



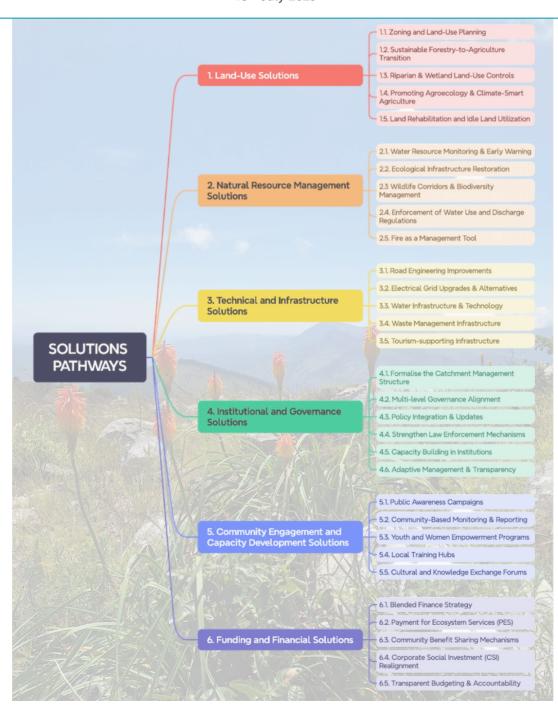






Solution Pathways

Summary document ahead of the 2^{nd} Multi-Stakeholder Meeting 13^{th} July 2025



The solution pathways

The interview data and the stakeholder workshop inputs point to a wide array of what the project team is referring to as 'solution pathways'. A solution pathway is less about an individual intervention or measure, and more about a series of **integrated**, <u>interdependent</u> interventions, policies, and transformations designed to address complex environmental and socio-economic challenges over time. The solution pathways are listed and defined in Table 1 below.

Table 1: Summary of the solution pathways.

SOLUTION PATHWAY		DEFINITION
1	Land-use solutions	These solutions pertain to managing how land is utilized in the catchment to balance development and conservation
2	Natural resource management solutions	These solutions focus on actively managing water, soil, and biological resources
3	Technical and infrastructure solutions	These solutions involve built or engineered interventions
4	Institutional and governance solutions	These solutions refer to changes in organisations, policies, and decision-making processes
5	Community engagement and capacity development solutions	These solutions focus on empowering local communities and stakeholder groups
6	Funding and financial solutions	These solutions deal with securing and managing money for plan implementation

Each solution pathway has five specific solutions (with the exception of the institutional and governance solutions pathway, which has six solutions), for a total of <u>31 specific solutions</u>. These are summarised in the tree diagram in Figure 1, with each solution described in detail in the following Table 2. Note that <u>Appendix I</u> contains an acronym list.

Our intention is that these solution pathways align with stakeholder inputs and existing initiatives, extending the input into potentially actionable programs. We think that adopting a mix of these will address many of the multi-dimensional challenges of the Upper Groot Letaba (UGL). The key is that these pathways are interconnected:

- success in securing funding will enable infrastructure fixes;
- strong institutions will better implement land-use and natural resource management (NRM) solutions;
- community engagement will maintain the infrastructure and support policy changes, and so forth.

In recognition of the interdependent nature of the challenges facing the UGL, the landscape plan will be based on a systems approach, proposing an integrated set of measures that can work together synergistically (i.e. where the interventions complement one another, forming mutually reinforcing, positive feedback loops, rather than the interventions working against one another via balancing loops and effects).



Figure 1: Tree diagram of the six solution pathways, with their associated solutions. See Table 2 for a full description of each solution.

Table 2: Description of each solution, within the associated solution pathway, for all six pathways. See $\underline{\text{Appendix I}}$ for the acronym list.

Solution pathway	Solution	Solution description
	1.1. Zoning and Land-Use Planning	Implement land-use zoning that directs intensive agriculture and housing to less sensitive areas, while designating critical recharge zones, steep slopes, and biodiversity hotspots as conservation or low-intensity use zones.
		For example, use the Spatial Development Framework (SDF) to enforce that "Ecotourism is important in SDF on R71" and "protection of sensitive areas and ecosystems".
		Integrate CBA (Critical Biodiversity Area) maps into municipal plans, effectively making certain land off-limits to conversion.
	1.2. Sustainable Forestry-	Guide the conversion of pine plantations to orchards so that it follows best practices, for example:
	to- Agriculture Transition	Clear felling is phased to avoid large soil exposure at once (preventing erosion), maintain buffer strips of natural vegetation between new orchards, and perhaps keep some plantation blocks as windbreaks or carbon sinks.
1. Land-Use Solutions		Work with forestry companies and new farmers to ensure land-use change does not lead to water overallocation or loss of corridors. The idea of "coherent and viable corridors for more than avian species" speaks to maintaining green linkages even as land use changes. Also, where pine is removed, assess if all should become orchards or if some marginal lands should be restored to grassland or indigenous forest for ecosystem service benefits.
These solutions	1.3. Riparian and Wetland Land-Use Controls	Establish a strict rule (through municipal by-laws or enforcement of national regulations) that the 30m riparian zone is a no-development zone - meaning no ploughing, no building.
pertain to managing how land is utilized in the		As part of land-use solutions, re-forest or allow for natural vegetation in those riparian strips. Possibly incentivize this by not counting that 30m in taxable land area or offering rates rebates.
catchment to balance development and conservation		Some stakeholders proposed "guidelines for riparian abstraction and corridors" - this would be a concrete output: a published guideline for landowners on do's and don'ts near watercourses (e.g., how to maintain a healthy buffer, permitted activities, etc.).
	1.4. Promoting Agro- ecology and Climate- Smart Agriculture	On existing agricultural lands, encourage agroecological practices - such as contour farming, cover cropping to reduce runoff, agroforestry (mixing trees with crops in appropriate zones), and organic farming where feasible. This aligns with suggestions to reduce chemical runoff and with organic farming promotion.
		A land-use solution here means shifting the agricultural land management paradigm to one that enhances soil and water conservation.
		The Department of Agriculture (DoA) can pilot demonstration plots or farms using these techniques within B81A to showcase benefits.
	1.5. Land Rehab- ilitation and Idle Land Utilization	Identify "land that is not being utilized and/or lying fallow" as per DoA's mapping (like fallow farms, or degraded lands) and design rehabilitation projects - e.g., reforestation, or allocation to community farming if appropriate. This is a land-use solution where stakeholders (perhaps through the Chamber or a land reform program) could facilitate partnerships on those lands, turning them either productive in a sustainable way or into conservation areas if unsuitable for farming. It ties into transformation goals as well - maybe involve emerging farmers in utilizing some of that land with mentorship from commercial farmers (a partnership approach to land use).

Solution pathway	Solution	Solution description
	2.1. Water Resource Monitoring & Early Warning	 Set-up continuous monitoring for river flows and quality. A solution in progress as mentioned: "Early warning system for water quality and spillages". Concretely, install sensors at key points (above and below Haenertsburg, above Ebenezer Dam, below major WWTWs) that track turbidity, chemical indicators, etc. Link this to a communication system (SMS or app) that alerts the WUA and other authorities if thresholds are exceeded (e.g., a sudden drop in oxygen indicating pollution).
		This way, resource managers can respond swiftly to incidents (natural or human-caused).
	2.2. Ecological Infra- structure Restoration	Treat the landscape's natural features as infrastructure to be restored. This includes: rehabilitating wetlands so they store water (e.g., plugging old drainage ditches if any in peatlands, replanting wetland vegetation), doing soil conservation works on eroded hill slopes (like gabions in gullies, planting vetiver grass hedges), and ensuring the "sponge" function of the uplands is optimized. Some suggested nature-based solutions (NbS) include planting indigenous
		trees where appropriate, removing alien trees (overlaps with invasives program), and using green engineering (like planting along road verges to reduce wash-off).
2. Natural Resource Man- agement Solutions These solutions focus on actively managing water,	2.3. Wildlife Corridors and Biodiversity Management	Work on a micro-scale to maintain corridors for wildlife. One mentioned solution was "coherent corridors not just for birds" - meaning ensure that as fencing goes up, some passages (like culverts under roads, or unfenced stretches along riparian zones) allow movement of small mammals, reptiles, etc. This might involve agreements with landowners to keep some fence gates open or use permeable fencing in certain areas. Additionally, a natural-resource management plan should address human-wildlife conflict (if any increase as land use changes) - e.g., monkeys or baboons raiding new orchards - to proactively mitigate through deterrents rather than killing, preserving biodiversity.
soil, and biological resources	2.4. Enforcement of Water Use	Strengthen the capacity for monitoring and enforcement by natural resource regulators.
	and Discharge Regulations	For DWS: ensure each lawful water user is actually measuring and reporting use - possibly roll out a program to install smart meters on large abstractions. Crackdown on "illegal connection on the pipeline/bulk water transfer" by forming a task team to inspect pipelines.
		For discharge: enforce that industries (like the mention of "Peppadew plant off-take" and other agri-processors) have proper effluent treatment.
		This might mean issuing new license conditions or conducting joint inspections with the WUA present to ensure compliance, thereby managing water resources (quantity and quality) within legal limits.
	2.5. Fire as a Management Tool	Under natural resource management, incorporate fire regime management for those ecosystems that need it (grasslands, to some extent pine plantation understories with controlled burns, etc.). Develop a burn schedule for the Haenertsburg grasslands in consultation with FroHG and fire authorities, use fire breaks effectively, and treat fire as both a hazard to mitigate and a tool to maintain ecosystem health.
		For plantations and farms, ensure they have updated fire management plans (some mentioned the need to implement the fire management plan). The solution includes training and equipping community fire volunteers (a Fire Protection Association outcome).

Solution pathway	Solution	Solution description
	3.1. Road Engineering Improve- ments	Move from temporary fixes to lasting engineering solutions on roads. For example, install concrete spillways on steep sections to prevent washouts, line critical culverts to handle flash floods, and consider paving the most critical stretches (even if just one lane or passing points) to ensure year-round access. Apply "low-volume road design" principles since traffic is not heavy-meaning using appropriate camber, drainage, and gravel quality rather than ignoring standards. A specific solution might be to target Georges Valley Road with a mix of pothole filling and selective tar patches on worst sections, combined with clear roadside drainage. Meanwhile, equip communities with reported "weekend clearing groups"* to help keep roads clear of fallen trees etc. (the data mentioned weekend clearing for invasives, but could also be applied to road maintenance like clearing debris).
	3.2. Electrical Grid Upgrades and Alternatives	For the Eskom grid, short-term technical fixes include installing reclosers (automatic circuit breakers that can reconnect after transient faults, useful for rural lines) and sectionalizing the network to minimize outage spread. Longer-term, bury lines in key segments prone to trees or move lines to road servitudes where easier to maintain. Also, explore alternative energy solutions: e.g., a pilot solar mini-grid in Haenertsburg to back up essential services (so when Eskom fails, water pumps and communications stay on via solar plus battery at the water treatment works, cell tower, etc.).
3. Technical and Infra-		This would address some stakeholders' concerns about communication failures during power outages - i.e. a technical fix where Tango Tower (repeater) could be equipped with a dedicated solar+ battery so it is not reliant on grid. This can be done relatively affordably and would maintain emergency communications.
Structure Solutions These solutions involve built or engineered interventions	3.3. Water Infra- structure & Technology	Construct small, locally appropriate infrastructure such as sand dams or retention weirs in upstream tributaries to enhance groundwater recharge (nature-based but engineered) - this has been effective in other water-scarce areas to increase dry season baseflow. Fix leaking canals by lining them or replacing with pipes (technical solution requiring capital). Introduce smart metering and telemetry for big water users - as a tech solution to transparency, larger farms and water schemes could have telemetry that the WUA/DWS can monitor in real-time to ensure compliance. Similarly, install automated weather stations and stream gauges feeding data to a central system - technology that helps in planning water releases and
	3.4. Waste Man- agement Infra-	restrictions (coupled with early warning as mentioned). On solid waste, mention was made of "need waste management services and plans for all developments" and improving recycling at source.
	structure	 Technical solutions here might include setting up a proper waste transfer station near Haenertsburg (with separation for recyclables, which could be tied into Howzit Market or community employment), and exploring small-scale waste-to-compost or biogas solutions for organic waste (given many agricultural and sawmill wastes were noted). The local solid waste issues (like no landfill nearby and dumping) could be alleviated by a well-designed drop-off that's "aesthetically pleasing" and
	3.5. Tourism- supporting Infra- structure	functional, combined with periodic haulage to a licensed site - a technical/operational fix for a cleaner environment. Build or improve minor infrastructure to support tourism: e.g., viewpoints and signage, safety measures at waterfalls (rails, steps), public toilets at key sites (Debengeni, scenic lookouts), and maybe a small info centre in Haenertsburg that doubles as a market for local crafts. These are infrastructure in the sense of facilities installation, relatively low-cost but high impact for visitor experience, aligning with LEDET's suggestions of stopover facilities, braai spots, etc. If tourism is to grow, such infrastructure is needed and was indeed mentioned by stakeholders as lacking.

Solution pathway	Solution	Solution description
	4.1. Formalise the Catchment Management Structure	As recommended, create the Upper Letaba Catchment Forum or strengthen the proto-CMA (Catchment Management Agency) functions. Institutionalize roles - e.g., the forum could have sub-committees for water allocation, for environment, for LED, mirroring the main issues. Ensure regular reporting and feedback into government planning cycles (the forum can produce an annual "State of the Catchment" report to inform IDPs, etc.). Essentially, fill the current governance gap with a multi-stakeholder institution with legitimacy.
	4.2. Multi-level Governance Alignment	Put in place protocols for alignment between district and local municipality for the B81A area (since it was noted B81A "belongs" to GTM but Mopani District Municipality (MDM) must coordinate). A solution might be an Inter-governmental Working Group on Upper Letaba involving officials from Mopani (IDP, water) and GTM (planning, environment, etc.) that meets and reports to both councils. Also, mainstream catchment objectives in provincial departments (like ensure the provincial LED strategy and provincial climate adaptation plans reference the Upper Letaba Landscape Plan once done - this requires political support).
4. Institutional and Governance Solutions	4.3. Policy Integration and Updates	If existing policies hinder collaboration, update them. For instance, if WUAs historically focus only on farmers, update its constitution to include environmental objectives - making it a model WUA that addresses ecological infrastructure (which might even require DWS to allow WUA funds/time spent on such issues). Locally, consider creating a Conservancy or Protected Environment status via provincial law for parts of B81A that brings landowners and authorities into co- management (this is institutionalizing a collaborative management as seen in other regions).
These solutions refer to changes in organisations, policies, and decision-making processes	4.4. Strengthen Law Enforcement Mechanisms	Perhaps create an Environmental Compliance Forum under LEDET that includes local community monitors. This is institutional - basically an alliance between LEDET, DWS enforcement, municipal environmental management, and community watchdogs (like MEW) to share intelligence and coordinate responses to illegal activities. It might push for joint operations (e.g., a multi-agency blitz on illegal dumping or water theft). The governance solution is to break the silo enforcement by institutionalizing a cooperative approach.
	4.5. Capacity Building in Institutions	Governance also fails due to capacity gaps; thus a solution is targeted capacity building: train municipal officials on landscape approaches, hire or assign a dedicated Catchment Coordinator in the municipality (someone who liaises with all stakeholders, essentially implementing recommendations like a catchment officer). Also, for Traditional Authority governance, maybe formalize their involvement via an MoU or by including them in project steering committees, giving them a governance voice beyond land rights. Another example: incorporate catchment priorities into ward committee agendas, bridging formal municipal governance with community voices.
	4.6. Adaptive Management and Transparency	Institute a practice of adaptive management in institutional operations - e.g., annually review what interventions worked or not in the catchment with stakeholders, and adjust plans accordingly. This can be part of the Forum's Terms of Reference (ToR). Also, commit to transparency - e.g., Mopani's suggestion that project progress should go to council for resolution is about making sure there's oversight and follow-through. So governance solutions include ensuring decisions and progress in catchment management are formally recorded and endorsed by political structures, giving them authority and accountability.

Solution pathway	Solution	Solution description
	5.1. Public Awareness Campaigns	Launch a series of awareness campaigns like "Put Water in the Boardroom" but also "Put Water in the Classroom and Community Hall."
		Engage schools via eco-clubs (as mentioned earlier), but also do roadshows in villages explaining the Landscape Plan, why invasives should be cleared, how communities benefit from protecting the catchment.
		Use local radio to broadcast segments on "Letaba - Our Lifeline" featuring local voices (maybe a chat with a farmer, a municipal officer, and a community member about water issues - to build mutual understanding). MEW's quote "we need to put water in the board room" implies high-level, but let's also put it in everyone's minds through education.
	5.2. Community- Based Monitoring	Train and designate volunteer "catchment guardians" in communities - ordinary citizens who are eyes and ears on the ground for issues like illegal dumping, new invasive outbreaks, or water leaks.
	and Reporting	Provide them a clear channel to report (perhaps via WhatsApp group directly to responsible officials or the Catchment Forum).
5.		This not only augments capacity but engages people in stewardship. If possible, provide a stipend or recognition for their role (perhaps funded through CSR or EPWP as environmental monitors).
Community Engagement	5.3. Youth and Women Empowerment Programs	As part of capacity development, tailor programs to involve youth and women (who often fetch water and manage home gardens).
and Capacity Development Solutions		For example, start a Youth Environmental Service program where young people get a year of training and work experience in catchment management (assisting with field surveys, clean-ups, awareness events).
These solutions focus on empowering local communities and		This could be supported by national youth programs. Also, ensure women are included in WUA committees or forum leadership, given their stake in water and community well-being, thus building their capacity in decision-making.
stakeholder groups	5.4. Local Training Hubs	Collaborate with the University of Limpopo or local TVET colleges (e.g. Letaba TVET) to set up a satellite training hub in Haenertsburg or Tzaneen focusing on water management, agriculture, and tourism skills relevant to the Landscape Plan.
		Offer short courses, such as:
		To farmers on efficient irrigation,to municipal staff on GIS,
		to community members on hospitality basics
		(all of which would build local capacity so that external experts are less needed over time).
	5.5. Cultural and Knowledge Exchange	Sometimes engagement is about building mutual respect. Consider organizing periodic "Letaba Indabas" - community dialogues where different stakeholder groups present their perspective:
	Forums	For example, one indaba on "water and culture" could have traditional leaders discuss cultural use of water sites, another could have farmers discussing irrigation needs, etc., fostering empathy and shared solutions (such as keeping certain sacred pools off-limits to pumping).
		This soft solution can strengthen the social fabric and get community buy-in for tough compromises by giving everyone a voice.

Solution pathway	Solution	Solution description
	6.1. Blended Finance Strategy	Develop a funding strategy that mixes public funds, donor grants, and private investments. For instance: leverage government programs like Working for Water (for invasives), Working on Fire, MIG (Municipal Infrastructure Grant) for water schemes, etc., ensuring B81A gets a share by submitting strong project proposals. Complement the above with donor funding - the Partners for Water grant is one, but also explore EU, GEF (Global Environment Facility) or corporate foundations interested in water-food nexus.
	6.2. Payment for Ecosystem	Prepare a Landscape Investment Portfolio highlighting projects ready for funding (with cost-benefit outlined) to present to potential funders (Chamber's idea of mapping opportunities can feed into this). Introduce a PES scheme where downstream water users (for example, a municipality or large agribusiness benefiting from cleaner, more
	Services (PES)	reliable water) pay into a fund that supports upstream conservation actions by communities or landowners. > This could be voluntary initially - e.g., Lepelle Northern Water or even Kruger National Park (downstream on Letaba) might contribute to such a fund recognizing the value of the Strategic Water Source Area (SWSA).
6. Funding and	6.2 Community	Over time, advocate for a portion of water tariffs to be earmarked for catchment management (this exists in some places as a "water resource management charge"). This creates a sustainable finance stream directly tied to ecosystem service maintenance.
Financial Solutions	6.3. Community Benefit Sharing Mechanisms	Ensure that any revenue from new activities (like tourism entrance fees, or carbon credits if, say, reforestation yields carbon finance) has a portion flowing to local communities/trusts. > For example, if Debengeni Falls had a small entry fee, part goes to GTM for maintenance, part to a community fund for villages around the falls.
These solutions deal with securing and managing money for plan implementation		Similarly, if a corporate sponsor funds alien clearing, maybe agree that a percentage of contracted work goes to local SMMEs or community co-ops - keeping money local and incentivizing community support.
	6.4. Corporate Social Investment	Work with large companies in or affecting the catchment (like ZZ2, timber companies, Eskom perhaps for powerline maintenance) to channel their CSI projects into Landscape Plan priorities.
	(CSI) Realignment	The Chamber's push for "transformation in CSR to focus on long-term, meaningful support" means instead of ad hoc donations, corporates could adopt, say, a 5-year project of funding a nursery for indigenous plants used in restoration, or sponsoring the WUA's monitoring equipment, etc.
		Establish a Corporate Stewardship Roundtable where businesses commit funding or in-kind support to specific plan components (with public recognition given - e.g., "This wetland rehabilitated with support from X company").
	6.5. Transparent Budgeting and Accountability	Financial solutions also include how funds are managed. Setting up a multi-stakeholder fund (perhaps managed by an NGO/NPO) dedicated to catchment projects could improve trust that money is used as intended (versus funnelling into general municipal budget where it might get diverted).
		Also, regularly publish financial reports of what has been spent on catchment activities (for instance, how Working for Water funds were used, how much the municipality invested, etc.) - this transparency can encourage continued funding (donors and taxpayers see results) and discourage misuse. It also helps the forum lobby for more funds by showing current spending gaps.

Appendix I: Acronyms

AWARD	Association for Water and Rural Development	
СВА	Critical Biodiversity Areas	
СМА	Catchment Management Agency	
CME	Compliance Monitoring & Enforcement	
CSI / CSR	Corporate Social Investment / Responsibility	
CoGTA	Department of Cooperative Governance and Traditional Affairs	
DARDLEA	Department of Agriculture, Rural Development and Environmental Affairs	
DFFE	Department of Forestry, Fisheries and the Environment	
DoA	Department of Agriculture (national department)	
DSS	Decision support system	
DWS	Department of Water and Sanitation	
EbA	Ecosystem-based Adaptation	
EPWP	Extended Public Works Programme	
EU	European Union	
EWR	Ecological water requirements	
FroHG	Friends of Haenertsburg Grasslands	
HADEF	Haenertsburg Development Foundation	
HRRA	Haenertsburg Residents and Ratepayers Association	
GTM	Greater Tzaneen Municipality	
IBT	inter-basin transfer	
IDP	Integrated Development Plan	
IWRM		
K2C	Integrated Water Resources Management	
KNP	Kruger to Canyons Biosphere Region NPC	
LDARD	Kruger National Park Limpopo Department of Agriculture and Rural Development	
LEDET	Limpopo Department of Agriculture and Rural Development Limpopo Department of Economic Development, Environment and Tourism	
LED	Local Economic Development	
LM	Local Municipality	
LNW	Lepelle Northern Water	
LWUA	Letaba Water Users Association	
MAPEO	Mukhufi Agro-Processing and Essential Oils	
MAR	Mean annual runoff	
MDM	Mopani District Municipality	
MEW	Mountain Environmental Watch	
NbS	nature-based solutions	
NGO	Non-Governmental Organisation	
NPC	Non-profit Company	
PES		
ROI	Payment for Ecosystem Services Return on Investment	
SANBI	Return on Investment South African National Riodiversity Institute	
SANParks	South African National Biodiversity Institute South African National Parks	
SANS 241	South African National Parks South African National Standards No. 241 (applies to the quality of potable/drinking water)	
SDF	Spatial Development Framework	
SES	Socio-ecological system	
SWSAs	Strategic Water Source Areas	
TA	Traditional Authority / Authorities	
14	Traditional Authority / Authorities	

ToR	Terms of Reference	
TVET	Technical, Vocational, Educational, and Training colleges	
UGL	Upper Groot Letaba	
WC/WDM	Water conservation / water demand management	
WGG	Woodbush Granite Grassland	
WMA	Water Management Area	
WSA	Water Services Authority	
WTW	Water Treatment Works	
WUA	Water User Association	
WUL	Water Use License	
wwtw	Waste Water Treatment Works	

Acknowledgements

This document reports on work undertaken as part of the project entitled 'Just Landscape Transition Plan for the Upper Groot Letaba catchment' (Assignment 202407084 / PVW524WB02), funded by Partners for Water (Ministry of Economic Affairs and Climate Policy, Kingdom of the Netherlands). We gratefully acknowledge the funding and programmatic support provided by the Dutch government.

The implementation of the project is led by the Association for Water and Rural Development (AWARD) and supported by Kruger to Canyons NPC and builds upon an earlier project funded by the South African Embassy of the Kingdom of the Netherlands (Contract Ref. PIA2023/B.2.1).

The participation of a wide range of stakeholders in the meeting hosted in Haenertsburg on the 27th May 2025 is gratefully acknowledged, as are the many stakeholders who participated in the interviews, focus groups and other discussions with the project team in the preceding weeks and months.

Association for Water and Rural Development (AWARD)

P O Box 1919 Hoedspruit 1380 Limpopo, South Africa T 015-793 0503 W award.org.za

Company Reg. No. 98/03011/08 Non-profit org. Reg. No. 006 - 821

