

Multi-level Governance, Policy Networks and the Integration of Mitigation and Adaptation in the Land Use Sector: Evidence from Indonesia

Monica Di Gregorio, Dodik Nurrochmat, Bruno Locatelli, Leandra Fatorelli, Emilia Pramova, Intan Sari, Sonya Kusumadewi

Primary theme: ***Multilevel Capacity***

Secondary theme: ***Coherence***

ABSTRACT

This paper explores the political opportunities and challenges associated with facilitating integration of climate change mitigation and adaptation in land use policy processes across levels of governance in Indonesia. Since the 2nd IPCC assessment report it has been recognized that mitigation and adaptation display important synergies in the land use sector (Klein et al. 2005, Nabuurs et al. 2007). While previous research has proposed various ways to integrate adaptation and mitigation activities (Murdiyarso et al. 2005), we know little about what is needed to effectively integrate policy decision-making processes and policy objectives across levels of governance (Locatelli et al. 2015, Doherty and Schroeder 2011, Ravikumar 2015).

We understand multi-level governance as ‘the existence of overlapping competencies among multiple level of governments and the interaction of policy actors across those level’, which result in ‘multi-level policy networks’ (Marks et al. 1996: 41-2) and reflect a multi-actor polycentric polity structure (Mayntz 1994, Ostrom 2010). Mechanisms that determine the structure of cross-level interactions – whether they result in dominance, separation, merger, negotiated agreement or systems change – are determined by: i) authority and power differentials; ii) level and limits of decentralization; iii) contrasting discourse; iv) cognitive transitions; and v) blocking - or supporting - policy coalitions (Young 2006).

This paper investigates multi-level governance processes within the sub-domains of climate change mitigation and adaptation in the land use sector. It focuses in particular on assessing the differences and the level of integration among these two sub-domains across national and sub-national governance levels. It does so by investigating the role of policy coalitions and of central policy actors in facilitating interactions across national, province and district levels in Indonesia. It adopts an institutional approach and social network analysis approach (Scott 2000, Young 2006).

The study is based on fieldwork undertaken between 2014 and 2015 in Indonesia. It is based on 120 interviews with policy actors across the national level and in one province (West Kalimantan) and in one district level (Kapuas Hulu).

INTRODUCTION

Climate change governance has evolved into a complex multi-level polycentric governance structure that spans from the global level under the United National Convention on Climate Change (UNFCCC), to national and sub-national levels, relying on both formal and informal policy channels (Bulkeley *et al.* 2014, Jordan *et al.* 2015). Across as well as within countries national, sub-national as well as international state and non-state actors are involved in formulating and implementing climate policies and actions (Newell 2000). Such a complex governance structure reflects the ‘glocal’ nature of climate change, whose distinct impacts are felt at and whose solutions involve multiple levels of governance (Gupta *et al.* 2007).

At the same time, decision making processes related to the two sub-domains of climate change mitigation and adaptation often occur in isolation from each other. In part this is because of different time frames, sectoral priorities, potential competition for resources and perceptions about the relevance of mitigation and adaptation at different governance levels (Adger 2001, Klein *et al.* 2005, Tol 2006). Yet, it 2nd has been increasingly recognized that mitigation and adaptation display important synergies in the land use sector (Klein *et al.* 2005, Nabuurs *et al.* 2007, Locatelli *et al.* 2015).

While previous research has proposed various ways to integrate adaptation and mitigation activities (Murdiyarso *et al.* 2005), we know little about the barriers and the opportunities to effectively integrate policy decision-making processes and policy objectives across levels of governance (Doherty and Schroeder 2011, Ravikumar *et al.* 2015). While considerable evidence have been gathered about supranational multi-level governance processes such as environmental management in the EU, fewer studies have investigated multi-level governance of climate change in the domestic context and most of these focus on the developed world (Hooghe 1996, Klein *et al.* 2005, Cash *et al.* 2006, Gupta 2007).

The paper adopts an institutional approach and social network analysis approach (Scott 2000, Young 2006). It applies theories on multi-level governance and on policy networks to investigate climate change mitigation and adaptation policy networks in the land use sector in Indonesia. It focuses particularly on the role of policy coalitions and of central policy actors in facilitating interactions across national, province and district levels in Indonesia.

It addresses the following research questions:

- To what extent do governance levels represent a barrier to information and collaboration exchanges in the climate change domain? Do cross-level interactions differ between mitigation and adaptation networks?
- To what extent do dominant and minority coalitions bridge across levels of governance?
- What is the role of specific organizations in facilitating or controlling cross-level interactions?

MULTI-LEVEL POLICY NETWORKS

One feature of the complexity of environmental problems such as climate change is the multi-level nature of their impacts and decision-making processes, and the need for cross-level policy coordination in order to address them (Adger 2001, Gupta *et al.* 2007). Multi-level governance in the climate domain, has emerged to tackle such cross-level policy problems (Newell *et al.* 2012). The concept of multi-level governance has been the subject of investigation by different social science disciplines from sociology, to political science, international relations and geography in relation to environmental as well as other policy problems (Stubbs 2005, Mwangi and Wardell 2012). This paper approaches multi-level governance from an institutional and policy network perspective (Ansell *et al.* 1997b, Young 2002).

Multi-level policy networks

We understand multi-level governance as ‘the existence of overlapping competencies among multiple levels of government and the interaction of policy actors across those levels’, which results in ‘multi-level policy networks’ (Marks *et al.* 1996a: 41-2). It refers to a polity that has a multi-actor polycentric structure, and where state actors interact with domestic and international non-state actors in complex multi-relational and multi-level networks (Ansell *et al.* 1997a, Szell *et al.* 2010). Policy actors control and exchange resources, including information, they collaborate and form political alliances within and across governance levels (Sabatier and Jenkins-Smith 1993, Marsh and Smith 2000, Ostrom 2010).

Multi-level policy networks underline both the cross-level (vertical) dimension of coordination and the network polity features that prioritize the horizontal dimension of governance. While these dimensions have often been considered separately in the literature, as multi-level governance and policy networks approaches respectively, we combine the two in order to highlight the dual features of multi-level governance in neo-pluralist networked polities (Ansell 2000, cf. Jessop 2004a).

Neo-pluralist approaches to the polity argues that central state actors do not take policy decisions alone (Newell 2000, McFarland 2007). Other state and non-state policy actors at different governance levels contribute to shape policy decisions and outcomes as they exchange resources to coordinate action and advance their interests. The involvement of the state is seen as ‘less hierarchical, less centralized and less directive’ than state-centered approaches and recognize that non-state organizations contribute material as well as immaterial resources, such expertise, information, and legitimacy to the policy process (Bache and Flinders 2004).

Multi-level governance networks and state power

Within this approach, the notion of 'policy networks' does not just represent a specific analytical perspective, it signifies the actual specific structure of the polity (Mayntz 1993: 5). Policy networks approaches suggest that policy domains can be envisioned as a set of resource-dependent organizations, where organizations depend on each other for resources and they interact in order to achieve their goals. Resources include both material resources, such as financial resources and immaterial power resources, such an information, expertise and legitimacy (Bache and Flinders 2004). While a

plurality of actors influence policy decisions, dominant coalitions retain some discretion in decision-making.

The constellation of power within the specific policy network determines the extent to which state actors are able to impose decisions (Rhodes 2006). In his work on British government Rhodes (1981) shows, for example, how central government departments uses policy networks in their own interest and how central versus local government are in fact asymmetrical. The central role of the state is also ensured by its democratic credentials (Jessop 2004b). Overall, because state actors have to authority to make binding decision with regard to policies, it is expected that they retain a high degree of centrality in the interorganization networks and provide leadership in steering of policy debates and initiatives (Ansell *et al.* 1997b). Within such a polity, policy outcomes are then ‘the outcome of overlapping competencies, tensions, and conflicts in a system multi-level governance’ (Marks *et al.* 1996b: 164).

Multi-level governance, policy coalitions and power differentials

Young (2006) refers to the presence of cross-level interactions among different regimes as ‘vertical interplay’. Such interplay can be asymmetric or more balanced depending of the constellation of power across levels. Evidence of asymmetric vertical interplay comes, from example, from a study on Trinidad and Tobago, which shows that central government actors exercised power by withholding access to information to other policy actors (Tompkins *et al.* 2002).

In different policy domains multi-level policy networks can take different shapes. In case of strong asymmetric power relations, cross-level interactions can results in dominance of one jurisdictional level over the others. More balanced constellations of power might result in various forms of negotiated agreement that accommodate to some extent diverse interests. Alternatively, levels might be completely separated, or merged, and finally a multi-level governance system might shift between these different states (Young 2006). A number of mechanisms determine which of the above structure cross-level interactions features. They are the a) authority and power differentials of policy actors, b) the presence of facilitating or blocking policy coalitions, c) the level and limits of decentralization, d) the presence of contrasting discourses and e) and the opportunities for cognitive transitions (Young 2006).

In this paper we investigate the first two mechanisms: the constellation of power and the role of coalitions in facilitating or hampering cross-level interactions. While we recognize the importance of discursive practices for the identification of coalitions as well as explaining cross-level interactions, in this paper we focus on density of interactions to identify likely policy coalitions. Discursive practice are an area for further analysis.

At the group level cross-level policy coalitions will facilitate integration of different levels of governance, while policy coalitions that are concentrated at one level of governance will make cross-level interactions more difficult. Similarly, at the organizational level, boundary or bridging organizations often act as intermediators facilitating interaction across different types of organizations or across jurisdictions (Folke *et al.* 2005). Intermediation can focus on different aspects. Some organizations might focus on facilitation information flows on climate change mitigation across

governance levels, while be involved or facilitate cross-level collaboration on climate change adaptation. In addition, there might also be influential organizations that do not facilitate or even hamper cross-level interactions.

METHODS

The case study investigates a cross-level policy network that includes policy actors that are most active at the national level in Indonesia, those operating at the level of the province of West Kalimantan in Indonesian Borneo, and actors operating with one of the districts of the province, Kapuas Hulu. This province and district were selected because of the district’s long expressed commitment to conservation and the recent involvement in the development of provincial level climate change policies in the land use sector. Thus, the policy network represents a cross-level ‘slice’ of the overall Indonesia multi-level climate change network, and the analysis focuses on the interactions between district, province and national level. We do not suggest that results are necessarily representative for Indonesia as a whole. But some features might reflect similar realities in other remote, forest rich provinces and districts.

The data were collected through a survey with 120 policy actors across the three levels of governance that asked them about communication and collaborative ties with other actors related to climate change mitigation and climate change adaptation. In addition, we used semi-structured interviews to collect information about organizations’ involvement in climate change policy processes and activities, their understanding of climate change concepts and their opinions about policy priorities and challenges to integrate climate change mitigation and adaptation in the land use sector.

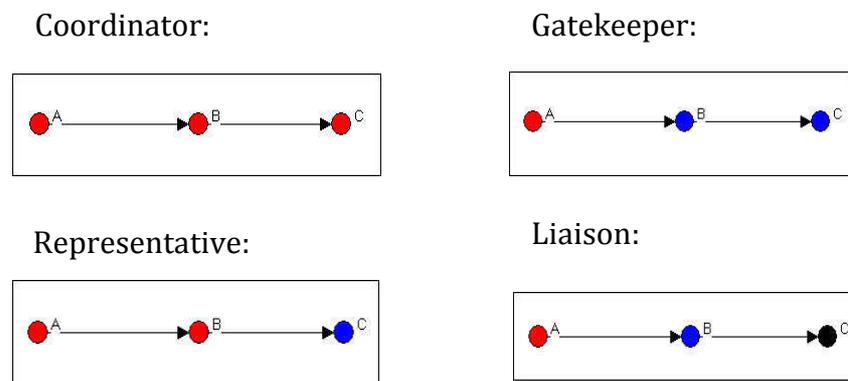
In the analysis, we first assessed the extent to which, within these policy networks the level of governance represents an obstacle for cross-level communication and collaboration and the extent to which interactions occur within as opposed to across governance level. The assessment is done through a simple homophily index (the E-I index). Homophily refers to the tendency of actors that share a specific similarity to interact more closely, compared to actors that do not (McPherson et al. 2001). The E-I Index (Krackhardt and Stern 1988) is an overall measure of homophily that compares within group and between group ties. It takes the number of ties of group members to outsiders, subtracts the number of ties to other group members, and divides by the total number of ties. The index ranges from -1 (high homophily) to +1 (high heterophily). Further, to investigate homophily by governance level in more detail, we undertake an analysis of variance based on the density in interactions within each level as a test for homophily by level (variable homophily model) and compare the results across the four network relations (communication and collaboration on mitigation and adaptation (UCINET command Tools>Testing Hypotheses>Mixed Dyadic/Nodal>Categorical Attributes>ANOVA Density Models).

Next we investigate sub-groups that are good candidates for policy coalitions. We use faction analysis to identify groups of actors that interact predominantly among themselves (UCINET command Network>Subgroups>Factions based on Hamming model of fit). These groups are likely to overlap strongly with policy coalitions, as one of the features of policy coalitions is that actors within a coalition engage in high

levels of interactions.

To identify the dominant policy actors and dominance of factions we refer to a simple actor-level prominence measure that indicates prestige. This measure is called indegree and is simply the sum of incoming ties (of communication plus collaboration ties in our case) for each actor (Knoke and Burt 1983). The higher the indegree the more sought after a policy actor is in the network (Freeman 1976, Scott 2000). Within level coordination is assessed through the brokerage measure called ‘coordinator’ role. The coordinator gives and receive ties within one level (figure 1). And finally, to identify policy actors that have mediatory roles across levels of governance, we rely on three other brokerage role: the gatekeeper, the representative and the liaison (Gould and Fernandez 1989). A gatekeeper controls access of policy actors from other governance levels, a representative acts as the main contact point for actors at other levels, while a liaison (e.g. an actor at provincial level) links actors of two different governance levels (national and district) (figure 1).

Figure 1: Brokerage roles:



Note: Different colours refer to different governance levels

RESULTS

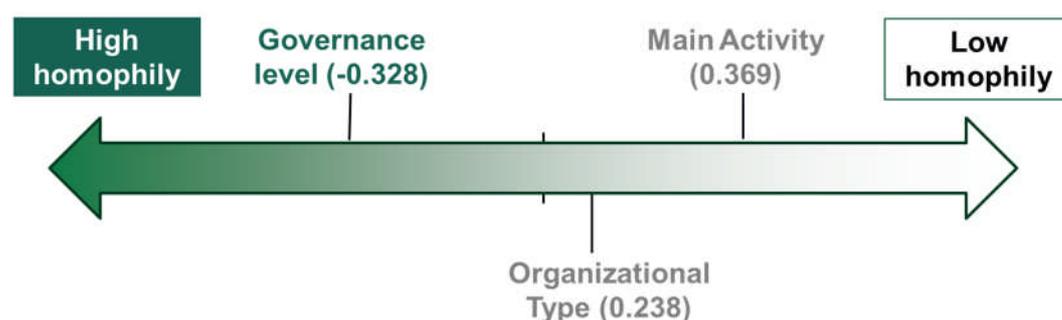
Birds of one feather flock together: Choice or constraints to cross-level interactions?

While there are numerous communication and collaboration ties related to both mitigation and adaptation across levels of governance, policy actors interact predominantly within levels. This is true for all three levels of governance. Figure 2 shows the E-I index for the multi-relational network that includes all communication and collaboration ties on both mitigation and adaptation. It shows the E-I index for three different attributes: the level of governance (categories: national, provincial, district), the type of organization (state actor, domestic and international NGO, business, research institution, intergovernmental organization and donors), the main activity policy actors are involved in (categories: they work mainly on mitigation, mainly on adaptation, they work substantially on both M and A, they undertake limited activities for both M and A). We find homophily with respect to all three different variables, as in all three cases the E-I index is smaller than the expected value for the case of absence of homophily. Among the three variables, the

governance level displays the highest levels of homophily, which corresponds to having the smallest E-I value (Figure 2).

The means policy actors are not just much more likely to interact within levels of governance compared to across level, but this homophily tendency is much stronger for the variable of levels of governance compared to organizational type, or main activity.

FIGURE 2: E-I Index for main activity, organizational type and governance level for the multi-relational network



Taking a closer look at the four single relationships – communication about mitigation, about adaptation and collaboration on mitigation and on adaptation – we can see that while governance level homophily occurs in all, there are some differences across these relations (Tables 1.A-D).

Overall density of interactions in the mitigation networks and within and across each levels is always higher than in the adaptation networks (for the same governance level). This indicates more activities, in terms of communication and collaboration across policy actors, are occurring in relation to mitigation compared to adaptation, suggesting that mitigation is a much more active policy sub-domain in the land use sector in Indonesia compared to adaptation. This is also confirmed by information from the policy analysis (Di Gregorio *et al.* 2015).

Further patterns are evident. While usually within group densities increase from national to province to district level (which you would expect in part on the basis that the group size increases), in the case of the mitigation communication network interactions among provincial level actors are less dense (0.32) than those among national actors (0.34). This is a first indication that information exchange on mitigation are particularly concentrated among national and among district level actors. These are also the levels at which most mitigation policy formulation activities and implementation have been concentrating. For in terms of collaboration a different story emerges, although homophily is still present, district actors reach out much more to both provincial and national actors and the same is true for national actors too. This reveals three features. First, cross-level collaboration is more valued by actors compared to within level collaboration. This is expected, as for example in opportunities and funds for collaboration for districts are likely to come from the central or through provincial levels. Second, obstacles to cross-level collaboration are likely to exist, given that homophily across level persists.

There is also one interesting further difference between mitigation and adaptation networks. The level of homophily among district level actors in the adaptation communication network (0.46) is much stronger than in the mitigation communication networks (0.36) (the coefficient is also much higher). In the collaboration network this is less pronounced (density is just slightly lower for the adaptation collaboration district level compared to the mitigation collaboration networks, but the difference is much smaller than for province and national levels) (Table 1.A-D). What this indicates is that communication among district level actors and to a lesser degree collaboration seems to be much more important for adaptation than for mitigation. This provides a first indication that local actors are engaged and maybe value the need to discuss and collaborate on adaptation more compared to mitigation, suggesting that it maybe is a higher priority for local compared to central actors.

One question that remains though is whether homophily across levels is primarily explained by preferences or by constraints that policy actors face.

One indication that actors are likely to experience constraints in cross-level (and cross-sectoral) interactions with regards to integrating the two climate change sub-domains comes from the survey. Among six different challenges proposed, policy actors themselves scored the difficulty to engage in cross-level and sectoral coordination as the most important challenge (Table 2). The very high level of homophily suggests a likely constraint to cross-level interactions.

TABLE 1. Density tables of cross-level interactions

Mitigation communication network			
Level (# nodes) %	National (78) 64%	Province (30) 25%	District (13) 11%
National	0.34***	0.15	0.09
Province	0.15	0.32***	0.25
District	0.09	0.25	0.36***
R ² -adj: 0.05			

Adaptation communication network			
Level (# nodes) %	National (78) 64%	Province (30) 25%	District (13) 11%
National	0.20***	0.10	0.06
Province	0.10	0.22***	0.18
District	0.06	0.18	0.46***
R ² -adj: 0.031			

Mitigation collaboration network			
Level (# nodes) %	National (78) 64%	Province (30) 25%	District (13) 11%
National	0.19***	0.08	0.03
Province	0.08	0.27***	0.18
District	0.03	0.18	0.24***
R ² -adj: 0.035			

Adaptation collaboration network			
Level (# nodes) %	National (78) 64%	Province (30) 25%	District (13) 11%
National	0.11***	0.05	0.02
Province	0.05	0.20***	0.15
District	0.02	0.15	0.23***
R ² -adj: 0.024			

***: $p < 0.001$ denotes presence of homophily at a statistically significant level

TABLE 2:

Linking adaptation and mitigation is difficult because....:	% agree	Scored as No 1 challenge
...coordinating the multiple actors across sectors and scales is very complex	88%	40
...of different priorities with regards to adaptation and mitigation	86%	26
...of insufficient technical knowledge and guidance about addressing them together	86%	14
...there is little dialogue between adaptation and mitigation actors	79%	13
current climate change policy frameworks treat them as separate action arenas	75%	15
...it makes implementation more complex	39%	1

Factions, power and cross-level communication in the climate change network

In the section, we present the results from the faction analysis of the climate change communication network (formed by the joint mitigation and adaptation communication ties). In this network, we identified five main factions, which are particularly dense areas of communication exchange. A sixth group of actors represents a residual category, which includes actors that have very limited communication among themselves as well as with other actors (see legend next page). We then characterized each faction according to the dominant type of actors that composed it. Consequently we named the factions: adaptation specialists (contains predominantly actors working on adaptation); mitigation specialists (contains predominantly actors working on mitigation); one faction containing mainly national level environmental justice NGOs; one faction with mostly provincial level forest and climate change actors and finally one faction with both provincial and district level agricultural and disaster management actors (see legend next page).

Dominance of national level adaptation and mitigation specialists

We then calculated indegree centrality of each policy actor within the network, which is represented by the size of the nodes in figure 3: the bigger the size, the higher the indegree. An actor with high indegrees is an actor that is sought either because she/he possesses valuable information or because it is value to be communicating with her/him. Thus, indegree is a measure of prominence in the network, and a measure of local influence. Apart from prominence we identified actors that are particularly active in linking with other actors within each level of governance. These actors have high coordination brokerage scores, which are depicted as the size of the nodes in figure 4.

Out of the five factions, the two that contain the most prominent policy actors (the mitigation and the adaptation specialist factions) include actors that are located (in terms of undertaking main operations or office location) exclusively at the national

level. The other three less powerful coalitions, formed by environmental justice NGOs, and predominantly local actors, are the ones that contain some policy actors that are located at different levels of governance. This evidence suggests that: a) influence with respect to communication networks resides primarily with specialized mitigation and adaptation actors at the national level, possibly this indicates that climate change expertise is a highly valued commodity, b) these same actors interact predominantly at the national level, which seems to indicate some level of isolation of provincial and district level actors, in particular in terms of engagement with powerful climate change actors, and c) it is less powerful non-states that predominantly engage in cross-level communication linking levels of governance.

Non-state actors as the main coordination specialists

The evidence also shows that the most central actors within each factions (actors with highest indegrees) are state actors, with the exception of the environmental justice NGOs groups which does not contain any state actors (the dominant actor is AMAN, which is the Indonesian indigenous people’s association). However, again it is primarily non-state actors – NGOs, independent councils and research organizations – that facilitate within faction information exchanges, being the most important coordinators (highest coordination brokerage score) (see legend to figure 3 and 4 below). This, underlines the very important role of civil society organizations in facilitating communication of ideas and flows of information about mitigation and adaptation within as well as across different levels of governance.

Another characteristic of the climate change communication network is that, while adaptation and mitigation specialists communicate with each other, at the national level there is a clear separation between these two specialist groups. At the provincial and district levels, however, the separation into factions relates more to the sectoral focus of policy actors. This can be explained by two distinct aspects. First, at national level policy actors are more specialized within the climate change sub-domains, some working primarily on adaptation and some predominantly on mitigation. While this specialization can be due to higher levels of expertise on climate change to begin with, it might also hamper policy integration of the two mitigation and adaptation in the land use sector, which could lead to trade-offs and potential benefits from integration being ignored (Locatelli *et al.* 2015). Second, it is likely that at the sub-national level there is an implicit recognition that climate change mitigation and adaptation might need to be considered together. The semi-structured interviews corroborated this suggestions, as local level policy actors tend to recognize more often the linkages between these two types of interventions and the need to integrate not just mitigation and adaptation but also development objective (Denton *et al.* 2014). However, these findings alone, do not suggest, or cannot provide an indication as to whether these same actors are in fact able to reconcile possible trade-offs between these objectives. This remains an aspect for further empirical assessment in terms of the policy outcomes (which are not assessed in this paper).

Legend and dominant characteristics of the factions

Factions	Cross-level coalition	Highest Indegree	Main Coordinator within levels (brokerage score)
● Adapt specialists	No	Min. Environ.	Nat Council on Climate Change
● Mitig. specialists	No	Min. Forestry	Center for Int. Forestry Research
● Nat Env Justi NGOs	Yes	AMAN (ind. org)	Epistema Institute (Env Just. NGO)
● Prov Forest&Climate Change actors	Yes	Forestry Service (Prov)	WWF - Prov. NGO
● Prov&Distict Agri&Disaster Manag.	Yes	Dev Planning Agency (Dist.)	BMKG -Prov state
○ Residual category (low density): private sector dominated= secondary actors, few connections within and outside			

FIGURE 3: Climate Change Communication network (nodes size equal indegrees)

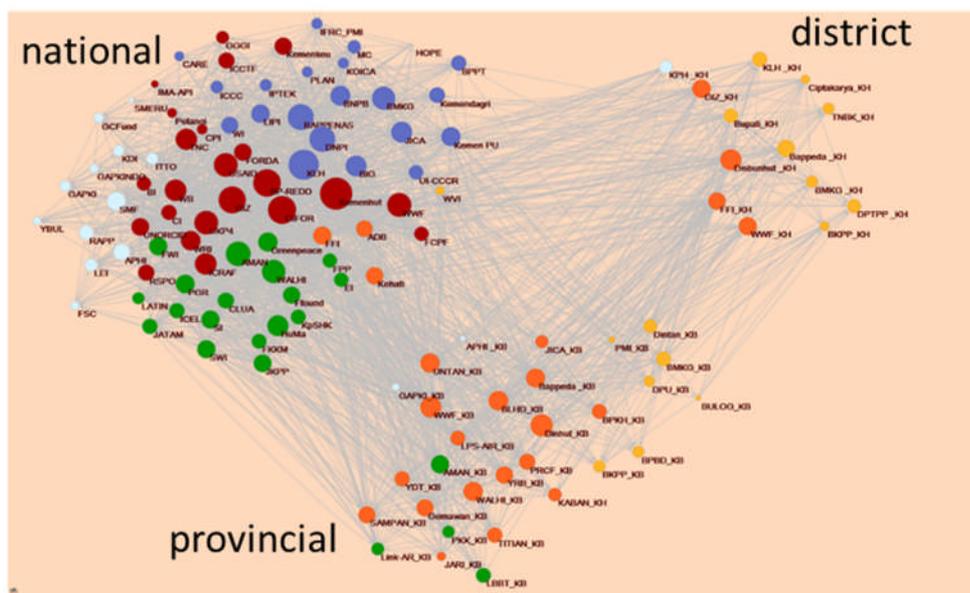
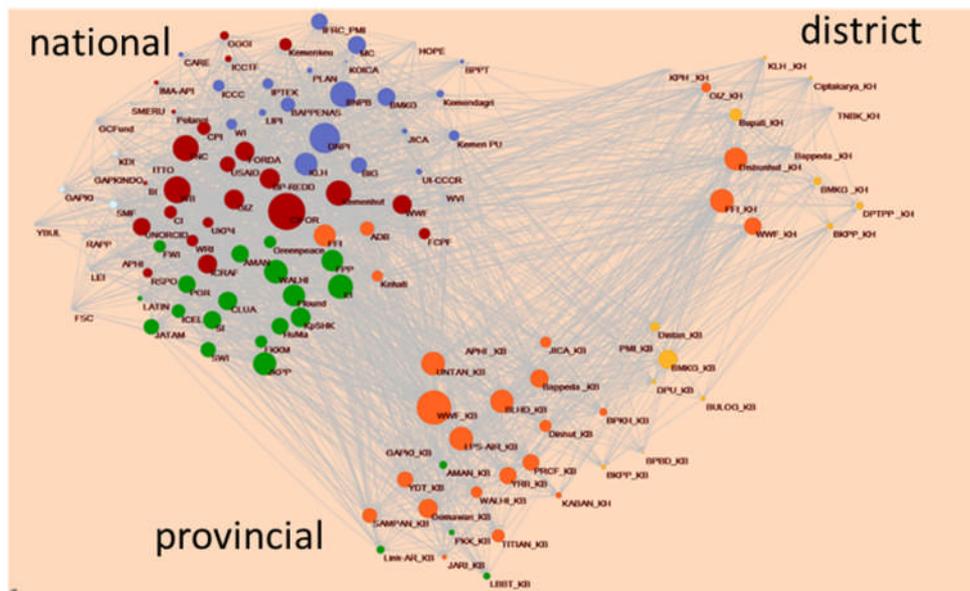


FIGURE 4: Climate Change Communication network (nodes size equals coordination brokerage scores)



Cross-level brokerage and local actors

In terms of cross-level brokerage we can distinguish three brokerage roles. Actors with high gatekeeper score are able to control information that is exchanged with over governance levels, while representatives have the opposite functions they channel information from one governance level to another. Comparing the two types of roles, the most relevant gatekeepers are the national level mitigation specialists, with the Ministry of Forestry, the research institute Center for International Forestry Research (which undertook this study in collaboration with the University of Leeds), and WWF - the main international NGO that is working on forest conservation projects in Kapuas Hulu district – having the highest scores (Figure 6 A).

On the other hand the most relevant representatives are at the provincial level and are non-state actors: WWF and the local university (Figure 6 B). WWF remains the main representative of national level actors, followed by another international NGO operating in Kapuas Hulu, Flora and Fauna International (FFI), which the ministry of Forestry following in third place. At district level, the main representative is the a local government actor, the District Forestry Services. Thus, part from the local levels, the main actors representing different levels of governance in communication networks are international NGOs that operate at the local level.

Finally, the main actors that link all three levels of governance are located at provincial level (Figure 6 C). This is not surprising as within the state hierarchy this is the level that is supposed to link national and district level. Again the main liaisons are WWF and the local university, followed by the Provincial Environmental Agency. What is more surprising is that a number of actors located at district level are also important liaisons, WWF, FFI and the District Forestry Services. This shows that district level actors interact directly with national and provincial levels of government and in fact play a key role in linking national level with provincial levels and vice-versa. This is supported by policy developments, in particular in relation to climate change mitigation, which have involved national and district level actors more prominently than provincial level actors.

DISCUSSION AND CONCLUSION

This study provides preliminary evidence of the structure of multi-level policy networks in the climate change mitigation and adaptation domain in the land use sector in Indonesia. Comparing mitigation and adaptation policy networks, the former are more dense, centralized and clustered than the latter. This indicates that the climate change mitigation policy domains is more developed than the adaptation one, with more communication flows and collaborative ties between actors within and across policy levels. The analysis of communication and collaboration networks shows that policy actors interact primarily within governance levels and sustained cross-level communication is particularly difficult to achieve.

Governance level homophily is highest in the **mitigation** networks at **provincial** level, and in the **adaptation** networks at **district** level, which indicates that different levels of governments have distinct interactions patterns in the two climate change sub-domains. These differences suggest that national and district level actors, although predominantly interacting within level, do reach out more to each other than to provincial actors. Thus, provincial level actors might in fact be marginalized in the overall mitigation networks. On the other hand, it seems that district level actors have taken ownership of the adaptation networks, with relatively high levels of within level interactions (relatively higher than national or provincial level actors) they put a high priority on within-level climate change adaptation communication exchanges. This happens despite the fact that climate change mitigation policy processes, actions and communication exchanges are more developed throughout all governance levels compared to adaptation ones. This suggests that district level actors are in fact (relatively) more concerned with climate change adaptation, compared to climate change mitigation. These findings indicate that climate change priorities of national level mitigation specialist and those of prominent national level state actors and international organizations that are pushing the mitigation agenda, dominate over the interests of climate change adaptation actors and those concerned with addressing the local impacts of climate change in the land use sector. Thus, cross-level interactions reveal a certain degree of dominance (Young 2006) of national level mitigation actors in the climate change domain in Indonesia. Their interests are likely to prevail in policy processes, which suggest limited propensity to integration climate change mitigation and adaptation objectives in practice.

Ansell's (1997b) suggestion that state actors play a central role in inter-organizational network is realized with respect to prominence in climate change communication networks. Indeed, the most central actors are state actors. However, the most important brokers, those that facilitate information flows within and across governance level are predominantly non-state actors, and specifically international NGOs who have the funds and operate local level projects, the local university. The fact that the main brokers

Further research, will use discourse analysis to further investigate the evidence for the findings, and explore the nature of cross-level coalitions in terms of underlying values

systems and discourses (Stubbs 2005). This will allow to better understand the formation of policy coalitions and whether actors at different governance levels understand and prioritize climate change mitigation and adaptation differently. In any case, this paper suggests the need for prominent national actors to support adaptation policies and actions in order to promote a policy agenda that better integrated climate mitigation and adaptation actions and that support the main interested of key district level policy actors.

REFERENCES

- Adger, W.N., 2001. Scales of governance and environmental justice for adaptation and mitigation of climate change. *Journal of International Development*, 13 (7), 921-931.
- Ansell, C., 2000. The networked polity: Regional development in Western Europe. *Governance*, 13 (2), 279-291.
- Ansell, C.K., Parsons, C.A. & Darden, K.A., 1997a. Dual networks in European regional development policy. *JCMS: Journal of Common Market Studies*, 35 (3), 347-375.
- Ansell, C.K., Parsons, C.A. & Darden, K.A., 1997b. Dual networks in European regional development policy. *Journal of Common Market Studies*, 35 (3), 347-375.
- Bache, I. & Flinders, M.V., 2004. Themes and issues in multi-level governance *In: Bache, I. & Flinders, M.V. eds. Multi-level governance*. Oxford: Oxford University Press.
- Bulkeley, H., Andonova, L.B., Betsill, M.M., Compagnon, D., Hale, T., Hoffmann, M.J., Newell, P., Paterson, M., Roger, C. & Vandever, S.D., 2014. *Transnational Climate Change Governance*.
- Cash, D.W., Adger, W.N., Berkes, F., Garden, P., Lebel, L., Olsson, P., Pritchard, L. & Young, O., 2006. Scale and cross-scale dynamics: Governance and information in a multilevel world. *Ecology and Society*, 11 (2).
- Denton, F., Wilbanks, T.J., Abeysinghe, A.C., Burton, I., Gao, Q., Lemos, M.C., Masui, T., O'Brien, K.L. & Warner, K., 2014. Climate resilient pathways: Adaptation, mitigation, and sustainable development. *In: Field, C.B., Barros, V.R., Dokken, D.J., Mach, K.J., Mastrandrea, M.D., Bilir, T.E., Chatterjee, M., Ebi, K.L., Estrada, Y.O., Genova, R.C., Girma, B., Kissel, E.S., Levy, A.N., MacCracken, S., Mastrandrea, P.R. & White, L.L. eds. Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge, United Kingdom and New York, NY: Cambridge University Press, 1101-1131.
- Di Gregorio, M., Nurrochamat, D.R., Fatorelli, L., Pramova, E., Sari, I.M., Locatelli, B. & Brockhaus, M., 2015. *Integrating mitigation and adaptation in climate and land use policies in Indonesia*. CCCEP Working Paper No. 245, SRI Working Paper No. 90, CIFOR Working Paper No. 199. Leeds, UK and Bogor, Indonesia.

- Doherty, E. & Schroeder, H., 2011. Forest tenure and multi-level governance in avoiding deforestation under REDD+. *Global Environmental Politics*, 11, 66-88.
- Folke, C., Hahn, T., Olsson, P. & Norberg, J., 2005. Adaptive governance of social-ecological systems. *Annual Review of Environment and Resources*, 30 (1), 441-473.
- Freeman, L.C., 1976. Centrality in social networks: Conceptual clarification. *Social Networks* 1, 1, 215-239.
- Gould, K.A. & Fernandez, R.M., 1989. Structures of mediation: A formal approach to brokerage in transaction networks. *Sociological Methodology*, 19, 89-126.
- Gupta, J., 2007. The multi-level governance challenge of climate change. *Environmental Sciences (special issue)*, 4 (3).
- Gupta, J., Van Der Leeuw, K. & De Moel, H., 2007. Climate change: a ‘glocal’ problem requiring ‘glocal’ action. *Environmental Sciences*, 4 (3), 139-148.
- Hooghe, L., 1996. *Cohesion policy and European integration: Building multi-level governance*. Oxford: Oxford University Press.
- Jessop, B., 2004a. The European Union and recent transformations in statehood. In: Puntcher Riekman, S., Mokre, M. & Latzer, M. eds. *The state of Europe: Transformations of statehood from a European perspective*. Frankfurt: Campus Verlag.
- Jessop, B., 2004b. Multi-level governance and multi-level metagovernance. In: Bache, I. & Flinders, M.V. eds. *Multi-level governance*. Oxford: Oxford University Press.
- Jordan, A.J., Huitema, D., Hilden, M., Van Asselt, H., Rayner, T.J., Schoenefeld, J.J., Tosun, J., Forster, J. & Boasson, E.L., 2015. Emergence of polycentric climate governance and its future prospects. *Nature Clim. Change*, 5 (11), 977-982.
- Klein, R.J.T., Schipper, E.L.F. & Dessai, S., 2005. Integrating mitigation and adaptation into climate and development policy: three research questions. *Environmental Science & Policy*, 8 (6), 579-588.
- Knoke, D. & Burt, R., 1983. Prominence. In: Burt, R. & Miner, M.J. eds. *Applied network analysis: A methodological introduction*. Beverly Hills CA: Sage, 195-222.
- Krackhardt, D. & Stern, R.N., 1988. Informal Networks and Organizational Crises: An Experimental Simulation. *Social Psychology Quarterly*, 51 (2), 123-140.
- Locatelli, B., Pavageau, C., Pramova, E. & Di Gregorio, M., 2015. Integrating climate change mitigation and adaptation in agriculture and forestry: Opportunities and trade-offs. *WIREs Climate Change*, 6 (6), 585-598.
- Marks, G., Nielsen, F., Ray, L. & Salk, J.E., 1996a. Competencies, cracks, and conflicts: Regional mobilization in the European Union In: Marks, G., Scharpf, F.W., Schmitter, P.C. & Streeck, W. eds. *Governance in the European Union*. London: SAGE.
- Marks, G., Nielsen, F., Ray, L. & Salk, J.E., 1996b. Competencies, cracks, and conflicts: Regional mobilization in the European Union. *Comparative Political Studies*, 29 (2), 164-192.
- Marsh, D. & Smith, M.J., 2000. Understanding policy networks: Towards a dialectical approach. *Political Studies*, 48 (4), 4-21.

- Mayntz, R., 1993. Modernization and the logic of interorganizational networks. *Knowledge and Policy*, 6 (1), 3-16.
- Mcfarland, A.S., 2007. Neopluralism. *Annual Review of Political Science*, 10 (1), 45-66.
- Mcperson, M., Smith-Lovin, L. & Cook, J.M., 2001. Birds of a feather: Homophily in social networks. *Annual Review of Sociology*, 27, 415-444.
- Murdiyarmo, D., Robledo, C., Brown, S., Coto, O., Drexhage, J., Forner, C., Kanninen, M., Lipper, L., North, N. & Rondón, M., 2005. Linking between mitigation and adaptation in land-use change and forestry activities. In: Robledo, C., Kanninen, M. & Pedroni, L. eds. *Tropical forests and adaptation to climate change: In search of synergies*. Jakarta, Indonesia: Center for International Forestry Research.
- Mwangi, E. & Wardell, A., 2012. Multi-level governance of forest resources (Editorial to the special feature). *International Journal of the Commons*. 6(2), pp.. DOI: , 6 (2), 79–103.
- Nabuurs, G.J., Masera, O., Andrasko, K., Benitez-Ponce, P., Boer, R., Dutschke, M., Elsidig, E., Ford-Robertson, J., Frumhoff, P., Karjalainen, T., Krankina, O., Kurz, W.A., Matsumoto, M., Oyhantcabal, W., Ravindranath, N.H., Sanz Sanchez, M.J. & Zhang, X., 2007. Forestry. In: Metz, B., Davidson, O.R., Bosch, P.R., Dave, R. & Meyer, L.A. eds. *Climate change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press.
- Newell, P., 2000. *Climate for change: Non-state actors and the global politics of the greenhouse*. Cambridge: Cambridge University Press.
- Newell, P., Pattberg, P. & Schroeder, H., 2012. Multiactor governance and the environment. *Annual Review of Environment and Resources*, Vol 37, 37, 365-387.
- Ostrom, E., 2010. Polycentric systems for coping with collective action and global environmental change. *Global Environmental Change*, 20 (4), 550-557.
- Ravikumar, A., Larson, A.M., Duchelle, A.E., Myers, R. & Tovar, J.G., 2015. Multilevel governance challenges in transitioning towards a national approach for REDD plus : evidence from 23 subnational REDD plus initiatives. *International Journal of the Commons*, 9 (2), 909-931.
- Rhodes, R.a.W., 1981. *Control and power in central-local government relations*. Farnborough, Hants.: Gower.
- Rhodes, R.a.W., 2006. Policy network analysis. In: Moran, M., Rein, M. & Goodin, R.E. eds. *The Oxford handbook of public policy*. Oxford: Oxford University Press.
- Sabatier, P.A. & Jenkins-Smith, H.C. eds. 1993. *Policy change an learning: An advocacy coalition approach*, Boulder, San Francisco, Oxford: Westview Press.
- Scott, J., 2000. *Social network analysis: A handbook*. London: SAGE.
- Stubbs, P., 2005. Stretching concepts too far? Multi-level governance, policy transfer and the politics of scale in Southeast Europe. *Southeast European Politics VI* (2), 66–87.
- Szell, M., Lambiotte, R. & Thurner, S., 2010. Multirelational organization of large-scale social networks in an online world. *Proceedings of the National Academy of Sciences*, 107 (31), 13636-13641.

- Tol, R.S.J., 2006. Adaptation and mitigation: Trade-offs in substance and methods. *Environmental Science & Policy*, 8, 572-578.
- Tompkins, E.L., Adger, W.N. & Brown, K., 2002. Institutional networks for inclusive coastal management in Trinidad and Tobago. *Environment and Planning A 2002*, 34, 1095 - 1111.
- Young, O., 2006. Vertical interplay among scale-dependent environmental and resource regimes. *Ecology and Society*, 11 (1).
- Young, O.R., 2002. *The institutional dimensions of environment change: Fit, interplay, and scale*. Cambridge, MASS and London: MIT Press.