Research Paper

Citizen networks in the Garden City: Protecting urban ecosystems in rapid urbanization

Johan Enqvist*, Maria Tengö, Örjan Bodin

Stockholm Resilience Centre, Stockholm University, SE-10691 Stockholm, Sweden

HIGHLIGHTS

- A citizen network provides a platform for urban environmental stewardship in India.
- Key activities include monitoring both authorities and fragmented urban ecosystem.
- Loose structure facilitates member participation but reduces efficiency.
- Internal legitimacy is prioritized over central leadership and external alliances.
- Rapidly changing cities may require different functions in citizen networks.

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ABSTRACT

Citizen groups can be important actors in urban environmental stewardship, and network structure often influences function and performance. However, most previous studies focus on cities in "developed" countries, thereby overlooking conditions relevant for the parts of the planet where most people live and most urban growth is expected. This paper describes a citizen network engaged in environmental issues in Bangalore, India, where rapid urbanization puts pressure on conventional management structures as well as the ecosystems providing benefits for the city's inhabitants. The study uses a mixed methods approach of qualitative interviews and social network analysis. Results show that the citizen network functions as a platform that enables interaction between diverse interest groups, and as a watchdog that monitors parks, lakes and trees to prevent further loss of fragmented urban ecosystems. The network's activities are influenced by internal tensions between inclusiveness and efficiency, and between internal and external legitimacy. Although core actors have central network positions, strong leadership or political alliances are not considered important; members instead prefer to emphasize transparency and democratic participation. This limits the capacity to act collectively on controversial issues, but creates an inclusive forum that bridges between groups in the heterogeneous and dynamic population. This is important for monitoring Bangalore's fragmented ecosystems and for raising public awareness and support. Findings indicate an urgent need to develop a comprehensive framework for urban environmental stewardship, to better describe potential roles of citizens in governance across diverse social, political and ecological conditions, and during different periods of urban change.

1. Introduction

Structural aspects of how network members interact have been shown to matter for civil society organizations (Diani & Bison, 2004), as well as public management and governance systems (Kickert, Klijn, & Koppenjan, 1997). Social Network Analysis (SNA) is increasingly applied to study natural resource management and complex social–ecological systems (Bodin & Prell, 2011; Carlsson & Sandström, 2008; Crona & Bodin, 2006; see also Ogden et al., 2013), as well as to how citizens and civic groups can influence the protection of urban ecosystems (Connolly, Svendsen, Fisher, & Campbell, 2013; Ernstson, Barthel, Andersson, & Borgström, 2010; Ernstson, Sörlin, & Elmqvist, 2008; Holt, Moug, & Lerner, 2012). However, these studies on urban environmental stewardship focus only on a Northern "developed country" context. As recently observed by McHale, Bunn, Pickett, & Twine (2013), there is a need to expand the understanding to and address challenges in the global South, where rising levels of urbanization in the coming decades are

* Corresponding author. Tel.: +46 707198225.
E-mail addresses: johan.enqvist@stockholmresilience.su.se (J. Enqvist),
maria.tengo@stockholmresilience.su.se (M. Tengö),
orjan.bodin@stockholmresilience.su.se (Ö. Bodin).

expected to challenge the capacity of urban ecosystems to support human wellbeing of all inhabitants (MA, 2005; TEEB, 2011). Cities can be crucial biodiversity hotspots, important for the maintenance of local ecosystem services such flood protection, pollination, recreation, and cooling (CBD, 2012). Increased urbanization implies competition between remaining green spaces and other land uses, which makes management of the service-generating ecosystems particularly complex.

This is evident in Bangalore, India, where shifting administrative control and geographical expansion of city boundaries happen against a backdrop of rapid population growth and social inequalities. The city's struggle to accommodate needs for infrastructure and settlements has had serious consequences for the city's trees, parks, lakes and other urban ecosystems (D'Souza & Nagendra, 2011). Future challenges such as water scarcity and temperature increases related to climate change are likely to be exacerbated further if more trees and lakes are lost (Nagendra, Sudhira, Katti, Tengö, & Schewenius, 2012). The ongoing urbanization in Bangalore is severing important links between citizens and urban ecosystems, both by reducing the ecosystem's capacity to provide benefits for human wellbeing, but also by limiting people's participation in management and protection of these green spaces.

Many Bangaloreans are critical of ongoing developments and participate actively in various civil society groups. This study describes a citizen network created in 2005. It is an informal group, and to reduce its exposure this paper uses the pseudonym *Green Life*. Green Life has both organizations and individuals as members and the group is primarily held together by an email list with about 850 people (as of 2012). Apart from sharing information and opinions online, some members also participate in informal meetings and organize actions depending on current developments in the city. Green Life members have worked on a broad range of issues related to urban governance and has used a variety of approaches including mobilizing street protests, physically preventing tree cutting, and raising public awareness and engaging communities in neighborhood governance. This study focuses primarily on Green Life's role in *urban environmental stewardship*, defined by Connolly et al. (2013:76) as "work to conserve, manage, monitor, restore, advocate for, and educate the public about a wide range of issues relating to sustaining the environment". Citizen groups are not the only actors involved in such work, but there is a lack of research on their role – particularly in cities in the global South. This study therefore contributes important insights into the protection and management of urban green spaces in developing countries, where most urbanization and related economic, institutional and ecological challenges are expected to occur in coming decades (UN Habitat, 2008).

1.1. Social network functioning

Green Life, as a network, consists of social relations whose structure is an important component of the analysis in this study. The following section gives a brief overview of how previous theoretical and empirical work on environmental governance and social network analysis relate to the present study. A more thorough description can be found in Enqvist (2012).

Members' participation in Green Life is likely to be related to the capacity of networks to enable interaction among actors and generate a greater diversity of ideas, knowledge and resources (Kickert et al., 1997; McCarthy & Zald, 1977). This capacity will depend Green Life's ability to *transmit information*, allowing members to access easily information and knowledge; and *facilitate deliberations*, enabling members to equally take part in the exchange of ideas regardless of background or power relations (Newig, Pahl-Wostl, & Günther, 2010). Participating in Green Life will be attractive to members if it is effective in generating

Table 1
Tensions in network functioning and their relation to various structural characteristics.

Tensions	Impact from network structure
Efficiency vs. Inclusiveness	**Closure**. A centralized network structure favors efficiency by strengthening leadership and facilitating coordination (Bodin et al., 2006; Provan & Kenis, 2007), particularly closeness centralization (Freeman, 1979). **Heterogeneity**. Both member diversity and size are indicators for inclusiveness. Also, size reduces efficiency as more members take more time to coordinate (Provan & Kenis, 2007).
Internal vs. External legitimacy	**Closure**. Centralization. Favors external legitimacy as central actors can represent the whole network, while internal legitimacy is reduced since members tend to prefer decentralized structures (Provan & Kenis, 2007). In-degree indicates popularity (Freeman, 1979). **Heterogeneity**. Size favors external legitimacy as more members indicate greater public support (Ansell & Gash, 2007).

"positive network-level outcomes that could not normally be achieved by individual organizational participants acting independently" (Provan & Kenis, 2007:230). Effective functioning can be impeded by internal network tensions. This can occur between *efficiency* and *inclusiveness*, which means that if Green Life members prioritize equal participation and transparency, the network can become less efficient in terms of action, and vice versa. Effectiveness also requires a balance between Green Life's *internal* and *external legitimacy*, a tension implying that accurately representing members' interests has to be weighed against the need to speak with one voice when interacting with outsiders (Provan & Kenis, 2007). There is also a potential tension between flexibility and stability (Provan & Kenis, 2007) that is not analyzed in this study, partly because it would require longitudinal data and Green Life is a relatively young network.

For Green Life to influence Bangalore's formal decision-makers, its representatives should preferably be able to demonstrate support from a broad membership base (Ernstson et al., 2008). On the other hand, members can perceive collaborations with politicians as controversial if they risk co-opting the movement (Ansell, 2003) – proper internal representation from a broader set of grassroots stakeholders is sometimes more important for a group's legitimacy than political contacts (Holt et al., 2012). One way to balance this can be to adopt a bi-modal approach of alternating between collaboration and confrontation with authorities (Connolly et al., 2013). Findings from Europe and North America suggest that members of environmental networks like Green Life tend to consist of a densely connected core and larger group of peripheral actors (Ansell, 2003; Diani & Bison, 2004; Ernstson et al., 2008). Such a structure could facilitate a "division of labor" in Green Life, where core actors interact with decision-makers and the political process and the peripheral actors focus on grassroots activities (Diani, 1995; Ernstson et al., 2008; Hahn, Olsson, Folke, & Johansson, 2006).

This study measures network features such as core–periphery structure to help identify key functions in Green Life. The employed SNA approach builds on previous theoretical and empirical work (Carlsson & Sandström, 2008; Holt et al., 2012; Sandström & Rova, 2010a, 2010b) that uses two broad categories of network characteristics: *closure* and *heterogeneity*. These characteristics relate in different ways to the Green Life's functioning and internal tensions, as summarized in Table 1 and described in more detail in Appendix A (see also Enqvist, 2012). Some previous research (e.g. Burt, 2000; Carlsson & Sandström, 2008; Newman & Dale, 2005) suggest that Green Life would benefit from a centralized structure that balances