JOURNAL OF HUMAN DEVELOPMENT AND CAPABILITIES
2026, VOL. 27, NO. 1, 10–35
https://doi.org/10.1080/19452829.2025.2604140

Routledge
Taylor & Francis Group

SPECIAL ISSUE: EDUCATION, SUSTAINABILITY AND SOCIAL JUSTICE, PART 2

Ecological Heritage and Relational Informal Learning for Youth Development in Southern Africa

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ABSTRACT

This paper situates itself at the nexus of youth development and ecological heritage in Southern Africa, critically engaging with enduring challenges such as unemployment, poverty, and the gradual erosion of cultural identity. It examines the potential of *Moringa oleifera* as a key ecological resource for fostering sustainable livelihoods and reinforcing localised ecological and cultural heritage. Drawing on participatory methodologies including intergenerational learning sessions, field visits, policy dialogues, and knowledge exchanges, complemented by a short documentary, we explore how ecological heritage and relational informal learning can cultivate collective productive capabilities within emerging Moringa industries. Two key insights emerge from the study. First, relational informal learning rooted in community, land, and intergenerational ties demonstrates that ecological heritage can support sustainable livelihoods through culturally embedded knowledge, locally accessible resources, and ecologically resilient practices. Second, the interplay between intergenerational learning and ecological heritage produces collective productive capabilities that foster shared, economically oriented agency, enabling communities to create, organise, and sustain livelihood possibilities while engaging youth in socio-ecological care.

KEYWORDS

Ecological heritage; empowerment; Moringa; participatory approaches; Southern Africa; youth development

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Introduction

There is a growing need to address the limitations of traditional, school-centric models of education, often critiqued as "schoolification" (Ring, O'Sullivan, and Wall 2020), which privilege formal, classroom-based learning at the expense of other forms of knowledge development. This critique has prompted significant interest in learning processes that occur outside formal educational settings, particularly those that play a critical role in youth empowerment. Particularly in parts of the Global South, there is an increasing recognition of the importance of contextual factors, often conceptualised as skill ecosystems, that influence how young people acquire and apply skills in ways that advance youth development goals (Brown 2022). Emerging scholarship further highlights the "geographies of informal education" (Mills and Kraftl 2014) as crucial spaces for skill formation. For example, informal apprenticeship systems (Gough et al. 2019), community-based learning (Baldridge et al. 2017), and the homeplace as a site of learning (Cin et al. 2025) offer alternative modes of learning that challenge dominant neoliberal and human capital paradigms.

In line with this shift toward locally grounded knowledge systems, we examine the intersection of ecological heritage and youth development through a participatory, intergenerational, and transnational knowledge exchange project conducted in Zimbabwe and South Africa. Within this intersection, we explore how youth capabilities are formed through relational informal learning (RiL) that occurs through co-production, dialogue, and engagement with local knowledge. Our focus is on learning about, cultivating, and preserving Moringa trees in ways that communities identify as beneficial to them. This focus brings together local knowledge from rural communities, entrepreneurial experiences from Moringa producers, and botanical expertise from university-based researchers. To frame our contribution, we extend the concept of RiL by drawing on relational pedagogy (Hinsdale and Ljungblad 2016) and the notion of collective productive capabilities (Andreoni, Chang, and Estevez 2021). RiL is understood here as informal learning embedded in relationships, often occurring through intergenerational exchange. Ecological heritage is simultaneously conceptualised as a site for cultural preservation and a framework through which sustainability and youth development can be pursued. We argue that understanding these processes requires participatory and ongoing dialogue that recognises development as relational and dynamic, rather than linear or one-size-fits-all (Mkwananzi and Cin 2022).

Globally recognised as a superfood rich in nutrients (Amaglo, Deng, and Foidi 2017), Moringa presents opportunities for youth to access both local and international markets, while its ecological benefits, such as drought resistance and soil enhancement, align with broader climate adaptation goals (Moyo et al. 2024). As Maroyi (2006) notes, it also offers significant economic potential for youth-led innovation and enterprise, contributing to household nutrition,

livestock fodder, and climate-resilient agriculture. By bringing together RiL processes and ecological heritage practices, we highlight how youth capabilities can be expanded through collective and transnational engagements. In doing so, we contribute to ongoing debates about the value of community-rooted and place-based learning, the ways youth exercise collective and relational forms of agency in the Global South, and the role of Indigenous ecological heritage in shaping locally grounded approaches to sustainable development.

Ecological Heritage and Sustainability

Ecological heritage remains underrepresented in youth development and capability discourses, yet it has long been central to livelihoods, creativity, and public culture in Southern African societies. Knowledge embedded in ecological heritage, such as traditional wooden crafts and curio industries, has been passed down intergenerationally, with innovative adaptations over time (Herwitz 2012). Rooted in forest ecology, environmental insights, and vernacular histories, these industries offer valuable lessons about how informal apprenticeship practices take shape in local contexts (Mkwananzi, Cin, and Marovah, 2021; Masungo et al. 2025). We therefore position ecological heritage as a critical yet often overlooked dimension of youth development, where ecological principles are embedded in everyday practices and exemplify the enduring partnership between nature and culture (Nhambura 2024). The promotion of such a partnership can be seen through Global models, such as Education for Sustainable Development (ESD), which is increasingly integrated with local socio-ecological knowledge (O'Donoghue and Shava 2019). The United Nations University's Regional Centre of Expertise (RCE) Initiative, led by South African researchers, has also demonstrated how locally grounded knowledge systems address climate resilience and resource management (O'Donoghue, Shava, and Zazu 2013). By mapping the links between climate change, heritage, and learning commons, this RCE initiative foregrounds social innovation and social learning as key to heritage-based sustainability education, positioning learning commons as small-scale, practical, quality-of-life-enhancing spaces where heritage catalyses change in everyday practices (O'Donoghue, Zazu, and Peddie 2013).

While such insights mark important progress, we still lack a clear understanding of how relational and collective learning processes help communities navigate disruptions to ecological heritage and shape youth development. Knowledge is created through lived, interdependent relationships across generations, species, cultures, and environments (Cajete 1994; Desai and Smith 2018; Haraway 2016). In this view, learning occurs in and through relationships, which is a core principle of this paper. Poole (2023) argues that inadequate attention to ecological loss and sustainable coexistence erodes local knowledge, worsening community challenges. Informal learning grounded in lived relationships with land, people, and place resists mainstream educational

models that fragment ecological knowledge into abstract disciplines. Here, heritage learning involves engaging with ecology as a living system of meaning, memory, and responsibility. Traditional ecological knowledge offers a counter-narrative to colonial ecological frameworks by emphasising continuity, stewardship, and human-nature interdependence. Within this lens, humans and land become teachers, and learning unfolds through participation, storytelling, and practice (Cajete 1994).

Berkes, Colding, and Folke (2000) understand traditional ecological knowledge as cumulative, adaptive, and transmitted through cultural practices. It plays a vital role in community-based conservation, where innovation emerges in response to environmental crises (Ruiz-Mallén and Corbera 2013). While rigid governance structures can limit innovation (Koontz et al. 2015), relational learning provides pathways to overcome structural barriers by engaging elders, youth, and policymakers in co-creation and shared decision-making. Based on this, we now turn to the theoretical framing. We extend the capability approach (CA) through a relational lens, demonstrating how youth and communities co-create ecological knowledge, which leads to collective productive capabilities that support communal well-being.

A Theoretical Lens to Relational Learning: Building Collective and Productive Capabilities for Youth Development

In this section, we weave together relational learning, ecological heritage, and the capability approach to build a case for collective productive capabilities (CPCs). We extend CA theorisations by conceptualising relational learning as a process that fosters the development of collective and productive capabilities co-constructed through human – human and human – environment relationships, intergenerational knowledge exchange, and communal participation, thereby centering youth as active agents in co-shaping sustainable futures alongside their communities. As the CA focuses on people's fundamental freedoms to lead lives they have reason to value, it emphasises what young people in our study can effectively *do* and *be* as the central metric of sustainable and youth development. We account for communal, intergenerational, and contextual learning and development.

Relational Informal Learning

In this paper, we highlight the importance of relationality, arguing that capabilities emerge from interactions within complex social contexts. We extend the approach of relational pedagogy, which emphasises learner connections both inside and outside schooling (Hickey and Riddle 2024; Sidorkin 2022), to argue for a form of relational informal learning that encompasses community-level and youth development. The literature on relational learning (see Merry and Orsmond 2020; Konrad 2010) emphasises community-oriented

approaches to teaching, where learning is crucial to the development of a community of practice that involves boundary work and is produced through interaction within communities, manifesting in two key dimensions. First, relational learning highlights the affective, social, and emotional aspects of teaching and learning, involving trust, care, consistency, reciprocity, and non-hierarchical relationships that extend learning beyond rigid classroom boundaries into spaces where young people can reconnect education with their lives and identities (Smyth, McInerney, and Fish 2013). Second, it is conceptualised as the creation of connected, dialogical spaces that extend beyond formal classrooms into informal, extracurricular, and digital contexts, fostering co-creation, student agency, and cross-cultural engagement (Bamford and Moschini 2025). Although both perspectives flesh out the learning that occurs through the boundary work of negotiating meaning, roles, and practices across different contexts and communities, relational learning is, at the same time, key to relational pedagogy. Relational pedagogy primarily centres on the dynamic interplay between teachers and students and the activation of informality to foster meaningful connections (Edwards-Groves et al. 2010), underpinned by an ontological commitment to learning as unfolding within webs of relations and encounters where knowledge is co-produced (Hickey and Riddle, 2022). Margonis (2007) highlights that humans learn and act most powerfully in intersubjective spaces. Therefore, relational pedagogy serves as a disruption to the metrics and testing regimes of globalised accountability (Lingard et al. 2015). Instead, it positions learning as emerging in between spaces through dialogical exchanges marked by reciprocity and trust (Biesta, 2004; Smyth, McInerney, and Fish 2013).

Our approach extends relational pedagogy in three key ways. First, while relational pedagogy primarily focuses on the importance of informality, which can occur between teachers and students within a school context as well as among peers in informal settings, we broaden the scope to consider education as unfolding through lived and living practices within communities. Second, we emphasise community-based relationality, shifting attention beyond the teacher – student relationship to the ways people connect, share, and co-create knowledge in community settings. Third, we foreground boundary work (the dynamic space of interaction where people, ideas, and practices from different domains meet and influence one another) across contexts, recognising that relational learning takes place at the intersections of school, community, digital, and informal spaces where identities and capabilities are shaped. We argue for a conception of relational informal learning that views knowledge and skill development as collaborative processes and as a key intersecting concept deeply intertwined with ecological heritage, intergenerational wisdom, and community bonds.

Relational learning becomes a pathway for fostering collective productive capabilities, empowering young people to actively shape sustainable futures

rooted in their unique cultural and environmental contexts. It challenges dominant educational models that privilege abstract, decontextualised, and often Western-centric forms of knowledge, and instead centres epistemologies that are intersubjective, embodied, and place-based (de Oliveira Andreotti 2014; Cajete 1994; Desai and Smith 2018). Therefore, we consider relational learning as a form of informal learning, particularly in its emphasis on learning outside formal institutions through culturally embedded, community-led, and participatory processes that facilitate learning from others. For the youth in our project, informal learning created flexible and context-sensitive spaces for intergenerational and experiential learning about ecological heritage, enabling young people to acquire socially relevant and economically valuable capabilities. Thus, RiL both built knowledge and strengthened young people's economic capability by expanding the skills, confidence, and opportunities they have to convert ecological knowledge into meaningful livelihood strategies, whether through sustainable resource use, community enterprises, or environmental stewardship initiatives. In this way, RiL encouraged young people to actively shape knowledge and development pathways that matter to them and their communities. In the process, youth saw themselves as learners, inheritors, and stewards of ecological heritage, capable of contributing to the economic well-being of their communities.

For young people facing socio-economic marginalisation, the learning experience offers critical pathways for cultivating environmental literacy, resilience, and practical reasoning, which are capabilities that are essential for navigating ecological uncertainty and economic exclusion (Mbah, Ajaps, and Molthan-Hill 2021). In this instance, ecological heritage holds culturally grounded potential for economic well-being, enabling them to develop skills in land stewardship, herbal knowledge, and community-rooted forms of livelihood. From a capability perspective, learning about and with ecology supports both individual and collective flourishing by enabling young people to imagine alternative futures, aspire beyond immediate constraints, and participate meaningfully in shaping their communities. Therefore, we position ecological heritage as central to developing collective productive capabilities, showing how it can enable youth to survive economically and sustain cultural continuity in their futures.

Expansion of Relational to "Collective" and "Productive"

We argue that RiL, as a capability, yields collective opportunities and freedoms that benefit the broader group (Ibrahim 2006). The capabilities are often not developed in isolation but emerge through social processes, particularly in communities with shared interests, cultures, or goals (Evans 2002; Ibrahim 2006). For example, Ibrahim (2017) asserts that collective capabilities emerge through collective action, generating benefits for the common good and extending beyond individual capabilities. In youth development, especially those facing socio-economic marginalisation, collective capabilities are deeply

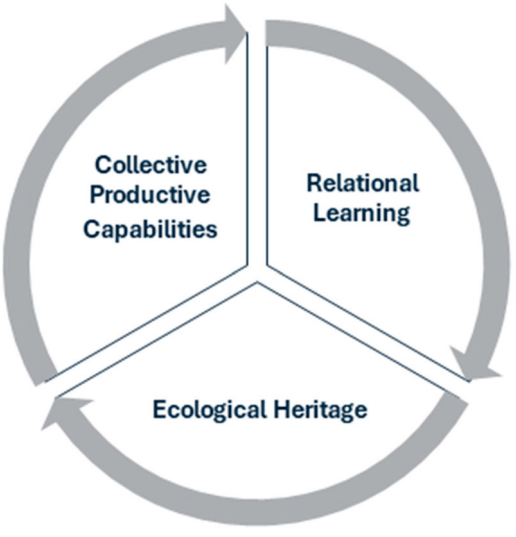


Figure 1. Conceptual relationship.

embedded in community-based and culturally grounded practices, such as preserving and harnessing ecological heritage. Therefore, we consider ecological heritage a vital resource for expanding *collective* into *productive* capabilities by generating new knowledge and enhancing development opportunities, including economic ones. Figure 1 illustrates this relationship.

In developing the concept of collective productive capabilities, Andreoni, Chang, and Estevez (2021) draw attention to productive activities (work), defining these capabilities as human or technical abilities (to make goods and services) that may be individually or collectively held but are always collectively constructed and deployed. The concept of collective productive capabilities refers specifically to the productive capabilities that cannot be possessed by individuals alone but can only be possessed by groups (Andreoni, Chang, and Estevez 2021). They are realised through coordinated production, organisational routines, and communal learning processes that enable societies to generate and sustain valued functionings (e.g. secure employment or improved living standards). Therefore, when van Staveren (2024) and Andreoni, Chang, and Estevez (2021) extend Ibrahim's notion of collective capabilities into the productive sphere, they stress that collective action is not only about mutual benefit but also about building and sustaining the material and organisational basis of development. This emphasis on productivity encompasses skills, knowledge, and resources, as well as opportunities and conditions that enable young people and their communities to participate meaningfully and sustainably in economic life. To this end, the functionings associated with collective productive capabilities include, for example, the ability to participate in decent and meaningful work and to benefit from structural transformations that improve wellbeing.

Such collective progression is especially relevant in contexts with insecure or limited employment opportunities, where connecting to ecology and engaging meaningfully with ecological knowledge enables young people to secure livelihoods and create income-generating opportunities. van Staveren (2024) deepens this perspective by highlighting the role of the community economy, an economic domain in which collective productive capabilities are not only required (e.g. for collective labour or resource management) but also developed (e.g. through locally rooted responses to food security or energy needs). In this economy, benefits largely remain within the community, which, because it is self-owned, self-managed, and democratically governed, enables youth to engage in meaningful work, such as ecological restoration, herbal medicine cultivation, or agroecological farming, that contributes to economic well-being and the collective good while reinforcing their role as capable change agents. Ecological heritage becomes both a cultural and environmental asset, as well as a foundation for building collective productive capabilities among young people.

We view collective productive capabilities as enabling youth and their communities to lead meaningful, sustainable, and interconnected lives. As shared opportunities and outcomes emerge through social and ecological relations, CPCs allow youth and their communities to pursue common objectives, navigate structural barriers, and co-create new, sustainable futures. This is particularly significant in less-resourced communities, where such capabilities can support more effective and equitable management of natural resources for the common good (Mkwananzi and Cin 2020; Stewart 2005). Furthermore, CPCs foster a sense of identity and solidarity, serving as prerequisites for expanding human freedoms (Anand 2007; Evans 2002; Ibrahim 2006). They create a community economy as a self-owned, self-managed, and democratically governed sphere where capabilities are required and developed. Thus, the instrumental value (livelihood security, income generation) becomes inseparable from the intrinsic and collective dimensions (cultural heritage, intergenerational wisdom, ecological stewardship). CPCs represent not a reductive economic tool, but a holistic mode of capability expansion that integrates economic resilience, cultural continuity, and ecological sustainability. In the findings section, we illustrate how relational informal learning supported the development of CPCs and the revitalisation and preservation of ecological heritage as part of a broader community economy. We now turn to the methodological process that informed this work.

Context and Methods

The research was conducted with multiple stakeholders, including youth in Binga, northwestern Zimbabwe, and in communities near the Kruger National Park, Mpumalanga, South Africa. Although both regions face comparable

socio-economic challenges, their agricultural practices and the role of youth in local development differ. Unevenly distributed tourism benefits shape economic opportunities in communities adjacent to Kruger National Park, often leading to unemployment rates exceeding 40% (SANParks 2022). Limited access to stable employment, vocational training, healthcare, and education renders youth vulnerable to high school dropout rates, substance abuse, and crime. Similarly, youth in Binga face unemployment, poverty, and unequal access to social services (Mkwananzi, Cin, and Marovah 2023). Persistent structural challenges have compelled many young people to migrate in search of employment, while those who remain are frequently excluded from meaningful decision-making in local development (Marovah and Mkwananzi 2020).

The transnational, multi-stakeholder collaboration at the heart of this paper initially emerged from two separate AHRC/GCRF Changing the Story Network Plus projects, later converging around Moringa as a focal point. The first project, Mapping Community Heritage with Youth in Rural South Africa (2020–2021), engaged Mpumalanga youth in exploring community heritage through interviews with elders and reflective workshops, with Pala Forerunners as the key local NGO partner. The second project, Youth Agency, Civic Engagement, and Sustainable Development: Ideas for Southern Africa (2020–2021), involved South African and UK researchers collaborating with Basilwizi Trust, Binga Community Museum (Zimbabwe), and The Support Centre for Land Change (South Africa) to enhance youth engagement in local development. A joint youth workshop in Pretoria in 2021 catalysed discussions on intergenerational and transnational knowledge exchange in ecological heritage. Follow-on funding enabled a joint bid focusing specifically on Moringa, youth development, and RiL. Through workshops, youth were introduced to the broader potential of Moringa beyond the limited Zimbabwean product range (tea and powder). They learned about diverse applications observed in South Africa, such as liquid fertiliser, mosquito repellent, lotions, cooking oil, energy drinks, and livestock pellets. They were exposed to other underutilised local resources, such as tamarind (busika) and cashew nuts, which remain undervalued for local economic development (Changing the Story 2022b).

To understand the potential of the Moringa industry in youth development, the project started with a Baseline Survey of Moringa Growing in 14 communities in the Greater Bushbuckridge Rural Municipality, in Mpumalanga Province, South Africa (a similar exercise could not be replicated in Zimbabwe due to logistical challenges at the time). Pala Forerunners' community-based youth researchers interviewed sixty-two Moringa growers in the study area. Our Primary aim was to understand the extent of Moringa growing among rural communities and the uses of Moringa products at the community level. Tables 1–3 below were generated from the data collected during the survey. As Table 1 shows, many respondents had two or fewer Moringa trees in their yards – those with four or more trees are in the minority. Table 2 shows the types of ailments treated with Moringa,

Table 1. Number of Moringa trees per respondent.

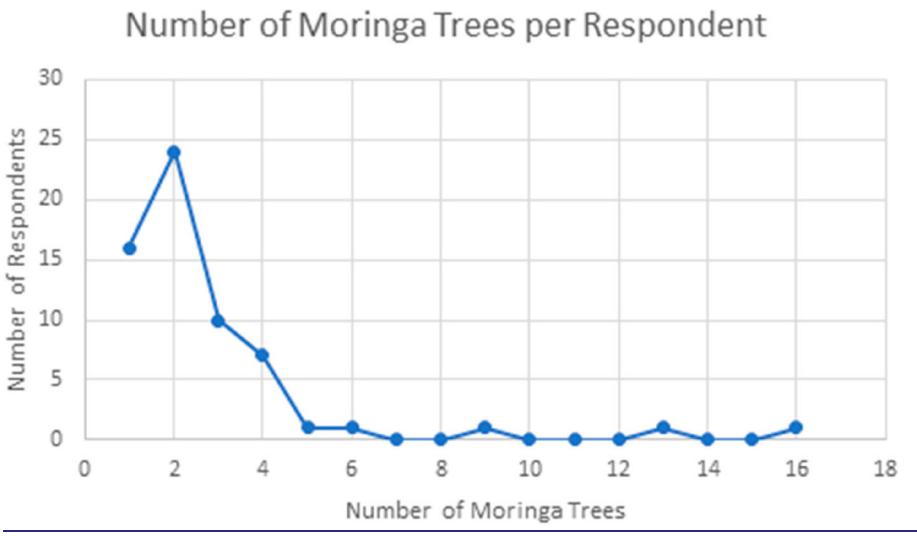
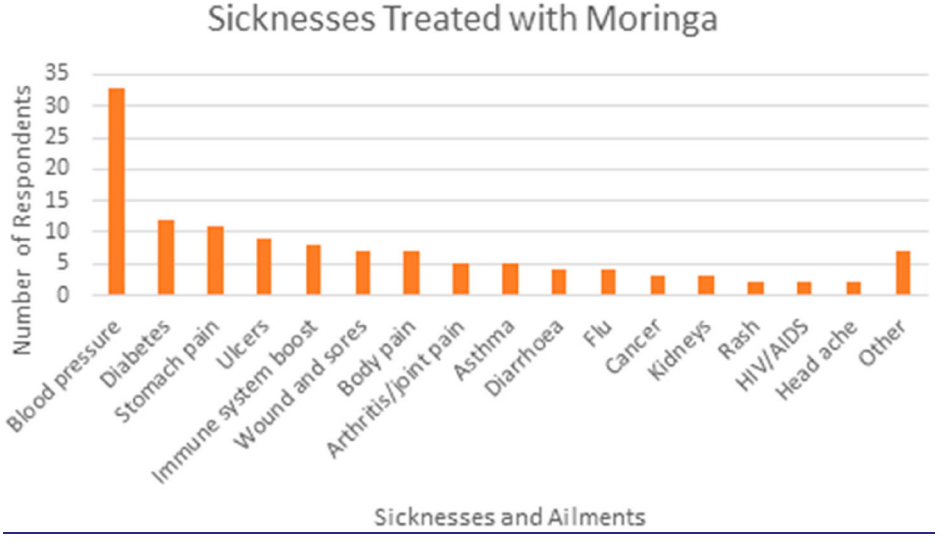


Table 2. Sicknesses treated with Moringa.

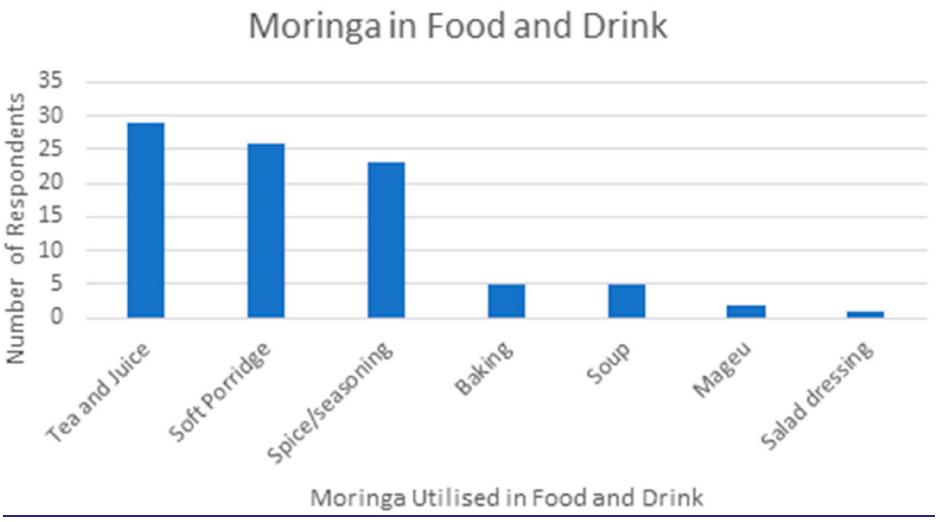


with blood pressure being the most common ailment for which locals use Moringa. Table 3 shows that Moringa's most popular culinary uses are related to tea, juices, spices/seasonings, and porridge.

Workshops

Following this survey, we planned workshops in both countries to discuss the diverse ways of knowing and practice in the Moringa value chain. The

Table 3. Moringa in food and drink.



workshops served as a capability-enhancing space, facilitating knowledge sharing about Moringa's historical and contemporary uses. While we were interested in how Moringa could be commercialised, we were also interested in the nexus of youth development, intergenerational learning, green skills, and "green learning agendas" (Kwauk and Casey 2021). Therefore, we brought together young people, policymakers, agriculturalists, industry experts, and local entrepreneurs to exchange knowledge about Moringa and explore opportunities in the Moringa industry. The goal was to galvanise action plans for addressing identified local needs. This collaborative approach accounted for the diversity of collaborators' experiences, as noted by Cooke and Soria-Donlan (2019). Failing to adopt such inclusive practices in development-focused research would disregard the unique knowledge, identities, and capabilities (opportunities) within communities (Marovah and Mkwananzi 2020).

The workshops, held sequentially in Mpumalanga (24–28 February 2022) and Binga (13–17 March, 2022), aimed to: (1) assess the extent of intergenerational knowledge transfer in Moringa-growing communities; (2) evaluate the emerging Moringa value chain to identify opportunities for youth development; and (3) galvanise action through policy engagement, knowledge empowerment, and exposure. Local partner organisations facilitated the selection of ten rural youths (five from each country) based on their prior work in the target communities. Additionally, two "expert" youths, one from each country, were included to assist participants in creating a short film at the end of the workshops through their videography and other technical skills. The workshops exposed participants to (a) community cultural and intergenerational knowledge, (b) botanical and agro-ecological knowledge about Moringa, (c) the Moringa product value chain, (d) national policy and engagement, and (e) co-

production of solutions to youth challenges. Of the ten youth participants, six were female, four were male, and all were black Africans aged between 20 and 35. Below is an outline of the workshop activities accomplished over the five days spent in each target area.

Day 1: Knowledge Exchange Sessions

In both country workshops, the first days focused on exchanging theoretical knowledge and introducing youth to Moringa's ecological heritage and commercial potential. Various experts, including community entrepreneurs, university-based botanists, policy specialists, and commercial agriculturalists involved in Moringa cultivation and processing, provided input. Experts outlined the basics of Moringa culture and ecology in each country. In South Africa, the day began with a discussion of baseline survey results and insights gathered from interviewing the youth, which foregrounded community perspectives. Highlights included a video lecture by a University of Pretoria botanist (the university maintains an experimental Moringa plot), input from a senior researcher at Mobile Agri Skills Development and Training, as well as a local lodge operator and a commercial farmer with a Moringa division. In Zimbabwe, the workshop also began with community perspectives, co-led by youth and a middle-aged community member interested in Moringa beneficiation. Figure 2 shows two Binga youths leading a session on Moringa

Figure 2. Binga youths leading a session on the communal uses of Moringa. Source: Photo courtesy of Junaid Oliphant.

community knowledge. Here, participants explored local vernacular nomenclature *(zakalanda)*, medicinal and traditional uses, and widespread beliefs from the 1990s that Moringa could cure HIV/AIDS. In both countries, youth were asked in advance to collect and share cultural knowledge about Moringa.

Day 2: The "Field School"

There is emergent thinking around "field schooling" and RiL (Graf 2024). In our case, we extended the meaning of the process to refer to actual visits to Moringa farms, as well as Moringa processing and retail ventures, which were designed to equip youths with "real-life" knowledge in addition to the theoretical knowledge they received earlier on Day 1. In South Africa, the team visited several Moringa value chain ventures in White River, including a Moringa nursery and a farm, an intercropped farm with Moringa, a homeopathic establishment that processes and dispenses Moringa-based alternative treatments, pellets for rabbit and chicken feed, liquid fertiliser, and other products. In Binga, we visited a home where Moringa is intercropped around the field, as well as a legacy plot from the 1990s initiative mentioned earlier.

Day 3: Participatory (Preparatory) co-production Activities

The third day was dedicated to reflection and co-creation of the next steps. Youth worked with facilitators to reflect on the learning from the previous two days (and indeed, the learning that took place before the workshops) and translate that knowledge into draft policy briefs. A policy briefing expert from the University of the Witwatersrand in Johannesburg provided input via video link. In Zimbabwe, the youth received input from a local entrepreneur. The policy briefs were prepared in advance of the policy engagement activities scheduled for the following day (Day 4).

Day 4: Policy Engagement

On the fourth day, workshop participants engaged with invited policy stakeholders to explore Moringa's potential for youth development. In South Africa, sessions included a provincial executive from the National Youth Development Agency (NYDA), a local MP, an official from the Department of Agriculture, and a member of the Mpumalanga Chamber of Commerce. Here, productive discussions took place about opportunities and obstacles to youth development. In Zimbabwe, the policy engagement sessions planned for the day were upended by a presidential rally in the area. A policy engagement event was later held by some team members at Lupane State University to showcase the workshop and initiate discussion around the findings outlined in the policy brief document prepared during the workshop.

Day 5: Summative Participatory Activities

The last day of workshopping included youth involvement in the design and co-creation of photo essays (one per country) and a short film capturing the main highlights of the workshop activities accomplished earlier in each country. We shared these with the project's funder and the youth participants, along with plans to maintain engagement with local stakeholders after the workshop. At the end of day 5 in each country, the youth were given Moringa seeds to plant in their communities.

Findings and Discussion

The project showed the interconnectedness of relational learning and ecological heritage, which we consider essential for youth development, particularly in contexts where young people face multiple forms of disadvantage. First, we discuss RiL as a necessary dimension for ecological heritage knowledge and ecological heritage as a potential channel for developing collective productive capabilities.

Relational Informal Learning for Ecological Heritage

The knowledge co-production in the workshops exemplifies RiL as a socially embedded, dialogic process unfolding through relationships among people, knowledge systems, and environments. Rather than hierarchical knowledge transfer, the workshops fostered horizontal learning by bringing together youth, elders, agricultural experts, and policy actors. Youth actively shaped discussions and innovations around Moringa cultivation, expanding their knowledge and imagining alternative futures within their communities. The workshops became informal learning spaces where experiential and scientific knowledge converged, revealing the potential of relational learning to drive personal empowerment and collective transformation.

As seen in Figure 2 above, two Binga youth lead a session on the community uses of Moringa. Central to their presentation was the vernacular Tonga name for Moringa: *zakalanda* or *muzakalanda,* which they emphasised as part of reclaiming ecological heritage. By foregrounding its local name and narrating its everyday uses, the youth demonstrated a deep, culturally rooted connection with their environment, which they had to reclaim through the intergenerational knowledge transfer process. They described Moringa's role in traditional dishes such as *chisyu* (a vegetable relish) and its use in making ash powder (soda) for preparing foods like *telele* (okra), underscoring how local biodiversity is embedded in food practices.

Additionally, its medicinal applications, such as treating eye infections and gastrointestinal conditions like *chiseni* (acute bloating), reflect traditional ecological knowledge passed down intergenerationally. One method they learned

from elders for treating *chiseni* involved crushing green Moringa leaves and applying the powder under the armpits and anus, highlighting how environmental resources are understood relationally through lived experiences, care, and ancestral knowledge systems. Through these practices, youth engagement reflects knowledge transfer and a form of ecological stewardship rooted in relational ways of knowing. One of the youths noted the value of this learning process:

> The value and potential of Moringa were not widely considered due to diminishing intergenerational knowledge transfer and a lack of meaningful stakeholder co-modelling of development strategies for Moringa products. This is important for us to think forward in how we can build on the knowledge of elders and the community. (Thabitha, Zimbabwean youth)

The community functioned as a valued learning space for exchanging ecological knowledge and expertise. The workshops strengthened the community's relationship with the environment while enhancing the youth's ability to preserve and engage in traditional ecological practices. Such interactions and knowledge provided the youth with a starting point to reimagine their future and communities, supported the conservation of meaningful cultural identities, and fostered agency among individuals to address contemporary challenges, including environmental sustainability and health.

Th′ese interactions created a participatory space in which youth and elders exchanged knowledge, strengthening the community's collective capabilities through active engagement with ecological heritage and intergenerational collaboration. This illustrates how the interconnectedness of individuals within social networks underpins the formation and exercise of capabilities. Within this relational framework, the youths' ability to lead discussions and envision entrepreneurial opportunities with Moringa was not simply an individual accomplishment but an outcome of their embeddedness in social and ecological relationships. Such bonds and community interactions foster an environment conducive to developing the collective productive capabilities necessary for group agency, cooperation, and the realisation of shared entrepreneurial potential. Participatory spaces, such as community gatherings and intergenerational exchanges, thus act as vital enablers of shared knowledge that supports capability development. Rendani shared:

> Our discussion has largely shaped my understanding of the Moringa tree. My family, especially elders, shared knowledge about its uses in cooking and medicine. Community gatherings often featured discussions about local flora, where people exchanged recipes and traditional remedies using Moringa. So, the information about Moringa is orally transmitted from one generation to another to preserve ecological knowledge (Rendani, Zimbabwean youth).

During the Binga "field school", the elderly Moringa growers shared memories of Moringa's pivotal role during the 1990s, when its nutritional value and

perceived benefits in managing HIV/AIDS garnered public recognition, highlighting its potential in health and wellbeing and demonstrating the community's agency in addressing crises through locally available resources. These discussions provided a foundation for participants to engage with Moringa's broader significance, linking past experiences to current opportunities for empowerment. A local Binga native and emerging entrepreneur, Mr Mulalo, outlined the critical requirements and prospects within the Moringa value chain, including land, water, seeds, technical knowledge, Moringa drying standards, organic certification, processing, and partnerships.

He further noted:

> At the processing level, there should be research on development so that Moringa products are in abundance. There should also be local market development so that most people know what they get from Moringa. (Mr Mulalo, Zimbabwean Moringa tea entrepreneur)

His sentiments on the value chain were echoed by an agricultural expert from Mpumalanga who shared that:

> This is what we need to look at, what resources do you have, what qualifications do you have to utilise the resources, and what plan of outcome is there with what you have access to. This is where we need to provide infrastructure, opportunity, secure markets so that people can … [produce] and we have to ring fence it for people to participate. (Mr. May, Department of Agriculture, Mpumalanga, South Africa)

Thabang, a local entrepreneur from Mbombela, in South Africa, highlighted the limited uptake of available government resources targeted at young people because:

> The people who are making presentations have no end-to-end. Someone says I want to farm, and [you ask them] where are you going to sell these things [and they say] I am going to look. So they are not going to make that money available. Yes, they want you to farm, but they don't want you to sit with [the produce]. One must be able to convince them where the bargain is and where the uptake is, and show them that when you get into that space, you are clear that there is an end-to-end (value chain).

The narratives above demonstrate that RiL constitutes a capability-enhancing process, primarily through its role in fostering meaningful engagement and learning with others, a function we have discussed earlier. These engagements enhance cultural and environmental capabilities by equipping youth with the skills and understanding necessary to navigate sustainability challenges. Such gatherings function as relational spaces that nurture collective agency and learning, enabling individuals to co-construct knowledge and preserve ecological heritage while adapting it to new contexts. They also take this collectivity a step further into productivity, which we explore in the next section.

From Collective Voices to "Productive" Opportunities for Youth Development

Reflecting on the preliminary stages of developing his Moringa-hibiscus tea blend, Mulalo shared the importance of partnerships in his business model. Initially focused on supplying Moringa leaves to Tanganda, a prominent tea company in Zimbabwe, he envisioned outsourcing the packaging of his tea blend to the same company. His narratives were crucial in leading discussions among the youth on the essential resources for venturing into Moringa production, while highlighting how collaboration and relational networks serve as conversion factors, enabling individuals and communities to transform available resources into valuable functions such as entrepreneurship and economic stability. The emphasis by the local entrepreneurs on the Moringa value chain and its entrepreneurial prospects equipped the youth with the knowledge and ability to deliberate on their future goals and the strategies needed to achieve their aspirations, and also collective productive capabilities through shared skills, knowledge, and resources that enable communities to participate in sustainable economic activities. Additionally, these relational collective spaces made the youth aware of the skills, capabilities, and support they need to make meaningful choices and develop their communities. The relational networks cultivated through the workshops, such as linking participants with local entrepreneurs and external organisations, were instrumental in inspiring shared aspirations for tangible outcomes, including developing business plans and planting their first Moringa trees, as we explain in the next section through the initiatives of Nxumalo, a youth leader and participant from South Africa. These networks enhanced access to resources and expanded the range of freedoms available to individuals and communities, fostering collective action toward shared objectives (Ibrahim 2006). Within relational collective learning, intergenerational knowledge transfer is fundamental to the process, and the two ways of knowing and sharing knowledge are important for youth development, as noted by two of the youths:

> The intergenerational knowledge of Moringa's uses and the practice of its farming could potentially help retain local heritage and promote indigenous knowledge systems and rural green economies. (Mengezi, South African youth)

The intergenerational knowledge transfer exemplifies a fundamental aspect of collective productive capabilities, preserving and propagating indigenous ecological knowledge and cultural heritage. As Mengezi noted, this transfer can bolster rural green economies and sustain local ecological and cultural assets, thereby reinforcing community resilience and identity. Similarly, Aneni highlighted that learning about sustainable practices and ecological resilience expands individual and collective capacities to adapt and thrive within their

environment, illustrating how ecological heritage can be embedded within collective productivity:

> The process of learning about its cultivation and uses has changed, or instead sharpened, my critical thinking skills, particularly regarding ecological sustainability and nutritional value. Additionally, cultivating and harvesting Moringa fostered resilience by teaching me the importance of sustainable practices and how to adapt to environmental changes, reinforcing a sense of responsibility towards nature. (Aneni, Zimbabwean youth)

As the youth noted, the opportunity for the intergenerational transfer of knowledge and skills from one generation to another is crucial for preserving ecological heritage and promoting cultural continuity. The workshops, intergenerational sessions, and the use of community spaces as learning sites and narrative platforms highlight that intergenerational knowledge ensures the continuity of cultural heritage by developing cultural capabilities to participate in and shape cultural life, including ecological practices, rituals, and symbols that express collective identity and values, through embedding the stewardship of ecological practices within broader narratives of identity, heritage, and wellbeing. In addition, relational learning emerges as a pathway to collective agency. Intergenerational knowledge is not merely transactional; it is profoundly relational. Knowledge shared through community gatherings and oral traditions fosters trust, collaboration, and shared purpose. It creates a sense of collective agency that empowers communities to address shared challenges, such as environmental sustainability, and leverages relational learning to co-create solutions. By linking individuals, local entrepreneurs, and external organisations, the networks particularly enhance access to resources, markets,

Figure 3. Green shoots: Joy's Moringa nursery. Source: Photo courtesy of Iris Nxumalo, May 2022.

Figure 4. Moringa trees from Joy's Nursery in 2024. Source: Photo courtesy of Iris Nxumalo, December 2024.

and knowledge; key conversion factors that expand freedoms and enable community-wide participation in economic and ecological practices. The workshops further demonstrated that, when utilised responsibly, ecological heritage can foster the development of sustainable capabilities that enable communities to manage and preserve resources effectively. From a capability lens, these opportunities bridge ecological knowledge with the ability to sustain resources for future generations, reinforcing the long-term importance of intergenerational knowledge transfer. In the next section, we look into such sustainable thinking.

Thinking Sustainably

We acknowledge the inherent challenges posed by projects with limited time frames and finite budgets, such as ours. These constraints can limit sustained engagement with stakeholders. However, in recognition of these limitations, we suggested the creation of a Moringa Youth Champions Programme in South Africa to create opportunities for youth to cultivate their capabilities in sustainable agriculture and entrepreneurship. By distributing Moringa seed packets to youth participants, the programme aimed to provide tangible resources and a foundation for developing business proposals to be submitted to the NYDA for funding. The local NGO, Pala Forerunners, continues to serve as the lead in this activity, providing mentorship and guidance that enhances the youths' capacity to take meaningful steps toward their goals. This, for us, is evidence that not only did the youth acquire opportunities but were

empowered to take on these new opportunities to flourish in and with their communities.

From a development viewpoint, which, according to Sen (1999), should expand people's freedoms to achieve valued beings and doings and advance their agency to take action that brings about change, the relational collective learning opportunity demonstrates how those around us often propel action. In this case, collective learning supports skills development and contributes to sustainable development by nurturing stewardship, intergenerational accountability, and a deeper connection to environmental heritage. In South Africa, the youth were motivated by the learning process and shared that they planned to start championing Moringa production, processing, and utilisation in the communities (Changing the Story 2022a).

As for the workshops in Zimbabwe, Miriro, a youth coordinator for a local organisation, highlighted the importance of workshops in terms of bonding the community to work together:

> Our community has organised workshops on Moringa cultivation, where people share thoughts and techniques for growing and utilising the tree. These collective efforts have improved local food security and strengthened community bonds by working together. We address malnutrition and economic instability, increasing our community's overall resilience.

In terms of thinking sustainably, we see that the youth's desire to champion Moringa in their communities reflects an understanding of sustainable development principles, including the use of local resources responsibly, promoting food security, and creating internal capacities (such as knowledge and attitudes) for ongoing production and use without depleting natural assets.

A few months after the workshops, Nxumalo, set up a business with some of her community members. Using the Moringa seeds distributed during the programme, Joy reported registering a cooperative certificate, securing a portion of land, creating job opportunities, and beginning the process of clearing and fencing the plot:

> We have managed to register the cooperative certificate, and we have managed to get a portion of land. We are busy trying to get it cleared and fenced. (Joy) (Figures 3 and 4)

Joy's actions demonstrate a forward-looking approach that emphasises sustainable resource management and local economic resilience, establishing a cooperative, securing land, and actively working on clearing and fencing. Thus, she is laying the groundwork for sustainable use and stewardship of ecological resources. Her focus on long-term land management and collective effort reflects an understanding that sustainable development depends on responsible ecological practices, local ownership, and community-driven initiatives. Therefore, we can argue that thinking sustainably involves nurturing long-term,

responsible engagement with ecological resources through collective action, skills, and knowledge.

Returning to RiL, the workshops reinforce earlier assertions that RiL is a socially embedded process unfolding through relationships. Rather than hierarchical knowledge transfer, the workshops fostered horizontal learning by bringing together youth, elders, agricultural experts, and policy actors. Youth actively shaped discussions and innovations around Moringa cultivation, expanding their knowledge and imagining alternative futures within their communities. This mutual engagement supported the development of collective capabilities**,** recognised intergenerational knowledge systems, and contributed to ecological and cultural sustainability.

Conclusion

In this research, we have examined the intersection of youth development and ecological heritage in Southern Africa, addressing the lived challenges faced by young people in Zimbabwe and South Africa. Our findings indicate two crucial points. First, relational informal learning rooted in community, land, and intergenerational ties shows that ecological heritage, as exemplified by *Moringa oleifera,* can be vital for sustainable livelihoods because it provides culturally embedded knowledge, locally available resources, and ecologically resilient practices that communities can draw on in times of socio-economic and environmental stress. Second, the study illustrates how intergenerational learning and ecological heritage constitute collective capabilities through which communities imagine, organise, and pursue sustainable futures. These relational processes cultivate forms of cooperation, creativity, and shared agency that extend beyond individual skills, enabling young people to participate in community wellbeing and socio-ecological stewardship. Although grounded in Southern African contexts, these insights have broader relevance: communities worldwide confronting socio-ecological pressures can draw on participatory, place-based approaches rooted in Indigenous knowledge systems to strengthen collective capacities for resilience and sustainable development. Sustainable futures, then, are less built than grown through the relational practices, ecological inheritances, and collective capabilities that shape how communities imagine and enact the lives they have reason to value.

Acknowledgements

This research was funded by the Arts and Humanities Research Council and Global Challenges Research Fund – Changing the Story Network Plus Project, under grant number AH/R005354/1.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Data access statement

The data for this project are situated in the countries where the research was conducted. To obtain access to the data, please contact Dr. Faith Mkwananzi at the University of the Free State, South Africa.

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