Indonesian regulations and market mechanisms are not settled yet. In 2023, the government launched the carbon market as part of Indonesia stock exchange. Limited number of companies involve and conduct carbon trading in the carbon market. This can be a sign of an unattractive market mechanism to reduce carbon.

The price of carbon on the carbon market is very cheap. Even though the HPP for calculating carbon reaches USD 12. Not yet attractive. People plant, their stomachs are full and they are economically helped. So this carbon is a bonus (Interviewee 1-CEO of Indonesian Company)

Results

Even though the carbon market and its mechanism are not settled yet, companies expect that the carbon market will be more interesting in the future. Companies have been trying to calculate the decline of carbon emission through their policy.

> *On the other hand, the potential for carbon trading is increasingly attractive, although there are still regulatory and methodological obstacles that must be overcome. This mitigation effort is supported by three main pillars: environmental management, business development and institutional strengthening. Fiar Ventures identified three key locations for this project: East Lampung, Central Kalimantan, and Tulungagung, where they have begun calculating the potential carbon that can be sequestered. (Interviewee 3- Carbon Reduction Implementation Head of Indonesian Company)*

Results

Public companies in Indonesia have an obligation to submit sustainability reports. So far, sustainability reports do not capture what companies do to reduce carbon emissions. Sustainability reports on public companies in Indonesia do not provide adequate information and data so they cannot show the extent of efforts to the extent of emissions produced by companies and efforts to reduce emissions.

> *"Just look at the sustainability report, the title is good, the emissions section reveals the data, it turns out that only the title is cool, the content is not there". (Interviewee 3-Academic)*

Results

Companies need incentives to engage in carbon trading schemes, for example tax reductions, and high carbon selling prices so that the economic potential of carbon sales is promising. Currently, the carbon market sells carbon for $3 for each carbon certificate making it less attractive for sellers.

"there are no incentives, well, if possible, if the carbon tax works like that, yes, and you have to be careful, how much will the carbon tax be penalized, if it is penalized, it's really cheap, 10 rupiah or 10 thousand rupiah, said the fish, I already know the price, but it's really very it's really cheap, people would be better off just paying tax instead of reducing emissions, you know, that's what this is going to be the challenge [...] the price of the carbon tax will be, right? If it's above the cap, we produce emissions above the cap, we'll pay the tax, right? Well, how much tax do we pay? If it's cheap, for example, it's better if I just pay the tax straight away, that's settled, right?". *(Interviewee 4- ESG Lecturer and Consultant)*

Results

Companies are still waiting for a clear carbon trading mechanism so they can carry out carbon trading transactions. So far, companies trading on the Indonesian carbon market are still very limited. This is due to unattractive prices, unclear regulations and mechanisms.

> *Apart from that, our company is also starting to move towards carbon trading, although it is still waiting for clearer regulations and methodology. By optimizing the potential of social forestry land, they hope to contribute significantly to reducing emissions and reducing the rate of deforestation in Indonesia, while still improving the welfare of local farmers* (*Interviewee 3- Carbon Reduction Implementation Head of Indonesian Company)*

Conclusion

This study highlights several effective strategies for carbon reduction. First, forests play a crucial role in this effort. As sources of biodiversity, they store carbon and serve as one of the most powerful tools for mitigating climate change. In particular, social forestry initiatives, which are driven by grassroots movements, significantly contribute to both carbon reduction and environmental sustainability.

Second, social forestry farmers have planted millions of trees, including cash crops, which not only enhance carbon capture but also improve the economic well-being of local communities. Economic incentives are a key driver in encouraging people to engage in reforestation efforts. When individuals see that forests provide them with livelihoods, they are more motivated to protect and care for these valuable ecosystems, which, in turn, supports greater carbon sequestration.

Third, leadership and governance within social forestry organizations are essential for addressing climate challenges. With over 200,000 members, these organizations can benefit from technology that calculates both economic and carbon reduction potentials, helping to improve their strategies and outcomes.

Conclusion

Fourth, companies must take meaningful action to reduce emissions, rather than offering mere lip service. Effective measures include partnerships with social forestry programs, investments in environmental services, and the development of renewable energy sources like solar power.

Finally, clear regulations and mechanisms for carbon trading are needed to further support carbon reduction efforts. Currently, the carbon trading process is unclear, particularly for companies wishing to engage with social forestry organizations. The pricing system, which currently sets carbon at $3 per million tons in the Indonesian market, does not provide adequate benefits for either side.

Thank you


Methodology
List of the interview questions are as follows:
1. How do you decrease carbon emission?
2. What are the challenges and opportunities of carbon reduction?
3. How do you calculate the amount of carbon emission reduction of your organization?
4. What strategies to continue the carbon emission reduction?
5. How effective are strategies to reduce carbon emission?