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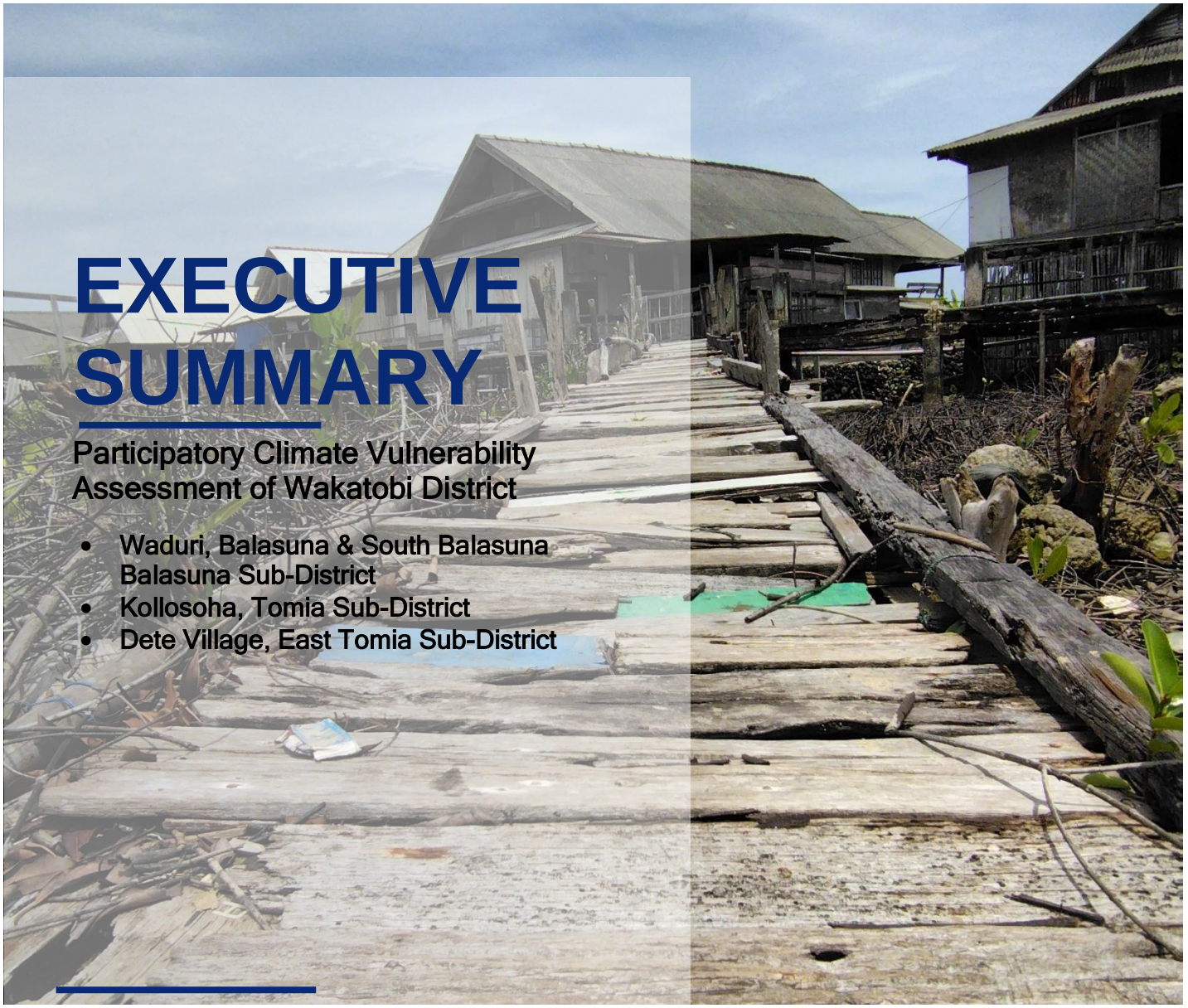

EXECUTIVE SUMMARY

Participatory Climate Vulnerability Assessment of Wakatobi District

- Waduri, Balasuna & South Balasuna Balasuna Sub-District
- Kollosoha, Tomia Sub-District
- Dete Village, East Tomia Sub-District

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Abstract

Climate change impact in Indonesia has been felt in every sector of life. Indonesia as an archipelago country faces great challenges of climate change impact. Various studies show that coastal and marine areas deal with the enormous crisis. A lot of effort has been done and it does not only need financial support but also political commitment, and overall integrated resources. Because climate change impact knows no regional administrative, authority implementing sector or one or two scientific fields.

Assessment of climate vulnerability at Wakatobi includes five villages from two islands: Kaledupa and Tamia. The five villages are Balasuna, South Balasuna, Waduri; Kaledupa Sub-District, Kollosoha Village; Tomia Sub-District, and Dete Village; East Tomia Sub-District. The assessment's purpose is to facilitate community and village government in strengthening community resilience to the impact of climate change and disaster risks in coastal areas.

To achieve that purpose, the assessment process is done using a participative approach with the purpose to grow critical awareness at the community level. Understanding important resources livelihood, change and tendency in climate patterns that occur, and the effect of livelihood system. The dialogic process among participants from various livelihood backgrounds, ages, gender, and also social stratification becomes part of exchanging knowledge, experience, and ideas/thought to cope with the problem in each village.

The assessment process conducted on 6-18 February 2023 indicates the vulnerability level at each village or area is on a low to the intermediate class. Those classes are the self-evaluation result of the discussion participant guided by the facilitator. The evaluation is based on indicators of the vulnerability-forming variables that have been prepared in the module.

Generally, climate and season change occur in 10-20 years. The change was noticed either at the beginning or at the end of the season, or the trait and the pattern of the weather or the season component. These changes give an impact on the community's livelihood. Either on livelihood, health care, or on the existing transportation systems. In the future, those existing changes will continually happen, either on characteristics, patterns, or the existing time.

In terms of adaptation capacity, the ability to overcome major change is on the intermediate or high level. This condition reflects that community still can overcome and adapt. Some capacity components need development efforts such as preparedness on overcoming extreme weather with disaster potential, the knowledge of spotting extreme weather signs, and the isolation of the area during bad weather and its effect on health care.

The observation time range is the past 10-20 years and the projections for the next 10 years. That time range is likely to the community's active memory to re-telling. Based on memory and experiences offered which is done dialogically, it's giving room for the discussion participant to do the innovation ideas which possibly occur in the next 10-20 years, and its effect on the community's livelihood system.

Responding to the various existing issues, each village formulates the adaptation action plan agenda. The action plan is part of the participant's commitment to the village government, YKAN, and Forkani as a work partner to follow up on various findings and society's efforts on building resilience to climate change impact. The action plan is also formed with other villages to see the adaptation action plan's similarity and correlation as a collective agenda.

Executive Summary

A. Background

Climate change impact has been a worldwide issue. Except for the mitigation efforts for suppressing greenhouse gas, for the archipelago and tropical countries like Indonesia, adaptation efforts have to be done. The intensity of climate-related disaster events in Indonesia is a fact that must be faced and overseen by the Government and community. BNPB noted, throughout 2022, there have been 3.531 disasters. 99,17 or 3.502 disasters are climate-related. The number of incidents has reduced compared to 2021 reaching 5.402 incidents. However, in terms of the percentage of climate-related disasters, it is relatively the same, namely at 99,53%.

Ecosystem-based adaptation (EbA) is one of the offerings of nature-based solutions to respond to and overcome the impact of climate change. EbA Foundation is based on ecosystem management that's not only helping the community to overcome the climate adaptation deficit but also contributing to improving the local economy based on local natural resources. To make it happen, Yayasan Konversi Alam Nusantara (YKAN) facilitates the coastal community, especially at the village level, conducting a vulnerability assessment is identifying and adopting integrated strategies for disaster risk reduction and climate change adaptation based on nature. The hope is that this process will contribute to ecosystem resilience and reduce the vulnerability of coastal communities. For this purpose, the assessment process was carried out in the coastal area of Wakatobi.

B. Method, Process, dan Site Study

This study combines two methods, qualitative and quantitative with a participative approach. The study uses the I-CATCH module developed from RRA (*Rapid Rural Appraisal*) and PRA (*Participatory Rural Appraisal*). The qualitative method is used in collecting the data and information through focus group discussions and semi-structured interviews, analyzing the change and tendency up to the identification and deciding the greatest problem to the community to climate-change impact. While the quantitative method is used to valuate vulnerability levels using the indicators at each vulnerability forming variables, exposure, sensitivity, and adaptation capacity. Vulnerability level obtained from vulnerability formulation: V = (E+S); CA.

The first step of the assessment process is studying the site study's secondary data, either from complete research results, statistical data, development planning documents, publications, books, journals, or assorted news. The desk research result becomes base for the assessment team to prepare the design, strategy, and field assessment process. Including preparing various kinds of possibilities for change of the action or step, process, or another adjustment. The assessment was conducted by doing focus group discussions, semi-structured interviews, and workshops.

The site study is at five villages from three Sub-Districts in Wakatobi District. The participant is a community delegation with various occupation backgrounds, gender, and social structure. This assessment was also attended by the Wakatobi National Park section office, local health workers, and the SIGAP program village

facilitator. Every assessment in each village is commonly attended by 32-44 community delegations. The percentage of female delegation reached 38,9% of the total 195 participants.

Table 1: number of assessment participants in five villages in Wakatobi District

No	Village	Sub-District	Number of Participants	Male	Female	Percentage
1.	Balasuna	Kaledupa	44	24	20	45,4
2.	South Balasuna	Kaledupa	43	29	14	32,5
3.	Waduri	Kaledupa	39	27	12	30,7
4.	Kollosoha	Tomia	32	17	15	46,8
5.	Dete	East Tomia	37	22	15	40,5
	Total		195	119	76	38,9

Table 2: assessment implementation time in five villages

No	Village	Sub-District	Implementation	Inter-village Workshop
1.	South Balasuna	Kaledupa	6 – 7 February 2023	12 February 2023
2.	Balasuna	Kaledupa	8 – 9 February 2023	12 February 2023
3.	Waduri	Kaledupa	10 – 11 February 2023	12 February 2023
4.	Kollosoha	Tomia	16 – 17 February 2023	18 February 2023
5	Dete	East Tomia		

C. Result and Findings

The community vulnerability level from five villages in the assessment location is at the low to intermediate level. That vulnerability level comes from looking at the exposure, sensitivity, and community adaptation capacity level in overcoming climate-change impact.

Table 3: vulnerability assessment result of each village

No.	Village/Area	Variable			Vulnerability
		Exposure	Sensitivity	Adaptation Capacity	
1.	Balasuna	High 3	Low 1,25	Intermediate 2,5	Intermediate
2.	South Balasuna	Low 1	Intermediate 1,75	Intermediate 2,5	Low
3.	Waduri	Low 1	Intermediate 1,8	Intermediate 2,5	Low
4.	Kollosoha	Intermediate 2	Intermediate 1,75	Intermediate 2,26	Intermediate
5.	Dete	Low 1	Intermediate 2,1	Intermediate 2,48	Low

The important finding from the research result is, in one stretch of Kaledupa and Tomia islands there is a different societal perception in sensing the level of exposure which is explained in Table 3. In participative assessment, there's always the possibility of different evaluations. Because each indicator as an evaluation base can be differently understood by the participants. The differentiation can also occur when deciding the last evaluation based on the collective agreement with participants. The agreement itself is influenced by communication skills or expressing an opinion and defending an argument. It must be realized that subjectivity is quite dominant over the achieved result.

Meanwhile, in sensitivity evaluation or adaptation capacity, the differences between each village are highly possible to occur. Each village can differ in magnitude/number of people who feel the impact of climate change with the capacity of responding to various changes or climate-change effects.

The assessment of participative climate vulnerability is aiming to prepare the community's action plan to overcome various problems from climate-change impact. The evaluation in measuring vulnerability level is placed as a part of identifying the society's problem according to climate. The existing indicators in each vulnerability variable are reflection media for all participants to measure exposure amount, sensitivity, or the effect of changing exposure and community's ability in responding and overcoming these changes. Those indicators can show the existing gaps that caused the value to decline.

Key findings from the vulnerability assessment in five villages at Wakatobi Regency are:

1. **Changes in weather components, patterns, and the nature of existing seasons have adversely affected people's lives:**

    - Hard to decide when is the right time to live a livelihood: farming, health, extreme weather (disaster threat), transportation, fisherman, etc. This condition happened in the community, either by fishermen, farmers, seaweed farmers, traders, or other occupations. Climate and weather pattern changes caused fishermen to have a hard time predicting when to sail. Sailing time is very limited and occasionally trapped in bad weather. The farmers feel like this change caused pests to increase, crop failure or even failure in planning due to too much water, drought, or flooding. Seaweed cultivators have a problem with high waves and rising seawater temperature which can cause damage or even crop failure.
    - Declining quality of agricultural products
      These changes also make the quality and quantity of agricultural products to decline. Increasing pests makes the farmers need more time for pest handling. In seaweed cultivating, the seaweed's quality reduces because of the factor of rising seawater temperatures and pollution of the marine environment.
    - Increasing intensity of disaster risk
      The intensity of disaster threats becomes greater. Apart from abrasion and flood, thunderstorms have the potential to be a disaster. Another potential threat that may occur is a strong wind. Tornadoes which previously only occurred at the sea, are now approaching the land.
2. **Development/assistance programs that should be able to support community resilience are not working.**

There is a stalled building site. Whereas, infrastructure has a crucial function for the community. The solar power plant at Tomia Island is one of them. The grant program from USAID through the MCI program hasn't operated yet since the project was handed over to the management.

3. **Insufficient public knowledge regarding climate change causes delays in doing a necessary adaptation.**
   Lack of socializing on the issue of climate change and its impact causes the development plan of the village government not to accommodate the important issue of building community resilience. The tendency that occurs, is that society and village government only react or take action when the climate change impact has been felt. That response is generally late due to the already severe condition. enormous resources and funds needed to handle this situation. Like the abrasion and high waves that have been felt before by society for a quite long period. However, before there is a detrimental incident to livelihood assets, this does not become a priority. Likewise, other impacts such as floods or various farmer's difficulties, or fishermen in carrying out their livelihood.

4. **Environmental damage causes an increased impact on the community.**
   The environmental damage that is caused by a non-climate factor, adds to the burden for the community in overcoming climate change impact. Such as damage to coral reefs due to the use of bombs and potassium in the past infected to the existence of fish or seaweed cultivating environment. Waduri village feels the impact on seaweed cultivation from river damage. Balasuna community feels the impact of waste pollution and the use of various chemicals used in agriculture toward seaweed cultivation. These add to rising seawater temperatures and high waves during extreme weather increasing climate-related impact felt by the community.

5. **Lack of government and village government support toward problems in the community.**
   The most problematic issue in the five villages is agriculture. The pest issue and disease haven't been resolved yet. The community seems to handle this situation alone to solve that issue. Deer pest issues become a dilemma for the farmers in Kaledupa Island, due to the deer being a protected animal. Meanwhile, the deer have become a pest and damage farmer plants. Corn caterpillar pests occur evenly in two islands. So far, caterpillar pests that can cause crop failure haven't been solved yet. Likewise, the pest on the onion is known at the local level lakadea. The healthcare issue becomes an important issue due to Kaledupa and Tomia being an island. When the weather is bad, this area is isolated. Adequate health facilities and infrastructure are needed on the three islands to ensure that the residents' health right is fulfilled. The high transportation cost to get the complete facility in the regency capital is a crucial thing to be addressed by District Government.

D. ACTION PLAN

Community action plans for overcoming climate change were considered the most burdening problem for society. Two main problems are defined by several identified problems and becomes a discussion since the first process.

No.	Village	The Most Burdensome Issues	Action Plan
1.	Balasuna	1. Agriculture Management - Difficulties to determine planting time	1) Research about nutrients and climate to see the correlation

		- Agriculture cultivating patterns are not matched with the existing season - Appropriateness of nutrients and climate with type and pattern of cultivation - Caterpillar and deer pests haven't able to solve yet - Water availability: barren land farming (rainfed)	between cultivated plants type and farming pattern 2) Organic fertilizer and pesticide training 3) Agricultural assistance; socialization 4) Pest handling: caterpillars on the corn and deer 5) Provisions supporting facilities for agriculture
		2. Coastal ecosystem management – seaweed cultivation - Increasing coastal quality due to climate change (hotter temperatures and waves) and environment: land pollution, use of poison for fishing - Seed and yield quality decline - Spreading seaweed disease	1) Research the coastal environment to define coastal condition cultivation place 2) Socialization research's results. Type of seaweed that match the existing environment and cultivation pattern 3) Socialization and public awareness about the impact of land pollution on seaweed; the use of chemicals for agriculture and waste 4) Capacity building and assistance for seaweed cultivation: - Seaweed pest handling - Socialization and training - Assistance 5) Push the regulation about waste management and chemical pollution 6) Information access to the environment condition (seawater temperatures) for seaweed cultivation.
2.	South Balasuna	1. Agriculture management: - Difficulties to determine planting time - Un-match cultivation pattern with the existing season - Appropriateness of nutrients and climate with type and pattern of cultivation - Caterpillar and deer pests haven't been able to solve yet - Water availability: barren land farming (rainfed)	1) Type of agricultural land research, suitable climate, types and patterns of agricultural cultivation in South Balasuna Village 2) Information access to the weather and climate for agricultural cultivation 3) Building commitment and agreement between parties to handle deer pest 4) pesticides and organic fertilizer training; handling the caterpillar pests in corn 5) Agricultural assistance
		2. River management:	1) Provision of feeds of perennials (fruit plants)

		- There are no large trees on the riverbanks causing erosion and sedimentation - A Large amount of waste, either organic or non-organic waste such as tree logs or plastic. This caused the coastal quality as the cultivation place for seaweed to decline	2) Heavy equipment for sedimentation dredging 3) Encouraging society's involvement in river restoration 4) Village policy to protect the river
3.	Waduri	1. Seaweed cultivation management: - The rising seawater temperatures cause the seaweed growth to stall - Spreading seaweed disease - Polluted marine environment due to the use of potassium or another type for fishing, mud from the land (contaminated with pesticides, herbicides, or another), and waste - seaweed seed thieft	1) Research the coastal environment (oceanography) to define environmental condition cultivation area, appropriateness of seed type, and seaweed cultivation pattern 2) Form a monitoring group (patrol) to ensure the safety and protection of seaweed cultivation; pollution from fish poison and theft 3) To affiliate with related parties, Wakatobi's National Park, Air Force, etc, to do the surveillance and collective patrols
		2. Waste management: - District government policy to reduce cleaning staff in the village - no recycling activities to utilize the existing garbage - Inadequate facilities to manage waste - Community awareness to throw garbage in its place - Impact on the environment and seaweed cultivation area	1) Socialization and campaign about garbage management in all circles 2) Equipping waste disposal facilities that separate organic and non-organic waste 3) Garbage recycling: the organic for the fertilizer and the non-organic for the usable products 4) Equipping recycle tools – the pilot project 5) Encouraging garbage recycling policy in the range of Kaledupa Island 6) Community service to clean up the garbage in the coastal areas
4.	Kollosoha	1. Agricultural management: - Suitability of agricultural land with the type and local climate - Difficulties to decide the planting time with agriculture cultivation pattern - Water availability for farming - Pests and agriculture disease, especially lakadea (onion) and caterpillar (corn)	1) Research on agriculture land and climate in Kallosoha Village, appropriateness with the plant type, and cultivation patterns: - Training in Matching cultivation pattern - Assistance 2) Socialization on lakadea disease for the onion;

			- Training in making pesticides, herbicides, fungicides, and organic fertilizer - Assistance and training 3) Provide a water network for agriculture
		2. Fishing management – fisheries production: - Catches of fish as non-permanent raw materials - Human resource capacity in producing dry fish and salted fish - Technology and equipment comprehension for fish drying and packaging - Price and marketing	1) Capacity building Human resource development and institution: - Drying technique, either traditionally or modern - Packaging - Business management and business plan 2) Strengthening business group: - Business plan and management facilitation (AD ART, SOP, BUMDes, etc) - Group assistance for production and marketing 3) Adequate equipment for fish drying (in the rainy season)
5.	Dete	1. Clean water availability: - Information about the existing freshwater in the village - Availability and pipeline network of clean water haven't reached the whole community yet - Rainwater utilization is not optimal - Water management technology hasn't been owned and controlled yet	1) Ensuring the availability of water discharge and the booster managed by the Tee Loe Foundation is sufficient and capable of distributing water to Dete Village 2) Coordination with Tee Loe Foundation as the manager of raw resources to repair and clean water pipeline network to the Dete area 3) Building water reservoirs from the Tee Loe Foundation to be distributed to the Dete Village 4) Obtaining the information on tools for the management of brackish/salt water into freshwater to manage the water from existing drilled wells 5) Build a pipeline network to distribute the water from existing drilled wells 6) Form a clean water manager at the village level (be able to encourage BUMDes) 7) Socialization of rainwater harvesting 8) Rainwater harvesting training

			9) Provision of rainwater harvesting tools and practices (pilot project)
		2. Agriculture management: - Suitability of agricultural land with type and local climate - Difficulties to decide the planting time - Agriculture cultivation patterns - Water availability for agriculture - Pests and agricultural diseases, especially lakadea (onion), and caterpillar (corn)	1) Observation of nutrients, climate, and conformity with the types and patterns of agriculture in Dete Village 2) Assistance or training on the treatment of onion plant disease (lakadea) 3) fertilizer, pesticides, and organic fungicides training 4) Agriculture assistance 5) Form a study group (field schools) of agriculture.
		3. Weather and climate information access: - Weather and climate information for cultivation activity - Extreme weather information for the disaster alertness	1) Weather and climate information management: weather and climate information access for agriculture 2) Disaster risks assessment and preparing disaster management plans at the village level 3) Disaster alertness: evacuation route, early warning, disaster preparedness team, etc 4) Village policy for disaster management 5) Encouraging types of boat adjustment and fishing gear to accommodate changes 6) Encouraging disaster mitigation efforts: wave breaker for coastal protection, harbors, mangroves planting, coral reef rehabilitation, etc.

E. Conclusion and Recommendation

From the assessment process and its results, it can be concluded:

1. Climate change that occurs has had an impact on the lives of people in the study area, both on Kaledupa Island and Tomia Island. Various negative impacts that have occurred to date are still able to be faced by the community through their adaptability. This ability can be seen from the level of vulnerability that is in the medium or low class. The level of vulnerability can change, especially if there is a change in terms of sensitivity or level of adaptation owned by the community. This condition must be considered and maintained by looking at the indicators on both variabal with low weight for capacity or high for sensitivity. To ensure changes in terms of exposure, further studies are needed by measuring specifically various climate components within a sufficient period of time to see changes and projections for the future.

2. Environmental damage that occurs and potential threats that already exist are variables that can increase disaster risk for the community. Handling the impacts of climate change needs synergy with environmental management and protection efforts and disaster risk management or disaster management. The threat of geological disasters that also have the potential to occur in study areas needs attention. So that a community action plan that is compiled can encourage a complementary resilience community.
3. Various developments in the village need synergy in encouraging community resilience. This condition needs to be started by building critical public awareness of the issue of climate change and its impact on their livelihoods and rights as citizens of the development process. So that the involvement that occurs is not just pseudo-participation in fulfilling the administration alone. The government and all parties also need to synergize and encourage and support various initiatives in the community related to adaptation and mitigation efforts that have been carried out. The problem of PLTS on Tomia Island needs to be facilitated so that assistance through the grant can be useful. Likewise with urgent needs with the scope of one island. Such as policy on waste management including recycling, assessment of nutrients and agricultural land, climate, and suitability to the types and patterns of cultivation that are the needs of all farmers on the two islands.
4. The action plan that has been compiled has become enough basis for the community and village to follow up. However, for the benefit of village development planning, adjustments need to be made according to the required format. Likewise, if the action plan for the needs gets support from other parties.
5. The community or village government, needs to be facilitated to formulate a more detailed action plan and encourage integration in the village government's development work plan. In planning that requires funding beyond the ability of the village government such as the construction of talud, clean water pipelines, management of salt/brackish water into fresh water, modification of boats, safer ports, sea ambulances etc. or related policies; The spatial layout for the Island area needs assistance. Various needs together can be encouraged to be communicated with the District, Provincial or National governments. Support from parties such as NGOs, academics or Indigenous Councils/organizations is also needed to strengthen these efforts.

Recommendation

From the process and studies that have been carried out, the study team recommends:

1. Village Government
    - Each village government in the study area is expected to use the study document and community action plan as a consideration in formulating the annual development work plan. If possible, this can fill in the issues in the village's medium-term development plan (RPJMDes) so the program for community resilience is accommodated in the annual village development plan. If the issue of climate change has not been accommodated in the RPJMDes, it is necessary to adjust activities in accordance with related issues.
    - Together with existing institutions at the village level; Dewan Adat, Bamuskam, BPD, BUMDes etc., coordinate with YKAN, especially with village facilitators to follow up on various needs in implementing action plans.
    - Coordinate with relevant regional apparatus organizations and district parliaments to follow up on findings and action plans that require policy and political support.

2. District and provincial government

   Facilitate and support the efforts and plans of the study area community in implementing the action plan; facilitation and support processes including bringing problems and existing planning at the provincial and national levels if planning and funding are needed that integrate many aspects

   - Consider compiling district-level climate vulnerability and risk assessments in identifying changes that occur and projections of climate change and its impacts; The climate vulnerability assessment itself will be the basis for the preparation of KLHS as a mandatory document for district and provincial governments.
   - Compile or update existing disaster risk assessment documents by considering climate change that occurs. The KRB document itself is a mandatory document for the district government in preparing the District Disaster Management Plan.

3. YKAN
   - Oversee the process of detailing and implementing action plans and study findings in the village government's annual development planning;
   - Facilitate short-term needs in ensuring sustainability after the assessment is carried out
   - Together with the village government, each communicates the study to the relevant parties; District Government, BTN Wakatobi, DPRD Wakatobi District.
   - Integrate village-level findings and action plans into existing programs;

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