Understanding the Policy Landscape for Climate Change Adaptation

A Cross-Country Comparison Using the Net-Map Method

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Contents

Tables

Figures

ABSTRACT

In the context of increasing vulnerability to climate change for people dependent on natural resources for their livelihoods, the International Food Policy Research Institute and partner organizations in Ethiopia, Kenya, Mali, and Bangladesh undertook a project broadly aiming to create knowledge that will help policymakers and development agencies to strengthen the capacity of male and female smallholder farmers and livestock keepers to manage climate-related risks. This study—one component of the project—examines the networks and power dynamics of stakeholders in the four target countries so as to (1) identify potential partners in the research process, (2) find out which organizations could make use of the research findings in their activities, and (3) inform the communication and outreach strategy of the research project. This paper describes the network structures for climate change policy, the actors in the networks with high centrality and influence scores, and the implications of these results for outreach and dissemination.

Keywords: climate change adaptation, policy impact, stakeholder mapping, social network analysis

ACKNOWLEGMENTS

ABBREVIATIONS AND ACRONYMS

|	
AAU	Addis Ababa University
ACCI	Adaptation to Climate Change and Insurance
AEDD	Agence pour L'Environment and Le Développement Durable (Mali)
AFC	Agricultural Finance Corporation
AfDB	African Development Bank
AGRA	Alliance for a Green Revolution in Africa
APCAM	Assemblée Permanente de Chambre de l'Agriculture du Mali
BCAS	Bangladesh Center for Advanced Studies
BRAC	Bangladesh Rural Advancement Committee
BWDB	Bangladesh Water Development Board
CC	climate change
CDPM	Comprehensive Disaster Management Program
CIFA	Community Initiative and Facilitation Assistance
CREADIS	Community Research on Environment and Development Initiatives
DAE	Department of Agriculture Extension (Bangladesh)
EPA	Environmental Protection Authority (Ethiopia)
EPaRDA	Enhancing Pastoralists Research and Development Alternatives
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GROOTS	Grassroots Organization Operating Together in Sisterhood
IER	Institut d'Economie Rurale (Mali)
INSAH	Institut du Sahel (Mali)
KFSSG	Kenya Food Security Steering Group
LGED	Local Government and Engineering Department (Bangladesh)
MoA	Ministry of Agriculture (Bangladesh)
MoARD	Ministry of Agriculture and Rural Development (Ethiopia)
MoDNKAL	Ministry of Development of Northern Kenya and Arid Lands
MoEF	Ministry of Fisheries and Livestock (Bangladesh)
MoFA	Ministry of Federal Affairs (Ethiopia)
MoFDM	Ministry of Food and Disaster Management (Bangladesh)
NGO	nongovernmental organization
NMA	National Meteorological Association (Ethiopia)
PCDP	Pastoral Community Development Program (Ethiopia)
PM	Prime Minister's office
SECO-ONG	Secrétariat de Concertation des ONG Maliennes
UNDP	United Nations Development Programme
USAID	United States Agency for International Development

1. INTRODUCTION

It is now widely accepted that climate change is one of the largest challenges facing agriculture in the 21st century. Among those who are most affected are poor agricultural households in the developing world, even though they have contributed least to climate change. Africa south of the Sahara is highly vulnerable to adverse impacts from climate change, due to low adaptive capacity, low levels of human and physical capital, poor infrastructure, and already high temperatures (Kurukulasuriya 2006). In Asia, Bangladesh ranks highest in most climate change vulnerability assessments as a result of high poverty, high dependence on agriculture, and large expected impacts from increased inland flooding and sea-level rise (Ali 1999; Keane, Page, and Kennan 2009; Nelson et al. 2010).

An increasing body of research focuses on the question of how agricultural households will be affected by climate change and how they perceive climate change (Deressa et al. 2009; Nelson et al. 2010). In view of the predicted effects on poor agricultural households, identifying the strategies that are best suited to support affected households to adapt to climate change is an urgent need. Against this background, the International Food Policy Research Institute and partner organizations in the target countries Ethiopia, Kenya, Mali, and Bangladesh undertook the project entitled Enhancing Women's Assets to Manage Risk under Climate Change, supported by the German Federal Ministry of Economic Cooperation and Development. The project broadly aims to create knowledge that will help policymakers and development agencies to strengthen the capacity of male and female smallholder farmers and livestock keepers to manage climate-related risks. And this study specifically examines the networks of stakeholders in the four target countries to facilitate effective engagement and dissemination of research results.

Figure 1.1 displays the overlapping policy fields and areas of intervention that were identified to relate to climate change adaptation. Agricultural technologies and sustainable natural resource management practices, such as selection of appropriate varieties and soil and water conservation practices, help reduce the yield risks caused by climate change (Kato et al. 2011). Improved access to irrigation can also serve this goal (Rosegrant, Ringler, and de Jong 2010). Examples of sustainable natural resource management practices include soil erosion and flood control measures. These strategies, which are displayed on the left-hand side of Figure 1.1 can be seen as technology-focused approaches.

Figure 1.1 Policy fields related to agricultural climate change adaptation
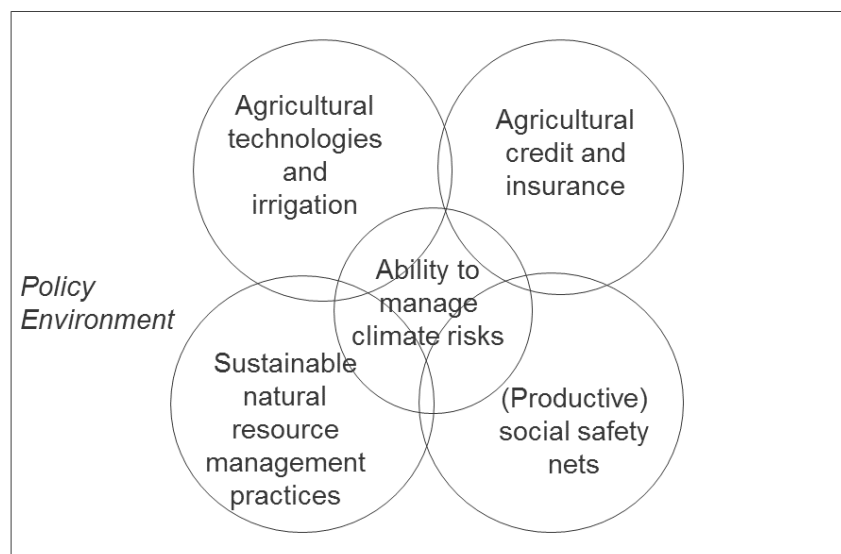
Source: Authors.

The right-hand side of the figure shows the approaches that involve the development of institutions, such as agricultural credit and insurance schemes, and the establishment of safety nets, which may simultaneously enhance production (productive safety nets).

A review of development activities indicates that organizations working in the policy fields indicated in Figure 1.1 use, to a large extent, group-based approaches. Examples include agricultural extension groups, water user associations in irrigation schemes, groups practicing community-based natural resource management, microcredit groups, and groups that are formed for weather-based insurance schemes. Research has shown that group-based approaches can be particularly effective in building assets among poor households (Kumar and Quisumbing 2010). However, group-based approaches may also face the challenges of elite capture and exclusion of poor households and of female household members (Eriksen and Lind 2009). Against this background, the Enhancing Assets project places particular emphasis on group-based approaches and includes an assessment of the governance challenges involved in implementing those approaches with a view to strengthening the asset base of poor households.

Because of the wide range of policy instruments and intervention areas that can help agricultural households to better use their assets for risk management, one can expect a wide range of organizations and agencies to potentially make use of the research results of this project. Therefore, stakeholder analyses were conducted in each of the four focus countries so as to

- identify potential partners in the research process,
- find out which organizations could make use of the research findings in their activities, and
- derive implications for the communication and outreach strategy of the research project.

Therefore, a stakeholder analysis was conducted at the beginning of the project in each of the four study countries. In addition to a review of documents and individual key informant interviews, information for the stakeholder analysis was gathered in country workshops conducted in Ethiopia, Bangladesh, Mali, and Kenya between August 2011 and January 2012. A participatory mapping tool called Net-Map was used to facilitate the workshops. The results of the stakeholder analyses were presented to the project team at the inception workshop to inform the team's understanding of the policy context and thus its stakeholder engagement and outreach activities throughout the life of the project. Furthermore, those who participated in the interviews are actively engaged in the issue of climate change adaptation and, through the participatory nature of the interview, frequently learned from the process and from other stakeholders at the workshop about the policy landscape.

The paper is structured as follows: Section 2 describes the methodology for the stakeholder analysis. Sections 3 through 6 review the "stakeholder landscape" identified in each of the four countries. Section 7 draws implications for the communication and outreach strategy of the Enhancing Assets project. Section 8 discusses the insights learned across the four countries. For complete lists of actors listed in each of the interviews, the abbreviations used in the network figures, and other key characteristics, please refer to the appendix tables.

2. METHODOLOGY FOR THE STAKEHOLDER ANALYSIS

The interview method used for the stakeholder analysis was the Net-Map method. Net-Map (Schiffer and Waale 2008) is a participatory interview technique that combines social network analysis (Hanneman and Riddle 2005), stakeholder mapping, and power mapping (Schiffer 2007). Net-Map helps people understand, visualize, discuss, and improve situations in which many different actors influence outcomes. By creating maps, individuals and groups can clarify their own view of a situation, foster discussion, and develop a strategic approach to their networking activities. Mapping can also help outsiders understand and monitor complex multistakeholder situations.

In particular, Net-Map allows stakeholders to examine not only the formal interactions in the network but also the informal interactions that cannot be understood by merely studying documents concerning the formal policymaking procedures. Actors meet to exchange information and lobby for certain policy goals; local and international initiatives contribute by adding funds or research; and all of these interactions contribute to shaping the content and process of policymaking. Actor-oriented approaches such as Net-Map help illuminate how individual actors' actions combine to create a "process of mutual construction" of policy networks (Keeley and Scoones 1999, 23). To get a realistic understanding of these formal and informal links and how the actors use them to influence the policy process, empirical fieldwork is crucial (as only the formal links can be deducted from government documents). To understand how the actors interact with each other in the process, social network analysis approaches are especially suitable, as they allow for a complex representation of a system, putting the actions of individuals and organizations into a greater perspective. Social network analysis (Hanneman and Riddle 2005) explains the achievements of actors and the developments within groups of actors by looking at the structure of the linkages between these actors. Thus, while traditional survey-based approaches collect data about attributes of actors, network analysis focuses on gathering information about the network through which these actors connect.

More specifically, in this Net-Map exercise, respondents were asked the following:
- What actors are involved in climate change adaptation?
- Who is giving advice to whom among these actors?
- How much influence does each actor have over improving the ability of farmers (and pastoralists or fishers) to adapt to climate impacts?
- What are the priorities and core activities of each of these actors in terms of climate change adaptation?

The answers to these questions were arrived at by group consensus. By promoting consensus in the group, we hope to facilitate cross-communication and balance the different voices and perspectives among various stakeholders. The actors' names were written on small note cards and spread across a large piece of paper. Upon nominating an actor to be included, respondents would provide explanations as to why that actor was important to add and what their primary activities are in this field. Advice flows were drawn among the actors, and then influence towers were added to each actor card. The results of this exercise were a visual depiction of the stakeholder network for climate change adaptation, and notes from the in-depth discussion during the process. The network data were entered into a social network analysis program to better assess the network structure. The influence scores attributed by the respondents were inputted as well, so that the nodes (the representations of each stakeholder in the network) can be sized according to their perceived influence over improving climate change adaptation for farmers, pastoralists, fishers, and forest gatherers, depending on the country.

In our depiction of the lessons learned through these four mapping exercises, we highlight a variety of interesting characteristics of the networks. Because of the participatory nature of the interview method, each group had a unique focus and emphasis. As such, not all the interesting characteristics were covered across all the countries. In particular, in the Kenya interview network connections were not drawn, so information about network dynamics was gleaned from the broader discussion.

Analysis and Report Structure

First, we examine the key actors or groups of actors and the structure of the network. Using social network analysis software VisuaLyzer (Tien et al. 2007), we examine how centralized or decentralized the network is; this has implications for how easily, and democratically, information and other flows spread through the network. We also look for clusters in the network, or groups of actors highly connected to one another within the network. Clusters are relevant because actors engage more with those within their own cluster than those outside their cluster. Next we focus in on those stakeholders engaging directly with target populations in each country. This gives us a sense of whom the conduits may be for the flow of information on adaptation, from the adapters and upward to decisionmakers. Likewise, we focus on those engaging directly with decisionmakers at the national level to understand who is working to shape policy on climate change adaptation. Then we assess some specific network measures that provide insight into who has control over information in the network. These measures are *betweenness centrality*, which is the number of times that this actor is the shortest path between two actors not otherwise connected and indicates control of information, and *closeness centrality*, which is a measure of how quickly information can move from a particular actor to all other actors (Borgatti, Everett, and Johnson 2013).[1] Finally we examine the distribution of power and influence in the network, according to the perceptions of the stakeholders interviewed, and the way in which various actors or groups are able to exert influence.

The results from this analysis are summarized below for each of the focus countries. Then implications for outreach strategies are discussed, given the distinct stakeholder landscapes in each country, leading to an overview of cross-country similarities and differences. However, certain limitations to the cross-country analysis should be considered. First, Net-Map workshops on which the analysis was primarily based were designed as participatory exercises to inform outreach activities and thus did not follow the same structure across countries but were flexible according to the ideas and preferences of the participants. Second, these were one-day group workshops that did not employ any specific sampling strategy and thus did not intend to capture perceptions of all stakeholders in the network. In spite of these weaknesses, the authors feel that some interesting insights come from these comparisons.

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[1] These measures are not easily assessed with "directed" network data (network connections that are not defined as reciprocal) with VisuaLyzer, so data were imported into UCINet (Borgatti, Everett, and Johnson 2013) to run just these two measures.

3. ETHIOPIA RESULTS SUMMARY

Network Structure

The structural characteristics of the network show how information and funding flows among actors; this has implications for who controls those flows. The network, depicted in Figure 3.1, is a highly centralized structure (degree centralization score of 85.26 percent). That is, a few actors have a high concentration of links, whereas many actors have few links (Hanneman and Riddle 2005). Such a network can be described in terms of its *core*, or those few highly linked actors, and its *periphery*, the many actors with few links. Furthermore, core actors are seen as having a high concentration of power or control of information in the network relative to that of others in the network (Hanneman and Riddle 2005). The full list of actors in Ethiopia's network and their characteristics can be found in Appendix Table A.1.

Figure 3.1 Complete Ethiopia network with advice and funding links

Source: Authors' calculations from Net-Map data.
Notes: Actors are sized according to their influence scores. Network Links: Advice = ⟶; Funding = ⇢.

A core–periphery analysis indicated 5 core actors in this network and 36 peripheral actors. The core actors are the Ethiopian Environmental Protection Authority (EPA), the Ministry of Agriculture and Rural Development (MoARD), the Prime Minister's office (PM), Delegation of the European Commission (or European Union, EU), and the Pastoral Forum. Among the core actors are three key government actors—EPA, MoARD, and PM. These three actors not only fall graphically in the middle of the network and have the highest number of links (degree of centrality), but they were also seen as having the highest influence (indicated by the size of the actors in Figure 3.1). Clustered around these actors, we find a variety of international and UN organizations with medium influence.

5

When assessing the betweenness (measure of control of information) and closeness (measure of ease of spread of information) centralities in the network, we find some overlap with the actors who are considered powerful and those with high centrality. MoARD, EPA, and the National Meteorological Association (NMA) have the highest closeness centrality scores, and EPA also has the highest betweenness centrality score.

Figure 3.2 Ethiopia target group network: Advice and funding network
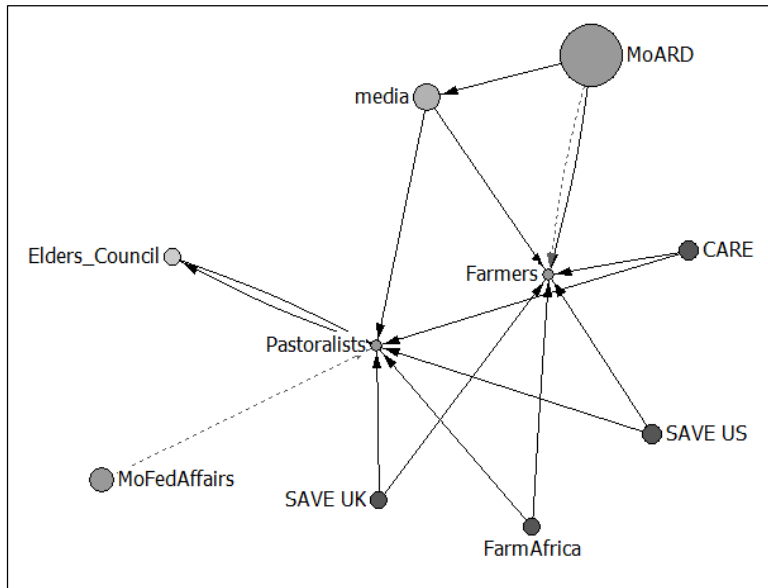
Source: Authors' calculations from Net-Map data.
Notes: Actors are sized according to their influence scores. Network Links: Advice = ——▶; Funding = – – ▶.

Target Communities

In Figure 3.2, we assess the component of the network directly engaging with the target communities by isolating those actors with direct links to farmers and pastoralists. In addition to a handful of international nongovernmental organizations (NGOs) linking directly to the target communities,[2] MoARD is linked to farmers and the Ministry of Federal Affairs (MoFA) is linked to pastoralists. MoARD provides advice, such as through agricultural extension, and funding, such as through the Productive Safety-Nets Program, to farmers. We can see that MoARD has a high influence score, which is understandable given the large role that agriculture plays in the country. MoFA provides funding to pastoralists through the Pastoral Community Development Program (PCDP). It was noted by interviewees that previously pastoralists were considered to be the responsibility of MoARD and, therefore, some tension may be seen related to awarding the PCDP to MoFA rather than MoARD. Communications and outreach initiatives should consider this possible tension between key actors when developing a strategy.

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[2] Although many Ethiopian NGOs are directly linked to the target communities, particularly within specific districts, we limited this exercise to those actors who were also active at the national level, so as to maintain the national focus of the exercise rather than going in-depth into the distinct activities in each district.

Policy Network

Figure 3.3 depicts the network of actors directly connected to the core government actors. We considered the core actors to be the hub actors—the EPA, MoARD, and the PM—as well as MoFA. Here we once again see a clear core–periphery structure, with very little interaction among periphery actors other than directly into and out of the core government actors. In fact, most of the links are inward links to the key government actors, suggesting that the primary activity of actors in the policy network is to have their ideas be heard by these four government actors.

Figure 3.3 Ethiopia policy-focused actor network
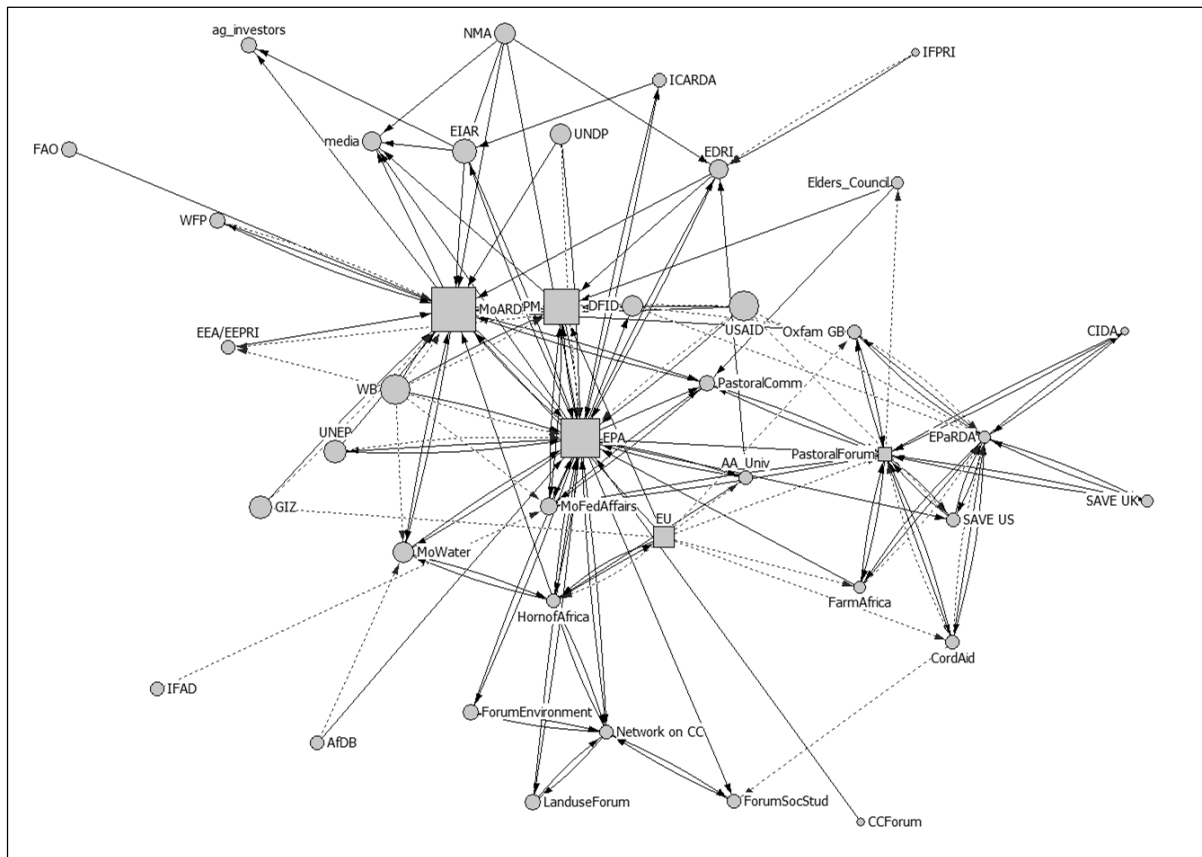
Source: Authors' calculations from Net-Map data.
Note: Actors are sized according to their influence scores. Network Links: Advice = ⟶; Funding = ⇢; Key policy actors = ▢.

Civil Society Clusters

Within the policy network are some sections of the network that are distinct from the rest of the network and diverge from the core–periphery structure. These are groupings of nongovernmental actors (including civil society) engaging with governmental actors on some specific policy issues.

First, a group of civil society actors focusing on climate change issues make up a cluster, wherein they share advice with each other as well as with the EPA and Addis Ababa University (AAU). This type of network structure promotes the free spread of ideas and innovation.

An additional cluster on pastoral issues can also be found in the network, depicting a dynamic relationship among civil society actors, NGOs, and government actors. Many actors who specifically focus on pastoral issues engage with the Pastoral Forum to exchange information and advice. This advice is then provided to MoFA and the Parliamentary Pastoral Committee. A Council of Elders reaches out to the PM and the Parliamentary Pastoral Committee with advice for how to serve the pastoralists. When we focus in on this cluster, however, we can see that the Pastoral Forum and the EPaRDA (Enhancing Pastoralist Research and Development Alternatives) actually begin to form something of a small core–periphery network rather than a more dynamic cluster wherein all actors are linked to most other actors. This shows that these two hub actors have some degree of control in this subnetwork devoted to pastoral issues.

4. BANGLADESH RESULTS SUMMARY

Network Structure

The complete network for Bangladesh is depicted in Figure 4.1. The full list of actors in the Bangladesh network and their characteristics can be found in Appendix Table A.2. Advice links and funding links are shown together. The network structure is highly centralized. As discussed above, this means that most actors have very few links and a few actors have many links around the hub or core, which consists of a few different actors. Perhaps the most important of the core actors are United Nations Development Programme (UNDP), Ministry of Food and Disaster Management (MoFDM), and Ministry of Fisheries and Livestock (MoEF) as they are also seen as highly influential, as indicated in Figure 4.3.

Figure 4.1 Complete Bangladesh network with advice and funding links
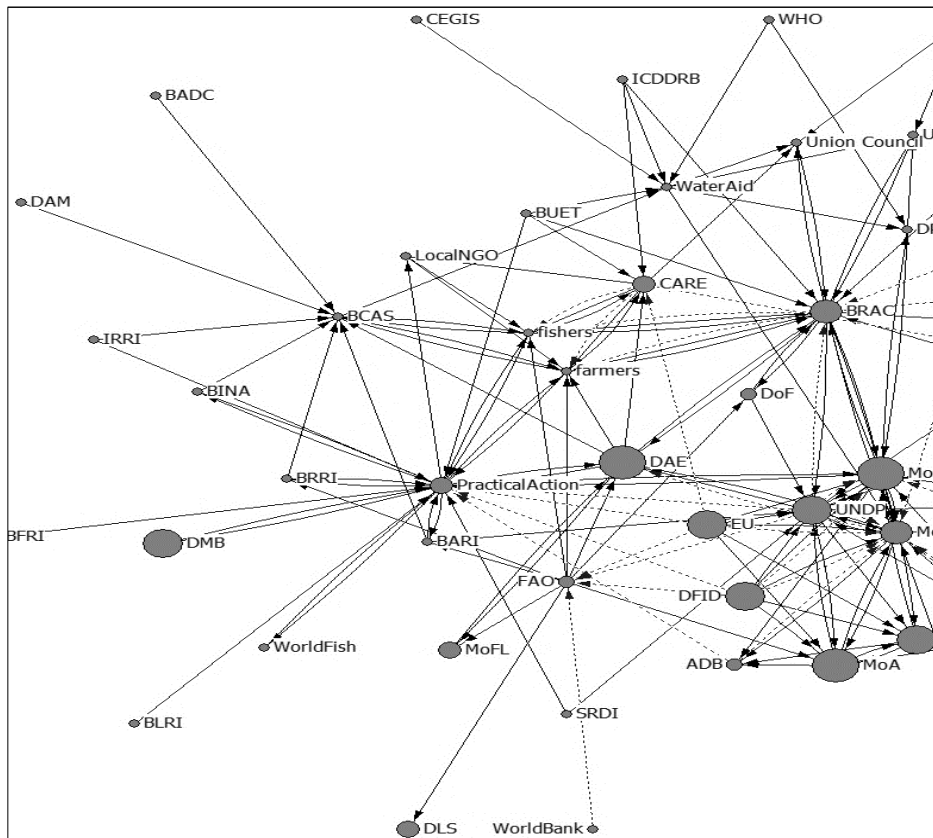
Source: Authors' calculations from Net-Map data.
Note: Actors are sized according to their influence scores. Network Links: Advice = ⟶ ; Funding = - - ➤.

From the network structure we can also perceive an interesting clustering within the network (Figure 4.2). The clusters show a division of actors according to an analysis of who is linked to whom. (The actors in the first cluster are depicted with a square, and the actors in the second cluster are depicted as circles.) The majority of donors, multilaterals, and government actors are in the second cluster, while the first cluster is largely dominated by research organizations. This indicates little cross-communication between these clusters and perhaps some degree of disconnect between policy and research.

9

Figure 4.2 Bangladesh network clusters
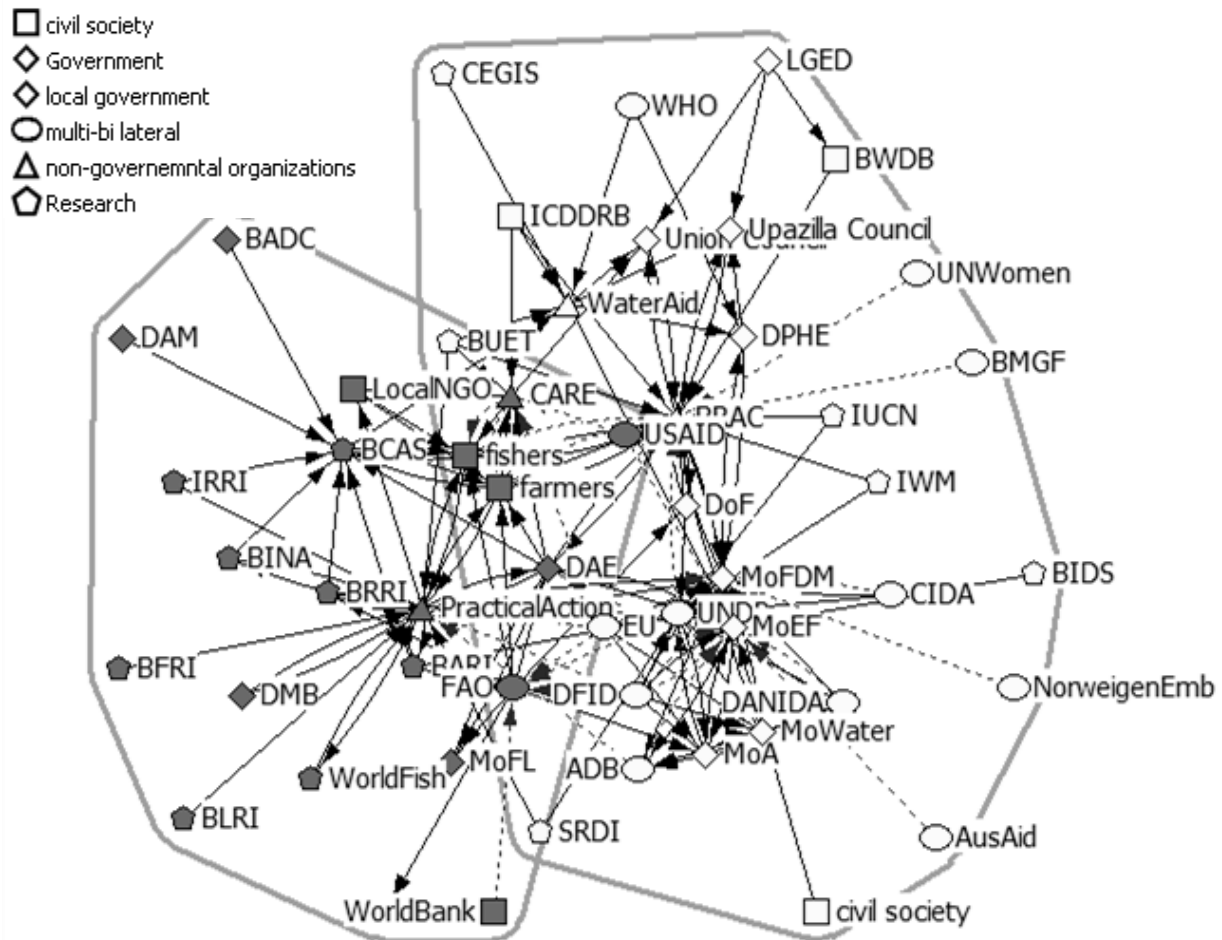

Source: Authors' calculations from Net-Map data.
Note: Actors are sized according to their influence scores. Network Links: Advice = ——▶ ; Funding = – – –▶; Actors:
cluster 1 shaded, see legend for actor type.

When assessing the betweenness (measure of control of information) and closeness (measure of ease of spread of information) centralities in the network, we find some overlap with the actors considered powerful and those with high centrality. The Department of Agriculture Extension (DAE) and the Food and Agriculture Organization of the United Nations (FAO) have the highest closeness centrality scores and Practical Action has the highest betweenness centrality score.

Target Communities

We also examined the actors who are directly engaging with farmers and fishers. Only Bangladesh Center for Advanced Studies (BCAS), Practical Action, CARE Bangladesh, and Bangladesh Rural Advancement Committee (BRAC) are actually receiving advice on climate change adaptation from farmers and fishers as well as providing it. (While these are not the only actors engaging directly with farmers and fishers on climate change adaptation, these were the links that the interview group was sure of.)

Influence

Interview partners were asked to rate the degree of influence that each actor on the map has over improving climate change adaptation in Bangladesh. We collectively defined *influence* as the ability to produce an outcome (make something happen) even in the face of resistance. Figure 4.3 shows the influence scores attributed by the workshop participants. In addition to the influence in improving climate change adaptation, the workshop participants noted that some actors also have the particular ability to negatively influence adaptation efforts and provided scores for negative influence when relevant.

Figure 4.3 Actor influence in Bangladesh
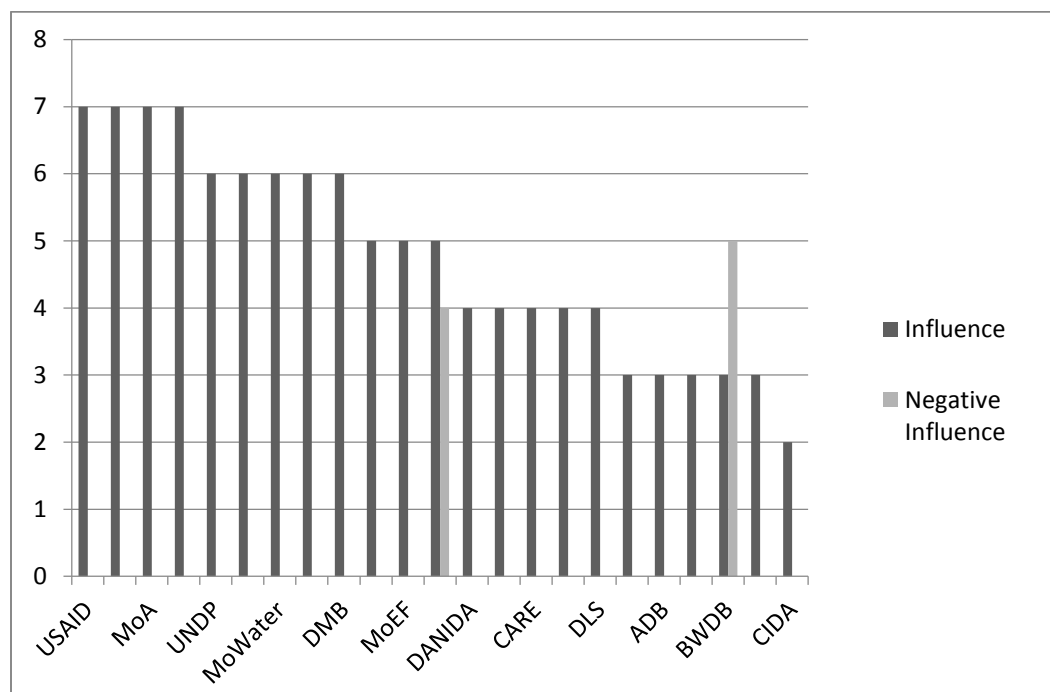
Source: Authors' calculations from Net-Map data.
Note: USAID = United States Agency for International Development; MoA = Ministry of Agriculture (Bangladesh); UNDP = United Nations Development Programme; DMB = Disaster Management Bureau; MoEF = Ministry of Fisheries and Livestock (Bangladesh); DANIDA = Danish International Development Agency; CARE = Cooperative for Assistance and Relief Everywhere; DLS = Directorate of Livestock Services; ADB = Asian Development Bank; BWDB = Bangladesh Water Development Board; CIDA = Canadian International Development Agency.

The highly influential government actors in climate change adaptation were seen as the MoFDM and Ministry of Agriculture (MoA), and the DAE within MoA. MoFDM was seen as important due to the Comprehensive Disaster Management Program (CDMP) housed within this ministry. The CDMP is a program explicitly designed to promote adaptation in the face of natural disasters and is meant to play a coordinating role in the government for adaptation activities. However, workshop participants noted that it is not as successful in this coordinating role as it could be. The MoA, on the other hand, is not mandated to address adaptation, but because of its significant capacity—through the DAE—to work directly with farmers providing advice and other support, it is seen as highly influential in improving the ability of farmers to adapt. Interestingly, the MoEF, and specifically the Department of Environment, while mandated to work on climate change issues, was not seen as influential in climate change adaptation due to a lack of capacity, especially manpower.

11

Two key government bodies—the Local Government and Engineering Department (LGED) and the Bangladesh Water Development Board (BWDB)—are seen to play a critical role in supporting climate change adaptation through the development of infrastructure and management of water resources, respectively. However, they are also seen as susceptible to mismanagement of their power, for instance developing infrastructure for the benefit of specific private interests rather than for small farmers generally. As such, these two bodies were seen as being capable of both positive and negative influence.

5. MALI RESULTS SUMMARY

Network Structure

The network in Mali largely has a decentralized, clustered structure. This type of network consists of multiple influential actors and groups of actors, many of whom are laterally linked with one another. We identify clusters of actors where a group of several actors shares a particularly high number of links. The structure of the network suggests that information flows well between actors within clusters, but not as easily across clusters. Additionally, the degree of influence an organization is able to exercise is likely to be greater within its cluster. The full list of actors in the Mali network and their characteristics can be found in Appendix Table A.3.

When assessing the betweenness (measure of control of information) and closeness (measure of ease of spread of information) centralities in the network, we find some overlap with the actors considered powerful and those with high centrality. The Institut d'Economie Rurale (IER) and FAO have the highest closeness centrality scores, and the Institut du Sahel (INSAH) has the highest betweenness centrality score.

The actors in Mali appear to fall primarily into three clusters based on the type of organization: a highly influential cluster of national-level government organizations including several key ministries and national directorates; a cluster of moderately influential organizations focused on research and policy; and a cluster of less influential Malian civil society organizations representing target populations at the national level (see Figure 5.1). The latter cluster, while attributed less influence than the other clusters, is nonetheless important because of its direct links to the target populations of farmers, pastoralists, forest users, and fishers. A number of important actors including financial and technical partners as well as government agencies appear to be largely independent of the main clusters, yet still highly influential.

Figure 5.1 Complete Mali network including advice and funding links (clusters circled)
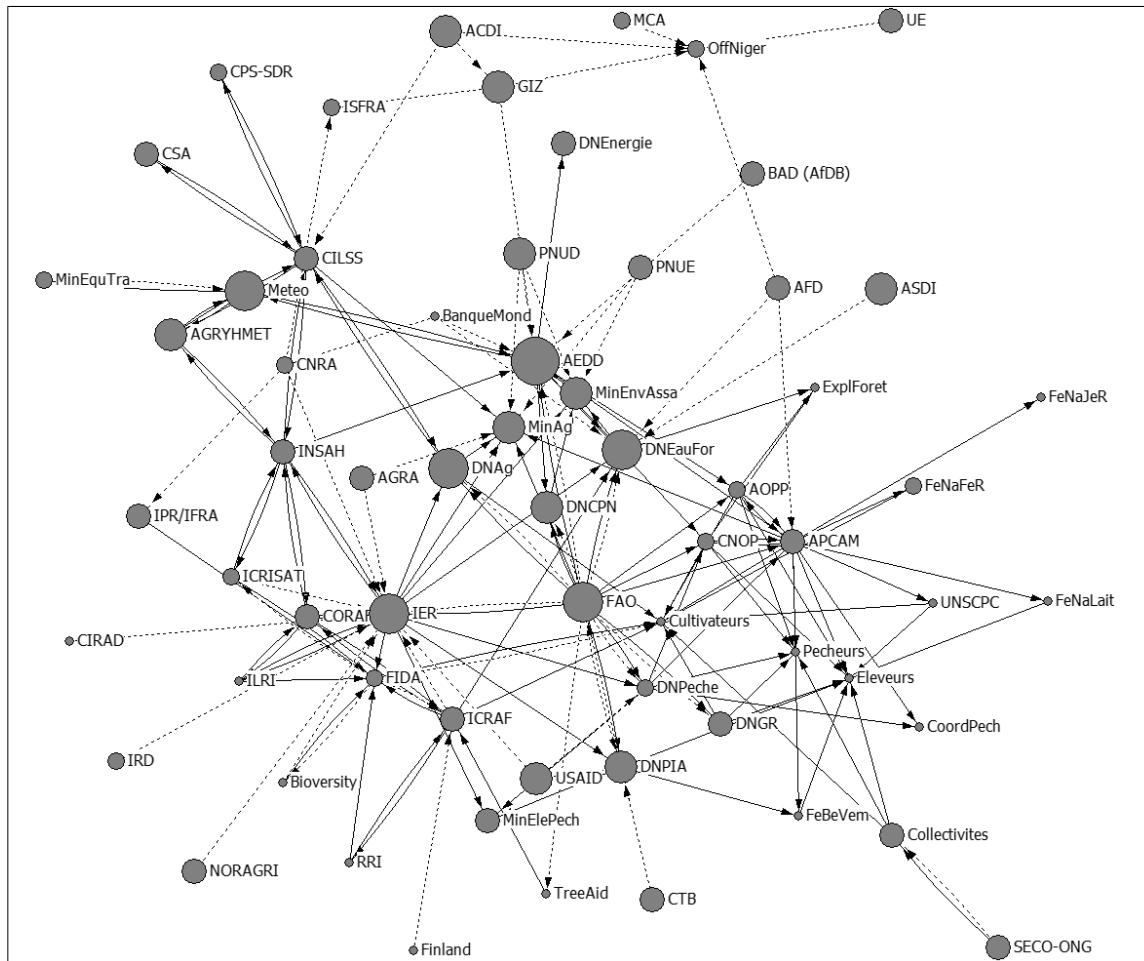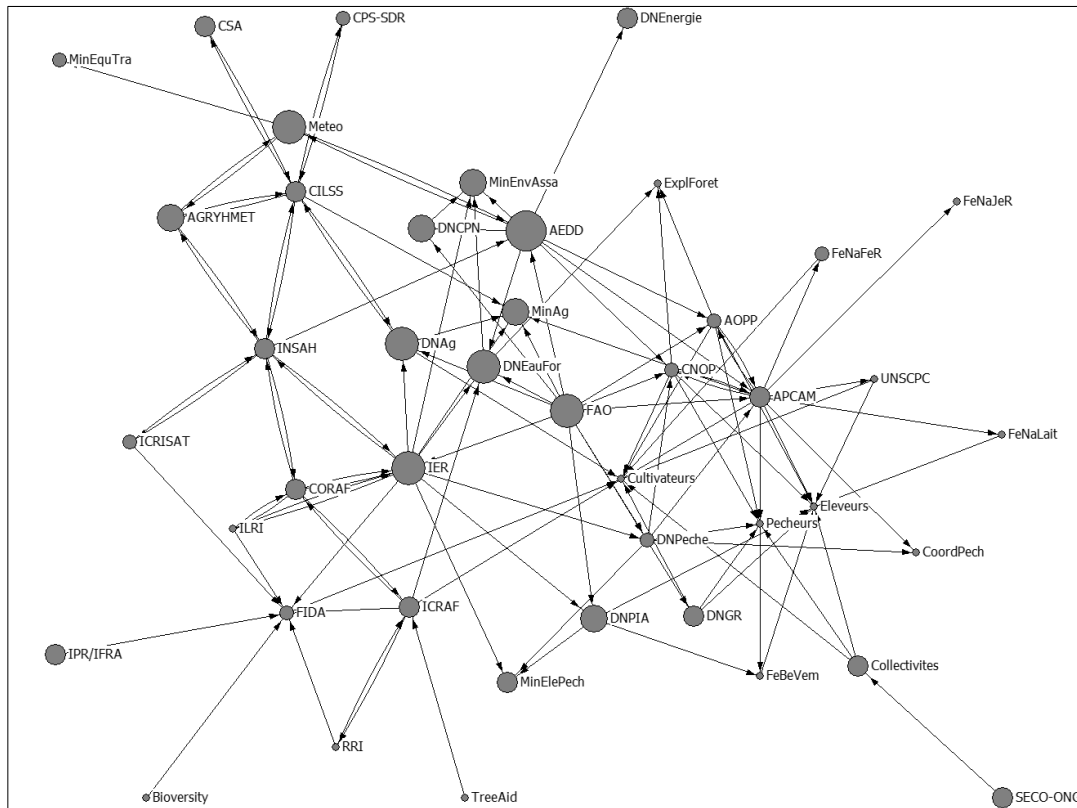

Source: Authors' calculations from Net-Map data.
Note: Actors are sized according to their influence scores. Network Links: Advice = ⟶ ; Funding = ⇢.

Interview participants felt that the advice links were critical to addressing the main purpose of the exercise—to identify important partners with whom to engage on the topic of climate change adaptation policies and programming, and to ensure that the outputs of the Enhancing Assets Project reach the actors in Mali who are capable of putting this information to good use. Therefore, here we examine in more detail the advice network (Figure 5.2). The clustering effect is still evident in the map, where we see that the organizations within each category (government, research, civil society) share the most links with other organizations of the same category. The advice map also reveals the importance of several key institutions that appear to serve as informational bridges between the various clusters, reflected also in the centrality measures described above. For example, IER appears to be the primary conduit between the group of research institutions and the most influential government agencies. Similarly, FAO bridges the gap between government agencies and the Malian civil society organizations.

The clusters of government agencies, research institutes, and civil society organizations are discussed in greater detail below.

Figure 5.2 Mali advice network

Source: Authors' calculations from Net-Map data.
Note: Actors are sized according to their influence scores.

Government Agencies

Interview participants felt that government agencies had the highest degree of influence in the network. Their influence derives from their role in developing and setting national-level policies pertaining to climate change adaptation, in addition to a more practical role of interacting with farmers, pastoralists, forest users, and fishers through the official government extension services. Figure 5.3 presents the network of advice links between all government actors. (Although IER is considered a research institute, it could have been categorized also as a government agency. This hybrid research–government role of IER was a topic of discussion during the Net-Map exercise, and ultimately the group decided to place it in both categories.)

Figure 5.3 Mali network of government actors

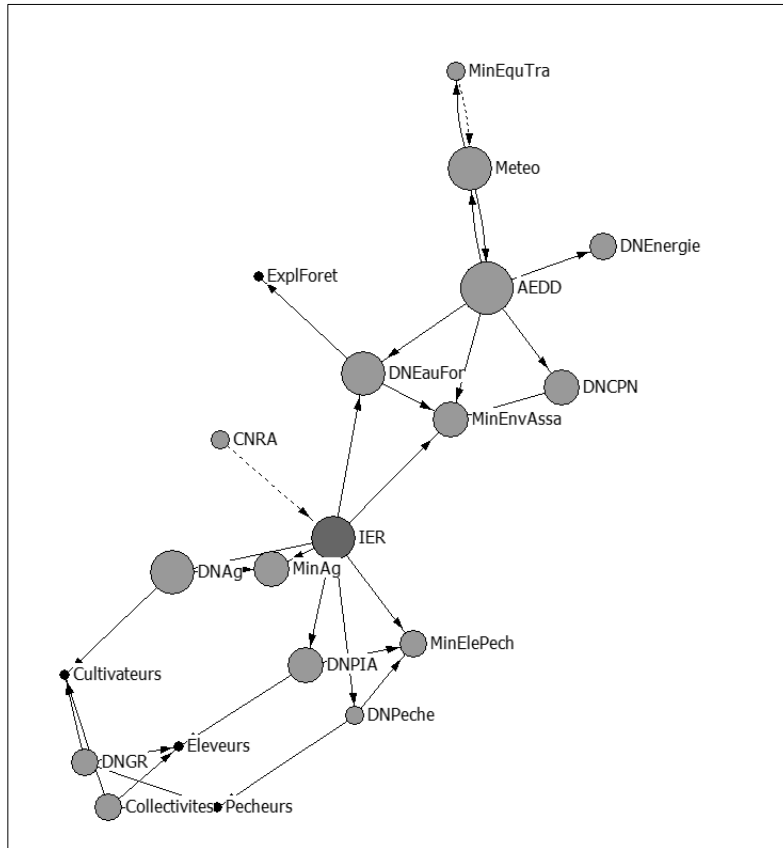
Source: Authors' calculations from Net-Map data.
Note: Actors are sized according to their influence scores. Network Links: Advice = ⟶ ; Funding = ⇢.

Isolating the government actors reveals a more centralized network structure. The important hubs of the cluster appear to be IER and Agence pour L'Environment and Le Développement Durable (AEDD). The Net-Map participants rated both of these organizations as highly influential (AEDD was given the highest influence score of 6; IER was given a score of 5), and this influence is reflected in their centrality in the advice network. Advice tends to flow outward from both of these organizations to other government agencies. Efforts to influence policies related to climate change adaptation in Mali, therefore, would be well targeted to these two organizations.

While AEDD and IER appear to be the most influential organizations with respect to government policy, the map suggests that their influence might be less direct when we consider climate change adaptation activities at the level of the target populations. Neither of those organizations gives advice directly to farmers, pastoralists, forest users, or fishers. Government agencies appear to advise farmers through the National Directorates (Les Directions Nationales) of Agriculture, Resource Management, Industrial Animal Production, Waters and Forests, and Fisheries, and through the regional authorities (les collectivités). It is interesting to note that in addition to being more closely connected with the target groups, the National Directorates were in most cases attributed more influence than their respective line ministries.

Research Organizations

Research organizations are the second most influential group of the three clusters identified above. Again, we include the highly influential IER as a research organization because of its dual identity as a government agency and a research institute. The network of research organizations is characterized by mutual advice links between a core group of organizations with a handful of other organizations that appear to be more peripheral, having no clear advice links to the main research network (Figure 5.4).

Figure 5.4 Malian research network

Source: Authors' calculations from Net-Map data.
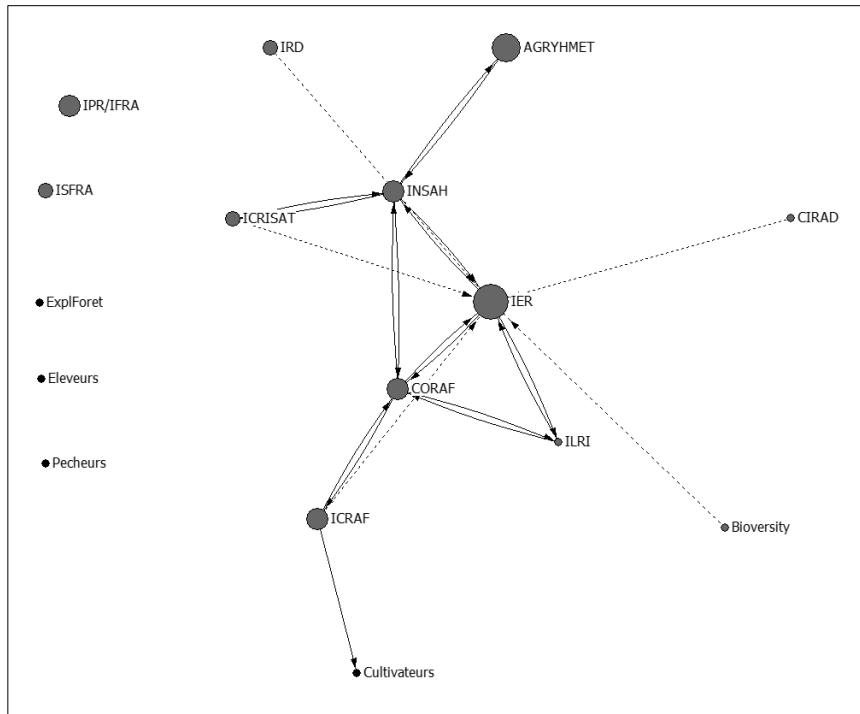Note: Actors are sized according to their influence scores. Network Links: Advice = ⟶ ; Funding = - - - ➤.

When considered together, Figures 5.3 and 5.4 highlight the importance of IER as a bridge between the networks of research organizations and government agencies, which otherwise share very few advice links. IER is highly influential in both networks and serves as a conduit between them. IER is therefore well positioned to serve the interests of both types of organizations. Researchers may use their relationship with IER to achieve a greater impact on the policy discussions happening within government. Government actors may use their relationship with IER to ensure that research in Mali is responding to the needs of policymakers. The map of research organizations in Mali also shows that very little advice flows directly from the research community to the target groups of farmers, pastoralists, forest users, and fishers.

Civil Society Organizations

Malian civil society organizations were not considered to be particularly influential compared with government and research organizations. Nonetheless, they constitute an important cluster of organizations because of their numerous and strong, direct ties to target groups (Figure 5.5). The network of civil society organizations in Mali is strongly centered on the Assemblée Permanente de Chambre del'Agriculture du Mali (APCAM). The cluster of civil society organizations is likely to be an important network for any climate change adaptation efforts that seek to reach farmers, pastoralists, forest users, and fishers; and APCAM would appear to be the obvious national-level entry point for such efforts.

Although not appearing to be connected to the rest of the civil society network, Secrétariat de Concertation des ONG Maliennes (SECO-ONG) was also considered to be an organization with a relatively high degree of influence. The group discussions indicated that SECO-ONG was effective in influencing the regional government authorities (les collectivités), and would also be considered an important national-level organization to engage so as to achieve greater local-level results.

Figure 5.5 Malian civil society network

Source: Authors' calculations from Net-Map data.
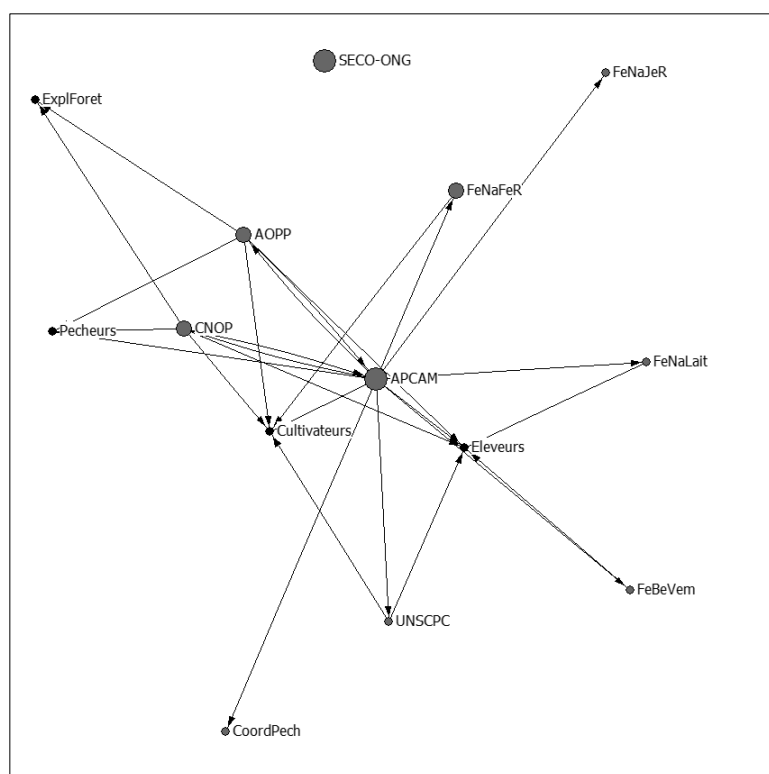Note: Actors are sized according to their influence scores. Network Links: Advice = ——▶ ; Funding = - - -▶.

6. KENYA RESULTS SUMMARY

Participants in the Net-Map workshop identified a large number of organizations working in the area of climate change adaptation. Given the large number of organizations that were identified and the limited time, the workshop focused on categorizing these organizations and identifying the main areas of activity, rather than mapping the linkages between organizations.

Key Ministries in Agriculture and Livestock and the Natural Resource Management Sector

The key ministries and departments working on agriculture and related issues were seen as the most influential of all the actor groups (Figure 6.1). The key ministries included in this grouping are the Ministry of Agriculture, the Ministry of Livestock Development, the Ministry of Water and Irrigation, and the Ministry of Development of Northern Kenya and Arid Lands (MoDNKAL). Their influence score is largely due to their scope and reach throughout the country and to their technical capacity. Interview participants noted that they are involved in dissemination of technologies and information, in capacity building through agricultural extension, and via their highly trained staff stationed throughout the country. The full list of actors in Kenya and their characteristics can be found in Appendix Table A.4.

Figure 6.1 Key ministries in Kenya
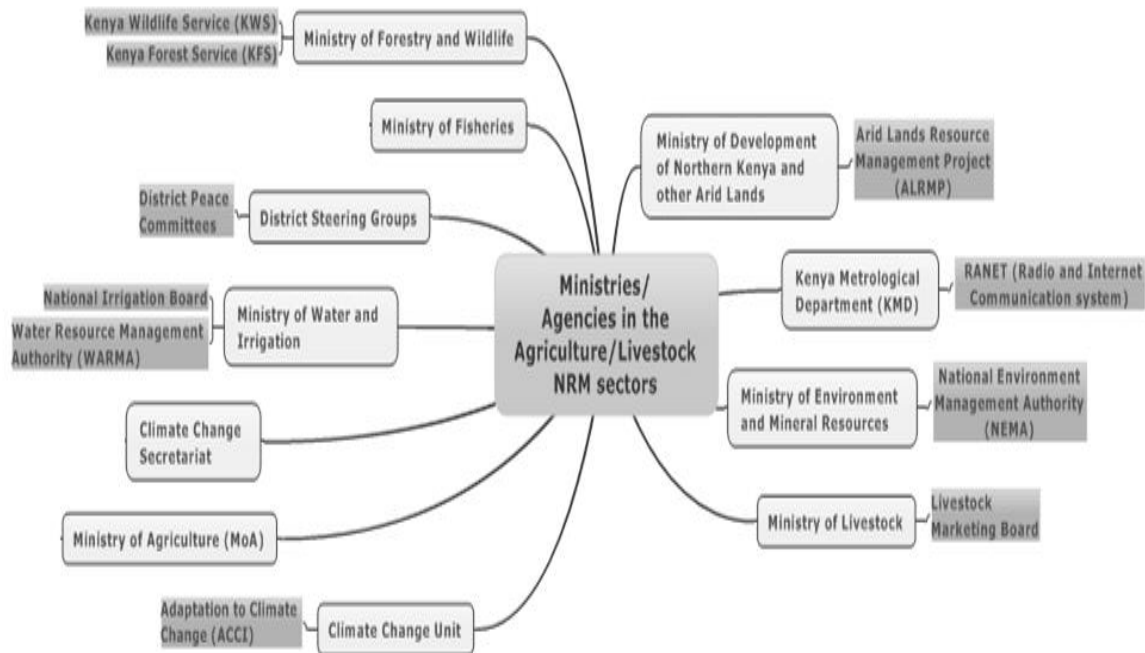
Source: Authors.

Networks

A variety of networks were also mentioned by stakeholders as playing an important role in climate change adaptation (Figure 6.2). Although they were not seen as highly influential, they were described as actively trying to influence policies related to agriculture and climate change in Africa. They also attract funding to support sustainable agriculture to improve well-being. For instance, the Alliance for a Green Revolution in Africa (AGRA) is working with small-scale farmers on increasing agricultural productivity

across the African continent to reduce poverty and hunger. Another network, Africa Adapt, aims to facilitate the flow of climate change adaptation knowledge for sustainable livelihoods between researchers, policymakers, civil society organizations, and communities vulnerable to climate variability and change across the continent. These networks are illustrated in Figure 6.2.

Figure 6.2 Active networks in Kenya
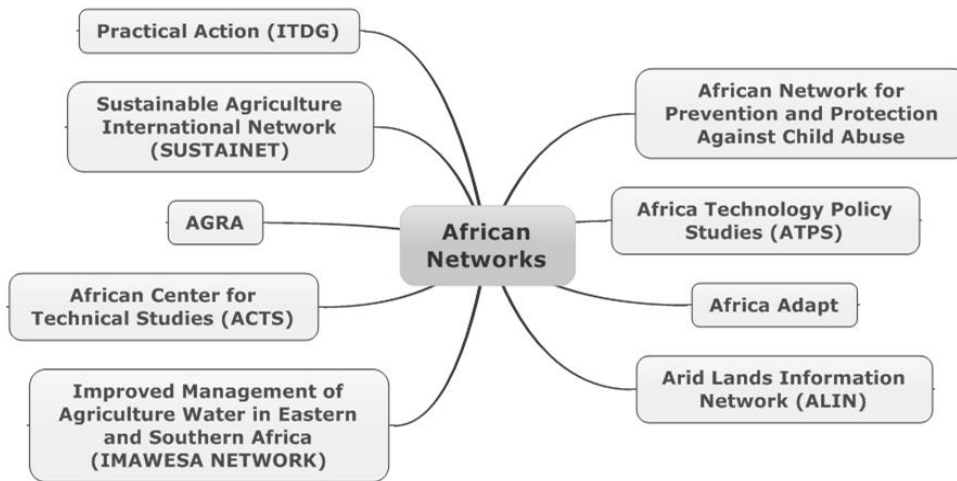
Source: Authors.

Multilateral and Bilateral Organizations

UN organizations are also involved in smallholder adaptation strategies, in particular by funding projects to promote adaptation to climate change among smallholder farmers in Kenya and across the continent. These organizations are involved in research on food security and sustainable natural resource management for sustainable livelihoods. They also fund research and projects aimed at facilitating climate change adaptation among smallholders and pastoralists. These organizations are shown in Figure 6.3.

Figure 6.3 UN and other multilateral organizations in Kenya
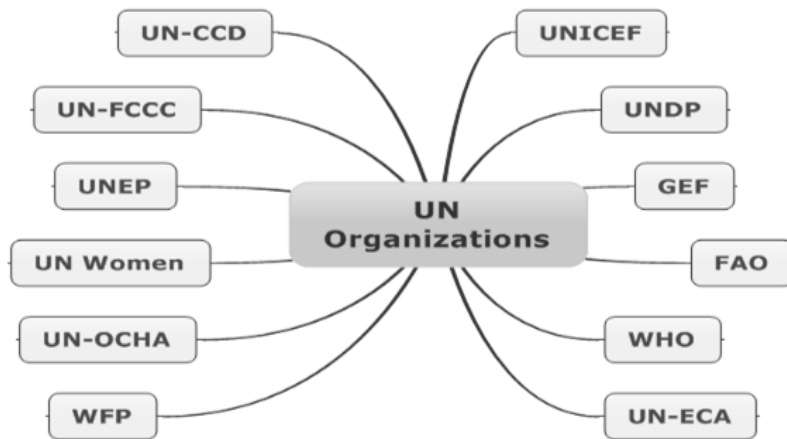
Source: Authors.

Similarly, but with perhaps a smaller scope, bilateral development agencies are mainly involved in funding projects, or funding the government directly, to help smallholder farmers and pastoralists adapt to climate-related shocks and climate change (Figure 6.4).

Both types of organizations are seen as moderately influential, primarily due to their funding activities.

Figure 6.4 Bilateral and donor organizations in Kenya
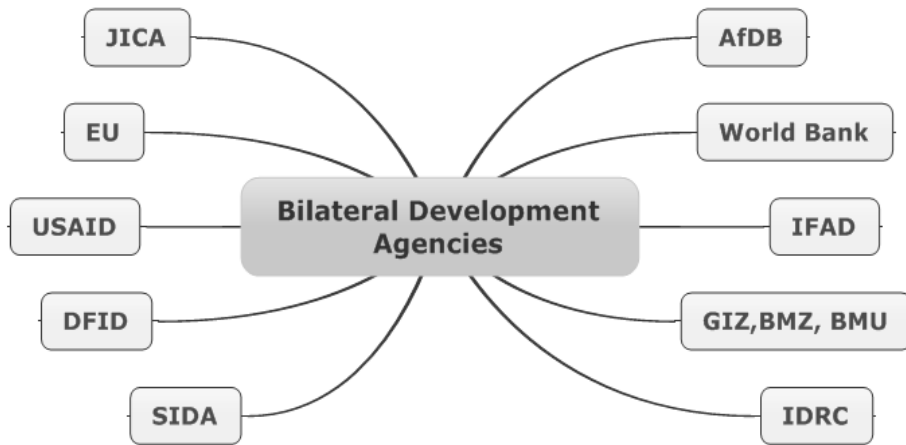
Source: Authors.

Figure 6.5 International and regional implementers in Kenya
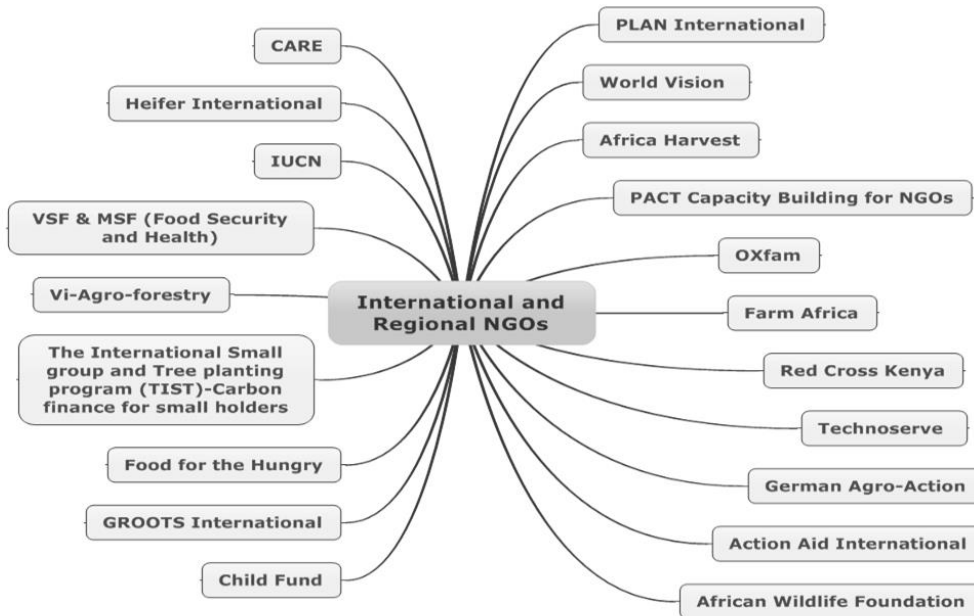
Source: Authors.

Figure 6.6 National implementers in Kenya
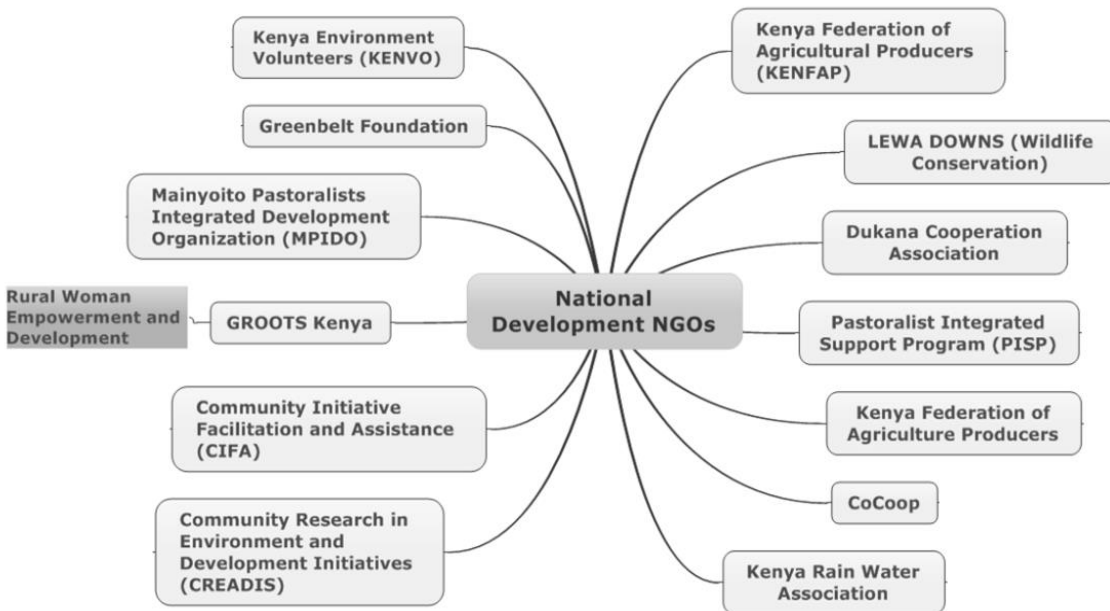
Source: Authors.

International, Regional, and National Implementers

NGOs working on climate change adaptation engage in a variety of activities. Some of these are extension services and training on agriculture and farming practices. They also help farmers and pastoralists develop group-based approaches to risk management and fund projects aimed at improving rural livelihoods. Some interventions include improving water and soil management (Community Research on Environment and Development Initiatives, or CREADIS), addressing women's access to land and control over assets (GROOTS Kenya—Grassroots Organization Operating Together in Sisterhood), development of a warning system for climate information (Community Initiative and Facilitation Assistance, or CIFA), and provision of food-for-assets and other safety-net programs (Kenya Food Security Steering Group, or KFSSG).

These organizations, depicted in Figures 6.5 and 6.6, are seen as highly influential—particularly the international and regional NGOs, which have a broad reach on the ground and also engage with ministries and donors at the national level.

Private Sector

Some private-sector organizations help farmers with risk management (Figure 6.7), including insurance companies like UAP Insurance, Jubilee, and the Syngenta Foundation; and financial institutions, such as Agricultural Finance Corporation (AFC) and the African Development Bank (AfDB). Insurance and banking institutions work with the local communication and information sector, including such companies as Safaricom Limited, to facilitate information dissemination and wildlife monitoring by providing database connectivity where farmers can consult on issues of weather directly. Adaptation to Climate Change and Insurance (ACCI) promotes adaptation to climate change through good agriculture practices for managing agricultural risk, and insurance through weather-based index products. ACCI works with the climate change units under the Ministry of Agriculture and the Ministry of Environment. ACCI also promotes private-sector involvement in agriculture, particularly in value chains for tea and coffee.

Figure 6.7 Private sector in Kenya
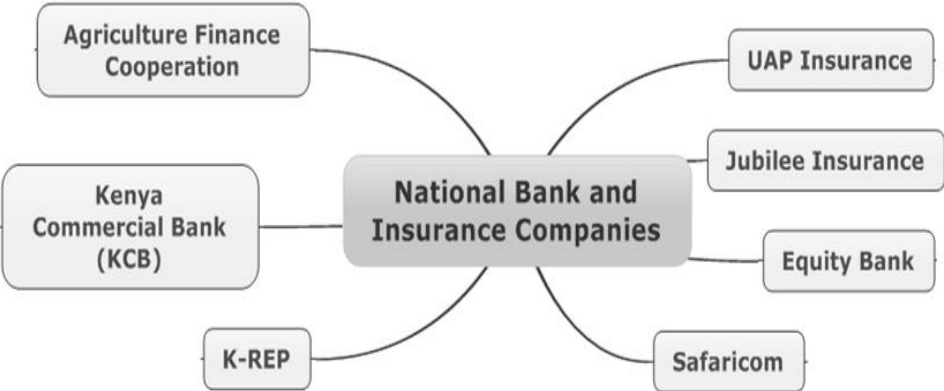
Source: Authors.

7. IMPLICATIONS FOR OUTREACH

The main objective of the stakeholder mapping exercise was to identify key actors engaging in climate change adaptation so as to more effectively target research results in those countries. In addition, these results can be used to assist new projects in identifying potential partners and key opinion leaders. Therefore the following section reflects on the results from the perspective of application in outreach, dissemination, and partnerships.

Ethiopia and Bangladesh have highly centralized networks according to the network data, and government actors in Kenya have the highest power scores, which suggests a similar top-down structure, although network data were not collected there. A high degree of centralization indicates that control over the network flows is concentrated in just a few actors. We can infer from this that the core or central actors in each network are likely the decisionmakers and gatekeepers of information, and as such they should be key partners in any outreach strategy. It was mentioned throughout the interviews that this type of outreach should continue to happen throughout the research process rather than at the end.

The fourth network, in Mali, was less centralized. The presence of a few prominent clusters in that network indicates that rather than reaching out to a single small group of actors, the strategy there should be multipronged to address each of the clusters. This may require different framing of the issue depending on the cluster. In addition, working to improve the connectivity among the clusters could feasibly shift the shape of the entire network to promote better flows of information, innovation, and a more cohesive and vibrant policy community.

Likewise, in Ethiopia and Bangladesh, smaller and less influential clusters were observed. These clusters can be seen as opportunity points for quick dissemination of information within the clusters. Similarly as in the discussion of Mali, if these small clusters have support to grow, vibrancy and cohesiveness could be added to the policy community.

Private-sector actors did not play a prominent role in the discussions, except in Bangladesh and Kenya. Although in Kenya the private-sector actors were providing helpful services to support adaptation, in Bangladesh private-sector entities were seen as acting in opposition to the needs and goals of small farmers and fishers. Whether seen as beneficial or harmful, dissemination of findings in an appropriate format for these audiences could expand their awareness of the issue of adaptation and the particular challenges faced by households in their countries.

Multilateral organizations appeared to play a more influential role in the policy landscapes of Kenya and Bangladesh than in those of Mali and Ethiopia, according to average influence scores. This should be considered when deciding how much to emphasize the public role of these actors in dissemination events or other public consultations. In some contexts the presence and support of these organizations could help leverage government action, but in other contexts a different strategy may be advisable.

Additionally, research organizations in each of the four networks were involved in some clusters in the network. In Mali and Bangladesh these were more dominant clusters. Not only can the particular research organizations specified be targeted for partnerships or for dissemination of results, but the fact that they are part of clusters indicates that information will likely spread quickly from them throughout their clusters.

To make use of these networks to inform future research and outreach on climate change adaptation in these four countries, both the structure of the network and various actor characteristics are important to consider. Actors with the highest degree of centrality have a high amount of control of the information flows in the network. For those countries described above as having highly centralized networks (Ethiopia and Bangladesh), engagement with the highly central actors is particularly important. Often the most central actors are the most powerful, but sometimes an actor may be less accessible in the network but still seen as an influential actor that should be considered important in the policy landscape. In addition, actors with high betweenness centrality—the actors that most often lie in the shortest path between any two other actors—also indicates a high amount of control of information flows, in addition

to the ability to play a liaison or intermediary role. Finally, actors with a high closeness centrality—those who would most quickly be able to reach everyone else in the network—are important for the spread of information. Thus these four measures are considered in choosing the key actors in each of the three countries for which we had network data: Ethiopia, Bangladesh, and Mali. In Kenya, where detailed network data were not collected, we have inferred the central actors from the qualitative data collected and influence scores.

The key actors in adaptation policy are as follows:

- Ethiopia: MoARD, EPA, NMA
- Bangladesh: United States Agency for International Development (USAID), MoFDM, FAO, DAE, Practical Action
- Mali: IER, AEDD, APCAM, FAO, INSAH
- Kenya: Africa Adapt, MoA, MoDNKAL

8. DISCUSSION

While some limitations exist in comparing results across countries, as described above, the exercise does yield some interesting contrasts. Both Ethiopia and Bangladesh have similarly centralized networks with key government agencies at the hub. Although we do not have network data for Kenya, the high influence and the prominent role of its key government agencies suggest a similar structure to the network. However, we find a dissimilar picture in Mali, with three distinct hubs (or clusters or actors), namely, government, research, and civil society.

Looking more deeply into the network structure, we see that the perceived distribution of power across the countries varies. For instance, in Ethiopia, Bangladesh, and Kenya the high-level government actors are the most influential—the prime minister in Ethiopia, the Ministry of Food and Disaster Management in Bangladesh, and the relevant ministries in Kenya. Mali, however, is distinct in that the highest influence is not seen in the central body but in the lower-level National Directorate du Agriculture, indicating once again a less centralized and hierarchical network.

Bangladesh and Mali both have a single, powerful multilateral organization playing a key role in the network. In Mali this is the FAO and in Bangladesh this is USAID. In Ethiopia and Kenya, on the other hand, the multilaterals are seen as less influential, presumably due to stronger, central government agencies.

All four case-study countries appear to have relatively dynamic civil society and nongovernmental actors engaging in climate change adaptation. The implementation and project activities described in all four countries were numerous. Furthermore, civil society organizations were active in linking the voices of target groups to NGOs and even decisionmakers. However, across all the countries were calls for more of this connectivity, indicating that the current level of engagement with target groups is insufficient for addressing these complex, interlinked issues. Furthermore, other calls were for better coordination among the many actors implementing programs on climate change adaptation so as to more efficiently and effectively address the challenges.

APPENDIX: SUPPLEMENTARY TABLES

Table A.1 Ethiopia: Complete actor list, acronyms, and actor characteristics

Actor	Acronym	Influence	Category	Activities as described by group
Addis Ababa University	AAUniv	2	Research	University has Climate Change Center, hosts Horn of Africa. Current plan to establish a center that produces documents on climate change issues, sponsor masters and PhD students on these issues.
African Development Bank	AfDB	2	Multi-/bilateral	Involved in climate adaptation via funding of IGAD. IGAD is working on transboundary natural resource management.
Canadian International Development Agency	CIDA		Multi-/bilateral	Funding. Working on "development."
Civil Society Network on Climate Change	Network on CC	2	Civil society	Has 10 thematic areas on climate change. Each thematic area has a leading organization. Highly involved in negotiation and policy issues. Not a practitioner at the ground level, but a network. Under Forum for Environment.
Cooperative for Assistance and Relief Everywhere	CARE	3	International nongovernmental organization	
CordAid	Catholic Organization for Relief and Development	2	International nongovernmental organization	Risk management: disaster prevention and preparedness. Development activities. Conflict management and peace building. Emergency relief.
Enhancing Pastoralist Research and Development Alternatives (EPaRDA)	EPaRDA	2	Civil society	Integrated pastoral development. Livestock health, products, and productivity. Gender, focusing on single-household poor women. Human health. Pilot rangeland management. Peace building and conflict management. Health insurance. Cross-border issues.
Ethiopian Development Research Institute	EDRI	2	Government	Research includes work on climate adaptation, has influence via close access to prime minister.
Ethiopian Economic Association/Ethiopian Economic Policy Research Institute	EEA/EEPRI	2	Research	Climate is one of their thematic areas. Work on climate change (CC) and livelihoods. Organize forums and conferences for discussions. Publish and distribute papers. Collaborates with Addis Ababa University, but no specific links were mentioned.

Table A.1 Continued

Actor	Acronym	Influence	Category	Activities as described by group
Ethiopian Environmental Protection Authority	EPA	6	Government	Oversees all environmental protection activities, including climate change. Also relevant to intergovernmental negotiations. Under Ministry of Natural Resources Development and Environmental Protection (MNRD&EP)
Ethiopian Institute of Agricultural Research	EIAR	5	Research	Government agency: Given a mandate to conduct agricultural research all over the country. Generating different agricultural technologies suited for climate change adaptation practices. Connects many of the universities. Influential through provision of technology and information, direct advice to Ministry of Agriculture.
Ethiopian Ministry of Agriculture and Rural Development	MoARD	6	Government	Most important government agency for reaching farmers. Has four directorates of which Disaster Prevention and Preparedness Agency (DPPA) is most important for climate adaptation. Also makes direct transfers to farmers and pastoralists via Productive Safety Net Program (PSNP). They're the main vehicle for government policy. Extension service, other policies go through them.
European Union	EU	4	Multi-/bilateral	ID'd as overall most important donor. Funding many activities directly and indirectly. Also a funder of IGAD. Highly involved in energy issues.
FarmAfrica	FarmAfrica	2	International nongovernmental organization	Mitigating damage of invasive *Prosopis*. Introducing ways and means to get some products from *Prosopis*.
Food and Agricultural Organization of the United Nations	FAO	4	Multi-/bilateral	FAO is notably working in pastoralist areas. Their work involves assisting communities to adopt new technologies, providing seeds, agricultural inputs, and food. Gives advice to MoA on policy, technical advice.
Forum for Environment	ForumEnvironment	3	Civil society	Advocacy and lobbying on environmental issues.
Forum for Social Studies	ForumSocStud	2	Civil society	Social studies research.
Gesellschaft für Internationale Zusammenarbeit	GIZ	4	Multi-/bilateral	Funds many activities. Working on fuel-efficient stoves. Involved in sustainable land management. Technologies and inputs for farmers.

Actor	Acronym	Influence	Category	Activities as described by group
Haromaya University		2	Research	Has a department on CC and agriculture. Active on pastoral areas.
Horn of Africa Regional Environment Centre and Network	Horn of Africa	3	Civil society	Network of environmental NGOs and higher learning institutions, hosted at Addis Ababa University. Have climate change and horn re-greening activities, renewable energy, park and buffer zone management, and environmental governance.
Institute for Biodiversity Conservation	IBC	0	Government	Gene banks. Biodiversity conservation. Within Ministry of Agriculture.
Inter-Governmental Authority on Development		1	International nongovernmental organization	Working on trans-boundary natural resource management.
International Fund for Agricultural Development	IFAD	3	Multi-/bilateral	Involved in microfinance. Working on (funding) Pastoralist Community Development Project (see Ministry of Federal Affairs).
Large-Scale Agricultural Investors	Ag investors	4	Private	This is *negative* influence on climate change adaptation. These are land grabbers, enclosing common land, restricting areas for grazing. Government is contributing to this by allowing access to the land.
Media	Media	3	Media	Government and private media, used as a tool to advise farmers and pastoralists.
Mekele University		2	Research	Does arid land research.
Ministry of Federal Affairs	MoFedAffairs	5	Government	Notable for running the Pastoral Community Development Project (PCDP), funded by World Bank and IFAD (maybe others). Their approval always necessary on pastoral issues. Also, they are responsible for the four emerging regions (sensitive area).
Ministry of Water and Energy	MoWater	3	Government	Dam construction, irrigation. Always involved in downstream issues with respect to these activities.
National Meteorological Agency	NMA	4	Government	Important as a source of primary data related to climate change.
Norwegian Church Aid	NorChurchAid	3	International nongovernmental organization	Funds Civil Society Network on CC.
Oxfam America	OxfamAm	3	International nongovernmental organization	

Table A.1 Continued

Actor	Acronym	Influence	Category	Activities as described by group
Oxfam Great Britain	Oxfam GB	3	International nongovernmental organization	Risk management: disaster prevention and preparedness. They're active in civil society network in climate change. Development activities targeting both pastoralists and farmers. Conflict mitigation, especially with pastoralists. Emergency interventions.
Pastoral Forum Ethiopia	PastoralForum	3	Civil society	Strong in advocacy
Pastoral Standing Committee in Parliament	PastoralComm	4	Government	Relevant parliamentary committee on pastoral issues. Have to approve everything.
Prime Minster	PM	8	Government	Prime minister himself is a big advocate on climate change issues.
Regional Elders Council	Elders_council	2	Civil society	Part of the traditional hierarchy. Establishing elders' councils at regional levels. Entirely made up of elders from the grassroots level. Goal is to come up with a unified national elders' council. Meet every January 25 with the PM. Meet frequently with the Parliamentary Standing Committee.
Save the Children—United States	SAVE US	3	International nongovernmental organization	SAVE-US was described as doing "development interventions," especially those related to food security and capacity building in local communities. Also involved in district-level policy formation and awareness raising.
Save the Children-UK	SAVE UK	2	International nongovernmental organization	SAVE-UK was described as doing similar work as FAO and WFP. They are more focused on targeting vulnerable groups (such as women and children). Help to minimize migration. Also promote agricultural technologies and inputs.
Sustainable Land Use Forum	SLUF	3	Civil society	Trainings and assessments. An umbrella organization with a lot of members. Notable for vetiver grass promotion.
Swedish International Development Agency	SIDA	1	Multi-/bilateral	Supporting the government bilaterally, but not implementing.
UK Department for International Development	DFID	4	Multi-/bilateral	Funding studies, including one important one on resource mapping. Also involved in institutional building for climate change adaptation.

Table A.1 Continued

Actor	Acronym	Influence	Category	Activities as described by group
United Nations Development Programme	UNDP	4	Multi-/bilateral	Policy and advocacy on environmental issues. Also involved in rangeland management. Role is more in oversight than implementation.
United Nations Environment Programme	UNEP	4	Multi-/bilateral	Policy and advocacy on environmental issues including climate change. Work on sustainable rangeland management.
United States Agency for International Development	USAID	4	Multi-/bilateral	Comparable to EU. Funding "everything."
Various embassies	Embassies	2	Multi-/bilateral	There appears to be some direct funding from embassies to in-country projects (unclear).
World Bank	WB	4	Multi-/bilateral	Working with Ministry of Agriculture. They are doing a lot, have allocated a lot of funds, for issues related to adaptation. Also working with Ministry of Federal Affairs by funding PCDP.
World Food Programme	WFP	4	Multi-/bilateral	WFP's work involves assisting communities to adopt new technologies, providing seeds, agricultural inputs, and food. Involved in preparedness and early warning issues.

Source: Author's compilation.

Table A.2 Bangladesh: Complete actor list, acronyms, and actor characteristics

Full Name	Actor	Influence	Category	Notes
Asian Development Bank	ADB	3	Multi/bilateral	Has completed capacity development on climate change with several ministries and NGOs. Is also working on developing crops better suited to climate change conditions.
Australian Government Overseas Aid Program	AusAid	3	Multi/bilateral	Mentioned in the discussion, but was not identified as an actor.
Bangladesh Agricultural Development Corporation	BADC	NA	Government	BADC does research on multiplying the saline-resistant crops/seeds, fertilizers, irrigation and soil resources. Involved in climate change (CC) adaptation through research.
Bangladesh Agricultural Research Institute	BARI	NA	Research	Involved in CC adaptation through research.
Bangladesh Center for Advanced Studies	BCAS	NA	Research	BCAS is working with government officials and policymakers for developing and identifying criteria to distinguish between projects that are on CC adaptation. Projects that provide climatic information like rainfall, drought, flood, and salinity can be identified as adaptation projects. BCAS is very involved in a network of research called Action Research on Community-based Adaptation Project— ARCAP, involving international NGOs, national institutions, academic institutes, regional-level and other international-level organizations. This has some influence at the policy level. BCAS is coordinating another forum called Climate Change Development Forum. BCAS is feeding the learning process worldwide.
Bangladesh Fisheries Research Institute	BFRI	NA	Research	
Bangladesh Institute of Development Studies	BIDS	NA	Research	No significant direct research or influence on climate change, but as a significant research institute of Bangladesh, may play some role in the future.
Bangladesh Institute of Nuclear Agriculture	BINA	NA	Research	A network of different research organizations.
Bangladesh Livestock Research Institute	BLRI	NA	Research	
Bill and Melinda Gates Foundation	BMGF	NA	Multi/bilateral	

Table A.2 Continued

Full Name	Actor	Influence	Category	Notes
Bangladesh Rural Advancement Committee	BRAC	5	Nongovernmental organizations	Has several projects on capacity building at the root level involving village people, climate change adaptation approaches involving the community, and establishing early warning systems. Implementing three or four new approaches with real-time information. They have 47 climate-resilient houses and cyclone centers in one of the most vulnerable areas of Bangladesh. Salinity erosion and emergency assistance in cases of climactic crises, desalination plant, and others are also some of the foci. Highly influential actor.
Bangladesh Rice Research Institute	BRRI	NA	Research	Not yet a significant actor.
Bangladesh University of Engineering Technology	BUET	NA	Research	Provides technical advice in some instances, but not a consistent participant or actor in CC adaptation.
Bangladesh Water Development Board	BWDB	3/–5	Government	They give early warning information about floods. They are influential but are seen as corrupt so are also seen as having negative influence. There are some complaints from the poor communities about badly made embankments.
CARE Bangladesh	CARE	4	Nongovernmental organizations	Climate Vulnerability and Capacity Assessment Tool—developed by CARE. Impact on community level, rainfall variability, food security, and migration linked with CC. Saline-tolerant crops and raised awareness at the community level.
Center for Environmental and Geographic Information Services	CEGIS	NA	Research	
Canadian International Development Agency	CIDA	2	Multi/bilateral	Has been mentioned by the participants as a source of funding for research/projects on CC adaptation, but their exact role or contribution was unclear.

Table A.2 Continued

Full Name	Actor	Influence	Category	Notes
	Civil society			Not yet a strong or influential actor as there is no single group that can be the representative of civil society in Bangladesh. Some organizations voice concern about CC and wetlands, but this is not organized.
Department of Agriculture Extension	DAE	7	Government	DAE disseminates the generated knowledge. DAE is not doing the research. They give advice to farmers on drought-and saline-tolerant crops and water management systems. They are one of the few government bodies with a very high capacity (many people working directly with farmers).
Department of Agricultural Marketing	DAM	NA	Government	
Danish International Development Agency	DANIDA	4	Multi/bilateral	They put a lot of funding into climate change work in Bangladesh.
Department for International Development	DFID	6	Multi/bilateral	They put a lot of funding into climate change work in Bangladesh. They also have impact on policy dialogue.
Directorate of Livestock Services	DLS	4	Government	Potentially strong actor, but their involvement is not extensive yet.
Disaster Management Bureau	DMB	6	Government	Influence in local areas due to work similar to the CDMP.
Department of Fisheries	DOF	3	Government	Potentially strong actor, but their involvement is not extensive yet.
Department of Public Health Engineering	DPHE	NA	Government	DPHE has lots of work related to safe water tubewells, salinity, arsenic problem, and so forth.
European Union	EU	6	Multi/bilateral	Mentioned to be the source of funding to many organizations, but was not specified to whom.
Food and Agriculture Organization	FAO	3	Multi/bilateral	FAO's role in funding and developing agricultural technology is related to climate change adaptation. They work with DAE and NARS. Some of their projects involve coastal fishermen for strengthening capacity and empowerment.

Table A.2 Continued

Full Name	Actor	Influence	Category	Notes
Farmers	Farmers	NA		Approached and somewhat included by some organizations like BRAC, FAO, Practical Action, Water Aid, and so forth but not to any significant amount. Should be considered seriously for any CC adaptation measures.
Fishers	Fishers	NA		Approached and somewhat included by some organizations like BRAC, FAO, Practical Action, Water Aid, and so forth but not to any significant amount. Should be considered seriously for any CC adaptation measures.
International Rice Research Institute	IRRI	NA	Research	Mentioned as potential actor, but does not have much emphasis on CC as of yet.
International Union for Conservation of Nature	IUCN	NA	Research	
Institute of Water Modeling	IWM	NA	Research	Has strong capability in research, potentially strong actor for advice and CC predictability.
Local Government and Engineering Department	LGED	5/–4	Government	They are a very influential organization in terms of developing infrastructure in rural areas and have plenty of manpower and expertise on climate change adaptation. They also have good connections with highly powerful political leaders, so perceptions of corruption give them negative influence.
Various local NGOs	LocalNGOs	NA	Nongovernmental organizations	NGOs in general are seen as potential actors in influencing CC adaptation practices as they have good grassroots-level networks.
Ministry of Agriculture	MoA	7	Government	They are the policymakers for the activities that DEA implements in support of farmers.
Ministry of Environment and Forests	MoEF	5	Government	The ministry itself is not so relevant for climate change adaptation. The key body within the ministry is the Department of Environment. They do not have sufficient manpower.
Ministry of Food and Disaster Management	MoFDM	7	Government	Within the ministry, the CDMP (The Comprehensive Disaster Management Program, Phase II) has a strong network working on climate change adaptation.

Table A.2 Continued

Full Name	Actor	Influence	Category	Notes
Ministry of Fisheries and Livestock	MoFL	4	Government	While they have policies relevant to climate change adaptation, they have very little manpower and so are not seen as highly influential.
Ministry of Water Resources	MoWater	6	Government	It is dependent on Water Board and WARPO, but separately they are influential in terms of policies.
Norwegian Embassy	NorwegianEmb	NA	Multi/bilateral	Not so relevant/important.
Practical Action	PracticalAction	4	Nongovernmental organizations	Although Practical Action is technology based, they do research too. Working on climate change issues since 2001. Practical Action is implementing projects that directly engage farmers and fishers, sometimes through local NGOs, with components on agriculture, aquaculture, and biodiversity.
Soil Resource Development Institute	SRDI	NA	Research	
United Nations Development Programme	UNDP	6	Multi/bilateral	
Union Council	Union Council	NA	Local government	Potentially an influential actor as government funds are usually disbursed through union and upazilla councils and these local government bodies are likely to have the capacity to reach and include local community people in awareness building and program implementation regarding CC adaptation. Union Council Chairman is elected and is highly influential in the locality.
United Nations Women	UNWomen	NA	Multi/bilateral	Not so relevant/important.
Upazilla Council	Upazilla Council	NA	Local government	High potential to significantly contribute in CC adaptation processes and CC-related projects. Would benefit from more intervention in human capacity development from the government, but already has some capacity in reaching and involving local farmers and fishermen in the upazillas. The government projects usually have to include the upazilla chairman for implementation, fund allocation, and other logistical services. Upazilla chairman is elected and is highly influential in the locality.

Table A.2 Continued

Full Name	Actor	Influence	Category	Notes
United States Agency for International Development	USAID	7	Multi/bilateral	Provides funding for projects on CC to other organizations and NGOs.
Water Aid	WaterAid	NA	Nongovernmental organizations	Conduct information studies—hot spots of scarce water, approach of CC adaptation—started four projects, trying to engage the local government. They are at an early phase of dealing with climate change. Conducting several studies for identifying hot spots in terms of scarcity of water. Several locations in coastal areas and char areas. Attempting to come up with bottom-up approaches and strategies of climate change involving local government and community people. Some climate-resilient technology is being researched.
World Health Organization	WHO	NA	Multi/bilateral	
World Bank	WorldBank	NA		Briefly mentioned in the discussion, but participants had the opinion that it is not yet an actor in CC adaptation.
WorldFish	WorldFish	NA	Research	Has several projects on CC and food security but yet to emphasize more on those issues.

Source: Author's compilation.

Table A.3 Mali: Complete actor list, acronyms, and actor characteristics

Actor	Map Abbreviation	Influence	Category
Agence Française de Dévelopment	AFD	3	Development partner
African Development Bank	BAD (AfDB)	3	Development partner
Agence pour L'Environment and Le Développement Durable	AEDD	6	Government
Alliance for a Green Revolution in Africa	AGRA	3	Development partner
Agrometeorology Hydrology Meteorology	AGRYHMET	4	Research
Assemble Permanente de Chambre Agriculture du Mali	APCAM	3	Civil society
Association des Organisation Paysannes	AOPP	2	Civil society
Bioversity International	Bioversity	1	Research
Cellule de Planification Statistique-Secteur de Développement Rurale	CPS-SDR	2	Government
Canadian International Development Agency	CIDA	4	Development partner
Centre de Coopération Internationale en Recherche Agronomique pour le Développement	CIRAD	1	Research
Comité National de la Recherche Agronomique	CNRA	2	Government
Commission Nationale des Organisations Paysannes	CNOP	2	Civil society
Conseil Ouest et Centre Africain pour la Recherche et le Developpement Agricoles	CORAF	3	Research
Conseille Supérieur de l'Agriculture	CSA	3	Government
Coordination of Fishers	CoordPech	1	Civil society
Coopération Technique Belge	CTB	3	Development partner
Direction National du Contrôle de la pollution et des nuisances	DNCPN	4	Government
Direction National de la Météorologie	Meteo	5	Government
Direction nationale de la production Industrielle Animale	DNPIA	4	Government

Table A.3 Continued

Actor	Map Abbreviation	Influence	Category
European Union	UE	3	Development partner
Food and Agriculture Organization of the United Nations	FAO	5	Development partner
Fédération des Bétail et Viande	FeBeVem	1	Civil society
Fédération Nationale des Femmes Rurales	FeNaFeR	2	Civil society
Federation Nationale des Jeunes Rureaux	FeNaJeR	1	Civil society
Fédération Nationale des producteurs du lait	FeNaLait	1	Civil society
Gesellschaft für Internationale Zusammenarbeit	GIZ	4	Development partner
Government of Finland	Finland	1	Development partner
International Crops Research Institute for the Semi-Arid-Tropics	ICRISAT	2	Research
Institut de recherche pour le développement	IRD	2	Research
Institut d'Economie Rurale	IER	5	Research and government
Institut du Sahel	INSAH	3	Research
Institut Polytechnique Rural/Institut pour la Formation et Recherche Appliquée	IPR/IFRA	3	Research
Institut Superieur de Formation Recherche Appliquee	ISFRA	2	Research
International Fund for Agricultural Development	FIDA	2	Development partner
International Livestock Research Institute	ILRI	1	Research
Millennium Challenge Account	MCA	2	Government
Ministère de L'équipement et le transport	MinEquTra	2	Government
Ministry of Agriculture	MinAg	4	Government
Ministry of Energy and Water	MinEneEau	2	Government

Table A.3 Continued

Actor	Map Abbreviation	Influence	Category
Ministry of Environment and Sanitation	MinEnvAssa	4	Government
Ministry of Livestock and Fisheries	MinElePech	3	Government
National Directorate of Agriculture	DNAg	5	Government
National Directorate of Energy	DNEnergie	3	Government
National Directorate of Fisheries	DNPeche	2	Government
National Directorate of Hydrology	DNHydro	3	Government
National Directorate of Resource Management	DNGR	3	Government
National Directorate of Waters and Forests	DNEauFor	5	Government
NORAGRI	NORAGRI	3	Development partner
Office du Niger	OffNiger	2	Government
Pastoralists	Eleveurs		Civil society
Permanent Interstate Committee for Drought Control in the Sahel	CILSS	3	Development partner
Regional Authorities	Collectivites	3	Government
Rights and Resources Initiative	RRI	1	International NGO
Secretariat de Coordination des ONG	SECO-ONG	3	Civil Society
Swedish International Development Cooperation Agency (Sweden)	ASDI	4	Development partner
Tree Aid	TreeAid	1	International NGO
Union Nationale des Societes Cooperatives Producteurs de Coton	UNSCPC	1	Civil society
United Nations Development Programme	PNUD	4	Development partner
United Nations Environment Programme	PNUE	3	Development partner

Table A.3 Continued

Actor	Map Abbreviation	Influence	Category
United States Agency for International Development	USAID	4	Development partner
World Agroforestry Center	ICRAF	3	Research
World Bank	BanqueMond	1	Development partner

Source: Author's compilation.

Table A.4 Kenya: Actor groups and characteristics

Classification of organization dealing with climate change	Influence	Explanation for influence scores
Key ministries and departments: Ministry of Agriculture (MoA), Ministry of Water, Kenya Metrological Department (KMD), Kenya Forest Service, Ministry of Fisheries, Ministry of Livestock. These are under agricultural sector and grouped together because is difficult to separate them.	8	Involved in technologies and information dissemination. Involved in capacity building through extension. They have well-laid structure on the ground with trained staff/technical capacity. They have infrastructure from top to bottom. They are countrywide. They have necessary resources such as staff. NGOs mostly use the government staff and thus it has the highest score because they have service provider.
International and regional NGOs (Oxfam, Farm Africa, PLAN, VSF, Vi-Agroforesty)	7	They derive their services through local and national NGOs and through themselves. They also work with ministries and major player in funding developmental projects.
National development NGOs: Kenya Environment Volunteers (KENVO), Kenya Federation of Agriculture Producers (KFAP), Kenya Rainwater Association (KRA), Grassroots Organizations Operating Together in Sisterhood (GROOTS Kenya), and others	6	Their coverage is wider. Faith-based organization may fund NGOs, but participants stated there are synergies between NGOs and faith-based organizations.
Religious-based organizations	5 or 6	While their original mandate is religious, they also help communities with disaster management. Their coverage is narrower. However, they are very active in pastoral communities.
Bilateral development agencies: Japan International Cooperation Agency (JICA), Swedish International Development Cooperation Agency (SIDA), Alliance for a Green Revolution in Africa (AGRA), or international financial organization	5	These organizations fund projects directly, especially natural resource programs.
UN Organizations: World Bank (WB), Food and Agriculture Organization (FAO), United Nations Development Programme (UNDP), World Food Programme (WFP)	4	They directly fund most climate change projects. They are "money bags."
National agricultural research organizations: Kenya Agricultural Research Institute (KARI), (FEPRI), or University-Egerton, Kenyatta, Nairobi universities	3	Influence is more academic. They do field trials and experiments and leave the dissemination of technologies to ministries such as MoA. They do more research with less extension.
Local administration (elders, local government structures, and others)	3	They mobilize communities and pass along development and climate information to farmers, including downscaled weather forecasts. The level of entry is good and information trickles to the people. While some are rigid to change or negative at times, stakeholders admitted they can't do without them because they are in touch with community and act as the voice of community members.
African Network: Alliance for a Green Revolution in Africa(AGRA), Africa Adapt (AFPS)	2	They focus on regional/continental strategy formulation and capacity building of policymakers and implementers. For instance AGRA is very active in influencing policies related to agriculture and climate change. They are also spearheading sourcing of funds and providing grants to implement activities that would improve climate change resilience.

Table A.4 Continued

Classification of organization dealing with climate change	Influence	Explanation for influence scores
International research organizations: International Livestock Research Institute (ILRI), International Centre for Research in Agroforestry/ World Agroforestry Centre (ICRAF), International Centre for Tropical Agriculture (CIAT), International Potato Centre (CIP)	2	They conduct research in collaboration with national research organizations, such as KARI. They have more funding.
Ministries of Social Affairs (Ministry of Health, Gender, Education, Medical Services)	2	They have indirect influence and support key ministries. They offer services that benefit all, such as health services.
International organization (Bill gates, Rockefeller	2	They provide financial support to NGOs and government.
Media (local/ international	2	They are raising awareness of climate change adaptation.
Related ministries (ministries of planning, energy, special programs, regional development)	2	They support Kenya ministries in their services.
Parliament	1	Mandate is policy formulation. Not active on climate change, apart from political messages during times of disaster. However, could be a very powerful institution if well engaged.
Coordinating bodies: Council for Christian Colleges and Universities (CCCU), climate change coordinating group	1	They formulate policy and coordinate climate change activities but their influence is very low.
International private companies (Coca Cola, Syngenta)	1	No direct contact with the farmers.
Africa Organization: International Fund for Agriculture Development (IFAD), New Partnership for Africa's Development (NEPAD), Common Market for Eastern and Southern Africa (COMESA)	1	They take time to develop policy and influence it with very minimal efforts aimed at implementation. They do "more talking." However, they are funding projects on climate change adaptation.
Training and research organizations: Center for Training and Integrated Research in ASAL Development (CETRAD), Kenya Institute of Organic Farming(KIOF), Kenya networks	1	They don't go out to look for clients directly.
National banks and insurance companies, for example, Equity bank, K-REP, UAP, Jubilee	1	They are business oriented and focus on making profit, but they have potential.
Office of Prime Minister: Climate Change Coordination Unit	0	Scored very low because of many intermediaries. For instance, a policy may be passed today and take three or more years to reach the ground.

Source: Author's compilation.

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