

“The sun is falling”: evidence of how local practices are mitigating and adapting to climate change, and what more can be done

Lessons learnt from community voices through the ‘Local Leadership for Global Impact’ project

Introduction

In Kiribati, Islanders are increasingly using the expression “the sun is falling” to understand and explain climate change, and begin to consider what more can be done to mitigate and adapt to it locally. While the sun is not actually falling, this relatively new expression amongst the islanders is understood as if the sun is getting closer to our planet which, in turn, explains rising temperatures, dying fish in shallow waters, and other effects of climate change. Indeed, it is within this context of a global climate crisis that GNDR¹ prioritises local knowledge and leadership², not least because resilience can only be achieved when built within a local context. Local communities most at risk must be enabled to participate, influence and take decisions on policies and practices - not only because they are the people most at risk but, importantly, because they understand first hand the risks themselves. Communities have critical knowledge and experience of their local environments, the threats they face and their consequences, the actions which help to reduce risk and barriers to those actions.³ Knowledge and practice from local actors, as well as the understanding and skills developed by individuals, or populations, specific to the place where they live, has to be used.

Despite the critical role of civil society organisations, local government and community leaders in managing disasters, 84% of local actors report not being included in assessing threats, preparing policies and plans, and taking action to reduce them⁴.

When there is an enabling environment in place, communities and local stakeholders can use their knowledge and practice to plan for complex disasters. When it is applied accordingly, as they lead decision making processes, systems to prevent disasters will be improved.

¹ The Global Network of Civil Society Organisations for Disaster Reduction (GNDR) is a network of 1,734 civil society organisations across 130 countries working together to strengthen the resilience of communities most at risk of disasters, and prevent hazards from becoming disasters. GNDR’s work is anchored on strengthening the collaboration, solidarity and mobilisation of civil society organisations; championing a localisation movement; and striving for development which is risk informed. <https://www.gndr.org/>, August 2023

² GNDR is currently implementing the Local Leadership for Global Impact (LLGI) project. It aims to enable communities to become more resilient to complex disasters. The assumption is that by strengthening the capacity, innovation and influence of local actors, the perspectives and priorities of most at-risk communities are amplified to decision-makers across multiple levels.

³ <https://www.gndr.org/about/strategy-2020-25/goal-2/>

⁴ Views from the frontline global report, GNDR, <https://www.gndr.org/resource/views-from-the-frontline/views-from-the-frontline-global-report/>

To further understand how knowledge and practice from local actors can be further utilised to plan for complex disasters, GNDR organised 10 knowledge exchange visits between local civil society organisations (CSOs) and academic researchers. Local knowledge from community members, in regards to how they are managing their environment, climate change and its consequences, was gathered. By facilitating knowledge exchange visits, it was hoped that local practice to mitigate and adapt to climate change can be documented - and consideration made as to what more could be done to drive forward effective solutions.

The findings from this work feed into multiple international frameworks including the Sustainable Development Goals⁵, the Sendai Framework⁶, the Paris Agreement⁷ and the Early Warnings For All Initiative⁸ - all recognising whole-of-society and inclusive approaches, but falling short on delivery of localisation⁹ aims. Evidence provided in this paper will feed into our ongoing policy of influencing progress towards those commitments, to ensure governments around the world take the necessary action to address current climate change adaptation and mitigation challenges - especially for those who are most at risk of disaster.

Methodology

Climate knowledge exchange visits were conducted across 10 countries: Benin, Zimbabwe, Uganda, Tunisia, Kiribati, Indonesia, El Salvador, Uruguay, Dominican Republic and India. The purpose was to share knowledge between local civil society and academic stakeholders in regards to environmental management and practices in specific geographical areas, and how this practice was affected by climate change.

To conduct the visit, a host organisation in each country was identified. They were all civil society organisations who have ongoing work with a community addressing and mitigating the effects of climate change. A facilitator for each knowledge exchange was then identified. They were a member of academic faculty or an expert in the subject area of the challenges faced by the community. Their facilitation role was to mobilise different local stakeholders and build space for each of them to share learning, confront their knowledge and experiences and exchange among them. to create an environment for shared learning and exchange. The facilitators were drawn from different countries from the host country for the purpose of

⁵ <https://sdgs.un.org/goals>

⁶ <https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030>

⁷ https://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf

⁸ <https://www.undrr.org/early-warnings-for-all>

⁹ For GNDR members working at the frontline of disaster risk, the idea of localisation is a revolutionary approach that turns traditional hierarchical global thinking on its head. Localisation means strengthening the capacity of local communities most at risk in terms of knowledge and skills; establishing effective systems and procedures in terms of governance and accountable management practice; supporting an enabling policy environment of the national/sub-national governments, donor agencies, INGOs and private sector; ensuring there are linkages among local actors at the horizontal level and across the local, national, and international levels, to engage, influence, implement and enforce accountability; transferring financial resources so that actions match words. A localisation movement connects local communities in all countries around the world and amplifies their voices at the relevant national and international levels. It emphasises upholding the human rights of people most at risk and recognises that there is knowledge, expertise and commitment at all levels, but local communities most at risk and frontline organisations must have space to influence, access to resources and the power to take decisions.

sharing different experiences, with the exception of India, Indonesia and Kiribati whereby logistics proved difficult to provide this international/cross- border element.

Table one: Exchange visits completed

| Country | Host CSO | Location | Facilitator |
|--------------------|--|---|---|
| Benin | CREDEL | Ouidah and Athieme | Nadege Parkoo, Togo |
| Dominican Republic | Servicia Social de Iglesias Dominicana | Multiple GNDR members | Dr Jorge Alberto Ruiz Ordonez, Guatemala |
| El Salvador | Funsal Prodesse | Multiple GNDR members | Dr Jorge Alberto Ruiz Ordonez, Guatemala |
| India | The Evangelical Fellowship of India Commission on Relief (EFICOR) | Selected villages of Amrapara block, Pakur district, Jharkhand state | Dr Swati Samvastar and Milind Pandit, India |
| Indonesia | YAKKUM Emergency Unit Indonesia | Giri Asih and Giri Jati villages (Purwosari District, Gunung Kidul Regency) | Thomas Wijaya, Indonesia |
| Kiribati | Foundation of the Peoples of the South Pacific Kiribati | Raweai, Bainuna and Rawannawi communities in Marakei Island | Tokintakei Bakineti, Kiribati |
| Tunisia | Association for Safeguarding the Medina and Patrimony of Kelibia (ASMPK) | Kelibia Municipality | Dr Mohamed Ftouhi, Morocco |
| Uganda | SAF-Teso | Soroti and Serere | Dr Margaret Kaigongi, Kenya |
| Uruguay | Sociedad Amigos del Viento | Multiple GNDR members | Ruben Mario Caffera, Uruguay |
| Zimbabwe | Nature Conservation and Development Trust | Chimanimani District | Adrian Phiri, Zambia |

The visits deployed participatory approaches blending both qualitative and quantitative methods to gather information with community members. The facilitators conducted desk reviews, developed quantitative tools (mainly questionnaires), administered focus group discussions (FDGs) and key informant interviews with community members and local stakeholders. They also utilised participatory tools from GNDR's

Localising Climate Projections Guide.¹⁰ Their methods were specific to their own research, and differed between each visit.¹¹

After the visits, both the host organisations and the facilitators produced reports of local knowledge and practice, and how climate change was and shared with GNDR detailing the visits and preliminary findings. GNDR analysed the findings to develop a draft global paper of evidence. The draft was discussed and verified through online meetings, and the final content is presented.

The academic facilitators also wrote articles for publication in journals. At the time of writing, papers from Indonesia¹² and Benin¹³ have been published in the European Journal of Environment and Earth Sciences and the Ensées Genre, Penser Autrement- (Université Félix Houphouët Boigny, Côte d'Ivoire) respectively.

¹⁰ <https://www.gndr.org/localising-climate-projections-guide-and-toolkit/>

¹¹ See country case studies for more information

¹² See <https://ej-geo.org/index.php/ejgeo/article/view/372>

¹³ See <https://reseau-mirabel.info/revue/13553/Revue-africaine-des-sciences-sociales-Pensees-genre-penser-autrement-RASS-PGPA>

Key findings

Seven global findings have been developed based on analysis of all the reports from the 10 knowledge exchange visits. They are listed below, with further evidence presented in more detailed case studies of each visit.

Finding One: Communities already vulnerable to multiple disaster risks continue to be significantly affected by climate hazards

Globally, the community members visited were exposed to multiple risks and bear the brunt of climate related hazards such as floods, droughts, cyclones, deforestation and heatwaves. Three examples from the exchange visits are highlighted.

The community in Chimanimani, Zimbabwe bore the brunt of cyclone Idai, the community in Siroti, Uganda has recently faced drought, and, over a number of years, the community in Kelibia Municipality, Tunisia have struggled to access clean water for domestic use. Whilst these climate risks were not uniform across the ten countries due to geographical disparities, it was however significant that the most vulnerable within each community were the most affected by climate change. The greatest consequence was the disruption it made to their livelihoods, further limiting their ability to mitigate and adapt to climate change, and build their own resilience.

Finding Two: The consequences of changing climates has long been evident

Communities spent time describing to facilitators their knowledge on the environment around them and how climate patterns are changing. It was clear that local ecosystems had changed or been negatively impacted as a result of climate change. Two examples from the global knowledge exchange visits are highlighted below.

In Kiribati, “Te katei ni Kiribati”, translated as Kiribati’s cultural values, have traditional concepts that give respect for the environment and the importance of its preservation. They intrinsically value customary environmental management practices for predicting, interpreting and decision-making in relation to climate variability and weather events. As mentioned at the beginning of this report, “The sun is falling” defines and expresses how islanders understand and explain the concept of climate change. This statement reflected on the traditional knowledge held in comparison with the impact climate change is having on daily lives and livelihood activities.

The communities involved in this programme in India were closely observing changes to their local ecosystem, both as a result of human activity and climate change. The reduction in the size of forest, disappearance of wildlife and floral elements were clear effects of climate change. They further described changes in climatic conditions such as the shifting of monsoon seasons, intermittent dry spells and rises in winter temperatures.

Finding Three: Knowledge and practice from local actors is ancient, evidence-based, and relevant

The exchange visits highlighted how local communities continue to utilise their knowledge and experience in the face of climate change, giving them coping mechanisms to address risks faced. Their knowledge and practice has led to communities adapting to the effects of climate change, demonstrating strengthened resilience. Four examples from the knowledge exchange visits are highlighted below.

In Tunisia, the local population knew how to adapt to drought and water shortages. This knowledge, inherited from previous generations, is put into practice by the "Ibn Chabat" system. Ibn Chabat consists of an ingenious system of water management by the local oasis communities, who are particularly vulnerable (for example the Oases of Tozeur and Nefta, amongst others). Other ancestral techniques for managing and adapting to drought and water pollution are also common in Tunisian towns. On the other hand, the same communities are called upon to manage episodes of water abundance in the rainy seasons, in order to reduce the catastrophic risks. This is done through the construction of tanks and the storage of water for domestic use where applicable or for farming. This was the case during catastrophic flooding in the communities of Beni Khalled and Nabeul in October 2018.

In Uganda, the community relies on indigenous weather forecasting methods in timing rainfall. These include the shape of the moon, the flowering of certain tree species, the direction of the wind and the emergence of certain birds and insects.

In Indonesia, Javanese farmers utilise their traditional seasonal calendar, which is called *pranata mangsa* where planting should start in the month of *kapat* (typically arriving in October). Even though it has been realised that the seasonal calendar is not always relevant, the calendar still guides farmers in deciding first planting. They also combine knowledge of their first season planting with the signs of nature such as the leaf fall of the *randu* tree (cotton tree), the decay of stink flower, the flow of water from water source, or when the *gadung* tree (three-leaved yam) is starting to grow and climbing.

At points, they also chose certain months to plant (typically November or December) based on linking their knowledge from their local context to the Gregorian/Western calendar. Aside from the time period, farmers knew that when the soil was wet enough (approx 10-20 cm rainfall in a month) then they could start to plant corn. One expression used by farmers is "when the soil is becoming soft (wet) let your hand open" which means that one should be ready to plant when the rainfall is wetting soil at a depth of 30 cm (the approximate depth of a hoe). They observed soil wetness at the depth of a hoe by hand, demonstrating local practice remains relevant for current agricultural techniques.

In India, communities predict precipitation by observing the sky in January. Specifically, they look for conditions that indicate 180 days until the monsoon will arrive in June. The farmers understand the "language of trees" - when the trees blossom, when the flower sheds their leaves, what quantity of fruit may come, etc. Some were able to locate where to look for groundwater, with their methods said to be more accurate than geologists in some cases. The facilitator highlighted the quality of this knowledge, and that this vast local knowledge requires more people to understand it so it can be further used.

Further, desk research has also highlighted the importance of this knowledge. “The use of local/indigenous knowledge by communities to predict weather patterns and climate change can be a vital component of climate related decision making. These forms of knowledge are often highly context specific and embedded in local institutions, providing biological and ecosystem knowledge with landscape information. They can contribute to effective land management, predictions of natural disasters [sic], and identification of longer-term climate changes.”¹⁴

Finding Four: Knowledge and practice from local actors is being challenged by climate change and changing ways of life¹⁵

Many examples of the relevance and validity of knowledge of local actors to manage their environment were captured during the exchange visits. Unfortunately, global findings indicate that changes to climate, and to modern ways of life, have created barriers to the effective use of some of this knowledge. Increasing urbanisation and the knowledge and practice gap between the urban and rural areas make it difficult to replicate local knowledge and practice to other localities, especially in urban contexts.

For example, in Kiribati, it was realised that whilst traditional knowledge plays a critical role in the way people respond to climate change scenarios, there is a clear decline in the application of traditional knowledge. Increasing population pressures are leading to a disregard of the traditional respect and bond that exists between people and their environment. The population in Kiribati continues to grow which has resulted in competition over limited resources. It is through this competition that some people have somewhat relinquished conservation methods to preserve natural resources. For example, allowing natural resources to replenish after being over-harvested is no longer supported in a way it once was. Open access to natural resources can be regarded as an opportunity which does not come with responsibility.

In Uganda, local knowledge has been challenged by wetland farming and deforestation. As one community member stated, “The types of birds and insects are nowhere to be seen nowadays due to effects of climate change. These birds and insects have migrated since their natural habitats have been encroached and destroyed by human beings for settlement or agriculture”. Community members also reported application of local knowledge in the conservation of water and soil were strategies which unfortunately do not work because of the damage to the environment caused by heavy flooding and persistent drought.

Some communities were not confident in mitigation or adaptation measures. For example, in India, some community members indicated that whatever is happening is nothing in human being’s hands and felt they could not do anything about it.

Finding five: Information from sources wider than the local context is not being shared effectively nor in advance of extreme weather events

It is evident that weather information emanating from sources outside the communities are not shared in timely or accessible ways to communities, nor in languages understood. This has many negative effects,

¹⁴ <https://www.ipcc.ch/srccl/faqs/faqs-chapter-7/>

¹⁵ Main finding India/Kiribati

including the undermining of local practice. Decisions may have been made differently if external sources of information had contributed to local decision making.

For example, in Indonesia, information from the Indonesian Agency for Meteorological, Climatological and Geophysics (BMKG)¹⁶ was not reaching all farmers, including older farmers and those who didn't have electronic devices. However, the scientific information of climatic anomalies such as La Nina and El Nino, presented during the knowledge exchange visit, was well understood and could have been predicted 3-6 months earlier. This valuable information needed to be delivered by mediators to assist farmers in farming management. To support decision making in anticipation of the change in rainfall, the timing of provision of rice seeds by the government to farmers could have been adjusted to maximise the rainfall for rice growing based on the weather predictions.

The number of rain gauges for rainfall observation was also limited in Indonesia. In one district, only one rain gauge was available in the Badan Penyuluh Pertanian, Government Agricultural Extension (BPP) office, which did not sufficiently represent other sub villages where the latitude of two villages ranged from 70 m to 340 m above sea level. Highlighting the importance of so-called 'last mile' communication, authorities were aware of El Nino and La Nina in advance but the information from BMKG needed to be delivered by mediators in simple words so that farmers would be able to respond accordingly and effectively.

Globally, there is a recognition that adaptation solutions can be improved if meteorological information is more readily available, whether through language (local translations or simpler terminology) or accessibility (public availability).¹⁷ Civil society and local actors remain with significant barriers to climate projections and academic knowledge to complement their own knowledge and practice.

Finding six: Communities have developed interventions to adapt to, or mitigate against, the effects of climate change

Communities across the globe have developed mitigation and adaptation measures to build their resilience in the face of adverse climate change. They have not stopped attempts to become more innovative as risks and exposure to hazards increase.

In Zimbabwe, the ecosystem-based approach¹⁸ has been promoted to achieve sustainable environmental management. The community is prepared and encouraged to use their own local knowledge and skills in adapting to climate change effects and build local resilience. Planting of indigenous tree species including fruit crops is one of the ways the forest is being conserved to protect the ecosystem and environment while, at the same time, empowering the community. This has a positive consequence in the ongoing safeguarding of the environment. "Afforestation was identified as an important activity that can make the

¹⁶ Badan Meteorologi, Klimatologi, dan Geofisika

¹⁷ <https://www.gndr.org/resource/localising-climate-projections/introduction-to-localising-climate-projections/>

¹⁸ The ecosystem approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. It recognizes that humans, with their cultural diversity, are an integral component of ecosystems.

community resilient to flooding and cyclones in the future. Introduction of communal grazing land and sustainable management of pasture in Chimanimani, and the introduction of Indigenous Knowledge System in the management and preparedness to climate related risks and hazards are other coping mechanisms used by the communities.” They also utilised knowledge on beekeeping and utilised sandbanks to block water run-off, reducing erosion and supporting water retention. It had a further benefit in extending the longevity of wells because, as the water table was deepened, the wells took longer to run dry.

Passing on knowledge is another way facilitators found to be successful in mitigating the effects of climate change. In Indonesia, knowledge is passed on in a process captured by the phrase ‘sitting and drinking together’. As with the local expression ‘open your hands, the soil is wet and ready for planting’, knowledge and practices are passed from one generation to another.

Finding seven: Collaborative ways of working to address climate change were found to be effective

Whilst noting that some government and donor agencies around the world are already using different bodies of knowledge to deal with risks, hazards and vulnerabilities induced by climate change, GNDR joins a number of national and international organisations who document various indigenous, and local, knowledge and practice. In doing so, such efforts have also supported in-country relations between stakeholders.

In the context of the present project, this was promoted through the exchange visits themselves with CSOs, host communities, local stakeholders and the visiting facilitators involved in the conversations. The connection between local authorities and CSOs has strengthened. In Uganda, for example, the visit has improved the relationship with local government officials, the Ministry of Teso Affairs, the CSOs and the community members involved. It helped local CSOs to improve networking, partnership and collaboration with both state and non-state actors. Staff capacity for knowledge on environment, disaster reduction and climate change resilience has also improved through the shared learning. Equally, the communities that SAF-TESO operates and visited, benefited from awareness raising, knowledge for mindset, behaviour and attitude change towards environment conservation and protection.

Desk research further highlighted that the understanding of climate change is not complete without partnership between multiple stakeholders who should each bring their knowledge to mechanisms addressing climate change. On its own, “(Local) Knowledge about future climate changes remains very uncertain...the context and location-specific nature of indigenous and local knowledge is inadequate to deal with the high-exposure nature of climatic shocks.”¹⁹ However, knowing that “local knowledge is often the only knowledge available to cope with climatic and natural disasters at the local level”²⁰, we must connect it with the knowledge and practice of multiple stakeholders to really see the effective management, mitigation and adaptation, of climate risks.

¹⁹ (IPCC, 2007; UNFCCC, 2013)

²⁰ (IPCC, 2007; UNFCCC, 2013)

Conclusions and recommendations

As those involved in the knowledge exchange visits reflected on the global findings, there was optimism in the group that communities have adopted, and continue to adopt, various strategies to build on their resilience. Reflecting that community members involved in the process had not resigned to fate nor lost hope, six conclusions and recommendations were drawn to move towards further embedding knowledge and practice by local actors in efforts to mitigate and adapt to changes in climate. These recommendations are centred on what more the GNDR network of civil society organisations can do.

Conclusion one: Those most at risk to climate change bear the brunt of its full force

It is essential that everyone listens to, and engages with, the communities at the frontline of climate risks. It is recommended that efforts to amplify the voices of those most at risk to duty bearers, to strengthen communities' resilience and prevent hazards from becoming disasters are intensified. We hope that this paper - and the participatory research on which it is based - can be one tool that can serve as a catalyst for action and energy across, and beyond, our movement of civil society organisations which, in turn, can speed-up a whole-of-society approach for local action to achieve this aim.

Conclusion two: Whilst being challenged by climate change and associated risk factors, local knowledge and practices remain valuable tools in managing the environment

The value of local knowledge and practice is recognised and respected. Any additional knowledge should be used to complement it - not used exclusively in its place.

To strengthen the use of local knowledge and practice in managing the environment, especially in regards to mitigating climate risk and adapting to climate change, it is recommended that civil society organisations (and others) celebrate it and facilitate ways to creatively pass it on.

Secondly, localisation efforts (including those of GNDR) need to continue to ensure the recognition of local actors and involvement of local knowledge in all processes to mitigate or adapt to climate change, as well as in early warning systems to cope with sudden onset climate disasters.

Conclusion three: Local knowledge would be strengthened if local actors had better access to wider knowledge sources

Internally, we hope to share across the network key messages from this paper so that they can be considered in the plans and interventions of our members, indeed facilitating the discussion of how they sit within different local contexts in which they may be applied.

Linking with external stakeholders, it is recognised that we need to better understand what information is needed in each context, who has it, how it is generated and passed on for each locale in which the fight against the climate crisis is critical. From this, we need to understand what can be done to fill any gaps in knowledge and, most importantly, insist on a cross-sectoral and integrated approach to share knowledge across risk drivers. This can be achieved in many ways including WhatsApp groups, regular meetings with responsible authorities and other stakeholders, and more. Through improved linkages to more external

sources of information, better decisions can be made by local actors. With knowledge starts the possibility to consider solutions.

Conclusion four: Adaptation is first and foremost a locally-processed initiative; and should be scaled-out through localised processes

There are many solutions that are creating positive progress in adapting to and mitigating climate risks. This paper has touched on some of them. However, whatever the solution, it needs to be embedded in the local context. We recommend that adaptation and mitigation to the climate crisis focuses on innovation led by communities most at risk.

Locally led initiatives require building trust with the community and, as CSOs, we need to carefully facilitate a link between the local, regional and global issues.

For local actors to play their critical role, they need access to climate projections to ensure they are adequately risk-informed in their planning, implementation and review of policies and actions to prevent, mitigate and prepare for complex crises. This localised information is essential to reduce the adverse impacts of climate change on communities most at risk by putting in place such actions. Localising climate projections means ensuring climate information – that is currently global, highly technical or academic, in languages not understood or not easily accessible (an individual does not know how to access it or is intentionally stopped from accessing it) – becomes easily available to local actors so that they can adequately plan for development and contingency actions in crises. Local actors should have the time, space and capacity to identify solutions that are affordable, relevant, impactful and sustainable within their communities.

Conclusion five: Nature based solutions should be sought in the fight against climate change

It is evident that communities are adopting various nature-based solutions to mitigate and curb the effects of climate change. Building from the ecosystems approach mentioned, nature-based solutions²¹ are sought. Examples drawn from this process have included organic farming methods to grow the right crops at the right time in the right way, utilising residue to improve soil matter; sand dams to improve the water table; and, utilising biogas with developing technologies. It is clear that nature-based solutions enhance human wellbeing, improve biodiversity and transform the environment in which they are implemented.

It is recognised by the authors and facilitators that water scarcity and the challenge of water management is a significant, direct consequence of climate hazards. Some methods highlighted in this paper potentially could have a direct, positive impact on water management and mitigate other risks - for example social tension and conflict, food insecurity, displacement and others. More understanding on this could be a follow-up to this work.

²¹ Actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services, resilience and biodiversity benefits - UNEP/EA.5/Res.5

Conclusion six: “If adaptation and mitigation measures are implemented collaboratively, the climate change problem will be solved”²²

A depth of collaboration is required to work together in a coherent way.

Synergy between local knowledge and scientific knowledge is key. For example, “Local and scientific knowledge should be linked to an Early Warning System so the communities can access and be prepared properly for climate induced disasters. Stakeholders and local leaders need to be trained and supported when trained in knowledge, and in terms of coordination so they can face risk and disaster.”²³ All forms of knowledge can address the climate crisis and stakeholders should not work in isolation.

There is also a need for close collaboration with the duty bearers both at local and national levels. CSOs often complement the work of the government and the harmonious collaboration between CSOs and the government often leads to better development outcomes. Different roles, perspectives, knowledge sources and expertise are required within the entire process.

Multistakeholder roundtables are suggested as effective mechanisms to strengthen policy and intervention, or address gaps and emerging risks. There is a recognition that scaling up local action across stakeholders not only requires an extension of work (for example one person covering more localities in their work) but also a strengthened capacity within their work (so there is the ability to intervene at the level required) and an increased financial investment at the local level. Once new knowledge is created through successful collaboration, this should be shared, whether to other communities, civil society organisations, districts, regions or internationally.

The political sensitivity of some interventions are recognised. The lobbying strength of certain large corporations can be devastating to local communities in some of the countries involved in this research. However, GNDR still emphasises the importance of working together to build resilience at all levels and local communities must be a part of the solution.

“Whilst climate change is global, the solution is local. If we understand the issue in context, we can all come together to create that “climate resilient village”. Whilst multiple stakeholders should be involved, we need to care for the microlevel - the best solution is recognising that there is no one solution to the climate crisis.”²⁴

GNDR will repeat these conclusions and recommendations as key messages with national and international climate and disaster risk reduction stakeholders, via policy influencing and further work to strengthen resilience to reduce disasters.

²² Uganda key finding

²³ Mohammed, 12 September 2023

²⁴ Dr Swati

Case study: India

The villages of Amrapara block, Pakur district were selected for the Climate Exchange visits. The villages are rural and exposed to severe droughts and floods when it rains. In addition, strong monsoon winds which blow across the area continue to affect the community. Discussion with communities and local stakeholders reveal that drought and water scarcity are the major hazards. Vegetation is on the decline and the land which was once arable has become dry and fallow. Pinki Paharin from Tutrapahar village said, “Earlier there were very big trees present in the forest but the greedy people cut all such big trees, so rains are annoying and not coming properly. Earlier we had many trees of marking nuts and all nuts were spoiled on the tree but now we rarely find them.”

On to the findings, the community is well conversant with the local ecosystem and observing the changes happening in the local ecosystem and they explained it in their local dialect. They understood the reduction in the size of the forest, disappearance of wildlife and floral elements as effects of the changes in the environment and ecosystem. They were aware of changes in climatic conditions like shifting of monsoon from early June to late June or early July, intermittent dry spells and rises in winter temperatures. However, whilst the community is aware of climate change, many were unable to understand the phenomenon. Many of them indicated that whatever is happening is nothing in human being’s hands, claiming “we cannot do anything about it”. This suggested the community was not prepared to face the adverse effects of climate change.

One comment from the community about local knowledge was, “The treasure of indigenous knowledge is almost locked as this knowledge is transferred from generation to generation orally and the youth is not aware of properties of elements of the surrounding ecosystem.” The community is practising multiple cropping systems. The cultivation, locally known as *Kurba kheti*, is happening in forests located on hills. In this pocket, some part of the forest belongs to the indigenous community. In *Kurba kheti*, in some patch of forest land where density is less, the ground is cleared mostly by fire. In the monsoon of the first year, maize, pigeon pea and *sutri* (legume) is cultivated and, after harvest in September, cow pea (*barbate*) is sown. In the second and third years, the land will be fallow and will be in use by fourth year. Meanwhile, in the second year another patch of forest will be cleared for cultivation. This evidence has contributed to our reflections for Finding Six.

Further indigenous knowledge shared amongst the population was seen by the *taanka*²⁵ traditional rainwater harvesting technique, common to the Thar desert region of Rajasthan, India. It provides drinking water and water security for a family, or a small group of families, and is composed of a covered, underground, impermeable cistern on shallow ground for the collection of rainwater. It is generally constructed out of stone or brick masonry, or concrete, with lime mortar or cement plaster. Rainwater or surface run-off from rooftops, courtyards, or artificially prepared catchments (locally called *agor*) flow into

²⁵ [Rainwater Harvesting Structures: 1: Taanka](#) *Indian Villages 2020* (in 2 Volumes) vision And Mission (vol. 1) strategies And Suggested Development Models (vol 2), Y.P. Singh (ed.). Concept Publishing Company, 2006. ISBN 818069321X. Page 421 .

the tank through filtered inlets in the wall of the pit. This evidence has contributed to our reflections for Finding Three.

After sharing their climate challenges, local mitigation strategies and adaptation measures with the visiting experts, the expert also shared with the communities various adaptation measures that would complement local knowledge and, in the long run, build their resilience. The strategies include:

- Awareness for soil testing practices
- Awareness for organic farming and development and demonstrations of organic inputs
- Use of micro irrigation system to conserve the water and extend the area
- Development of water budget and making the community aware of it so as to conserve water
- Awareness for soil conservation measures at individual and community level
- Awareness for usefulness of biomass to maintain the fertility through different composting techniques
- Awareness for cultivation of multi cut good quality green fodder
- Awareness through training on hydroponics technique for green fodder cultivation for lactating large and small ruminants
- Analysis of weather forecast
- Use of a local weather station.

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This information has been provided by community members in Amrapara block, Pakur district, Jharkhand state. The Evangelical Fellowship of India Commission on Relief (EFICOR) continues to work with them. Swati Samvatar (PhD) and Milind Pandit were the facilitators for the visit.

Case study: Indonesia

Giri Asih and Giri Jati villages (Purwosari District, Gunung Kidul Regency) were selected to host the climate exchange visit. The community faces a myriad of climate related issues including El Nino and La Nina, unpredictable rainfall leading to water scarcity and increasing temperatures. The effects of climate change, especially drought and floods are being experienced in the community. In the agricultural communities of the Javaisland, findings from the visit show that the farmers use the Javanese calendar of planting. It indicates in which month planting should start ("*kapat*" month - which usually takes place in October), but the farmers should also consider whether rainfall is enough. They use natural signs such as thunder or the decay of stink flowers to predict the weather pattern or seasons. This evidence has contributed to our reflections for Findings One, Two, Three and Six.

The community is well conversant with the local planting calendar. The farmers' local knowledge is able to anticipate aspects of climate change such as observing the signs, i.e. the growing of the *gadung* tree (*Dioscorea hispida*) and *suweg* plant (*amorphophallus* sp), and also checking the soil wetness which is used to decide the first season of planting. The local knowledge of first season planting is through using the signs of nature such as the leaf fall of *randu* tree (cotton tree), the decay of flower, by choosing November or

December as the months to plant, the flow of water from water source or, lastly, when the *gadung* tree (three-leaved yam) is starting to grow and climbing.

The farmers are also aware that measuring the rainfall is very important so that they will understand the amount of rainfall and the reality in the field. The rains are important as illustrated by this old Javanese saying “Yen lemahe wis empuk, tangane megar” literally translated as “when the soil is becoming wet, let your hand be ready for planting”. This evidence has contributed to our reflections for Findings Two and Three.

Information from BMKG regarding the La Nina was not reaching all farmers. The scientific information of climatic anomalies such as La Nina and El Nino was well understood and could have been predicted 3-6 months earlier, and this valuable information needed to be delivered by mediators to assist farmers in farming management. Information on La Nina was also needed to be anticipated for better planning, i.e. the timing of provision of rice seeds by the government to farmers should be adjusted to maximise the rainfall for rice growing based on the current climate prediction. The rainfall observation was also limited because rainfall observations were made only in the place at BPP office that might not be sufficiently representative of 2 sub villages where their latitude ranged from 70 m to 340 m above sea level. “The knowledge of the occurrence of El Nino and La Nina was known in advance to authorities. If this information from BMKG needed to be delivered by mediators in simple words so that farmers would get the benefit of climate change to manage their farm.” This evidence has contributed to our reflections for Finding Three.

In terms of climate adaptation, the government of Gunung Kidul has made a significant effort by revegetation of bare hilly land with timber tree species such as teak, acacia and mahogany. Farmers receive benefit in terms of the available water through revegetation and the timber value where selective timber harvesting is done for farmer emergency needs. The local community protects these forests as they are aware of the function of forests to save water, prevent erosion and generate income for timber. Most farmers in the two communities combined cash crops (rice, corn, soybean, chilli, peanut) and timber trees such as acacia, teak, mahogany in their land (agroforestry). The timber is also for their saving and only cut when they need money. As an aside, planting trees in their farm is one local knowledge point to make farmland more sheltered. Scientifically, timber trees maintain the surrounding air temperature, in order to keep plants from blooming quickly and productivity can be produced as optimally as possible. Higher temperature will accelerate flowering but decrease its productivity. Through the exchange learning, the Ngudi Mulyo farmer group and Melati women farmer group increased their knowledge on climate information, specifically about the La Nina phenomenon. At the time of writing, this was taking place (between September 2022 and March 2023) and causing high rainfall which was to impact the crops. This information helped farmers to decide what kind of crops they should plant and how to anticipate farmland flooding. In Ngudi Mulyo, the expert also shared about drip irrigation which is suitable for some types of plants. The farmers were excited to try this model for their plants such as tobacco and the exercise has demonstrated the value and importance of collaboration in addressing the consequences of climate change.

Acknowledgement

This information has been provided by community members in Giri Asih and Giri Jati Villages (Purwosari District, Gunung Kidul Regency). YAKKUM Emergency Unit continues to work with them. Thomas Wijaya was the facilitator for the knowledge exchange visit. His paper has been [published](#) by the European Journal of Environment and Earth Sciences.

Case study: Kiribati

Raweai, Bainuna and Rawannawi communities in Marakei Island hosted the climate exchange visits. The communities are grappling with issues of floods, droughts, increasing temperatures, water shortage and heat waves as well as contamination of existing water sources. Water shortage is common as the communities struggle to access clean water for domestic use or even for agriculture. Agricultural productivity has declined as the crops dry up due to the droughts or increased salinity of the soils, highlighting the multiple risks that communities are exposed to in the face of climate change.

The “sun is falling” defines and expresses how people, especially those who dwell in the rural communities understand and explain the concept of climate change. This statement reflects on the traditional knowledge that captures the concept of climate change and the impact it places on our daily and livelihood activities. Kiribati society is characterised by its retention of traditional beliefs and customs. Based on “Te katei ni Kiribati”²⁶, respect for the environment and the importance of its preservation is intrinsically valued. This promotes customary environmental management practices and local knowledge which has been essential to successfully living off the land. Local communities in Kiribati have applied their indigenous knowledge systems in gathering, predicting, interpreting and decision-making in relation to climate variability and weather events.

It was found that, whilst traditional knowledge plays a critical role in the way people respond to climate change scenarios, there is a clear decline in the application of traditional knowledge. Increasing population pressures are leading to a disregard of the traditional respect and bond that exists between people and their environment. Indeed, even as awareness of climate change and its consequences is present, communities increasingly look to the government for remedies to resolve issues. Meanwhile, the facilitator reflected that it was easier to share knowledge with local actors on climate change issues if it was discussed based on their own context. It was recommended that the interlinkages between different forms of knowledge could be further explored using community perspectives as a lens to describe, explain and predict situations.

Acknowledgement

This information has been provided by community members in Raweai, Bainuna and Rawannawi communities on Marakei Island. The Foundation of the Peoples of the South Pacific continues to work with

²⁶ Direct translation: Kiribati’s cultural values

them. Tokintakei Bakineti, Community Development Specialist with focus on climate change, was the facilitator for the knowledge exchange visit.

Case study: Tunisia

Kelibia is located on the shores of the Mediterranean Sea and faces challenges linked to climate hazards such as droughts, floods, coastal erosion, sea level rise, wildfires and increasing temperatures and humidity. The shortage of water is a common phenomenon but, but one that is taking on new dimensions in the current context of climate change, causing an increasingly accentuated climatic water deficit. The participants mentioned erosion and the retreat of the coastline, the infiltration (intrusion) of sea water into agricultural land and the risk of fires in the vegetation cover due to heat waves in recent years, highlighting the links between climate change and disaster risk. Findings from the climate exchange visit show that practices associated with ancient local knowledge of climate change adaptation and mitigation remain in place today. Domestic cisterns (Majel in Arabic or Foskiya) collect clean and even potable drinking water. These cisterns reduce the risk of flooding during rainstorms, and store drinking water for use during droughts.

The local population has historically known how to adapt to and mitigate drought and lack of water. This knowledge, inherited through generations, is put into practice by the “Ibn Chabat” system, which consists of an ingenious system of water management by local oasis communities, which are particularly vulnerable (for example, the Oasis of Tozeur and Nefta, amongst others). Other ancestral techniques of management and adaptation to drought and water pollution are also common in most Tunisian and North African cities. On the other hand, the same communities are called upon to manage episodes of excessive water abundance, in order to reduce catastrophic risks, for example the case of catastrophic flooding in the communities/cities of Beni Khalled and Nabeul in October 2018.

Acknowledgement

This information was provided by members of the urban community of Kelibia. The coordination of this case study was facilitated by the Association for the Protection of the Medina and the Heritage of Kelibia (ASMPK) and the Scientific Research Laboratory “Biogeography, Applied Climatology and Environmental Dynamics” (BICADE-University of Manouba). It was led by University Professors Mohamed Ftouhi (PHD) and Habib Ben Boubaker (PHD-HDR), Director of BICADE and President of ASMPK, as well as the support of the National Water Exploitation and Distribution Company (SONEDE- District Menzel Temime).

Case study: Uganda

In the Ugandan Teso region of Serere and Siroti, the community faces deforestation, cultural erosion and political upheaval. Wetland farming has also been used more extensively. These have led to short and long-term impacts such as flooding, drought, pests and diseases. Irrespective of the well-known climate change impacts in this region, little effort to counter these impacts has been applied in a region that continues to face a myriad of challenges. The community relies on indigenous weather forecasting methods in timing

rainfall. These include the perceived shape of the moon, the flowering of some tree species, the direction of the wind as well as emergence of some types of birds and insects. These methods have been challenged by wetland farming which has made it practically impossible to continue forecasting in this way. For example, the types of birds and insects are nowhere to be seen nowadays as they have migrated due to climate change and their natural habitats being encroached upon, and destroyed, by human beings for settlement or agriculture. Local community members also reported application of local knowledge in the conservation of water and soil, strategies which are currently rendered useless due to heavy flooding and persistent drought.

The visit has improved the cordial relationship with local government officials, the Ministry of Teso Affairs, the CSOs and the community members involved. It has helped the local CSOs to improve networking, partnership and collaboration with both state and non-state actors. Staff capacity for knowledge on environment, disaster reduction and climate change resilience has also improved through the shared learning. Equally the communities that SAF-TESO operates, and visited, benefited from awareness knowledge for mind-set, behaviour and attitude change towards environment conservation and protection. Communities have now started to plant trees in their household gardens to improve the environment and reduce climate change vulnerabilities. The facilitator shared knowledge with local government representatives on making bi-laws for environmental compliance in the management of wetlands, forests and natural resources. There is ongoing monitoring at these sites by SAF-TESO to work towards this aim, highlighting the importance and effectiveness of collaboration in the climate crisis. This evidence has contributed to our reflections for Finding Seven.

Acknowledgement

This information has been provided by community members in Soroti and Serere. SAF-Teso continues to work with them. Margaret Kaigongi (PhD) was the facilitator for the knowledge exchange visit.

Case study: Zimbabwe

Chimanimani District in Zimbabwe hosted the climate exchange visit. The area was hit by cyclone Idai in 2019 and is yet to fully recover from its devastating effects. In addition, the area faces droughts, floods, deforestation and soil erosion. This evidence has contributed to our reflections for Finding One.

Locally, climate change is referred to as “Ishanduko ya chongi”. Weather has of late become unpredictable and erratic across many parts of Zimbabwe. There have been increased shortages of water for agriculture and domestic use. In addition, bore holes and streams are drying up due to the destruction of riparian lands and water catchment areas. Temperatures are changing by becoming more extreme (either too hot or too cold). Rainy seasons are quite unpredictable and can cause flooding because the top layer of the soil is exposed and the trees and vegetation have been destroyed to be used as wood fuel and charcoal burning. From the findings, the community members indicated their understanding of the signs and effects of climate change at local level. They could cite cyclones (cyclone Idai in particular), droughts, drying of bore holes, erratic rains and short rain season as the main signs of climate change experience in the area. They

knew that the heavy deforestation of the land, due to utilisation of firewood and timber trading with the neighbouring Mutare City, was not conducive to addressing climate change.

It emerged that local knowledge of climate change is based on traditions (passed from one generation to another through folklore) and not based on outputs from modern weather forecasting technologies or from the meteorological office. According to the researcher, "The approaches on sustainable environmental management being promoted in the area is an Ecosystem Based approach. The community is prepared and encouraged to use their own local knowledge and skills in adapting to climate change effects and build local resilience."²⁷, thus highlighting the important and often overlooked role and capacity of local knowledge in addressing climate change.

The Ecosystem Based approach is promoted in Chimanimani in order to achieve sustainable environmental management. The community is prepared and encouraged to use their own local knowledge and skills in adapting to climate change effects and build local resilience. Planting of indigenous tree species including fruit crops is one of the ways the forest is being conserved while empowering the community. The tree seedlings are used to curb deforestation in the district whilst community members are able to sell more seedlings as well. For example, Ms. Mazungunya sold over 2,000 local tree species to CSOs working in conservation of nature. This was one of the community success stories: "Afforestation was identified as an important activity that can make the community resilient to flooding and cyclones in the future". Introduction of communal grazing land and sustainable management of pasture in Chimanimani, introduction of Indigenous Knowledge System in the management and preparedness to climate related risks and hazards are other coping mechanisms used by the communities.

With regards to beekeeping, the activity is used as a tool to help forest conservation while helping communities generate income. Bee keeping is one of the green economic livelihood practices in Chimanimani helping people to adapt to climate change by conserving forests (including watershed areas) where beehives are placed. Forests play a key role in reducing environmental shocks such as cyclones, areas with intact forest record less damages during cyclones as compared to areas with damaged vegetation. With erratic rains experienced in some parts of the district, semi-arid part in particular, beekeeping provides income to communities helping them adapt in terms of securing food for their families. In the Highlands part of Chimanimani, bee keeping is also a common activity used as a source of income by the communities. This is an environmentally friendly activity as it promotes forest conservation and protection of sensitive ecosystems which are key in providing services (e.g. water provisioning, flood control) to the people for climate change adaptation.

The exchange visit report highlights how the exchange of knowledge from different perspectives can therefore drive forward effective solutions to address climate change as evidenced in the findings and conclusions of this report.

²⁷ Zimbabwe report, page 11

Acknowledgement

This information has been provided by community members in Chimanimani District. The Nature Conservation and Development Trust continues to work with them. Adrian Phiri was the facilitator for the knowledge exchange visit.