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COASTAL AREA DEVELOPMENT THROUGH MANGROVE PLANTING AND TREE FOSTER PARENTS (OTAP) AS CLIMATE CHANGE RESTORATION AND MITIGATION EFFORTS SEDARI VILLAGE, CIBUAYA DISTRICT, KARAWANG REGENCY

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ABSTRACT
Introduction: *The global community is faced with some problems such as the climate crisis. The coastal area is one of the areas that are at risk of abrasion and the impact of the climate crisis. Sedari Village is one of the areas in the coastal area that has the risk of abrasion and climate change. This study aims to analyze coastal area development through mangrove planting and tree foster parents (otap) as climate change restoration and mitigation efforts.* ***Methods:*** *The community empowerment program in Sedari Village consists of several stages, namely institutional. formation, institutional training, and biophysical development through mangrove planting.* ***Result:*** *PT Pertamina Patraniaga Fuel Terminal Cikampek conducts a coastal area development program through mangrove planting and tree foster parents. Community empowerment activities aim to map the activities needed for environmental restoration. The Biodiversity and Community Empowerment Program are carried out through many pre-activity stages, from implementation to monitoring and evaluation.* ***Conclusion:*** *Based on community empowerment activities, it is concluded that coastal area development activities through mangrove planting and OTAP initiation have a high urgency value.*

Keywords: *mangrove, OTAP, innovation*

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INTRODUCTION

The global community is faced with some problems such as the climate crisis, the food crisis, and the economic crisis. In 2022 the world economic forum (*world economic forum*) released a report on risk threats with 50% of the 10 main problems of the global community being environmental problems (Javaid et al., 2022). The environmental problems that have been mentioned have an impact, both in terrestrial or inland areas to coastal areas.

The coastal area is an important strategic area to be developed. This is because the proportion of coastal areas in the world is 10%, but almost 1 third of the world's population lives in coastal areas. Judging from the climate crisis, coastal areas can be one of the locations that are affected in various forms.

The coastal area according to Law (UU) number 1 of 2014 can be interpreted as a transitional area between land and sea ecosystems that are affected by changes on land and at sea. (Bahari,

2016). Based on case studies in Indonesia, there are some areas in coastal areas that face many environmental problems. For example, the problem of abrasion on the Kuala Leuge beach, East Aceh District which has not been dealt with comprehensively is evidenced by the government's not yet optimal policy in mitigating abrasion (Abda, 2019). Other problems such as the extinction of the Mangrove forest in Taar Village, where the mangrove forest area is used as a place for wood production for development, poses a threat to the forest area (Salamor, 2022).

Administratively, Sedari Village is located in Karawang Regency. Geographically, Sedari Village is located on the north coast of Java Island. In terms of tourism potential, Sedari Village, which is located in a coastal area, is one of the potential destinations. Based on data from the Regional Government (Pemda) of Karawang Regency, there are 7 natural tourist objects such as Tanjung Pakis Karawang Beach, New Ocean Beach, Cibendo Beach, Sedari Beach, Cilamaya Kulon White Beach, Tanjung Baru Beach with the dominance of mangrove tourism in Sedari Village (Dewi, 2022)However, it is inseparable from the coastal area, Sedari Village has consequences in the form of the risk of abrasion and other climate crisis impacts because it is located in a coastal area.

Historically, according to several sources, this village has a fairly extensive mangrove forest. The area of mangrove forest in Sedari Village is about 49.20 ha with a physical carrying capacity of 332.00 people/day, a real carrying capacity of 25,047 people and an ecological carrying capacity of 26.65 ha and the distance between settlements and the beach is quite far (Readi et al., 2021). However, in current conditions, the distance between settlements and the shoreline is very close.

This condition triggers *PT Pertamina Patraniaga Fuel Terminal Cikampek* to carry out community empowerment activities. Community empowerment activities carried out by *PT Pertamina Patra Niaga Fuel Terminal Cikampek* aim to (1) formulate an action plan for coastal area restoration and (2) a planting program and initiation of a post-planting maintenance system (Fatimatuzzahroh et al., 2021).

METHOD

Location The biodiversity program is located in Sedari Village, Cibuaya District, Karawang Regency, Indonesia. The community empowerment program in Sedari Village consists of several stages, namely institutional formation, institutional training, and biophysical development through mangrove planting. Institutional initiation was carried out at the Sedari Village Hall, Cibuaya District, Karawang Regency. The tools used in the implementation of institutional initiation include laptops, LCD projectors, questionnaires, institutional guides, and cameras. As for planting activities, the tools used include bamboo stakes, banners, and seed markers. While the material used is Avicennia marina seeds with a total of 7,777 seeds. On the other hand, as additional information for programming, we conducted interviews with 10 *key informants* including village leaders, village officials, and the community.

RESULTS AND DISCUSSION

1. Action Plans and Institutions

   In the framework of management science in general, activities are composed of planning, organization, implementation, and evaluation. The planning stage of empowerment

activities in Sedari Village includes the socialization of the program that has been implemented with the number of participants involved being 40 people. In general, the stages in community empowerment activities are listed in Figure 1 regarding the flow chart of community empowerment activities.

The socialization activities aim to describe the program plans that will be carried out; get a picture of the response of the community's acceptance of the program to be implemented. After the socialization, the program led to the presentation of the plan for planting activities and the initiation of Tree Foster Parents (OTAP) (Randy et al., 2015). The selection of mangrove commodities or species is based on the function of the existence of mangrove plants. In terms of function, mangroves can have benefits as a wave barrier, habitat for marine life, windbreaks, sediment traps, and seawater intrusion barriers (Imran & Efendi, 2016).

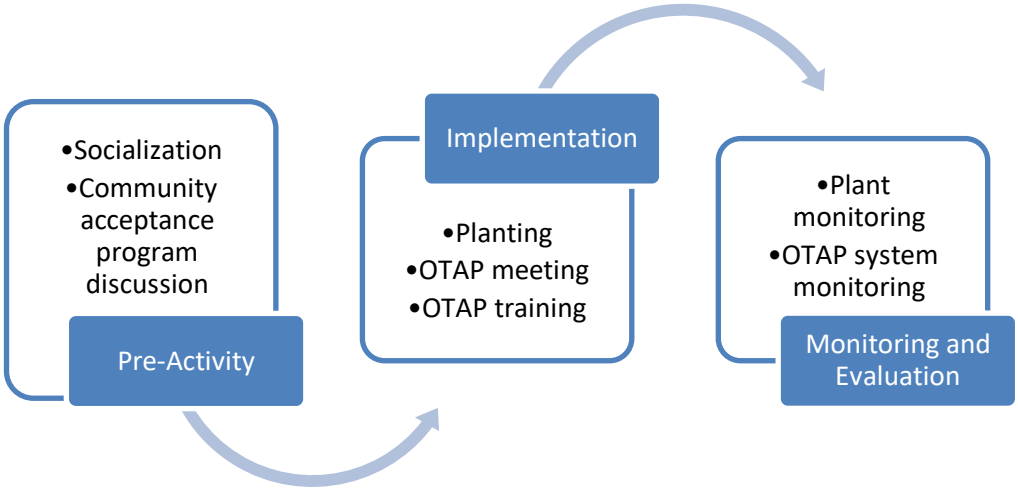


Chart 1. Flowchart of community empowerment activities in Sedari Village, Karawang Regency

Foster parents are a community-based tree maintenance program by providing education about the urgency of mangroves and being aware of the environment. The stages of initiation of the OTAP program consist of initial discussions on OTAP, OTAP training, and preparation of a supporting policy framework related to OTAP until the inauguration of the name of the OTAP management (Wahyudin et al., 2017).



Figure 1 . Tree Foster Parent Training

In general, both planting and OTAP activities are within the framework of the big theme Sedari Kang Hari which has the meaning of Sedari Village as a sustainable and independent green village. The big theme is inseparable from the condition of Sedari Village which requires efforts to deal with the risk of abrasion and the continued impact of the climate crisis.

2. Mangrove Planting

Mangrove planting activities with *Avicennia marina species* were carried out with as many as 7,777 seedlings. The mangrove planting program by FT Pertamina Cikampek does not only involve external parties from Sedari Village but also involves community participation. Approximately 20 people are involved in the mangrove planting program. Community participation is an important element in the implementation of empowerment programs to increase public awareness of the environment.

Planting activities cannot be separated from the abrasion condition of Sedari Village which is getting worse. Now the distance between settlements and the shoreline in Sedari Village is only about 20 meters, according to information from key informants interviewed, the distance between the shoreline and settlements is quite far. In line with this, information obtained from Iqbal (2017) mentions that the description of the distance between settlements and the shoreline states that people still pass through the plantation area to the mangrove forest first.

In line with this, mangrove planting activities have a high level of urgency for areas affected by abrasion. According to (Budhiman et al., 2010) areas with large and dense mangrove areas have lower abrasion values.



Figure 2. Planting activities by PT. Pertamina Patraniaga Fuel Terminal Cikampek

The planting activities that have been carried out are 7,777 with a spacing of 50 cm x 50 cm. The spacing of 75 cm and 50 cm showed better results than the distance of 25 cm, between the spacing of 75 cm and 50 cm there was no significant difference (Nasution & Feliatra, nd). At the time of monitoring the planting of the planting area, additional protection is given in the form of a parent tied to the bamboo. This protective treatment is carried out so that the new plants planted can be protected from goats in the planting area. The mangrove planting program is expected to provide positive benefits to the environment. This is in line with the case study of mangroves in Cuba which states that the existence of mangroves can contribute to the protection of 22,000 people per year and avoid the risk of losses due to disasters of 150 million dollars with an area of 222 km2 or the equivalent of 40,000 football fields (Cepal, 2018).

3. SWOT Analysis for the Sustainability of the Sedari Village Environment Program

After planting and initiating OTAP activities, it is known that the community has a positive response to environmental sustainability programs. In line with this, according to (Haloho et al., 2019) public acceptance of mangrove forests is positive.

The SWOT analysis is intended to see opportunities for program sustainability related to improving the quality of the environment in Sedari Village. SWOT analysis is used to analyze internal and external conditions. Internal condition analysis is aimed at identifying resources, capabilities, and basic competencies. Meanwhile, the analysis of external conditions identifies market or external conditions (Rangkuti, 1998).

Strength • High public awareness • High level of community participation	Weakness • There is no measurable data regarding the rate of abrasion • Need more involvement
Opportunity • Natural tourism potential area • Access to Sedari Village is getting better from time to time	Threat • Abrasion rate • Environmental hazards, pond waste

Table 1. SWOT analysis matrix on coastal area development

Based on Figure 3 regarding the SWOT analysis matrix, it is known that programs or activities related to improving environmental quality have the potential for sustainability. This is based on a column of strengths, weaknesses, and opportunities that tend to be positive or have opportunities for the involvement of other sectors. Such the need for measurable data and the involvement of many parties can be a trigger to expand the level of impact.

In the threat column, some external threats are the main threats to the sustainability of the program. If the rate of abrasion is much faster than planting activities, it is not impossible, the challenges of planting activities in the next period will be more severe because they require physical infrastructure support to withstand waves. Likewise with the threat of environmental hazards in the form of waste from community pond activities.

4. Penta Helix Collaboration: Other Stakeholder Engagement

implementation of the community empowerment program by *PT Pertamina Patra Niaga Fuel Terminal Cikampek* is inseparable from the collaboration between stakeholders. The concept of community empowerment collaboration carries the concept of the *Penta Helix Collaboration* (figure 4) consisting of academia, industry, community, government, and media.

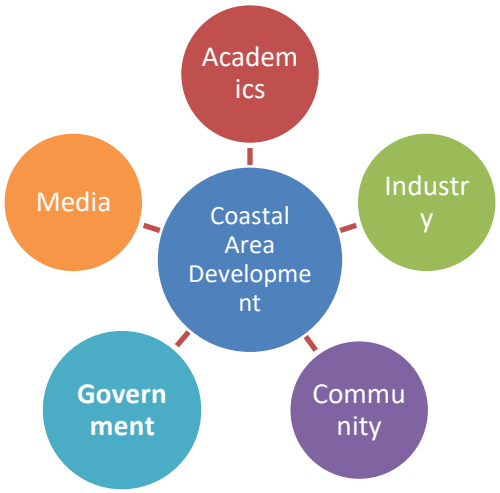


Chart 2. Penta Helix Collaboration Concept

In the concept of Penta Helix Collaboration, each stakeholder has its role and function. Academics in community empowerment programs provide input in the form of scientific data that can support decision-making. The industry as a strategic partner, in this case, can be intended as FT Pertamina Cikampek which can act as investors and agents in regional development. Community means people who are directly involved. Not only involved, but the community is also part of the affected. The government is the policy maker and the government in question is at the provincial level to the village government. The real manifestation of the role of the village government is the issuance of a certificate from the OTAP management. The next stakeholder is the mass media. Mass media is needed to increase public awareness regarding a particular problem to create public attention in Sedaris Village, Cibuaya District, Karawang Regency.

CONCLUSION

Biodiversity activities in the form of developing coastal areas in Sedari Village have a high level of urgency. This is in line with public interest in environmental programs and high public awareness of the environment. A positive situation can be an opportunity for similar environmental activities to be carried out in Sedari Village so that the main problems related to abrasion can be resolved. The activities carried out were training for tree foster parents, planting mangrove trees to prevent abrasion and increasing the sustainability of environmental programs in the village of Sedari. So that similar environmental restoration activities can be one of the efforts to mitigate the climate crisis or other bad risks in Sedari Village.

REFERENCES

Abda, M. K. (2019). Mitigasi Bencana terhadap Abrasi Pantai di Kuala Leugekecamatan Aceh Timur. *Jurnal Samudra Geografi*, *2*(1), 1–4.

Bahari, M. I. (2016). Efektivitas Pengawasan Hutan Mangrove Di Wilayah Pesisir Kabupatenlamongan. *Jurnal Novum*, *3*(1), 97–105.

Budhiman, S., Dewanti, R., Kusmana, C., & Puspaningsih, N. (2010). Kerusakan hutan mangrove di Pulau Lombok menggunakan data landsat-TM dan sistem informasi geografis (SIG). *Warta Lapan*, *3*(4).

Cepal, N. U. (2018). *The effects of climate change in the coastal areas of Latin America and the Caribbean: evaluation of systems for protecting corals and mangroves in Cuba*.

Dewi. (2022). *Pantai Karawang : 7 Destinasi Populer*. Travels Promo.

Fatimatuzzahroh, F., Hadi, S. P., & Purnaweni, H. (2021). Tingkat Partisipasi Masyarakat Dan Analisis Aktor Pada Rehabilitasi Mangrove Di Desa Karangsong, Kabupaten Indramayu, Jawa Barat. *Jurnal Sosial Ekonomi Kelautan Dan Perikanan*, *16*(2), 257–269.

Haloho, L. L., Thamrin, E., & Dewantara, I. (2019). Persepsi Masyarakat Terhadap Keberadaan Hutan Mangrove di Desa Sungai Kunyit Laut Kabupaten Mempawah. *Jurnal Hutan Lestari*, *7*(1).

Imran, A., & Efendi, I. (2016). Inventarisasi mangrove di pesisir pantai cemara Lombok Barat. *JUPE: Jurnal Pendidikan Mandala*, *1*(1), 105–112.

Javaid, A., Arshed, N., Munir, M., Amani Zakaria, Z., Alamri, F. S., Abd El-Wahed Khalifa, H., & Hanif, U. (2022). Econometric Assessment of Institutional Quality in Mitigating Global Climate-Change Risk. *Sustainability*, *14*(2), 669.

Nasution, S., & Feliatra, F. (n.d.). *The Effect of Space Planting on Growth of Mangrove (Avicennia Marina) Seedlings in the Anak Setatah Village, West Rangsang District Meranti Archipelago Riau Province*. Riau University.

Randy, A. F., Hutomo, M., & Purnama, H. (2015). Collaborative efforts on mangrove restoration in Sedari village, Karawang district, West Java province. *Procedia Environmental Sciences*, *23*, 48–57.

Rangkuti, F. (1998). *Analisis SWOT teknik membedah kasus bisnis*. Gramedia Pustaka Utama.

Readi, A. F., Christina, J., Rahmanita, M., & Asmaniati, F. (2021). Studi Eksplorasi Potensi Pariwisata Kreatif Kawasan Hutan Mangrove Desa Sedari, Kecamatan Cibuaya, Kabupaten Karawang, Jawa Barat. *Khasanah Ilmu-Jurnal Pariwisata Dan Budaya*, *12*(2), 151–158.

Salamor, Y. L. (2022). Studi Kerusakan Hutan Mangrove di Desa Taar Kecamatan Dullah Selatan Kabupaten Maluku Tenggara. *KROMATIN: Jurnal Biologi Dan Pendidikan Biologi*, *3*(1).

Wahyudin, Y., Purnama, H., Teguh, I., Randy, A. F., Trihandoyo, A., Ramli, A., & Arkham, M. N. (2017). Analisis manfaat biaya program orang tua asuh pohon mangrove di Wilayah Pesisir Karawang. *Jurnal Mina Sains*, *3*(2), 23–34.

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