SOCIAL CONSIDERATION FOR BLUE CARBON MANAGEMENT

C.C Pricillia¹, M.P Patria¹,², and H. Herdiansyah¹∗
¹School of Environmental Science, Universitas Indonesia, Central Jakarta, Indonesia
²Department of Biology, Faculty of Mathematics and Natural Sciences, Universitas Indonesia, Depok, Indonesia
Introduction

Coastal ecosystems

Adaptation
1. Increase sedimentation on coast
2. Prevent storm and stronger waves
3. Prevent coastal erosion (Chow, 2018)

Mitigation
Carbon sequestration $\rightarrow$ blue carbon
Blue carbon is organic carbon preserved in marine and coastal ecosystems such as mangroves, salt marshes, and seagrass (Macreadie et al., 2019)

163 countries submitted NDC
- 53 states include coastal ecosystems as the adaptation plan
- 28 states have included coastal ecosystems as the mitigation plan
Introduction

Degradation of coastal ecosystems

Establishment of Blue Carbon Project

Caused by human activities on the coast, such as
1. land conversion to aquaculture
2. Dredging
3. Seawater pollution
4. Changes in physical processes in coastal areas
5. Exploitation of resources
(Mitra & Zaman, 2015; Duarte et al., 2004)

Coastal ecosystems area in the world is 2% - 6% of tropical forest

Equivalent to 19% of carbon emissions from global deforestation.
(Pendleton et al., 2012)

Benefits:
1. Conservation
2. Restoration
3. Carbon financing for sustainable economy

Examples:
• Mikoko Pamoja in Gazi Bay, Kenya
• Markets and Mangroves in Mekong Delta, Vietnam
• India Sundarbans Mangrove Restoration in Sundarbans, India/Bangladesh
(Wylie et al., 2016)
According to Thomas (2014), literature related to blue carbon is dominated by technical and policy commentary and lack of social considerations and public sector perspectives.

The key to the successful implementation of the blue carbon project is the participation of local communities (Beyerl, et al., 2016; Espinoza-Tenorio et al., 2019; Vierros, 2017; Wylie et al., 2016).

1. Building social resilience
2. Preserving cultural values
3. Promoting ecosystem services that are a source of livelihoods (Butler et al., 2014).

Aims

1. Update the current literature about this gap, especially how the social consideration in blue carbon management literature has been emerging since Thomas (2014) publication.
2. Answer the question, “What are the social aspects that need to be considered?”
Method

- Semi-systematic review method
- The main objectives of this method are to show the research progress over time and to provide an extensive background of current knowledge (Cronin, Ryan, & Coughlan, 2008; Snyder, 2019).

Google Scholar Database: Peer-reviewed literatures

Central concept: ‘Blue carbon’

Related terms used were ‘management’, ‘project’, ‘communities’, ‘social’, ‘policy’, ‘stakeholders’, and ‘people’, ‘mangrove’, ‘salt marshes’, and ‘seagrass’

Year of Publication 2014 - 2020

26 publications were found

Content analysis
Results

Four main social aspects:

1. Livelihood
2. Land tenure
3. Local knowledge
4. Local capacity
Livelihood

Mekong Delta, Vietnam
Source: Wylie et al. (2016)

Offers organic certification of shrimp yields, resulting in a higher price for their shrimps. However, the shrimp farmers are restricted to destruct mangrove and mandated to achieve more mangrove coverage by conserving or planting (Wylie et al., 2016).

Incorporating community’s livelihood to the blue carbon management strategy is proven to be effective (Wylie et al., 2016).

Without concerning the livelihoods, communities would be less supportive of coastal ecosystem conservation and rehabilitation efforts (Brown, et al., 2014).

Sustainable tourism by conserving mangrove ecosystems

Nusa Lembongan, Bali
Source: nusapenidatour.co.id
Blue carbon projects can be a **new source of income** for communities from carbon financing in addition to providing other ecological and economic benefits that are needed by organisations (Vanderklift et al., 2019).

**Crediting mechanisms**

**United Nations:**
1. Clean Development Mechanism (CDM)
2. Joint Implementation Mechanism (JI)
3. Reducing Emissions from Deforestation and Forest Degradation (REDD +).

**Voluntary carbon markets:**
1. PlanVivo
2. Verified Carbon Standard (VCS)
3. Gold Standard (World Bank, 2020).

**Crediting mechanisms at the regional, national and sub-national levels**

Suitable for small scale projects because simple requirements and few transaction costs (Bryan et al., 2020; Wylie et al., 2016).

Can serve as pilot sites for procedures, methodologies and technologies for managing blue carbon and subsequently incorporated into regulatory schemes (Bryan et al., 2020) such as CDM, JI, and REDD +.

**Direct payment**

'Socio Manglar’ in Ecuador was established to offer direct money to communities in exchange for the preservation and restoration of mangrove areas. (Dorothée Herr et al., 2017).
Land Tenure

The social conflict among the local community has to be analyzed and many literatures strongly suggest that land tenure has to be clearly defined before implementing any plan in the selected area as this might lead to social conflict (Contreras & Thomas, 2019; Howard et al., 2017; Lovelock & Duarte, 2019; Moraes, 2019)

Land tenure systems:
1. The blue carbon project in Kaimana, West Papua, Indonesia, is developing with the help of Conservation International and other stakeholders. Kaimana’s people practice communal ownership system in the mangrove forest area (Howard et al., 2017), which the land ownership is divided based on clan

2. In Guyana, legally the land is owned by public/government, Amerindians (indigenous peoples), and private (Johnson-Bhola, 2020) as well as in Tanakeke Island, South Sulawesi, Indonesia the mangrove area is owned by local communities, private sectors, public, and government (Brown et al., 2014).
• Most of the people living in coastal areas do not know that mangroves are legally protected yet local people are willing to conserve mangroves on their land if compensation is given (Johnson-Bhola, 2020).

Tanakeke Island

• Issuing legal title to landowners of rehabilitated mangrove forest can be the solution for land tenure issue (Brown et al., 2014)

• The legal title of the rehabilitated mangrove area is guaranteed with several conditions:
  1) Rehabilitated lands may not be clear-cut in the future. Timber harvest is allowed by following the regulation;
  2) All community members get access for non-timber forest products
  3) Landowners does not require to pay aquaculture-use taxes, as their ownership classified as conservation/sustainable utilization;
  4) Traditional owners without land certificates will be assisted to be registered;
  5) Each village will designate an area for the strict reserve of ecological services (Brown et al., 2014).

Land Tenure

Resource use rights by the community (Howard et al., 2017)
Local Knowledge

The contribution of local communities during the planning and management process leads to success (Vierros, 2017).

Important local knowledge during blue carbon planning process:
1. knowledge about current and potential threats to the conservation of coastal ecosystem
2. identification of potential sites for blue carbon management
3. habitats around blue carbon ecosystem
(Howard et al., 2017; Vierros, 2017).

Local stewardship
“the actions taken by individuals, groups or networks of actors, with various motivations and levels of capacity, to protect, care for or responsibly use the environment in pursuit of environmental and/or social outcomes in diverse social-ecological context” (Bennett et al., 2018).
Local Capacity

Governance factors: laws, policies, organizations, power, and politics (Lockwood, Davidson, Curtis, Stratford, & Griffith, 2010; Robbins, 2012).

In the context of blue carbon management, the example of governance factors are:
1. The mangrove restoration site in Kantiyajal, India. CSR program from private sectors (Mitra & Zaman, 2015).
2. Ecuador is one of the countries that already included blue carbon as the mitigation efforts in their NDC, the ‘Socio Manglar’ programme is the implementation of their strategy (Dorothée Herr et al., 2017).

Local community assets:
1. Social capital (e.g., trust, networks, and relationship)
2. Financial capital
3. Physical capital (e.g., infrastructure and technology)
4. Cultural capital (e.g., traditions, knowledge, and practices)
5. Human capital (e.g., skills, education, and demographics) and
6. Institutional capital (e.g., agency, empowerment, and options) (Bennett et al., 2018).

Local communities and project managers can be equipped with training, resources, and support to ensure their capacity to manage the blue carbon project and adapt processes to their culture (needs, practice, and local knowledge) (Howard et al., 2017; Vierros, 2017).
Local Capacity

- Women’s participation is one of the underestimated local capacity because local social systems and structures often deprive women participation and ownership over natural resources (Moraes, 2019).
- Moreover, often women are directly concerned by the conservation of coastal ecosystem resources, yet they are rarely recognized as stakeholders and not well informed of current policies such as REDD+ (Brown et al., 2014; Cormier-Salem, 2017).

- In Kaimana, Papua there is all-female patrol group, which are in charge of monitoring, enforcement, and compliance practices (Howard et al., 2017).
- In Tanakeke Island, South Sulawesi, Indonesia, the group called Womangrove was established to ensure women participation from planning until the implementation of project (Brown et al., 2014). The establishment of Womangrove also supported with gender awareness training to all of the involved parties (Brown et al., 2014).
- Women’s participation in the blue carbon project can increase local capacity besides give benefits to women such as empowering women and generate alternative income (Wylie et al., 2016).

Source: Howard et al., (2017)
Lack of study of blue carbon management in seagrass and salt marshes ecosystems

- Low public awareness towards ecosystem services of seagrass and saltmarshes
- Low local capacity to manage them (McKinley, Pagès, Ballinger, & Beaumont, 2020; Quevedo et al., 2020).
- More extensive research is needed for seagrass and salt marshes ecosystem, from technical, policy, and social aspects, therefore this information can be transferred to the local community.
Conclusion

- The social aspects of the local community that have to be considered in blue carbon management are **livelihood, land tenure, local knowledge, and local capacity**.

- Research publication about the social aspect in blue carbon management has emerged since 2014 and have incorporated those aspects on the establishment of a blue carbon project.

- Moreover, more extensive practical studies are needed to apply strategies on the real subject to strengthen the theory in recent literature.

- The **down-top approach** by considering those aspects is needed to answer the challenging global issue, which is the integration of social-cultural dimensions and government mechanisms.

- Further research is needed to challenge the effectiveness of incorporating those aspects by evaluating the sustainability of running blue carbon projects.
Thank you