

2023-11

# Developing an Understanding of Traditional Maasai Water Practices and Technology

Mwemezi, Rwiza

Brill

---

[https://doi.org/10.1163/9789004687769\\_009](https://doi.org/10.1163/9789004687769_009)

*Provided with love from The Nelson Mandela African Institution of Science and Technology*

# Developing an Understanding of Traditional Maasai Water Practices and Technologies

*Experiences from the Nyerere K4C Hub, Tanzania*

*Mwemezi Johaiven Rwiza, Haikael D. Martin and Ahmad Kipacha*

## Abstract

The African traditional knowledges and knowledge systems are on the brink of extinction. The indigenous knowledge of Africa has not been extensively studied and documented. In sub-Saharan Africa, the supremacy of colonial education in higher learning education has been responsible for erasing traditional knowledge. It is against this backdrop that a team of researchers from the Nyerere Knowledge for Change (K4C) Hub set out to investigate how traditional knowledges and modern, mainstream ways of knowing can be bridged. The study we report on was conducted in collaboration with the Maasai village leaders of Nduruma Village in Arusha, Northern Tanzania. Village committee meetings, interviews, group discussions, photograph taking, video recording, voice recording, and direct observation were among the methods used to gain knowledge on the Maasai traditional technologies of water management. The information gathered and shared in this case study contributes to building mutually beneficial expert-community partnerships.

## Keywords

Maasai communities – Indigenous knowledge – knowledge cultures – decolonisation of knowledge – CBPR methods

## 1 Introduction

Currently led by the Nelson Mandela African Institution of Science and Technology (NM-AIST) in Arusha, Tanzania, the Nyerere Knowledge for Change (K4C) Hub is part of the Global K4C Consortium. The goal of the Nyerere Hub is to build community-based participatory research capacity to address the United Nations Sustainable Development Goals (SDGs), with a focus on

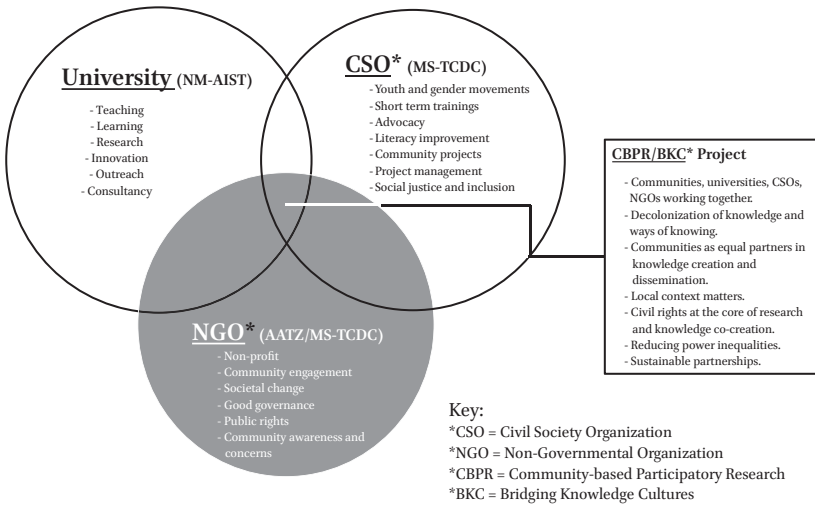


FIGURE 9.1 A pictorial representation of the diversity of the partners in the Nyerere Hub consortium and how the Bridging of Knowledge Cultures Project comes in

SDG4-6 and SDG13. This is done by designing and conducting educational programs aimed at developing research capacity for the co-creation of knowledge through collective action by professionals, community-based researchers, community groups, and academics.

The partners in the Nyerere Hub consortium form a university-advocacy-community triangle (Figure 9.1). The objectives, interests, and organisation culture within the consortium, although intersecting, may vary. For example, civil rights and advocacy, although important, are not the core business of the NM-AIST, which is a higher learning education (HLE) entity; but civil rights and advocacy form a core business for both the MS-Training Centre for Development Cooperation (MS-TCDC) and ActionAid Tanzania (AATZ). It was this variation in the Nyerere Hub consortium that fuelled the idea to research how traditional knowledge cultures, in this case the Maasai knowledge cultures, could reshape the mainstream thinking in HLEs, civil society organisations (CSOs), and non-governmental organisations (NGOs).

The NM-AIST is a typical colonised-education university characterised by a teacher-centered pedagogy rooted in Western science (le Grange 2019). Higher learning pedagogy rooted in postcolonial teaching and learning style has been shown to be less effective in the African learning context (ibid). For example, to date, six decades after independence, it is still rare for a Tanzanian, Mozambican, or Malawian construction company to win a contract of a multimillion-dollar road construction project. The curriculum at the engineering school the Tanzanian, Mozambican, or Malawian engineer has studied in is not directly

tailored to their context, thus hindering effective practice (Blom et al., 2015; Kaplinsky & Kraemer-Mbula, 2022; Kithiia & Majambo, 2020; Sherratt & Aboagye-Nimo, 2022). In most cases, in sub-Saharan Africa, what people grow up learning in their local community is usually detached from what they come to learn later in school and university settings (Seehawer & Breidlid, 2021). Therefore, universities and research institutions in Tanzania, and in most of the sub-Saharan Africa, still struggle when it comes to university-community linkages. For economic and social development, education that takes into account the culture and values of the community may help to avoid a mismatch between the missions and visions of education institutions and community problems (Coman, 2016; Ponnuswamy & Manohar, 2016; Tierney, 1988).

The Nyerere Hub is generally embedded in a postcolonial knowledge environment characterised by walls and fences in which the co-creation of knowledge is difficult (Seehawer & Breidlid, 2021). The NM-AIST has a motto: “Academia for Society and Industry”. However, NM-AIST trains its scholars using colonial tools and facilities, and the inclusion of ‘society’ has been questionable. MS-TCDC is, by design, an NGO (ActionAid – Denmark) and a CSO at the same time. The principles of community-based participatory research are key to the success of multipurpose and multicultural organisations such as MS-TCDC. The NGO culture is characterised by aid, donations, community involvement, empowerment, and advocacy, and this approach could serve communities better than the practice in higher learning education. However, emphasis on ‘management for results’ may mean that NGOs are more results-oriented than community-based (Claeyé, 2014). Furthermore, most NGOs are under pressure to operate as a ‘business-like’ organisation. This may pose some limitations on how NGOs deal with community problems. NGOs that use community-based approaches are known to be more successful compared to those that ignore the local contexts and community participation (Selman, 2004).

Rural communities of sub-Saharan Africa have an untapped wealth in the form of indigenous knowledge (Thakur et al., 2020), though this knowledge and associated practices ingrained in the local communities is gradually but steadily eroding and may even be lost in the next generations (Lwoga et al., 2010). The Nyerere Hub chose Maasai community water practices to learn how to better engage with community, consider prioritising research and projects that involve the community and action, and in doing so bridge the existing gaps between community knowledge and expert knowledge. The topic of water management addresses a multidimensional problem (ethics, rights, access, and management). The goal of the case study was to learn how universities and advocacy groups, CSOs and NGOs can work with communities

on equitable terms. By analysing how a Maasai community manages its community water project, we explored the Maasai knowledge culture. Hub partners and Maasai village leaders narrated and co-investigated their different knowledge cultures. By mapping differences in the two knowledge cultures we aimed to better inform delivery of educational and other services which do not neglect inclusion and co-creation with indigenous knowledge, and help establish more egalitarian and resilient expert-community relations. The knowledge systems within the hub and the knowledge gathered in this case study will help establish more.

Beginning with an overview and general background of the hub members, this chapter moves on to the methodology used in the research and how the data was analysed. The section on findings discusses key lessons learned. The chapter concludes with some of the hub's plans to bridge the Maasai knowledge cultures with the work of the hub.

## 2 Study Area and Participants

This study was carried out in Nduruma, a village 40 km from Arusha city, Tanzania (Figure 9.2). The village has a population of 12,000 (National Census, 2012) and an average family size of 5. The main economic activities in the village are agriculture and livestock keeping.

In this case study, participants were of two types: (1) village leaders, elders and (2) representatives from the hub partners. The village leaders/elders



FIGURE 9.2 Learning with the Nduruma village water committee leaders

represented the people of Nduruma while the hub representatives were the researchers (experts). One of the hub partners had previously worked in this Maasai village on a different project. This prior engagement led to the selection of Nduruma village for the BKC case study.

All pictures used in this chapter were taken with consent from the participants.

### 3 Methodology

Structured and nonstructured interviews were used to initiate a community conversation with the Maasai village leaders. The interviews focused on how the traditional knowledge about furrow maintenance, water distribution, and irrigation management was acquired, retained, and transferred. For example, how do the Maasai communities come up with new irrigation technologies? Researchers also performed onsite observation by participating in the village committee meetings and taking notes of how the meetings are conducted. Through observation we gained information on leadership patterns in Maasai communities.

#### 3.1 Data Collection

An introductory session preceded the village meetings. Facilitators kicked off the meeting by briefly introducing the role of community-based research in the decolonisation of knowledge (Figure 9.3), explaining that in community-based research there are no experts and laymen – we are co-learners and knowledge co-creators. The host villagers were excited to hear that their knowledge was valued and that not having formal education did not make them illiterate.

For triangulation purposes, different data collection tools were used. Also, different methods fit different environments better than others. Standard data collection methods such as interviews, observations, and focus groups were used. Participatory methods such as community mapping, photography, video recording, resource mapping, and story-telling were also used. A village leaders' workshop at NM-AIST was planned, but this was not possible due to time and budget constraints. The university was still determined to conduct at least one traditional knowledge workshop with the Maasai leaders. With signed consent (release letters), the village and the meetings were (1) recorded (voice), (2) filmed (video), and (3) photographed (pictures). As the meetings progressed, participants from the university and NGOs took notes in their notebooks. Voice clips, video clips, and pictures were taken using mobile phones. Maasai village leaders led the mapping of water and infrastructure resources by drawing on flipcharts. The flipcharts and marker pens were



FIGURE 9.3 The Nduruma water canal that serves Olmaroroi, Nduruma-Kati, and other subvillages in Mlangarini village. The canal passes through a largely semi-arid landscape of the Arusha region in Tanzania (Photo taken onsite)

brought in by the university participants. The interviews and discussions were held in Kiswahili (Swahili). Table 9.1 indicates how some of the methods were used during the study.

### 3.2 Analysis

The data collected was investigated by the hub team to consolidate lessons relevant to the ВКС project. The hub team also reviewed the pictures taken in the field to identify the ones to use in this chapter. The videos were watched by the hub members to augment the lessons learnt from the discussion notes. Likewise, the voice recordings were played to ensure key messages were not getting missed. The messages were synthesized in a report under the following heads: (1) Village lifeline: the water canal; (2) Water resource sustainability: a living classroom; (3) Maasai knowledge system and knowledge culture; (4) Canal history: the water heritage; (5) Not agricultural, but pastoral: the leadership heritage; (6) Water governance; (7) Cultural modernization; and (8) Age-set system, democracy, and culture.

As a dissemination strategy, a summary of the report was printed and shared with the Maasai village leaders in a workshop. The printout summary and the presentation were in Kiswahili. This was done to ensure that all participants understood the content of the report. The hub partners led the discussions. Whenever disagreement occurred, the village chairman (Maasai elder) would intervene to narrate the correct information that should be included in the report. This has a bearing on in-hub power relations. Like in any other formal organisation, the Maasai have a leader who comes in to settle disputes. Unlike

TABLE 9.1 A summary of the methods used during the study

No.	Method/Tool	Procedures
1.	Interviews	The interview schedule with open-ended questions was prepared by the hub members. One hub member was selected to lead the question-and-answer session with other hub members allowed to join in the discussion by asking follow-up questions and/or giving clarification to enrich the discussion.
2.	Observation	The hub members accompanied by the Maasai elders walked around the village. During the walks, different features of the village were recorded by either taking photos or by jotting down what was being discussed in the notebooks. The purpose was to gain more understand of what the day-to-day life in a Maasai village setting is like.
3.	Focus group	Apart from the discussions that resulted from the interview questions, there were sessions that were led thematically, e.g., leadership practices, water resource management, the importance of indigenous knowledge, etc. This was done with a few selected elders to gain a deeper understanding of how systems work in the Maasai knowledge culture.
4.	Community mapping/resource mapping	We asked the elders to draw maps indicating natural resources and settlement arrangement with a focus on water resources distribution. This encouraged rich discussions about indigenous natural resource management among the Maasai.
5.	Photography/video recording	The hub members were accompanied by a Maasai warrior (youth) who used a smartphone to take pictures in the village walks and during the meetings. During the introductory visits, the hub members helped the Maasai warrior learn how to take good pictures and videos using a smartphone.
6.	Storytelling	The village elders have a culture leader for their village who was also part of our field meetings. This Maasai elder narrated historical events relating to changes in climate and the changing of Maasai livelihood strategies. We also heard stories about how knowledge is transferred from one Maasai generation to another.



TABLE 9.2 A comparison of the Maasai traditional knowledge culture and higher learning education cultures

No.	Maasai knowledge culture	HLE knowledge culture
1.	Characterised by collective learning to improve the livelihoods of the whole community.	Individualistic and driven by personal achievements.
2.	Learning-intensive.	Teaching-intensive.
3.	Dominated by daily practice.	A mix of theoretical and practical components. In Africa, the theoretical component supersedes the practical component.
4.	Skills more important than achievements.	Importance laid on program completion and timely graduation with high grades.
5.	No accreditation bodies required.	Local and international accreditation an important feature.
6.	Gender segregation dominant.	Highly inclusive.
7.	Social values and age seniority over democratic practices.	Knowledge and democracy are compatible.
8.	High knowledge democracy. Knowledge acquired in an open community setting.	Operated under colonial principles. Knowledge walled in campuses, libraries, and auditoriums.
9.	Knowledge is a community property.	Copyrights and intellectual properties.
10.	Knowledge and skills are intergenerational and governed by culture and traditions.	Highly influenced by market forces. Demand-driven curricula.

in formal organisation settings, the Maasai leader must be a respected elder. Furthermore, in one of the focus group discussions, the village leaders were asked to compare the Maasai knowledge system against the formal education system. Their views were organised and are presented in Table 9.2.

#### 4 Discussions

In the following discussions, the excerpts are transcriptions from the audio-video recordings of the village meetings.

#### 4.1 *Lesson 1: Village Lifeline – The Water Canal*

We manage a water canal for livestock watering and irrigation purposes (Figure 9.4). The water canal serves two sub villages of Nduruma-Kati and Olmaroroi. But the canal goes as far as the neighbouring Mlangarini village. The water canal brings the village communities together to manage the water in the canal as ‘canal members’ come from the two sub-villages that were mentioned before, and from sub-villages in Mlangarini village. However, the water canal is owned by the Olmaroroi sub-village. (Village leader)

To us, the experts, and for the BKC project in particular, this was eye-opening. The fact that a natural resource brought the community together through shared knowledge on water management, led us to think can a resource and knowledge that is at risk bring the hub partners together? As a follow-up, the hub will run workshops in which the Maasai elders will be co-facilitators and co-trainers – focusing on traditional natural resource management and fostering of indigenous knowledge. A recent study conducted in the indigenous communities of Australia found that indigenous land and sea management promoted knowledge exchange, and generated opportunities for both learning and sharing to enhance the quality of life (Jarvis et al., 2021).



FIGURE 9.4 Preparation for a living classroom between formal education leaders and traditional Maasai water canal leaders

#### 4.2 *Lesson 2: Water Resource Sustainability – A Living Classroom*

This [the canal] is not just water; it is water for this and future generations. We are water stewards. There is a difference between wealth heritage and knowledge heritage. These are different. Our ancestors, the Maasai ancestors, made us inherit knowledge, not wealth. They did so with a purpose: they knew that by making us inherit good knowledge, we will definitely find wealth. This inheritance process works by ensuring that the Maasai child stays close to their father as the father performs his day-to-day duties. [Note: the Maasai culture is predominantly patriarchal]. As the child stays close to the father and sees his father working, they acquire knowledge, this is practical knowledge. But these fathers and grandfathers also acquire knowledge from their children and grandchildren. The children do not passively watch their elders to learn. These children work alongside their fathers and grandfathers. But, you know, children invent things. So, it is a living classroom for both groups – knowledge exchange between elders and the younger generation. (Maasai elder 1)

For sustainable university-community partnerships, the hub partners need to develop community-based curricula that has a large proportion of hands-on activities. As research by Bodorkós and Pataki (2009) indicates, for universities to sustainably work with communities, a possible methodology would be conducting participatory action research. This, they argue, would facilitate bottom-up sustainable planning and development in socio-economically disadvantaged rural communities. To this end, the hub members plan to work with communities on common research topics to address a community problem.

#### 4.3 *Lesson 3: Maasai Knowledge System and Knowledge Culture*

Our knowledge system, unlike the [post-colonial type, colonized] classroom, is highly dynamic. Our knowledge system is based on values. Younger generations must respect older generations. We have a highly strict ethical system. We cannot separate values and ethics from knowledge. They go together. For example, the value we place on cattle is almost religious [laugh]. Your cattle, your life – we say. We almost look at our herds the same way we look at our fellow humans [laugh]. No cattle, no Maasai. We do not have [commercial] banking systems. Our livestock is our bank and our economy. Our traditional water management practices are somehow better than what is usually taught in formal [engineering]

classes. We have had educated villagers come to our village with their classroom knowledge; very boastful. In most cases their classroom practices have failed, and these educated people end up getting frustrated. However, we have also had some educated people who came to live in our village, and they listened to us [we taught them how things work] and they live with us happily. We may not have received a formal education, but we know how life works here in the semiarid lands. We research, learn, and acquire knowledge while working. You fail, you do it again, until you pass. (Maasai elder 2)

The post-colonial, non-participatory, and teacher-centered model in higher education has largely failed Africa. A recent study of the Maasai students' experiences and their perception of the education process in Tanzania revealed that formal (post-colonial) education was challenging in a way that it was difficult for them to reconcile the requirements of their traditional life with those of formal schooling (Pesambili & Novelli 2021). It seems to us, that experts need to develop curricula that suits the needs of the community. In doing so, the bridging of knowledge cultures is inevitable. Curriculum design, development, and review must consider the needs of the immediate beneficiaries – the neighbouring community. Needs assessments, therefore, have to be community-based.

Community knowledge, handed down over generations, is not antagonistic to expert knowledge. The production, use, validation, and dissemination of community knowledge may revitalise university-community linkages by promoting local participation in higher education initiatives to counter the power asymmetries that usually hinder engagement with communities (Fernández-Llamazares & Cabeza, 2018). Social responsibility in higher learning requires academic and research institutions to open up to society's real problems, narrowing the expert-community power inequalities that exist (Bodorkós & Pataki, 2009). By borrowing experiences from local communities on how knowledge is generated and handed down from generation to generation, hub members may gain insights on how to practice a locally-relevant pedagogy. Our hub is currently not practicing this. The Nyerere hub will work with the neighboring Maasai communities to run workshops and informal classes for indigenous knowledge transfer.

#### 4.4 *Lesson 4: Canal History – The Water Heritage*

This water canal was established a long time ago by our forefathers. They built it from scratch. This was during the colonial era [before

1961]. At that time, there were no established villages – the Maasai were living freely, there were no maps, no delimitations, no modern land use planning, etc. The water canal was a private property owned by two Maasai elders [late]: Toviwo and Elkeleyoni. There was no need for a village water committee because the canal was privately owned by the two elders. If someone wanted a portion of this water, they would bring a token (a bag of sugar or a goat) and request to be permitted to use the water. These were very powerful elders. People feared them. In the past [pre-independence], this village was not as arid as today. There used to be rivers [points to a nearby gully]; and from these large rivers, our elders dug trenches to transfer water to their pasturelands. It is dryer these days. So, this canal is even more important today than it used to be in the 1960s. (Village water canal supervisor)

This is a great lesson to the universities in Tanzania and the hub members, in particular. We can see how the Maasai communities have been changing their practices to respond to socio-political and socio-economic changes. The canal started as private property and later, as the circumstances changed, ownership of the canal became communal. We can also see that water canal management in the beginning was nondemocratic, but over time a more democratic natural resource management system was introduced. Unlike the general perception of many African elites, the traditional systems are not conservative and static. Instead of criticizing rural communities for not being progressive, the hub members need to work collaboratively with communities as they grapple with changing environments, including climate change (Mapfumo et al., 2013). For the Nyerere Hub members, this would mean that we visit communities when writing research projects, to co-generate project concept notes and write proposals that address the community's problems.

#### 4.5 *Lesson 5: Not Agricultural, but Pastoral – The Leadership Heritage*

You may think that this canal was built to bring water to the village for irrigation. However, remember that the Maasai are traditionally pastoralists. Therefore, in the beginning, this water canal was made in order to bring water to the herds. Irrigation and smallholder farming came later, probably as a means to cope with the changing environments. Farming is new and when it started, most farmers depended on rains. When the rains became unreliable, these smallholder farmers began to ask for a portion of the canal water to irrigate their farms. Farming practices in our Maasai communities are, in themselves, a community classroom

for knowledge production, sharing, and usage. This is something we are learning. It is a very practical classroom. We have no teachers, we teach ourselves. And we are learning from each other. When a neighbour fails, you learn from their mistakes and do something different. [Because of the changing climate and increasing population], the implementation of water canal management was necessary to avoid disputes and conflicts over water use. The Maasai knowledge system is a continuously evolving living classroom [or laboratory]. As we speak, we have formal leadership for our canal water distribution and management – since the late 1980s. We conduct whole-village meetings to elect leaders. (Village chairman)

This is a situation referred to by Brock-Utne (1996) as coming “to terms with the situation in which even the social construction of a people’s reality is and has been constantly defined elsewhere” (p. 335). The African university (expert knowledge) is too ‘westernised’ to respond to the needs of Africa. African experts need to find its eyes in the eyes of her elders – in the rural ‘unlearned’ communities. The Nyerere Hub will advocate for a community-inclusive curriculum. Currently, stakeholders in curriculum development exclude the village and rural marginalised communities. Through our collaboration with the Maasai communities, the hub will seek community members’ participation during curriculum development and review stages. The NGO and CSO hub members will initiate campaigns for community-inclusive curricula; the university hub member will create the modalities through which community voices can be tapped during development and review of academic and research curricula.

#### 4.6 *Lesson 6: Water Governance*

In the beginning, there was no government interference with the village water committee leadership. The canal was managed according to the Maasai ‘age set’ system. Although the village government has a hand in the management of the water canal, the canal is still largely managed using traditional means. The elders are passing on the skills, knowledge, and culture of water management to the younger age groups. The elders are mentors, trainers, and teachers. The culture of water canal management is inheritable. It is passed on from one generation to another. The Maasai culture is a heritage one: one may go to formal school, but the governance structure is usually traditional. We listen to elders and prioritise herds over agriculture. It will probably always be that way. (Village chairman)

It would be of interest to the hub partners in the future to study the role of the Maasai age-set system on natural resource management in order to bridge the gap with indigenous knowledge cultures. In search for literature reflections on the Maasai age-set system and the role it plays in natural resource management, it was difficult to find published information on this subject. Bruyere et al. (2016) came close to decoding the role of the Maasai elders in transmitting knowledge to younger generations, recognising the scarcity of literature that explains traditional Maasai knowledge and how it can be passed on to future generations for sustainable environmental management.

#### 4.7 *Lesson 7: Cultural Modernization?*

The Maasai culture that used to be strict and strong, is gradually changing. The younger generations are slowly learning that farming can be equally profitable. They are learning from their non-traditionalist neighbours that having a smaller but well managed herd could be more profitable than having bigger but degraded herds. (Maasai elder 3)

In this change to more modern practices, there is a danger – the loss of traditional knowledge. Authors such as Bruyere et al. (2016) have said that

Communities have shifted to alternative modes of traditional knowledge transmission when the historically familial modes are weakened, or as more viable alternatives develop. These new and non-familial avenues for knowledge transmission have often emerged when communities undergo social and economic changes. (p. 3)

The Nyerere hub, by working with the Maasai communities, will look for funding to establish the 'Maasai indigenous knowledge bank' to prevent valuable knowledge from getting lost.

#### 4.8 *Lesson 8: Age-Set System, Democracy, and Culture*

We vote to get village leaders. Voters vote for people who they think will uphold our Maasai traditions. In the past, it was impossible for the younger members of the community to be voted to lead because that was against the traditions. However, that is changing. We have young leaders, but the elders were satisfied that these young ones were cultured enough before they were elected. The elders were satisfied that the young leaders would follow the traditions. The Maasai age-set system is nonetheless

still respected. Without the age-set system, there will be no values. The age set system is basically a value system. The age-set system is traditionally highly-coded – a group of young men who went for circumcision during the same period, have a specific name that refers only to them. A mention of the age-set name is loaded with information – of the year that this group of people attended the circumcision rituals, definitely of an approximate year that this group of people were born. The name of that particular age-set also carries a meaning – heavy rains, disaster, plentiful harvest, droughts, etc. “Korianga”, “Nyanguro”, “Seuri”, and “Makaa” are some of the Maasai age-set names, and they all have a meaning. The age-set names are made by a group of respected elders (the Laigwanans). They are not just random names. These names have a history imbedded in them. In our Maasai traditional (cultural) meetings, all age-sets participate. It is in such meetings where old-age knowledge is passed on from the very old generations to the younger generations. In such meetings, it is mostly the elders (the “Laigwanans”) who lead the conversations; the younger age-sets sit and listen. The wise elders (the Laigwanans who are knowledge specialists, the) have a special name, they are also the clan leaders. The Laigwanans are more or less like presidents. (Maasai elder 4)

The strict Maasai age-set system draws many controversies. Some scholars have argued that the Maasai age-set system is incompatible to the modern education system and may lead to increased illiteracy among males in the Maasai communities (Rohoh et al., 2010). Other scholars have argued, however, that the introduction of modern schooling system into the traditional Maasai age-set system has empowered Maasai girls who, customarily, would have been relegated by the age-set system to domestic duties; modern education could then be a useful tool in the preservation of the Maasai culture (Archambault, 2017). The tensions that exist between the Maasai age-set culture and how these can be reconciled by bridging knowledge cultures is still subject to research. The Nyerere Hub will encourage conversations around gender inclusivity in meetings with the Maasai communities; the hub will also run conversations with the Maasai community on the role of inclusive education for community development.

## 5 Water and Other Resources Mapping

The Maasai conversations was followed by the water and other village resources mapping. A flipchart was hung on a sycamore fig tree by the water



canal, and the Maasai leaders held marker pens to draw the village resources (Figure 9.5).

In the resource mapping session, the visiting researchers were surprised by how highly knowledgeable their village counterparts were. The completed resource map was excellent (Figure 9.6). The quality of the map was almost comparable to the Google map in Figure 9.2. This indicated that traditional knowledge and modern knowledge can be bridged to yield great results – although the Maasai elders did not go to a formal school to learn map drawing, they still could draw a good map, meaning that traditional knowledges and academic knowledge are synergistic. The question that is still bothering the research participants is: Why have African universities, to a large extent, ignored traditional knowledge? What we have included in Table 9.2 indicates that the postcolonial model university may not be the ‘only’ best fit for African education. African scholarship needs to rethink the postcolonial knowledge model by embracing participatory approaches. The renewed movement for the decolonisation of the African university should be started by African scholars. The marginalization by postcolonial education of the cultural uniqueness of different African societies and the consequences this marginalisation carries cannot be overemphasised (Prempeh 2022).

After the resource map, the villagers drew the leadership pattern for their village, i.e., the village water leadership organogram (Figure 9.6). The organogram

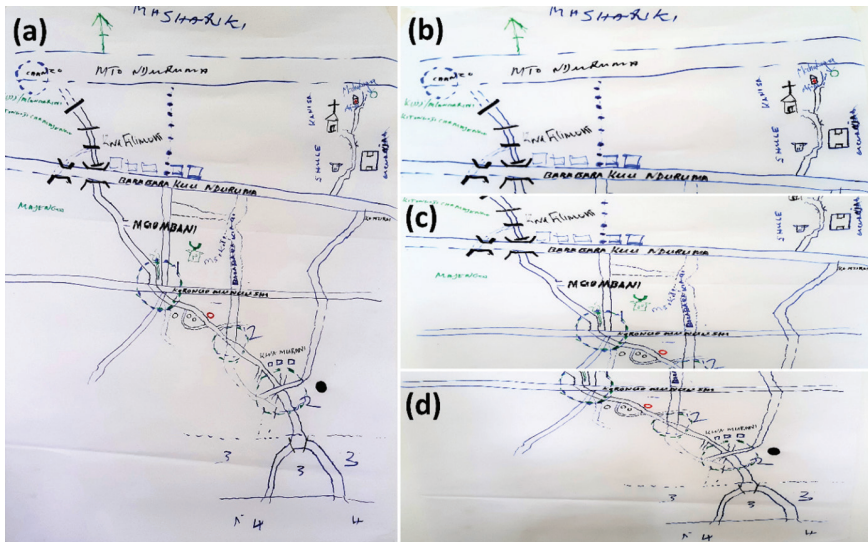


FIGURE 9.5 Resource map for Nduruma village drawn by the village water committee leaders – (a) the whole-village map, (b) to (d) zoom-in crops of the whole-village map

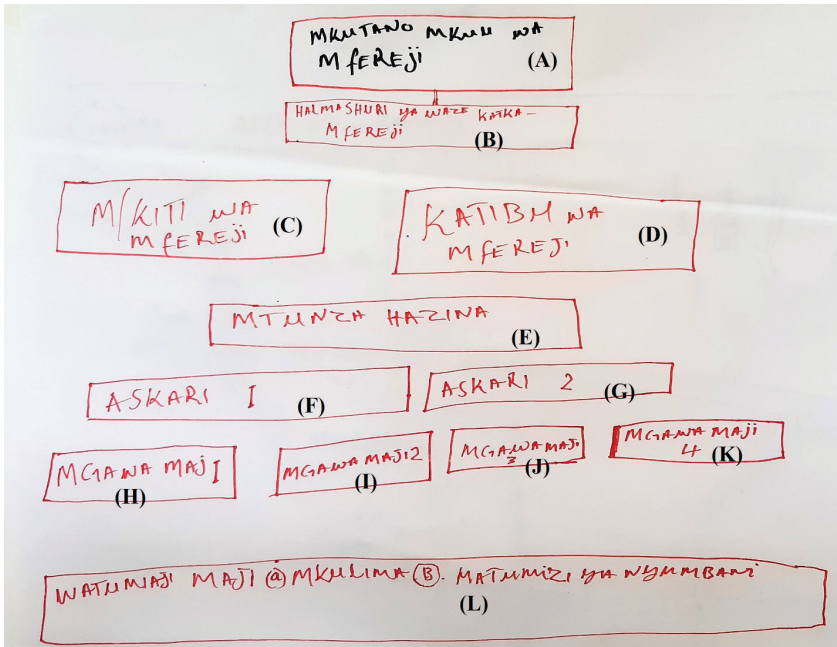


FIGURE 9.6 Village water canal leadership drawn by the water canal members of Nduruma village – (A) Village water canal general meeting; (B) The advisory council of elders; (C) Water canal chairperson; (D) Water canal secretary; (E) Water canal treasurer; (F) and (G) Water canal guards; (H) to (K) Water distribution persons; and (L) Water users

was simple and self-explanatory. The village water committee leaders did not include lines or arrows to join the boxes. Power relations and power dynamics are interpreted. Apart from organised leadership, the Maasai follow the culture-based traditional leadership that is difficult to draw – parallel to the formal water management system there is a complex age-set system playing in the background. This could be a reason why the village water committee leaders avoided drawing lines and arrows in the water canal leadership organogram. The village water canal management practices were well organised, and they were amicably optimised by the embedded culture and traditions. This a good lesson to university hydrologists and water resource management professionals. It is also a lesson for NGOs and CSOs working in rural areas to ensure access to safe and clean water for all. What the Western (North) literature identifies as underdevelopment in Africa is probably replicated in the African scholars' mindset (Chokor 2004; Njoh & Akiwumi 2012). Participatory research

methods could be used to mitigate the effects of the damaging colonial legacy in African HLE systems.

## 6 Maasai Knowledge versus Hub's Knowledge Systems: Bridging the Two Cultures

1. In Maasai traditional settings, knowledge is handed down over generations through storytelling and hands-on practice in which the younger generations learn from their elders. In the hub setting, knowledge is generated through scientific research, validated by reviewers, and shared through print media, videos, pictures, policy briefs, dissemination meetings, etc. By working together, methods such as storytelling, elder-youth engagement, practical skill impartation, whole-village meetings, and communal leadership used by the Maasai community to generate, validate, and transmit knowledge can be tapped by the hub members. Similarly, scientific technological methods such as observation, geo-mapping, photo-taking, and videography that are compatible with the Maasai culture may be transferred to the Maasai community in order to record and preserve their practices.
2. The hub members face difficulties relating to organisational change. The Maasai, although traditionally pastoralists, have managed to acquire and apply skills in agriculture and water management and transition into a pastoral-agricultural livelihood strategy. By working together, community knowledge on how to transition into a different business model may be beneficial to the hub members, who are accustomed to the NGO, CSO, university culture, i.e., the experts need to be less rigid to change, and learn to transition and operate in a way that is compatible for mutual understanding and enriched community engagement. The hub members should feel that it is their social responsibility to reach out and work with the Maasai community to document the livelihood transitions that the Maasai, have made in response to climate change and population growth.
3. Some cultural aspects of the Maasai culture are difficult (or so we felt) to bridge with the hub practices. While the age-set cultural aspect of the Maasai traditions is good for them, we felt that it marginalises women and girls and portrays elderly men as dominant figures in the community. The hub believes that the Maasai age-set system and its rigid structures will change as a result of community-CSO-NGO-university engagement.

4. The Maasai culture is loaded with power asymmetries, i.e., the position of the Laigwanans on social matters cannot be challenged. The Laigwanans are the community guardians whose word is final. Our hub strives for excellence in social and gender inclusivity. We acknowledge that there are some aspects of the Maasai culture that cannot be democratised. In the hub, we believe that as expert knowledge will gradually start change in response to including community knowledge, the same will happen in the Maasai community – and power inequities with also change.

Mutual change is essential for bridging knowledge cultures. Through co-generation, co-validation, and co-dissemination of knowledge, we hope the two knowledge systems will impact each other in a positive way. There are knowledge culture aspects such as equal opportunity and gender-inclusive practices that the Maasai communities can acquire from HLE institutions and CSOs to positively complement their traditional practices. There are also many knowledge culture aspects such as skill-based practices, learning by doing, intergenerational handing down of knowledge, etc., that HLE institutions, NGOs, and CSOs can acquire from the Maasai knowledge culture. This is not only limited to water management practices and technologies but also to the learning environment, mode of teaching, value system, knowledge democracy, etc.

### Acknowledgements

The research team would like to acknowledge the UNESCO Chair in Community Based Research and Social Responsibility in Higher Education for support and guidance. Many thanks to the Social Sciences and Humanities Research Council of Canada (SSHRC), Canada, for financial support. We would like to thank the Nelson Mandela African Institution of Science and Technology (NM-AIST), the MS-Training Center for Cooperation Development (MS-TCDC, ActionAid Denmark), and ActionAid Tanzania (AATZ) for supporting and hosting the Nyerere K4C Hub. The hub mentors are all appreciated. We, authors would like to thank the following village leaders and community members: Petro Toviwo Mollel, Mejool Toviwo Mollel, Elibariki Ng'idare, Alex Toviwo ole Merinye, Lucas Abraham, Mesiaki Mungaya, Sangau Toviwo Mollel, Peter Gombo, Thobias Ng'dare, Tayai Sumlei, and Jackson Lamiani. Many thanks to the then staff members at MS-TCDC and AATZ: Nkatha Mercy, Redimna Ginwas, and Zahra Mansoor.

## References

- Archambault, C. S. (2017). The pen is the spear of today: (Re)producing gender in the Maasai schooling setting. *Gender and Education*, 29(6), 731–747. <https://doi.org/10.1080/09540253.2016.1156061>
- Blom, A., Lan, G., & Adil, M. (2015). *Sub-Saharan African science, technology, engineering, and mathematics research: A decade of development*. World Bank Publications.
- Bodorkós, B., & Pataki, G. (2009). Linking academic and local knowledge: Community-based research and service learning for sustainable rural development in Hungary. *Journal of Cleaner Production*, 17(12), 1123–1131. <https://doi.org/10.1016/j.jclepro.2009.02.023>
- Brock-Utne, B. (1996). Globalisation of learning: The role of the universities in the South, with a special look at sub-Saharan Africa. *International Journal of Educational Development*, 16(4), 335–346. [https://doi.org/10.1016/S0738-0593\(96\)00055-7](https://doi.org/10.1016/S0738-0593(96)00055-7)
- Bruyere, B. L., Trimarco, J., & Lemungesi, S. (2016). A comparison of traditional plant knowledge between students and herders in northern Kenya. *Journal of Ethnobiology and Ethnomedicine*, 12(1), 48–48. <https://doi.org/10.1186/s13002-016-0121-z>
- Chokor, B. A. (2004). Perception and response to the challenge of poverty and environmental resource degradation in rural Nigeria: Case study from the Niger Delta. *Journal of Environmental Psychology*, 24(3), 305–318. <https://doi.org/10.1016/j.jenvp.2004.08.001>
- Claeyé, F. (2014). *Managing nongovernmental organizations: Culture, power and resistance*. Routledge.
- Coman, A. (2016). Organizational culture in higher education: Learning from the best. *European Journal of Social Science Education and Research*, 3(1), 135–145.
- Fernández-Llamazares, Á., & Cabeza, M. (2018). Rediscovering the potential of indigenous storytelling for conservation practice. *Conservation Letters*, 11(3), e12398.
- Jarvis, D., Stoeckl, N., Larson, S., Grainger, D., Addison, J., & Larson, A. (2021). The learning generated through indigenous natural resources management programs increases quality of life for indigenous people: Improving numerous contributors to wellbeing. *Ecological Economics*, 180, 106899. <https://doi.org/10.1016/j.ecolecon.2020.106899>
- Kaplinsky, R., & Kraemer-Mbula, E. (2022). Innovation and uneven development: The challenge for low- and middle-income economies. *Research Policy*, 51(2), 104394. <https://doi.org/10.1016/j.respol.2021.104394>
- Kithiia, J., & Majambo, G. (2020). Motion but no speed: Colonial to post-colonial status of water and sanitation service provision in Mombasa city. *Cities*, 107, 102867. <https://doi.org/10.1016/j.cities.2020.102867>

- le Grange, L. (2019). Rethinking learner-centred education: Bridging knowledge cultures. *Africa Education Review*, 16(6), 229–245. <https://doi.org/10.1080/18146627.2018.1464642>
- Lepore, W., Hall, B. L., & Tandon, R. (2021). The knowledge for change consortium: A decolonising approach to international collaboration in capacity-building in community-based participatory research. *Canadian Journal of Development Studies/Revue canadienne d'études du développement*, 42(3), 347–370.
- Lwoga, E. T., Ngulube, P., & Stilwell, C. (2010). Managing indigenous knowledge for sustainable agricultural development in developing countries: Knowledge management approaches in the social context. *The International Information & Library Review*, 42(3), 174–185. <https://doi.org/10.1016/j.iilr.2010.07.006>
- Mapfumo, P., Adjei-Nsiah, S., Mtambanengwe, F., Chikowo, R., & Giller, K. E. (2013). Participatory Action Research (PAR) as an entry point for supporting climate change adaptation by smallholder farmers in Africa. *Environmental Development*, 5, 6–22. <https://doi.org/10.1016/j.envdev.2012.11.001>
- Njoh, A. J., & Akiwumi, F. (2012). Colonial legacies, land policies and the millennium development goals: Lessons from Cameroon and Sierra Leone. *Habitat International*, 36(2), 210–218. <https://doi.org/10.1016/j.habitatint.2011.08.002>
- Pesambili, J. C., & Novelli, M. (2021). Maasai students' encounter with formal education: Their experiences with and perceptions of schooling processes in Monduli, Tanzania. *International Journal of Educational Research Open*, 2, 100044. <https://doi.org/10.1016/j.ijedro.2021.100044>
- Ponnuswamy, I., & Manohar, H. L. (2016). Impact of learning organization culture on performance in higher education institutions. *Studies in Higher Education*, 41(1), 21–36.
- Prempeh, C. (2022). Polishing the pearls of indigenous knowledge for inclusive social education in Ghana. *Social Sciences & Humanities Open*, 5(1), 100248. <https://doi.org/10.1016/j.ssaho.2022.100248>
- Rohoh, A., Chiuri, L., Matheka, R., & Bor, E. (2010). Effects of Murran system's indigenous knowledge on Maasai youth's school attendance in Narok District, Kenya. *African Research Review*, 4(3), 1–23. <https://doi.org/10.4314/afirrev.v4i3.60212>
- Seehawer, M., & Breidlid, A. (2021). Dialogue between epistemologies as quality education: Integrating knowledges in Sub-Saharan African classrooms to foster sustainability learning and contextually relevant education. *Social Sciences & Humanities Open*, 4(1), 100200. <https://doi.org/10.1016/j.ssaho.2021.100200>
- Selman, P. (2004). Community participation in the planning and management of cultural landscapes. *Journal of Environmental Planning and Management*, 47(3), 365–392.

- Sherratt, F., & Aboagye-Nimo, E. (2022). Decolonizing occupational safety management: The case of construction site safety culture in Ghana. *Safety Science*, 151, 105732. <https://doi.org/10.1016/j.ssci.2022.105732>
- Thakur, R., Rane, A. V., Harris, G., & Thakur, S. (2020). Future prospective and possible management of water resources in respect to indigenous technical knowledge in South Africa. In P. Singh, Y. Milshina, K. Tian, D. Gusain, & J. P. Bassin (Eds.), *Water conservation and wastewater treatment in BRICS Nations*. Elsevier.
- Tierney, W. G. (1988). Organizational culture in higher education: Defining the essentials. *The Journal of Higher Education*, 59(1), 2–21.