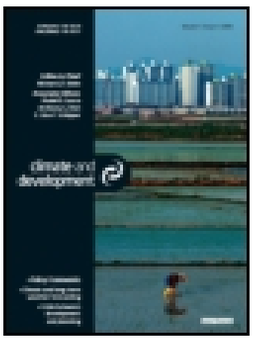

Taylor & Francis
Taylor & Francis Group

Climate and Development

ISSN: 1756-5529 (Print) 1756-5537 (Online) Journal homepage: http://www.tandfonline.com/loi/tcld20

Power and influence mapping in Ghana's agricultural adaptation policy regime

Chase A. Sova, Thomas F. Thornton, Robert Zougmore, Ariella Helfgott & Abrar S. Chaudhury

To cite this article: Chase A. Sova, Thomas F. Thornton, Robert Zougmore, Ariella Helfgott & Abrar S. Chaudhury (2016): Power and influence mapping in Ghana's agricultural adaptation policy regime, Climate and Development, DOI: 10.1080/17565529.2016.1154450

To link to this article: http://dx.doi.org/10.1080/17565529.2016.1154450

Climate and Development, 2016
http://dx.doi.org/10.1080/17565529.2016.1154450

climate and development

RESEARCH ARTICLE

Power and influence mapping in Ghana's agricultural adaptation policy regime

Chase A. Sova[a,b,c*], Thomas F. Thornton[c], Robert Zougmore[a,d], Ariella Helfgott[a,c,e] and Abrar S. Chaudhury[a,c]

[a]*CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), Copenhagen, Denmark;* [b]*International Centre for Tropical Agriculture (CIAT), Cali, Columbia;* [c]*Environmental Change Institute (ECI), University of Oxford, Oxford, UK;* [d]*International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Bamako, Mali;* [e]*Environment Institute, University of Adelaide, Adelaide, Australia*

(*Received 28 January 2015; accepted 25 November 2015*)

Debates around the design and content of climate change adaptation policies are shaped, in part, by the power and influence of actors within an adaptation regime. This paper applies a power-mapping technique, Multilevel Stakeholder Influence Mapping (MSIM), to stakeholders in Ghana's agricultural adaptation policy regime. The method provides a quantitative influence score and visual map for actor groups active-in or affected-by the policy process, from the differentiated perspectives of national, regional, and local-level respondents. MSIM, as applied here, seeks to determine the underlying power structure of the adaptation regime and provides insight in to two key power-laden themes: stakeholder participation and multilevel institutional design. Results indicate that when taken collectively (the views of national, regional and local respondents *combined*) Ghana's adaptation regime is considered bipolar and elite-centred in its power distribution. A distinguishable 'adaptation establishment' or dominant group of power holders made up of technical government and international agencies can be identified. Meanwhile, political groups, the private sector, civil society, and universities are considered to wield substantially less power in the regime. Differentiated perspectives (i.e. national, regional or local respondents *alone*) reveal that several potential cross-level bridging institutions are not considered influential at all operational levels. Farmers, traditional authorities, and the District Assembly, for example, are all considered highly influential from the perspective of local-level respondents, but their counterpart agencies at the national level are not considered influential by policymakers there. Contrary to the hyper-politicized nature of climate change adaptation at international levels, Ghana's policy regime would benefit from increased participation from political agents, as well as from traditional authorities and farmers. These actor groups can help reverse the a-political nature of the adaptation regime, improve power pluralism across actor groups and levels, and facilitate cross-level cooperation between formal and informal institutions crucial to adaptation success.

Keywords: power; influence; climate change; agriculture; adaptation; policy; Ghana

1. Introduction

Agriculture is a mainstay of the Ghanaian economy contributing to nearly 25% of the country's gross domestic product (Government of Ghana, 2014b). Relying heavily on rain-fed systems with limited irrigation infrastructure, the sector is particularly vulnerable to the impacts of climate change. In the northern regions, where the bulk of Ghana's cereal crops are produced, already harsh median temperatures are expected to further increase by the year 2030 (Jalloh, Nelson, Thomas, Zougmore, & Roy-Macauley, 2013). The Government of Ghana has taken policy steps to mitigate the negative effects of climate change across a variety of sectors, including agriculture. This includes the development of a National Climate Change Adaptation Strategy (NCCAS) in 2012, and a National Climate Change Policy (NCCP) in 2014. Climate change has also been addressed in the country's Medium-term National Development Policy Framework and the Food and Agriculture Sector Development Policy II. Despite such progress, Ghana remains in the early stages of adaptation regime formation.

The development of the above-mentioned policies necessarily involves participation from diverse stakeholder groups, each with their own interests and objectives. What is included or excluded from adaptation policy is widely discussed and very often contested. Agricultural adaptation in Ghana draws on an especially wide network of stakeholders (and interests) given the diverse agro-ecological zones and the correspondingly context-specific adaptation requirements across the country. Power relations between actors determine how adaptation is defined, who or what is considered 'vulnerable', and what adaptive measures

*Corresponding author. Email: chase.sova@gtc.ox.ac.uk

are ultimately prioritized. Indeed, how the debates around policy design and content are resolved is dependent upon a variety of factors including stakeholders' access to (and quality of) decision-making forums (Few, Brown, & Tompkins, 2007; Sherman & Ford, 2014), legitimation of certain forms of knowledge over others (Adler & Bernstein, 2005; Jennings, 2009; Nyong, Adesina, & Elasha, 2007), prevailing norms and values (Adger et al., 2009), institutional design (Agrawal, 2008; Dovers & Hezri, 2010), and perceptions of climate impacts and vulnerability, among other considerations. These factors, in turn, are shaped by the interests and power of actor groups within the adaptation regime (Adger, Arnell, & Tompkins, 2005a; Sova et al., 2015).

The Earth Systems Governance (ESG) project research framework promotes the debate around power in socio-ecological systems research. ESG recognizes power as a key cross-cutting theme that affects five central analytical problems (architecture, agency, adaptiveness, accountability and legitimacy, and allocation and access) facing the governance of socio-ecological systems (Biermann et al., 2010). The authors note the ubiquitous nature of power and the challenges in its conceptualization. They suggest that despite its centrality, 'how power is conceived in studies of governance and institutions is not often discussed' (Biermann et al., 2010, p. 289). Adaptation governance offers no exception.

Yet addressing power in any complex system is important for practical reasoning (i.e. navigating a world of agents and their powers), for the moral allocation of responsibility, and for the evaluation of social systems (Morriss, 2002). This is especially important in early regime formation – as is the case with climate change adaptation in Ghana – in that a clear baseline analysis of power can assist in developing appropriate success measures for procedural and/or distributional justice that contribute to the improved adaptive capacity of vulnerable populations. Understanding which actor groups are influential or powerful within a given adaptation regime is thus of considerable consequence, and can lead to improved policy and institutional design (Sherman & Ford, 2014).

This study applies a recently developed methodology, Multilevel Stakeholder Influence Mapping (MSIM) (Sova et al., 2014), to visually map the level of influence of actors within Ghana's agricultural climate change adaptation policy regime, using a district in the Upper West Region as a case study. The study constitutes among the first efforts to empirically map power and influence in adaptation regimes. It asks the questions 'which actor groups currently possess the greatest influence across various "operational" levels (i.e. national, regional, and local) with respect to the design and implementation of agricultural climate change policy?', and 'what can be said about the resulting power structure (i.e. is the resulting regime elite-centred or pluralistic in nature)?' This paper does *not* seek to provide a comprehensive review of the treatment of power within the social sciences (for such analyses, see Lukes, 1974, 2005; Morriss, 2002, among others). Nor does it seek to identify and typify common sources or 'bases' of power (see French & Raven, 1959; Greene & Elfrers 1999, among others). Rather, the main purpose of the study is to map the power and influence of actor groups in relation to adaptation policy formation and implementation. As such, the results of this analysis are likely to be of immediate interest to academics and practitioners working in the area of stakeholder participation and multilevel system design around climate adaptation.

What follows in Section 2 is a review of common power orientations in governance literature and an assessment of the current treatment of power within two key climate change adaptation themes: stakeholder engagement and multilevel institutional design. The MSIM methodology is then introduced in Section 3, followed by an introduction of the Ghana case study context in Section 4. Section 5 provides objective MSIM results, while Section 6 discusses the implications of MSIM results as they relate to existing governance and adaptation literature in West Africa. The limitations of the study are outlined in Section 7, and concluding remarks are given in Section 8.

2. Power in adaptation literature

Power dynamics between actors influences regime formation. Power is defined here in the Weberian sense as the ability to influence the behaviour of others, with or without resistance (Weber, 1978). 'Power' and 'influence' are used interchangeably in this study. Regime formation implicitly assigns roles to participants, determining who decides what is considered 'desirable' and 'undesirable', and dictating the legitimacy of the resulting structure (i.e. the classic question 'who governs?'). 'At the most general level governance is a social function centred on efforts to steer or guide the actions of human groups … towards the achievement of desired ends and away from outcomes regarded as undesirable' (Young, 2013, p. 3). Who governs matters in adaptation planning because how we choose to draw the boundaries around scope, scale, and time frame of adaptation, which disturbances elicit the need to adapt, and what are the notions of desirability or improvement of the governance system often completely determines the conclusions and recommendations for action (Helfgott, 2011).

Regime power structures often fall on a spectrum between 'elite-centred' and 'pluralistic' orientations (Dahl, 1958; Liu, Lindquist, Vedlitz, & Vincent, 2010; Merelman, 1968; Mills, 1956; Vergara, 2013; Wong, 2010). Pluralist theory presumes that power is dispersed among several groups that compete equally for resources. Meanwhile, elite theory posits that power is concentrated

in the hands of a few individuals or organizations that exert disproportionate influence over decision-making. 'Elites may be defined as persons who, by virtue of their strategic locations in large or otherwise pivotal organizations and movements, are able to affect political outcomes regularly and substantially' (Higley, 2008, p. 3). Elite-centred regimes often lack transparency, devalue representation of non-elites (or 'non-experts'), and – particularly important for multilevel systems – undermine the principle of subsidiarity (i.e. that affairs should be handled by the lowest, least centralized competent administrative or political unit). Meanwhile, regimes that are truly pluralistic are driven by public opinion, and tend to be more egalitarian and participatory in nature, and thus exhibit greater transparency, responsiveness, and legitimacy in the eyes of 'constituents'.

Whether an adaptation regime is elite-centred or pluralistic (or somewhere in between) is determined in part by two central power-laden factors commonly discussed by adaptation theorists: institutional design (especially the multilevel nature of adaptation governance structures), and participation in adaptation decision-making.

2.1. *Institutional design*

Institution-focused studies of adaptation aim to discover appropriate institutional designs, rules, and decision-making procedures to improve the efficiency and equitability in the delivery of adaptation resources to vulnerable communities (Agrawal, 2010; Berman, Quinn, & Paavola, 2012; Christoplos et al., 2009; Eakin & Lemos, 2010; Gupta et al., 2010; Næss, Bang, Eriksen, & Vevatne, 2005; Schipper, Fencl, Hoffmaister, & Osbeck, 2012). Studies of this sort draw attention to key power-laden concepts like decentralization and devolution of authority in adaptation regimes, and adaptive/collaborative management arrangements (Berkes, 2010; Brockhaus & Kambire, 2009; Tompkins & Adger, 2004). Institutional scholars emphasize the importance of multilevel, multiscale characteristics of climate change adaptation (Adger, 2001; Adger et al., 2005a, 2005b; MacKinnon, 2011; Ostrom, 2010a; Ribot, 2010; Urwin & Jordan, 2008; Vincent, 2007). Vertical interplay in particular between multilevel, 'polycentric' (Ostrom, 2010b) institutions in adaptation regimes are constrained by relationships of power (Tompkins & Adger, 2004; Young, 2013, 2002). Yates (2012) for example, adopts MacKinnon's (2011) 'scalar politics' construct to analyse cross-level power dynamics in Nepal's adaptation regime. MacKinnon suggests that there is an important distinction to be made between 'politics of scale', or the idea that politics occur on a given, fixed level with defined boundaries and 'scalar politics'. Scalar politics refers to the 'strategic deployment of scale' or the purposeful utilization of multilevel structures to promote one's interests. Viewed in this way, power is seen not as a product of multilevel structures and their hierarchies, but that those structures serve as an instrumental medium through which to channel power.

2.2. *Participation*

Another prevalent theme for the study of power in adaptation regimes is stakeholder participation. Few et al. (2007) discuss the micro-politics of stakeholder consultation and participation in adaptation regimes and the use of 'managerial containment' by powerful actors to guide participatory engagements towards predetermined goals. This work is reflective of a wider trend in critical stakeholder engagement literature that seeks to demonstrate how participatory processes can serve as in instrument of power and domination (Cooke & Kothari, 2001; Rydin & Pennington, 2000; Sherman & Ford, 2014; Treby & Clark, 2004). These authors argue that 'empowerment' – the common usage of power in this domain – through improved participation in decision-making can improve equitability and can reduce stakeholder vulnerability, but the creation of a space of engagement alone does not equal success in this regard (Skoufias, 2003; Thomas & Twyman, 2005; Tompkins & Adger, 2004). Improved adaptive capacity, rather, relies on *active participation* by concerned parties (Smit & Pilifosova, 2001).

Ultimately, understanding who is perceived to be powerful or influential in adaptation regimes is an important first step in paving the way for more robust analyses of the sources of power addressed above. As suggested by Few et al., 'any participatory process will only gain legitimacy if the relevant stakeholders are included and if effort is invested in finding out who is "important" in policy, meaning both who is most influential and also who is most likely to be affected by decisions and actions' (Few et al., 2007, p. 56). Achieving this through MSIM analysis, as we will see, can provide important insight in to participatory arrangements and multilevel institutional design.

3. MSIM in Ghana

MSIM is a simple visual tool to examine and display the relative influence that different individuals and groups have over decision-making (Mayers & Vermeulen, 2005). The original methodology, Stakeholder Influence Mapping, was developed by James Mayers and Sonja Vermeulen (2005) at the International Institute for Environment and Development and was adapted by Sova et al. (2014) to serve in multilevel analyses.

MSIM uses circles to represent different stakeholder groups, placed by an individual respondent within a pyramid where the policy/legislation (or broad scenario) in question serves as the pyramid cap or 'apex'. The perceived influence of each actor group is shown in the relative closeness of the circles to the policy apex. Different colour

and size circles can be used to represent stakeholder groups during the mapping activity (e.g. government, non-governmental organization (NGOs), civil society, etc.). The average location of a group relative to other stakeholders on each individual MSIM map is used to produce a composite influence score for each stakeholder group. A composite map that visualizes power from the combined perspective of the entire sample – or from other meaningful subsets of respondents – can also be produced. As suggested by Sova et al. (2014),

> MSIM builds on existing power-elucidating techniques in that its individual interview style mitigates against group polarization (and group think), its use of an elicitation object more easily facilitates the sharing of sensitive information, it allows power perspectives across multiple actor levels, and it serves as a useful technique in delineating system boundaries as perceived by different actor groups. (p. 384)

MSIM utilizes perception-based data and relies on triangulation between actor groups to determine an influence score. Perceptions, while imperfect, are particularly important in early regime formation where power structures have yet to be full institutionalized. It is, after all, 'the world as it is perceived is the world that is behaviourally important' (Jain, 2005, p. 47). Perception is at the heart of bias formation. Bias formation in adaptation regimes, in turn, determines which adaption pathways are considered more or less viable.

MSIM differs from Social Network Analysis and inter-organizational network analysis in that 'MSIM does not speak to the strength or type of connection between the actors discussed … it seeks only to elucidate an actor group's relationship towards a policy process or decision-making scenario, and only by extension, its relationship to other actors' (Sova et al., 2014, p. 385). A generic example map is found in Figure 1 below.

The MSIM methodology contains 13 steps, outlined in detail in Sova et al. (2014), and summarized in Table 1 below. Here the MSIM steps have been grouped according to three stages of implementation: preparation, mapping, and analysis. The 'mapping' stage is conducted with the respondents, while 'preparation' and 'analysis' are conducted separately by the analyst.

3.1. *Preparation*

The MSIM exercise in Ghana focused on the policy apex 'the design and implementation of agricultural climate change adaptation policy' (step 1), and focused on the current state of power dynamics as of 2013 (step 2). MSIM mapping was conducted with 30 separate respondents using rational subgrouping sampling and representing a cross-section of actors within Ghana's agricultural adaptation regime including government actors, civil society, donors, and farmers. These actors were chosen from a larger sample of 100 respondents participating in semi-structured interviews for a broader PhD study. Comprising principally of senior professionals within their organization, this subset was chosen for the respondents' intimate knowledge of climate change and agricultural policy at their particular operational level, and to ensure appropriate representation from diverse actor group types. Given the slow progress in decentralizing adaptation planning in Ghana, a limited number of knowledgeable individuals were identified at regional and local operational levels. As outlined in Table 2 below, a total of 15 respondents were chosen from the national level, 7 from the regional level, and 8 from the local level (step 3). Regional and district locations were selected on the basis of agricultural climate change vulnerability (temperature, rainfall, and pest and disease risk) as identified through Ghana's UNFCCC 2nd communication (see Section '4' below). Before MSIM mapping was conducted, the authors assembled a comprehensive list of 73 policy stakeholders with support from a key informant from the University of Ghana, Legon (step 4). This list included actor groups related to agriculture and climate change in any capacity in Ghana. The stakeholders on the comprehensive list were grouped in to the following categories: 'national government', 'regional/local government', 'civil society', 'NGOs/INGOs', 'bilateral and multilateral donors', and 'private sector'. The list included specific organizations and agencies where possible (e.g. Ministry of Food and Agriculture (MoFA), the World Bank, and University of Ghana), and generic stakeholder groups when necessary (e.g. traditional authorities, women's groups, and input providers). The order of the stakeholders under each category was randomized so as to reduce the potential bias of the analysts in ordering the actor groups. The final comprehensive stakeholder list and a blank MSIM mapping board (A4 size) were printed and brought to each interview (step 5).

3.2. *Mapping*

MSIM mapping interviews were conducted with respondents in May of 2013. At each interview, the respondent was first presented with the comprehensive stakeholder list. They were asked to place a checkmark ('tic') next to the 20 actor groups that they felt to be most 'highly relevant' to the policy focus in question (i.e. those actor groups active-in or affected-by agricultural adaptation policy). The respondent was free to add new relevant actors to the list (step 6). The rationale for an initial prioritization of actors/actor groups was to bring the stakeholder list down to a more manageable size for mapping. Note was taken of the relative size of each stakeholder group identified in this step to be used later in the digitization of the maps (step 7).

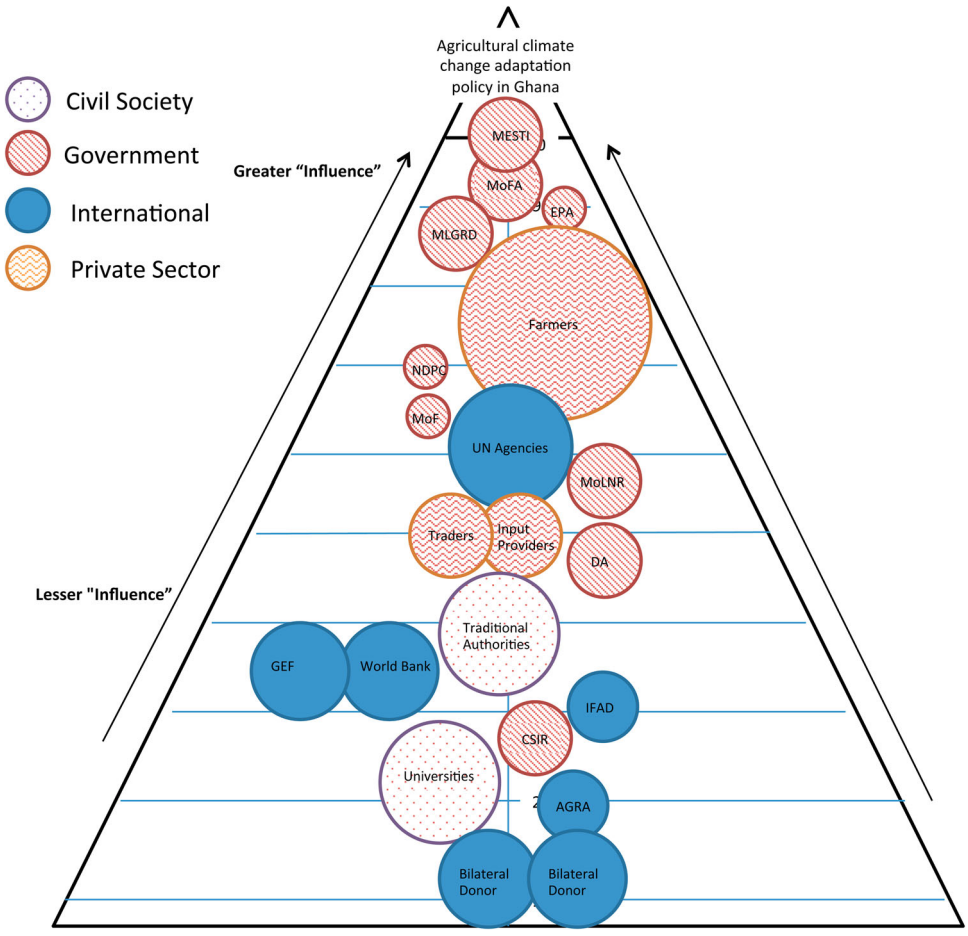

Figure 1. Example MSIM map.
Note: This is a generic stakeholder influence mapping/MSIM mapping board intended as an example, not as a paper result. The policy object, or apex, is located at the top of the mapping pyramid. Actor groups in the form of circles placed closest to this 'apex' are deemed most influential from the perspective of the respondent. Actors near the bottom of the pyramid are deemed less influential, but not without influence entirely. Different actor types are indicated by colour (or shade), including civil society, government, international, and private sector. The size of the circle approximates the relative population of that actor group, though this has no bearing on the final influence score.

The respondent then placed each of the actors groups deemed 'highly relevant' one-by-one on the influence mapping board, drawing, in the form of a circle, the most powerful/influential actor group at the top, or apex of the pyramid, and the least (less) influential at the bottom (step 9). Power was defined to the respondent as 'the ability to influence the behaviour of others, with or without resistance' (step 8).

As each actor was placed on the map, the respondent was asked what type of power/influence the actor/actor group was exercising (i.e. position, personality, persuasion, coercion, force, knowledge, and resource), and was prompted to indicate whether that influence resulted from any policy or legal framework (step 10). As this study focused on current state of power dynamics, questions as proposed in step 11 of Sova et al. (2014), 'assessing system boundaries', were not asked to respondents. Assessing system boundaries is intended to reveal the way the system 'ought to be' by focusing on sources of control, motivation, knowledge, and legitimacy. It is a normative form of assessment not applicable here given that this study limited its scope to how the system 'is' at present.

3.3. *Analysis*

Following the interviews, each of the 30 MSIM maps was digitized to facilitate the production of an influence score for the 73 stakeholder groups on the comprehensive list. Determining an influence score from multiple, individual maps involved two principle variables: (1) the frequency, or the number of respondents that found the stakeholder group 'highly relevant' to the policy focus in question (step 6); and (2) the adjusted ranking, or the average ranking level at which the stakeholder was placed on the map by respondents (the higher the ranking level, the higher the perceived influence) (step 9).

Table 1. MSIM 13-step methodology.

Stage	MSIM step
Preparation	1. Define policy focus
	2. Define one or more key time periods
	3. Identify influence-mapping respondents
	4. Identify policy stakeholders
	5. Prepare materials
Mapping (with respondents)	6. Fine-tune the stakeholder list
	7. Estimate stakeholder group sizes
	8. Define 'influence' and its relation to 'power' as it is understood within your conceptual framework
	9. Map stakeholder influence and relationships
	10. Identify key moments and mechanisms
	11. Assess system boundaries
Analysis	12. Keep record of map for future reference
	13. Calculate influence score

Source: Adapted from Sova et al. (2014).

As suggested by Sova et al. (2014), a relative ranking score (*R*) was first established by the analyst by counting each actor groups upwards from the bottom of each influence map and assigning the counted value as the ranking score. That is, the actor placed lowest on an influence map receives a ranking score of 1, the second lowest a score of 2, the third lowest a score of 3, and so on. Actors/actor groups placed on the same level as one another receive the same ranking score (e.g. 'farmers' and 'rural poor' placed side by side at the bottom of an influence pyramid would both receive a ranking score of 1). Ranking scores for each actor group were recorded in a spreadsheet.

It should be noted that this counting strategy allows for a different number of ranking levels to be identified by each respondent. To ensure that the highest and lowest ranked

Table 2. MSIM respondents by actor level.

Respondent organization	Organization type	Level of operation
National Patriotic Party (NPP)	Civil society (political group)	National (Accra)
GEF	Multilateral donor	National (Accra)
MoFA (×2)	Government	National (Accra)
Ghana Environmental Conventions Coordinating Agency (GECCA)	Government	National (Accra)
Forum for Agricultural Research in Africa (FARA)	Academia	National (Accra)
NDPC	Government	National (Accra)
University of Ghana, East Legon (×2)	Academia	National (Accra)
CSIR, Science and Technology Policy Research Institute (STEPRI)	Academia	National (Accra)
Agricultural Development Bank (ADB)	Private sector	National (Accra)
Ghana Climate Action Network (G-CAN)	Civil society	National (Accra)
CSIR, Animal Research Institute (ARI)	Academia	National (Accra)
Climate Action Network (CAN)	INGO	National (Accra)
Development Institute	NGO	National (Accra)
MoFA	Government	Region (Wa)
Ghana Social Opportunities Project (GSOP)	NGO	Region (Wa)
EPA	Government	Region (Wa)
RCC	Government	Region (Wa)
Council of Scientific and Industrial Research (Savannah Agricultural Research Institute (SARI))	Academia	Region (Wa)
Plan Ghana	INGO	Region (Wa)
Savannah Accelerated Development Authority (SADA)	Government/private sector	Region (Wa)
Farmer (×2)	Private sector	Local (Lawra)
District Agricultural Development Office	Government	Local (Lawra)
Local agricultural development NGO	NGO	Local (Lawra)
DA (×2)	Government	Local (Lawra)
Village chief	Traditional Authority	Local (Lawra)
Religious body	Civil Society	Local (Lawra)

actor groups on each map received the same score, the relative ranking was adjusted to a normalized value. As such, the number of ranked levels was identified for the entire sample ($n = 30$) yielding an average of 13 ranked actor levels. The relative ranking for each stakeholder on each respondent map was then adjusted to this 13-level equivalent by applying a normalization formula. After applying this function, the highest possible ranking score for an actor group was 13 and lowest 1 across all influence maps. For a detailed description of 'relative' versus 'adjusted' rankings, see Sova et al. (2014).

$$\text{Adjusted ranking} = \left(\frac{\text{Ranking score}}{13}\right) \times \text{number of ranking levels for respondent } 'n'$$

Once normalized, the adjusted rankings for each actor group were summed and then divided by the maximum frequency score of 30 (i.e. supposing the actor was identified as 'highly relevant' by all respondents in the sample) to produce the composite influence score. This method of calculation reduces biased mapping outcomes by including in the calculation the instances that an actor/actor group was not identified as relevant (i.e. has a mean adjusted ranking of zero) (Sova et al., 2014).

$$\text{Composite influence score} = \sum \text{adjusted ranking for } \frac{n1 - n30}{30}$$

4. Context

The MSIM methodology was applied with stakeholders in Ghana's agricultural climate change adaptation regime from national, regional, and local operational levels. This paper adopts a definition of 'levels' from Cash et al. (2006) and Gibson, Ostrom, and Ahn (2000) as the units of analysis that are located at different positions on a scale. Accra, the nation's capital, serves as the site for national-level analysis, Wa, the municipal capital of Ghana's Upper West Region (UWR) the site of regional-level analysis, and Lawra District, UWR, the site of local-level analysis. Detailed respondent information is included in Table 2 above.

Nationally, it is estimated that over 50% of the working population in Ghana is engaged directly in agriculture (Government of Ghana, 2007). The bulk of agricultural production remains concentrated in the hands of smallholder farmers, with approximately 2.75 million households engaged in the sector and 90% of landholdings less than 2 hectares in size (Government of Ghana, 2010b). The MoFA, Ministry of Environment, Science, Technology and Innovation (MESTI), and the Environmental Protection Agency (EPA) (MESTI's implementing agency) are the three principle government bodies charged with promoting adaptation to climate change for the agricultural sector nationally. The National Development Planning Commission (NDPC) and Ministry of Finance (MoF), meanwhile, work with these agencies to integrate climate change in to national development plans. These government agencies are supported in this endeavour by a host of NGOs, bilateral and multilateral donors, and other civil society actors.

The national legislative and policy environment is dense, with agricultural climate change objectives introduced across a number of documents. This includes but is not limited to the National Climate Change Adaptation Strategy (Government of Ghana, 2012b), the National Climate Change Policy (Government of Ghana, 2014a), the Medium-term national development policy framework: Ghana Shared Growth and Development Agenda (Government of Ghana, 2010c, 2014b), the Food and Agricultural Sector Development Policy II (Government of Ghana, 2007), and the Medium-Term Agricultural Sector Investment Plan (Government of Ghana, 2010b). Ghana is currently undertaking a process of political, fiscal, and administrative decentralization (Government of Ghana, 2010a), led by the Ministry of Local Government and Rural Development (MLGRD), which is placing more budgetary and planning responsibility on local administrative and technical units (Amankwah et al., 2014; Lentz, 2006).

Regionally, the Upper West Region of Ghana is located some 12-hour journey by bus from Accra and is sparsely populated with less than 2.8% of the country's population (Government of Ghana, 2012a) of which 70.7% are considered 'poor', and 45.1% 'extremely poor' – the highest incidences of poverty in Ghana's 10 regions (Government of Ghana, 2014c). Given the high levels of poverty and deteriorating environmental conditions, the UWR is considered among Ghana's most vulnerable regions to climate change (Government of Ghana, 2011). The country's second UNFCCC national communication estimates temperature increases in Ghana's northern savannah regions between 1.7°C and 2.04°C by the year 2030, with high temperatures peaking at 41°C (Government of Ghana, 2011). This, according to crop simulation models by MacCarthy, Adiku, and Yangyuoru (2013), will precipitate declining maize yields between 19% and 41% in the Guinea Savannah zone by 2050. Rainfall is expected to fall 1.1% to 3.1% across all regions in Ghana by 2020, and 13% to 21% by 2080. (Government of Ghana, 2011). Impacts are already being felt, resulting in significant migration from Ghana's northern regions (Rademacher-Schulz, Schraven, & Mahama, 2013). Wa is the regional capital of UWR and houses the Regional Coordinating Council (RCC), which serves as the political and administrative centre of the UWR and undertakes development

planning and monitoring and evaluation. MoFA and EPA are responsible for promoting agricultural climate change adaptation at this operational level. Several NGOs and civil society groups operate out of Wa, although significantly fewer in number than those operating out of Tamale, the Northern Regional capital to the East.

Locally, the Lawra District is located in the upper-most reaches of UWR along the border of Burkina Faso and is home to an estimated 100,000 people, the majority of which, 83%, are engaged in subsistence agriculture as the base activity for their livelihood. Agriculture accounts for 80% of the district's entire economic activity (Government of Ghana, 2013). The district lies in the Guinea Savannah zone of Western Africa, and as such, has one wet season from April to October. Climate Change is reported to be impacting on the arrival of the Tropical Maritime air mass that brings about the rainy season (Government of Ghana, 2011). The District Assembly (DA) serves as Lawra District's political and administrative centre. Decentralized agencies like the District Department of Agriculture, responsible for agricultural adaptation in the district, operate under the jurisdiction of the DA. The EPA also has an assigned desk officer in the DA. Simultaneously, a traditional ruling structure exists alongside these modern political administrative units in the district, and includes a network of village chiefs, sub-chiefs, and a Paramount chief for the ruling area.

5. Results

This section provides the results of the MSIM analysis in Ghana's agricultural adaptation regime. Actors with the highest composite influence scores for the entire sample are discussed, followed by the actors with the lowest influence scores. The highest composite influence scores are then presented for actors groups from the perspective of national, regional, and local respondents separately, demonstrating how perceived influence of actor groups changes across operational levels.

5.1. *Highly influential actor groups*

Table 3 contains the list of the 20 actor groups with the highest composite influence scores (frequency combined with the average ranking position on the MSIM maps) from the perceptions of the entire 30 respondent sample.

The MoFA is deemed most influential with regards to agricultural climate change adaptation policy development and implementation in Ghana. MSIM respondents cite the agency's mandate for agricultural development and its extensive network of Regional and District offices as the key factors in MoFA's influence in this regard. The ministry's perceived expertise is also a source of power, especially among area extension agents who are tasked with supporting local farmers with technical innovation. The MESTI and its implementing agency, the EPA, are deemed nearly as influential as MoFA, given MESTI's mandate in steering national climate change initiatives in Ghana, as well as both agencies' connections to international agencies for the mobilization of climate change resources. Farmers are also considered highly influential in Ghana's adaptation regime, although this influence is mainly derived from respondents at the regional and local levels ranking farmers as highly influential (as seen in Table 4 below). Farmers are described as the 'front lines' of adaptation policy and 'the implementers' without which there is no action. Farmers are also influential because of their possession of local and traditional knowledge, a valuable resource to development agencies, driven by a growing preference among practitioners for community based adaptation approaches. Below farmers we see a host of government agents including the District Assemblies, Council for Scientific and Industrial Research (CSIR), Ghana Meteorological Agency (GMET), Ministry of Lands and Natural Resources (MLNR), and the Forestry Commission (FC), all ranked for their domestic authority and mandates on climate change related issues. Still highly influential, but less so than those aforementioned government agencies, is group of International organizations including UN Agencies, Global Environment Facility (GEF), and the CGIAR research program on Climate Change, Agriculture and Food Security (CCAFS), among others. The World Bank ranks considerably higher in Table 3 than other multilateral and bilateral groups. These international agencies are frequently cited as having access to significant financial resources, well-trained staff, and maintain autonomy in their programming from the central government. Placed within the international agencies are the NDPC and the MoF. NDPC and MoF are deemed influential by respondents because of their central role in development planning and budget allocation in Ghana. They exhibit substantial reward power through the plan and budget approval process. Finally, traditional authorities (Chiefs and Paramount Chiefs, for example) are the last to be included in Table 3. This highly influential group is cited for their custodianship of lands, and their ability to enact traditional decrees (against bush-burning for example). Figure 2 visualizes these 20 influential actors groups in a MSIM composite map.

5.2. *Less influential actor groups*

Equally informative are those actors deemed 'less influential' with regard to agricultural climate change adaptation policy in Ghana by MSIM respondents. Table 4 contains a list of actors deemed 'highly relevant' by at least 10 respondents (33% of respondents) but with the lowest composite influence scores when using data from the complete sample, $n = 30$. The '33% of respondents' qualifier is designed to eliminate from the analysis the actor groups

Table 3. Most influential actors groups with regard to agricultural climate change adaptation policy in Ghana, entire sample ($n = 30$).

Actor/actor group	Frequency identified as 'highly relevant' by respondents	Average adjusted ranking score ($1 \leq Ra \leq 13$)	Composite influence score
MoFA	28	10.6	9.9
MESTI	26	10.0	8.6
EPA	23	9.9	7.6
Farmers	27	7.3	6.5
World Bank	22	8.4	6.2
DA	24	7.6	6.1
CSIR	21	8.2	5.8
GMET	19	8.5	5.4
MLNR	19	8.4	5.3
FC	18	8.1	4.9
UN Agencies (FAO, UNDP, UNEP)	18	7.6	4.6
GEF	15	8.4	4.2
NDPC	15	8.0	4.0
MoF	14	8.6	4.0
INGO's (undifferentiated)	20	5.9	4.0
CGIAR research program on CCAFS	17	6.8	3.9
Bilateral agency #1	19	6.0	3.8
International Fund for Agricultural Development (IFAD)	17	6.7	3.8
Bilateral Agency #2	16	7.1	3.8
Traditional authorities (paramount chief, sub-chief, and chiefs)	15	7.3	3.6

never identified as 'highly relevant' by respondents (i.e. a frequency and average adjusted ranking of 0), or only identified by a handful of respondents. As suggested by Sova et al. (2014), less influential rankings with MSIM, as found in Table 4, can lead the analyst to 'those actors that are directly impacted by or serve critical roles in adaptation or policy processes, but do not leverage influence in any meaningful way' (p. 406).

The results of 'less influential' rankings suggest that many private sector actors (input providers, agro-industries, and rural banks, for example) are frequently identified by respondents as highly relevant, yet do not appear to be active or influential in decision-making and implementation around climate change adaptation. Respondents reference the importance of these groups by citing the challenges in distributing new and improved seed varieties without the support of Ghana's network of input providers, and a similar inability to develop new varieties without research and academia, also included on this list of less influential groups. Similar difficulties in reducing post-harvest losses and improving market access for smallholder farmers are cited in the absence of engagement from agro-industries. The presence of MLGRD in this table is reflective of Ghana's slow-moving advances in fiscal and administrative decentralization. Respondents cite obstruction on the part of national-level actors, and limited capacity of staff at the district level as key factors in MLGRD's minimal influence at present.

Table 4. Less influential actors groups with regard to agricultural climate change adaptation policy in Ghana, entire sample ($n = 30$).

Actor/actor group	Frequency identified as 'highly relevant' by respondents	Average adjusted ranking score ($1 \leq Ra \leq 13$)	Composite influence score
National Disaster Management Organization (NADMO)	11	3.3	1.2
Agro-industries	12	4.3	1.7
Banks	13	4.9	2.1
Civil society group #1	12	5.5	2.2
Universities	13	5.5	2.4
NGOs	14	5.1	2.4
Bilateral #3	11	6.6	2.4
Bilateral #4	10	7.3	2.4
Bilateral #5	12	6.3	2.5
Input providers	14	5.6	2.6
MLGRD	11	7.3	2.7

5.3. *Influence across levels*

Research in adaptation policy must take into account the multilevel features of the policy process (Adger, 2001; Adger et al., 2005b), including policy development, implementation, and evaluation. Each of these stages implicates different actor sets, knowledge and information, and resources. As such, MSIM results that reflect perceived influence from each of these unique levels of operation can be instructive. Table 5 provides a comparison of the most influential actors from the perspective of each operational level. There were considerable variations in perceived stakeholder influence according to respondents operating at different levels (national, regional, and local).

Calculating a composite influence score from the perspective of a distinct operational level follows the same protocol as used for the entire sample. The sum of average adjusted ranking scores for each stakeholder groups is produced from the maps pertaining to the operational level in question and is divided by the maximum possible frequency score of 15, 7, and 8, for national, regional, and local operational levels, respectively.

These multilevel results offer insights in to which actor groups can serve as bridging agents between operational levels, and highlight key gaps in the multilevel adaptation planning and implementation process.

6. Discussion and implications

Several key trends emerge from MSIM analysis in Ghana with regard to the underlying power structure of the adaptation regime. These trends provide insight in to the technical, a-political nature of the adaptation regime, the distinct lack of pluralism among highly influential actors, and the cross-level interaction of formal and informal institutions.

Regarding stakeholder participation, in this analysis government and international agencies are most frequently

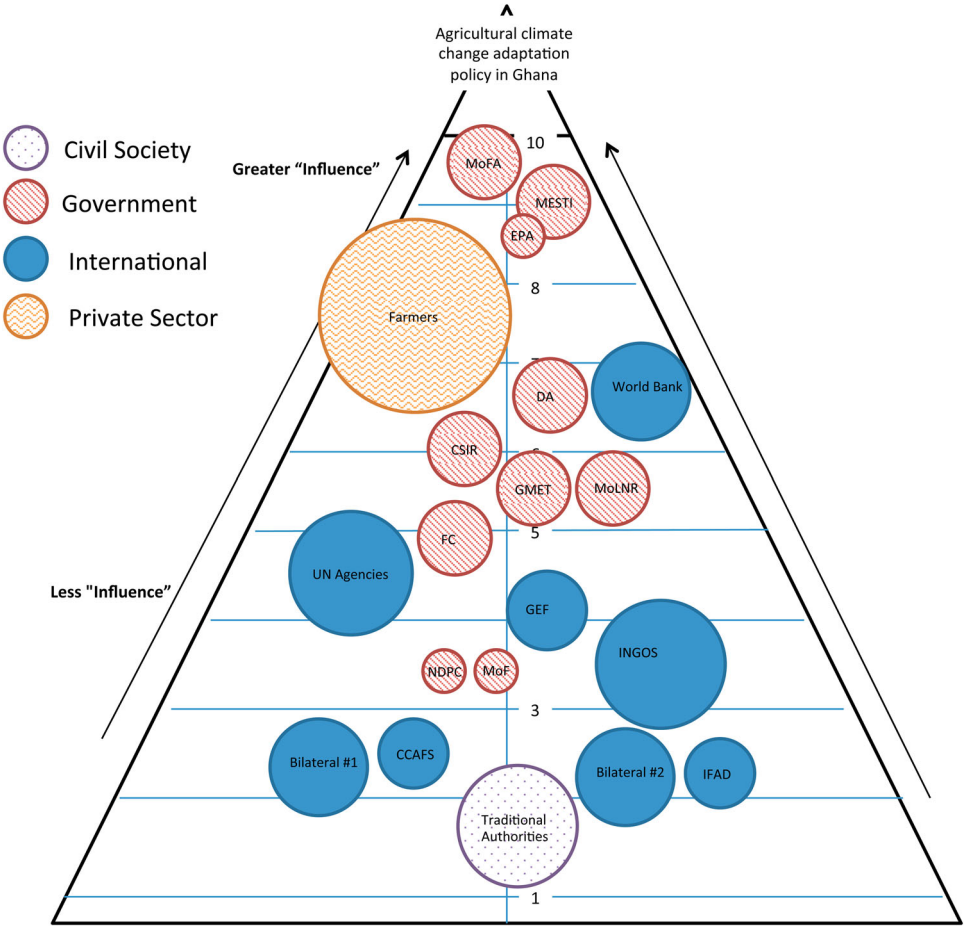

Figure 2. Combined MSIM map of highly influential actors for Ghana's agricultural adaptation regime ($N = 30$).
Note: This results map visualizes the most influential actor groups as perceived by the combined MSIM sample of 30 respondents. Respondents were asked to rank actors for their influence with regard to 'agricultural climate change adaptation policy in Ghana', which includes both policy development and implementation. The most influential actor group is deemed to be the MoFA. The least influential (although not without considerable influence) is traditional authorities. The size of the circles in this figure reflects the relative size of the actors groups, albeit not proportionally. The circle colour (or gradient) represents the actor group type, as indicated in the key to the left of the pyramid.

Table 5. Most influential actors with regard to agricultural climate change adaptation policy in Ghana as perceived by respondents at the national, regional, and local levels.

(a). National level ($n = 15$)	(b). Regional level ($n = 7$)	(c). Local level ($n = 8$)
MESTI	MoFA	CSIR
MoFA	MESTI	MoFA
World Bank	EPA	EPA
NDPC	Farmers	Farmers
UN agencies	FC	DA
EPA	CSIR	Traditional authorities (paramount chief, sub-chief, and chiefs)
GEF	DA	NGOs (undifferentiated)
Bilateral #6	District Department of Agriculture	FC
MLNR	GMET	MESTI
GMET	GEF	MLNR

ranked as highly influential in Ghana's agricultural climate change adaptation regime. Of the top 20 most influential actors (Table 3) using data from the entire respondent sample, 10 (50%) are government agencies and 7 (35%) are internationally based. These groups are perceived as especially influential among national-level respondents, a sample which most closely reflects the views of traditional 'policymakers'. Influence, then, in Ghana's adaptation policy regime is perceived as bipolar. Technical government agencies (MESTI and MoFA), INGOs, bilateral and multilateral donors form what can be referred to as the 'adaptation establishment', or the dominant group of power holders (elites) within the adaptation regime.

While the adaptation regime can be safely considered 'elite-centered', it does not exhibit elitism common to traditional power structures in Ghana – and West Africa more broadly – that elevate 'big men' politicians and powerful executive branch players for their positional power and clientalistic tendencies (Fukuyama, 2014; Rowley, 2000). In fact, political parties, the President, and the District Chief Executive (DCE) are not cited by respondents in this study as highly influential in agricultural climate change adaptation. These findings are consistent with that of Cameron (2011) who suggests 'there is not a broad demand from constituents for politicians to own the response agenda to climate change, and thus little or no domestic accountability pressure for achievement' (p. 20). Meanwhile, adaptation literature increasingly evidences the importance of political considerations in determining adaptation policy outcomes by ensuring popular participation, improving downward accountability, and allocating appropriate discretionary power to local actors through democratic processes (Dodman & Mitlin. 2013; Granderson, 2014; Ribot, 2003).

In addition to the exclusion of politically oriented groups (a-politicization), the private sector and civil society are also notably absent from the power rankings, and even appear among 'less influential' actors in MSIM results. The private sector's limited engagement in adaptation policy development to-date is widely documented and has important implications (Agrawala et al., 2011; Biagini & Miller, 2013; Pauw & Pegels, 2013). That a large, diverse swath of actor group types – the private sector among them – are not considered influential within Ghana's adaptation regime challenges calls for system-wide approaches to adaptation in food systems to facilitate truly transformational adaptation (Ingram, 2011; O'Brien, 2012).

With respect to multilevel institutional design, MSIM results confirm that respondents tend to attribute the highest influence to actor groups within their own level of operation, what we term 'proximal level bias'. As such, several organizations embedded in multilevel institutional structures are not included as highly influential by respondents across operational levels. Traditional authorities, for example, manifest as chiefs, sub-chiefs, and Paramount chiefs at the local level in the Lawra District, but are represented by the National House of Chiefs and the Ministry of Chieftaincy and Traditional Affairs (MCTA) in Accra. Similarly, the DA operates semi-autonomously at the local level but is guided by the MLGRD at the national level. Both of these groups, traditional leaders and the DA, are deemed highly influential by local-level respondents but their national-level counterparts, the House of Chiefs, MCTA, and MLGRD, are not perceived as influential by national-level respondents.

This dichotomy in power attributed to traditional authorities is reflective of a popular debate in Ghana over the role and legitimacy of traditional ruling structures (Abotchie, Awedoba, & Odotei, 2006; Ahwoi, 2010; Asamoah, 2012; Belden, 2010; Crawford, 2004; Guri, 2006; Lentz, 2006). At present, traditional authorities are considered locally as custodians of the land and natural resources, they determine land ownership, and decide over local conflicts in traditional courts (Crook, Asante, & Brobbey, 2010). Chiefs are often trusted sources of local and traditional knowledge, and are responsible for the framing of climate change in customary religious terms, among other influential socio-cultural roles (Eguavoen, 2013; Nyantakyi-Frimpong, 2013). Yet from the

central perspective, there is a sense of competition between modern and traditional governing structures. In fact, 'since the era of colonization, Ghanaian governments have struggled with how to use traditional authorities to achieve their own objectives without making chiefs more powerful than themselves' (Hoffman, 2010, p. 5). This is consistent with adaptation literature on formal and informal rural institutions and the need for improved institutional collaboration between these entities (Agrawal, 2010; Berman et al., 2012; Schipper et al., 2012; Yaro, Teye, & Bawakyillenuo, 2014). Increased collaboration between the DA and traditional authorities, in particular, can assuage concerns posed by some institutional theorists that increasing the power of so-called non-representative authorities (e.g. chiefs) can slow democratic transition in decentralized regimes (Ribot, 1996).

Finally, farmers are deemed both 'highly relevant' and highly influential from the combined perspective of the entire MSIM sample, yet they are not ranked among the most influential actor groups by national-level respondents. This reflects a common challenge in national adaptation planning resulting from proximal level bias; wherein the physical distance between policymakers and those farming communities affected by climate change impacts limits the integration of these marginalized groups in decision-making, contributing to the bipolar, elite-centered structure of the regime. MSIM thus provides empirical evidence of the 'adaptation paradox' at work – those most affected by climate impacts may be most distanced from adaptation intervention decisions (Ayers, 2011). This finding highlights the important nexus between participatory processes and institutional design. If 'highly relevant' stakeholders operate within an institutional environment where they are merely consulted on predetermined policy then pre-existing power relations between actor groups may be reinforced and perpetuated. In the words of Arnstein, 'participation without redistribution of power is an empty and frustrating process for the powerless' (1969, p. 216).

7. Limitations

The multilevel trends in power dynamics identified in this study reflect perceptions and experiences of stakeholders in the Lawra District and the Upper West Region of Ghana. The findings are not necessarily reflective of other districts and regions in the country. Traditional ruling structures, for example, differ dramatically across the country, some wielding more or less power than is characteristic of chiefs in the UWR. Similarly, the perceived influence of NGOs and INGOs is also geographically dependent. Second, it should be noted that MSIM respondents are most likely to perceive influence as it is derived from highly visible sources of power. Actor groups deriving power from positions of authority, of prestige, or that have ready access to resources and capital are more likely to be perceived as highly influential by respondents. Actor groups that exercise less visible or less deliberate forms of power, such as the media, are less likely to appear among 'highly influential actors'. Finally, organizing respondent data according to operational level (national, regional, and local) is only one such grouping available to the MSIM analyst. Operational levels are not perfect delineations. Some of the respondents in this exercise frequently move between Accra (national) and Wa (regional), or Wa and Lawra (local). Defining their predominant level of operation ultimately requires some subjectivity.

8. Conclusion

Rendering underlying power and influence dynamics visible among adaptation actors is an important step in improving the delivery of resources to those most vulnerable and assigning responsibility for outcomes in adaptation regimes. MSIM is applied here to Ghana's agricultural adaptation policy regime with diverse respondents from Accra, the Upper West Region, and the Lawra District. The study constitutes among the first efforts to empirically map power and influence in adaptation regimes. Through this analysis, MSIM provides insight in to the underlying power structure of the regime (i.e. elite-centred versus pluralistic orientations), and contributes to two key power-laden themes in adaptation: stakeholder participation and multilevel institutional design.

Respondents in this study consider power in the adaptation policy regime in Ghana as bipolar, or elite-centred. A distinguishable 'adaptation establishment' or dominant group of power elites made up of technical government and international agencies can be identified. This power orientation effectively renders adaptation planning technical and a-political, contrasting with traditional power structures in Ghana that elevate powerful executives and political parties. In fact, contrary to the hyper-politicized nature of climate change adaption at international levels, agricultural adaptation policy in Ghana would benefit from increased political engagement from the President, MPs, DCEs, and other party leaders to facilitate improved decentralization, popular participation, and downward accountability. This would reduce bipolarity and cross-level disconnect in the regime and make the policy process more adaptive to genuine needs.

Achieving increased pluralism more broadly in the adaptation regime (including power distribution towards the private sector, civil society, academia, and farmers themselves) should also be a priority and will allow for system-wide, transformational adaption that the current homogenous, elite-centered power structure cannot accommodate. A more pluralized power structure would offer increased transparency, responsiveness, and legitimacy within the regime, widening the portfolio of potential adaptation responses.

MSIM results also reflect the challenges in multilevel institutional design of adaptation regimes. In particular, the disparity in power attributed to the DA, traditional authorities, and farmers between local and national-level actors is especially detrimental to the cross-level performance of the regime. Potential bridging actors with high local-level influence could be better engaged at higher levels of operation to improve understanding of and responses to adaptation needs, capacities, and delivery. This – in the case of traditional authorities – will require increased coordination between formal and informal institutions in which 'modern' and traditional governing structures are seen not as competing but complimentary institutions. Increased emphasis on developing informal farmer-based organizations and national farmer associations will also help to assuage the effects of the 'adaptation paradox' and improve farmer representation across levels.

While the results of this analysis are reflective of only one region in Ghana and do not trace the full scope of power networks or their dynamics, this study marks an important advancement in understanding which actor groups are considered influential within a given adaptation regime. The results highlight existing patterns of influence and bias in adaptation policy-making, evidencing the concentration of power among technical agencies and the need for adaptive, agile, multilevel institutional networks. Achieving true 'polycentric', responsive multilevel governance cannot evolve through simple decentralization or scale linkage, but must build on a thorough understanding of power and influence dynamics among key players in the adaptation policy process, as identified here. Further research in to the underlying sources of these power dynamics can provide a basis for generating more inclusive, pluralistic adaptation policy regimes.

Acknowledgements

This research was conducted under the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), which is a strategic partnership of CGIAR and Future Earth. Support was also provided by the Environmental Change Institute (University of Oxford) and the Environment Institute (University of Adelaide).

Disclosure statement

No potential conflict of interest was reported by the authors.

ORCID

Chase A. Sova http://orcid.org/0000-0003-2823-7520

References

Abotchie, C., Awedoba, A., & Odotei, I. (2006). Perceptions on chieftaincy. In K. Irene, I. Odotei, & K. Awedoba (Eds.), *Chieftaincy in Ghana* (pp. 103–144). Accra: Sub-Saharan.

Adger, W. N. (2001). Scales of governance and environmental justice for adaptation and mitigation of climate change. *International Development*, *13*(7), 921–921.

Adger, W. N., Arnell, N. W., & Tompkins, E. L. (2005a). Successful adaptation to climate change across scales. *Global Environmental Change*, *15*(2), 77–77.

Adger, W. N., Arnell, N. W., Tompkins, E. L., Dessai, S., Lu, X., Risbey, J. S., … Haddad, B. M. (2005b). Adaptation to climate change: Perspectives across scales. *Global Environmental Change*, *15*(2), 77–176.

Adger, W. N., Dessai, S., Goulden, M., Hulme, M., Lorenzoni, I., Nelson, D. R., … Wreford, A. (2009). Are there social limits to adaptation to climate change? *Climatic Change*, *93*(3–4), 335–354. http://dx.doi.org/10.1007/s10584-008-9520-z

Adler, E., & Bernstein, S. (2005). Knowledge in power: The epistemic construction of global governance. In M. N. Barnett & R. Duvall (Eds.), *Power in global governance*. New York: Cambridge University Press.

Agrawal, A. (2008, March 5–6). *The role of local institutions in adaptation to climate change*. Paper presented at the Social Dimensions of Climate Change, Washington, DC.

Agrawal, A. (2010). Local institutions and adaptation to climate change. In R. Mearns & A. Norton (Eds.), *Social dimensions of climate change: equity and vulnerability in a warming world* (pp.173–198). Washington DC: World Bank.

Agrawala, S., Carraro, M., Kingsmill, N., Lanzi, E., Mullan, M., & Purdant-Richard, G. (2011). *Private sector engagement in adaptation to climate change: Approaches to managing climate risks*. (Environment Working Papers) Paris: Organization for Economic Cooperation and Development (OECD).

Ahwoi, K. (2010). *Local government and decentralization in Ghana*. Accra: Unimax Macmillan.

Amankwah, K., Klerkx, L., Sakyi-Dawson, O., Karbo, N., Oosting, S. J., Leeuwis, C., & van der Zijpp, A. J. (2014). Institutional dimensions of veterinary services reforms: responses to structural adjustment in Northern Ghana. *International Journal of Agricultural Sustainability*, *12*(3), 296–315. doi:10.1080/14735903.2014.909635

Arnstein, S. R. (1969). A ladder of citizen participation. *Journal of the American Institute of Planners*, *35*, 216–224.

Asamoah, K. (2012). A qualitative study of chieftaincy and local government in Ghana. *Journal of African Studies and Development*, *4*(3), 90–95.

Ayers, J. (2011). Resolving the adaptation paradox: Exploring the potential for deliberative adaptation policy making in Bangladesh. *Global Environmental Politics*, *11*(1), 62–88.

Belden, C. (2010). *IFPRI discussion paper 01030: Examining relationships between customary and state institutions in Ghana's decentralized system*. Washington, DC: International Food Policy Research Institute (IFPRI).

Berkes, F. (2010). Devolution of environment and resources governance: trends and future. *Environmental Conservation*, *37*, 489–500.

Berman, R., Quinn, C., & Paavola, J. (2012). The role of institutions in the transformation of coping capacity to sustainable adaptive capacity. *Environmental Development*, *2*(0), 86–100. http://dx.doi.org/10.1016/j.envdev.2012.03.017

Biagini, B., & Miller, A. (2013). Engaging the private sector in adaptation to climate change in developing countries: Importance, status, and challenges. *Climate and Development*, *5*(3), 242–252. doi:10.1080/17565529.2013.821053

Biermann, F., Betsill, M. M., Gupta, J., Kanie, N., Lebel, L., Liverman, D., … Zondervan, R. (2010). Earth system

governance: A research framework. *International Environmental Agreements: Politics, Law and Economics*, *10*(4), 277–298.
Brockhaus, M., & Kambire, H. (2009). Decentralization and adaptation in Burkina Faso. In W. N. Adger, I. Lorenzoni, & K. O'Brien (Eds.), *Adapting to climate change: Thresholds, values, governance*. New York: Cambridge University Press.
Cameron, C. (2011). Climate change financing and aid effectiveness, Ghana case study. London: Agulhas Applied Knowledge.
Cash, D., Adger, W. N., Berkes, F., Garden, P., Lebel, L., Olsson, P., … Young, O. R. (2006). Scale and cross-scale dynamics: Governance and information in a multilevel world. *Ecology and Society*, *11*(2), 8.
Christoplos, I., Anderson, M., Arnold, V., Galaz, M., Hedger, R., Klein, J. T., & Le Goulven, K. (2009). *The human dimension of climate adaptation: The importance of local and institutional issues*. Stockholm: Commission on Climate Change and Development. http://www.ccdcommission.org/Filer/the_human_dimension_of_climate_adaptation.pdf.
Cooke, B., & Kothari, U. (Eds.) (2001). *Participation: The new tyranny?* London: Zed Books.
Crawford, G. (2004). *Democratic decentralisation in Ghana: Issues and prospects*. (POLIS working paper no. 9). Leeds, UK: University of Leeds.
Crook, R. C., Asante, K., & Brobbey, V. (2010). *Popular concepts of justice and fairness in Ghana: Testing the legitimacy of new or hybrid forms of state justice*. (Working paper no. 14). London: Africa Power and Politics.
Dahl, R. A. (1958). A critique of the ruling elite model. *The American Political Science Review*, *52*(2), 463–469. doi:10.2307/1952327
Dodman, D., & Mitlin, D. (2013). Challenges for community-based adaptation: Discovering the potential for transformation. *Journal of International Development*, *25*(5), 640–659. doi:10.1002/jid.1772
Dovers, S. R., & Hezri, A. A. (2010). Institutions and policy processes: The means to the ends of adaptation. *Wiley Interdisciplinary Reviews: Climate Change*, *1*(2), 212–231. doi:10.1002/wcc.29
Eakin, H., & Lemos, M. C. (2010). Institutions and change: The challenge of building adaptive capacity in Latin America. *Global Environmental Change*, *20*(1), 1–3. http://dx.doi.org/10.1016/j.gloenvcha.2009.08.002
Eguavoen, I. (2013). Climate change and trajectories of blame in Northern Ghana. *Anthropological Notebooks*, *19*(1), 5–24.
Few, R., Brown, K., & Tompkins, E. L. (2007). Public participation and climate change adaptation: Avoiding the illusion of inclusion. *Climate Policy*, *7*(1), 46–59. doi:10.1080/14693062.2007.9685637
French, J. R. P., & Raven, B. H. (1959). The bases of social power. In D. Cartwright (Ed.), *Studies in social power* (pp. 150–167). Ann Arbor, MI: Institute for Social Research.
Fukuyama, F. (2014). *Political order and political decay: From the industrial revolution to the globalisation of democracy*. London: Profile Books Ltd.
Gibson, C., Ostrom, E., & Ahn, T. K. (2000). The concept of scale and the human dimensions of global change: A survey. *Ecological Economics*, *32*(2), 217–239.
Government of Ghana. (2007). *Food and agriculture sector development policy II*. Accra: MoFA.
Government of Ghana. (2010a). *Decentralization policy framework: Accelerating decentralization and local governance for national*. Accra: MLGRD.
Government of Ghana. (2010b). *Medium term agriculture sector investment plan*. Accra: MoFA.
Government of Ghana. (2010c). *Medium-term national development policy framework: Ghana shared growth and development agenda (GSGDA)*. Accra: NDPC.
Government of Ghana. (2011). *Ghana's second communication to the UNFCCC*. Accra: EPA.
Government of Ghana. (2012a). *2010 population and housing census: Summary report of final results*. Accra: Ghana Statistical Service: Ghana Statistical Service.
Government of Ghana. (2012b). *National climate change adaptation strategy*. Accra: MESTI.
Government of Ghana. (2013). *The composite budget of the lawra district assembly for the 2013 fiscal year*. Accra: Lawra district assembly.
Government of Ghana. (2014a). *Ghana national climate change policy*. Accra: MESTI.
Government of Ghana. (2014b). *Medium-term national development policy framework: Ghana shared growth and development Agenda (GSGDA) II*. Accra: NDPC.
Government of Ghana. (2014c). *Poverty profile in Ghana (2005–2013): Ghana living standards survey Round 6*. Accra: Ghana Statistical Service.
Granderson, A. A. (2014). Making sense of climate change risks and responses at the community level: A cultural-political lens. *Climate Risk Management*, *3*(0), 55–64. http://dx.doi.org/10.1016/j.crm.2014.05.003
Greene, R., & Elfrers, J. (1999). *Power the 48 laws*. London: Profile Books.
Gupta, J., Termeer, C., Klostermann, J., Meijerink, S., van den Brink, M., Jong, P., … Bergsma, E. (2010). The adaptive capacity wheel: A method to assess the inherent characteristics of institutions to enable the adaptive capacity of society. *Environmental Science & Policy*, *13*(6), 459–471. http://dx.doi.org/10.1016/j.envsci.2010.05.006
Guri, B. (2006). *Traditional authorities, decentralization and development: Strengthening the capacity of traditional authorities for good governance and development at the local level*. Accra: Center for Indigenous Knowledge and Organizational Development (CIKOD).
Helfgott, A. (2011). *Resilience, adaptation and development*. Lecture series. Oxford, UK: University of Oxford.
Higley, J. (2008). *Elite theory in political sociology*. Austin: University of Texas at Austin.
Hoffman, B. (2010). *The political economy of decentralization in Ghana*. Washington, DC: Georgetown University.
Ingram, J. (2011). A food systems approach to researching food security and its interactions with global environmental change. *Food Security*, *3*(4), 417–431. doi:10.1007/s12571-011-0149-9
Jain, N. K. (2005). *Organisational behaviour. Volume 1*. New Delhi: Atlantic Publishers and Distributors.
Jalloh, A., Nelson, G. C., Thomas, T. S., Zougmore, R., & Roy-Macauley, H. (Eds.). (2013). *West African agriculture and climate change: A comprehensive approach*. Washington, DC: International Food Policy Research Institute (IFPRI).
Jennings, T. L. (2009). Exploring the invisibility of local knowledge in decisionmaking: The Boscastle Harbour flood disaster. In W. N. Adger, I. Lorenzoni, & K. O'Brien (Eds.), *Adapting to climate change: Thresholds, values, governance* (pp. 240–254). Cambridge: Univerisity of Cambridge Press.
Lentz, C. (2006). Decentralization, the state and conflicts over local boundaries in northern Ghana. *Development and Change*, *37*(4), 901–919.

Liu, X., Lindquist, E., Vedlitz, A., & Vincent, K. (2010). Understanding local policymaking: Policy elites' perceptions of local agenda setting and alternative policy selection1. *Policy Studies Journal*, *38*(1), 69–91. doi:10.1177/1065912909346744

Lukes, S. (1974). *Power: A radical view.* 1st ed. London: Palgrave Macmillan.

Lukes, S. (2005). *Power: A radical view.* 2nd ed. London: Palgrave Macmillan.

MacCarthy, D. S., Adiku, S. G. K., & Yangyuoru, M. (2013). Assessing the potential impact of climate change on maize production in two farming zones in Ghana using the CERES-maize model. *Ghana Policy Journal*, *5*(Special Issue on Climate change in Ghana: Impacts on agriculture and the policy implications), 27–39.

MacKinnon, D. (2011). Reconstructing scale: Towards a new scalar politics. *Progress in Human Geography*, *35*(1), 21–36.

Mayers, J., & Vermeulen, S. (2005). *Stakeholder influence mapping. Power tools*. London: International Institute for Environment and Development (IIED).

Merelman, R. M. (1968). On the neo-elitist critique of community power. *American Political Science Review*, *62*(2), 451–460. doi:10.2307/1952940

Mills, C. W. (1956). *The power elite*. New York: Oxford University Press.

Morriss, P. (2002). *Power: A philosophical analysis*. Manchester: Manchester University Press.

Næss, L. O., Bang, G., Eriksen, S., & Vevatne, J. (2005). Institutional adaptation to climate change: Flood responses at the municipal level in Norway. *Global Environmental Change*, *15*(2), 125–138. http://dx.doi.org/10.1016/j.gloenvcha.2004.10.003

Nyantakyi-Frimpong, H. (2013). *Indigenous knowledge and climate adaptation policy in Northern Ghana*. (Background No. 48). Waterloo, Ontario: The Centre for International Governance Innovation (CIGI).

Nyong, A., Adesina, F., & Elasha, B. O. (2007). The value of indigenous knowledge in climate change mitigation and adaptation strategies in the African Sahel. *Mitigation and Adaptation Strategies for Global Change*, *12*(5), 787–797.

O'Brien, K. (2012). Global environmental change II: From adaptation to deliberate transformation. *Progress in Human Geography*, *36*(5), 667–676. doi:10.1177/0309132511425767

Ostrom, E. (2010a). A multi-scale approach to coping with climate change and other collective action problems. *Solutions*, *1*(2), 27–36.

Ostrom, E. (2010b). Polycentric systems for coping with collective action and global environmental change. *Global Environmental Change-Human and Policy Dimensions*, *20*(4), 550–557. doi:10.1016/j.gloenvcha.2010.07.004

Pauw, P., & Pegels, A. (2013). Private sector engagement in climate change adaptation in least developed countries: An exploration. *Climate and Development*, *5*(4), 257–267. doi:10.1080/17565529.2013.826130

Rademacher-Schulz, C., Schraven, B., & Mahama, E. S. (2013). Time matters: Shifting seasonal migration in Northern Ghana in response to rainfall variability and food insecurity. *Climate and Development*, *6*(1), 46–52. doi:10.1080/17565529.2013.830955

Ribot, J. C. (1996). Participation without representation: Chiefs, councils and forestry law in the West African Sahel. *Cultural Survival Quarterly, 20* (Fall), 40–44.

Ribot, J. C. (2003). Democratic decentralisation of natural resources: Institutional choice and discretionary power transfers in Sub-Saharan Africa. *Public Administration & Development*, *23*(1), 53–53.

Ribot, J. C. (2010). *Vulnerability does not fall from the sky: Toward multiscale, pro-poor climate policy. New frontiers of social policy.* Washington, DC: World Bank.

Rowley, C. K. (2000). Political culture and economic performance in sub-Saharan Africa. *European Journal of Political Economy*, *16*(1), 133–158. http://dx.doi.org/10.1016/S0176-2680(99)00051-8

Rydin, Y., & Pennington, M. (2000). Public participation and local environmental planning: The collective action problem and the potential of social capital. *Local Environment*, *5*(2), 153–169.

Schipper, E. L. F., Fencl, A., Hoffmaister, J. P., & Osbeck, M. (2012). *Adaptation to climate change and agriculture: What role for rural institutions? CGIAR research program on Climate change, agriculture and food security.* Stockholm, Sweden: Stockholm Environment Institute.

Sherman, M. H., & Ford, J. (2014). Stakeholder engagement in adaptation interventions: An evaluation of projects in developing nations. *Climate Policy*, *14*(3), 417–441. http://dx.doi.org/10.1080/14693062.2014.859501

Skoufias, E. (2003). Economic crises and natural disasters: Coping strategies and policy implications. *World Development*, *31*, 1087–1102.

Smit, B., & Pilifosova, O. (2001). *Adaptation to climate change in the context of sustainable development and equity.* Climate change 2001: Impacts, adaptation, and vulnerability – Contribution of working group II to the third assessment report of the intergovernmental panel on climate change. Cambridge, UK: Cambridge University Press.

Sova, C., Helfgott, A. S., Chaudhury, A., Matthews, D. F., Thornton, T. J., & Vermeulen, S. (2014). Multi-level Stakeholder influence mapping: Visualizing power relations across actor levels in Nepal's agricultural climate change adaptation regime. *Systemic Practice and Action Research*, *28*(4) 383–409. doi:10.1007/s11213-014-9335-y

Sova, C., Vervoort, J., Thornton, T., Helfgott, A., Matthews, D., & Chaudhury, A. (2015). Exploring farmer preference shaping in international agricultural climate change adaptation regimes. *Environmental Science & Policy*, *54*, 463–474. http://dx.doi.org/10.1016/j.envsci.2015.08.008

Thomas, D. S. G., & Twyman, C. (2005). Equity and justice in climate change adaptation amongst natural-resource-dependent societies. *Global Environmental Change*, *15*(2), 115–124. http://dx.doi.org/10.1016/j.gloenvcha.2004.10.001

Tompkins, E. L., & Adger, W. N. (2004). Does adaptive management of natural resources enhance resilience to climate change? *Ecology and Society*, *9*(2), 10.

Treby, E. J., & Clark, M. (2004). Refining a practical approach to participatory decision making: An example from coastal zone management. *Coastal Management*, *32*, 353–372.

Urwin, K., & Jordan, A. (2008). Does public policy support or undermine climate change adaptation? Exploring policy interplay across different scales of governance. *Global Environmental Change*, *18*(1), 180–191. http://dx.doi.org/10.1016/j.gloenvcha.2007.08.002

Vergara, L. G. (2013). Elites, political elites and social change in modern societies. *Revista de Sociologia*, *28*, 31–49.

Vincent, K. (2007). Uncertainty in adaptive capacity and the importance of scale. *Global Environmental Change*, *17*(1), 12–24. http://dx.doi.org/10.1016/j.gloenvcha.2006.11.009

Weber, M. (1978). *Economy and society.* Berkeley: California University Press.

Wong, S. (2010). *Elite capture or capture elites? Lessons from the 'counter-elite' and 'co-opt elite' approaches in Bangladesh and Ghana*. (Working Paper 82). Helsinki, Finland: World Institute for Development Economics Research.

Yaro, J. A., Teye, J., & Bawakyillenuo, S. (2014). Local institutions and adaptive capacity to climate change/variability in the northern Savannah of Ghana. *Climate and Development*, 1–11. doi:10.1080/17565529.2014.951018

Yates, J. S. (2012). Uneven interventions and the scalar politics of governing livelihood adaptation in rural Nepal. *Global Environmental Change*, *22*(2), 537–546.

Young, O. R. (2002). *The institutional dimensions of environmental change: Fit, interplay, and scale*. Cambridge: MIT Press.

Young, O. R. (2013). *On environmental governance: Sustainability, efficiency, and equity. On politics*. Boulder, CO: Paradigm.