

# Street survey on coastal human-environment relations in Lease, Central Maluku, Indonesia 2024 – Study report

## Research and study report are part of the project “Searching for solutions for Carbon-sequestration in coastal ecosystems (sea4soCiety): Innovative Approaches to Enhancing the Carbon Storage Potential of Coastal Vegetated Ecosystems”

### 1. Background and context

The project “Searching for solutions for Carbon-sequestration in coastal ecosystems ([sea4soCiety](#))”, is part of the [Deutsche Allianz Meeresforschung](#) research mission [CDRmare](#), financed by the Federal [German Ministry for Research and Education](#). The social science part of the project is based at the University of Hamburg, in the working group of [Prof. Dr. Beate Ratter](#). The project works across several countries: Germany, Malaysia, Indonesia and Columbia. The work in Indonesia, which this study report is about, has been conducted through the cooperation with Pattimura University in Ambon, here especially with Prof. Dr. Agus Kastanya, who assisted in setting up a research infrastructure (field assistants, identification of research sites, transport to research sites, collecting documents for research permits, meaningful translation of research questions into the Indonesian context). This study report follows the manual for contextualizing qualitative data (Heuer et al. 2020).

#### A. Content and structure of the project

The necessity for acting against ongoing climate change and for implementing mitigation and adaptation measures has reached widespread social awareness in recent years. However, the national contributions to reduce greenhouse gas emissions submitted so far by the Parties to the Framework Convention on Climate Change are not expected to be sufficient to achieve the goals of the Paris Agreement. The goal of a climate-neutral society can only be achieved through additional, reliable and sustainable measures to remove CO<sub>2</sub> and other greenhouse gases from the atmosphere and store them in a long-term and stable manner, so the conclusion of the IPCC. Such measures can only be taken if their consequences are weighed against the benefits and are socially accepted. Ideally, these measures provide co-benefits in the context of additional needs and requirements for ecosystem services and can be linked to economic benefits. This societal and economic challenge requires in-depth knowledge of the social and ecological systems that are affected by corresponding measures. sea4soCiety contributes to the understanding of coastal vegetated ecosystems as the basis for increasing the storage and sequestration capacity of these ecosystems for greenhouse gases. Thus, sea4soCiety contributes with a socio-ecological component to the overall goal of the bigger research mission "Marine Carbon Storage as a Pathway to Decarbonisation" and is embedded in a network of collaborative projects with a focus on physico-chemical measures of greenhouse gas-removal. The network also looks into the potential beyond coastal vegetated ecosystems in Germany, Malaysia, and Columbia. The research of this study report however aims at understanding Coastal Vegetated Ecosystem potentials in Indonesia and can be compared with the results of the wider network and their work at other study sites.

Coastal vegetated ecosystems (CVE), as the sole focus of this project, are among the world's most potent natural stores of greenhouse gases, but their integrity and extent have been compromised and diminished over decades by numerous human activities. Consequently, the global capacity for climate change mitigation through "blue carbon" sequestered in coastal ecosystems declined dramatically, and concrete actions are needed to reverse this trend. sea4soCiety aims to develop innovative approaches to enhance the potential for carbon sequestration in coastal ecosystems in Germany and worldwide

that are ecologically feasible, environmentally sound, legally and ethically unobjectionable, and based on societal requirements for additional benefits, including economic viability, as well as broad acceptance. Locally and regionally, coastal societies will gain from services and benefits provided by enhanced coastal ecosystems, while globally making a strong contribution to climate change mitigation and adaptation by increasing greenhouse gas storage capacity and helping coastal ecosystems cope with climate change impacts such as sea level rise and extreme weather events. Together with increased biodiversity and productivity of coastal ecosystems, these consequences of the proposed actions will contribute to societal well-being and economic stability, so the project idea.

Decision-making processes that promote different methods of carbon sequestration require accompanying measures at five interrelated levels (social, political, legal, economic, and ethical). This sub-project and its study report focus on the analysis of selected coastal case study areas in Indonesia. The analysis of the socio-cultural constitution and the exploration of a deliberative management strategy will take place transdisciplinarily in close cooperation with regional actors from various sectors. A population survey and a series of stakeholder interviews are employed to investigate the perception of coastal ecosystems by coastal societies and their readiness and openness to change. The economic potential of a „blue economy“ and a possible contribution to sustainable regional development will be examined in comparison to existing international approaches and in consideration of existing regulatory mechanisms and development strategies. The goal is to understand different coastal cultures and social framings of the coast, activate local knowledge and innovation, and identify early triggers for social resistance. The social and political feasibility and potential impacts of Carbon Dioxide Removal (CDR) interventions are analysed, taking into account the acceptance by change agents, stakeholders, and residents towards active intervention for sustainable regional development. The results can form the basis for designing deliberative governance strategies.

The aims of the sub-project presented in this study report are:

- 1) Identification of stakeholders and analysis of local acceptance of interventions in natural ecosystems;
- 2) Identification of infrastructural, political, and governance needs of a transformation;
- 3) Identification of environmental and economic benefits and value to local stakeholders.

#### A.1 Research methodology

The sub-project working in Indonesia, in a first step, applied an explorative qualitative social science approach, followed by a quantitative survey.

##### Identification of stakeholders and analysis of local acceptance of interventions in natural ecosystems

To identify stakeholders, semi-structured expert interviews across different scales (national to local) and across different institutions (national government to local NGOs) were conducted. Stakeholders include the Ministry of Forestry and Environment (mangroves and climate change topics, coastal protected areas within their mandate), the Ministry of Fisheries and Marine Affairs (seagrass, issues related to protected areas within their mandate), Ministry of Finance (potential for carbon trade from Blue Carbon approaches), Ministry of National Development Planning (spatial planning aspects), Universitas Pattimura, Coral Triangle Center (NGO that has conducted trainings on Blue Carbon and has extensive experiences at the study sites in Indonesia). Starting from the national level, the stakeholder analysis follows through to the local level to identify actors relevant on the local level, too. The interviews followed a snowball sampling method, learning about more stakeholders to be involved through interviews. The interviews were explorative and will not be addressed further in this study report.

### Identification of infrastructural, political, and governance needs of a transformation

Interviews also aimed at identifying needs on the way to a blue carbon transformation.

### Identification of environmental and economic benefits and value to local stakeholders

To analyse the societal perspective on blue carbon interventions, a survey that has also been conducted along the German coast (Fink et al. 2024), was implemented. The survey comprises questions on the relation of coastal communities to their natural environment, their understanding of home (*tanah air*), nature (*lingkungan dan alam*), what role different coastal plants (mangroves, sea grass,) play for people's region, what role climate change plays in the context of these plants and the respective region, what opportunities people see in shaping their coastal vegetated systems.

## 2) Data generation: Preparation and implementation

### *A. Selection and description of actors*

The main empirical focus was the survey that had formerly been conducted along the German coasts. Together with the partners from Pattimura University and the Coral Triangle, research sites were identified. Sites were identified along the following features: accessibility, knowledge of the place, permission of district heads to interview in the district, proximity to protected area. Once the permission of the district head was obtained, the village heads of the respective villages were contacted and their permission was also sought. This in the end led to interviews being conducted in Eastern Indonesia, Central Maluku Province, on 2 of the Lease islands, Nusa Laut and Haruku. On each island, interviews were conducted in 4 villages. In total 145 interviews were conducted. The questionnaire comprised of 10 open and 40 closed questions. The interlocutors were randomly sampled. People who live along the coasts of the two islands were stopped in the streets and asked if they wanted to participate in the survey. The interviews themselves were most of the times conducted in peoples houses or on people's verandas, sometimes also just at the beach, depending on the preference of the interlocutors. The only precondition was that people are residents of the area where interviews were conducted which was the case for all interlocutors approached. Interviews were conducted with the help of two field assistants, students from Pattimura University. Usually, an interview day started in the morning with an introduction to the village head after which interviews were conducted until lunch break. To avoid the heat, the day was then paused until early evening, to then continue a second round of interviews. Almost all of the approached interlocutors agreed to be interviewed.

All interviews were started with the following information:

"I guarantee that any information you submit will be kept confidential. Your name or any information that might identify you in the study report will not be used. Your participation is completely voluntary. You have the right to withdraw your participation at any time, or to refuse to answer some of the questions. If you have any questions regarding this study, please do not hesitate to ask the researcher who conduct the interview/survey. A research permit was obtained prior to travelling to Indonesia, which comes along with an ethical clearance. Am I allowed to start with the interview?"

Only once this question had been answered with yes, the interview commenced. Interview duration was between 15 to 45 minutes.

## *B. Methods, instruments and process of data generation*

In order to be able to cover a wide range of perceptions towards blue carbon endeavours across different sites, the survey that had previously been conducted along the German coasts, was mirrored. A quantitative survey approach was chosen in order to cover a wide range of perceptions. A random sampling design was employed in order to cover a random variety of respondents, representing a wide range of members within society. The study sites were selected because previous work has been conducted there and a network existed already, which is of utmost importance when conducting research in places that do not use the researchers' first language and that are shaped by a different cultural setting than the one the primary researcher has been socialized in. More than one week was spent on familiarizing with the research setting, obtaining documents needed, getting to know the field assistants and interested researchers from Pattimura University, finalizing the questionnaire and also testing the questionnaire. A manual was prepared for the student assistants to explain main points of importance when conducting interviews, e.g. quality more important than quantity. As the questionnaire included two pictures (one of mangroves and one of seagrass), those were also chosen in cooperation with the local NGO Coral Triangle Center (CTC) to ensure species displayed in the pictures were indeed species growing in the interview area.

Interviews were, as they were in Germany, too, conducted through the use of tablets (which were brought from Germany). Kobotoolbox, a free survey software was used to conduct the interviews. A first version of questions had been fed into Kobotoolbox when still in Germany. These questions were then discussed in a half day meeting together with partners from Pattimura University and CTC during the first week in Indonesia.

### 3) Cleaning of data, analysis and future potential of data use

Following the approach explained above, a total number of 143 interviews were conducted across 2 islands and 8 villages.

#### *A. Data and data processing*

All answers provided were directly inserted into the Kobotoolbox software using a tablet (which also had the questions, including possible answers or free fields for some open questions and comments). Most questions had a scale as possible answers, ranging from "I fully agree" to "I fully disagree", with additional options of "I rather agree" and "I rather disagree". It was also always possible to answer „I do not know“. This applies for example for a question like „Mangroves are an ecosystem worth being protected.“ Kobotoolbox offers the option to download data in different formats. In this case, data were downloaded into an excel sheet. The excel sheet was checked for technical correctness. 3 interviews appeared double and were cleared, so that only one version of this interview remained. It is unclear why they appeared double.

The data does not include the name of the person interviewed. Personal data asked for were age, number of children and age and what village people lived in. The data could hence be considered anonymous.

#### *B. Data analysis and results*

The data were analysed in a way that allowed for comparison between the German and Indonesian sample. This was not feasible for all questions asked. Challenges arise for example in the context of impacts different level government offices have, as the Indonesian setup is different from the German setup. Many questions were, nevertheless, compared quite easily. The data shows for example that a willingness towards seagrass protection and expansion is higher in the Indonesian sample than it is in the sample taken in Germany, while willingness towards seagrass protection and

expansion in both countries is above 50%. A paper presenting the data has been submitted and is currently (July 2024) under review. Once published, the information will be added here.

## Publication bibliography

Fink, Michael; Wittenburg, Jasper; Bosse, Julia; Hübner, Paulina; Knupper, Marc; Meyer, Jocelyn et al. (2024): Street Survey on Societal Acceptance of Blue Carbon along the German Coasts 2022 - sea4soCiety Study Report & Questionnaire.

Heuer, Jan-Ocko; Kretzer, Susanne; Mozygemba, Kati; Huber, Elisabeth; Hollstein, Betina (2020): Kontextualisierung qualitativer Forschungsdaten für die Nachnutzung: eine Handreichung für Forschende zur Erstellung eines Studienreports. With assistance of Universität Bremen.