

Malawi Environment and Natural Resources Management (ENRM) Project: Interim Evaluation Findings

Dr. Kristen Velyvis

Dr. Anthony Louis D'Agostino

September 2020



Acknowledgments

- **This is joint work with**
 - Thomas Coen, Irina Cheban, Naomi Dorsey, Arif Mamun (Mathematica)
 - Hua Xie, Yating Ru, Ephraim Nkonya, and Claudia Ringler (IFPRI)
- **We want to acknowledge MCC and MCA-Malawi staff for their input and guidance**
- **The views and opinions expressed herein are those of the authors and do not necessarily represent those of MCC or any other U.S. Government entity**

Presentation roadmap

- **Project overview and program logic**
- **Evaluation methods**
- **Findings**
- **Next steps**

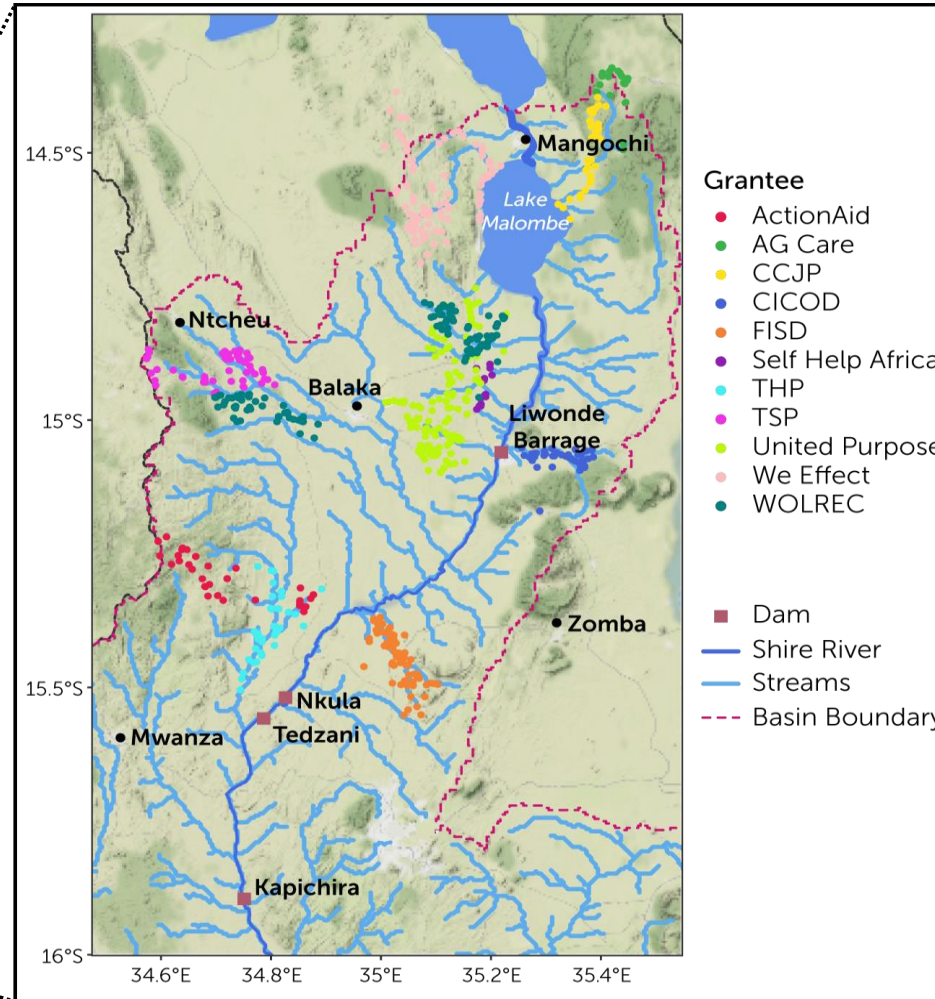
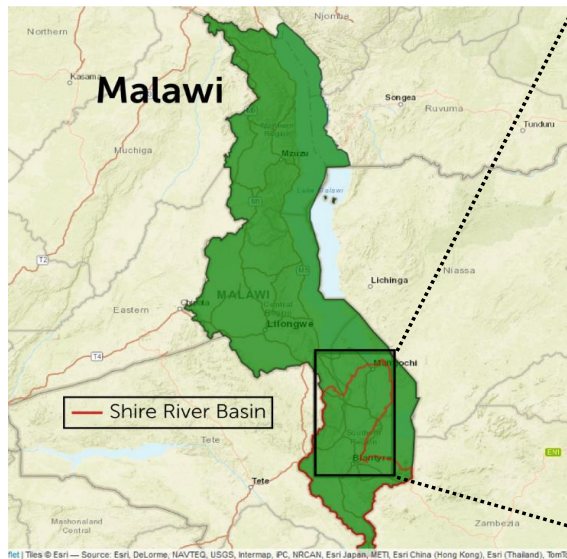
Project overview and program logic

ENRM project overview: 2013-2018

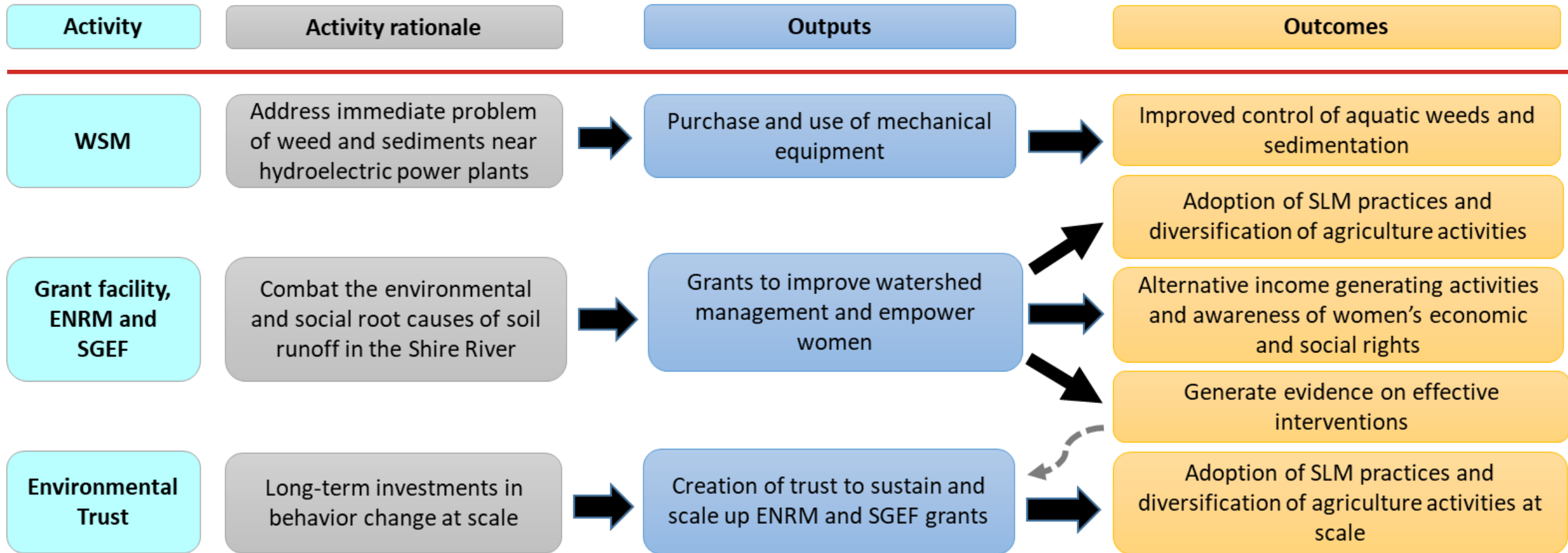
- The Weed and Sediment Management (WSM) activity
- Environment and Natural Resource Management (ENRM) activity
- Social and Gender Enhancement Fund (SGEF) activity
- Grant Facility
- Environmental trust



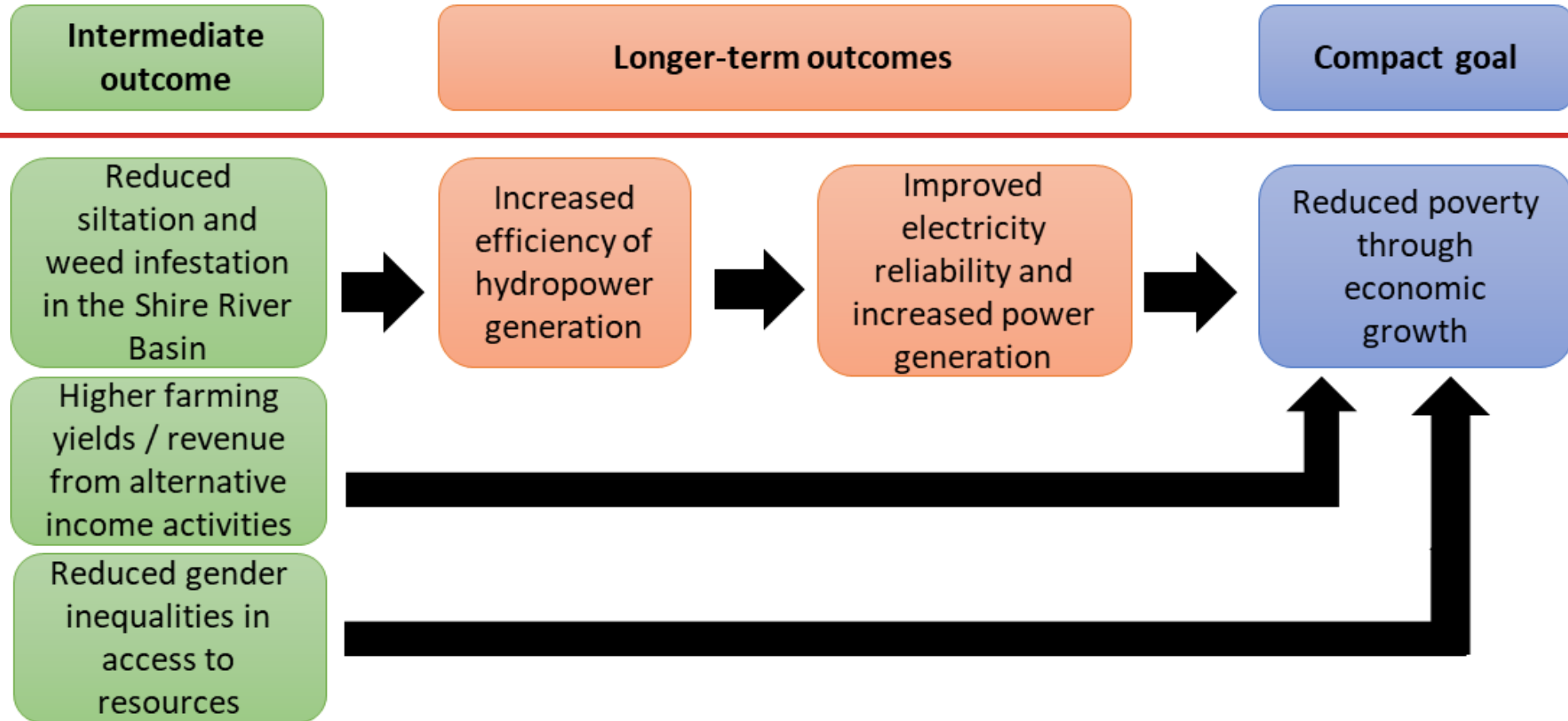
Map of ENRM project locations



Program logic for the ENRM project



Program logic for the ENRM project: Outcomes and compact goal



Evaluation methods

Evaluation summary

Evaluation method: activity	Main research questions	Data sources
<ul style="list-style-type: none">• Performance evaluation: WSM activity, grant facility activity; environmental trust; ENRM project• Case Studies: ENRM and SGEF grants• Geospatial modeling: ENRM project	<p>How was the activity implemented?</p> <p>Which outcome/objectives were achieved, which were not and why?</p> <p>What are stakeholders' perceptions of the sustainability of outcomes?</p> <p>How has land use along the Shire River changed during the ENRM project?</p> <p>If the project activities were expanded, how would they affect sedimentation in the Shire River based on alternative modeling scenarios?</p>	<ul style="list-style-type: none">• Key informant interviews with MCA-Malawi, MCC, EGENCO, implementation staff; community leaders; participants; and district government officials• Focus groups with grant beneficiaries• Site visits to power stations• Primary/secondary data on water quality data, weed harvesting, activity location, climate, and environmental characteristics• Project documentation and environmental assessments

ENRM project timeline

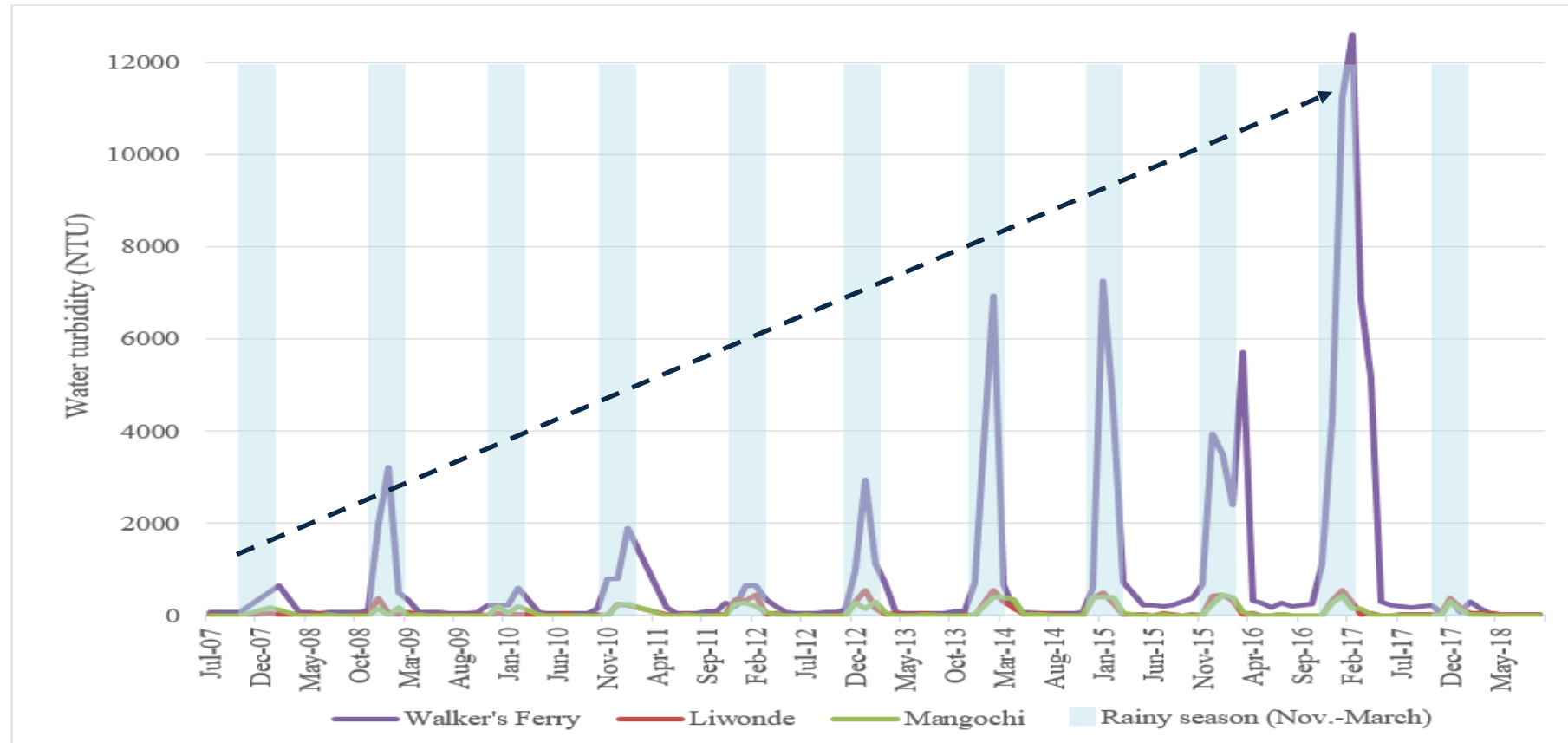
Calendar year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Overall compact														
MCC and Government of Malawi enter into compact	█													
Compact takes effect			█											
Compact terminates								█						
WSM activity														
WSM activity design				█	█	█								
WSM equipment procurement						█	█	█						
WSM activity training and implementation								█						
ENRM and SGEF grant activity														
Grant facility design				█	█									
Proposal review and selection					█									
ENRM and SGEF grant implementation					█	█	█	█						
Environmental trust														
Trust planning and design					█	█	█	█						
Trust operationalization and start-up									█	█	█			
Trust stabilization and expansion												█	█	█
Mathematica evaluation														
Evaluability assessment and evaluation design						█	█							
Interim data collection, analysis, and report								█	█					
Final data collection, analysis, and report											█	█		

Findings



Findings on WSM activity

Turbidity levels near Nkula power station were rising since 2007, impairing power generation



Source: Blantyre Water Board and Southern Region Water Board.

Note: Water quality was measured at the Walker's Ferry water station, near the Nkula power plant head pond and at the Shire River in Liwonde and Mangochi townships. Reported results are monthly averages. NTU = Nephelometric Turbidity Units.

WSM activity implementation

- **Equipment delivery was severely delayed, problems with poor contractor selection/performance**
 - Dredger procurement cancelled for the Nkula power station
- **EGENCO was a supportive partner/engaged and invested in equipment procurement and training**
 - As of compact close, the newly-procured equipment had not yet been put into operation

WSM plans before and after compact

Location	Pre-compact status	Post-compact (planned)	Post-compact (actual)
Liwonde barrage	<ul style="list-style-type: none"> Degraded weed removal equipment (weed harvester and cutter, conveyor belt) 	<ul style="list-style-type: none"> Upgraded and rehabilitated weed removal equipment 	<ul style="list-style-type: none"> Upgraded weed removal equipment <ul style="list-style-type: none"> 2 weed harvesters 2 tipper trucks 1 conveyor belt
Nkula power station	<ul style="list-style-type: none"> Limited-capacity dredger 	<ul style="list-style-type: none"> High-capacity dredger from MCC Trash barrier 	<ul style="list-style-type: none"> Limited capacity dredger Limited trash barriers at the intake for weeds
Tedzani power station	<ul style="list-style-type: none"> Ad hoc contractual dredging 	<ul style="list-style-type: none"> Ad hoc contractual dredging 	<ul style="list-style-type: none"> Ad hoc contractual dredging
Kapichira power station	<ul style="list-style-type: none"> Inefficient scouring (flood-induced sediment transport) 	<ul style="list-style-type: none"> High-capacity dredger and sediment removal system 	<ul style="list-style-type: none"> High-capacity dredger and sediment removal system

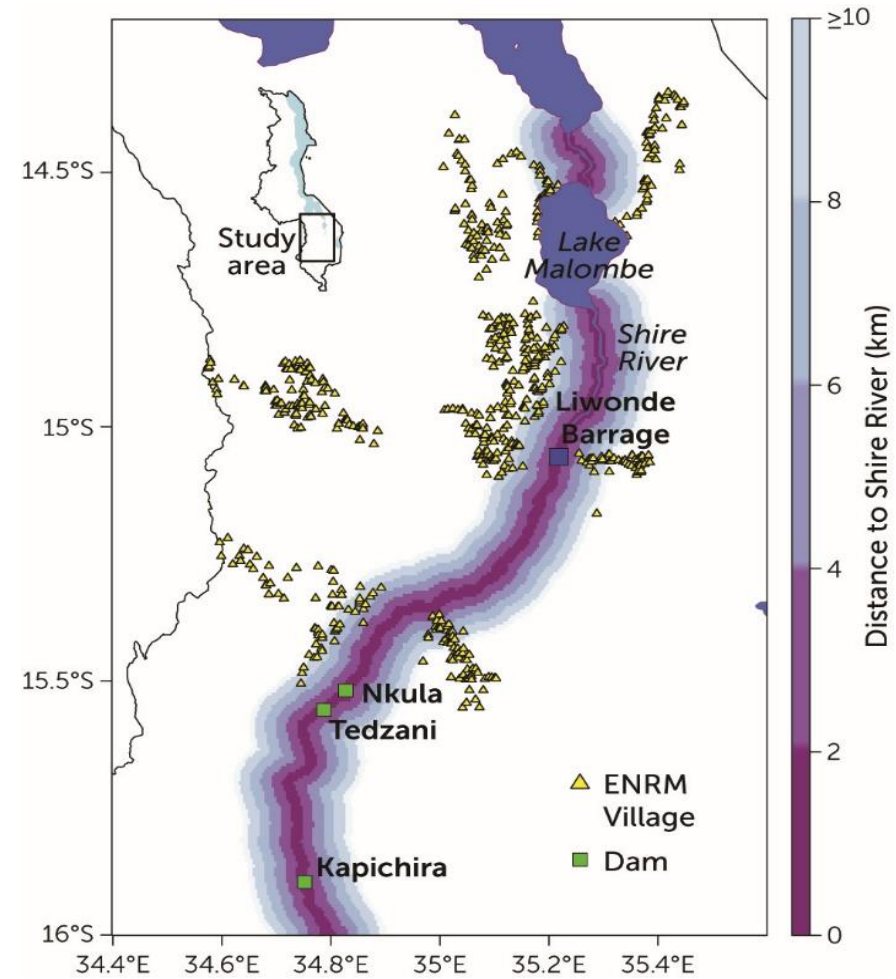
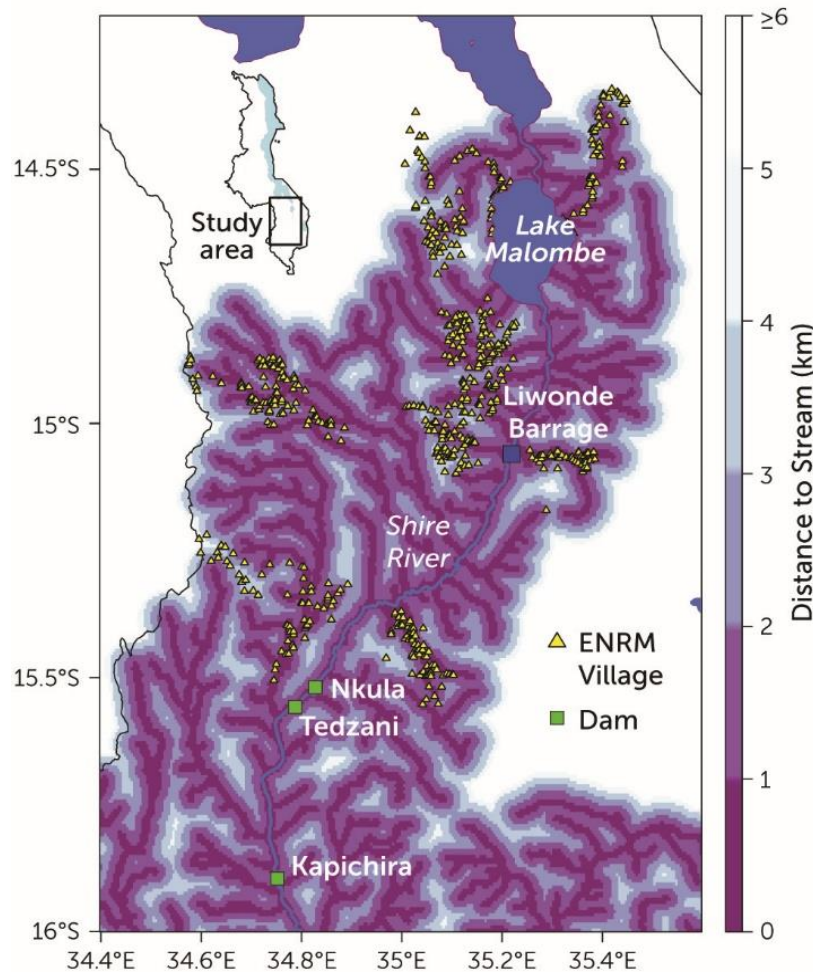
Findings on ENRM and SGEF grant facility activity



Grant facility activity implementation

- **Well-designed facility allowed experimentation to identify effective sustainable land management interventions**
- **MCA-Malawi conducted a thorough process to identify the most qualified grant applicants, and provided robust financial and programmatic oversight**
- **MCA-Malawi could have designed the grant facility to benefit the planned environmental trust with greater synergies**

Grantee villages located near prioritized areas: ~2km of nearest stream



Grant facility progressed toward achieving objectives

- Exceeded output targets, but lacked resources or capacity to monitor key outcomes like farming practices
- Succeeded in pushing all grantees to integrate ENRM and SGEF activities
- Supported activity scale-up and raised awareness about soil erosion

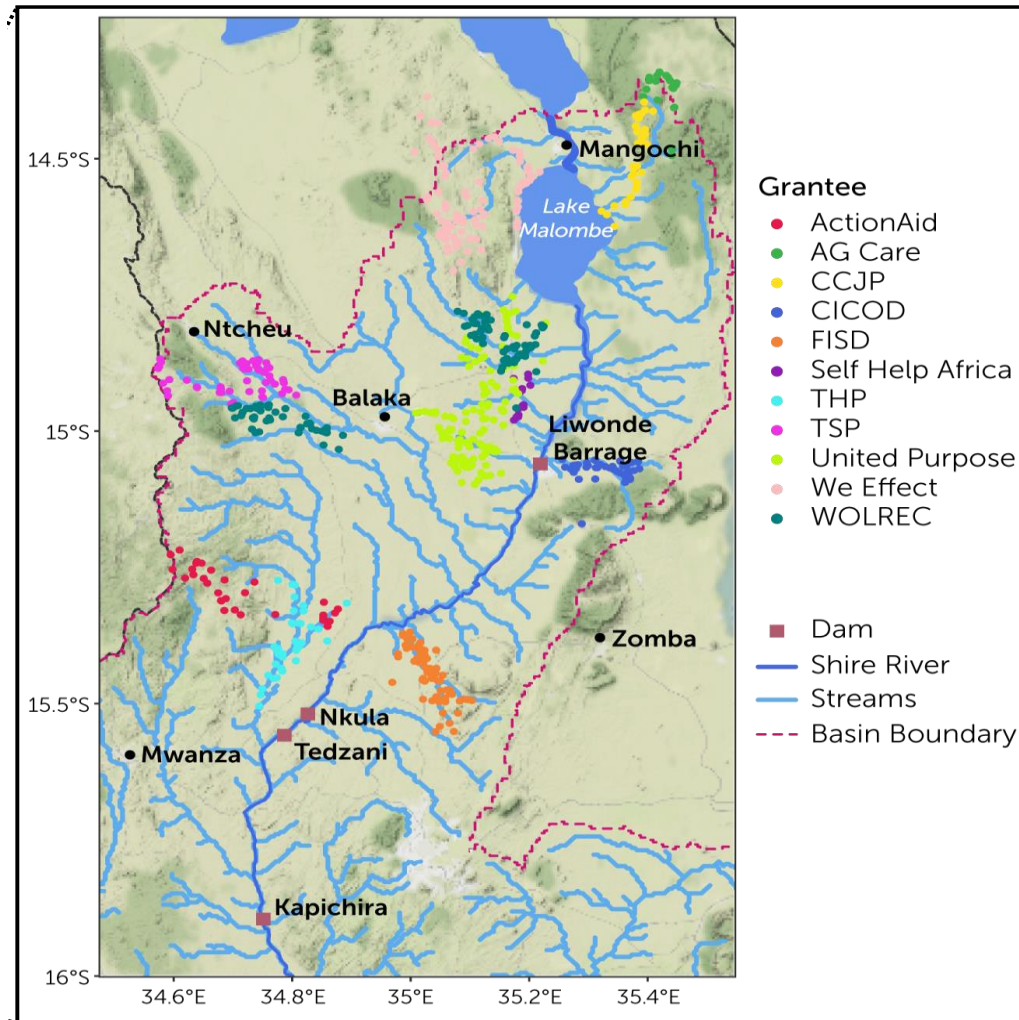
Results surpassed targets for key indicators

Domain	Indicator	Result	Target	% of target
Trees	# planted	6,943,879	4,451,618	156%
	# survived	4,306,890	2,868,473	150%
ENRM leadership training	# leaders trained	7,751	6,745	115%
	# of women completed leadership training	4,222	2,787	151%
	# community members on community-level committees	18,547	8,560	217%
SGEF	# of community members engaged in SGEF initiatives in targeted areas	73,676	52,670	140%
REFLECT/Reflection action circles	# operational	448	312	144%
	# of community members participants	16,469	6,761	244%
VSLs	# operational	907	447	203%
	# of community member participants	27,096	19,245	141%

Findings from case studies



Map of 5 case study locations



CCJP – Catholic Commission for Justice and Peace

FISD – Foundation for Irrigation and Sustainable Development

TSP – Training Support for Partners

UP – United Purpose

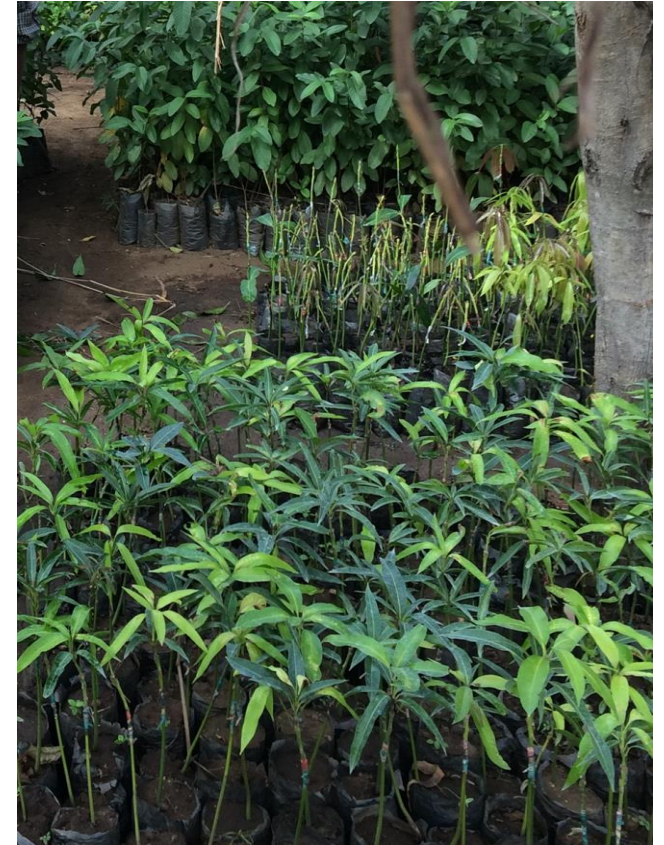
WOLREC – Women’s Legal Resources Centre

Case study grants implementation

- **Effectively established through community buy-in and in partnership with government agencies and local leaders**
- **Successfully used REFLECT circles to identify priorities, action steps and/or for implementation**
- **Used participatory, hands-on training methods and demonstration**
- **Achieved their expected outputs**
- **Grantees were adaptive: responsive to donor and beneficiary needs**

Adoption of conservation agriculture and land management practices

- **Widespread adoption of conservation agriculture and land management practices by those who participated in activities**
- **Engagement of women in ENRM activities**
- **Adoption motivated by visible benefits of practices**
- **Participants liked the participatory, hands-on training and use of demonstrations**



Effects on gender roles

- **VSLs were popular and successful**
- **REFLECT Circles and VSLs were effective structures for change**
- **Changes**
 - Increases in joint household decision-making
 - More equitable division of labor
 - More leadership opportunities for women
 - More participation for female household heads in community decision-making
- **Resistance to changes in gender roles remained**

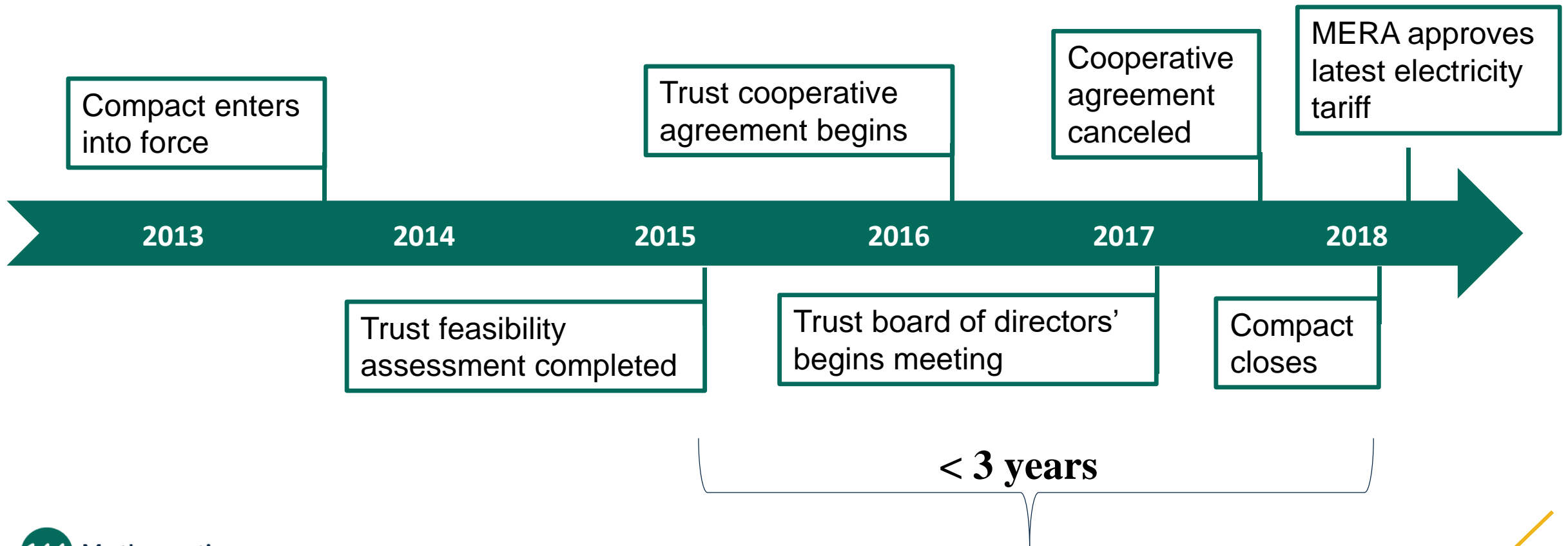
How did grants that focused more on ENRM or SGEF activities compare with grants that targeted both?

- Integrating both ENRM and SGEF activities was more effective than targeting only one type of activity
- Adding SGEF activities to ENRM activities benefited the ENRM objectives more than ENRM activities helped grantees reach gender equity goals



Findings on the environmental trust

Shire Basin Environmental Support Trust (Shire BEST): Key implementation events



Major factors affecting trust establishment

Trust operations not launched by end of compact due to

- Lack of agreement on trust structure
- Focus on implementing the grant facility
- Poor contractor performance

Trust has functional board of directors with key stakeholders for land management

- However, board members have limited availability for their tasks and need permanent technical staff to push the trust forward

Funding availability

- Through increased environmental management levy from MERA
- Initial operations covered by EGENCO/ESCOM electricity levy

Trust was the project's pivotal sustainability mechanism for achieving longer-run reductions in sediment yield. But, by the end of the compact, the trust existed only on paper



Key trust step	Main finding
Establish trust steering committee	Achieved
Trust steering committee meets regularly until trust is legally established	Achieved
Hire trust coordinator	Partially achieved
Develop name, mission, vision, programmatic focus, and objectives of the trust	Achieved
Regularly coordinate/communicate with government stakeholders	Partially achieved
Draft trust legal documents (trust deed, articles of incorporation, constitution)	Achieved
Legally register trust	Achieved
Officially appoint trustees	Achieved
Hire trust executive director	Not achieved
Open trust bank accounts	Partially achieved
Obtain office space, equipment, and supplies for the trust	Partially achieved
Draft terms of references to hire permanent staff	Partially achieved
Approve an investment policy and investment guidelines	Partially achieved
Approve an operations manual	Partially achieved
Secure funding for the trust	Partially achieved
Hire an international investment manager	Not achieved
Draft call for proposals, including grant application forms and reporting requirements	Not achieved
Issue call for proposals	Not achieved

Overall ENRM project findings



Increased deforestation and cropland expansion along the Shire River during the ENRM project

- **~7% of land area in the Shire River Basin experienced land cover change between 2015 and 2017**
- **Trends suggest deforestation and cropland expansion**
 - A large share of deforested area is located in high-slope areas, and agricultural land is encroaching onto riverbanks
 - The evidence suggests that areas facing high erosion risk are being converted to biomes that exacerbate soil erosion

If project activities were scaled up, sedimentation in the Shire and electricity production losses would decrease

- **Scaling sustainable land management practices would reduce sediment inflow for the Nkula, Tedzani, and Kapichira reservoirs by 30-40% relative to business-as-usual**
- **After 20 years, the three plants would avert losses of 28-36 MW of hydroelectric production capacity due to sedimentation compared to business-as-usual**

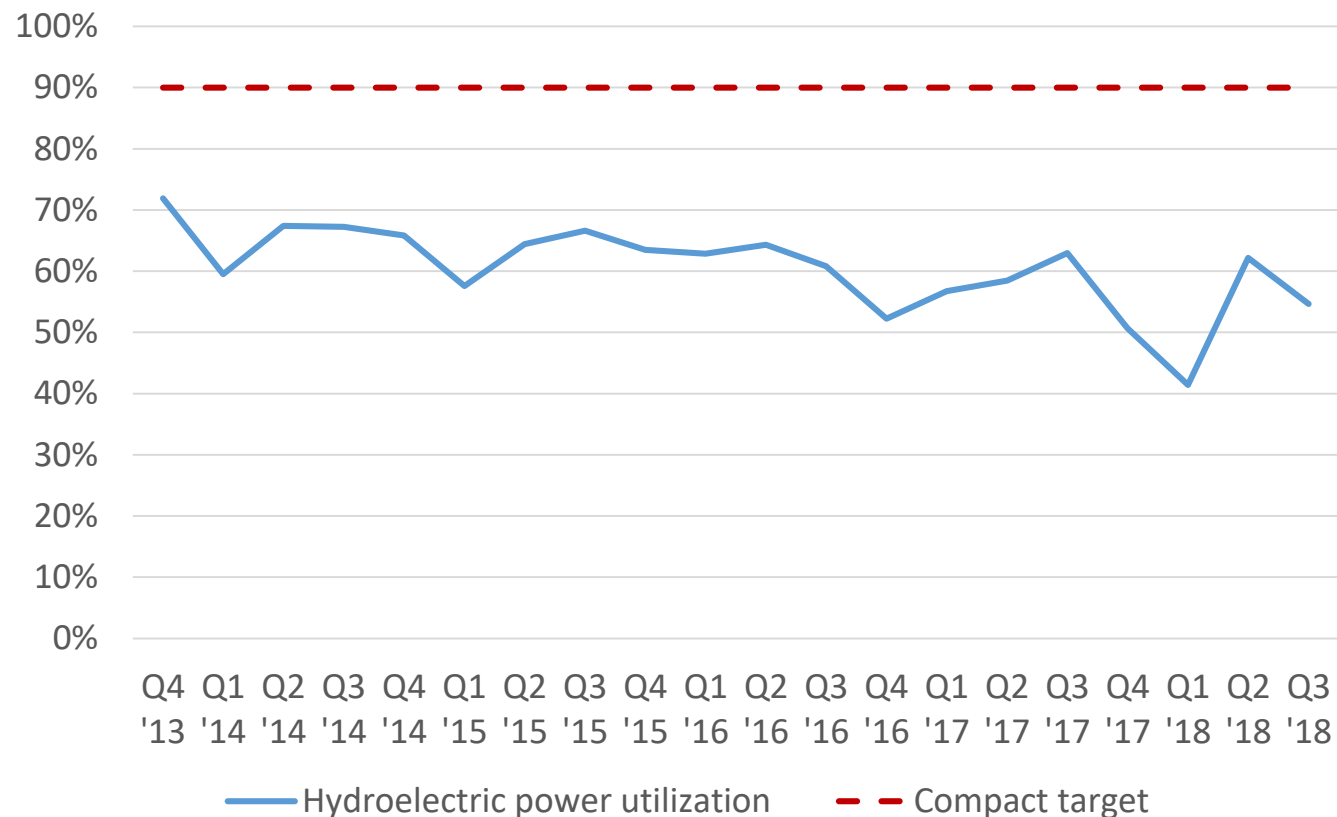
Major factors affecting ENRM project effectiveness

- **The project achieved many of its intended outputs**
- **Activities were aligned with the project's theory of change**
 - However, an ambitious set of activities for a five-year compact
 - Limited experience in procuring dredging equipment and setting up a trust in Malawi
- **MCA-Malawi, with MCC support, demonstrated strong implementation flexibility**
 - Adjusted to conditions on the ground, particularly poor contractor performance
- **Contractor selection and oversight was a substantial implementation barrier for both the WSM and trust activities**

Too early to assess ENRM project final outcomes

- The project has yet to effect a reduction in weeds and sediment in the Shire River
 - Thus it's too early to assess higher-level outcomes on power generation and reliability
- In the final quarter of the compact, average power plant utilization was a disappointing 55 percent, well below the compact target of 90 percent

Overall hydropower plant capacity utilization by quarter: 2013–2018



Source: Malawi compact Indicator Tracking Table (MCC 2019).

Next steps

Next steps

- **Final evaluation data collection in 2021**
 - Operationalization of WSM equipment and changes to power reliability
 - Sustainability of ENRM and SGEF grant outcomes
 - Establishment of environmental trust and beginning operations
- **Final evaluation report in mid-2022**

Thank you!

Questions?

Supplemental slides

Sampling plan for key informant interviews by respondent type

Respondent type	Activity evaluations	Number of people	Sample description
MCC DC staff and consultants	All	5 (with one joint interview)	Staff and consultants who supported the Malawi compact.
MCC Malawi-based staff	All	2 (joint interview)	Managerial staff who oversaw compact implementation.
MCA-Malawi monitoring and evaluation staff	All	2 (joint interview)	Staff from the MCA-Malawi monitoring and evaluation team.
MCA-Malawi sector staff	All	4	Relevant sector staff for the WSM, grant facility, and trust activities.
EGENCO headquarters staff	WSM	2	Senior staff at EGENCO headquarters in Blantyre who were heavily involved in the WSM activity and worked closely with MCA-Malawi and MCC.
EGENCO operational staff	WSM	4 (2 per site)	Operational staff at the Kapichira power plant and the Liwonde barrage, including senior site managers and head engineers who had been involved in the procurement and operation of WSM equipment.
Trust board members	Environmental trust	4	Active committee members, including the committee president, who represent various key sectors for the trust (such as civil society, government, and power companies).
Grant program staff	Grant facility	23 (~2 per grantee) ^a	Staff who implemented activities and managed the grant with MCA-Malawi, including one member of senior management who directed the grant activities and one staff member who oversaw SGEF activities. We identified respondents by soliciting information from each grant organization and reviewing the grant contact list provided by MCA-Malawi.

Description of quantitative and administrative data sources

Data source (evaluation)	Description
EGENCO	Longitudinal data on weed and sediment management and electricity generation by power plant and at the Liwonde barrage
Blantyre and Southern Region water boards	Longitudinal data on water turbidity at three sites along the Shire River
MCC and MCA-Malawi	Grant indicator tracking table; grant facility manual, policy guidelines, resource requirements, call for proposals, and communications plan; grant selection criteria; grant proposals and quarterly and final reports; internal and consultant grant evaluations; Upper and Middle Shire environmental assessment reports
MCC and MCA-Malawi	Trust feasibility study; trust strategic plan, monitoring and evaluation plan, funding proposal; trust board meeting minutes; implementer deliverables
Geospatial data	
Mathematica	GPS coordinates for the 648 villages in which ENRM and SGEF grants were implemented ^a
HydroSHEDS (Lehner et al. 2008)	Vector data representing the geographic location of all streams throughout the Shire River Basin
Global Extent of Rivers and Streams data (Allen and Pavelsky 2018)	Vector data of Shire River
National Forest Restoration Opportunity areas (Malawi Ministry of Natural Resources, Energy and Mining 2017)	Mapping of forest restoration opportunity areas throughout Malawi, as identified through the National Forest Landscape Restoration Assessment
Shuttle Radar Topography Mission (SRTM) slope (Farr et al. 2007)	Digital elevation model with one arc-second (~ 30 meters) spatial resolution

Performance evaluation analytic methods by evaluation activity

Analytic methods	WSM activity	Grant facility activity	Environmental trust	Overall ENRM project
Implementation effectiveness framework	X	X	X	X
Data triangulation	X	X	X	X
Thematic framing	X	X	X	
Descriptive trends analysis	X			
Geospatial analysis		X		
Document review	X	X	X	X
Sustainability framework	X		X	
Cross-evaluation data synthesis				X
Logic model assessment				X

Unanswered questions from interim evaluation

- 1. Did EGENCO complete the sediment disposal area and successfully operationalize its capital dredging plan?**
- 2. Is the dredging at Kapichira restoring active storage at the head pond and increasing hydropower plant utilization?**
- 3. Is EGENCO able to harvest more weeds with the new equipment at Liwonde? Is EGENCO able to maintain the equipment? How has weed harvesting affected plant utilization downstream?**

Unanswered questions from interim evaluation (cont'd)

4. Did ENRM and SGEF grant beneficiaries continue to adopt SLM practices, and did those practices spread within the community? Did communities maintain and expand nascent behavioral changes in women's empowerment?
5. Did the environmental trust become operational, including establishing an office, solidifying a reliable funding stream, hiring staff, soliciting proposals, and providing grants?
6. Once fully implemented, was the ENRM project able to improve hydropower generation?