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TABLE OF CONTENTS

Executive Summary1
INTRODUCTION: How Can We Map Landscape Governance?	9
SUMMARY of International Insights	13
APPROACH 1: Mapping Connectivity . . . . .	.23
Method 1: Participatory Social Network Analysis . . . . .	.28
Method 2: Social Network Analysis Questionnaire . . . . .	.36
APPROACH 2: Mapping Priorities and Values . . . . .	.41
Method 1: Priorities Questionnaire . . . . .	.44
Method 2: Values Questionnaire . . . . .	.48
ANALYZE the Social Landscape . . . . .	.51
VISUALIZE the Social Landscape . . . . .	.52
ANALYZE Network Centrality. . . . .	.52
ANALYZE Network Shape. . . . .	.60
ANALYZE Network Attributes. . . . .	.66
CREATE a Strategy for Change . . . . .	.73
CONCLUSION: Why Map Social Landscapes? . . . . .	.81
Endnotes . . . . .	.83
References . . . . .	.83
Acknowledgments	85
About the Authors	86

LIST OF ABBREVIATIONS

The category "General" has organizations and acronyms that appear throughout the text or in multiple international insights. The other categories show abbreviations that only appear in the relevant country-specific insight.

GENERAL

FAO: Food and Agriculture Organization of the United Nations

GEF: Global Environment Facility

GIZ: Deutsche Gesellschaft für Internationale Zusammenarbeit

ICRAF: World Agroforestry Centre

ICT: Information and communications technology

IUCN: International Union for Conservation of Nature

NGO: Nongovernmental organization

USAID: United States Agency for International Development

WRI: World Resources Institute

BRAZIL

ASPROFAGU: Association of Rural Producers Family Groups United

ASPROSEIS: Association of Rural and Family Producers United Six

CTPJ: Association of Rural Producers of the Três Vista, Jauari, Santa Ana and Santa Helena Groups

GAC: Galileia Community

INDIA

BAIF: Earlier registered as Bharatiya Agro Industries Foundation, renamed BAIF Development Research Foundation or simply BAIF

CARD: Centre for Advanced Research and Development

CGWB: Central Ground Water Board, Ministry of Water Resources

Ekta Parishad: A nonviolent people's action movement for land reform in India

DDA: Deputy Director Agriculture

DSC: Development Support Centre

FDC: Forest Development Corporation

FES: Foundation for Ecological Security

FPO: Farmer Producer Organization

FRC: Forest Rights Committee

GVT: Gramin Vikas Trust is a national organization established in 1999 by Krishak Bharti Cooperative Limited (KRIBHCO) for sustainable livelihood development of poor and marginalized communities

IARI: Indian Agricultural Research Institute

ICAR-CIAE: ICAR-Central Institute of Agricultural Engineering, Bhopal

ICRISAT: International Crops Research Institute for the Semi-Arid Tropics

IFFDC: Indian Farm Forestry Development Cooperative

IIFM: Indian Institute of Forest Management

JNKVV: Jawaharlal Nehru Krishi Vishwa Vidyalaya or Jawaharlal Nehru Agricultural University

K. K. Singh: Krishna Kumar Singh, a former Member of Legislative Assembly and founder of VELT

KVK ICAR: Krishi Vigyan Kendra (an agricultural extension centre) under Indian Council of Agricultural Research

NABARD: National Bank for Agriculture and Rural Development

NCHSE: National Centre for Human Settlements and Environment

NTCA: National Tiger Conservation Authority

NTPC: National Thermal Power Corporation

PMKSY Watershed: Watershed development component of Pradhan Mantri Krishi Sinchayee Yojana. A Government of India's programme that has amalgamated ongoing schemes on irrigation, watershed management, and improving farm productivity.

PRADAN: Professional Assistance for Development Action

RA/Beat Guard: Range Assistant/Beat Guard are lower level functionaries in the Forest Department

SFRI: State Forest Research Institute

SRIJAN: Self-Reliant Initiatives through Joint Action

SRLM SHG: Sustainable Rural Livelihoods Mission Self-Help Groups

TRIFED: Tribal Cooperative Marketing Development Federation of India

UNDP: United Nations Development Programme

WALMI: Water and Land Management Institute, Aurangabad

WWF: World Wildlife Fund

INDONESIA

BKPEDT: Coordinating Agency for Lake Toba Ecosystem Conservation

PUPR: Ministry of Public Works and Housing

SDA: Water Resources Directorate, under the Ministry of Public Works and Housing

KENYA

CFA: Community Forest Association

EU: European Union

KeNHA: Kenya National Highway Authority

KEPHIS: Kenya Plant Health Inspectorate Service

KeRRA: Kenya Rural Roads Authority

KFS: Kenya Forest Service

KURA: Kenya Urban Roads Authority

KWS: Kenya Wildlife Service

KWTA: Kenya Water Towers Agency

NEMA: National Environment Management Authority

WRMA: Water Resources Management Authority

WRUA: Water Resource User Association

RWANDA

ACNR: Association pour la Conservation de la Nature au Rwanda

ADRA: Adventist Development and Relief Agency

AEE: African Evangelistic Enterprise

AFDB: African Development Bank

ARCOS: Albertine Rift Conservation Society

BK: Bank of Kigali

BRALIRWA: Braseries et Limonaderies du Rwanda

COPRORIZ: Cooperative de Promotion des Riziculteurs de Ntende

FHA: Forest of Hope Association

FONERWA: Rwanda's Green Fund

LAFREC: Landscape Approach to Forest Restoration and Conservation

LWH/RSSP: Land-Husbandry, Water-Harvesting and Hillside Irrigation

MINADEF/Reserve Force: Ministry of Defense

MINAGRI: Ministry of Agriculture and Animal Husbandry

MINALOC: Ministry of Local Government

MINECOFIN: Ministry of Finance and Economic Planning

MINEDUC: Ministry of Education

MINILAF: Ministry of Lands and Forestry

MININFRA: Ministry of Infrastructure

MINIRENA: Ministry of Natural Resources

NAEB: National Agricultural Export Development Board

RAB: Rwanda Agriculture Board

RDB: Rwanda Development Board

RECOR: Rwanda Environment Conservation Organization

REMA: Rwanda Environment Management Authority

RWFA: Rwanda Water and Forestry Authority

SACCO: Savings and Credit Co-operative

TSC: Tree Seed Center

UNEP: United Nations Environment Programme

WCS: Wildlife Conservation Society

GLOSSARY

Actor: An organization, person, or other entity in the network.

Attribute: A quality or feature of an actor, such as gender, race, or age for individuals, and type, size, or funding for organizations.

Betweenness Centrality: A measure of network centrality measured as the frequency with which the actors lie on the shortest path between other actors.

Biophysical: Biological structures and biological processes.

Bridge: Another term for betweenness centrality.

Centralization: A measure of the extent to which one or a few actors have higher centrality measures than other actors.

Closeness Centrality: A type of network centrality, measured as the distance actors are from other actors.

Cloud: The interactions happening over the Internet, especially the dialogue over social media.

Clusters: A network measure that assesses the extent to which ties are distributed within communities rather than between them.

Connectivity: The degree to which individuals and organizations are connected to each other.

Core: The inner center of the network; the opposite of periphery.

Degree Centrality: A type of network centrality, measured as the number of connections held by each actor.

Density: A network measure of the number of ties in the network, expressed as a ratio between the existing number of connections and the maximum possible.

Eigenvector Centrality: A type of network centrality measured as the extent to which actors are connected to other central actors.

Governance: A system of management that considers the involvement of the actors, rules, and practices in governing resources.

Greatest Reach: Actors connected to the most connected actors, also known as eigenvector centrality.

Net-Map: A participatory social network analysis tool created by Eva Schiffer to map connections, influence, and interest in a network.

Network Attributes: A measure of the characteristics of those within the network.

Network Shape: A measure of how the shape of a network—specifically the size, density, core, periphery, and clusters—affects its efficiency and speed.

Periphery: The outer edges of the network; the opposite of core.

Social Influence: The manner in which actors affect the attitudes and behaviors of other actors.

Social Landscape: A term growing in popularity in sociology, geography, media studies, and marketing, defined as the “characterization of people, social organizational structure, and social relations on the land” (Field et al. 2003).

Social Network Analysis: A methodology to investigate social structures through the use of networks and graph theory.

Social Selection: A measure of network attributes focusing on the dispersion of knowledge across actors with different attributes.



DISCLAIMER

This publication presents a methodology for assessing the social landscape based on data collected in six countries. It is acknowledged that the data presented may be subject to misinterpretation and omissions within the network.

This guide has used generalizations to help readers understand the social landscape and to inform change at scale. The authors recognize the complexities and limitations involved and recommend that those using the guide adapt their mapping exercises to suit the intended recipients. Selective participation in mapping workshops cannot represent every individual or reveal every power dynamic in the landscape. Networks are dynamic, and the boundaries are difficult to define. Conducting

a social landscape analysis aims to be an important initial step that needs to be revisited periodically to get an adequate understanding of relationships, flows, priorities, and values.

This guidebook is intended to be used by practitioners with no experience of social network analysis or other network research. To increase usability, the academic theory that guided the research has been kept to a minimum.

The methodology is iterative and is meant to be adapted. World Resources Institute welcomes developments and suggestions to improve this guide.

NOTE ON SOFTWARE

The publication uses existing software to organize information and create relationship maps. All of the relationship maps are made with Kumu, a powerful, free data visualization software. Social network analysis software are designed to identify the most central actors, and the visualizations focus on actors with the highest degree centrality. Social network analysis maps are coded the same way that the stakeholders viewed connections and organizations to show their perceptions. The authors are not promoting or endorsing these software and do not make any guaranties about accuracy. The publication does not provide a guide to data entry or visualization techniques as technology changes quickly.





EXECUTIVE SUMMARY

Traditionally, forest and landscape restoration has been concerned with mapping the biophysical opportunity to plant trees and shrubs. But, it is not just about the trees. This guidebook introduces a new focus for mapping: the people who live, work, and depend on the landscapes. By translating methodologies frequently used in the crisis fields of health and national security, the guide offers actionable, environmental-related strategies to build a movement around restoration.

HIGHLIGHTS

- Biophysical opportunities mapping is a well-established technique used in forest and landscape restoration. However, there is also a need to map social opportunities and better understand social landscapes. For example, landscape connectivity and resource potential are important for geospatial mapping and are equally important for social landscapes mapping.
- The authors have adapted established methodologies of social network analysis and values mapping to create a user-friendly guide for restoration-specific social landscapes mapping.
- This guide presents a methodology to better understand landscape governance through two main approaches: mapping actors' resource flows and mapping their priorities and values.
- The guide presents the initial results of restoration-specific social landscapes mapping based on research conducted in six countries across Africa (Kenya and Rwanda), Asia (India and Indonesia), and Latin America (Brazil and Mexico).
- This guide is intended to be used and adapted to identify opportunities to build stronger networks and to measure changes in the network. This methodology can help drive positive change on the ground in forest and landscape restoration efforts.

WHY MAP SOCIAL LANDSCAPES?

Understanding the social landscape, or how people organize themselves on the land, is essential in creating a larger social movement and bringing about the large-scale change needed to achieve a restoration movement (Rowson et al. 2010). By emphasizing early understanding of the social landscape and measuring progress, restoration practitioners can be more efficient with resources, improve collaboration and outreach, and anticipate conflicts and bottlenecks.

This publication brings together different approaches to social network analysis and priorities and values mapping to understand forest and landscape restoration governance. The guide supplements the Restoration Opportunities Assessment Methodology (ROAM) through its focus on social aspects—such as landscape governance—not covered in the road-test version of ROAM (IUCN and WRI 2014). The guide is designed to support policymakers, researchers, and those involved in restoration decision-making and implementation by offering a social landscapes assessment methodology for use in restoration efforts.

This guide focuses on actors, specifically the way their connectivity, priorities, and values influence the social landscape. When social relationships and knowledge flows are visualized, they can be evaluated. The guide encourages practitioners to ask the question “How do people act in their landscape?”

HOW DO YOU MAP SOCIAL LANDSCAPES?

The publication offers two different approaches to understanding social landscapes. The first, *Mapping Connectivity*, is used to understand network connectivity, or the degree to which individuals and organizations are connected. The second, *Mapping Priorities and Values*, is used to reveal the attitudes and cultural systems behind social networks. The guide highlights two methods for each of these approaches (Table ES-1).

Mapping Connectivity helps identify community needs and the actors who are best placed to contribute to favorable outcomes. This guide explains how to map connectivity through *participatory social network analysis* using Net-Map—a participatory process to map social networks developed by Eva Schiffer—and a *social network analysis questionnaire*. Social network analysis is a formal theory to analyze the relationships among individuals or organizations by focusing on the positions of the actors (Paletto 2016). This type of analysis has frequently been used to inform natural resource management decisions (Bodin and Prell 2011), as well as to design strategic networks and prioritize actions (Hauck et al. 2015). The analysis can highlight the actors who influence policy, initiate actions, and facilitate knowledge transfer (Paletto et al. 2016). For example, mapping networks allows decision-makers to invest in social infrastructure—that is, to help engage communities, unions, cooperatives, and organizations to unlock the potential capacity of communities and their resources (Gorriiz-Mifsud et al. 2016).

Table ES-1 | Two Approaches to Understand Social Landscapes

APPROACH	METHOD	FOCUS	OBJECTIVE	OUTCOME
MAPPING CONNECTIVITY	PARTICIPATORY SOCIAL NETWORK ANALYSIS	FLOWS: <ul style="list-style-type: none"> ■ information ■ resources (e.g., seedlings) ■ finance ■ partnership ■ authority ■ conflict 	To understand the entire landscape of actors in a network in a participatory workshop setting	To identify needs at different scales and to get a community organized
	SOCIAL NETWORK ANALYSIS QUESTIONNAIRE		To understand the flows between actors in a network and the frequency of interaction using a questionnaire format	To identify actors with unique connections that may be leveraged to negotiate potential conflict or to disseminate information
MAPPING PRIORITIES AND VALUES	PRIORITIES QUESTIONNAIRE	PRIORITIES: <ul style="list-style-type: none"> ■ restoration goals ■ restoration interventions ■ restoration activities 	To understand the priorities of actors regarding goals, intervention types, and activities	To identify common goals among stakeholders that can help shape partnerships or funding proposals
	VALUES QUESTIONNAIRE	VALUES: <ul style="list-style-type: none"> ■ resource availability and extraction ■ preferences for resources, connectivity, and access 	To understand the values of actors regarding land use and general environmental practices	To improve restoration land-use planning and to understand how the community values its environment

Source: WRI.

Mapping Priorities and Values helps identify common goals and improve land-use and restoration planning (Dominguez and Hollstein 2014). This guide explains how to map priorities and values through a *priorities questionnaire* and a *values questionnaire*. The priorities questionnaire focuses on a community’s restoration goals, intervention types, and activities. Understanding priorities can help shape partnerships and funding proposals by isolating gaps in knowledge and identifying common goals across organizations.

The values questionnaire focuses on preferences and experiences. It can help improve restoration land-use planning among different stakeholder groups because the mapping of landscape values reveals suitable land uses and their social impact (Weber and Brown 2014). Actors with different environmental, economic, and social interests may not share land-management preferences (Brown et al. 2014). With this method, values can be determined geographically and applied to different settings at multiple scales. Understanding the priorities and values of actors

provides deeper insights into how actors relate to each other within the network and how actors can work across global and local scales.

Understanding network connectivity in combination with priorities and values builds a detailed picture of the social landscape. This analysis can inform strategies for change that draw on the strengths of the existing social landscape and support an effective and mobilized restoration network.

HOW DO YOU ANALYZE SOCIAL LANDSCAPES?

After mapping the social landscape, the guide focuses on analyzing three aspects of the network: centrality, shape, and attributes. Each aspect of network analysis is determined by a number of measures, and each measure answers a target question. For example, degree centrality—one of the most common measures—looks at who has the most connections in the network. These “Connectors” could be relied upon to set a unified message and encourage greater collaboration at all scales. Table ES-2 summarizes the three aspects of network centrality and their measures. In addition, the section on network analysis offers the definitions, advantages, and disadvantages of each measure.

Measuring network centrality can help us identify the network’s powerful and important actors by looking at how many connections the actor has and whether the actor is connected to other powerful actors. Social network analysis visualization software can automatically calculate the centrality measures. To make them more intuitive, the four central roles are described as Connectors, Spreaders, Gatekeepers, and Change Champions, along with the social network analysis terminology of degree centrality, closeness centrality, betweenness centrality, and eigenvector centrality.

Table ES-2 | A Quick Guide to Network Analysis

ASPECT OF NETWORK ANALYSIS	MEASURE	QUESTION
CENTRALITY	The Connectors (Degree Centrality)	Who has the most connections in the network?
	The Spreaders (Closeness Centrality)	Who spreads information most easily across the network?
	The Gatekeepers (Betweenness Centrality)	Who are the key intermediaries or bridges in the network?
	The Change Champions (Eigenvector Centrality)	Who is most connected to central actors in the network?
SHAPE	Size	Is the network large enough to contain all relevant actors but still small enough to allow for cohesion?
	Density	How many actors are operating in the same space?
	Core	Are core actors effectively using their central position?
	Periphery	In what ways are peripheral actors being heard and involved?
ATTRIBUTES	Clusters (Cliques)	What spheres of influence do actors have within their network and beyond to drive the agenda?
	Diversity	Is there a diversity of voices driving the agenda?
	Dissemination	Are current discussions reaching new communities?

Source: WRI.

The second aspect of a network that should be analyzed is the network shape.

Many of the shape measures can be seen visually once the map has been input into the appropriate software. The five measures—size, density, core, periphery, and clusters—provide an overview of the network shape. When conducting the network shape analysis, users should consider what is the most efficient network structure for reaching the intended goals (Valente 2010).

The third aspect of analysis, network attributes, refers to the characteristics of those within the network.

The term “inclusion” offers a broad template for recognizing difference along generational, gender, race, religious, nationality, or any other ground. Understanding whether the network shows inclusion allows for a more sophisticated understanding of social forces driving development outcomes. In addition, the personal backgrounds of stakeholders involved in the social landscape process will affect the results. Attributes of participants and organizations should be recorded and then the level of inclusion should be analyzed based on the network’s diversity and its ability to disseminate resources.



HOW DO YOU CREATE A STRATEGY FOR CHANGE?

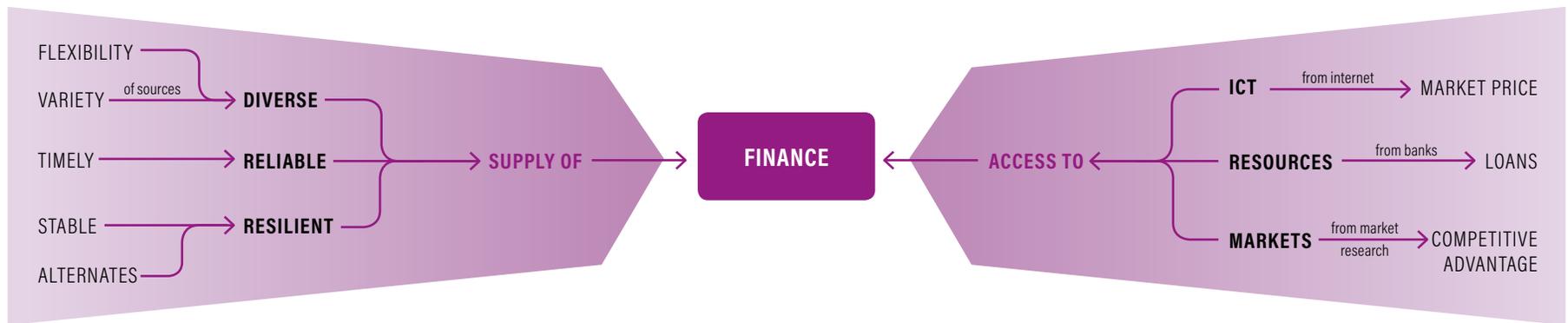
In the concluding section of the guidebook, a strategy for change is proposed for three restoration resource networks: seedlings, information, and finance. These networks all rely on a diverse, reliable, and resilient supply. They also need access to information and communications technology (ICT), resources, and markets. The proposed strategies for change each offer supply-focused questions related to all individual actors in the supply chain. Actors in any position can ask these questions to understand their supply of and access to resources. The strategies should

be applied to the intended recipients of these services, who, in the case of restoration, are often farmers or community organizations (Figure ES-1).

For example, the following questions are appropriate to a finance network:

1. Is there a **variety** of financial options? (DIVERSE)
2. Are there **reliable** sources of finance? (RELIABLE)
3. If the main funding source were cut off, are there **alternatives**? (RESILIENT)

Figure ES-1 | Building a Strategic Finance Network: Supply and Access to Resources



Source: WRI.

HOW DO WE USE SOCIAL LANDSCAPE MAPPING?

International case studies used these approaches to social landscape mapping to reveal important local insights into the social challenges affecting restoration.

In **Brazil**, a participatory social network analysis workshop with a small rural community in the Amazon helped identify that access to the Internet, and specifically to the weather forecast, would allow the community to more safely and efficiently develop plant nurseries. In addition, information access varied between genders, highlighting the need for more equitable access.

In **India**, participatory social network analysis workshops in the Sidhi district showed a lack of diversity of actors working on restoration, pointing to the need to encourage nongovernmental organizations (NGOs) to operate in the district and dedicate time to gaining the trust of the local community.

In **Indonesia**, participatory social network analysis workshops on the management of Lake Toba revealed the need for better inter-governmental collaboration and highlighted the role of local community organizations as agents of change.

In **Kenya**, a participatory social network analysis workshop in the Mount Elgon ecosystem showed the limited role that farmers play in environmental decision-making and underscored the ongoing conflict between government agencies and indigenous communities.

In **Mexico**, priority mapping confirmed that actors working on urban development in the Carmen municipality also needed to focus on programs to prevent social violence to be successful in their local development plan. Recognizing this shared priority provided avenues for greater funding and collaboration through knowledge of shared values. A social network analysis questionnaire underscored the strong collaboration between government agencies and the need to continue strengthening connections among government institutions and between government and nongovernmental actors.

In **Rwanda**, a full social landscapes analysis highlighted the challenges of working between the community, district, and national levels. It recommended that key governmental organizations

Table ES-3 | Questions for Social Impact

THREE PROVEN WAYS TO USE SOCIAL NETWORKS	QUESTIONS FOR SOCIAL IMPACT
1. Encourage Trust and Efficacy	How can the local restoration movement be more aligned with the priorities and values of its stakeholders?
2. Capitalize on Existing Roles	How can existing roles in the network be leveraged to increase impact?
3. Use Social Capital to Scale	What social capital (e.g., central actors) in the network can be mobilized to scale restoration efforts?

Source: WRI.

increase their communication and collaboration with a focus on the community farmer.

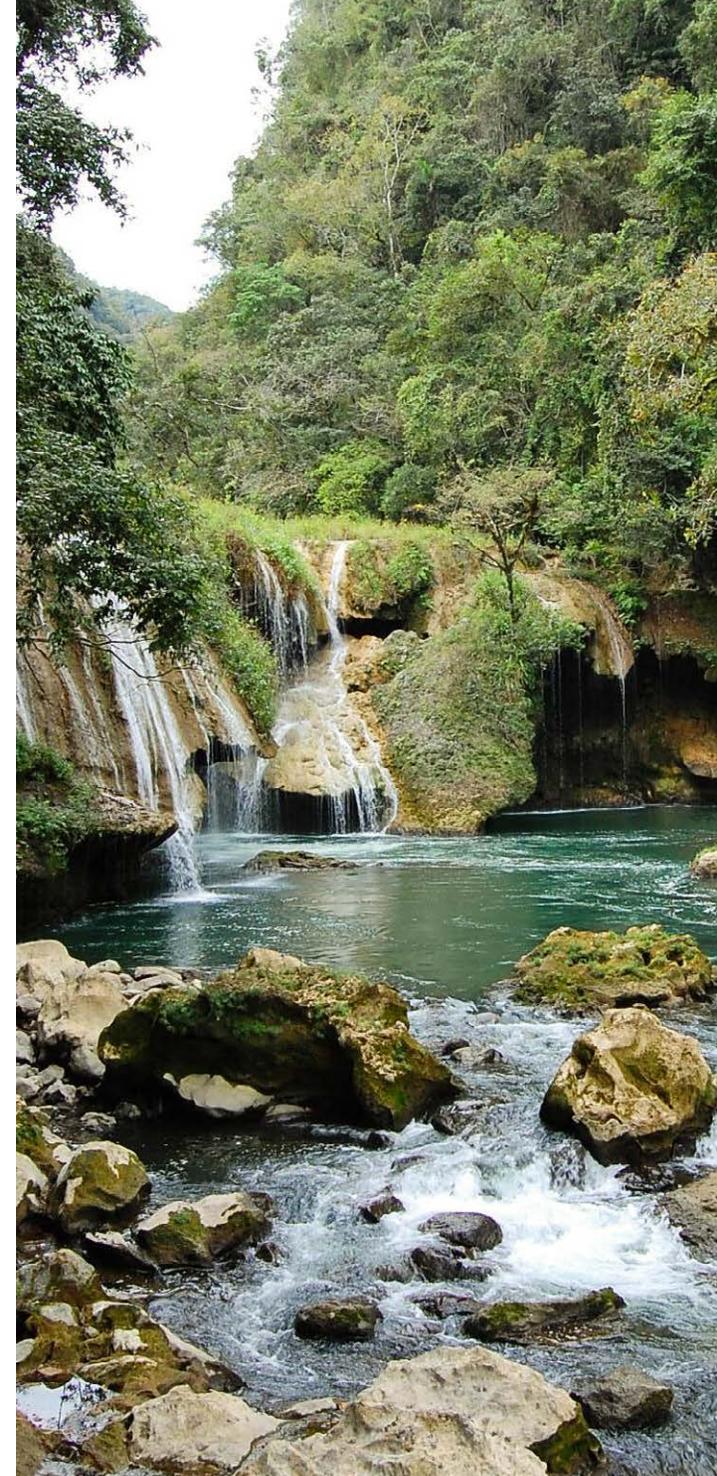
READY TO MAP YOUR SOCIAL LANDSCAPE?

When considering whether a social landscape analysis can create the desired impact, see if you can answer questions on social impact for your network (Table ES-3). Asking these types of questions allows practitioners to better use their own networks and scale up individual efforts to a larger, more unified movement.

After reading this guidebook, you should feel inspired to map your social

landscape. These four steps provide an easy way to get started:

1. **MAKE** a commitment to map your social landscapes around a specific goal or activity.
2. **ANALYZE** the social landscape maps to determine what works and what could be improved.
3. **WORK** with groups within the social landscape to identify, agree upon, and implement changes.
4. **REPEAT**, or make a commitment to evaluate changes in the social landscape periodically.

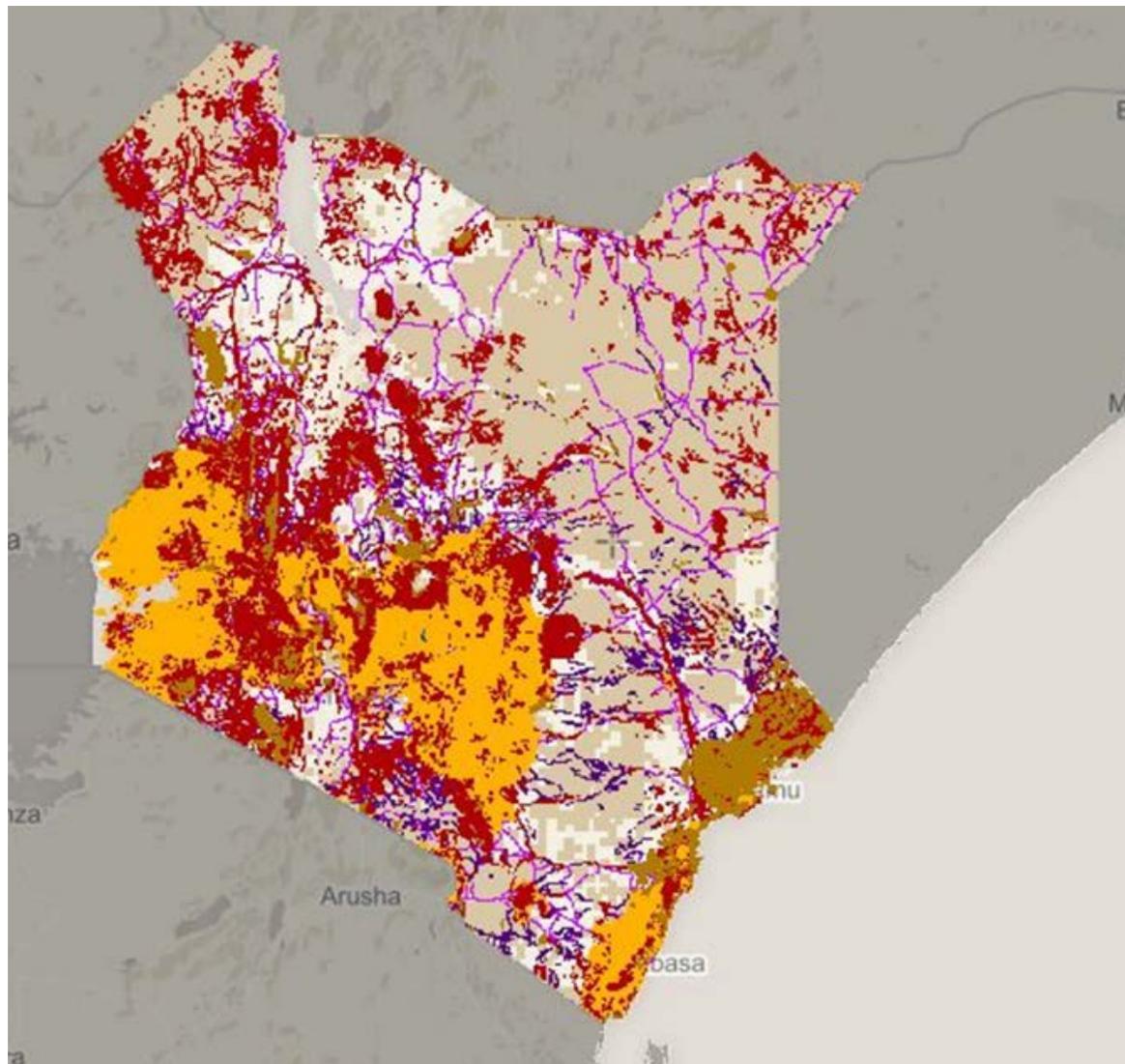




INTRODUCTION: **HOW CAN WE MAP LANDSCAPE GOVERNANCE?**

It would be inconceivable to embark on restoration interventions without creating a map of the biophysical landscape (Figure 1). Everyone knows what a map is. A map is essential to quickly understand the soil, the vegetation, the geography, and the opportunities that exist for land use. It notes the river systems, migratory pathways, and ecological systems that traverse the landscape. Connectivity, in particular functional connectivity, refers to these flows of biophysical resources across a landscape (Martin 2016). Landscape ecology and biodiversity conservation efforts often identify the need to restore connectivity across fragmented landscapes in order to enrich biodiversity and encourage the flow of resources (Baguette et al. 2012).

Figure 1 | Biophysical Landscape Restoration Opportunities Map for Kenya



Source: Kenya Forest Service 2016.

Understanding the social landscape, or how people organize themselves on the land, is central to landscape management.

Yet, people are at the heart of restoration. Success or failure relies on how people act toward the landscape and toward each other—in short, how they govern their landscape. Understanding the social landscape, or how people organize themselves on the land, is central to landscape management. Social landscapes can answer questions on how people make decisions about the landscape and who influences those decisions. Just as we create biophysical landscape opportunity maps to assess the potential for restoration interventions, we need to create social landscape opportunity maps to make informed decisions about the social potential. Connectivity, a key part of biophysical analysis, is also central to social landscapes. Strong ties to other organizations can reduce uncertainty and promote adaptation by increasing communication and information sharing (Kraatz 1998). In essence, collaboration contributes to the development of networks and the accumulation of social capital (Borg et al. 2015).

The social landscape can be defined as the “characterization of people, social organizational structure and social relations on the land” (Field et al. 2003). The term is gaining momentum in the fields of sociology, geography, media studies, and marketing.¹ Tools to conduct social assessments, such as social network analysis and values mapping, have only had limited use in the environmental field.

The focus on people and networks responds to a need to assess landscape governance. Governance refers to who has power, influence, and decision-making capacity. It also focuses on which processes, systems, policies, and laws are in place; which institutions exist; and how decision-makers are held accountable in relation to the environment (Mansourian 2012). It is difficult to govern ecosystems because the environment does not adhere to human-made jurisdictions or administrative borders (Bodin and Crona 2009). The governance of restoring land involves a projected future landscape, climate, population, and technology level, with value chains that do not yet exist and with actors that may not yet collaborate.

There are three key components to governance: actors, rules, and practices (Davis et al. 2013). This guide focuses on the actors, providing tools to identify and analyze actor networks, priorities, and values. The maps provide contextual, organizational, and behavioral evidence to support intervention planning by helping stakeholders to understand existing systems. Not all

How to Use This Guidebook

The guidebook separates the social landscape into two approaches: 1) mapping connectivity and 2) mapping priorities and values. Each approach offers two methods that can be used separately or concurrently, depending on the detail of information desired.

International case studies are used to illustrate insights from mapping social landscapes. In the analysis section, the case studies offer examples for the three types of network analyses.

A strategy for change is proposed for three resource networks: information, seedlings, and finance. These sample strategies can be used as a reference for an existing social landscape.

The guide focuses on the actors in a social landscape, recognizing that social opportunities must be understood to implement a restoration movement and to scale up site-level initiatives.

governance issues need to be tackled at once. Stakeholders should focus on the minimum conditions needed to create a positive outcome (Grindle 2007).

Through field tests in Brazil, India, Indonesia, Kenya, Mexico, and Rwanda, this publication brings together different approaches to social analysis by focusing on forest and landscape restoration governance. This publication is designed as an easy-to-use guidebook to assess

the social landscape for restoration. It provides an accompanying supplement to the Restoration Opportunities Assessment Methodology (ROAM) through its focus on social aspects not covered in the road-test version (IUCN and WRI 2014). This guidebook is intended to support policymakers, researchers, and those involved in restoration decision-making and implementation by offering a restoration social landscapes assessment methodology.

There are three key components to governance: actors, rules, and practices. This guide focuses on the actors.



SUMMARY OF INTERNATIONAL INSIGHTS

Many practical insights have already been gained from testing this guide. These case studies offer examples of how to analyze the network as shown in the guidebook's Insights sections. This summary provides an overview of why this methodology could be useful in a variety of contexts.

BRAZIL | WHY SOCIAL LANDSCAPES?

To understand how restoration and agroforestry information flows in the region, focusing on the difference between information flow to men and women in the rural Galileia community of Brazil.

BASICS

- 1. AREA:** Galileia community, Juruti, Pará state
- 2. SCALE:** Local and regional scales regarding information flow in Galileia.
- 3. PARTICIPANTS:** Community members
- 4. QUESTION:** Who influences restoration and agroforestry information in the community of Galileia?
- 5. FLOW:** Information
- 6. METHOD:** Net-Map workshop

MAJOR INSIGHTS

- 1. GENDER:** At the community level, **access to information was limited to secondhand sources for women.** Men were more likely to be engaged directly with organizations providing information.
- 2. CONNECTIVITY:** Connectivity is limited to physical resources and minimal access to technology. Cell phone networks, internet access, and road infrastructure connectivity are limited. These challenges lead to the community's isolation from needed information.

STRATEGY FOR CHANGE

- 1. INCLUSION:** Advocate for **greater representation of both men and women** at local meetings and trainings to allow for equitable access to information.
- 2. TECHNOLOGY:** Advocate for the private sector, which is already involved in restoration interventions, to sponsor increased **access to the Internet or cell phone networks.** Better connectivity would allow for greater independence with information access for both men and women and access to information, such as weather, to increase safety.

Locations of Case Studies



GUIDEBOOK INSIGHTS

NETWORK ATTRIBUTES:

GENDER MAP

→ SEE PAGE 69

To understand who can help implement and scale landscape restoration in Madhya Pradesh for the identified target landscape, and the pilot district of Sidhi.

BASICS

1. **AREA:** Sidhi district, eastern Madhya Pradesh, Madhya Pradesh
2. **SCALE:** District (Sidhi) and State (Madhya Pradesh)
3. **PARTICIPANTS:** State government, NGOs, private sector, research institutions, district government, universities, political leaders, elected representatives of local institutions, and farmers
4. **QUESTION:** Who influences implementation of landscape restoration in Madhya Pradesh?
5. **FLOWS:** Information, authority, funding, and conflict
6. **METHOD:** Three Net-Map workshops

MAJOR INSIGHTS

1. **DIVERSITY:** There is a **lack of diversity of actors**, specifically NGOs, that can help implement and scale landscape restoration in the Sidhi district and the eastern Madhya Pradesh landscape.
2. **COLLABORATION:** The interplay of social and political divisions has created **collaboration challenges** affecting how NGOs operate in the Sidhi district.
3. **CONFLICT:** State agencies, especially the forest department, have **tense relations** with other government departments and farmers in the district, which might become a challenging barrier for scaling.
4. **FINANCE:** Restoration relies heavily **on state budget allocations**, which are channeled through local-level government bodies. Direct lines of funding are difficult to access through the government.

STRATEGY FOR CHANGE

1. **CHANGE CHAMPIONS:** Tap networks and champions that **interact across scales** to scale up interventions from individual sites to landscape level.
2. **INFORMATION:** Create **greater awareness of rules, regulations, and resource rights** related to landscape restoration among farmers to improve collaboration and facilitate better implementation of policies.
3. **INCENTIVES:** Develop **value chains that incentivize stakeholders** (especially NGOs) to pursue restoration in the region.
4. **COORDINATION:** **Break silos and create better cooperation** between different government departments.

GUIDEBOOK INSIGHTS

NETWORK CENTRALITY:

CONNECTORS & GATEKEEPERS | *SCALING MAP*

→ SEE PAGES 54-55

NETWORK ATTRIBUTES:

ORGANIZATION ATTRIBUTES | *IMPLEMENTATION MAP*

→ SEE PAGES 70-71

BASICS

1. **AREA:** Lake Toba, Laguboti, North Sumatra
2. **SCALE:** National (Jakarta) and Community (Laguboti)
3. **PARTICIPANTS:** National government agencies, subnational government agencies, NGOs, local communities, academic institutions, and private sector
4. **QUESTION:** Who influences the water quality management of Lake Toba?
5. **FLOWS:** Authority and information
6. **METHOD:** Two Net-Map workshops

MAJOR INSIGHTS

1. **CHANGE CHAMPIONS:** Although there are many coordinating bodies, there is **no clear leader** to supervise the lake management.
2. **COORDINATION:** There is **a lack of cooperation and coordination** among government institutions across scales. There is a significant gap between central government and district government.
3. **CONNECTIVITY:** The subnational government is a central actor but is still **working in a silo**, especially at the district scale. Provincial and district governments are often not connected to other sectors, such as academia, businesses, and NGOs.
4. **INTEREST:** **Influential actors with negative interest** affect the management of the lake. These actors can include aquaculture farmers, hotel and household owners, agriculture and livestock farmers, and forest enterprises.

STRATEGY FOR CHANGE

1. **CHANGE CHAMPIONS: Identify and empower the most capable local community organizations.** With activities that include public education, advocacy, environmental protection, and information exchange, NGOs play a significant role in shaping the water quality agenda. NGOs tend to be highly connected to each other and to other types of actors at different levels (national and subnational).
2. **COORDINATION: Focus on coordinating with the district levels.** Several coordinating bodies exist to manage Lake Toba's water quality, but they have been initiated at the national or provincial level with little focus on the district level that oversees monitoring and law enforcement. Enlist local community organizations to participate and to monitor the lake governance.
3. **AUTHORITY: Understand the roles within governmental bodies.** Lake Toba is a national priority area where the distinction in authority between central and local government is not clear.

GUIDEBOOK INSIGHTS

NETWORK SHAPE:

SIZE, DENSITY, CORE, PERIPHERY, CLUSTERS |
COLLABORATION MAP

→ SEE PAGES 62-63

To better understand who can help implement and scale landscape restoration in the Mt. Elgon ecosystem of Trans-Nzoia county.

BASICS

- 1. AREA:** Mt. Elgon ecosystem in Trans-Nzoia county, western Kenya
- 2. SCALE:** Sub-county (western Trans-Nzoia)
- 3. PARTICIPANTS:** Government, NGOs, research institutions, resource user associations, and local community members
- 4. QUESTION:** Who influences landscape restoration in the Mt. Elgon ecosystem of Trans-Nzoia county?
- 5. FLOWS:** Partnership, information, authority, funding, and conflict
- 6. METHOD:** Net-Map workshop

MAJOR INSIGHTS

- 1. CONNECTIVITY:** Very few connections exist between farmers and the main restoration actors (the Ministry of Agriculture, the Ministry of Environment and Forestry, and the Kenya Forest Service). The ecosystem is dominated by smallholder agriculture, meaning any large-scale change will need to **involve farmers**.
- 2. CONFLICT:** There is **significant and ongoing conflict** between the Ogiek indigenous community and key national- and county-level government agencies, which was reaffirmed with the mapping exercise.
- 3. COORDINATION:** Key national and county government agencies are linked by both conflict and authority, leading to **uncoordinated efforts**. Restoration initiatives are perceived as national government activities, resulting in low levels of ownership at the county level.
- 4. DIVERSITY:** The **private sector** does not play a big role, either positive or negative, in landscape restoration in the ecosystem.

STRATEGY FOR CHANGE

- 1. CHANGE CHAMPIONS:** **Target farmers** as key on-the-ground implementers and important partners to achieve success.
- 2. CONNECTIVITY:** Bring together **community resource user groups**. These two groups, Water Resource User Associations (WRUAs) and Community Forest Associations (CFAs), share overlapping territories, and many of their activities affect each other.
- 3. COORDINATION:** Increase collaboration between **county and national government actors** to scale up landscape restoration efforts.

GUIDEBOOK INSIGHTS

NETWORK CENTRALITY:

GATEKEEPERS | *INFORMATION FLOW MAP*

→ SEE PAGES 56-57

MEXICO | WHY SOCIAL LANDSCAPES?

To assess the social characteristics (e.g., diversity, cohesion), perceptions, and networks of stakeholders in Carmen to identify key barriers and opportunities to implement a local economic development action plan for the municipality.

BASICS

1. **AREA:** Carmen municipality, Campeche state
2. **SCALE:** Municipal (Carmen)
3. **PARTICIPANTS:** Federal, state, and municipal government representatives, NGOs, local private-sector leaders, and academia
4. **QUESTION:** What are the social, environmental, economic, and urban priorities among stakeholders in the municipality of Carmen?
5. **FLows:** Communication, coordination/collaboration, finance, negative influence, and priorities
6. **METHOD:** Social network analysis and priority questionnaire (online)

MAJOR INSIGHTS

1. **PRIORITIES:** The way organizations ranked **urgency and importance** on public policy programs differed from previous participatory workshops and face-to-face discussions. Stakeholders assigned higher urgency and importance to a broader scope of policies than they had done previously.
2. **COLLABORATION:** There was a difference between stakeholders' stated concerns and their ongoing actions. Organizations showed concern for vulnerable populations such as farmers, but had **limited collaboration and coordination** with them.
3. **CONNECTIVITY:** Evidence showed the **siloed operation** of the different actor groups. Specifically, governments work primarily with governments and NGOs with NGOs.

STRATEGY FOR CHANGE

1. **PRIORITIES: Prioritize actions** for future stages by highlighting the contrasting opinions the priority questionnaire identified.
2. **EVIDENCE:** Recognize identified barriers and continue to gather evidence on **social cohesion opportunities and new barriers.**
3. **CONNECTIVITY: Identify and address weaknesses** within the network to make the local economic development strategy feasible.

GUIDEBOOK INSIGHTS

CLUSTERS:
COLLABORATION MAP

→ SEE PAGE 39

PRIORITIES:

→ SEE PAGE 47

To understand the flow of restoration-related information and resources as well as stakeholders' priorities and values in the Rwandan context.

BASICS

1. **AREA:** Gatsibo district
2. **SCALE:** National (Kigali), District (Gatsibo), Community (Gatsibo)
3. **PARTICIPANTS:** NGOs, donors, Rwanda Water and Forestry Authority, Gatsibo district officers, farmers, and community leaders
4. **QUESTION:** Who influences restoration in Rwanda?
5. **FLows:** Finance, information and collaboration, seedlings, and authority
6. **METHOD:** 3 Net-Map workshops; priorities and values questionnaires

MAJOR INSIGHTS

1. **PRIORITIES:** There are many actors in the network, yet for most of them **restoration is not a priority**.
2. **CONNECTIVITY:** Rwanda Water and Forestry Authority (RWFA) is the main institution linking key landscape actors. However, this connectivity does not extend to the communities and farmers that are major implementers and beneficiaries of restoration.

3. **COORDINATION:** Many NGOs work directly with communities without involving coordinating institutions (e.g., districts). These silos often lead to duplication of efforts, conflicts, or reduced impact on the ground.
4. **FINANCE:** Farmers receive a **minimal share of restoration funds**. They also lack direct access and technical and financial skills to play more entrepreneurial roles in restoration.

STRATEGY FOR CHANGE

1. **FINANCE:** Create more channels for direct access to finance and knowledge, allowing farmers to take ownership of restoration.
2. **SEEDLINGS:** Investigate whether market mechanisms can better facilitate the **purchase and distribution of seedlings** while encouraging better quality and improved variety.
3. **FARMERS: Invest in farmers** by providing in-depth services and support over the long term.

GUIDEBOOK INSIGHTS

GENERAL ANALYSIS:

INFORMATION & COLLABORATION MAP

→ SEE PAGE 20-21

GEO-LOCATION NETWORKS:

AUTHORITY MAP

→ SEE PAGE 34-35

PRIORITIES & VALUES

→ SEE PAGE 45, 49

NETWORK CENTRALITY:

CHANGE CHAMPIONS | FINANCE MAP

→ SEE PAGE 58-59

NETWORK SHAPE:

CLUSTERS | SEEDLINGS MAP

→ SEE PAGE 64-65

INSIGHTS: RWANDA

INFORMATION AND COLLABORATION:

How do organizations collaborate and share restoration information?

In Rwanda, the restoration space is full of actors and information sharing. Yet, there is no structured method to collaborate or to build on the work of others. For many NGOs, restoration is not a priority. The International Union for Conservation of Nature (IUCN) is one of the few NGOs that focuses purely on restoration, and Rwanda's Green Fund (FONERWA) is the first to provide technical and financial support to public and private projects that contribute to the environment, climate change, and green growth. With many different agendas, it is difficult to bridge information gaps.

The Rwanda Water and Forestry Authority (RWFA), a national government agency in charge of policies and programs on reforestation and the management of forests and natural water resources, was identified as one of the most connected actors in the network. Cooperatives are also highly connected within the network. The Equity Bank in Rwanda, a lending bank to both cooperatives and individual farmers, was identified as having the greatest reach. **What role could these central actors play in helping streamline information flow?**

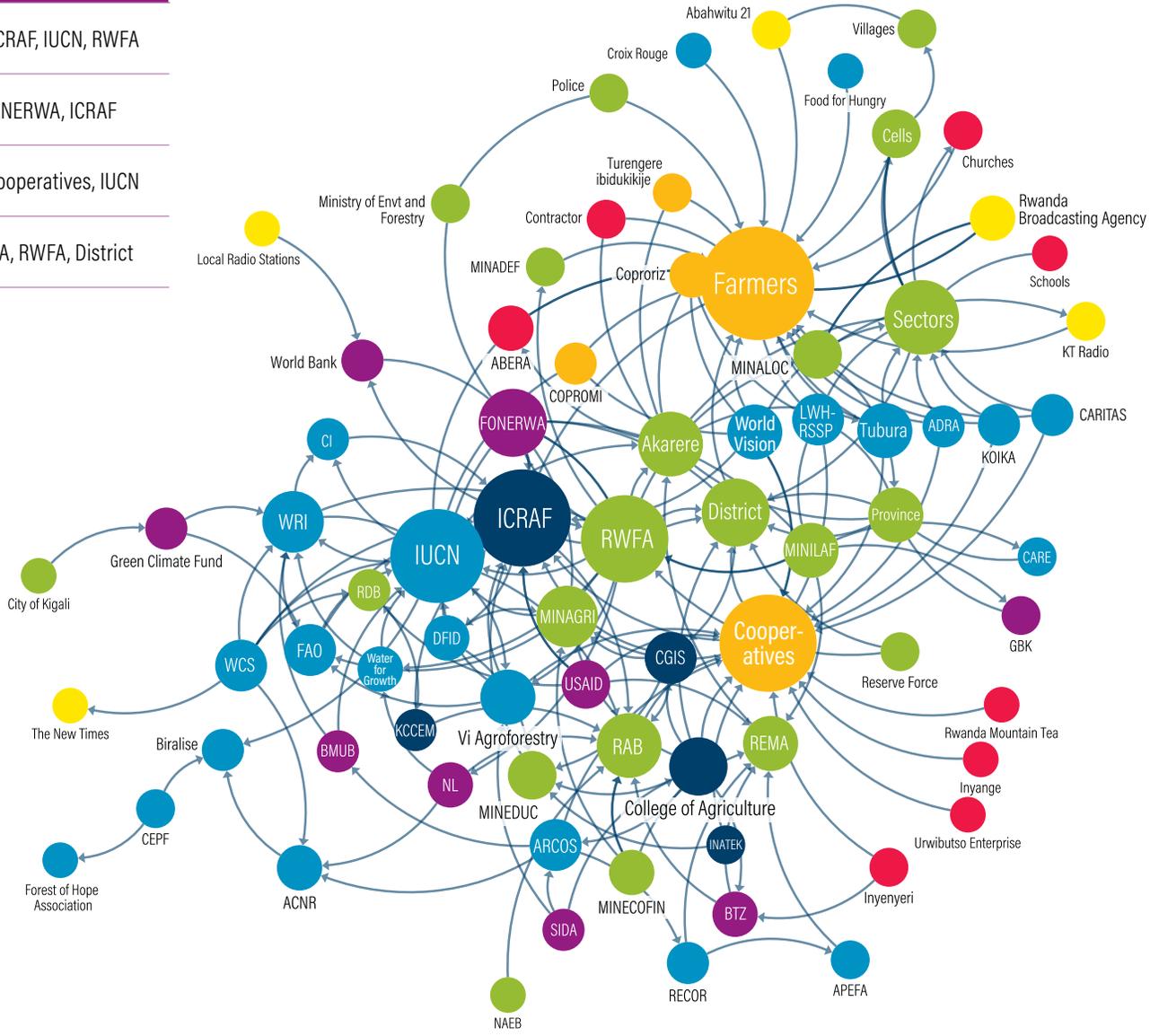
Discussions highlighted that farmers play an important role in restoration, but they are not consulted regarding implementation or rule enforcement. For example, enforcement agencies do not clearly communicate rules such as sanctions for tree cutting to farmers. There are also no requirements for institutions to provide information and monitor restoration activities at the community level. **How could information flow within the network lead to more meaningful and applied collaboration?**

Furthermore, the network is dominated by restoration actors focusing on socioeconomic and development goals. Actors with different goals such as biodiversity conservation (for example, the Rwanda Development Board [RDB], the Wildlife Conservation Society [WCS], and Forest of Hope Association [FHA]) are not very well connected with network hubs. **How can diverse actors be integrated to achieve diverse restoration goals?**

Centrality is a measure of the central positioning of actors in a network.

Figure 2 | Rwanda Information and Collaboration Network (National, District, Community)

CENTRALITY	WHO?
Connectors Degree Centrality	Farmers, Cooperatives, ICRAF, IUCN, RWFA
Spreaders Closeness Centrality	RWFA, Farmers, IUCN, FONERWA, ICRAF
Gatekeepers Betweenness Centrality	Farmers, ICRAF, RWFA, Cooperatives, IUCN
Change Champions Eigenvector Centrality	Farmers, ICRAF, FONERWA, RWFA, District



LEGEND

- Local Community
- NGOs
- Research Institutions
- Government
- Private Sector
- Donors
- Media
- Information & Collaboration

Source: WRI.



POWERS
The Change
Time

WHO IDENTIFIES LA
RESTORATION IN BURU

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APPROACH 1: **MAPPING CONNECTIVITY**

When looking to map connectivity, it is important first to consider the goal of the restoration project and then to see how social network analysis could contribute to the restoration project. Analyzing existing literature points to three main reasons why studies rely on social network analysis to help strengthen natural resource governance systems (Table 1).

Table 1 | Three Proven Ways to Use Social Networks

THREE PROVEN WAYS TO USE SOCIAL NETWORKS	WHAT THE STUDIES SAY
<p>1. Encourage Trust and Efficacy</p>	<p>Trust is key to network collaboration and can be identified through the extent of formal and informal networks (Borg et al. 2015). Network analysis can address the network's collaboration and conflict flows to increase positive relations (Paletto et al. 2016). In addition, understanding information flow and communication can help strengthen channels with disconnected or disenfranchised members of the network (Alexandrescu et al. 2016).</p>
<p>2. Capitalize on Existing Roles</p>	<p>Skills and knowledge sets can be identified through social network analysis. Identifying skills is essential for the management of local resources, helping to understand both strengths and gaps in knowledge (Crona and Bodin 2006). Scaling strategies are more effective if the network is mapped with an understanding of specific roles and the missing key actors and links (Bixler et al. 2017).</p>
<p>3. Use Social Capital to Scale</p>	<p>Social networks are an indicator of social capital. Often actors with larger social networks have more livelihood strategies, such as access to finance and resources (Cassidy and Barnes 2012). Vulnerable populations can be identified and actions taken to increase resilience in communities (Ricciardi 2015). Individual actors play an important role in bridging economic, geographical, and geopolitical boundaries and hierarchies (Keskitalo et al. 2014).</p>

Source: WRI.

This guide presents two user-friendly approaches for social network analysis:

PARTICIPATORY SOCIAL NETWORK ANALYSIS through Net-Map, a methodology developed by Eva Schiffer;² and a **SOCIAL NETWORK ANALYSIS QUESTIONNAIRE**. Table 2 also includes Net-Map LITE, a simpler, alternative version of Net-Map that can be applied with time constraints or when participants have difficulties understanding the full Net-Map methodology.

Combining a participatory approach like Net-Map with a questionnaire format can allow greater insight into the social landscape. For example, a participatory approach can be followed up by a questionnaire, or a scoping questionnaire can be used before participatory

mapping. Together, these two social network analysis approaches create a baseline for understanding social landscape connectivity. Since the creation of these maps represents the subjective reality of the participants, the social network map should be considered a starting point for further investigation.

When collecting social network data, the way in which it is collected will have a profound effect on the end results. Different survey approaches (for example, group, individual, or electronic) offer trade-offs related to response rates, costs, and data accuracy (Borgatti et al. 2013). A mix of methods can provide a fuller picture to triangulate data.

Net-Map focuses on data collection in group settings while the questionnaire was trialed through electronic data collection (e-mail). These two approaches often focus on similar questions regarding flows of knowledge, resources, finance, authority, and conflict. Table 3 offers a guide for how to frame the social network analysis question to reach a similar expected outcome.

In addition, the social network analysis question should specify a clear boundary (for example, a region, area, geography, or time scale). Stating the parameters early on can help limit the network and produce a more complete map.



QUICK TIPS | ENSURING INCLUSIVE ENGAGEMENT

One principle of inclusive governance is that rules and decision-making processes must be designed and implemented in a way that ensures fair and equitable participation by all stakeholders within a landscape.^a

The social network analysis map can contribute to achieving inclusive landscape governance when it incorporates the diverse perspectives and experiences of a wide range of stakeholders. Answering the following considerations prior to conducting social network analysis can help avoid bias and achieve more inclusive participation in social network mapping activities:

- Include diverse identities and viewpoints on the facilitation team. *A diversity of voices can help prevent biased interpretations of the results.*
- Ensure confidentiality and practice informed consent. *Marginalized participants may feel more acute risks from sharing information.*
- Triangulate and disaggregate results. *Conducting stakeholder mapping separately with people from different identity groups can help us understand how different segments of society experience problems differently.*^b

For example, in Brazil, women and men were separated to map information networks, and the results highlighted insightful differences.

Practitioners should refer to the Network Attributes section (page 66) to determine how the results of the social network analysis are affected by the similarity of attributes for participating individuals and for organizations.

a. De Graaf, M., L. Buck, S. Shames, and R. Zagt. 2017. *Assessing Landscape Governance: A Participatory Approach*. Washington, DC: Tropenbos International and EcoAgriculture Partners.

b. Catholic Relief Services. 2017. *Peacebuilding, Governance, Gender, Protection and Youth Assessments*. Washington, DC: Catholic Relief Services.

Table 3 | Mapping Connectivity with a Restoration Focus

FLOWS	OBJECTIVE	KEY QUESTIONS
INFORMATION	To improve communication and information flows of restoration knowledge, especially to the actors on the periphery	NET-MAP: Who influences restoration information in <i>x</i> region? Who influences collaboration for restoration in <i>x</i> region?
		NET-MAP LITE: Who provides information on restoration?
		SNA QUESTIONNAIRE (open): Who do you collaborate/share information with?
		SNA QUESTIONNAIRE (closed): How often do you communicate with (<i>list of names</i>)? How often do you communicate with (<i>types of actors</i> , e.g., government/NGO extension officers, micro-finance community workers, etc.)? How often do you collaborate with (<i>list of names</i>)?
RESOURCES (e.g., Seed Access)	To understand strategies for seed access, including who are the main seed sources and the resulting implications for network efficiency and equity	NET-MAP: Who influences seed selection in <i>x</i> region? Who influences seed trade in <i>x</i> region?
		NET-MAP LITE: Who trades seedlings for restoration interventions?
		SNA QUESTIONNAIRE (open): Who do you trade/exchange seeds with?
		SNA QUESTIONNAIRE (closed): How often do you trade seeds with (<i>list of names</i>)?
FINANCE	To understand what funds are available, and where and who they are channeled through	NET-MAP: Who influences restoration finance in <i>x</i> region?
		NET-MAP LITE: Who provides restoration finance in <i>x</i> region?
		SNA QUESTIONNAIRE (open): Who have you provided finance to in the past <i>x</i> years? Who have you received finance from in the past <i>x</i> years?
		SNA QUESTIONNAIRE (closed): How often have you provided finance to (<i>list of names</i>) in the past <i>x</i> years? Who have you received finance from (<i>list of names</i>) in the past <i>x</i> years? Who have you provided finance to (<i>list of names</i>) in the past <i>x</i> years?
AUTHORITY	To understand who makes land-management decisions and has influence to block or unlock opportunities	NET-MAP: Who influences land-management decisions in <i>x</i> region?
		NET-MAP LITE: Who holds authority over whom in <i>x</i> region?
		SNA QUESTIONNAIRE (open): Who governs your land-use decisions in the landscape?
		SNA QUESTIONNAIRE (closed): Who governs (<i>list of actors</i>) your restoration decisions? ⁴
CONFLICT	To understand conflict dynamics that can affect or be exacerbated by restoration interventions	NET-MAP: Who influences conflict dynamics in <i>x</i> region?
		NET-MAP LITE: Which actors are in conflict in <i>x</i> region?
		SNA QUESTIONNAIRE (open): Whose decisions affect you? With whom do you have conflict?
		SNA QUESTIONNAIRE (closed): Whom do you have conflict with (<i>list of actors</i>)?

Source: WRI.

METHOD ONE: PARTICIPATORY SOCIAL NETWORK ANALYSIS

PARTICIPATORY SOCIAL NETWORK ANALYSIS:

MATERIALS: Flip chart paper, colored pens, colored sticky notes, tape, building blocks.

ROLES: 4-10 participants per group, 1 facilitator per group, 1 note taker per group

FORMAT: Workshop of 1.5 to 4 hours, depending on the complexity of the network

OBJECTIVE: To understand the landscape of actors in a network in a participatory workshop setting

OUTCOME: Social network analysis map

The first approach, Net-Map, involves stakeholder groups mapping the network flows relevant to their local context and challenges. This participatory social network analysis approach is adaptable to many contexts, including restoration-related concerns, such as natural resource governance or land-tenure conflicts. The participatory process focuses on stakeholders' perception, providing insights on their thinking but also leading to potential gaps in information or subjectivity to be taken into consideration.

Net-Map can be conducted at any stage of the restoration work, although often the questions will change to reflect the changing needs of the work. We recommend conducting a Net-Map activity at a minimum within the early stages of the work to set a baseline and influence the restoration strategy for that region.

It is important that the Net-Map activity be conducted in a safe and neutral space for all participants, especially when talking about issues like conflict and authority. The location and timing of the exercise should consider the needs of different stakeholder groups, power dynamics, and gender norms. It is important to understand observer and researcher biases and to follow ground rules for social research.³ Facilitators should encourage all members of the group to contribute their ideas.

THE APPROACH

Net-Map's original methodology has been adapted and simplified based on pilot studies in Brazil, India, Indonesia, Kenya, Mexico, and Rwanda. This process aims to determine which actors are involved in each network, how they are linked, how influential they are, and what their goals are.

Participatory social network analysis through Net-Map follows eight stages, starting with defining the question and ending with data analysis (Figure 3). Net-Map LITE offers an alternative, depending on the time constraints and the difficulty participants have in understanding the Net-Map process. Net-Map LITE is based on simplifications of the original methodology that arose from field-test adaptations.⁴

Who influences
[restoration-related activity]
in [location or landscape]?

Figure 3 | The Steps of Participatory Social Network Analysis through Net-Map



Source: WRI.

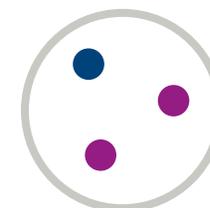
STEP 1. DEFINE THE QUESTION

Write the question at the top of the flip chart paper.

The best questions are specific, relevant, and focused on change. The question should attempt to capture the entire relevant social landscape, including actors directly involved as well as those on the periphery of the network. Asking a broad question such as “who influences...?” helps to identify actors that may be having positive as well as negative effects on restoration decisions. Net-Map LITE offers more direct questions that can be easier to answer. However, using Net-Map LITE may not offer insights into the full landscape, as it may disregard actors that negatively influence restoration or that are not currently connected but have the potential for influence. The location of the question can be predefined by the facilitators (recommended) or open to discussion by the group. A full list of key questions and themes can be found in Table 3 with more information on each question’s objective.

STEP 2. IDENTIFY ACTORS

Ask participants to list all the actors related to the question on a separate piece of flip chart paper.



After the actors have been listed, participants should group them in categories. The following seven categories are used throughout the paper and should work well for most contexts, but can be adapted as needed:

- Farmers/Smallholders/Community Organizations
- Government
- NGOs
- Private Sector
- Media Organizations
- Research Institutions/Academia
- Donors/Financial Institutions



QUICK TIPS | NOTE TAKER

Designate a note taker in the group who can be responsible for capturing the insights from discussions. The discussions that arise from producing the maps are an essential part of the learning process, and reflections should be recorded and included in the analysis. These discussions help the facilitators understand the perceptions of the stakeholders and capture insights that might not come out in the maps. These insights do not show up in the social network analysis maps but should be reflected in reports.

In Kenya, discussions highlighted important insights regarding relations with farmers, which would not have been identified through mapping networks alone.

The key requirement is that all the groups of actors must play a different role. For example, if research organizations play the same role as NGOs in that location, they must be in the same category. Try to keep categories to seven or less to reduce complexity. The grouping is flexible based on the objectives of the exercise. For example, it may be important to divide government into national and state levels.

Make a key of the different actor categories chosen and write the name of each actor on a sticky note placed randomly on the flip chart paper. For example, purple could represent research institutions, meaning all types of research institutions would be written on purple sticky notes and placed on the flip chart paper.

NET-MAP LITE

In some cases, creating categories for actors may be too complex or time consuming. Participants may not be aware of what category the actor represents. In such circumstances, emphasis needs to be placed on data collection of the actor network. In these situations, official coding can occur after the initial mapping exercise if adequate discussions and research on the actors have been conducted.

In Brazil and Rwanda, category coding was omitted for simplicity in rural villages.

STEP 3. ALLOCATE LINKS

Once the actors and actor groups have been defined, participants should identify the mutually exclusive flows between the actors. More than three flows can be time consuming, difficult to read on a flip chart, and prove challenging to input later. It is important to focus on which flows are key to the research goal. The recommended flows for restoration-related questions include:

- Information
- Resources
- Funding
- Authority
- Conflict
- Partnership

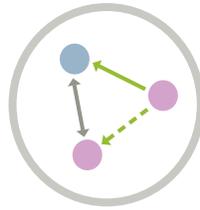


QUICK TIPS | IDENTIFYING ACTORS

If participants seem to have trouble thinking of actors, facilitators can ask the following questions:

- **IMPACT:** Who is affected by the decisions made by each of the actors listed?
For example, consider who is affected by the actions of the district leader.
- **FORMALITY:** Are there any informal actors involved who are not listed?
For example, include local champions, celebrities, or figures with informal power such as local cultural or religious figures, local elites, middlemen, land brokers, mafia groups, or private security.
- **SPECIFICITY:** Are there any institutions listed that could be broken down to better represent their different needs and concerns?
For example, break down “farmers” into independent smallholders and contracted farm workers or male farmers and female farmers if relevant.

Create a key for the flows on the side of the flip chart paper (e.g., purple for authority, green for funding) and draw flows between the actors on the map.



Additional features can be added to the flows to highlight the formality or the strength of the flows. It may be relevant to understand informal finance flows or casual information flows between friendship groups. If this approach does not enhance the data, it is best to keep it as a solid line. Ways of representing flows could include:

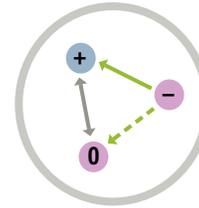
- Formal flows (solid line) —————
- Informal flows (dashed line) - - - - -
- Directional flows (arrows) ← →
- Strength of flows (thickness of line) ————

STEP 4. ASSIGN INTEREST

Interest should be assigned to see which actors actively support restoration, which actors are impeding progress, and which actors are neutral.

To show interest on the map, the actors are assigned either

- + (positive interest),
- (negative interest or conflicting interest),
- 0 (neutral interest or overall no negative or positive interest)



NET-MAP LITE

Although there are many benefits of asking about interest and influence in a landscape, this step can sometimes be skipped when using Net-Map LITE questions or with limited time constraints. When using direct Net-Map LITE questions, actors with negative interests will often not show up. Net-Map questions that include “who influences” are more likely to identify restoration actors with a negative influence, such as mining companies.

In Indonesia and India, a range of actors with positive and negative influence on restoration were identified, helping to highlight potential conflicts within the region.

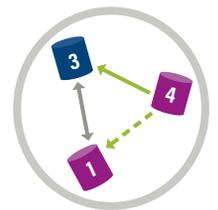
STEP 5. ASSIGN INFLUENCE

Participants should identify the actors’ influence level in the network.

Blocks can be used to identify the relative amount of influence within the landscape. The focus should stay on “how strongly can actors influence the results?” (for example, the successful restoration of *x* landscape) rather than the more contentious question of “how powerful is this actor in your society?” Participants should place the blocks on the relevant actors and then record the number manually on the map, with the most influential actors having the highest number of blocks and the least influential having one block.

The number of blocks is relative to the largest degree of influence chosen; therefore, standardization is not required. For ease of explanation, the following guidelines can be used:

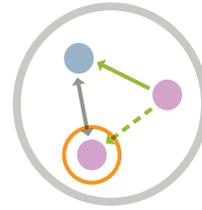
- 4: Most influential actors
- 3: Significantly influential actors
- 2: Influential actors
- 1: Actors with limited influence



NET-MAP LITE

If the workshop has limited time remaining, participants can be asked which key stakeholders could bring about exponential change if the relevant flow were increased. For example, which actors should exponentially increase information flow to ensure the success of the project? These key stakeholders should be circled.

In Brazil, participants were asked to identify the actors that could increase information flow.



STEP 6. DISCUSS DATA

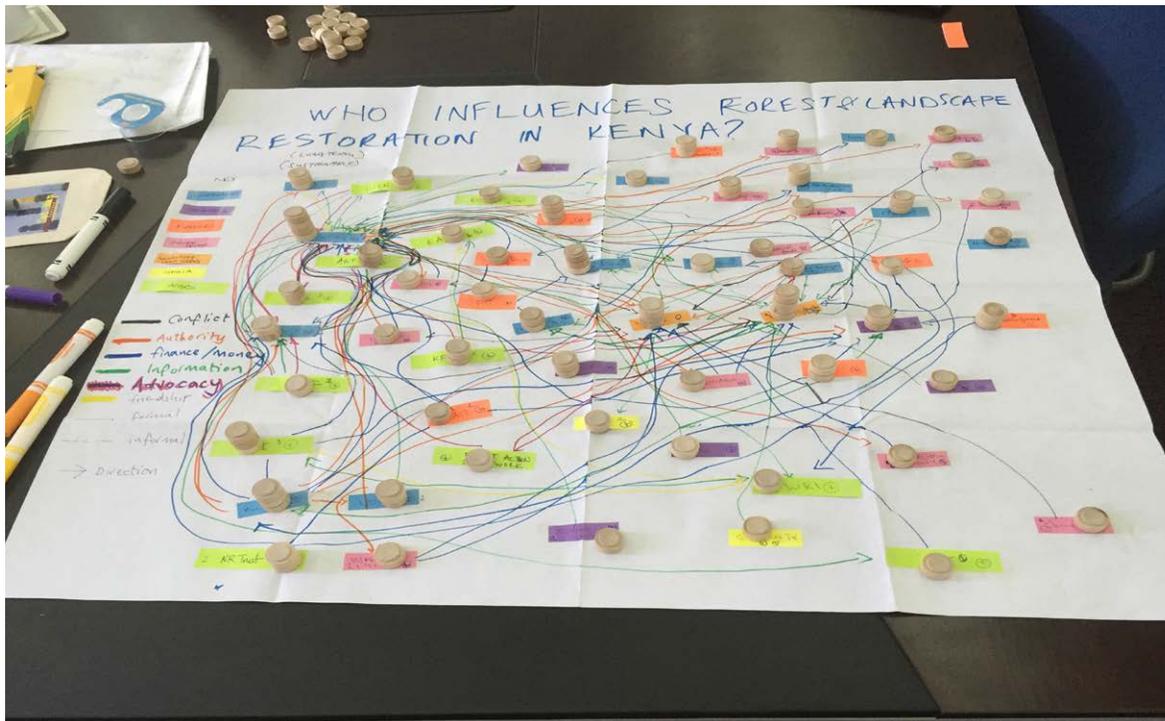
Now that the mapping process is complete, ask participants to step back and reflect on the results.

Facilitators should provide the following guiding questions for participants either verbally or in writing:

- **SURPRISES:** What do you find most surprising about the map?
- **MISSING ACTORS:** Does the map include all actors necessary to ensure restoration in the landscape? Who from the landscape is left out of the map, and why?
- **CENTRAL ACTORS:** Who are the central actors in the map? Are they adequately positioned to lead or participate in the restoration process? Why or why not?
- **ACTORS ACROSS SCALES:** Which actors operate across scales? What are the reasons for these actors to operate within multiple networks and scales? Do they share common attributes?

These reflections are key to drawing insights from the mapping process, and note takers should record this discussion. Now that the map has been created and the initial insights analyzed, the data can be input and a strategy for change can be considered.

Figure 4 | Net-Map in Kenya with Completed Social Network Analysis



Source: WRI.



INSIGHTS: RWANDA

AUTHORITY:

How does authority influence restoration implementation?

In Rwanda, the authority map places the government at the center. The RWFA is the most connected actor for authority of restoration nationally. **RWFA's authority over NGOs allows it to be at the center of the national restoration authority map.** NGOs must all receive memorandums of understanding or support letters through RWFA alone or RWFA and district governments to legally operate in Rwanda. Many NGOs also communicate directly with the district governments, the second most connected actor in the network.

The districts and the Ministry of Lands and Forestry (MINILAF) also play important roles. Without MINILAF, RWFA would not have policies and funding for programs. Without districts, RWFA programs would not materialize into action. Putting RWFA at the center of coordinating numerous cycles of restoration efforts led by NGOs places extra burden on RWFA and assumes that RWFA is suited for aligning NGO-led interventions with government objectives and that RWFA has the mandate and influence to facilitate strategic relationships for interventions to take place.

Although the authority network highlights the central presence of the Rwanda government, it also shows the **informal authority of NGOs and bilateral cooperation agreements.** Many major agencies like RWFA have direct long-term support from another country in the form of technical experts or consultants. Technical experts can shift the dynamics of decision-making, such as when local experts defer to foreign experts due to lack of expertise, when accountability is placed on an external party, or when foreign experts are incentivized to push a predetermined agenda.

Actors and their flows can also be mapped to locations. Figure 5 shows the organization headquarters of the main actors in the authority map. Private sector organizations tend to be based throughout the country to be closer to their operation centers. Other organizations, especially NGOs, often have headquarters outside of Rwanda, meaning influence comes from other geographic areas. **Using location-based networks can offer new insights on the geographic spread of power.** In the Rwanda case, it highlighted the ongoing informal authority networks influencing restoration outside of the Rwandan capital.

Figure 5 | Rwanda Authority Network Using Geo-Location



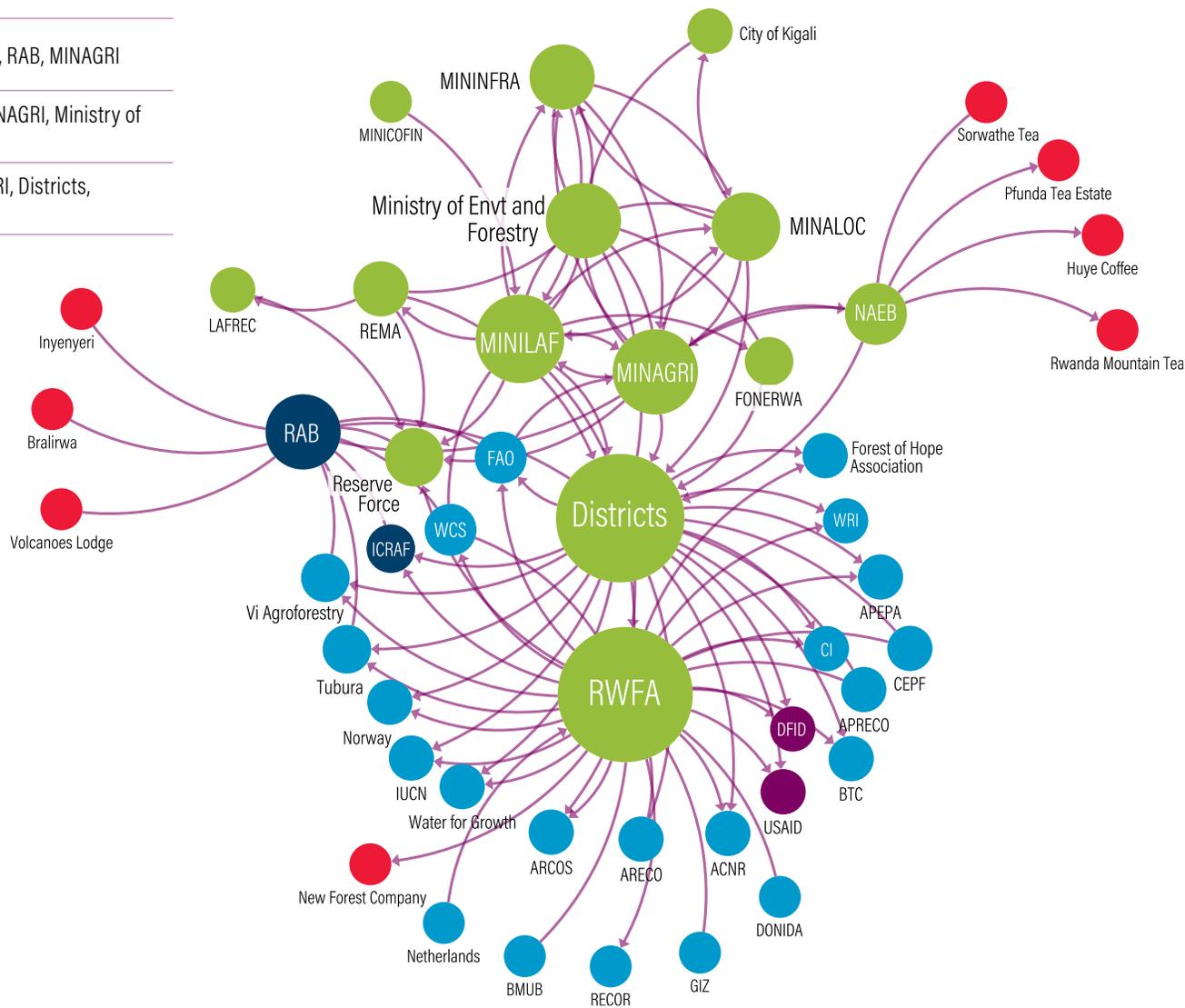
Source: WRI.

Figure 6 | Rwanda Authority Network (National)

CENTRALITY	WHO?
Connectors Degree Centrality	RWFA, Districts, MINILAF, MINAGRI, Ministry of Env't.
Spreaders Closeness Centrality	RWFA, Districts, MINILAF, RAB, MINAGRI
Gatekeepers Betweenness Centrality	Districts, RAB, RWFA, MINAGRI, Ministry of Env't.
Change Champions Eigenvector Centrality	Ministry of Env't., MINAGRI, Districts, MINILAF, MININFRA

LEGEND

- Local Community
- NGOs
- Research Institutions
- Government
- Private Sector
- Donors
- Media
- Authority



Source: WRI.

METHOD TWO: SOCIAL NETWORK ANALYSIS QUESTIONNAIRE

SOCIAL NETWORK ANALYSIS QUESTIONNAIRE:

MATERIALS: Survey system

ROLES: 10–50 participants

FORMAT: Recommended survey length of 15–20 minutes

OBJECTIVE: To understand the flows between actors in a network and the frequency of occurrence of interaction using a questionnaire format

OUTCOME: Social network analysis map

The second approach, questionnaires, has traditionally been used in social network analysis, especially since it can be administered relatively easily at low cost. Nonetheless, large-scale survey data can be difficult to gather or subject to respondent bias (for example, an inability to answer questions accurately or an unwillingness to respond honestly) (Schiffer and Hauck 2010). Although restoration often relies on focus groups that would be best suited for the Net-Map methodology, using a questionnaire can provide similar data about the network. A social network analysis questionnaire can either be conducted as a stand-alone activity or as a supplement to participatory social network analysis.

THE APPROACH

The social network analysis questionnaire can either be open—requiring name or organization generation by the participant, or closed—requiring the participant to select from a roster of names or organizations. Problems of recall make it difficult to name others in the network on an unaided basis, meaning that the open method should only be used when it is not possible to make a roster (Bodin and Prell 2011). Setting a clear boundary of the network (for example, a region, area, geography, or time scale) will make the roster more concise (Scott 2017). The list of stakeholders should be accompanied by choices of frequency or graded interaction on a Likert scale (Borgatti et al. 2013).



QUICK TIPS | CLUSTERING

Clustering all actors into categories of organization (for example, NGOs as a category rather than the specific NGOs) allows the identification of social network clusters. Clustering will often be easier when asking a Net-Map question that captures the larger spectrum of actors. When actors are classified in the clustering method, it can be easier to identify the actors that are not included in the network.

In Mexico, social network clustering helped identify which types of organizations (for example, NGOs, private sector, etc.) worked closely together.

Figure 7 | The Steps of a Social Network Analysis Questionnaire



Source: WRI.

STEP 1. DEFINE THE QUESTIONS

The social network analysis questionnaire should focus on a different flow for each question. Sample questions are provided below regarding flows for information, partnerships, and finance. Additional key questions and themes can be found in Table 3 with more information on the objective of each question.

SAMPLE QUESTION 1. INFORMATION FLOW

How often do you share information with [partners of a network or other groups of organizations or individuals]?*

- **FREQUENTLY:** Have frequent contact, actively collaborate or share information and resources or have a formal agreement or working relationship for seeking or providing expertise and advice (>once per 3 months)
- **SOMETIMES:** Have occasional contact, get updates at events that bring the community together, but do not have an active working relationship
- **NEVER:** Limited or no contact

* Information sharing does not need to be directly related to restoration but could affect restoration or land-use management

ORGANIZATION	FREQUENTLY (3)	SOMETIMES (2)	NEVER (1)
Provide here a list of organizations or people that are part of the network you want to analyze.			
Leave space for respondents to add organizations not listed with which they share information or collaborate.			



SAMPLE QUESTION 2. PARTNERSHIP FLOW

Does your organization belong to any coalitions, partnerships, or working groups that share information, plan strategy, or coordinate activities?

- Yes
- No

If yes, please list the coalition(s) your organization is involved in.

SAMPLE QUESTION 3. FINANCE FLOW

Who funds restoration activities?*

- **SHARE:** You as an organization share funds for restoration-related activities
- **RECEIVE:** You as an organization receive funds for restoration-related activities

- **GIVE/FACILITATE:** You as an organization provide funds for restoration-related activities

*Funding can be of any amount but does not include in-kind activities. (If needed, the question can be phrased to include a scale [for example, over \$100,00 a year]).

ORGANIZATION	SHARE (4)	RECEIVE (3)	GIVE (2)	N/A (1)
Provide here a list of organizations or people that are part of the network you want to analyze.				
Leave space for respondents to add organizations not listed with which they share, receive, or give/facilitate funding.				

INSIGHTS: MEXICO

COLLABORATION:

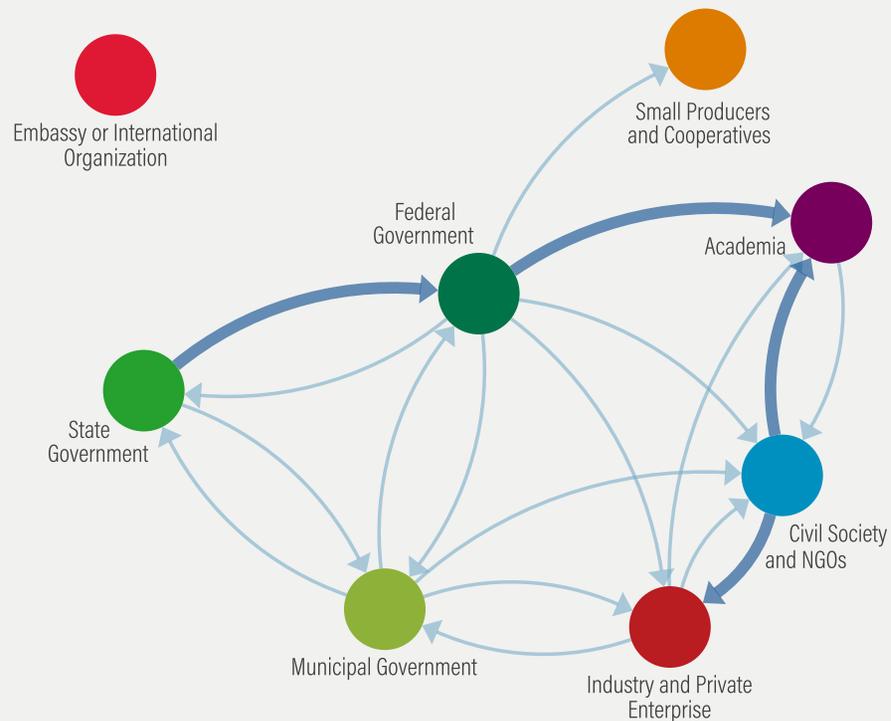
How do decision-makers collaborate in Carmen?

In the municipality of Carmen, Mexico, the social network analysis questionnaire highlighted the **gap in collaboration between the government and other sectors**. The results point to the opportunity to enhance collaboration across sectors as part of the social cohesion strategy of the project and the need to work toward achieving consensus on the most urgent actions.

The questionnaire visualized the ruptures and weaknesses in relationships between sectors. In addition, it provided evidence for the difference between theoretical priorities and everyday actions. For instance, while a majority of the participants expressed a strong interest in promoting policies for the benefit of the most vulnerable (such as small farmers and fishermen), the collaboration flows demonstrated that there was a limited level of interaction with the sector of small producers and cooperatives. The questionnaire also highlighted the under-utilized connections, such as the international organizations or embassies.

Overall, the questionnaire delivered to local stakeholders a clear priority and opportunity map for governance and specifically the social cohesion interventions needed to promote and implement a Local Economic Development Action Plan.

Figure 8 | Collaboration among Carmen Stakeholders by Sector



Source: WRI.



APPROACH 2: **MAPPING PRIORITIES AND VALUES**

Networks provide important information, but focusing on networks alone can omit valuable data about why such structures exist. Understanding the priorities and values of actors within a network, as well as those that are on the periphery or marginalized, provides more nuanced data on the social landscape. Priorities and values can indicate how actors relate to each other, but it can also highlight new areas for collaboration and offer warning signs of potential areas of conflict.

PRIORITIES AND VALUE QUESTIONNAIRES:

MATERIALS: Survey system

ROLES: 10–50 participants (depending on the goals and generalizability required)

FORMAT: Recommended survey length of 15–20 minutes

OBJECTIVE: To understand stakeholders' priorities and values regarding restoration-related activities, land use, and general environmental practices

OUTCOME: Map of stakeholder priorities and values to build on social network analysis

Understanding priorities can help shape partnerships and funding proposals, as well as isolate gaps in knowledge.

In addition, this information can point to the social identity of actors in the network, showing how the similarity and differences of actors affect network clusters. Most importantly, the adoption rate of an innovation, such as restoration, is often linked to the innovation's compatibility with the values, beliefs, and past experiences of individuals in the social system (Rogers 2003).

This guide highlights two methods: a **PRIORITIES QUESTIONNAIRE** and a **VALUES QUESTIONNAIRE**.

The priorities questionnaire helps identify the diversity within a network or the extent of specialty focus. The values questionnaire builds on the previous work by analyzing place-based preferences for key land-management issues such as access, development, and conservation (Brown et al. 2015). These questionnaires can help compare the priorities and values of restoration stakeholders—whether the government, a researcher, or a farmer—to understand how the network operates across scales. Together, measuring the priorities and values of actors can allow for better understanding of how stakeholders value and prioritize restoration-related issues within their network.

THE APPROACH

The seven steps for creating priority and values questionnaires are outlined in Figure 9. The questions for each questionnaire (step 1) are provided in the following sections, as well as the separate chapters for visualizing and analyzing the data.

Examples of questions are provided below for both priorities and values questionnaires. Priorities and values questionnaires can be conducted in a workshop-setting or as separately distributed questionnaires.

The survey should be tested with target respondents before sending out the finalized survey. Target respondents should be asked whether:

1. the questions and answers are clearly worded;
2. the answers are mutually exclusive; and
3. the answers would address the key aim of the study.

Figure 9 | The Steps of Priorities and Values Questionnaires



Source: WRI.



QUICK TIPS | ADDRESSING SCALE DYNAMICS

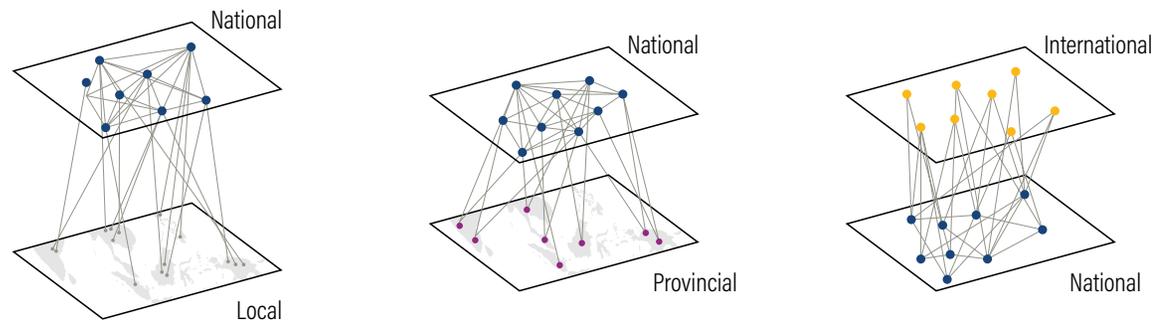
The mismatch between the different scales of governance and the environment is a primary cause for the lack of adherence to environmental policies.^a Policy decisions and management interventions are made at a different scale from where ecological processes take place.

Three common challenges in scale dynamics include:

- 1. IGNORANCE:** a failure to recognize the interactions between scales;
- 2. MISMATCH:** a persistence of scale mismatches between human and environment systems; and
- 3. PLURALITY:** a lack of attention to cross-scale interests and cross-scale solutions.^b

An analysis of the social landscape should capture the flows, priorities, and values at multiple scales, when possible. Identifying cross-scale connections can increase opportunities for bridging. Cross-scale solutions can lead to solutions that are more politically and ecologically sustainable.^b

Connecting Networks across Scales



Source: Adapted from Mills et al. 2014.

Notes: a. Paloniemi, R., E. Apostolopoulou, E. Primmer, M. Grodzinska-Jurcak, K. Henle, I. Ring, M. Kettunen, J. Tzanopoulos, S. Potts, and S. Van den Hove. 2012. "Biodiversity Conservation across Scales: Lessons from a Science–Policy Dialogue." *Nature Conservation* 2: 7–19.
 b. Cash W., W. Adger, F. Berkes, P. Garden, L. Lebel, P. Olsson, L. Pritchard, and O. Young. 2006. "Scale and Cross-Scale Dynamics: Governance and Information in a Multilevel World." *Ecology and Society* 11 (2): 8.

METHOD ONE: PRIORITIES QUESTIONNAIRE

Identifying priorities can show how networks align and diverge regarding restoration goals, restoration intervention focus, and restoration activities. Administering this questionnaire can help the practitioner better understand the strengths and weaknesses of the network, allowing for more active discussions among similarly minded groups or activating a strategic shift to cover a larger range of restoration-related activities.

These three Likert-graded questions can be modified based on your user group, but they should be presented in the same way to each respondent to create an accurate comparison. Similar presentation allows for standardization across scales. We recommend administering the priorities questionnaire with the values questionnaire to receive a more nuanced analysis of the network actors.

SAMPLE QUESTION 1. RESTORATION GOALS—WHY?

Identify priorities for your organization (5 is top priority, 1 is lowest priority).

RESTORATION GOALS	TOP PRIORITY	HIGH PRIORITY	MEDIUM PRIORITY	LOW PRIORITY	NOT A PRIORITY
Food and Agricultural Production	5	4	3	2	1
Energy (Fuelwood, Charcoal, Hydropower) Production	5	4	3	2	1
Forests Products and Commodities Production	5	4	3	2	1
Water Resources Protection and Conservation	5	4	3	2	1
Biodiversity Conservation	5	4	3	2	1
Soil Conservation	5	4	3	2	1
Climate Mitigation or Adaptation	5	4	3	2	1
Community Development (Livelihoods)	5	4	3	2	1
Market Development (Value Chains)	5	4	3	2	1
Ecotourism Development or Culture Preservation	5	4	3	2	1
Fulfilling Legal Requirements	5	4	3	2	1
Fulfilling International Goals (NDCs, SDGs)	5	4	3	2	1
Other	5	4	3	2	1

INSIGHTS: RWANDA

PRIORITIES:

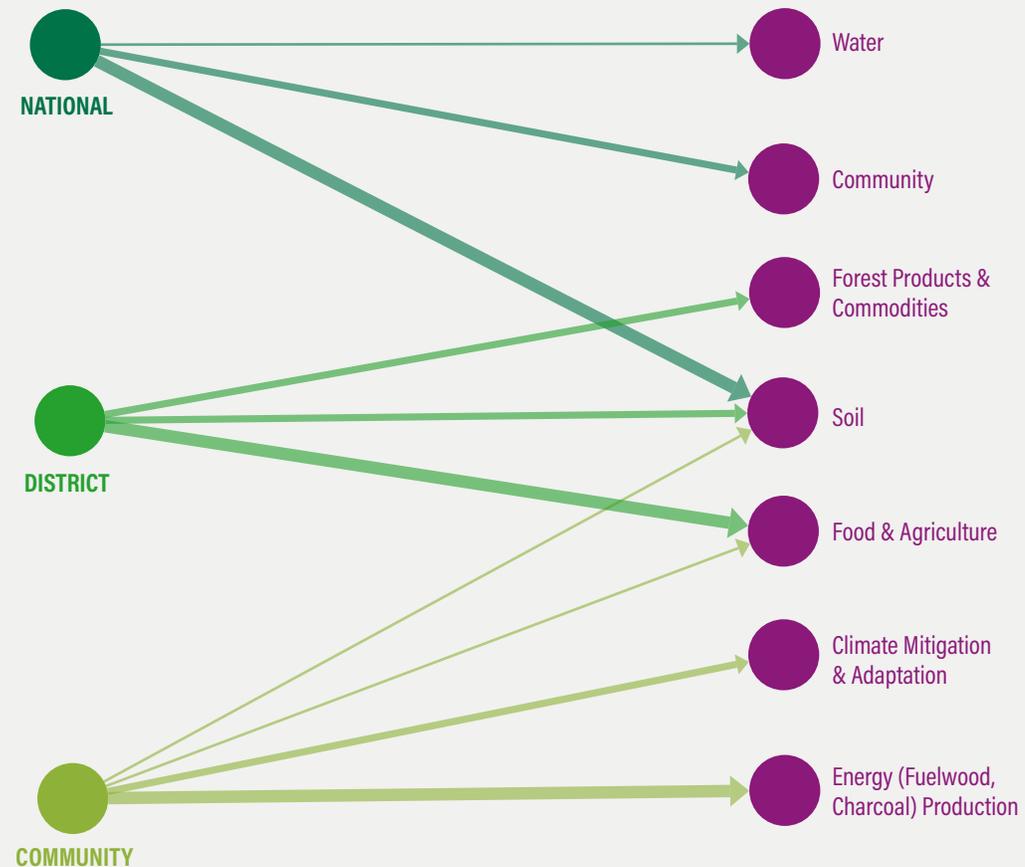
How do restoration goals differ across networks and scales?

In Rwanda, mapping priorities highlighted stakeholders' priority focus. The data show the responses of the three highest ranked priorities at each scale. Each group identified different top priorities: national—soil conservation; district—food and agriculture; and community—energy production.

Soil conservation, a national mandate of the key governmental organization RWFA, remained important at both the district and community scales. The district and community both prioritized food and agriculture as well.

The district leadership can act as a **broker for communicating and acting on the priorities of different scales.** District officers are often the ones receiving training and attending workshops to learn more about how to operationalize national mandates. At the same time, they are also the ones visiting farmers and listening to their needs. Although well-positioned as brokers of two scales, districts also have double the number of constituents and stakeholders to keep happy.

Figure 10 | Rwanda Restoration Priorities



Source: WRI.



SAMPLE QUESTION 2. RESTORATION INTERVENTION—WHAT?

Identify the vegetation intervention priorities for your organization (5 is top priority, 1 is lowest priority).

RESTORATION VEGETATION FOCUS	TOP PRIORITY	HIGH PRIORITY	MEDIUM PRIORITY	LOW PRIORITY	NOT A PRIORITY
Planted Production Forests	5	4	3	2	1
Agroforestry	5	4	3	2	1
Improved Fallow	5	4	3	2	1
Grassland Improvement	5	4	3	2	1
Bamboo Management	5	4	3	2	1
Mangroves Planting	5	4	3	2	1
Peatland Interventions	5	4	3	2	1
Natural Regeneration	5	4	3	2	1
Conservation/Protection Enhancement	5	4	3	2	1
Other	5	4	3	2	1

SAMPLE QUESTION 3. RESTORATION ACTIVITY FOCUS—HOW?

Identify the focus of restoration activities for your organization (5 is top priority, 1 is lowest priority).

RESTORATION ACTIVITY FOCUS	TOP PRIORITY	HIGH PRIORITY	MEDIUM PRIORITY	LOW PRIORITY	NOT A PRIORITY
Research	5	4	3	2	1
Advocacy	5	4	3	2	1
Implementation (Planting or Other On-the-ground Restoration Work)	5	4	3	2	1
Restoration Market Development (Value Chain)	5	4	3	2	1
Education or Training	5	4	3	2	1
Funding	5	4	3	2	1
Monitoring	5	4	3	2	1
Restoration Commodities Production	5	4	3	2	1
Other	5	4	3	2	1

INSIGHTS: MEXICO

PRIORITIES:

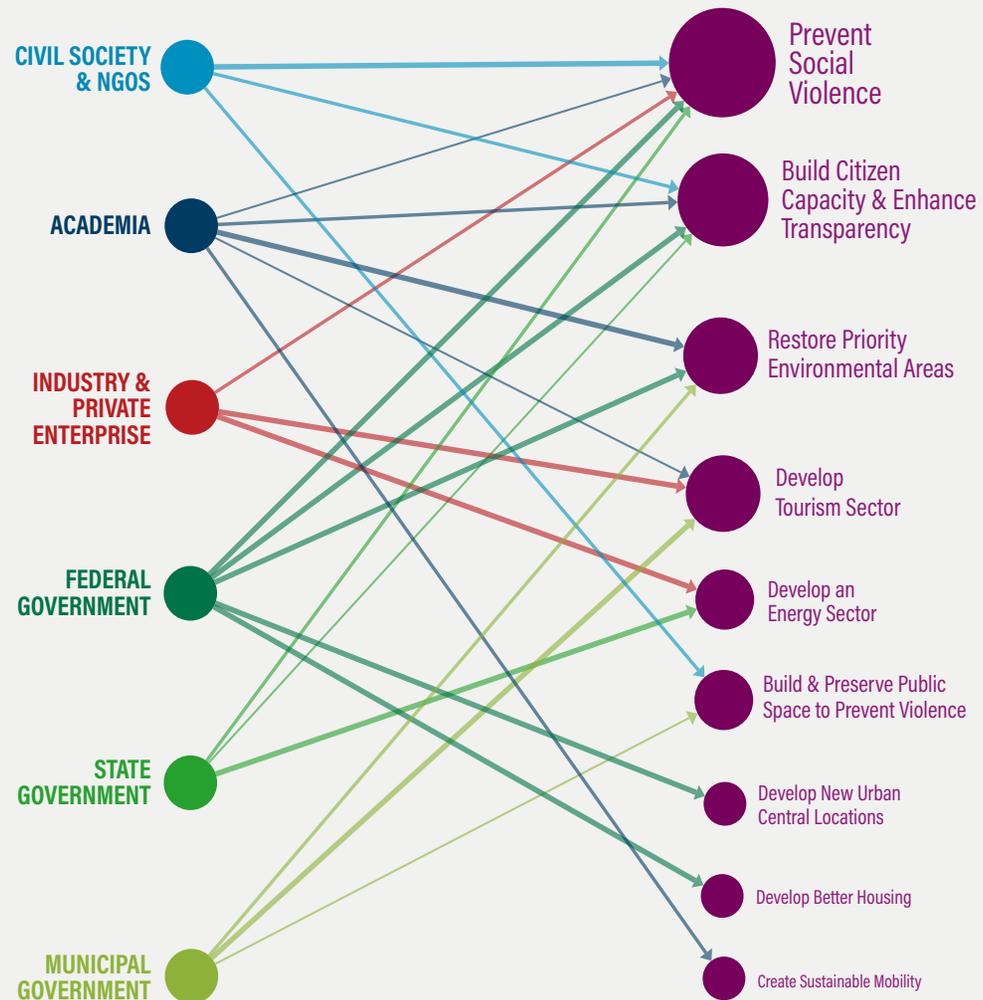
How do decision-makers prioritize the Carmen municipality's proposed policy programs?

In the Carmen municipal actor network, the priorities map showed contrasting views among decision-makers of the urgency of the proposed policy programs. The priorities questionnaire asked actors to rank the importance of 11 public policy programs on a scale of 1 to 5. Each sector's top three priorities were ranked on the final priorities map.

Programs related to the theme of "Prevent Social Violence" were ranked as a top priority by all sectors (regardless of the specific mandate of the participant organizations and institutions), except some decision-makers within the municipal government. In addition, the municipal government did not share the second priority to "Build Citizen Capacity & Enhance Transparency" with some municipal representatives ranking it high while others low. This divergence highlights potential conflict within organizations and between different organizations and community representatives. This conflict will be a crucial element to resolve to encourage collective action going forward.

Overall, the analysis highlighted the obstacles and opportunities to encouraging action on the established goals. By acknowledging the opposing visions and prioritizing the barriers to dissolve between them, the priorities questionnaire will help increase the probability of long-term success.

Figure 11 | Mexico Carmen Municipality Priorities



Source: WRI.

METHOD TWO: VALUES QUESTIONNAIRE

A values questionnaire can be used to identify stakeholder values on land use and restoration-related activities. This type of questionnaire is known as a psychometric questionnaire, a method for measuring attitudes and behavior. Understanding stakeholder values is necessary before starting restoration work because it is possible that the restoration goals may be counter to local preferences. Stakeholder values can be used to guide the focus and direction of interventions.

The sample questionnaire covers a variety of different land-use angles to understand the stakeholder’s land-use values related to restoration. The questionnaire provides two extreme choices (for example, circle numbers 7 through 1) to help collect unbiased data and not offer leading questions. Specifically, the questionnaire focuses on resource availability, extraction, and usage, as well as issues of land access, connectivity, and general environmental preferences.

SAMPLE VALUES QUESTIONNAIRE

As you read the statements, circle your attitude on the scale regarding land and resource use. It is helpful to think of which statement you identify with more between the two extremes.

For example, if your land has a lot of water resources, you might circle 6. If the land was neither in good nor bad condition, you could circle 4 in the middle of the scale. If your land produces as many crops as the average, you might circle 3.

1. RESOURCE AVAILABILITY...								
Water resources are plentiful	7	6	5	4	3	2	1	There is a shortage of water
Land is in very good condition	7	6	5	4	3	2	1	The land is in poor condition
Products from the land are plentiful	7	6	5	4	3	2	1	The land does not produce any crops, timber, or other products.
2. RESOURCE EXTRACTION...								
All income is generated from the land	7	6	5	4	3	2	1	No income is generated from the land
All crops are subsistence	7	6	5	4	3	2	1	No crops are subsistence
All fuel is from the land	7	6	5	4	3	2	1	No fuel is from the land
3. CONNECTIVITY...								
Information is easy to access on the Internet	7	6	5	4	3	2	1	No Internet access is available
Local information is available through the radio or TV	7	6	5	4	3	2	1	No local information is available through the radio or TV
Road infrastructure is good	7	6	5	4	3	2	1	No road infrastructure
4. MY PREFERENCE FOR RESOURCE USE...								
Grazing livestock allowed	7	6	5	4	3	2	1	No grazing allowed
Forestry plantations allowed	7	6	5	4	3	2	1	No forestry plantations allowed
Any species planting allowed	7	6	5	4	3	2	1	No non-native species allowed
5. MY PREFERENCE FOR RESOURCE EXTRACTION...								
Fuelwood gathering allowed	7	6	5	4	3	2	1	No fuelwood gathering allowed
Logging of native forests allowed	7	6	5	4	3	2	1	No logging of native forests allowed
Hunting allowed	7	6	5	4	3	2	1	No hunting allowed
Fishing allowed	7	6	5	4	3	2	1	No fishing allowed
6. MY PREFERENCE FOR ACCESS...								
Private leases of land	7	6	5	4	3	2	1	Government control of land
High access to land	7	6	5	4	3	2	1	Limited public access to land

Source: Adapted from Brown et al. 2015; Pocerwicz et al. 2012.

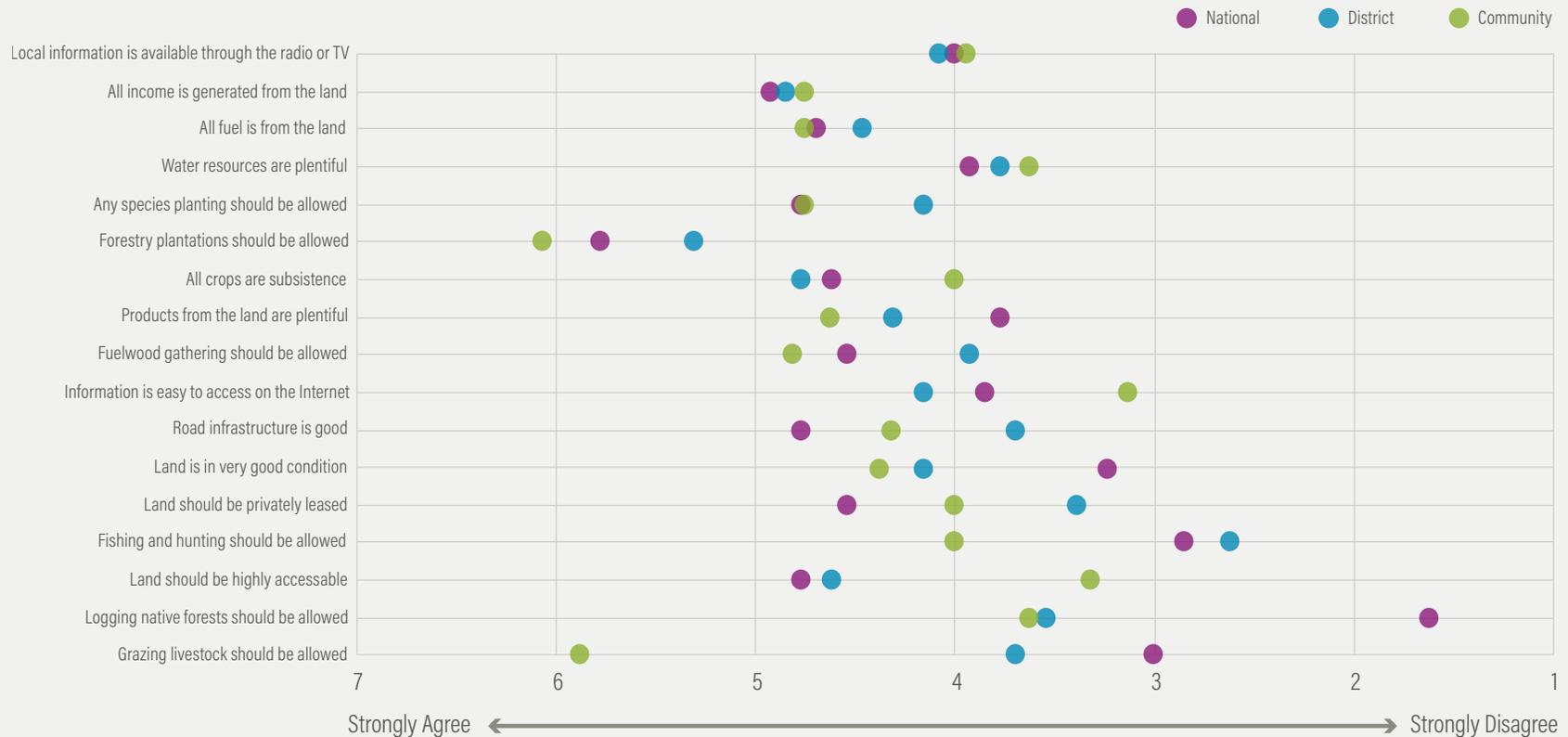
INSIGHTS: RWANDA

VALUES:

How do values differ across scales in Rwanda?

National, district, and community stakeholders in Rwanda answered the values questionnaire. The averages of all responses are shown below. At all scales, there is agreement on reliance on the land for income generation and fuelwood. Difference of opinion can be seen on the perception of road infrastructure, Internet access, and condition of land. Stark divergence occurs regarding regulation of logging native forests and whether grazing should be allowed. Understanding where stakeholders agree and disagree can help **give evidence for the difference of opinion and reduce conflict** when these differences are considered. Although this method can simplify heterogeneous groups like communities to an average value, it provides a starting point for understanding differences across scales. Discussions will help to bring out common values and highlight the outlying voices.

Figure 12 | Rwanda Restoration Values



Source: WRI.

ANALYZE **THE SOCIAL LANDSCAPE**

After collecting the data, it is important to understand how to interpret the network. As Robins (2015) suggests: “Good visualization can help your network study, but it is at its most powerful when combined with good analysis.” Analyzing the social landscape focuses on network centrality, network shape, and network attributes. Visualizing and analyzing the network can offer insights that can support more strategic restoration-related activities in the landscape.

VISUALIZE THE SOCIAL LANDSCAPE

Inputting the data into social network analysis software will allow it to be more easily analyzed visually and statistically using social network analysis metrics. This publication highlights five social network analysis software programs that have been tested for visual attractiveness and usability. Some of these software have been used in scientific studies since the early 2000s,

and some are new to the social network analysis field. Table 4 offers a range of options for the user depending on the user's budget, computer requirements, and—more importantly—priorities regarding visual attractiveness and ease of use.⁵ Restoration practitioners with a small budget and limited time to invest in learning a new program are the target user.

Table 4 | Quick Guide to Key Social Network Analysis Software^a

SOFTWARE	TARGET USER	PUBLIC ACCESS	FORM OF ACCESS	VISUAL ATTRACTIVENESS	USABILITY
Datamuse	General	Paid (Single License Payment)	Internet	High	Easy
Gephi	Researcher	Open Source	Download Program (Mac, Linux & Windows)	Moderate	Challenging
Kumu ^b	General	Open & Paid Private Version (Monthly Subscription)	Internet	High	Easy
NodeXL	General & Researcher	Open & Paid Pro Version (Monthly Subscription)	Download Program (Windows primarily; Mac & Linux with modifications)	Moderate	Moderate
UCINET (with Netdraw)	Researcher	Paid (Single License Payment)	Download Program (Windows primarily; Mac & Linux with modifications)	Low	Challenging

Notes: a. Based on commonly available software in early 2018.

b. All social network analysis figures in this guide are made with Kumu.

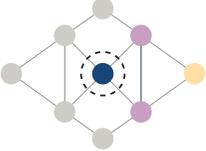
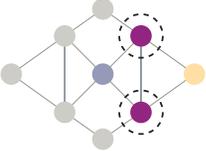
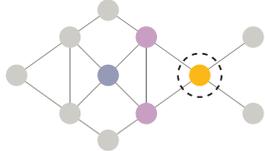
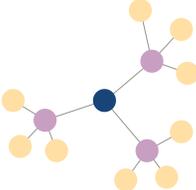
Source: WRI.

ANALYZE NETWORK CENTRALITY

Centrality measures offer a way of understanding the relative power of actors in a network. Communities are built on connections, and there remains a positive relationship between centrality in the network and power (Paletto et al. 2016). By occupying central positions, actors are better able to exert influence over others and are better positioned to access valuable information or finance that can put them at an advantage (Bodin and Crona 2009).

Social network analysis uses centrality terminology—**centrality measures of degree, closeness, betweenness, and eigenvector**—to identify the network's powerful and important actors. To make them more intuitive, the four central roles are described as **Connectors, Spreaders, Gatekeepers, and Change Champions** (Table 5). The social network analysis visualization software calculates the centrality measures. Combined with other network analyses, measuring network centrality is a key tool to understand the social landscape.

Table 5 | Analyzing Network Centrality

MEASURE	PICTURE	TECHNICAL TERM	DESCRIPTION	OPPORTUNITIES	THREATS	QUESTION
The Connectors		Degree Centrality	The number of direct connections an actor has	Can disseminate knowledge effectively and hold significant influence over the network	Can destabilize the network if removed and can be misleading as they may not be the most influential actors in the wider network	<i>Who has the most connections in the network?</i>
The Spreaders		Closeness Centrality	The distance of each actor from all the other actors	Can reach everyone in the network quickly (e.g., sharing new key messages)	Can reach everyone in the network quickly (e.g., spreading bad information)	<i>Who spreads information most easily across the network?</i>
The Gatekeepers		Betweenness Centrality	The number of times an actor is on the shortest path between other actors	Can connect disparate groups and act as an information gateway	Can be bottlenecks or points of failure (e.g., withholding information)	<i>Who are the key intermediaries or bridges in the network?</i>
The Change Champions		Eigenvector Centrality	How connected an actor is to the most connected actors	Can exert influence over key actors	Does not necessarily show the strongest local influence	<i>Who is most connected to central actors in the network?</i>

Source: Adapted from Atos 2011.

INSIGHTS: INDIA

SCALING:

Who are the key actors that can implement and scale landscape restoration in Sidhi?

Although the Sidhi district's network size is large, the network still lacks a **diversity of actors**. The core of the network is dense with key government agencies, including the Divisional Forest Officer (who leads the Forest Department), the Collector (who leads the district administration), and *Zila Panchayat* (an elected body of the district administration). These Connectors include restoration in their mandated roles and responsibilities and are the key actors for ensuring implementation of any restoration intervention. However, these departments work in silos, and **poor coordination can affect the convergence of activities on the ground**.

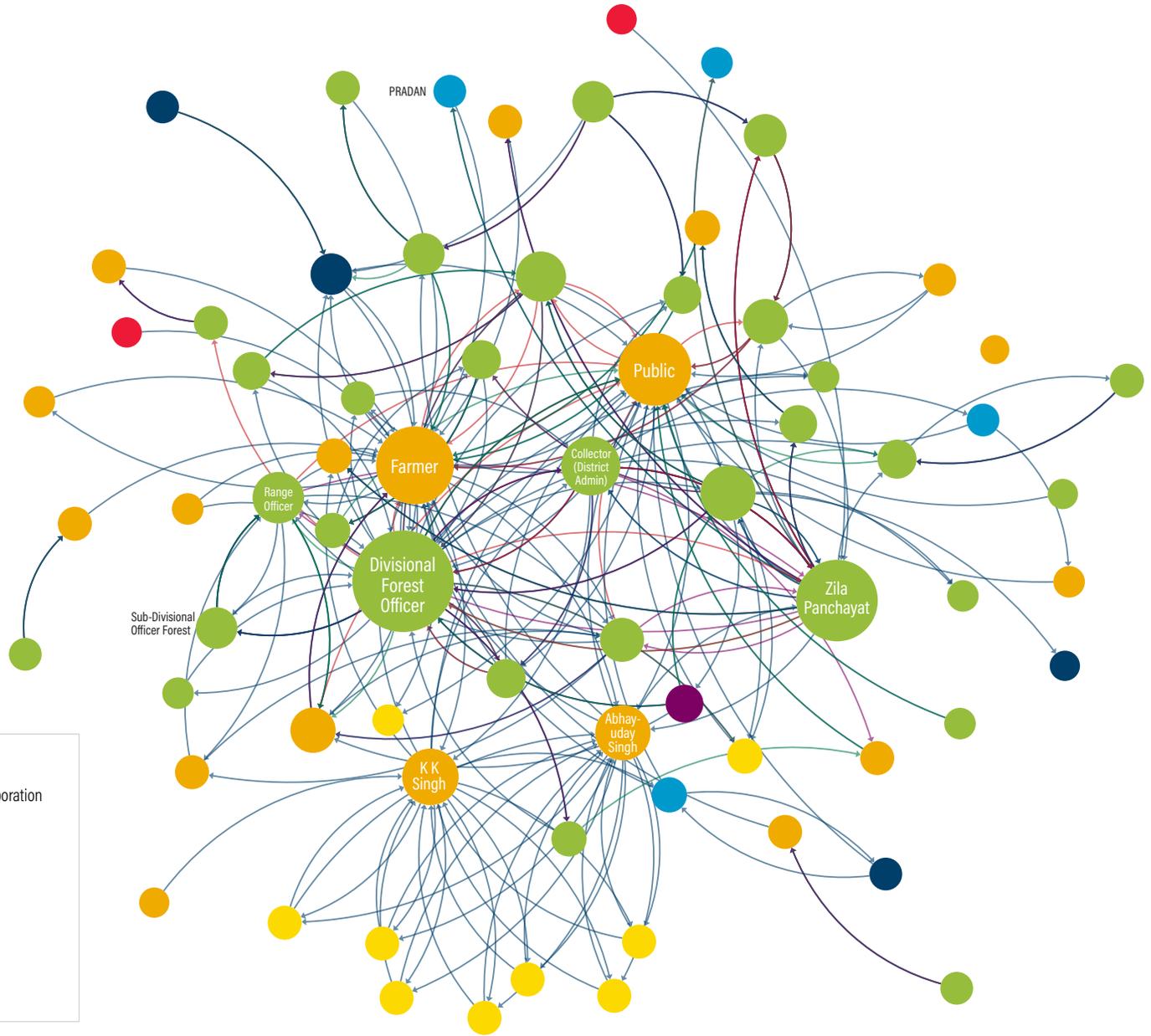
Given their high degree of closeness within the network, both farmers (that is, landowners) and the public could be bridges for disseminating new information on landscape restoration. However, poor implementation of state programs and poor relationships with a few private-sector organizations in the district **means that new initiatives need to gain the trust of farmers by farmers and the public**.

Other vital actors at the state level—including research institutions, financial players, NGOs, and the media—congregate at the periphery of the network. **Tapping into peripheral actors to raise awareness about landscape restoration on the ground may help break the business-as-usual scenario**. These peripheral actors can bring in information about landscape restoration from other networks. For instance, the Professional Assistance for Development Action (PRADAN) emerged as one of the key NGOs in centrality metrics for the Madhya Pradesh state analysis. Nonetheless, PRADAN remains on the periphery at the district level and is working in only one of the *Tehsils* (or sub-districts) in Sidhi.

Notably, most of the media organizations are connected via K.K. Singh, a former member of the Legislative Assembly, and Abhayuday Singh, the current president of the Zila Panchayat. Both are well known political representatives of the region. **Information dissemination through them could also be faster, given their reach efficiency**. However, using these individuals as bridges also runs the risk of politicizing restoration, which may impede the envisaged outcome.

Figure 13 | India Sidhi District Social Network Analysis Map

CENTRALITY	WHO?
Connectors Degree Centrality	Divisional Forest Officer, Zila Panchayat, Farmer, Public, Collector (District Admin)
Spreaders Closeness Centrality	Divisional Forest Officer, Zila Panchayat, Public, Farmer, K. K. Singh
Gatekeepers Betweenness Centrality	Divisional Forest Officer, Farmer, Public, Abhayuday Singh, Zila Panchayat
Change Champions Eigenvector Centrality	Divisional Forest Officer, Sub-Divisional Officer Forest, Range Officer, Zila Panchayat, Farmer



LEGEND

● Local Community	— Information & Collaboration
● NGOs	— Finance
● Research Institutions	— Authority
● Government	— Conflict
● Private Sector	
● Donors	
● Media	

Source: WRI.

INSIGHTS: KENYA

CONNECTIVITY:

Who influences restoration, and specifically information flow, in the Mt. Elgon ecosystem of Kenya?

To understand the landscape of influential restoration actors in the Mt. Elgon ecosystem in Trans-Nzoia county, participants mapped flows of funding, conflict, authority, partnerships, and information.

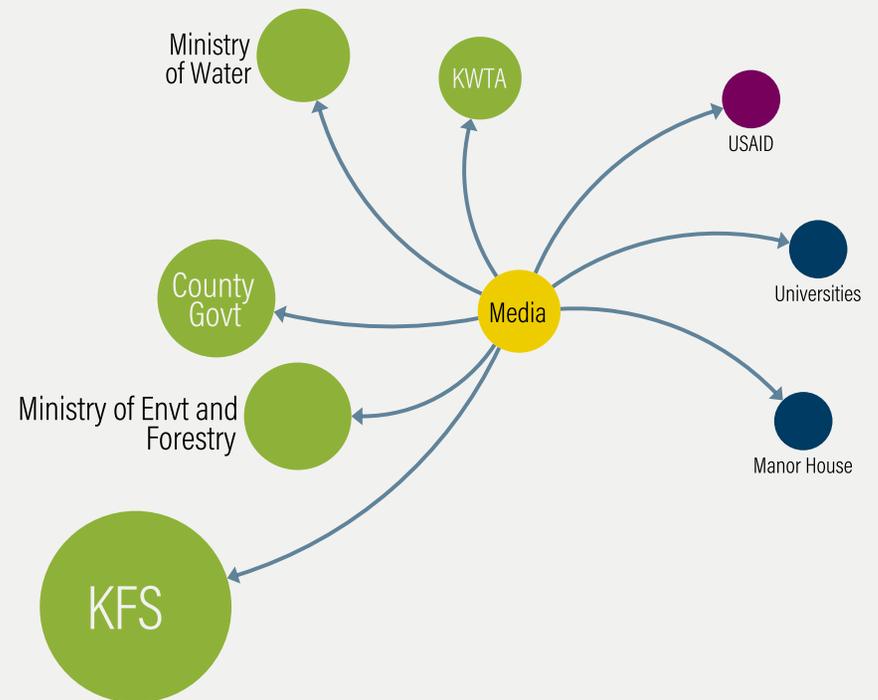
When focusing on the information flow, the social network analysis map showed that none of the central restoration actors provides information directly to each other. Instead, **media acts as a key knowledge bridge in the network between organizations**. While these organizations may be getting their information through other channels as well, this insight shows that the media should be relied on as a prominent player in the restoration movement. In addition, information sharing should be increased among other organizations in the network.

The primary land use in the Mt. Elgon ecosystem is agriculture, meaning that **restoring at scale will require farmers to be involved**. The Water Resources Management Authority (WRMA) is the only actor connected to farmers. Although the Kenyan Forest Service (KFS) is very well connected to the actors involved in forest management, it is lacking good connections with farmers. KFS remains one of the leading actors on restoration nationally, but in this landscape WRMA plays the key role in scaling restoration.

Better coordination between KFS, WRMA, and another influential government player, the National Environment Management Authority (NEMA), could **scale the impact of these three government agencies and allow restoration to reach more sectors**, including water, agriculture, forests, and grazing.

Finally, nearly all actors in this landscape are in conflict with poachers, specifically tree poachers and illegal loggers. Poachers have only one positive flow—a partnership flow with Kenya Urban Roads Authority (KURA), Kenya National Highway Authority (KeNHA), and Kenya Rural Roads Authority (KeRRA)—which could be targeted by KFS and the Kenya Wildlife Service (KWS) to shut down poaching in the area.

Figure 14 | Kenya Mt. Elgon Ecosystem Information Sharing Network



Source: WRI.

Figure 15 | Kenya Mt. Elgon Ecosystem Social Network Analysis Map

CENTRALITY	WHO?
Connectors Degree Centrality	KFS, WRMA, NEMA, County Govt, Poachers
Spreaders Closeness Centrality	KFS, WRMA, NEMA, County Govt, Poachers
Gatekeepers Betweenness Centrality	KFS, WRMA, Media, NEMA, Ministry of Agriculture
Change Champions Eigenvector Centrality	KFS, NEMA, County Govt, WRMA, Ministry of Environment and Forestry



LEGEND

- Local Community
- NGOs
- Research Institutions
- Government
- Private Sector
- Donors
- Media
- Information & Collaboration
- Finance
- Authority
- Conflict
- Partnerships

Source: WRI.

INSIGHTS: RWANDA

FINANCE:

Which organizations finance restoration interventions in Rwanda?

Information regarding finance flows remains limited. Only a few actors could identify how funds flowed within the network, or felt comfortable sharing that information. Social network analysis highlighted the central role of the Rwanda Water and Forestry Authority (RWFA), the Gatsibo district, and the farmers.

How can access to these actors be leveraged productively to provide adequate finance for restoration?

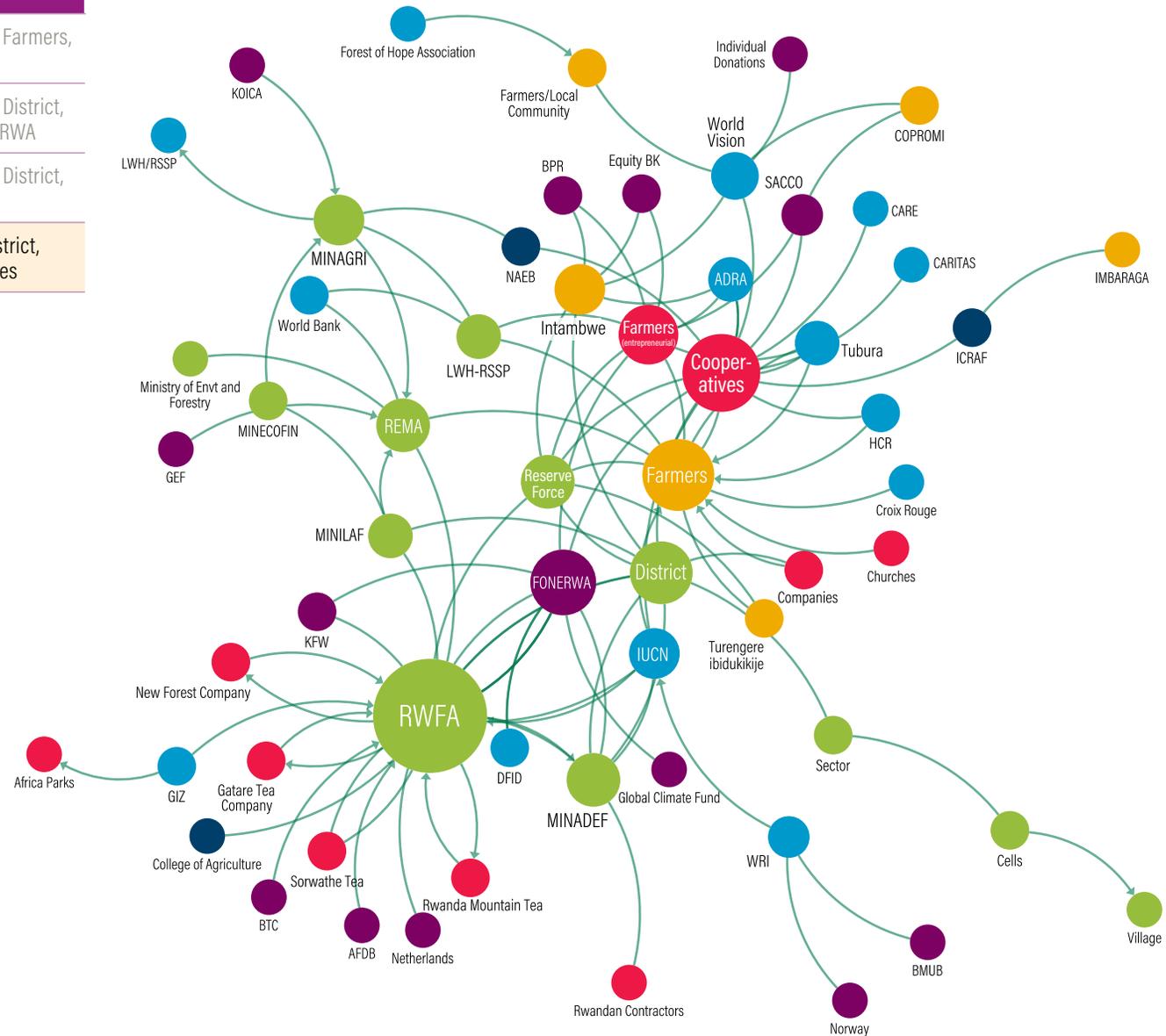
In the Gatsibo district, funding for restoration interventions goes through many different institutions before reaching the farmer. **Could there be more direct methods?** The Gatsibo district is not involved in project planning and does not have the skills to apply for funds on its own, therefore relying on others to bring in funding. Other districts, for example, have become more involved in financing, with one district building the skills necessary to submit proposals directly to Rwanda's Green Fund (FONERWA).

Farmers are one of the most connected actors with quick access to finance from many different groups. Some farmers are able to get bank loans but need more financial support while awaiting the growth of trees. In addition, the finance flow to farmers can be unpredictable or insufficient. Nonetheless, farmers' high connectivity and their bridging role to other actors underscore that groups of farmers—through cooperatives or community groups—should be key points of contact for scaling restoration finance.

On the whole, information on finance is limited, often complex, and nontransparent. RWFA and FONERWA are hubs for finance, but it leads to the question of **what other hubs do and could exist?**

Figure 16 | Rwanda Finance Network (National, District, Community)

CENTRALITY	WHO?
Connectors Degree Centrality	RWFA, Cooperatives, Farmers, FONERWA, District
Spreaders Closeness Centrality	Cooperatives, RWFA, District, Reserve Force, FONERWA
Gatekeepers Betweenness Centrality	Cooperatives, RWFA, District, FONERWA, Farmers
Change Champions Eigenvector Centrality	RWFA, FONERWA, District, MINADEF, Cooperatives



LEGEND

- Local Community
- NGOs
- Research Institutions
- Government
- Private Sector
- Donors
- Media
- Finance

Source: WRI.



ANALYZE NETWORK SHAPE

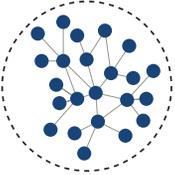
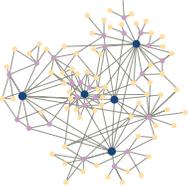
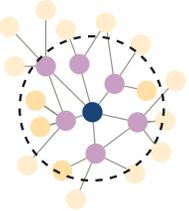
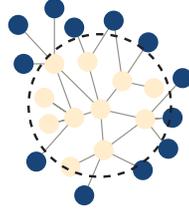
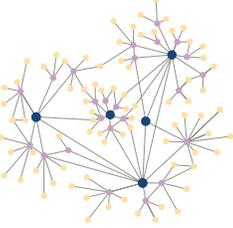
The second aspect of a network that should be analyzed is the network shape. Many of these measures can be seen visually once the map has been input into the appropriate software. The five measures—size, density, core, periphery, and clusters—provide an overview of the network shape.

When looking at network shape, the ideal shape will be dependent on the desired outcome. Users should consider “what is the most efficient network structure for reaching the intended goals” when conducting the network shape analysis (Valente 2010).

For example, when looking at density, innovations may diffuse faster in dense networks. However, an extremely dense network can show repetitive communications and overlaps in work streams. In addition, the lack of periphery actors can mean that new information is unable to reach a dense network (Valente 2010).

Looking at the network’s size, density, core, periphery, and clusters involves looking at how resources—information, finance, and seedlings—are spread throughout the network. The analysis of network shape can give insights into the speed of resource diffusion across the network (Valente 2010).

Table 6 | Analyzing Network Shape

MEASURE	PICTURE	DESCRIPTION	OPPORTUNITIES	THREATS	QUESTION
Size		The total number of actors and connections in the network	A larger network can show strong involvement and interest	A large network can lead to overlap in work streams and lack of clear messaging	<i>Is the network large enough to contain all relevant actors but still small enough to allow for cohesion?</i>
Density		The ratio between the existing number of connections and the maximum possible	A dense network can show helpful collaboration and connectivity	A dense network can lead to overlap in work streams or a lack of innovation	<i>How many actors are operating in the same space?</i>
Core		Actors at the center of the network	Core actors can strengthen the shared message and inspire a movement	Core actors can capture the space (intentional or unintentional) and disenfranchise peripheral actors	<i>Are core actors effectively using their central position?</i>
Periphery		Actors on the periphery of the network	Peripheral actors can hold the key to important information external to the network	Peripheral actors can be disconnected and show limited involvement with a central message	<i>In what ways are peripheral actors being heard and involved?</i>
Clusters (Cliques)		The existence of multiple smaller communities in the network	Clusters can spread messages to new groups and be cohesive around central issues	Clusters can have weak ties to other communities, limiting their reach	<i>What spheres of influence do actors have within their network and beyond to drive the agenda?</i>

INSIGHTS: INDONESIA

COLLABORATION:

How can collaboration be increased in Lake Toba to improve water quality?

Mapping the stakeholders involved in the management of water quality at Lake Toba occurred in two workshops, one national and one at the community level. Participants at the community-level workshop built on the earlier map and identified many new subnational and local actors, such as traditional leaders. Interestingly, the hubs identified in the national workshop stayed relatively unchanged.

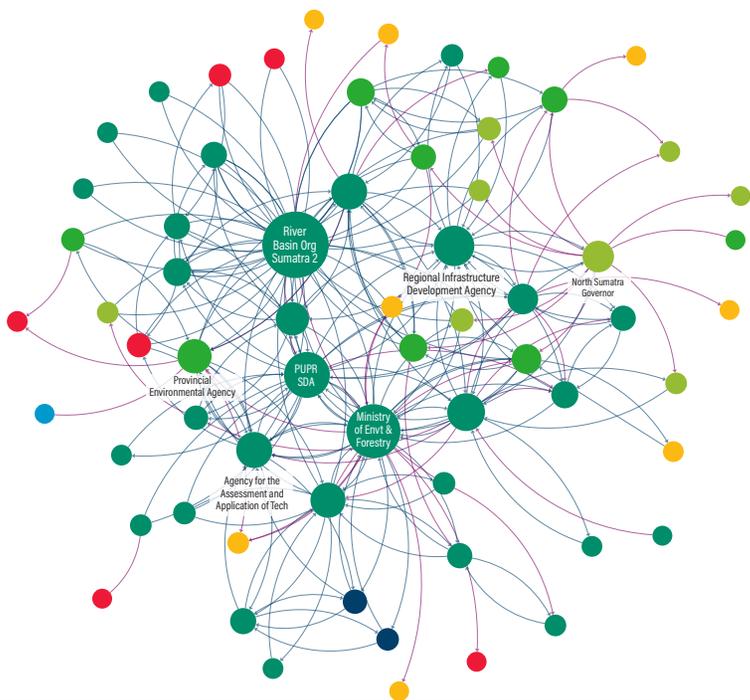
The **network size is large**, with many actors involved in the management of Lake Toba. The core is composed primarily of central government agencies that maintain significant influence. **These central actors are more vocal and more involved**. However, these central government agencies have limited collaboration with provincial or district-level government agencies, which are closer in proximity to the lake.

Other types of actors—such as the private sector, research institutions, and local communities—remain on the periphery, often disconnected to key government agencies. **The lack of connection between core and periphery is limiting communication and coordination across the network**. The interaction between government agencies and other actors needs to be enhanced to produce meaningful action.

In this context, NGOs act as **important bridges through their large range of activities and high collaboration** with other types of stakeholders. Animated and honest discussions at the community level praised NGOs for their strong engagement with each other as well as with the local communities. NGOs regularly advocate for improved Lake Toba water management to the government and the private sector. Their range of activities includes public education, advocacy, environmental protection and conservation, and information exchange. With active participation and close relationships with different kinds of stakeholders, NGOs show strong potential to be change champions.

Finally, by asking about interest and influence in the Net-Map process, the social network analysis map helped prioritize the actors with the **highest negative influence—large polluters—that should be targeted in outreach campaigns**. When outreach is unrealistic, consider who influences these actors and search for common ground. How can they continue working in the landscape without causing as much harm? In addition, some high influence actors can be undecided (neither positive nor negative) and may be able to be pulled in a positive direction, encouraging a domino effect of negative influence actors.

Figure 17 | Indonesia Lake Toba Social Network Analysis Map (National)



LEGEND	
● Local Community	● NGOs
● Research Institutions	● Local Government
● Provincial Government	● Central Government
● Private Sector	● Donors
— Information & Collaboration	— Authority

CENTRALITY	WHO?
Connectors Degree Centrality	River Basin Org Sumatra 2, Ministry of Environment & Forestry, CSOs, PUPR SDA, Provincial Environment Agency
Spreaders Closeness Centrality	River Basin Org Sumatra 2, Ministry of Environment & Forestry, North Sumatra Governor, Regional Infrastructure Development Agency, PUPR SDA
Gatekeepers Betweenness Centrality	River Basin Org Sumatra 2, Ministry of Environment & Forestry, CSOs, North Sumatra Governor, District Planning Agency
Change Champions Eigenvector Centrality	River Basin Org Sumatra 2, Ministry of Environment & Forestry, Provincial Environment Agency, Agency for the Assessment and Application of Tech, PUPR SDA

Source: WRI.

Figure 18 | Indonesia Lake Toba Social Network Analysis Map (Community)



SHAPE	MEANING
Size	Large network
Density	Dense core
Core	Central core composed primarily of government agencies
Periphery	Disconnected peripheral actors composed primarily of private sector, research institutions, and local community
Clusters Cliques	Clusters developed primarily around government agencies and their areas of influence

INSIGHTS: RWANDA

SEEDLINGS:

How are seedlings distributed at the community level?

Social network analysis identified three clusters for seedling distribution. The farmers, the cooperatives, and the Tree Seed Center are the most connected due to their role in running seed germination and seedling production businesses.

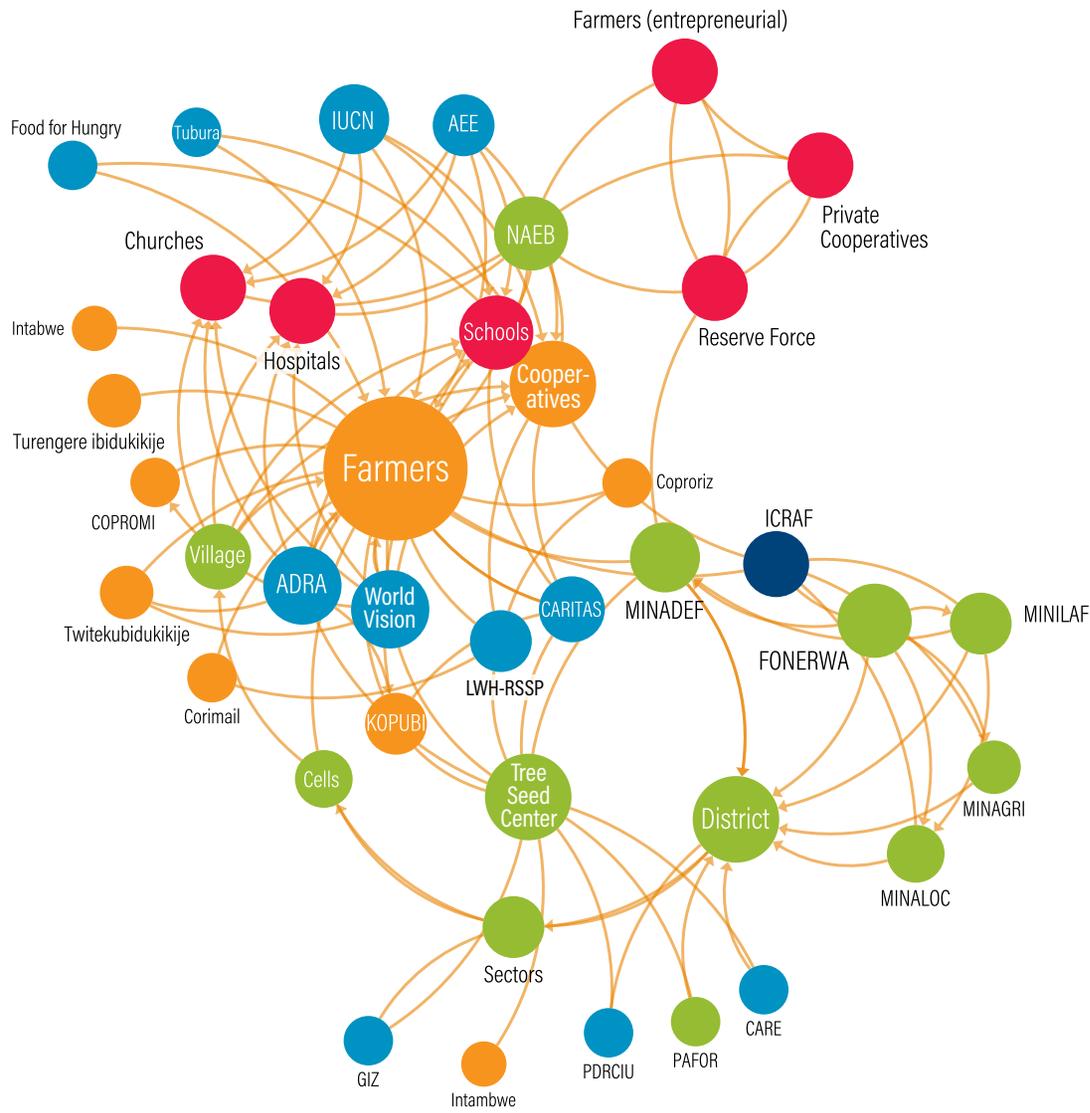
The farmers and cooperatives are clustered with schools and churches. Environmental clubs in schools often organize activities with farmers or support farmers by purchasing seedlings. Churches are often a venue through which farmers in need can receive charitable contributions. Notably, there are different groups of farmers—subsistence and entrepreneurial—playing different roles in seed distribution.

Farmer communities, seemingly at the core of the seedlings network, regularly incur losses by creating seedlings based on perceived demand from NGOs, small businesses, and government agencies, which does not necessarily match demand. The Reserve Force, a government entity under the Ministry of Defense, operates like a business. It buys seeds from the Tree Seed Center and farmers, produces seedlings, and sells the seedlings to NGOs, government agencies, and sometimes back to farmers. This type of competition pushes down the price of seedlings, making it difficult for farmers to earn money from the seed trade.

In addition, NGOs import many of the seeds, giving them decision-making authority on the flow of seedlings. Overall, **quality, affordable seeds and seedlings are less accessible to farmers** than to NGOs, the private sector, and government entities like the Reserve Force or RWFA.

The public and private sector could play a greater role in creating equitable access for farmers and cooperatives to participate in the seed and seedling trade.

Figure 19 | Rwanda Seedlings Network (District, Community)



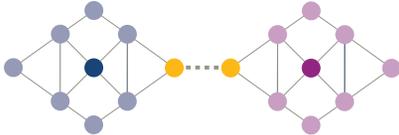
CENTRALITY	WHO?
Connectors Degree Centrality	Farmers, Cooperatives, District, Tree Seed Center, ADRA
Spreaders Closeness Centrality	Farmers, Tree Seed Center, ADRA, World Vision, NAEB
Gatekeepers Betweenness Centrality	Farmers, Tree Seed Center, NAEB, ICRAF, MINADEF
Change Champions Eigenvector Centrality	Farmers, CARITAS, NAEB, KOPUBI, Tree Seed Center

SHAPE	MEANING
Size	Medium
Density	Medium dense
Core	Local community and NGOs at the core
Periphery	Government on the periphery
Clusters Cliques	Clusters forming around farmers, cooperatives, NAEB, and Tree Seed Center

LEGEND	
●	Local Community
●	NGOs
●	Research Institutions
●	Government
●	Private Sector
—	Seedlings

Source: WRI.

Table 9 | Analyzing Network Attributes

MEASURE	PICTURE	DESCRIPTION	OPPORTUNITIES	THREATS	QUESTION
Diversity		The number of similarities in the attributes table	A diverse network can include a diversity of voices and be more representative of the community one is desiring to reach	A diverse network does not mean that everyone's voices are equal in the discussion	<i>Is there a diversity of voices driving the agenda?</i>
Dissemination		The activity of communicating to new groups	Communicating to new groups can lead to new members and an enriched discussion	Communicating to new groups can lead to new challenges of cohesiveness	<i>Are current discussions reaching new communities?</i>

Source: WRI.

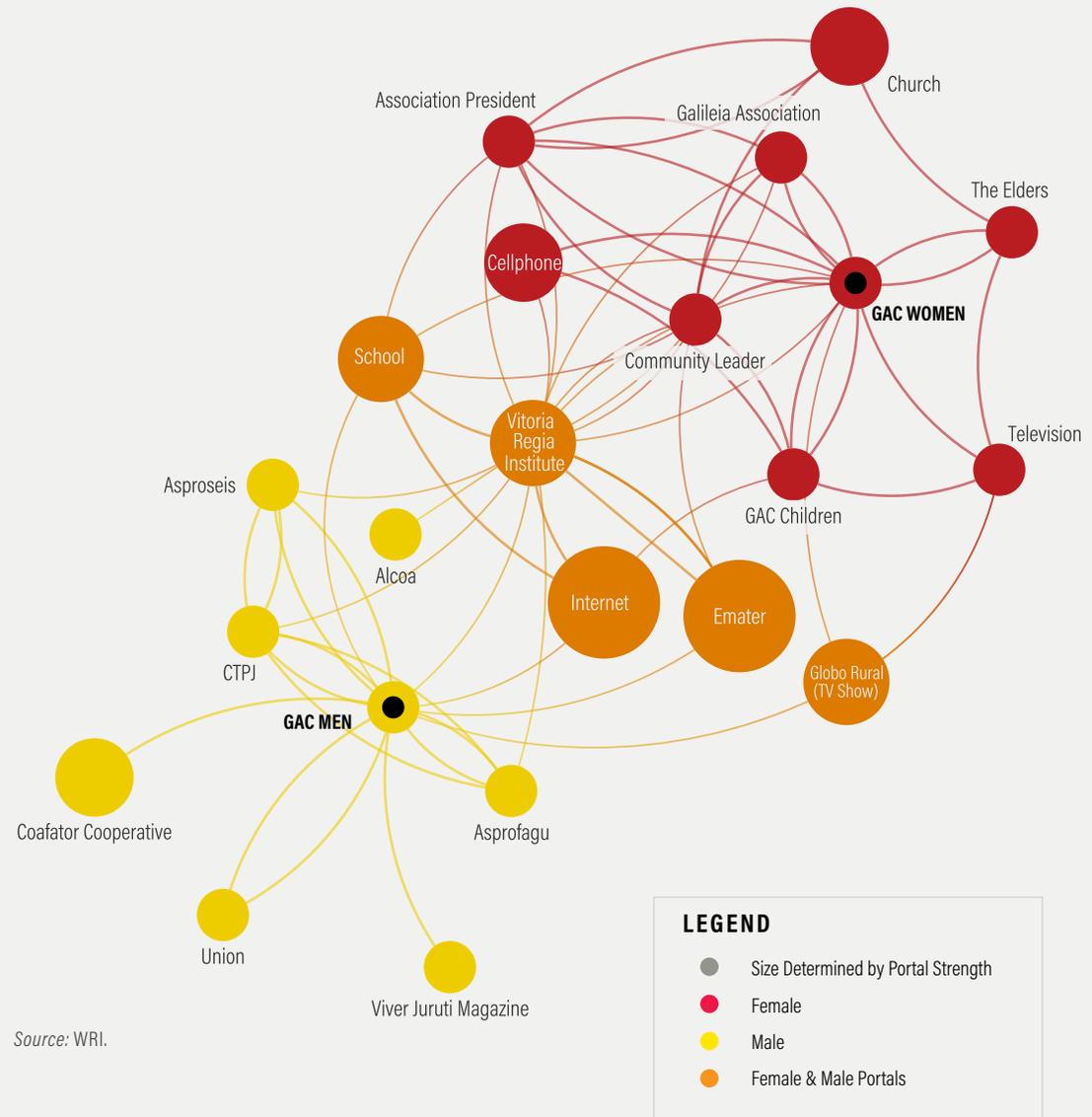
INSIGHTS: BRAZIL

GENDER:

How does agroforestry information flow differ between men and women in the Galileia community?

Community members in rural Galileia in the Juruti municipality of the Brazilian state of Pará identified channels that could provide a greater amount of information if strengthened. The men and women were split into two groups to create a more inclusive workshop that gave equal voice to the two groups. Women tended to cite secondary sources of information such as elders, children, the church, and community leaders, whereas men tended to identify organizations that provided direct sources of information. **Both groups showed consensus on five main information channels:** a Brazilian television program called Globo Rural, the Internet, the local school, Emater (a rural public extension service), and the Vitoria Regia Institute (a technical assistance NGO). Of these five, participants emphasized that **the Internet and Emater had the most potential to exponentially increase information flow** if greater access were enabled.

Figure 20 | Brazil Galileia Community Information Network



Source: WRI.

INSIGHTS: INDIA

IMPLEMENTATION:

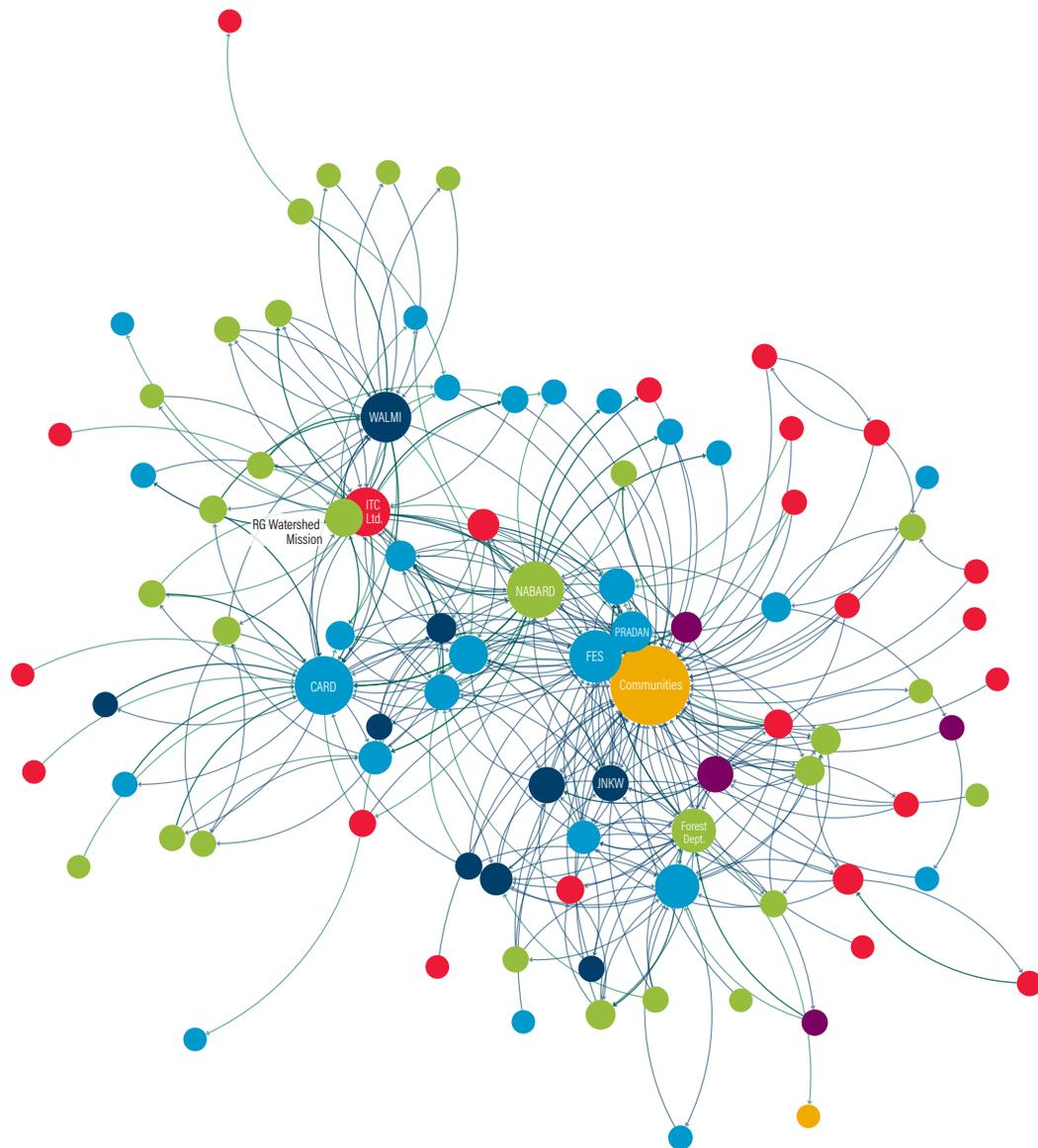
Which actors can help implement landscape restoration in Madhya Pradesh?

The Madhya Pradesh social network analysis map shows the **diversity of actors and, specifically, organization types** that are involved at the state level in restoration-related activities. Major organizations in Madhya Pradesh working on landscape restoration include government agencies, the private sector, research institutions, the local community, and donors. The network map of Madhya Pradesh shows **a few loosely connected clusters** within the network. The size of the organizations involved varies although **most of the NGOs operate at a regional or state level**. These NGOs are often funded either through competitive state government grants, donor agencies, or private-sector foundations.

During the social network analysis activity, stakeholders argued that the funding flows determined decision-making authority. Organizations that receive funding need to show accountability toward the funding agencies. **This interconnected understanding of funding and authority flows can reduce the diversity of voices driving the restoration agenda**, even when the network has a diversity of organization types.

All the organizations are well-known at the regional level in Madhya Pradesh. However, some, like the Foundation for Ecological Security (FES), are known in the restoration global community. Mapping connectivity at the state level clarified **the need to tap networks and champions that interact across scales**, such as the National Bank for Agriculture and Rural Development (NABARD), the Centre for Advanced Research and Development (CARD), FES, Professional Assistance for Development Action (PRADAN), and the Forest Department. Tapping these organizations could **increase the trust of local organizations and the community** at the state and district level.

Figure 21 | India Madhya Pradesh State Social Network Analysis Map



CENTRALITY	WHO?
Connectors Degree Centrality	Communities, CARD, NABARD, FES, WALMI
Spreaders Closeness Centrality	NABARD, CARD, FES, ITC Ltd., RG Watershed Mission
Gatekeepers Betweenness Centrality	CARD, NABARD, FES, WALMI, ITC Ltd.
Change Champions Eigenvector Centrality	Communities, CARD, FES, PRADAN, JNKVV

ATTRIBUTES	MEANING
Organization Type	All different: NGOs, government agencies, private sector, research institutions, local community and donors
Organization Size	Large to medium
Organization Funding Type	Varies across the spectrum: international, national, and local
Organization Renown	High to medium
Organization Representation	Varies across the spectrum: national to community

LEGEND

- Local Community
- NGOs
- Research Institutions
- Government
- Private Sector
- Donors
- Media
- Information & Collaboration
- Finance

Source: WRI.



CREATE A **STRATEGY FOR CHANGE**

For restoration efforts to restore land and livelihoods at scale, the restoration movement needs to create inclusive pathways for the people who work and manage the land. Understanding their experiences and knowing who they interact with most often—by using approaches such as those in this guide—can inform more sustainable approaches.

To help practitioners, three examples of resource networks important to restoration—information, seedlings, and finance—are provided below to inform strategies for change. The case of the Rwandan farmer is used for each of these networks to illustrate how social landscape maps can inform practices and encourage change.

- **FOR AN INFORMATION NETWORK**, this analysis could result in a decision to ensure that farmers are part of any strategic planning to improve information flow to the farmers.
- **FOR A SEEDLINGS NETWORK**, considering the strategy for change could lead to developing market mechanisms to better facilitate the purchase and distribution of quality seedlings.

- **FOR A FINANCE NETWORK**, discovering that there is little independent funding going directly to farmers could result in the development of more finance channels, new loan systems, or more competitive cooperatives.

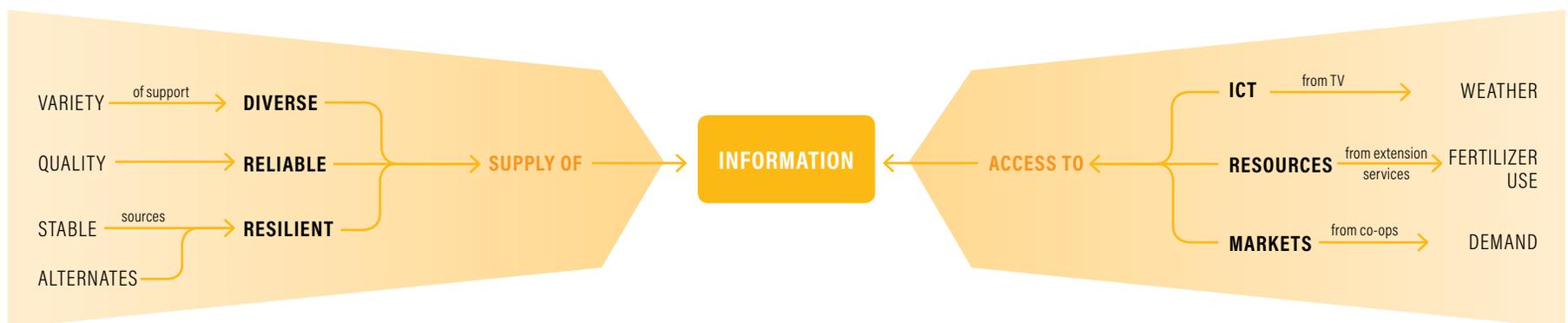
The strategies should ideally be applied to the intended recipients of these services, which for restoration is often farmers or community organizations. In each strategic network example, the supply side analyzes the diversity, reliability, and resilience of the network, giving rise to three questions for practitioners to consider. These questions should be analyzed by focusing on the first- and second-degree connections of the actor. The access side focuses on access to ICT, resources, and markets.

THE INFORMATION NETWORK OF A RWANDAN FARMER

DIVERSE: The information network of the Rwandan farmer is dense. Generally, farmers are bombarded by information with mixed messages. Farmers want in-depth services over the long term from fewer entities as opposed to many entities providing on-the-surface services for a short amount of time.

RELIABLE: NGOs remain one of the farmers' most reliable suppliers of information. Although NGOs provide quality information, the NGOs may stay only a short time, or they may not regularly provide information to farmers in a coordinated way.

Figure 22 | Building a Strategic Information Network



Source: WRI.

- 1) Is there a **diverse** supply of information? 2) Are information sources **reliable**? 3) If main information sources were cut off, would there be **alternative** sources?

THE SEEDLINGS NETWORK OF A RWANDAN FARMER

DIVERSE: The seedlings network of the Rwandan farmer is dominated by NGOs that are offering free or low-priced seedlings. The only official supplier that provides a variety of seeds to the farmer is the government-run Tree Seed Center (TSC). Overall, Rwandan farmers have an extensive seed and seedling network for receiving seeds and seedlings, but farmers have little control over germination, distribution, and availability of the species they want.

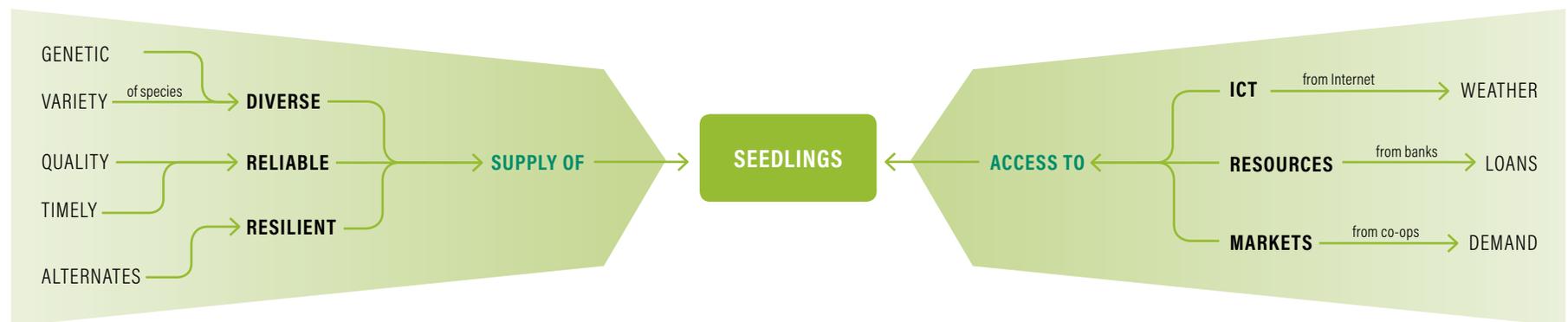
RELIABLE: One of the farmers' most reliable suppliers is the TSC because it generally provides quality products within the necessary time frame. However, TSC also has little enforcement power to control the seed quality in the country that comes from other places when farmers, NGOs, and small and medium enterprises try to compensate for the limited national supply. No formal system or mechanism filters the quality of seedlings that get to the farmers.

ALTERNATIVES: The alternative supplier for the farmer would be NGOs, such as IUCN and One Acre Fund (locally known as Tubura), and the village administration where districts channel seedlings.

TWO STRATEGIC CHANGES:

1. Aggregate the farmers' needs for seed and seedling species.
2. Develop market mechanisms for seedlings.

Figure 24 | Rwanda Seedlings Network Focused on the Farmer



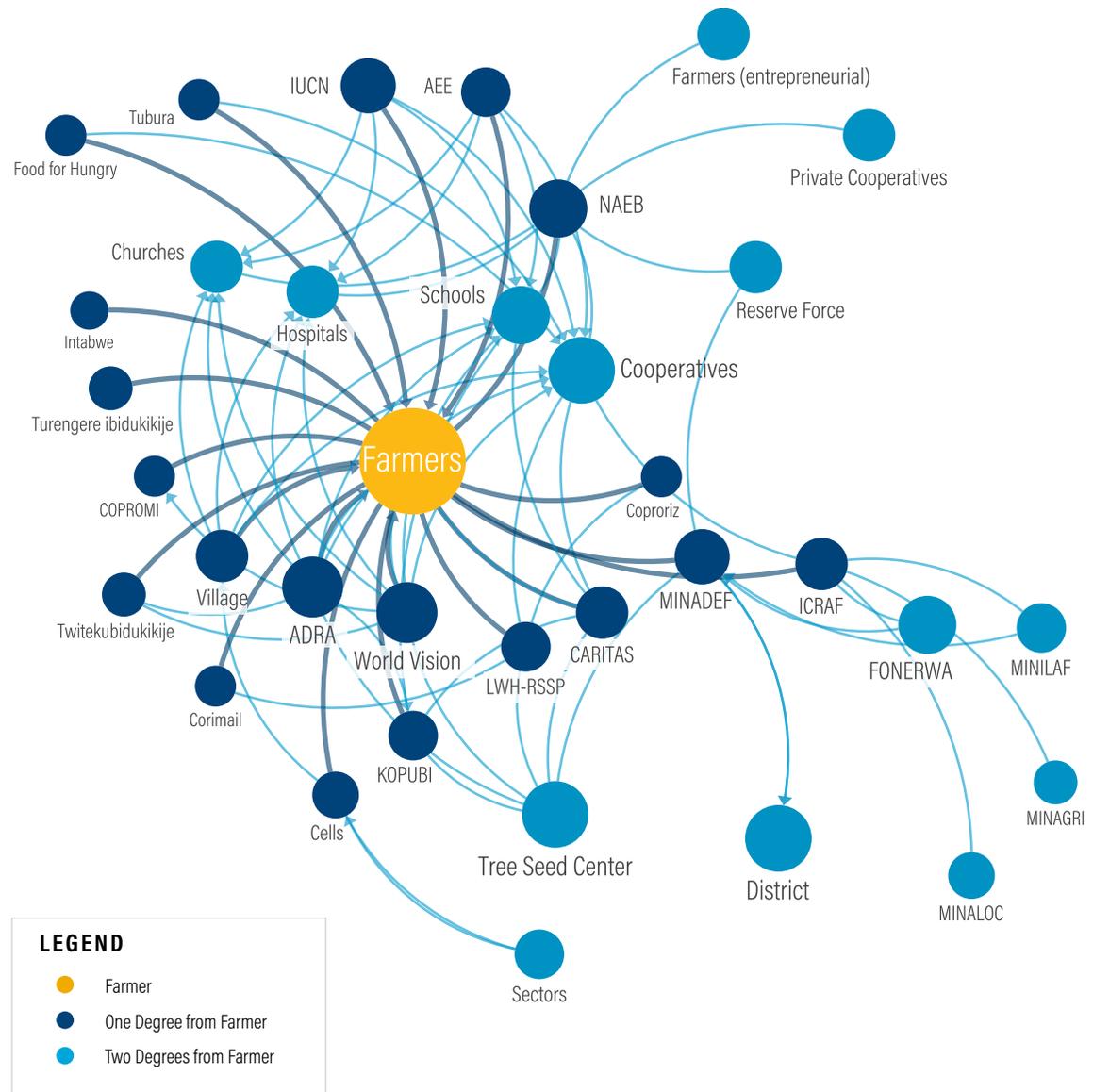
Source: WRI.

- 1) Is there a **diverse** supply of seedlings? 2) Are there **reliable** suppliers? 3) If main suppliers were cut off, are there **alternative** suppliers?

Seedling production and distribution is happening everywhere, led by entrepreneurial-minded farmers, farmer cooperatives, small and medium enterprises, NGOs, and the Reserve Force. Yet, farmers still produce seedlings based on projected demand, leading to market flooding that allows contractors to take advantage and bring down the price. The district could take more initiative by aggregating farmers' needs for seed and seedling species. Such information would be also beneficial to NGOs looking to fund restoration activities.

Another option would be to develop market mechanisms for seedlings. Market forces could better facilitate the purchase and distribution of seedlings and encourage better quality and improved variety. Farmers could be provided with training and information access to allow them to become better businesspeople and negotiate market forces. Alternatively, another organization or a private-sector actor could help decentralize the existing network structure.

Figure 25 | Rwanda Seedling Network Focused on the Farmer



Source: WRI.

THE FINANCE NETWORK OF A RWANDAN FARMER

DIVERSE: The financial network of the farmer is sparse. Most large funds go through other institutions before reaching the farmer. Only wealthy farmers and members of cooperatives can access restoration loans.

RELIABLE: A reliable source of funding directly reaching farmers is from NGOs that hire farmers to implement restoration activities.

ALTERNATIVES: Farmers need to access other financial benefits from restoration other than being implementers.

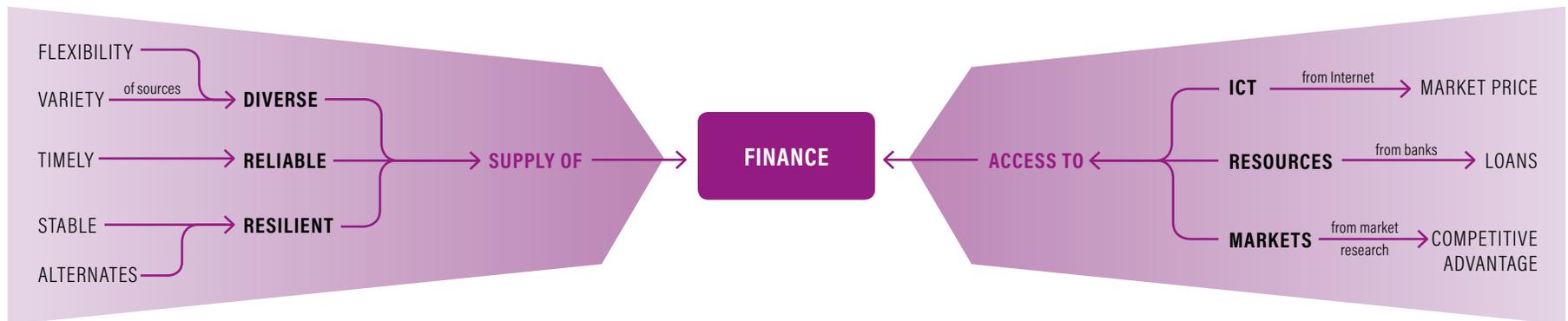
TWO STRATEGIC CHANGES:

1. Provide more channels for farmers to directly access finance.
2. Empower cooperatives.

More accessible channels need to be created to provide finance directly to farmers. One suggested direct channel of funding to farmers is a loan fund that would assist farmers while they wait for trees to mature. Farmers can then pay back the loan after they harvest mature trees. Alternatively, more funding could be injected into existing channels, such as the channel created by NGOs to implementers.

Cooperatives tend to have more visibility to a larger range of stakeholders and more access to restoration loans. Farmers should be encouraged to join cooperatives to access these resources. In addition, restoration actors should increase cooperatives' capacity to directly access competitive markets. With more members and more access to markets, cooperatives can be empowered to be larger players in disseminating restoration finance.

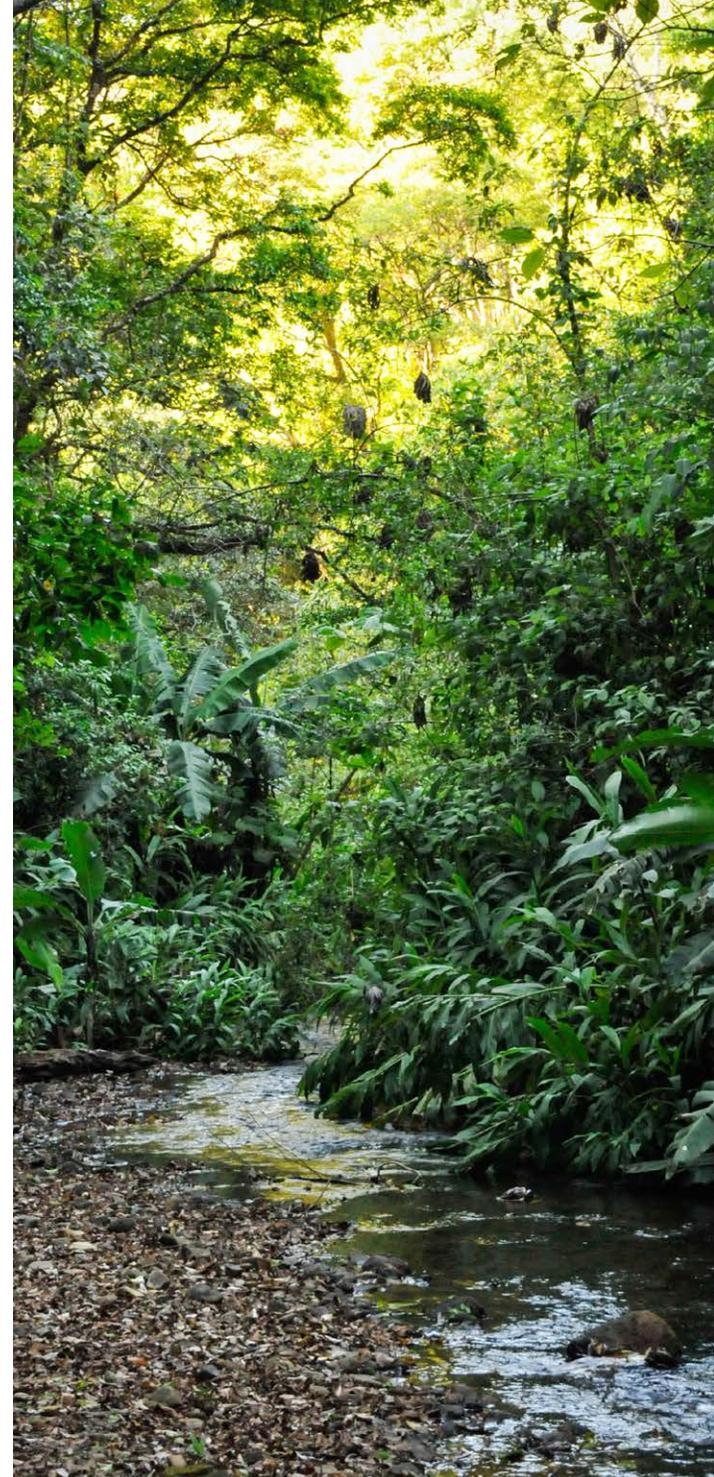
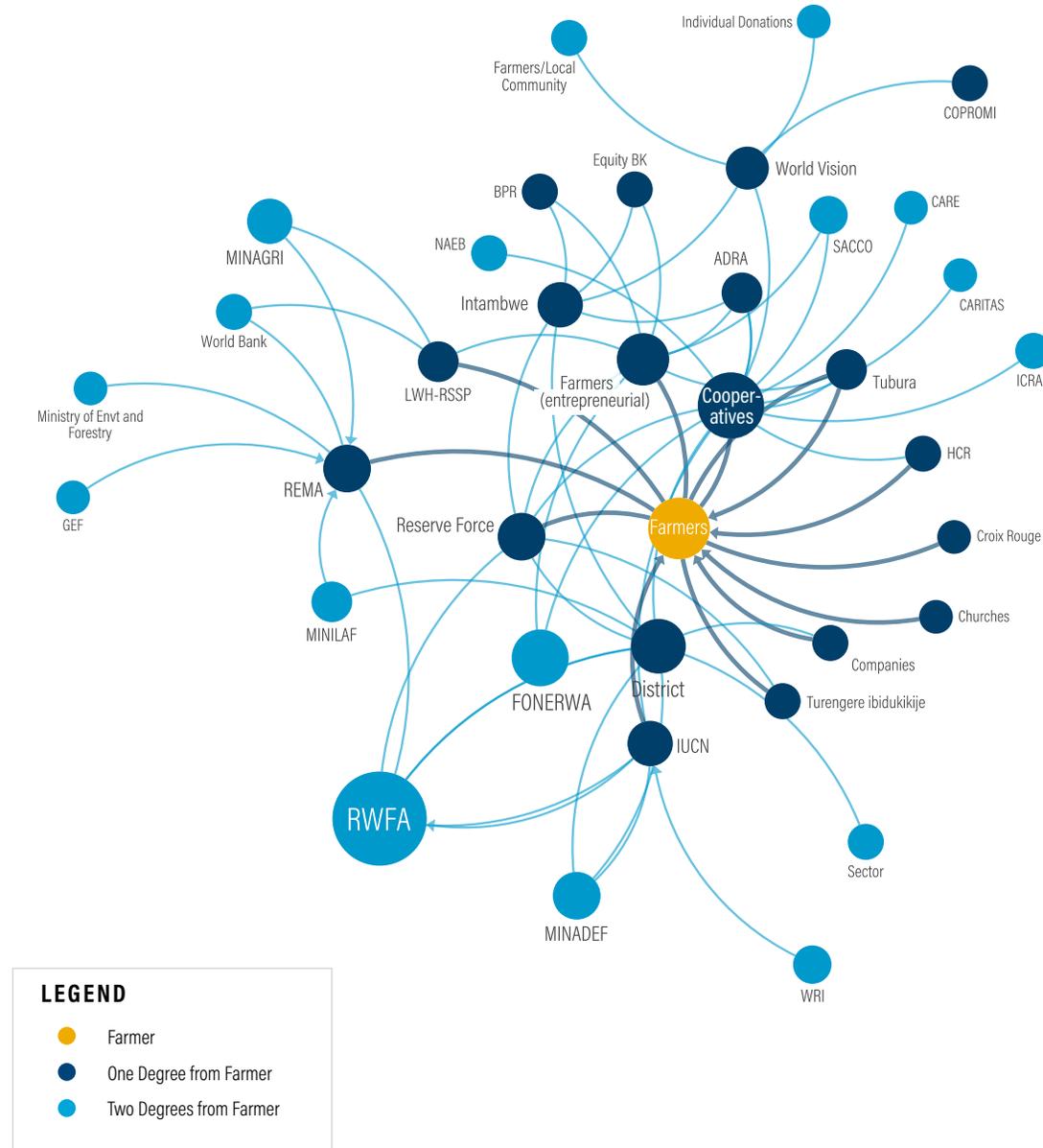
Figure 26 | Building a Strategic Finance Network



Source: WRI.

- 1) Is there a **diversity** of financial options? 2) Are there **reliable** sources of finance? 3) If main funding sources were cut off, are there **alternatives**?

Figure 26 | Rwanda Finance Network Focused on the Farmer



Source: WRI.



CONCLUSION: **WHY MAP SOCIAL LANDSCAPES?**

Social landscape mapping provides essential information about actors in the landscape. It offers a baseline map of actors' connectivity, priorities, and values, as well as crucial insights to consider when strategizing for scale. This guidebook can help readers understand why analyzing the social context is as important as conducting a biophysical opportunities map.



To consider whether analyzing the social landscape can create the desired impact, return to the three proven ways to use social networks to make a difference and see if you can answer the questions in your network (Table 10). Asking these types of questions can allow practitioners to better use their own networks and to scale up individual efforts to a larger, unified movement.

Now is the time to create a plan to analyze your social network:

- 1. MAKE** a commitment to map your social landscapes around a specific goal or activity.
- 2. ANALYZE** the social landscape maps to determine what works and what could be improved.
- 3. WORK** with groups within the social landscape to identify, agree upon, and implement changes.
- 4. REPEAT**, or make a commitment to evaluate changes in the social landscape periodically.

Table 10 | Questions for Social Impact

THREE PROVEN WAYS TO USE SOCIAL NETWORKS	QUESTIONS FOR SOCIAL IMPACT
1. Encourage Trust and Efficacy	How can the local restoration movement be more aligned with the priorities and values of its stakeholders?
2. Capitalize on Existing Roles	How can existing roles in the network be leveraged to increase impact?
3. Use Social Capital to Scale	What social capital (e.g., central actors) in the network can be mobilized to scale restoration efforts?

Source: WRI.

ENDNOTES

1. The following sources provide more information on how social network analysis has been used in other fields of study. **Sociology:** Ferguson, S., ed. 2017. *Mapping the Social Landscape: Readings in Sociology*. Thousand Oaks, CA: SAGE Publications, Inc.; **Geography:** Brown, G., D. Weber, K. de Bie. 2014. "Assessing the Value of Public Lands Using Public Participation GIS (PPGIS) and Social Landscape Metrics." *Applied Geography* 53: 77–89; **Media Studies:** Jones, S.G. 1997. "The Internet and Its Social Landscape." In *Virtual Culture: Identity and Communication in Cybersociety*, edited by S.G. Jones, 7–35. London: SAGE Publications Ltd.; **Marketing:** Einstein, N., and D. Daniel. 2016. *The Social Landscape: The State of Social Marketing 2016*. Boston: The Relevancy Group.
2. For more information on how Net-Map was originally designed, go to the **Net-Map website:** <https://netmap.wordpress.com/about/> or read the **academic paper:** Schiffer, E., and J. Hauck. 2010. "Net-Map: Collecting Social Network Data and Facilitating Network Learning through Participatory Influence Network Mapping." *Field Methods* 22 (3): 231–249.
3. Social researchers conducting social landscape analyses should understand basic research principles to conduct high-quality, ethical research. More information can be found here: Denscombe, M. 2010. *Ground Rules for Social Research: Guidelines and Good Practice*. London, UK: Open University Press.
4. The Net-Map adaptations are based on Advance Level Net-Map Certified Facilitator Training, Nairobi, Kenya, March 2016.
5. Many more social network analysis software exist. We have included commonly used programs that do not require coding skills. A greater range of options is available for practitioners who use R and Python.

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Our Challenge

Natural resources are at the foundation of economic opportunity and human well-being. But today, we are depleting Earth's resources at rates that are not sustainable, endangering economies and people's lives. People depend on clean water, fertile land, healthy forests, and a stable climate. Livable cities and clean energy are essential for a sustainable planet. We must address these urgent, global challenges this decade.

Our Vision

We envision an equitable and prosperous planet driven by the wise management of natural resources. We aspire to create a world where the actions of government, business, and communities combine to eliminate poverty and sustain the natural environment for all people.

Our Approach

COUNT IT

We start with data. We conduct independent research and draw on the latest technology to develop new insights and recommendations. Our rigorous analysis identifies risks, unveils opportunities, and informs smart strategies. We focus our efforts on influential and emerging economies where the future of sustainability will be determined.

CHANGE IT

We use our research to influence government policies, business strategies, and civil society action. We test projects with communities, companies, and government agencies to build a strong evidence base. Then, we work with partners to deliver change on the ground that alleviates poverty and strengthens society. We hold ourselves accountable to ensure our outcomes will be bold and enduring.

SCALE IT

We don't think small. Once tested, we work with partners to adopt and expand our efforts regionally and globally. We engage with decision-makers to carry out our ideas and elevate our impact. We measure success through government and business actions that improve people's lives and sustain a healthy environment.

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