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Transforming Universities
for a Changing Climate

**Unlocking and
supporting
community-led
climate actions in the
coastal communities
of Tanzania**

**Transforming Universities for
a Changing Climate**

Working Paper Series No. 20

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Climate-U

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for a Changing Climate

Unlocking and supporting community-led climate actions in the coastal communities of Tanzania

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Abstract

The participatory action research (PAR) project involved university researchers, students and members of coastal communities of Somanga and Songosongo, Tanzania. The PAR members endeavored to establish spaces for knowledge-based and action-based learning about climate change and the promotion of climate justice and for co-designing and implementing culturally sensitive climate actions. The team examined the negative effects of climate change on the coastal and marine ecosystem and on people's livelihood opportunities, and established that coral reefs and mangroves were under great threat as a result of natural and human factors. Accordingly, the PAR members resolved to (i) transplant corals to support reef restoration, (ii) plant and care for mangroves for regeneration of coastal land, and (iii) conduct a climate change awareness campaign targeting primary school pupils. Getting their inspiration from their indigenous values system and utilizing their local climate change knowledge and the innovative ideas of community members, the PAR members successfully transplanted 6918 corals, planted 17,735 mangroves, and inspired pupils to plant and care for 60 trees. Other indicative outcomes and impacts of the PAR are increase in knowledge and skills in climate actions of community members; and enhanced awareness of climate justice and sense of agency in university researchers and students.

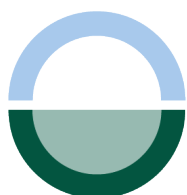


Table of contents

Abstract	3	5.3 Engaging communities and policy actors in climate change issues	18
1. Introduction	5		
2. Background to the PAR project	5		
3. The PAR project	6	6. Concluding Remarks	16
3.1 The PAR team	6	References	20
3.2 The PAR process	6		
3.3 Climate Justice Aims of the PAR project	8		
3.4 Challenging and enabling PAR environments	9		
3.4.1 Commitment and reliability of PAR members and partners	9		
3.4.2 Resistance, blockages and limited support of powerful gatekeepers	10		
3.4.3 Security and safety at the field sites	10		
3.4.4 Limited financial resources and unsustainability of climate action	10		
3.5 Planned and Implemented PAR activities	11		
3.5.1 Activities of the Coral Team	11		
3.5.2 Activities of the Mangroves Team	13		
3.5.3 Activities of the Campaign Team	14		
4. The PAR project and Epistemic Justice	15		
5. The PAR project and University Capabilities	16		
5.1 Learning about and teaching climate change	16		
5.2 Researching and disseminating climate change knowledge	17		



1. Introduction

Climate change is largely an anthropogenic phenomenon with irreversible negative consequences on the natural and human systems (IPCC 2013). It is “not a single problem but a cluster of challenges” that must be “managed by people acting individually and collectively” to prevent more possible climate crises from occurring (Jamieson 2014: 8). As such, the anthropogenic climate change is posed to bring about massive extinctions of plants and animals, rising of sea levels, droughts, heat waves, and storms in the world and negative impacts on human welfare, social and political relationships, human and national security. The world is already experiencing climate impacts in the form of social, economic and environmental crises and vulnerabilities (IPCC 2014). In fact, multiple climate-related challenges are deeply embedding socio-economic and political institutions and influencing actions and behaviours of their members (Meadowcroft 2009, Shaw et al., 2014).

Redressing climate challenges requires, *inter alia*, understanding and unlocking opportunities for climate action in the respective organizations and communities. This is an important role that universities and their researchers can play to make significant strides in dealing with the climate crisis. Noting these potential roles and contributions of universities, the Transforming Universities for a Changing Climate (Climate-U) project was conceived and implemented to examine actual roles and contributions of universities in addressing the climate crisis in low and middle-income countries. In Tanzania, the Climate-U project was designed and executed in the form of a participatory action research (PAR) project involving university researchers, students and members of coastal communities. These PAR members examined social, political and economic roots of the climate crisis and the available opportunities for individual and collective climate action.

We present the background to the PAR project and describe the state of climate crisis in the coastal communities of Somanga and Songosongo in Kilwa District which caught our attention under Section 2. We describe the process of designing and executing the PAR in Section 3 and the unlocked opportunities for climate action under Sections 4 and 5. We end the report in Section 6 with our concluding remarks.

2. Background to the PAR project

Coastal communities along the Indian Ocean in Tanzania have been experiencing rising sea surface temperatures, rising sea levels, severe coastal floods, damaging windstorms and cyclones, and the salinisation of water sources. These climate change effects have negatively affected coastal areas, people’s coastal and oceanic livelihood opportunities, and coral reefs and mangroves, which are habitats and breeding-grounds, shelters and primary sources of food for aquatic biodiversity. Noting these climate change impacts, between 2020 and 2022, we conducted research

in the coastal communities of Somanga and Songosongo in Kilwa District to gather evidence of climate change awareness and action.

Somanga village is situated along the shore of the Indian Ocean, south of Rufiji Delta and next to the main road from Dar es Salaam to Lindi and Mtwara. It lies between latitude 8° 22’ 53” S and longitude 39° 16’ 52” E. Songosongo village is on the main island of the archipelago of Songosongo islets in the Indian Ocean. It is situated between latitude 8° 31’ 11” S and longitude 39° 30’ 21” E.

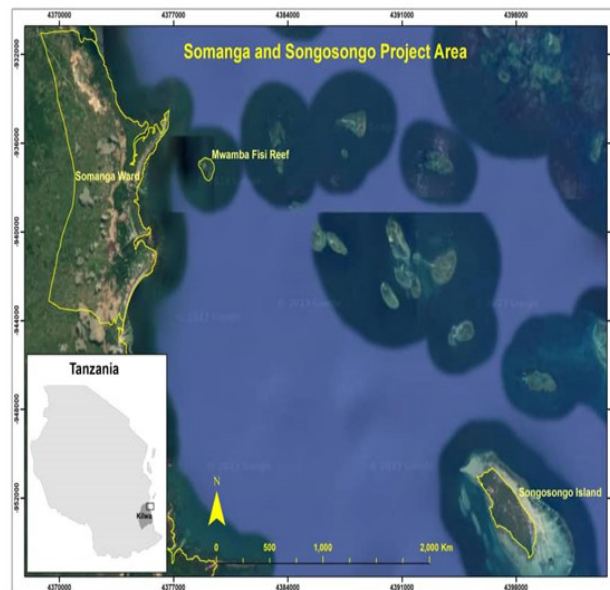


Figure 1. Map showing the PAR Sites of Somanga and Songosongo Villages

Fishing is the main economic activity in Somanga. Men (80%) and women (50%) depend on fishing for their livelihoods, and only a few villagers depend on small-scale farming (men 14%; women 30%) and small businesses (men 5%; women 10%). Small-scale farmers engage in maize, millet and cassava farming and livestock keeping. The Lindi-Mtwara road places the village at a business advantage (Lazier, Harrison, Samoily, & Maina, 2013).

As Songosongo Island is all-coral rag in nature with sandy soils, farming is almost impossible, except in areas that support coconut farming. This makes fishing the main activity for men (90%) and women (65%). Some villagers engage in seaweed farming, livestock keeping and small businesses. Seaweed farming is mainly practised by women (30%) (Lazier et al., 2013).

Both Somanga and Songosongo villages have experienced the impacts of climate change. Somanga village has experienced the effects of climate-related phenomena since the mid-1950s (Lazier et al., 2013). In 1952, the village recorded a severe famine, which led to community members feeding on insects and fruits. The village experienced cholera epidemics in 1979, 1995 and 2003. Famine associated with floods was reported in 1995, and famine associated with drought was reported in 1977. Torrential rain causes road and bridge damage every year (Lazier et al., 2013).

Songosongo village has been recording unpredictable rains, and its cold seasons are becoming less cool. In 2013, the village experienced unpredictable and below average rainfall that resulted in a low crop yield. Beach erosion has intensified due to very strong Southeast monsoon wind. Ocean water increasingly intrudes natural wells, leading to a drinking water crisis. The village records hot temperatures that affect the growth of seaweed, causing them to change from their natural colour to yellow and then white, and the strong sunshine causes coral bleaching (Lazier et al., 2013).

Given the past dreadful climate change events they have experienced and their daily struggles to mitigate or adapt to these climatic-related challenges, coastal people have formed some knowledge about the nature, causes, and impacts of climate change and mitigation or adaptation measures. During the 2020-2022 research in Somanga and Songosongo, we remarked on the coastal people's huge interest in redressing climate crisis. In particular, we were impressed by the established community groups and their initiatives to mobilize resources for managing climate change. These voluntary community-based organizations (CBOs) were (i) *Shirika la Hifadhi ya Mazingira na Watu Wenye Mahitaji Maalum* (SHIMAWWA), (ii) *Kikundi cha Utunzaji wa Mazingira na Matumbawe* (KIUMAMA), and (iii) Somanga Environment Group (SEG).

SHIMAWWA was officially registered in 2020 to engage in environment protection and conservation on Songosongo Island. Its members are nine men and seven women. KIUMAMA and SEG are based at Somanga village. KIUMAMA has seven male and 13 female members. KIUMAMA was officially registered in 2021 to engage in conservation of the coastal and marine environment, focusing in particular on the protection and rehabilitation of coral reefs. SEG was officially registered in 2021 to engage in mangroves conservation and protection. SEG has 10 men and nine women as members.

Members of these CBOs were determined to use own resources and local knowledge to conserve their coastal and marine environment and manage climatic-related phenomena. We were deeply touched by initiatives of these CBOs and pleaded to support them to realize their visions. Three months after the conclusion of our field research in the coastal communities, an opportunity to implement PAR project came.

3. The PAR Project

3.1 The PAR team

We needed various knowledge and skills to successfully design and implement the PAR project. We looked for and identified such knowledge and skills in university researchers and students who participated in the Cultures and Ethics for Sustainability (CESU) and the Monitoring, Evaluation and Learning in Africa (MELA) research groups of the Centre for Social and Political Research (CSPR) and the Department of Educational Psychology and

Curriculum Studies at the Dar es Salaam University College of Education (DUCE). CESU members have expertise and experience in exploring the cultural roots of sustainability crises and ethics for inspiring human actions towards sustainability. MELA members have expertise in indigenous methodologies and evaluation practices.

We also recruited members of the three CBOs following the recommendation of lead investigators, who had conducted field research in these coastal villages and had knowledge about their work. The three CBOs were (i) *Shirika la Hifadhi ya Mazingira na Watu Wenye Mahitaji Maalum* (SHIMAWWA), (ii) *Kikundi cha Utunzaji wa Mazingira na Matumbawe* (KIUMAMA), and (iii) Somanga Environment Group (SEG). They received and accepted the invitation to join the PAR initiative. All PAR members signed the informed consent form and granted permission to use their voices and images when reporting PAR results.

3.2 The PAR process

The first PAR meeting was held at Somanga village on 6 May 2022 and attended by DUCE researchers, members of KIUMAMA, SEG and SHIMAWWA, political leaders and village executive officers. Ms Fatuma Mikidadi, Chairperson of the North Somanga Village, chaired the meeting, which lasted for three hours. DUCE researchers used the meeting opportunity to introduce the project to the community members; to implore for the support of political leaders and government officers in the village government authorities; and to confirm the interest and commitment of the CBOs partners in the PAR.

Dr Mazigo said the following when introducing the project at the meeting:

"In November 2021, you made yourself available to respond to our survey questions on how you understand and deal with the phenomenon of climate change in your localities. Dr Mwita and I were very much touched by your vulnerability to climate change, on the one hand, and your concerted efforts to organise and use your own resources to manage climate-related challenges. Besides, we remember very well how you challenged us to help you deal with the climate crisis instead of just collecting data and leave! We took this challenge seriously, searched for and secured a small grant to undertake action research, and now we are here to start the journey of working with you to find solutions to some forms of climate crisis you experience. Let me know if you are interested in and ready for this journey."

Dr Mwita also elaborated on the nature of the participatory action research and implored the political leaders and government officers for their support:

"I am not fond of conducting research that does not address the challenges facing the community. That is why I am very happy to participate in this action research. I wish to tell you that this research is different from the last



one because this one provides spaces to learn together, and find and implement solutions together. Therefore, all participants will be searchers of solutions to flooding, coral bleaching, environmental destruction, and declining fisheries resources. Let us get ready to find solutions to the climate and environmental problems facing us. It is our hope that our political leaders and village executive officers will support this initiative and ensure that it bears many good fruits."



Figure 2. Participants of the first PAR meeting held at Somanga on 6 May 2022

Mr Said Chande expressed appreciation for the DUCE researchers and pleaded for the commitment of members of KIUMAMA to the PAR: .

"I thank you very much for coming back to help us solve our problems. Let you know that, before you, we received many researchers and supported them to conduct their research, but they have never come back to share their research findings. You are very unique! You have come not only to share feedback, but also to collaborate with us to find solutions. As the secretary of KIUMAMA, I confirm that we are very much committed and ready to work with you. We are in this journey together."

Speaking on behalf of SEG, Mr Ally Winda also expressed appreciation for the DUCE researchers by highlighting their generosity shown in inviting representatives of SEG to DUCE to enter into dialogue and to celebrate the International Year for Artisanal Fisheries and Aquaculture (IYAFA) 2022¹, which was held from 12 to 14 April 2022. He stated enthusiastically:

"We are already partners because you care about us. You supported our participation in the IYAFA celebrations and

now you are here to work with us. You are very generous and we cannot say no to the opportunities you are creating for us. I confirm that our group is also committed and will work hard to accomplish all tasks that you assign us. We further state that we will not let you down."

The chairperson of SHIMAWWA, Mr Said Abdi, added his voice to the many praises and promises of unwavering commitment to the PAR:

"We, members of SHIMAWWA and of Songosongo village, do not hesitate to collaborate with Dr Mazigo's team because we have known from their past research project in our village that they are serious and caring researchers who work very hard to solve societal problems. We therefore promise to work hard and achieve the project goals. ... I also know that members of KIUMAMA and SEG are committed to and take this project very seriously. We are forming a winning team to face the climate crisis. We are more than ready to start the journey and win big!"

When delivering her closing remarks, Ms Fatuma Mikidadi, the chairperson of North Somanga Village, offered words of support to the project and the PAR team:

*"Let me assure you that both North and South Somanga villagers are peaceful people and focused on development. I also confirm to you that we, members of the village government, support the said project very much and will extend every support for its smooth implementation. Keep us informed of the implementation progress, of any challenge you encounter, and of any help that you may need. Me, the village executive officers here present, and my counterpart, the chairperson of South Somanga village, welcome you and will cooperate until the end of the project. KAZI IENDELEE!"*²

Having confirmed their interest in the PAR project, Dr Mazigo instructed members of each participating CBO to meet, discuss and deliberate on the interventions they wanted, and to prepare action plans and budgets, which would be presented, debated and approved at the second PAR planning meeting.

The second PAR planning meeting was held on 07 May 2022 and attended by DUCE researchers, chairpersons, secretaries, and treasurers of KIUMAMA, SEG and SHIMAWWA. Each CBO presented its preferred intervention, plan of action and budget. Members also discussed and resolved to implement three major activities. These activities were (i) restoration of corals, (ii) restoration of mangroves, and (iii) conducting climate change

1 The United Nations General Assembly declared 2022 the International Year of Artisanal Fisheries and Aquaculture (IYAFA 2022) to recognize the significant contribution of small-scale artisanal fisheries and aquaculture to food systems, livelihoods, culture and the environment. DUCE's Centre for Social and Political Research (CSPR) in collaboration with the Ministry of Livestock and Fisheries Development (MLFD), Food and Agriculture Organization of the United Nations in Tanzania (FAO TZ), and the IYAFA 2022 National Steering Committee, organized the 2022 IYAFA event from 12th to 14th April 2022 at DUCE Campus. The event comprised five key note speeches, eight science-policy-practice dialogues, exhibition of fishery products, fish consumption campaign and spaces for participating 320 representatives of small-scale fishers, state and non-state organizations to dialogue and deliberate on strategic approaches to solving challenges facing the small-scale fisheries sector and creating opportunities for actors in it to create wealth.

2 KAZI IENDELEE means Let the work continue! It is a famous slogan of HE Samia Suluhu Hassan, President of the United Republic of Tanzania.

awareness campaigns among the children and youth. Small teams were formed and charged with the effective implementation of these activities. These were the Coral team, the Mangrove team, and the Climate Change Awareness Campaign team. Each team was allocated TZS 5,000,000 (about USD 2,250) to implement its plan of action.

3.3 Climate Justice Aims of the PAR Project

We had envisioned the PAR project that would offer participants good opportunities for knowledge-based and action-based learning about climate change challenges and the promotion of climate justice. We wanted the PAR that would support the co-designing and implementation of culturally rooted or culturally sensitive climate actions. We emphasised these two forms of climate action because we were mindful of the potential of human cultures to constrain or steer transformations to sustainability. Clammer (2016), Gardner (2010), and Holthaus (2008) have very powerfully highlighted the role of cultures in providing their members with paradigms and approaches to structure their relationships with other kinds of systems and beings on planet Earth, and the values to inspire sustainable or unsustainable actions. These authors maintain that various forms of the sustainability crisis experienced today have their roots in people's cultures and that their redress requires culturally sensitive solutions. Therefore, we determined to strive for climate actions that PAR members from the coastal communities considered appropriate and effective.

In addition, as university researchers, we sought to learn from partner CBO members about their (i) culturally rooted knowledge and skills for managing climate change, (ii) frameworks and values that shape and inspire their climate action, and (iii) approaches and strategies to climate change communication to inspire others to take action. Accordingly, we aimed to document (a) indigenous knowledge about climate change and techniques for mitigating and adapting to the impacts of climate change possessed by members of the CBOs, (b) processes that members of the CBOs followed to organise themselves and mobilise support to deal with climate-related phenomena in their villages, and (c) sources of inspiration and the hopes of members of these CBOs. In doing so, we aimed to generate content for our envisioned climate action outreach programme in the coastal communities of Tanzania.

In the context of the PAR project, we interpreted climate justice as requiring us to involve in climate action the affected people by taking seriously their plight, views and forms of knowing and dealing with climate change impacts. As highlighted earlier, we had committed to work with the people in coastal communities to co-design and implement culturally sensitive interventions to deal with the threats and impacts of climate change on their localities. In line with this commitment, we envisioned a PAR that would make use of and do justice to local knowledge and innovations, and that would promote climate justice for the people of Somanga and Songosongo communities. Thus, throughout our PAR planning, monitoring and evaluation meetings, we spent lots of time pondering the following questions, and proceeded with

the design or execution of any proposed intervention only when we were satisfied with the positive responses.

- i. Are we designing or executing an intervention that would give rise to positive effects on the communities and people?
- ii. Is the intervention that we design or execute based on the coastal people's shared experiences and evidence of the phenomenon of climate change and its impacts?
- iii. Is the intervention that we design or execute informed by the coastal people's knowledge of and skills for dealing with the phenomenon of climate change and its impacts?
- iv. Are we considering or doing enough to enhance coastal people's capabilities to carry on with the intervention beyond the life of the project?

From Question (i) challenged us to envision, design and execute interventions that coastal people would consider appropriate and relevant. During our planning meetings, we debated on and approved PAR activities with the potential for bringing about positive effects on the coastal communities. In this regard, for instance, we chose and implemented mangrove restoration activities because our PAR partners (SEG members) considered this important for the livelihood of the Somanga villagers. SEG members established that mangroves provide coastal people with house-building materials and firewood, and that they protect fish-breeding grounds against strong waves, windstorms and soil erosion. They also established that the disappearance of mangroves aggravates the effect of floods, strong winds, the rise in sea levels, soil erosion and the destruction of fish breeding-grounds. Accordingly, we became convinced that mangrove restoration was connected with the livelihood practices of the coastal people.

We also chose and implemented reef-building and corals restoration activities because our partners (KIUMAMA members) convinced us that coral reefs are important for the marine ecosystem and livelihood practices of the coastal people. They argued that fish cannot be found, cannot live, cannot stay and cannot feed on the dead or damaged coral reefs and that, with the successful rehabilitation of coral reefs, fish will continue living, feeding and breeding. Therefore, we understood that successful reef-building and coral planting would eventually solve the problem of the declining fisheries resources experienced and affecting fishing activities.

In addition, we chose and approved a climate change awareness campaign targeting children and youth because it was considered appropriate and relevant for Songosongo Island. SHIMAWWA members presented evidence of increasing coastal erosion and environmental degradation on the island and argued that only appropriate actions of the climate-literate people would save the island from future climatic and environmental challenges. Thus, we supported their use of local knowledge and evidence of the effects of climate change from their locality to educate and inspire climate actions in the youth of the island.



Questions (ii) and (iii) challenged us to design and execute interventions based on coastal people's experience of the impacts of climatic change and draw on their local knowledge and skills to manage climate change and environmental degradation. Our CBO partners were provided with enough time to gather evidence of the impacts of climate change on aspects they wanted to work on and gave them opportunities to share insights about their intervention approaches.

In this regard, for instance, the SEG produced evidence of mangrove destruction and the associated effects on the livelihood practices of the Somanga people. In addition, the SEG shared its vast knowledge of different types of mangroves, ways of planting and caring for them, and conditions for their flourishing when planted. It was on the basis of evidence of destructed mangroves and demonstrated level of expertise in managing mangroves that convinced the PAR team to approve mangrove-restoration activities.

On the other hand, KIUMAMA produced evidence of dead corals or destroyed coral reefs, shared their vast knowledge on how ocean warming contributed to the death of corals, their understanding of different types of corals and the conditions they needed to thrive, as well as their knowledge of and skills for reef-building and coral planting. Based on this evidence and demonstrated capacities, the PAR team decided to invest in reef-building and corals restoration activities at Mwamba Fisi.

Likewise, the members of SHIMAWWA collected and produced evidence of their villages being affected by coastal erosion, drought and environmental degradation, and demonstrated knowledge of and skills for campaigning for climate action and environmental conservation. The PAR team considered the evidence presented, knowledge demonstrated and the campaigning skills to approve the climate change awareness activities on Songosongo Island. Question (iv) challenged us to consider the capabilities of coastal people to carry on with the activities beyond the life of the project. The PAR activities utilised and relied mostly on the knowledge and skills of KIUMAMA members in the restoration of corals, of SEG members in the restoration of mangroves, and of SHIMAWWA members in climate change awareness campaigns. In doing so, it was guaranteed that these partners would continue with their chosen and valued intervention activities.

3.4 Challenging and Enabling PAR environments

As in any other project, the implementation of the PAR initiative was destined to face numerous challenges. In this section we present what we perceived to be the main risks and the actual challenges we experienced during the implementation of the PAR activities, and highlight the strategies we employed to mitigate possible and actual challenges.

3.4.1 Commitment and reliability of PAR members and partners

We imagined situations in which some PAR members and partners might lose interest in the project and have low commitment to implementing project activities or turn into unreliable partners. Considering our experience in previous research projects, we knew that this situation was possible. In fact, literature has established that decisions to enter into research collaborations are influenced by (i) the perceived benefits of the collaboration, the perceived costs of the collaboration (Lubell, Schneider, Scholz, and Mete, 2002; Lubell, 2007), the perceived severity of the problem being addressed (Johnson, Scicchitano, and Willing, 2009), and participant trust in the organizing institution (Leahy and Anderson, 2008; Smith, Leahy, Anderson, and Davenport, 2012). Being aware of all these possible situations, the PI and Co-PI invited to the PAR team DUCE researchers they believed were interested in participatory action research, community engagement, and climate change, and/or who had expertise in or wanted to enhance their capabilities in these areas.

During the implementation stage, we held several meetings to openly discuss and distribute roles, set targets, and implore the commitment of each PAR member and partner. All members and partners understood and accepted their roles and committed to implementing the assigned PAR activities. We also established a WhatsApp group for the PAR members and partners to regularly report on progress, challenges, and experiences, and to collectively find solutions to the reported challenges. Short videos and pictures of implemented activities were shared regularly in our WhatsApp group and inspired others and kept up the enthusiasm for PAR activities. On the positive impact of shared videos and pictures, a leader of one of the small PAR team noted:

When team [...] was sharing their videos and photos of their good work, my team felt very challenged and somehow inferior. By then we were lagging behind in implementing the project activities. We held a meeting, challenged ourselves and determined to do better. This raised our enthusiasm. We worked hard and when we shared the photos and videos of our work, other people were excited and congratulated us. In the end, we have also delivered a lot.

In addition, the leaders of the small PAR teams closely monitored the progress of their work and shared their reports during meetings of the main PAR team. Respectful and open discussion, and acceptance and honest implementation of deliberations reached in the small or main PAR meetings enabled the prevention of potential misunderstanding and ensured high levels of commitment and enthusiasm among PAR members and partners. By the time we concluded the project, the PAR team was still intact and interest in the project activities was still high.

3.4.2 Resistance, blockages and limited support of powerful gatekeepers

We also thought about the power, roles and influence of political leaders, executive officers and public servants and the possibility of them resisting, blocking or not supporting the implementation of PAR initiatives in their jurisdictions. We openly discussed these possible situations with our PAR partners in our initial planning meetings, and strategized on navigating and overcoming them. We identified all powerful gatekeepers and devised a relationship and communication strategy to engage with them effectively. We agreed to openly inform them of the purpose of the PAR initiative, request their support, invite them to relevant PAR events, and to update them regularly on progress with and challenges facing the PAR initiatives.

Thus, before embarking in the implementation stage, we personally met with and submitted letters of introduction and research permits from the University of Dar es Salaam (UDSM) to the Kilwa District Executive Director, the ward executive officers and the village executive officers in the Songosongo and Somanga communities. We also met fisheries officers, environment officers, political leaders and beach management unit leaders. During our meeting with these officers and political leaders, we took the liberty to inform them about the purpose of the PAR initiatives, the people involved and the activities to be implemented, and responded respectfully to their questions and concerns. Fortunately, all these officers and leaders found our PAR initiatives relevant and pledged support.

Every time we went to the field sites, we let these officers and leaders know of our presence in their jurisdiction. We also invited some of these officers and leaders to the field sites and other PAR events for them to see and hear about what we were doing or had achieved. The more these officers and leaders saw or heard about the good work of the PAR team, the more they increased their interest in and support of the PAR activities.

By the time the project was concluded, we had not experienced any resistance or blockages from these powerful government officers and political leaders. Instead, they valued the PAR activities and offered our PAR partners lots of support, including granting permission to KIUMAMA to conserve the coral reef known as Mwambafisi, SEG to conserve 10 hectares of destroyed mangroves at Somanga Bay, and to 20 pupils under SHIMAWWA to plant trees and care for them at areas surrounding Songosongo Health Centre.

3.4.3 Security and safety at field sites

Since some PAR partners resided on the island or implemented their PAR activities in or around the ocean, we considered security and safety issues when travelling and working in the sea for people with no experience with the challenges posed by the ocean. We openly discussed these challenges and devised mechanisms to prevent possible risks and threats. We ensured that the boats met the required security and safety standards, and that colleagues wore life jackets all the time.

The assistant researcher reported the fear he had and attempts to contain it:

I am from the mainland and unused to working in or travelling on the sea. So, I felt very insecure when I was selected to work with the corals restoration team because I had to travel in a motorboat a few kilometres into the ocean and stay there for two or three hours planting corals. My fears increased when we used a small motorboat. However, I was inspired by the confidence that others in the boat had and believed that we would be safe. Their confidence and easiness was clear when working at Mwamba Fisi. They dived into the ocean to look for pieces of corals, collected and attached them on to small bricks and then planted them. Having experienced this, I said to myself, if these people have remained safe, I will also be safe. My fears vanished on that very day!

We were also concerned with the potential hostility to researchers and foreigners that had previously been recorded in the Songosongo and Somanga communities. It has been recorded that some researchers were once beaten and/or driven out of these communities because some community members claimed that they were generating evidence for a plan to sell their ocean and bar the community from using it. The PI expressed this worry as follows:

My main concern was the security and safety of researchers and foreign partners. Aware of past incidents of researchers being driven out, along with a foreign expatriate, after rumours indicated he was going to 'buy' the ocean. I therefore urged our CBO partners to properly communicate the purpose of our work in the sea in their communities to avoid misunderstanding and associated hostilities. Our CBO partners did what was necessary and nothing bad happened to us.

We were also fortunate that leaders of our CBO Partners commanded respect from ordinary citizens, government officers and political leaders. In turn, such respect was extended to the researchers and to the whole PAR team. By the end of the project, no incidences of mistreatment, harassment or abuse of PAR members and partners had been recorded.

3.4.3 Limited financial resources and unsustainability of climate action

The PAR initiative had to last for one year and did not have a lot of funds. However, we noted that our CBO partners were ambitious in their plans. We thought we could run the risk of engaging in unmanageable interventions and unsustainable climate action by the time the project ended. We openly and honestly discussed the amount of funds available for the interventions, requested that the design and implementation of each intervention be mindful of the budget ceiling of five million shillings, and approved only plans for activities that members were capable of carrying on with





Figure 3. Attaching and cementing pieces of corals into the three holes of the small bricks. Each small brick has three holes which serve as holders of the attached pieces of corals.

after the end of the project. Consequently, we agreed that (i) reef-building and corals restoration activities would cover Mwamba Fisi only, (ii) mangrove restoration would cover a four-hectare piece of coastal land, and (iii) climate change awareness campaigns would cover 20 pupils at the Songosongo primary school.

3.5 Planned and implemented PAR Activities

3.5.1 Activities of the Coral Team

KIUMAMA members assessed the state of coral reefs in their area and determined that Mwamba Fisi had many colonies of damaged corals. Destructive blast fishing practices and impacts of climate change were the main contributors to the death and decline of corals. URT (2022) reports that between 2000 and 2020, irresponsible fishers employed illegal blast fishing techniques whose explosion caused irreversible damages to the coral reefs, ecosystem and environment. In fact, blast fishing contributed to the destruction of more than 30 coral reefs in the unprotected areas of Kilwa and Kibiti Districts (URT, 2022). Besides, marine waters in these districts experienced high levels of sea surface temperature (i.e. above 27°C) in 1998, 2005, 2016 and 2020, which contributed to the bleaching and death of corals (URT, 2022). Degradation of coral reefs due to blast fishing and climate change resulted into massive losses of biodiversity, weakened resilience and loss of habitat, which in turn led to the decline of fisheries resources. In turn, destruction of corals and degradation of coral reefs amount to destruction of the livelihood opportunities of coastal people.

KIUMAMA members claimed that solutions to declining corals lied in concerted efforts to ending blast fishing and in reef-building and corals restoration initiatives. Therefore, they chose to start with the rehabilitation of the coral reef known as Mwamba Fisi, which covers an area of 1 km² and situated about 5 km offshore of Somanga Village Bay. They requested for permission from the village government authority to conserve Mwamba Fisi and plant

corals, and permission was granted.

In addition, they identified and recruited Mr Hamis Basha, a knowledgeable coral restoration trainer, to educate them about reef-building and coral restoration using a rare technology he had invented. The technology involves the use of small bricks to which three pieces of coral reef are attached in small holes that are made in each small brick and cemented to keep them upright, after which the small bricks with corals are placed in an area of the ocean where coral reef damage has taken place. Mr Basha, the trainer and inventor of the coral restoration technology used by the Coral team, had the following to say when he shared his experience during a question-and-answer session with journalists in Somanga Village on 17 December 2022:

"I attended a training workshop on coral restoration in Kunduchi, Dar es Salaam, back in 1994. As part of the training, we would go to the Indian Ocean, dive to colonies of coral reefs, take photos with submersible cameras and record their types and characteristics. I recorded about different types of corals at the time. I also know that cement hardens in ocean water after 10 minutes, and that is why we use it to attach corals placed in small holes in the small bricks. I kept all that I learned to myself until 2022, when I met Mr Saidi Chande, whom I had known about for some time. He invited me to Somanga Village in Kilwa District to train some men and women who were interested in reef-building and the restoration of corals, and I accepted the invitation. After they sent me some money for bus fare, I travelled all the way from Mtwara to Somanga Village, where I was warmly received by Mr Mohamed Chande. We planned and implemented training sessions that ended in success. All those who received training know how to rehabilitate coral reefs where damage has taken place."



Figure 4. Planted corals on the seabed.



Figure 5. Handing the bricks with corals to divers who put them in the seabed.



Figure 6. Divers placing the small bricks with coral on the seabed.

Date	Planted Corals	Status
12/05/2022	813 corals	Average growth 28 cm
13/05/2022	600 corals	Average growth 28 cm
18/07/2022	600 corals	Average growth 22 cm
25/09/2022	600 corals	Average growth 18 cm
11/12/2022	720 corals	Average growth 12 cm
18/12/2022	720 corals	Average growth 12 cm
07/01/2023	900 corals	Average growth 8 cm
08/01/2023	900 corals	Average growth 8 cm
14/01/2023	1,065 corals	Average growth 8 cm

Table 1. Status of planted corals as of 18 March 2023
Source: PAR project monitoring data, May 2022 to April 2023

Records collected on 18 March 2023 at Mwamba Fisi and presented under Table 1 above show that the planted corals had grown and increased in size. One piece of coral planted on 12 May 2022 had grown by 28 cm long, while another piece planted on 25 September 2022 had grown by 18 cm, and one planted on 14 January 2023 had grown by 8 cm. This is good news for PAR members and shows that their coral restoration intervention is not in vain.



3.5.2 Activities of the Mangroves Team

SEG members established the shocking loss of mangroves in their areas. The major cause of mangrove degradation includes overexploitation for poles and timber; conversion of mangrove forest into agricultural land; conversion of mangrove forest into salt production and climate change (URT, 2022). Irresponsible people illegally harvested mangroves for domestic uses such as house construction, making furniture, boat building and firewood and that for subsistence or for selling to obtain some income (URT, 2022). The most recorded loss of mangroves was in Rufiji delta where the coverage of mangroves declined from 51,941 hectares in 1991 to 45,519 hectares in 2015 (URT, 2022). The observed impacts of mangroves degradation are decline in prawn fishery due to prawns' overdependence on mangrove vegetation as their nursery ground, and increased coastal erosion which lead to loss of property, land and infrastructure (URT, 2022).

SEG members believed that the solution to this situation lied in the restoration of the deforested mangrove areas. Thus, they requested for permission from the village government authority to conserve a four-hectare piece of coastal land with the most destroyed mangroves, and permission was granted. They embarked on the mangrove restoration while also raising awareness on the importance of conserving mangroves. Following their successful awareness campaign on conserving mangroves in their village, a new group, Kikundi cha Mwani na Mikoko (KIMWAMI), was formed in December 2022 and was supported to plant and conserve a six-hectare piece of coastal land at Somanga bay. Thus, between February and April 2023, SEG members collaborated with KIMWAMI members to plant mangroves in the newly secured six hectares of coastal land.



Figure 7. Planting mangroves in a 4 hectare area in Somanga Bay.

By 30 April 2023, the Mikoko team had planted and cared for 17,735 mangroves in a 10-hectares of coastal land in Somanga bay. Table 2 covers activities accomplished by the Mangroves team whereas Photos 6 and 7 show mangroves planting activities and status of the planted mangroves as of 18 March 2023.

Date	Activities	Status
15/06/2022	Planting 2,000 mangroves	4 ha of coastal land in Somanga Bay
01/08/2022	Planting 1,500 mangroves	4 ha of coastal land in Somanga Bay
07/10/2022	Planting 1,200 mangroves	4 ha of coastal land in Somanga Bay
10/12/2022	Planting 1,500 mangroves	4 ha of coastal land in Somanga Bay
01/02/2023	Planting 2,000 mangroves	4 ha of coastal land in Somanga Bay
02/02/2023	Planting 1,250 mangroves	6 ha of coastal land in Somanga Bay
10/02/2023	Planting 1,250 mangroves	6 ha of coastal land in Somanga Bay
24/02/2023	Planting 1,435 mangroves	6 ha of coastal land in Somanga Bay
28/02/2023	Planting 2,100 mangroves	6 ha of coastal land in Somanga Bay
03/03/2023	Planting 2,000 mangroves	6 ha of coastal land in Somanga Bay
21/03/2023	Planting 1,500 mangroves	6 ha of coastal land in Somanga Bay

Table 2. Activities implemented by the Mangroves team between May 2022 and April 2023.

Source: PAR project monitoring data, May 2022 to April 2023.



Figure 8. Planted mangroves in fenced 4 hectare coastal land in Somanga Bay.

3.5.3 Activities of the Campaign Team

Believing strongly in the potential of climate-literate people to engage in actions which prevent climatic and environmental challenges, the Campaign team determined to educate and inspire climate actions in the children and youth of Songosongo Island. Thus, they designed and implemented the climate change awareness campaign targeting pupils at Songosongo primary school. The main components of the campaign were (i) four workshops to learn about climate-related challenges and deliberate on appropriate climate action in the locality, and (ii) implementation of selected climate action in the village. The team implemented the activities as shown in Table 3.

Date	Activities	Status
June to July 2022	Documenting evidence of climate change impacts on Songosongo Island to be used in the workshops	20 photos and 10 short videos showing village areas affected by climate change
August 2022	Identifying and recruiting consenting pupils	20 pupils who are members of an environment club at Songosongo primary school
September 2022	Establishing objectives, contents, delivery and outcomes of the four workshops	Four workshops with clear and agreed-on objectives, contents, delivery, and outcomes
September 2022	Introducing the project and requesting support of political leaders, government officers, parents, religious leaders, businesspersons, and investors	Stakeholders requested moral and material support
October to December 2022	Developing workshop materials and activities	Materials and activities for each of the four workshops
January to April 2023	Facilitating workshops and in-field activities	Lesson delivery and in-field reports
April to June 2023	Pupils planting and caring for trees around the health centre	60 planted trees

Table 3. Activities implemented by the Campaign team between May 2022 and April 2024

Source: PAR project monitoring data, May 2022 to April 2023.

The first workshop focused on experiences of climate change on Songosongo Island. Facilitators used short videos and photos taken in the localities to show negative impacts of changing climatic conditions on livelihood practices and life on Songosongo Island, consequences of their past inactions and omissions and required actions to prevent negative effects. They shared stories of past rising sea levels which destroyed buildings near the sea shore, very high sea temperature which affected growth of corals and seaweed, and drought which led to water crisis, and facilitated pupils to reflect on actions which would prevent the climate crisis and negative impacts.

The second workshop focused on climate change and coastal erosion. Facilitators helped pupils learn how changing climatic conditions contributed the worst recorded coastal erosion on the island. They took pupils to places affected by coastal erosion and facilitated them to learn the causes, consequences and effective ways of preventing coastal erosion.



Figure 9. Pupils observing the effects of coastal erosion.

The third workshop covered climate change and water crisis. Facilitators presented on changing climatic conditions which led to the state of water crisis on the island. Pupils visited selected natural springs and learned how drought led to their drying up and eventual water crisis on the island. In addition, facilitators guided pupils to reflect on actions to prevent drought and water shortages.

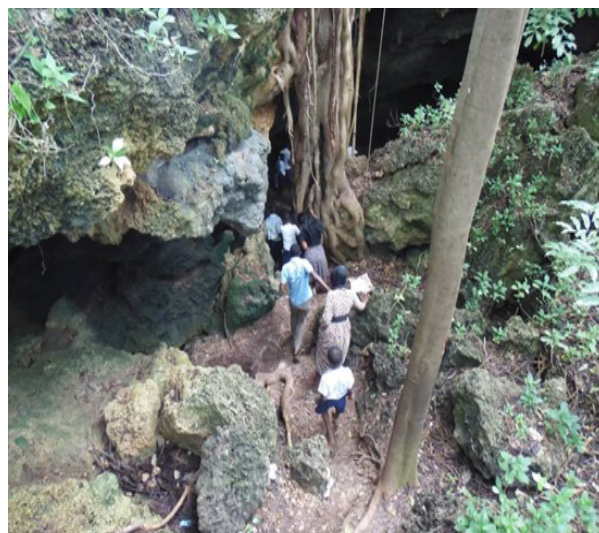


Figure 10. Pupils observing the the drying natural well following the prolonged drought.

The fourth workshop covered climate change and human actions. Facilitators discussed human actions and behaviours which contributed to changing climate conditions and eventual climate



crisis. Pupils visited destroyed natural forests and poorly managed solid wastes and learned negative consequences of such human actions and behaviours. Facilitators guided pupils to reflect and determine actions and behaviours that responsible persons should avoid and promote to effectively deal with the climate crisis. The pupils resolved to plant and care for trees around the health centre.

4. The PAR Project and Epistemic Justice

We were aware of the marginalisation of local knowledge about climate change and of the voices of women, children and youth in interventions to mitigate and adapt to climate change impacts in coastal communities. We knew these forms of marginalisation eventually resulted in epistemic injustice. Therefore, we prioritised the use of local knowledge and creating platforms for men, women, children and the youth in these communities to share their insights on dealing with the impacts of climate change in their localities. In particular, we considered the experiences, interests and perspectives of women, youth and children when designing and implementing the PAR activities.

On respecting and using local knowledge, for instance, the secretary of KIUMAMA stated:

"We are very delighted to work with DUCE researchers. They are smart and respect our local knowledge and innovations. They provide us with every possible opportunity to show and use our own knowledge and skills in reef rebuilding and corals restoration. They used to tell us to believe in our knowledge and skills and, throughout the project we were in charge of the intervention. They also provided us with local and national platforms to showcase how we do coral restoration. We presented our work at the climate action dialogue at DUCE. Participants in the dialogue in Kenya and the UK listened, asked questions and appreciated our work. Journalists have widely reported on our work. Since then, I receive many calls from people who want to know more about our work. I am very grateful for all these opportunities."

The perspectives of the KIUMAMA secretary were also echoed in the remarks of the SEG and SHIMAWWA secretaries. The SEG secretary remarked:

"I admire the spirit and attitude of our DUCE partners. While we knew that they possess lots of environmental knowledge and could easily dictate on what to do with the mangrove restoration, they did not. Instead, they were always encouraging us to use our own knowledge and experience to determine and plant mangrove species suited in the Somanga context. Throughout the process, they never imposed anything; instead, they trusted in our capacities and supported us in implementing intervention tasks."

In the same vein, the SHIMAWWA secretary reported:

"We knew the expertise and experiences of our DUCE partners in designing and facilitating climate change awareness workshops and campaigns, but they did not dictate. Rather, they listened to our ideas and strategies and helped in sharpening them. Eventually, we trusted in ourselves and went on to design and deliver relevant workshops and conduct successful climate action campaigns."

Regarding due consideration of the experience, interests and perspectives of the women and youth members, a 24-year-old female member of the Coral team stated the following:

"I am an active member of KIUMAMA and can confirm that I was effectively engaged in every step of the corals restoration intervention. I received training on making bricks and planting corals from Mr Basha. I participated in all sessions of planting corals at Mwamba Fisi, and attended all planning meetings held here at Somanga. I am happy that I have been given many opportunities to learn and participate in restoring corals. I now consider myself an expert in reef-building and coral planting"

Likewise, a 26-year-old male member of the Coral team who also serves as the boat captain and diver remarked:

"In one meeting, our secretary indicated that we could receive training on rebuilding reefs and repairing the destroyed coral reefs. I immediately registered my interest. Then I received the training, got adequate expertise and now I enjoy planting corals and monitoring their growth. I am glad that I am trusted and fairly engaged in this intervention. I hope to continue doing this for my community."

On considering the interests and voices of children, a 12-year-old pupil reported:

"We appreciate the opportunity to learn about climate change and engage in redressing some of its impacts in our village. My friends and I have chosen planting trees around the health centre. We promise to do our best to care for the plants we have planted."

Some female members reported their satisfaction with the respectful involvement of women in the PAR project. Regarding this, a 56-year-old woman and member of KIUMAMA said:

"I am happy with what we have achieved with this project. I have enjoyed every step of the project and had the opportunity to participate and share my knowledge of and experience in managing the project funds and coral restoration in the meetings I participated in. In the meetings, I never felt intimidated but I was free to express my ideas while others listened attentively. I am also happy"

that women members participated effectively in the making of the bricks and planting corals ... and what is most interesting is the fact that their work was very much valued by other members and our DUCE partners. This is good and motivates us a lot."

Another female participant, a 48-year-old woman, recalled her experience with the PAR team over the preceding year and said the following:

"At first I felt nervous and had little confidence when I learned that we would collaborate with university researchers. I wondered what I would contribute in the discussions and meetings with those learned fellows. However, as we started interacting, I found that they were friendly and very interested in learning from us. They encouraged us to speak and listened attentively as we spoke our minds. Slowly, I started sharing my ideas with confidence and was motivated when I saw that they considered and/or integrated my ideas in the intervention. In addition, I was thrilled when I went to the university and participated in the climate action dialogue. This was a rare opportunity to share my ideas on dealing with problems associated with climate change. This unique experience has contributed to enhancing my confidence to speak in public and during official gatherings."

As such, all designed and implemented PAR interventions benefited from the local knowledge and experience of men, women and youth participants. We took seriously their local knowledge and ways of interpreting the phenomena of climate change and environmental degradation, and engaged with them fairly in the design and implementation of the PAR interventions. Accordingly, we ensured that all our PAR interventions were on a manageable scale, built on shared knowledge and the values of people, and comprised activities that members of the participating CBOs could continue implementing when the projects end. In doing so, we consciously avoided large-scale interventions that could turn into heavy burdens for members of the participating CBOs and local communities. In this regard, we established that KIUMAMA members can afford costs of caring and monitoring of corals planted on 1.5km² of Mwamba Fisi; SEG members can afford the costs of caring and monitoring of a 4-hectare mangrove land; and SHIWAMMA members can afford supporting 20 pupils in caring for the 50 plants planted around the Songosongo health centre.

5. The PAR Project and Univeristy Capabilities

5.1 Learning about and teaching climate change

The DUCE researchers and assistant researchers reported on their enhanced awareness of climate change problems and capabilities to teach climate change topics. Regarding their enhanced

awareness of climate change problems, one researcher said:

"I had not developed interest in researching climate change issues because I believed that solutions for climate change problems would be provided by natural science and technological research. I was very wrong! I have learned that human activities are the main contributors to climate change and that changing some human behaviours could rescue us from the threats of climate change. Accordingly, I have learned ways to uncover sources and solutions to human actions and behaviours that lead to climate change."

The above perspective was echoed by another researcher, who reported:

"I was made to believe that solutions to climate change problems are produced through natural science and technological research only, but I now know that well-designed and well-executed social enquiries can produce some important knowledge about and solutions to pressing climate change problems."

One more researcher stated the following:

"I never knew, but through this research, I have learned how cultures influence climate action and how numerous insights and values embodying indigenous knowledge and value systems inspire climate action. I now know how to find solutions to the climate crisis in local cultures and knowledge systems."

Regarding their enhanced awareness of and capabilities to improve teaching about climate change, another researcher stated the following:

"This experiential learning about ways to manage climate change has opened my eyes to see limitations in our current university curriculum and pedagogical approaches. I am now able to see that our courses have very little coverage of climate change issues, and their delivery inadequately offers learners an opportunity to acquire relevant competencies for dealing with them. It is unfortunate that our graduates leave with very little competence to handle climate change issues. I hope we can do something about it before it is too late."

Another researcher, who runs climate change and environmental management courses, said:

"I have learned that well-organised excursions to sites impacted by climate change and environmental degradation enhance teaching and learning about the causes, impacts and solutions to climate change and environmental problems. I will consider two or three excursions in my future course delivery."



On the enhanced capabilities to develop a curriculum for an outreach programme, an assistant researcher with theoretical knowledge in designing curriculum stated:

"I am glad I had the opportunity to participate in the actual design of the curriculum. This exercise provided me with a platform to use my theoretical knowledge in the actual development of a curriculum. I feel that I have improved my knowledge and skills in curriculum development."

The issues reported above point to the many lessons and enhanced capabilities that DUCE researchers and assistant researchers have recorded. It is hoped that, on the basis of these lessons learnt and enhanced capabilities, the teaching and learning of climate change and environmental issues at DUCE will improve.

5.2 Researching and disseminating climate change knowledge

It was reported that the University of Dar es Salaam's Research Agenda 2018/19 – 2028/29 supports climate change research, but most research conducted under the climate change theme was in the fields of natural sciences and technology (UDSM 2018, p.15). The reason for this is the low confidence and limited competence of humanities and social science researchers to engage with climate change issues. It also was reported that only a handful of DUCE researchers had an interest in and/or conducted participatory action research. However, it was reported that the current PAR and its positive outcomes have sparked interest in participatory action research and enquiries about the social and ethical dimensions of climate change.

Improved awareness of the social and ethical dimensions of climate change, and enhanced capabilities to see and research the social and ethical issues underlying climate change problems, were reported by most DUCE researchers and assistant researchers. For instance, one researcher said:

"Some of us had little interest in climate change because we believed we are unable to generate the required knowledge and so left it to researchers in the natural science and technology fields. But now my interest in climate change has increased and my ability to develop a climate change research agenda through the humanities and social science lens has been enhanced.."

The other researcher recalled how, in her previous research, she struggled to comprehend social and ethical issues in the management of climate change, but claimed that the current PAR had enhanced her competence to conduct inquiries about them:

"In our previous research project, I struggled to understand how people's value systems inspired or constrained their climate actions, but now I have learned well and can effectively conduct inquiries about social and ethical issues underlying climate actions."

The PAR process offered some important lessons to postgraduate

students who participated in this study. One of the assistant researchers saw value in and learned to engage knowledgeably with ordinary citizens in participatory action research. He said:

"I never imagined that ordinary citizens in the villages were that much concerned with climate change and that they were working hard to find appropriate solutions. This experience has changed my perspective and would influence the design of my future social and educational research. In my future research, I will consider, select and effectively engage with knowledgeable citizens in the co-production of knowledge and in searching for solutions to community problems."

Other researchers learned about and improved their approaches to disseminating research findings. This was highlighted by one assistant researcher, who said the following:

"I have learned how to present research findings to various stakeholders who may help voice and address the challenges facing the community. I have learned this from how the principal investigator was collaborating with the entire research team and university leaders in the preparation for and coordination of meetings and workshops which brought together various climate change and environmental stakeholders, journalists, government leaders, and leaders of governmental and nongovernmental institutions to reflect together on addressing the climate change challenges facing coastal communities."

Another researcher reflected on their enhanced capabilities to disseminate research findings:

"We are used to publishing journal papers to share research findings. However, we have learned that we can also effectively disseminate our research results through the media. The media provided good coverage of the issues raised in the public dialogue and community-led ecological restoration activities and related innovations. Many people had read in the newspapers and heard in the news about these research activities. There were people who were telling me that we had done a good thing to engage with the media. What is important, however, is the fact that we have learnt and acquired some skills in the effective engagement of the media. We will continue building on these competencies gained to better disseminate our research outputs in the future. "

The productive engagement of stakeholders in research and the dissemination of findings was also emphasised by the DUCE Principal when delivering his welcome and opening speech during the Public Dialogue on Climate Change held at the DUCE campus on 18 November 2022. He stated:

"Let me welcome you officially to this day's public dialogue which is a very important occasion for us to reflect and

discuss the causes and effects of climate change and how we may address them. I believe it is a special day which brings together not only academicians, but also various stakeholders, including ordinary community members. Occasions like this one are rare. But it is now the direction of our university to organise frequent public dialogues that target the potential beneficiaries of our studies."

With increased interest in climate change research and participatory action research, and enhanced capabilities to research and disseminate climate change knowledge, as reported in this section, we could hope for more interventions to improve climate action in the country.

5.3 Engaging communities and policy actors in climate change issues

It was reported that, whereas the UDSM Vision 2061 urges university researchers to collaborate with industries and communities to find solution to real life challenges (UDSM, 2012), very few community-university engagement initiatives and outreach programmes had taken place at DUCE. This situation was associated with budget constraints and limited skills for engaging with communities and policy actors amongst DUCE staff. However, the DUCE researchers and assistant researchers who participated in this PAR reported having learned about and practised some ways to effectively engage with communities and policy actors in co-learning and finding solutions to pressing climate change issues. They also reported that some DUCE staff had become interested in and learned to value community engagement and outreach programmes following their successful organisation of events to engage with community members and policy actors held on the university campus and widely reported by the media.

A participating researcher said that the PAR process has contributed to enhancing her capabilities to engage effectively with communities and climate change stakeholders. She emphasised:

"When I joined the PAR team I was just graduated with limited competencies in managing a research project. Nevertheless, I was assigned to lead one of the small PAR groups. I was worried but decided to shoulder my responsibilities. I watched and learned from my senior colleagues on how to interact and communicate with other partners. I coordinated and monitored the implementation of activities in my group. I also took part in organising PAR meetings and events. Slowly but surely I learned to identify key stakeholders, draft and send them invitation letters, and receive and serve some of them when they attended our PAR events. Since then, I have mastered the basics of effective stakeholder engagement."

One of the assistant researchers reported that he had learned to value community engagement and the basics of research collaboration. He explained:

"Being a novice researcher I could not comprehend concepts like community engagement and collaborative research. I slowly learnt their meaning and significance in research. Later, I understood that the better comprehension of sources and solutions to community problems depends on effective community engagement and collaboration among stakeholders. I further learnt effective ways of initiating and sustaining community engagement and productive research collaboration from my senior researchers. With the positive outcomes generated through well-established and well-managed engagement with people at our field sites, I have come to value community engagement very much and would do my best to establish and sustain some in my research career."

The valuing and appreciation of community engagement in the research process was also underscored by the Chairperson of the Centre for Social and Political Research (CSPR), which hosted this PAR project. He stressed this aspect when he delivered a speech to invite the DUCE principal to open the public dialogue on 18 November 2022:

"I am happy to welcome all of you to today's very special event, which essentially is the continuation of a big job which is being done in collaboration with researchers and various communities involved in climate actions and, which in one way or another, have been affected by climate change. ... this concept of community engagement helps us very much to see the importance and relevance of having a university and what it should do. Therefore, we basically live what we have been discussing, namely that it is important in our research studies to involve the community so that the nation may benefit from what we do, for it is them who educate us through their taxes. They are the ones who pay our salaries. By conducting our research to try to address the problems facing our communities, people will see the importance of having a university."

Furthermore, the CSPR Chairperson indicated that they would draw on the PAR teams' expertise and experience gained in engaging stakeholders to strengthen CSPR's Public Service and Community Engagement Unit.

With increased institutional support of community engagement and outreach programmes, and enhanced capacities to engage with communities and climate change stakeholders, we can hope for more community-university engagement initiatives and outreach programmes to co-produce knowledge and find solutions to climate change problems.

6. Concluding Remarks

The designing and implementation of the PAR project afforded us many lessons on approaching the climate crisis and unlocking opportunities for climate action at the university and in the coastal



communities.

First, we learned that universities have diverse expertise which could facilitate better comprehension of the climate crisis and finding for solutions to some of its worst challenges. Slowly but surely we learned that expertise for facilitating the understanding and redressing climate crisis rested not only in the fields of natural sciences and technology but also in the fields of humanities, social sciences and education. In fact, the expertise in the latter fields is better placed to effectively facilitate the exploration of deep causes and solutions to the climate crisis. Therefore, university researchers in all fields of knowledge are urged to use their diverse expertise to addressing climate crisis.

Second, we learned that universities are capable institutions and are better placed to create platforms for the diverse stakeholders to engage in dialogue to find solutions to the different forms of climate crisis in their localities. Accordingly, it is high time for universities to use such capabilities and opportunities to engage various stakeholders in exploring and implementing appropriate climate actions in their localities.

Third, we learned that communities are highly concerned about the climate crisis, have accumulated relevant local knowledge about it, and have innovative ideas for redressing its worst effects. With the help of university researchers, communities can devise and implement interventions to realize their valued mitigation or adaptation goals. Thus, university researchers ought to cultivate attitudes and values that enable them to respectfully and productively engage with committed community members to better learn their local knowledge and innovative solutions to the climate crisis. Only trusted community-university engagement would facilitate the unlocking of local climate knowledge and support local knowledge brokers and innovators to devise and implement climate actions relevant and appropriate in their contexts.

Lastly, we learned that most climate change-stricken communities are eagerly waiting university researchers to help them devise and implement diverse climate actions. Therefore, universities and their researchers should move fast to collaborate with those communities to unlock and support all possible opportunities for climate actions in those communities.

The engagement of the university in dialogues with social movements has led to the acknowledgment of existing initiatives in peasant territories and traditional communities, thereby reinforcing the partnership between the university and social movements in co-creating knowledge concerning climate change. The incorporation of perspectives from social movements, traditional peoples, and communities into the discourse on climate justice has spurred critical evaluations of the strategies employed to address climate-related challenges.

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Climate-U

Transforming Universities
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About Transforming Universities for a Changing Climate

Climate change is the most significant global challenge of our time, and many of its effects are felt most strongly in the poorest communities of the world. Higher education has a crucial role to play in responding to the climate crisis, not only in conducting research, but also through teaching, community engagement and public awareness. This study contributes to our understanding of how universities in low and middle-income countries can enhance their capacity for responding to climate change, through a focus on the cases of Brazil, Fiji, Kenya, India, Indonesia and Tanzania. In doing so, it contributes to the broader task of understanding the role of education in achieving the full set of Sustainable Development Goals.

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