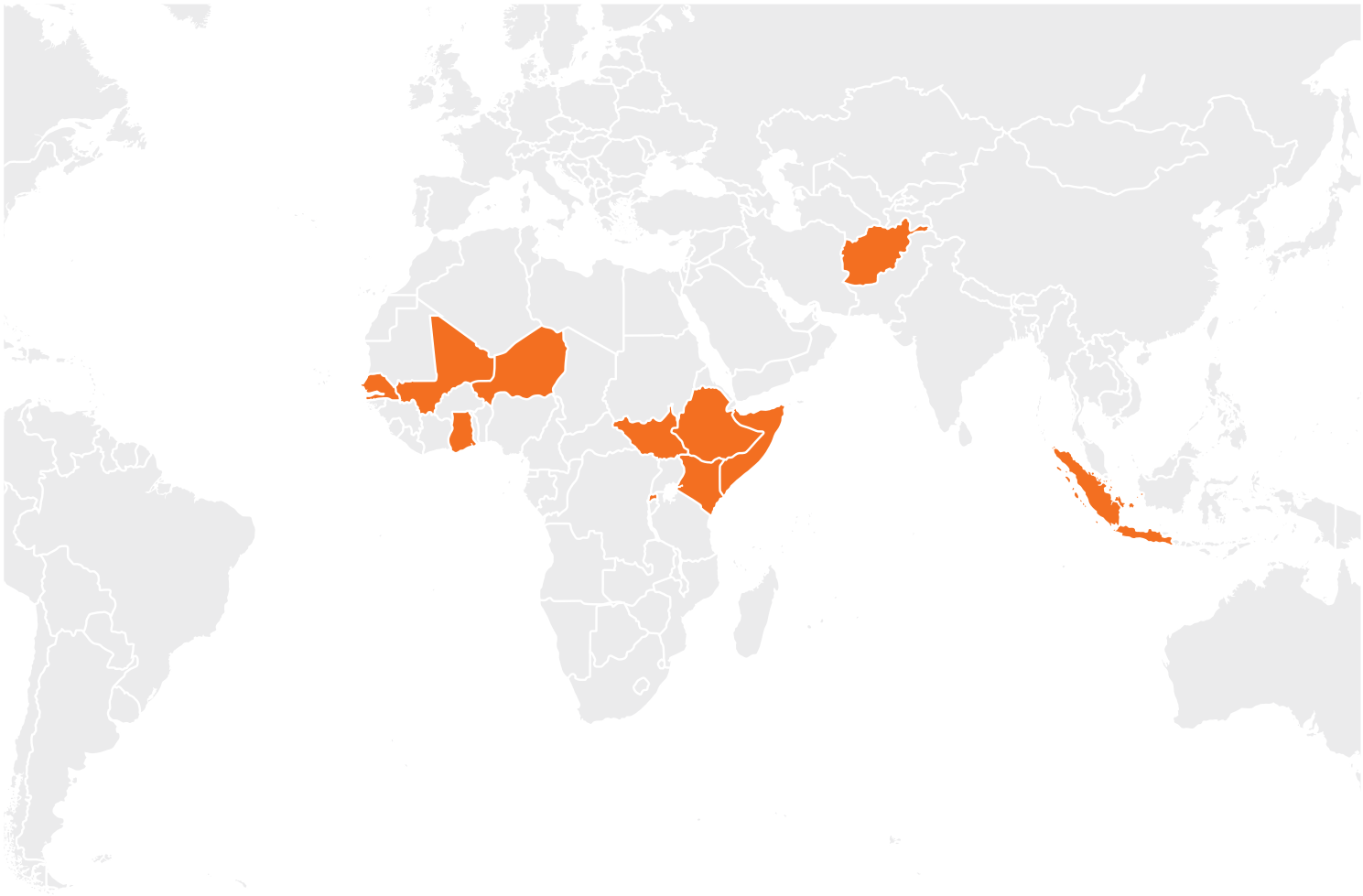
World Vision

FARMER MANAGED NATURAL REGENERATION EVIDENCE GAP MAP

Research Brief | 2024

THIS MEANS THE WORLD



Acknowledgments

This research brief summarises the results from an evidence gap map on Farmer Managed Natural Regeneration (FMNR) and Regreening Communities (RGC), conducted from August to October 2023.

World Vision Australia (WVA) commissioned independent consultant Dr. Tafadzwa Nyanhanda from Triumphant Global to perform this study. Oversight and analysis support from WVA was provided by Alice Muller, FMNR Scale Up Senior Impact Evidence Advisor; Dr. Andrew Carter, FMNR Scale Up Monitoring Coordinator; and Dr. Saba Mebrahtu Habte, Impact Evidence Building Manager.

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Front cover photo: A woman participant in the Drylands Development Programme is practicing FMNR. She and other community members were upskilled as 'Trainers of Trainers' to share innovative agricultural technologies with others.

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The results of FMNR efforts are clearly visible in Somaliland. The regenerated land, shown on the right side of the boundary fence, provided a nature-based solution to help fight famine in Beerato village.

SUMMARY OF FINDINGS

This research brief summarises the main findings from an independent analysis of the available evidence of the impacts of Farmer Managed Natural Regeneration (FMNR) and the Regreening Communities (RGC) project model on biophysical environment, agricultural productivity, and human well-being. The review systematically analysed 34 studies to determine what knowledge already exists and which areas require further investigation, drawing on relevant impact reviews from both World Vision and other organisations.

The review found that **the FMNR and RGC evidence bases have grown significantly in recent years** across most of the observed outcome areas. **The FMNR outcomes with the most evidence available were in the biophysical environment,** where the impacts of FMNR on provisioning ecosystems services (such as fuelwood, timber and non-timber products, honey, tree nuts and fodder), regulation and maintenance services were clear.

Though less abundant than biophysical environment, **evidence of FMNR's impact on the areas of agricultural productivity and human wellbeing, including income, food security and nutrition, governance and empowerment, is growing strongly.** Further evaluations and research could more deeply demonstrate how FMNR achieves change, particularly in the way that the practice is almost always implemented in parallel with other interventions through models such as RGC.

Because **most of the existing evidence is from West and East Africa,** there is a need to extend the FMNR evidence base to other countries and contexts in Southern Africa, South-East Asia and the Pacific regions. **Greater consistency and nuanced detail in data collection, measurement and assessment** will help better understand how FMNR impacts child wellbeing and gender equality, disability and social inclusion (GEDSI).

World Vision Australia (WVA) could play an important role in strengthening and expanding the evidence base, particularly on child wellbeing, which is in line with World Vision's recently launched RGC project model. In partnership with other stakeholders such as research partners, WVA could also continue playing a key role in further strengthening the evidence base on biophysical environment.

BOX 1 WHAT IS AN EVIDENCE GAP MAP?

An evidence gap map (EGM) is a tool that is used increasingly to promote evidence-informed policy and future research priorities[1]. It often involves a systematic review of internal evidence, based on impact evaluations, and external evidence in peer reviewed or grey literature.

The evidence is 'mapped' onto a population, intervention, comparison and outcomes (PICO) framework that visually highlights areas where there is a saturation of information and areas where there are gaps. In the context of understanding FMNR, an evidence gap map will help inform decisions on future evaluative research agendas and programming.

1 International Initiative for Impact Evaluation. Evidence Gap Maps – 3ie. https://www.3ieimpact.org/evidence-hub/evidence-gap-maps

CONTEXT

Climate change, unsustainable farming practices and the exploitation of natural resources are rapidly degrading productive land around the globe. Land degradation threatens the livelihoods and survival of the world's most vulnerable people. It results in the loss of biodiversity, increased conflicts, exacerbated poverty, and food and nutrition insecurity[2]. Rural communities are far more vulnerable to the effects of climate change and conflict associated with diminishing natural resources.

But land restoration methods like Farmer Managed Natural Regeneration (FMNR) and Regreening Communities (RGC) can help reverse many of these challenges by improving food and nutritional security, sequestering carbon, recharging groundwater and reversing biodiversity loss[3].

Recognising the need to further build the evidence base for FMNR and RGC, World Vision Australia commissioned an evidence gap map (EGM) in 2023 by independent consultant Dr. Tafadzwa Nyanhanda from Triumphant Global. Identifying gaps in the existing knowledge, and growth since World Vision's 2016 evidence gap analysis[4], will inform future FMNR impact evaluation priorities and programming. The review's findings are summarised in this brief.

In Ethiopia, a group of women are measuring the regrowth of a tree that has been pruned selectively using FMNR. Combined with other land restoration techniques, FMNR can be a more effective method for re-vegetation than planting trees.

2 UNCCD. The economics of desertification, land degradation and drought: methodologies and analysis for decision-making background document. (2013): https://digitallibrary.un.org/record/749587?ln=en#record-files-collapse-header

3 Nkonya E, Mirzabaev A, Von Braun J. Economics of land degradation and improvement – a global assessment for sustainable development. Springer Nature. (2016)

4 Crawford A, Shteir S, Rojas Chaves D. Farmer managed natural regeneration; evidence gap analysis. World Vision Australia. (2016)

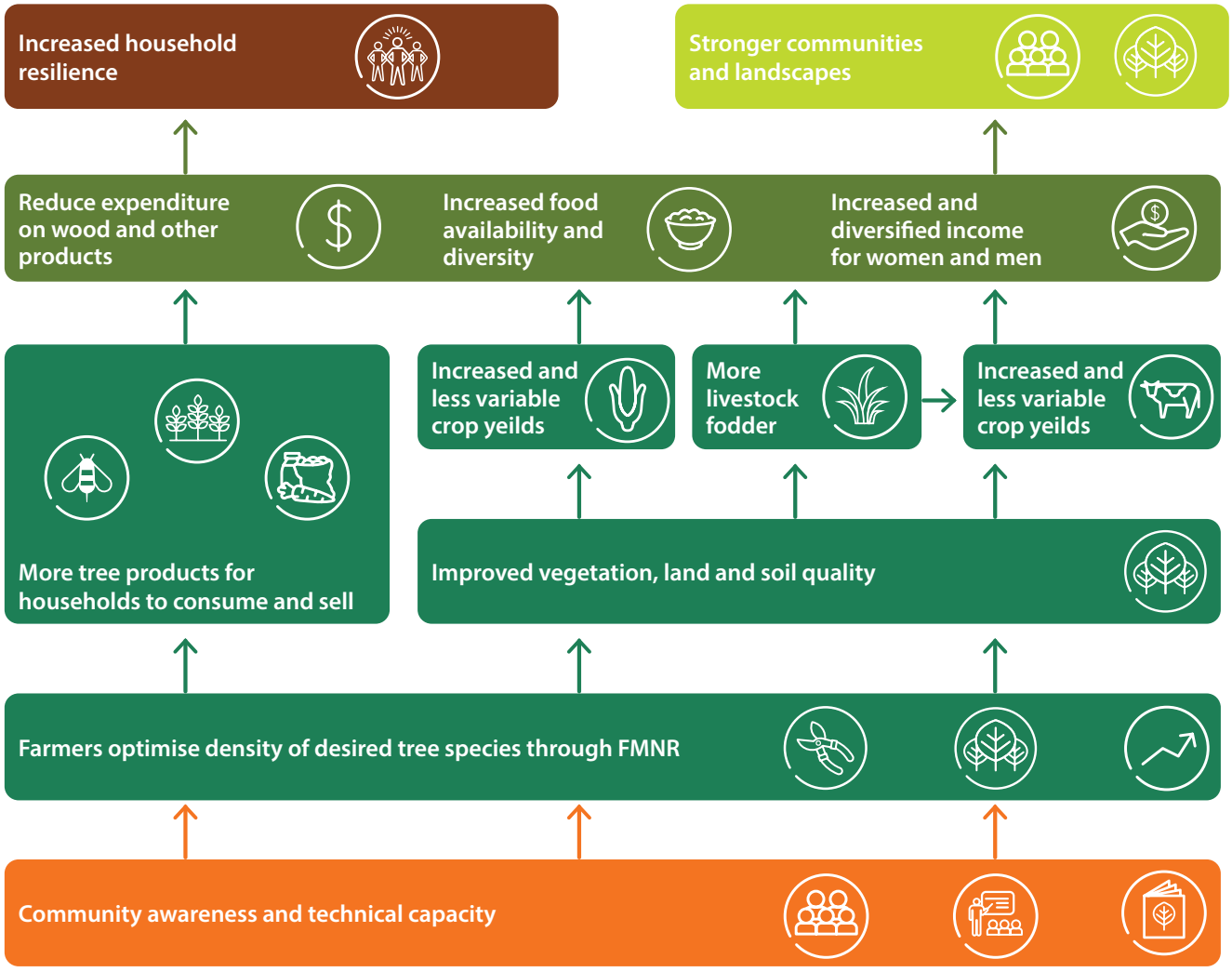
BOX 2 WHAT IS FMNR?

Farmer Managed Natural Regeneration (FMNR) is a highly effective, simple and low-cost technique that helps reverse land degradation. Through FMNR, living tree stumps and self-sown seeds are re-grown into usable trees through pruning and protection. The regeneration of trees, which is generally faster and less expensive than planting trees, restores and builds natural assets and makes agricultural activities more productive, increasing income and food and water availability.

FMNR also increases the capture and storage of carbon in trees, plants and soil. This has a direct impact on climate change by removing this greenhouse gas from the atmosphere. In addition to selective pruning, FMNR projects promote other landscape regeneration practices. These include water management, livestock and weed control, and fire management.

The technical practice of FMNR can be used as part of a broader community development approach, such as Regreening Communities (RGC), to mobilise and empower local communities to restore their natural environment.

Figure 1: FMNR Theory of Change



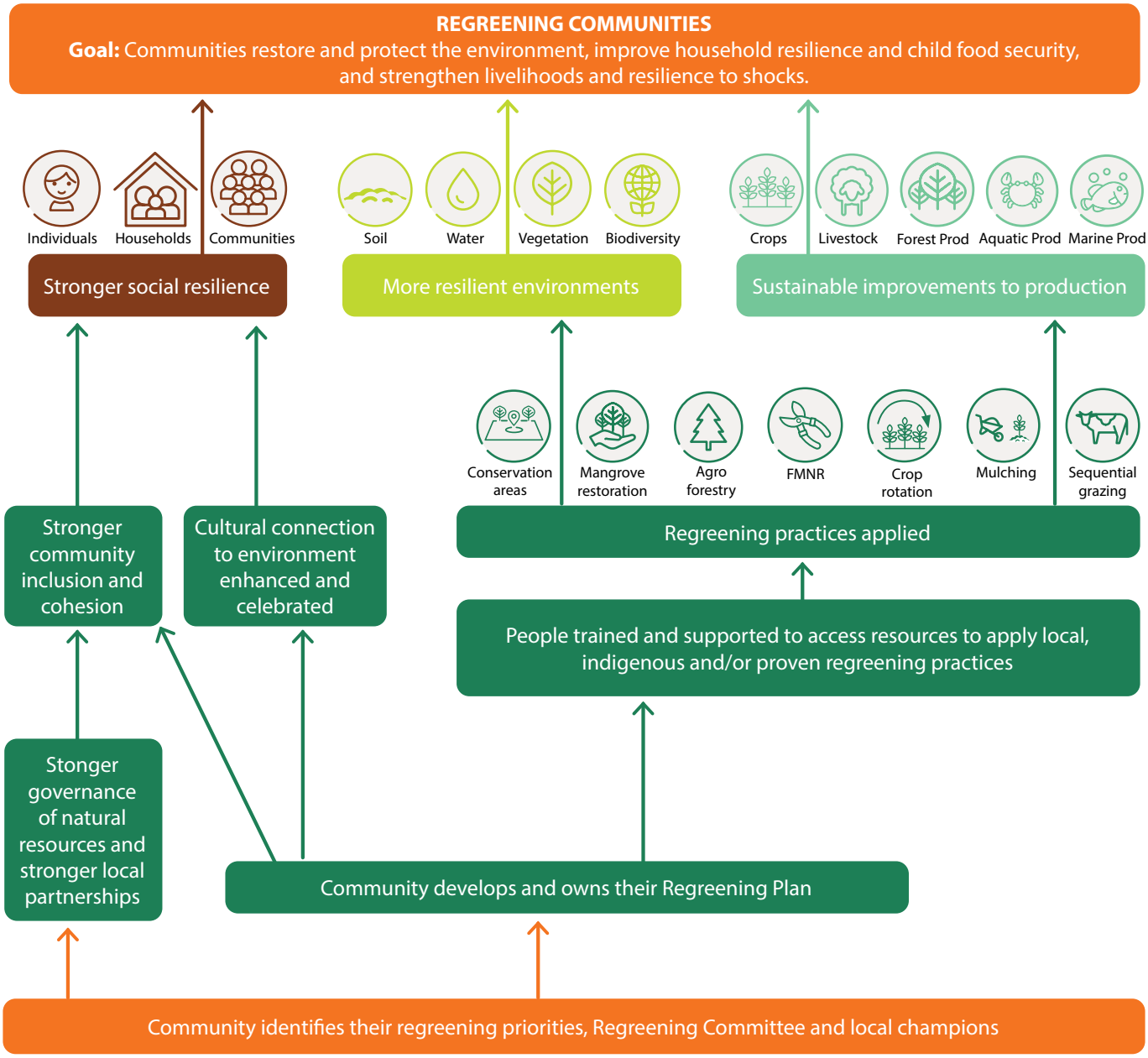
BOX 3 WHAT IS REGREENING COMMUNITIES?

Regreening Communities (RGC) is an inclusive and community-led environmental restoration project model developed by World Vision. RGC supports vulnerable communities to:

- Improve community cohesion and reduce natural resource-based conflict
- Generate a more climate-resilient landscape
- Increase agricultural productivity to improve households' overall wellbeing and income

Through RGC, target communities are guided through a participatory environmental restoration process. Each community selects a tailored set of solutions that are best suited to their context. These may include scaling up indigenous restoration practices, strengthening government partnerships for restoration, and introducing proven practices like FMNR. Because the natural environment impacts all members of a community, this project model is designed to be inclusive and accessible to all people.

Figure 2: How the Regreening Communities Project Model Achieves Change



RESEARCH OBJECTIVES

The FMNR evidence gap map aimed to review and summarise the existing evidence of FMNR's impacts on the biophysical environment, agricultural productivity and human wellbeing. Importantly, the study aimed to identify knowledge gaps, prioritising future avenues for evaluation and research to inform policy and program design.

The research was guided by key questions including:

- What does the evidence say about FMNR's outcomes?
- What are the major FMNR evidence gaps?
- How effectively have World Vision Australia's FMNR projects[5] supported FMNR scaling?
- How has World Vision Australia's FMNR programming integrated with other project models and approaches?
- How does World Vision use FMNR programming to support child wellbeing?
- To what extent do FMNR projects align with the RGC project model?

Initially sceptical about FMNR, Anita and Reuben are now passionate advocates. The couple were trained in FMNR through the Central Rift Farmer Managed Natural Regeneration Scale-Up Project (CRIFSUP) in Kenya.

5 FMNR projects are defined as those that feature FMNR as a core intervention (or similar), but also likely include other restoration, livelihood and similar initiatives.

METHODOLOGY

A systematic review of existing internal and external evidence dating as of 2016 was undertaken to determine what is already known about FMNR. Following rigorous screening of the available evidence, a total of 34 studies were selected for review. The screening processes used the JBI Critical Appraisal checklists[6] to account for the differences in the quality of study designs and analysis methods and, where applicable, assessed the risk of bias in all included studies. Systematic reviews were screened using the International Initiative for Impact Evaluation (3ie) quality appraisal method, based on their standardised checklist[7]. The selected studies included[8]:

- Independent mid-term and final project evaluations for 11 of World Vision Australia's FMNR projects (see Table 1 for the project list)
- Peer-reviewed literature systematically searched from databases including PubMed, EBSCO: Agricola, EconLit, Web of Science, Scopus and CINAHL
- Grey literature, such as FMNR evaluations from other organisations

The study used the global standard practice for evidence gap maps[9] with rows in a matrix representing interventions and columns representing outcomes. The Population, Intervention, Comparison, Outcome (PICO) framework, as defined in the FMNR programs, was applied for framing the inclusion and exclusion criteria and developing the search strategy.

LIMITATIONS

While the study's search strategy was robust and systematic, existing evidence could have been missed due to terminology and language differences. FMNR is known by many different names and some terminology may not have been included in the search. The risk of missing existing studies was minimised through close consultation with a research specialist and an advisory team that included field experts.

There are also limitations in the attribution of project outcomes to FMNR. In practice, FMNR is often integrated with other complementary interventions and there is no singular kind of FMNR project. The projects included in this study do contain other interventions which may have influenced outcomes. Additionally, most of the external evidence reviewed included studies without qualitative evidence or baseline and control data. These factors make disentangling the impact of FMNR on a project's outcomes complex.

A group of 'Training of Trainers' participants in Kenya are learning how to teach others to prune and regenerate trees using FMNR through the Drylands Development Programme. The group are encouraged to build the capacity of other smallholder farmers by sharing their skills and knowledge.

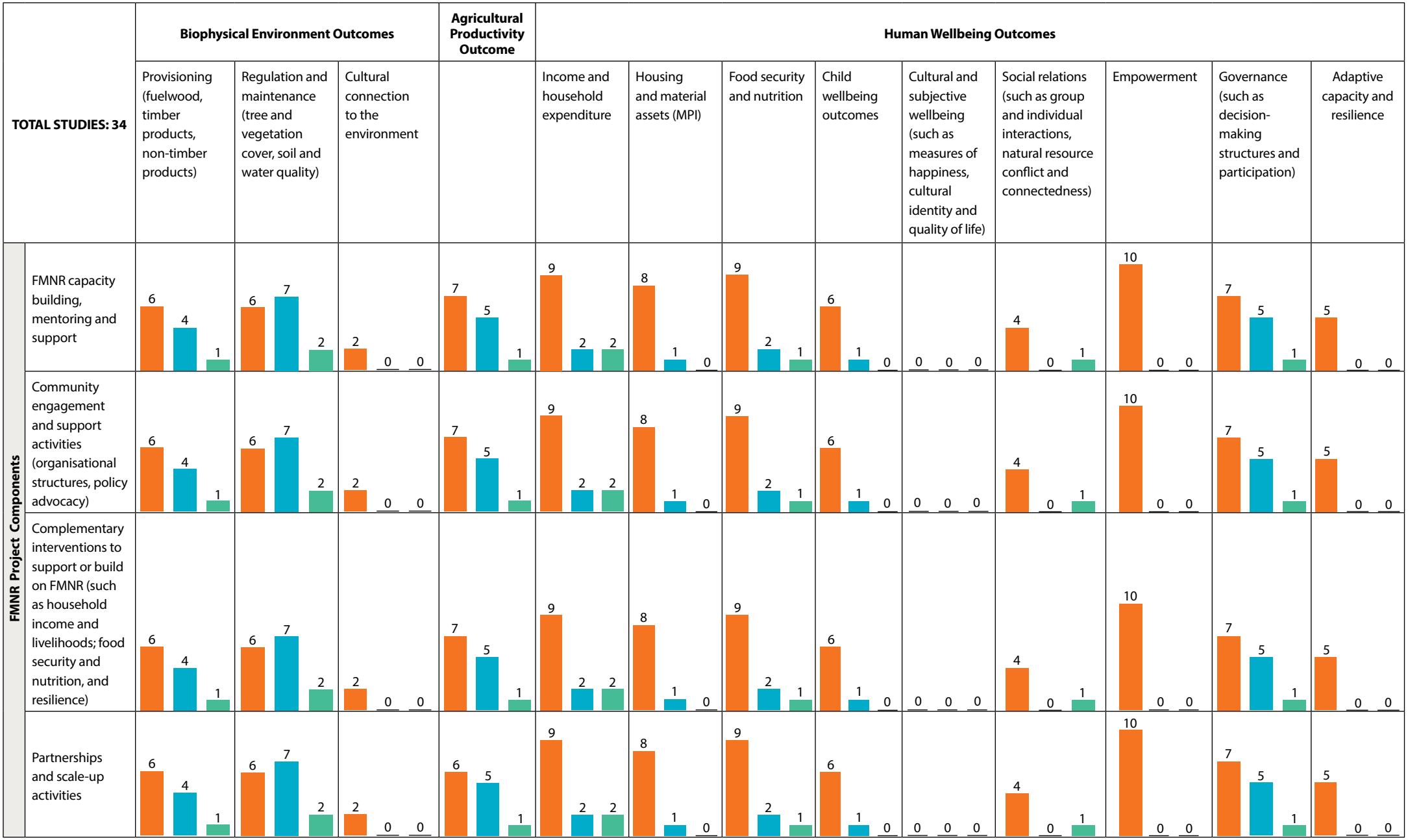
6 Santos WMd, Secoli SR, Püschel VAdAJRI-ade. *The Joanna Briggs Institute approach for systematic reviews.* (2018)
7 Snilstveit B, Bhatia R, Rankin K, Leach B. *3ie evidence gap maps. A starting point for strategic evidence production and use.* International Initiative for Impact Evaluation (3ie). (2017)
8 The list of peer-reviewed and grey literature included in this study are available in the full report, available upon request.
9 Snilstveit B, Vojtkova M, Bhavsar A, Gaarder M. *Evidence gap maps - a tool for promoting evidence-informed policy and prioritizing future research: World bank policy research working paper.* (2013)

TABLE 1: Overview of the 11 World Vision projects included in the study

PROJECT	COUNTRY	PERIOD	DONOR ORGANISATION	PROJECT GOAL	KEY PROJECT FOCUS AREAS
Central Rift Farmer-Managed Natural Regeneration Scale-Up Project (CRIFSUP)	Kenya	2017–2021	Australian Government through the Australian NGO Cooperation Program (ANCP)	To contribute to improved food security and livelihoods for smallholder farmers and pastoralists, both women and men, in Kenya by 2021 through FMNR and other evergreen agricultural practices	• Arid and Semi-arid counties • FMNR • Savings for Transformation (S4T) • Local Value Chain Development (LVCD) • Farmer Producer Groups • Citizen Voice and Action (CVA)
Landscape restoration, irrigation to benefit most vulnerable - Australia Afghanistan Community Resilience Scheme (AACRS) *Phases One and Two*	Afghanistan	2014–2021	Australian Government through the Australian NGO Cooperation Program (ANCP)	For communities and families in Badghis to have livelihoods that are more sustainable and inclusive of vulnerable groups	• FMNR • Agroforestry • Natural resource management • Livelihoods • Food security • Producer groups/cooperatives • Water management • Disaster management
Talensi Farmer Managed Natural Regeneration Project *Phase 3*	Ghana	2017–2020	Australian Government through the Australian NGO Cooperation Program (ANCP)	Improve household food security and resilience for 8,000 people, especially the most vulnerable and their families, by addressing land degradation through FMNR and farmer managed agroforestry systems	• Lead Farmer Groups • Savings for Transformation • FMNR • Local Value Chain Development (LVCD) • Natural resource management through improved cook stoves, fire mitigation and control and food waste sensitisation • Livelihoods
Enhancing Resilience for Improved Livelihoods in Togdheer	Somaliland	2017–2020	Australian Government through the Australian NGO Cooperation Program (ANCP)	Enhance resilience through improved ecosystem health and food security of agropastoralist communities	• FMNR • Agroforestry • Natural resource management • Livelihoods • Food security • Producer groups • Village Savings Loans Association (VSLA) • Water management • Resilience and disaster management
Regreening Africa	Ethiopia, Ghana, Kenya, Mali, Niger, Rwanda, Senegal, and Somalia	2017–2022	European Union (EU)	Improve smallholder livelihoods, food security and resilience to climate change in Africa while restoring ecosystem services	• FMNR • Agroforestry • Natural resource management • Livelihoods • Food security • LVCD • Producer groups/cooperatives • Water management

PROJECT	COUNTRY	PERIOD	DONOR ORGANISATION	PROJECT GOAL	KEY PROJECT FOCUS AREAS
Forest Landscape Restoration for Improved Livelihoods (FLR)	Rwanda	2017–2023	Australian Government through the Australian NGO Cooperation Program (ANCP)	Improve food security and livelihoods for smallholder farmers in Rwanda by 2023	• FMNR • Agroforestry • Tree nurseries managed by farmers' cooperatives/groups • Financial inclusion and capacity building • Natural resource management • Livelihoods • Food security
Drylands Development Programme (DryDev)	Burkina Faso, Mali, Niger, Ethiopia, and Kenya	2019–2021	The Ministry of Foreign Affairs (MoFA) of the Netherlands	Sustained improvements in food and water security, livelihoods and resilience, and the empowerment of women and disadvantaged groups	• Natural resource management • Climate- and water-smart management • Climate-smart agricultural commodity production • Market access • LVCD • Livelihoods • Financial inclusion • Local governance and institutional strengthening
Rural Economic Development (iRED)	Indonesia	2016–2020	Australian Government through the Australian NGO Cooperation Program (ANCP)	Increase sustainable economic development of Sumba Island utilising FMNR and LVCD approaches	• FMNR • Agroforestry • Natural resource management • Water management • Cooperatives • LVCD
Integrated Management of Natural Resources for Resilience in the Asal (IMARA) Program	Kenya	2017–2021	Swedish International Development Cooperation Agency (SIDA)	Increase the resilience of marginalised households to climate change related shocks through diversified livelihoods and improved natural resource management	• FMNR • Agroforestry • Natural resource management • Water management • Cooperatives • Cook stoves • LVCD • Disaster management
Food Security and Resilience in Transitioning Environments (FORESITE)	South Sudan	2019– 2023	European Union (EU)	Contribute to strengthening community resilience, improving governance and conflict prevention, and reducing forced displacements due to loss of livelihoods	• FMNR • Agroforestry • Natural resource management • Cooperatives • LVCD • Gender equality • Peacebuilding
ReGreen the Globe (RtG)	Ethiopia	2019–2024	Australian Government through the Australian NGO Cooperation Program (ANCP)	Scale up FMNR across 752,910 hectares of deforested and degraded land across 33 woredas in three regions (Amhara, Southern Nations, Nationalities, and People's Region and Oromia) of Ethiopia by 2024	• FMNR • Scaling FMNR through national scale-up platforms • FMNR training, advocacy and technical advice • Resource mobilisation • Incentives • Research and evidence building • Knowledge dissemination

Figure 3: FMNR Evidence Gap Map[10]



10 This table shows that all projects reviewed included all four of the project components listed. As such, evidence of each of these projects for each of the outcomes listed is consistent across all project components in the majority of cases (all but one instance) at this point in time.

OVERALL FINDINGS

HOW IS FMNR PROGRAMMED?

The study found that all FMNR projects reviewed demonstrated high reach and uptake, ranging from 45 percent to 95 percent of each targeted community adopting FMNR. All projects used one or a combination of local scaling models, community-based organisations or external partnerships to promote the adoption of FMNR. Additionally, the evidence shows that FMNR has been integrated predominantly with livelihood activities like value chain development and savings groups. This integration has resulted in increased FMNR adoption and improvements in both biophysical environment outcomes and human wellbeing.

The technical practice of FMNR mirrors a similar community planning process as the RGC project model. Hence, the implementation processes of FMNR projects reviewed follow the FMNR project model and align with RGC. There is also evidence that FMNR practice has been adapted to fragile contexts, resulting in enhanced community resilience and adaptive capacity.

EVIDENCE BASE OF FMNR OUTCOMES

The most abundant evidence found on FMNR outcomes was in the category of biophysical environment, as shown in the evidence gap map in Figure 3. This category includes FMNR's impact on ecosystem services that provide products and services to households (such as fuelwood, timber and non-timber products, honey, tree nuts and fodder), or regulate and maintain environmental conditions (such as soil health and water quality). Evidence on FMNR's impact on the areas of agricultural productivity, income, food security and nutrition, community governance and empowerment is also growing.

Evidence of FMNR's contibution to biodiversity was limited, despite anecdotal observations. Limited evidence was found on FMNR's contribution to species biodiversity, cultural connection to the environment, cultural and subjective wellbeing, social relations, adaptive capacity and resilience, despite the frequent observations and anecdotal reports of these outcomes. The identification of these and other gaps in the existing knowledge base will help inform future evaluative research and program design priorities.

Through the Rural Economic Development (iRED) project, Lingga Wandal (left) leads a Women Farmers Group where she boosts productivity by encouraging members to actively plant trees and share the benefits of their collective work fairly.

BIOPHYSICAL ENVIRONMENT OUTCOMES

TREE COVER

Tree cover increases with FMNR

There was significant evidence found on FMNR's impact on tree density, particularly in West Africa and parts of East Africa, but further investigation into different contexts is needed. A 2020 study of successful FMNR sites in Sahelian agroforestry parklands identified high tree densities resulting from the regeneration of existing tree seeds[11]. But the same study reported that scaling out FMNR practices to land use types beyond agroforestry parklands may be less effective. An earlier 2017 study into FMNR in the Sahel found that crop production increased by up to 915 kilograms per hectare when tree density was between 15 and 40 trees per hectare[12]. However, crop yields decreased when tree density was beyond this level. These results indicate the need to further explore the optimum tree density and species mix for local farming systems as well as contribution to increasing biodiversity.

TREE PRODUCTS

Tree products are more available as a result of FMNR

Both internal and external evidence demonstrated FMNR's positive effects on the availability of tree products. The final evaluation for World Vision's Regreening Africa project found that the overall percentage of households that reported using tree products from farm and communal land had doubled over the project period[13]. Increases were also reported in household use of fuelwood from farm and communal land, the consumption of fruit and nuts, and the use of fodder shrubs and medicinal plants.

A 2020 review of eight external studies revealed that the practice of FMNR provided communities with a broad range of tree products both for their own use or to sell for income[14]. These products included fuelwood, wild leafy vegetables, fodder, nuts, fruits, honey, edible seeds and medicinal plants. The existing evidence is mostly qualitative or self-reported data from farmers – very few studies have attempted to quantify available tree products.

SOIL FERTILITY

FMNR can increase soil fertility

Existing knowledge has shown that FMNR has a positive effect on soil fertility. Most of this evidence is qualitative and based on farmer perceptions on soil fertility improvements, though several studies have measured soil organic carbon. A review from 2020 found several studies revealing FMNR's positive effect on soil organic carbon, particularly in sandy soils in parkland systems across the Sahel[15]. Where contextually possible, research partnerships are encouraged to facilitate experimental studies to determine FMNR's effects on soil fertility in different contexts and adaptations.

Once feeble shrubs, these trees in Kenya now stand tall and offer shade for livestock, attract bees from a nearby apiary, and provide readily accessible firewood for both cooking and income – all through using the practice of FMNR.

11 Lohbeck M, Albers P, Boels LE, Bongers F, Morel S, Sinclair F, et al. *Drivers of farmer-managed natural regeneration in the Sahel.* Lessons for Restoration. (2020)
12 Binam JN, Place F, Djalal AA, Kalinganire A. *Effects of local institutions on the adoption of agroforestry innovations: evidence of farmer managed natural regeneration and its implications for rural livelihoods in the Sahel.* Agricultural and Food Economics. (2017)
13 Woldeyohanes T, Kegode H, Hughes K, Outtara I, Vågen T-G, Winowiecki LA, et al. *Regreening Africa Consolidated Endline Report.* World Agroforestry. (2023)
14 Chomba S, Sinclair F, Savadogo P, Bourne M, Lohbeck M. *Opportunities and Constraints for Using Farmer Managed Natural Regeneration for Land Restoration in Sub-Saharan Africa.* Frontiers in Forests and Global Change. (2020)
15 Chomba S, Sinclair F, Savadogo P, Bourne M, Lohbeck M. *Opportunities and Constraints for Using Farmer Managed Natural Regeneration for Land Restoration in Sub-Saharan Africa.* Frontiers in Forests and Global Change. (2020)

AGRICULTURAL PRODUCTIVITY OUTCOME

Crop and livestock production benefit from FMNR

Most of the projects reviewed indicated improvements in crop yields and livestock productivity through FMNR practice, but variations in yields were noted due to different contexts. For example, crop yields varied across the seven Regreening Africa countries in line with different rainfall and soil quality from one country to another. Further research into understanding the processes and principles underpinning crop yield changes is recommended as crop production yields were rarely quantified. The majority of evidence assessed was qualitative or self-reported by farmers according to their perceptions of productivity.

Ruth is harvesting pawpaws from her thriving garden after undertaking training in agroforestry and land restoration practices through the Forest Landscape Restoration (FLR) for improved Livelihoods project in Rwanda.

HUMAN WELLBEING OUTCOMES

HOUSEHOLD INCOME AND POVERTY

FMNR contributes to household income and assets, but there is limited evidence of how equally these benefits are shared across all vulnerable groups

Positive shifts in household income and the accrual of productive and household assets as a result of FMNR were noted. FMNR trees on farms and community-managed forest reserves generated surpluses of natural resources that were used to diversify household income through firewood, construction timber and non-timber forest products. In some project areas, improved crop yields and livestock productivity also contributed to increased household income.

However, the studies that disaggregated income data by gender revealed that FMNR benefits were not equally shared with the most vulnerable groups in the community. Future social equity analyses would help to better understand how and why FMNR benefits are distributed differently across the community – and how to achieve more equitable outcomes through FMNR.

CHILD WELLBEING OUTCOMES

More evidence is needed to demonstrate FMNR's contribution to child wellbeing outcomes

There was limited external evidence found on FMNR's impact on child wellbeing. Some evidence was found of children's and youth's positive participation in land restoration activities at school and within their communities. Only one study was found to directly measure children's nutritional status in the context of FMNR[16]. The evidence review identified the need for future FMNR program designs to intentionally articulate the following pathways for improving child wellbeing:

1. Improved production (leading to improved food security and nutrition)
2. Improved household income (such as from selling timber)
3. Mainstreaming gender equality, disability and social inclusion
4. Reduced conflict and better social cohesion and resilience

FOOD SECURITY AND NUTRITION

Food security and nutrition is enhanced by FMNR and regreening practices, but more evidence is needed to better understand the synergies

Improvements in food security were found in most of the World Vision projects reviewed, as this is one of the main goals of FMNR. The CRIFSUP project in Kenya reported an increase of 31 percent in the number of households reporting sufficient food year-round. The Forest Landscape Restoration (FLR) project in Rwanda found regreening practices to be a significant factor positively associated with a household's sufficient diet diversity. During focus group discussions, FLR project participants highlighted the increased availability of fruit trees and vegetable gardens as key contributors to better diet diversity. For the Drylands Development Programme, there was evidence among women in Kenya that being in FMNR intervention sites increased the likelihood of consuming more than four food groups by 15 percent.

External knowledge has also indicated FMNR's potential to improve food security and nutrition, as demonstrated through evidence of an increase in food consumption in areas of higher tree density[17], more diverse diets[18], and a reduction in the number of months experiencing food insecurity[19]. However, more evidence is needed to highlight clearly the synergy between FMNR and food security. This could be achieved by intentionally integrating FMNR with food security and nutrition or nutrition-sensitive agriculture (NSA).[20]

GENDER AND DISABILITY INCLUSION

FMNR can contribute to gender equality, but more evidence is needed

Existing evidence has shown that FMNR can have a positive effect on gender equality and women's empowerment. For example, FMNR can reduce the time needed to collect firewood – a burden that often rests on women and girls – by making firewood more readily available. Nine out of the 11 World Vision projects reviewed in this study disaggregated data by gender[21].

16 Nkonya E, Kato E, Kabore C. *Impact of Farmer-Managed Natural Regeneration on Resilience and Welfare in Mali.* Green and Low-Carbon Economy. (2023)
17 Binam JN, Place F, Djalal AA, Kalinganire A. *Effects of local institutions on the adoption of agroforestry innovations: evidence of farmer managed natural regeneration and its implications for rural livelihoods in the Sahel.* Agricultural and Food Economics. (2017)
18 Chomba S, Sinclair F, Savadogo P, Bourne M, Lohbeck M. *Opportunities and Constraints for Using Farmer Managed Natural Regeneration for Land Restoration in Sub-Saharan Africa.* Frontiers in Forests and Global Change. (2020)
19 Nkonya E, Kato E, Kabore C. *Impact of Farmer-Managed Natural Regeneration on Resilience and Welfare in Mali.* Green and Low-Carbon Economy. (2023)
20 NSA is a food-based approach to agricultural development that puts nutritionally rich foods and dietary diversity at the focus of program design, while minimising unintended negative nutrition consequences of agriculture programs. As defined in World Vision Australia's Evidence Building Framework (Food Security, Health and Nutrition Evidence Pillar), NSA interventions aim to enhance year-round access to nutritious and diverse foods, increase income and empower individuals to meet their families' needs.
21 AACRS project, IRED project, FORESITE project, IMARA project, CRISFUP project, Talensi project, Regreening Africa, FMNR-Somaliland project and the DryDev programme

While this disaggregation enabled gender-specific data analysis, more consistent sex and age-disaggregated quantitative and qualitative data are needed to specifically measure the impact of FMNR on women's economic empowerment and the sharing of FMNR benefits.

In terms of disability inclusion, most of the projects reviewed were not disability responsive. There was little to no data on the participation of people with disabilities or disability specific FMNR outcomes, nor evidence of efforts to tailor projects for disability inclusion. Only three projects extensively disaggregated data by disability status[22]. Two projects highlighted that the participation of individuals with mobility disabilities in FMNR practices was limited because of challenges with dangerous terrain[23]. Better inclusion of people with disabilities in activities like value chain development is important for future FMNR programming.

SOCIAL COHESION

The impact of FMNR on social cohesion has not been widely measured

There was limited evidence showing FMNR's impact on social cohesion. However, social cohesion was only measured in three projects[24] and these projects were operating in fragile contexts or were integrated with a disaster reduction approach. For FMNR programs to be most effective, high levels of community cooperation are needed to ensure a unified community-led approach to environmental regeneration[25]. Measuring social cohesion is therefore necessary to understand FMNR's impact alongside the community processes that facilitate its effective adoption.

ADAPTIVE CAPACITY AND RESILIENCE

Adaptive capacity and resilience of FMNR participants has not been widely assessed

One of the main goals of FMNR and RGC is to build household and community resilience. Rapid restoration of tree cover through FMNR around rural dwellings, farms and surrounding landscape has been shown to contribute significantly to the psychological and physical wellbeing of residents, thereby increasing their resilience. However, a more systematic approach to understanding and measuring the link between FMNR and household and community resilience is needed.

GOVERNANCE

More evidence is needed on the contribution of FMNR and regreening models to improved governance

Governance is an important aspect for the adoption of FMNR. The review found strong qualitative evidence pointing to community empowerment and governance as an outcome of FMNR. More evidence is needed to understand where, when and for whom FMNR might be appropriate for long-term sustainability, given that implementation strategies must align with local land and tree tenure systems.

In Kenya, farmers work together to restore tree cover on the land next to an irrigation dam using FMNR and other regeneration practices.

22 AACRS project, FMNR-Somaliland project and the FORESITE project
23 Talensi project and the IRED project
24 FORESITE project, CRISFUP project and the FMNR-Somaliland project
25 Francis R, Weston P, Birch J. *The social, environmental and economic benefits of Farmer Managed Natural Regeneration*. World Vision Australia. (2015)

RECOMMENDATIONS

The current evidence base of FMNR's effects on the environment, agricultural productivity and human wellbeing has certainly grown since World Vision Australia's evidence gap analysis in 2016[26]. However, continued strengthening of this knowledge is critical to improving FMNR's effectiveness and scale. Credible evidence of the impacts of FMNR can be instrumental when promoting the practice and advocating for support in scaling the practice globally. Priority should therefore be given to addressing the remaining identified knowledge gaps.

Yanindra, a farmer in Indonesia, is growing her own eggplants for cooking and selling after being trained on land management through the Rural Economic Development (iRED) project. "They say our eggplant is sweeter than anywhere else," she says.

KEY RECOMMENDATIONS

Standardise impact measurement across future FMNR programming

Measuring consistent indicators across different land restoration projects will enable the systematic collection of statistically rigorous data on the effects of FMNR programming, improving how evidence is collected, aggregated and assessed. Standardised social cohesion measurement should be included in these indicators.

Increase explicit focus on gender equality, disability and social inclusion (GEDSI)

Participatory action research involving women, young people, elderly people and people with disabilities would generate a more nuanced understanding of FMNR's impacts. The review recommends intentionally incorporating GEDSI objectives, outcomes and outputs into FMNR program design, informed by context-specific GEDSI assessments. Additionally, increase the measurement of sex-, age- and disability-disaggregated quantitative and qualitative data to help assess the effectiveness of FMNR and GEDSI integration.

Closely measure women's economic empowerment

Include indicators specifically measuring the economic empowerment of women through FMNR and any changes in their status within the household and community. Consider the flip side of indicators–high participation from women in FMNR activities may appear positive, but could also indicate heavier work burdens for women who already have many other household duties.

Measure FMNR's impact on child wellbeing

Grow the number of projects that integrate FMNR with other approaches that have proven pathways to improving children's wellbeing, such as food security and nutrition approaches or gender and disability inclusion. This integration will help FMNR projects to intentionally measure and improve outcomes for children and youth.

Partner with research institutions to collect data

Collaborate with other credible research institutions to collect and document more data (particularly quantitative) on tree cover, species and density; the biophysical impacts of FMNR on biodiversity; crop yields; livestock productivity; water quality and security; and soil fertility.

Incorporate multiple measurements of household income data

Future FMNR programming should consider using a variety of indicators on both cash and non-cash household income, which to date has largely relied on self-reported data. Consider also measuring improved livestock production and the growth of assets, such as high-value trees, as sources of income.

26 Ibid

FMNR practices can benefit both the land and people, providing children and their families with improved access to tree products like leafy vegetables, nuts, fruits and edible seeds.

For more information, please contact:

Alice Muller, FMNR Scale-Up Senior Impact Evidence Advisor,
World Vision Australia: alice.muller@worldvision.com.au

Andrew Carter, FMNR Scale-Up Monitoring Coordinator,
World Vision Australia: andrew.carter@worldvision.com.au

Saba Mebrahtu Habte, Impact Evidence Building Manager,
World Vision Australia: saba.mebrahtuhabte@worldvision.com.au

World Vision ANCP desk: ancp@worldvision.com.au

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