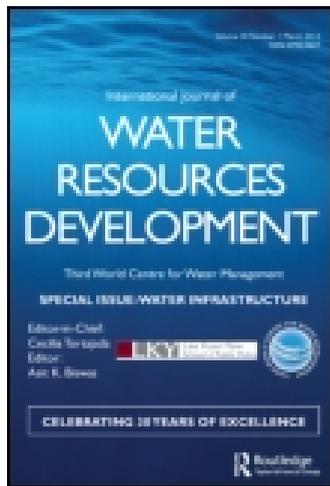


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Too much of a good thing? Building social capital through knowledge transfer and collaborative networks in the southern Philippines

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Meaningful engagement of diverse stakeholders is essential for ensuring support for science-based responses to complex watershed challenges. A collaborative network in the Davao river basins, in the Philippines, provides evidence of an approach that enabled integration of science into local decision making and increased bonding social capital between shared-interest groups. Insufficient attention towards bridging and linking social capital allowed bottlenecks between policy and implementation to persist. This ‘dark side’ of social capital was evidenced by entrenched sector positions and lower levels of trust between different interest groups. A social-learning approach is recommended to create new spaces for productive ‘bridging’ relationships.

Keywords: social capital; knowledge transfer; integrated catchment management; evidence-based decision making; collective action; collaborative networks

Introduction

Continued degradation of water and related ecosystems, coupled with increased awareness of negative social and economic impacts, affirm the ongoing and persistent challenges in water management (Kuylenstierna, Björklund, & Najlis, 1997; Vörösmarty et al., 2010). Since the establishment of the Dublin Principles (International Conference on Water and the Environment, 1992), integrated water resource management (IWRM) has been the dominant response to this challenge. Once broadly accepted, IWRM has come under increasing scrutiny (Biswas, 2004; Biswas & Tortajada, 2010; Butterworth, Warner, Moriarty, & Batchelor, 2010). Two commonly cited criticisms of IWRM are that technically, it has been overly prescriptive and failed to contextualize science to match local needs (Bonell, 2001; Falkenmark, Gottschalk, Lundqvist, & Wouters, 2004; Sachs, 2008) and that socially, traditional responses have failed to consider the collaborative processes or the relationships that are needed to enable more cohesive ownership of policy decisions (Brown & Farrelly, 2009; Pahl-Wostl et al., 2008; Pretty & Ward, 2001).

Failure to demonstrate the benefits of integrated approaches is a major driver of pessimism around the role and value of IWRM and its basin-scale equivalent, integrated catchment management (ICM). This highlights the need for closer examination and documentation of case studies that underline the benefits of different aspects of IWRM (Andersson, Bonell, & Moody, 2004; Biswas, 2004). In this context a number of key questions need to be addressed. Technically, how can science be locally adapted to drive more informed decision making, and how can knowledge transfer be employed to influence policy and practice? Socially, how can collaborative processes improve social capital among stakeholders? To answer these questions and consequently to contribute to the

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ongoing debate on the benefits of integrated approaches to water management, this research examines the social and technical components of UNESCO's Hydrology for the Environment, Life and Policy (HELP) approach in the Davao river basins in the southern Philippines.

The socio-technical HELP approach

While IWRM concepts are useful for providing an overview of all the pieces and layers of the river-basin puzzle, they do not provide detailed answers as to how the pieces should fit and interact together. HELP provides a step down in scale from the generic IWRM principles to a focused framework for ICM (Andersson et al., 2004) and was established with the aim of better informing decision making through user-driven frameworks for ICM (Bonell, 2001). HELP seeks to achieve this through addressing two central bottlenecks: first, a time lag in the flow of information between scientists, policy makers and stakeholders that was delaying the implementation of scientific findings for the benefit of society; and second, stakeholders' remaining fragmented due to a lack of common rules that can guide harmonized responses. Consequently, a 'paradigm lock' was created, where on one side (*the technical*) hydrological science was isolated by a lack of proven utility and on the other side (*the social*) stakeholders were isolated by disaggregated institutions (Bonell, 2001, p. 12).

Falkenmark et al. (2004, p. 309) outline how the HELP framework could drive a "radical reorientation" of how water management "can be operationalized on the ground". At the heart of this radical change lies the need for consistent and inclusive dialogue that is informed by interdisciplinary science and enables stakeholders to drive the creation of policy frameworks under which management can progress at multiple levels. Since 2001 the HELP approach has been scaled up, and the HELP principles have since been adopted to varying degrees in 67 basins globally (Khan, 2008). While the HELP approach is conceptually sound (Shuttleworth, 2006), there is a need to reflect and question whether and how it has delivered.

The HELP approach can be deconstructed into two key components (Figure 1): *technical*, where knowledge transfer aims to increase the quality of decision making by promoting the adoption of responsive interdisciplinary science to meet local environmental, social and economic concerns; and *social*, where social capital is strengthened through participation of a full range of stakeholders.

UNESCO has conducted two global reviews of the HELP approach (Khan, 2008, 2011). The reviews provide an overview of challenges and present common solutions, but lessons

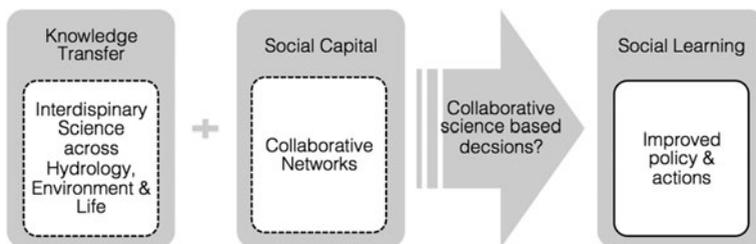


Figure 1. Simplified framework illustrating how the adoption and implementation of the social and technical components of HELP can lead to improved decisions and collective actions. The components are presented in the white boxes, while the outer grey boxes highlight related theories.

are collated on a global scale and lack resolution to reveal the added value of HELP over other ICM approaches. Broader examinations of ICM that consider the role of collaborative networks and interdisciplinary science are increasingly available in developed basins (Borowski, 2010; Cook et al., 2013; Fenemor et al., 2011; Garmendia & Stagl, 2010; Kilvington, Allen, & Fenemor, 2011; López-Gunn, 2012; Lubell, 2004; Mostert, Craps, & Pahl-Wostl, 2008); however, such assessments are less common in developing contexts (Hoverman, Ross, Chan, & Powell, 2011). Cook et al. (2013) reported the evolution of networks in developed basins to organizations based on participation that act as mediators between government and the public. In this context, a case study of HELP as practised in the Davao river basins, where progress in ICM has mostly relied on local resources, provides an opportunity to examine the contribution of science-based knowledge and multi-stakeholder collaboration after almost a decade of implementation (2004–2013).

Knowledge transfer

Under HELP, knowledge transfer is largely dependent on and driven by self-motivated basin networks, with periodic support from regional coordinators (Shuttleworth, 2006). The extent to which knowledge transfer has occurred in the new context is important to evaluating the HELP approach, and individual and organizational receptivity are necessary precedents for this to occur. The most relevant knowledge-transfer steps to HELP have been: modification of new approaches to match local needs; diffusion of approaches across organizations; and mainstreaming and sustaining new knowledge and approaches (Spiller, McIntosh, Seaton, & Jeffrey, 2012; Rogers, 2003).

Collaborative networks

Participation and stakeholder dialogue are at the heart of driving innovation in the HELP approach. In the past two decades, collaborative networks, also referred to as multi-stakeholder platforms or partnerships, have become major components for enabling participation in ICM. While disillusionment has emerged over a perceived failure of collaborative networks to deliver substantial change in the way water is governed (Warner, 2006), with the ongoing reorganization of water management globally, it seems premature to discount the potential of multi-stakeholder networks (Cook et al., 2013).

Deeper understanding of the diverse types of collaborative networks can provide clarity on what can be expected from individual networks. Networks can be voluntary or statutory and typically comprise different stakeholders coming together to address shared concerns (Warner, 2006). Collaborative networks have been criticized for being *ad hoc* and unstructured, but such ‘adhocracy’ can be an efficient method of mobilizing resources and experts from different disciplines while avoiding the bureaucratic trappings of traditional government responses (Hahn, Olsson, Folke, & Johansson, 2006; Toffler, 1971).

A recent trend in developed countries has been the evolution of loose networks into more formal participatory catchment organizations. Cook et al. (2013) highlight the increasing role that participatory catchment organizations play in bridging the gap between governments and stakeholders. This trend reflects the ongoing importance of networks in building social capital, a key factor enabling collaboration across different interest groups (Pretty & Ward, 2001). While collaborative networks have demonstrated the ability to bridge horizontal integration (across organizations and disciplines), there is less evidence of vertical integration (power sharing) (Cook et al., 2013; Warner, 2006). This twin challenge of integrating horizontal and vertical dimensions of collaboration is a

persistent bottleneck inhibiting the effective power sharing which is necessary for sustained outcomes (Kilvington et al., 2011).

Social capital

While many networks lack the power to directly deliver change, this does not prevent the continued building of relationships and social capital, which over time can positively influence how decisions are reached (Borowski, 2010). Social capital is understood as an intangible connection between individuals and organizations (Fukuyama, 2001). Social capital facilitates collaboration and stakeholders with established relationships have greater confidence to invest in shared activities, trusting that other stakeholders will also invest time and energy to produce shared outcomes (Putnam, 1995). In this way social capital reduces transaction costs between stakeholders (Pretty & Ward, 2001). Since ICM requires consideration of a range of socio-ecological and economic concerns across multiple levels and scales, social capital is one means of reducing complexity. Landcare groups in Australia provide an example of how tightly bound rural groups were able to cross boundaries and engage a wide range of private and non-farming interest groups (Eames, 2005). Cramb (2005) documented similar positive cross-sectoral bonding in Landcare groups in Bukidnon, Philippines. However, social capital that exists within interest groups can prevent as well as aid collaboration.

Fukuyama (2001) highlights how the internal capital of one group can be created at the price of hostility towards external groups. Labonne and Chase (2011) have shown how increased social capital actually reduced collective action in Philippine villages. These concerns highlight that stakeholder networks do not automatically build productive social capital but require a careful set of principles or design criteria that can enable effective collaborative arrangements (Warner, 2006). Woolcock (2001) identifies three main types of social capital: bonding, bridging and linking.

Bonded groups tend to be homogeneous and form tight bonds built around a shared interest. This tight bond can create inward-looking positions and induce actions representative only of the group. Catchment health, however, is the responsibility of society as a whole and requires integration of horizontal and vertical interests – this integration can occur through bridging and linking social capital (Eames, 2005). Bridging social capital brings together different interest groups around a common goal, while linking social capital connects different interest groups and mobilizes across different hierarchical levels (Woolcock, 2001). Bridging and linking capital have weaker bonds and require careful facilitation to maintain trust and relationships across interest groups (Woolcock, 1998). The distribution and quality of social capital depends on the boundaries created and maintained by actors across different levels: individuals, organizations, networks and the whole community (Eames, 2005).

The social aspects of this article aim to examine where and how social capital has been built and how it contributes to decision making. However, while social capital can contribute to building trust and relationships, the process by which social capital is built is still debated (Field, 2003). Eames (2005) suggests social learning as an approach that can assist in understanding the steps required to build social capital.

Case study: the Davao river basins

The Philippines is a middle-income developing country characterized by high population growth. A significant percentage of this population is directly dependent on natural resources for employment (ACIAR, 2009). Davao City (1.5 million inhabitants) is the

main urban centre in the southern Philippines and broadly mirrors national trends, with high rural poverty and rapid urban growth (NEDA, 2011). The Davao river basins are a cluster of eight rivers overlapping Davao City (Figure 2). The river systems discharge from mountains in the north and west to the Davao Gulf. The uplands contain pockets of primary forest along with large areas of secondary forest. Confined aquifers that lie beneath the lowland areas to the south of Davao City are the major source of water for domestic and commercial uses. The upper watersheds of the Talomo, Lipadas and adjacent sub-catchments of the Davao River are major recharge areas for these aquifers. Rainfall of 2500 mm per annum is evenly spread throughout the year, but mostly falls during intense rainfall events, at times leading to flash flooding (Hearne, 2011a).

Plantation-style agriculture and hydropower are major corporate activities in the upper watersheds. In the uplands, deforestation is driven by lack of tenure and conflicting government policies. Growing export markets for bananas have also driven expansion of plantations in the uplands (PCEEM, 2006). Both corporate and subsistence agricultural systems are resulting in soil erosion and pollution of waterways (Hearne & Monsanto, 2011). Urbanization has resulted in increased quarrying in mid-catchments, while unregulated abstraction of groundwater coupled with the ongoing deterioration of surface water is increasing water security risks for urban communities (Hearne, 2011b). Downstream coastal communities have attributed depleting fish stock levels to sedimentation and habitat destruction (Perez, Pido, Garces, & Salayo, 2012). Limited government resources have been a constant barrier hindering appropriate responses to the continued degradation of watersheds (Hearne, Gamboa, & Monsanto, 2008; PCEEM, 2006). The HELP Davao Network was formed after admission to the UNESCO global network of HELP river basins in 2004. The local network was composed of multi-sectoral actors with contributions based on shared action plans targeted at addressing local issues. Early outcomes from the network's efforts included a shift from narrow issue-based policies to integrated policies encompassing development and conservation of watersheds (Hearne et al., 2008).

Methods

The research involved an in-depth case study collecting both qualitative and quantitative data through semi-structured interviews and online surveys. Appendix 1 and 2 (in the online supplemental files at <http://dx.doi.org/10.1080/07900627.2014.898579>) present the guide used in semi-structured interviews and the online survey template. Online consultation with the HELP Davao Network led to identification of a wide range of organizations based on the following criteria:

- participation in HELP Davao
- capacity to influence decision making
- demonstrated knowledge relevant to the research topics
- sectoral representation (academic, government, environmental, livelihoods, agri-business, and energy)

A stakeholder mapping exercise was undertaken to prioritize stakeholders for participation. Interviews and surveys were pretested for cultural appropriateness and completeness with local and international HELP specialists. Pretesting and data collection took place over a four-month period in early 2013. Qualitative interview data was analyzed using NVivo (2013). The online survey included open and closed questions and used Qualtrics (2013) survey software for analysis and visualization of results. The closed questions used a Likert scale, allowing rapid validation of the themes identified in the interviews.

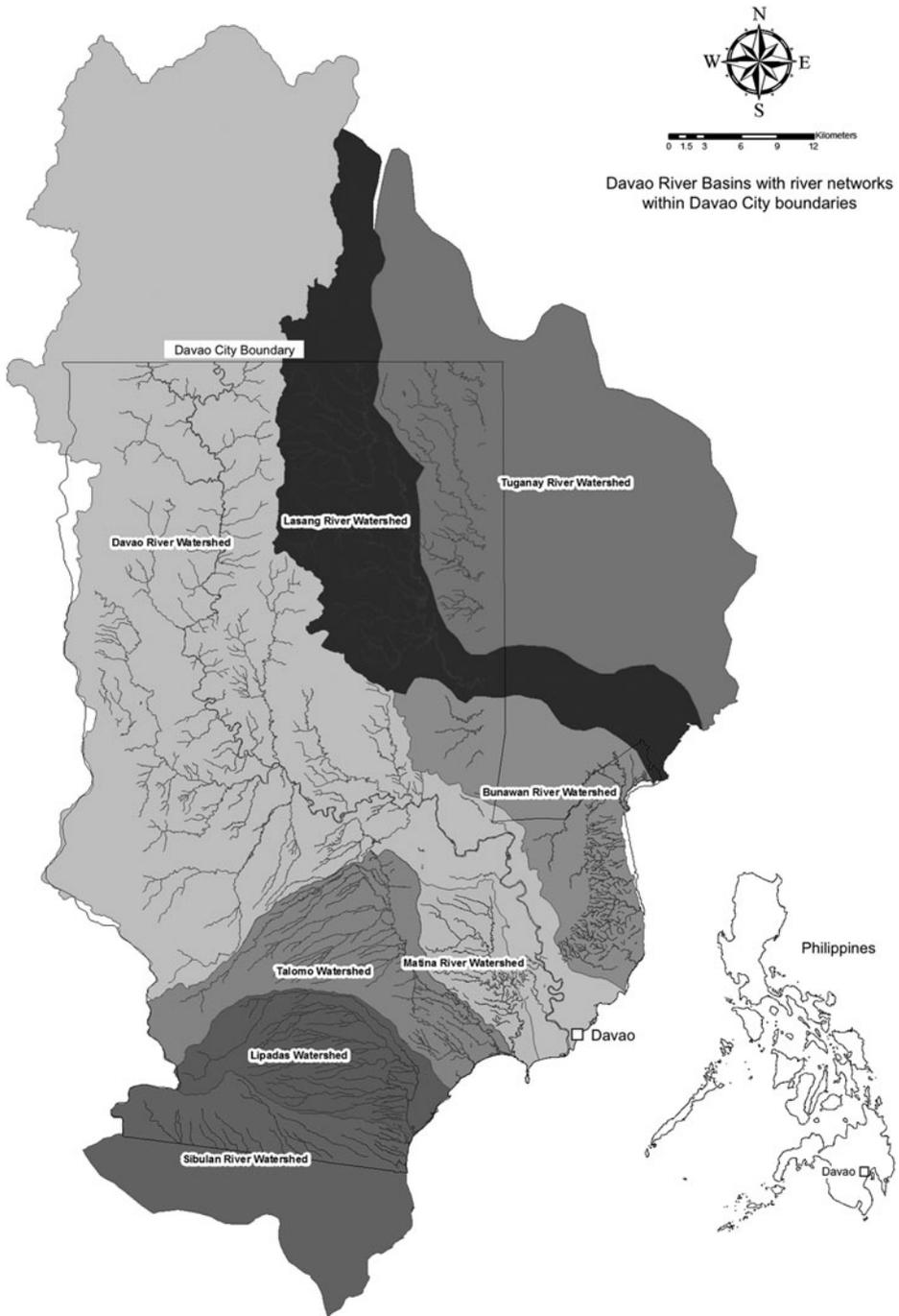


Figure 2. Map of Davao river basins with river networks within Davao City boundaries. Source: Davao City Planning Office (2006).

Nine semi-structured interviews and 43 online surveys were conducted, a sample deemed representative of active watershed stakeholders. Survey responses represented the following sectors: civil society (33%), public (31%), academic (18%), corporate (8%), and other (8%). Findings were analyzed for consistency and triangulated against established literature. While there were variations, survey results mostly corroborated the opinions expressed in interviews. Consideration of emergent themes, coupled with triangulation of data sources, was employed to reduce bias from interviewer influence (Denscombe 2010; Dillman et al. 2009). In practice this was achieved by encouraging interviewees to be open and critical of the HELP Davao Network, and supporting interviewees to deviate from set questions and explore their concerns.

Findings and discussion

The HELP paradigm lock identifies two weaknesses in traditional approaches to water management: how to contextualize science; and how to drive collaboration that results in shared decisions *and* actions. Study findings provide insights on a range of different themes (Table 1), including how the HELP approach has been adapted to the local context, the extent of knowledge transfer and its impacts on policy and practice, and how the different types of social capital have affected decision making and collective action.

Customization of HELP in Davao

In any knowledge-transfer process, modification and reinnovation are common steps as ideas are adapted from concept into practice (Spiller et al., 2012). Findings from the online survey and semi-structured interviews indicate that implementation of HELP in Davao remains closely aligned with original UNESCO objectives, with local innovation also occurring.

Participants observed that governance and leadership of the Davao Network were important elements for down-scaling the HELP approach and driving diffusion of concepts at a basin level. The network was described as having evolved from

a loose network to a registered organization, with strategic endorsement from the Regional Development Council and direct programming support from the Department of Science and Technology (academic actor).

A second area of innovation has been the adoption of knowledge, with the need for both scientific and indigenous knowledge widely accepted.

HELP is unique in its approach, where knowledge and approach are not developed in some remote laboratory; it is about contextualising science in the community (academic actor).

This description resonates with HELP objectives that recognize that science cannot operate in a vacuum but requires contextualization in “real catchments” to meet the needs of “real people” (Khan, 2008, p. 429).

Knowledge transfer

Diffusion of knowledge

Overall, the HELP approach is widely accepted by the Davao stakeholders. The online survey reported high levels of increased knowledge of key HELP concepts at both individual (82%) and organizational (65%) levels. Participation in network activities has played a key role in enabling knowledge sharing, with 74% of respondents reflecting that they had participated in network activities and 90% of respondents having a clear understanding of how they could contribute to the network. Stakeholders recalled

Table 1. Summary of findings from semi-structured interviews.

Themes	Indicators	Academic	Corporate	NGO	Government
Receptiveness of technology	Recognition of a need for improved science	++	+	++	+
	Awareness of fragmented sectors	+++	+	++	+
Modification	Utilizing a mix of science with other knowledge sources	+++		++	++
	Respected for free and prior local consent	++		+	
Diffusion processes	Appreciation for scientific based approaches	+++	++	++	++
	Facilitated balanced participation	++		+	++
	Recognition of interconnectedness of resources uses	++	-	++	+
Evidence of paradigm change	Reduced conflict potential/ recognition of interdependence	+	-	+	
	Enhanced knowledge/ new research				++
	Shared vision	++	++	+/-	++
	Institutionalization of joint plans and strategies	++	+	+	++
Mainstreaming	Enabled collective action	++	-	+	++
	Utilization of HELP concepts/approaches	++	+/-	++	++
	Institutional changes	+	+/-	++	++
	Field implementation	+	+/-	++	+
Improved relationships	Persistent capacity gap	+/-	+	+	++
	Improved relationships	++	-	+ +/-	++
	Greater trust	++	-	++	++
	Pooling of resources	+/-	+	+/-	-
Persistent challenges	Engaged and responsive decision makers	+	-	++	++
	Clarity in HELPs governance, mandate and strategic direction	++	++	++	
	Improved transparency	++	++	+	
	Vertical integration in decision making	+++	++	+	
Communication and dissemination of data	Conflicting policies and programmes	++	++	++	+
	Lack of field resources	++		++	++
	Communication and dissemination of data	++		++	++
		++		++	++

Note. A blank cell signifies that a clear sectoral opinion was not detected in the interview. +++ Very strong agreement (with indicator). ++ Strong agreement. + Agreement. +/- Mixed opinions. - Disagreement.

participation in a range of activities, including trainings, forums, study tours, coordination meetings and reference materials. These concrete activities helped knowledge diffusion and built capacity for how stakeholders understand and approach watershed management (Table 2). A further example cited included shifting debate from single-issue policies, such as banning aerial spraying in banana plantations, towards developing comprehensive evidence-based watershed policies. Hosting cross visits to see and learn from good practice in watershed management, conducting field surveys and workshops to pool knowledge, and developing shared responses to development pressures are further examples of collaborative network activities. The network was able to develop risk-reduction strategies in the aftermath of flash flooding as well as building awareness of the interconnectivity between food, water and energy in debates related to the abstraction of groundwater for coal power.

The network was commended for facilitating the creation of a shared vision for IWRM for the Davao region, where both the National Economic Development Authority and the Regional Development Council have “taken on the issues and directions as set in the agreed IWRM action plans” (government official).

Stakeholders are now more aware of the need and application of science in decision making, but it is also clear that the HELP Davao Network cannot take full credit for these changes. Interviews highlighted that an active civil society, coupled with recent extreme climatic events, were drivers for increased focus on science-based decision making. The network is however credited as being “instrumental in creating a supportive environment for adaptive and evidence-based decision making and planning” (government official).

While knowledge-transfer activities were noted to have contributed to increasing local awareness and capacities, evidence of follow-up implementation is less extensive. There was evidence of improved synergies between policy and planning and individuals from the network being engaged by government and corporate actors to deliver tasks related to watershed management. While these synergies are positive examples of the diffusion of HELP concepts, it is clear that all sectors recognize the painfully slow translation of shared decisions into practical actions.

Policy and practice

Mainstreaming of knowledge is one of the later stages in a knowledge-transfer process (Spiller et al., 2012). The creation of evidence-based policy to enable the mainstreaming of new knowledge and technologies is an established strategy in the management of natural resources (Falkenmark et al., 2004; Pretty & Ward, 2001). Davao stakeholders identified “employing science to better inform social, environmental and economic concerns” and “integrating science with other forms of traditional knowledge” as the statements that best reflected the strategic approach of the network. When asked to benchmark against other organizations, participants saw the network as performing above sector averages in its contribution to ICM.

The aftermath of the 2011 flash floods provides an example of how the network built collaboration and collected evidence to inform decision making. At the height of the wet season, an intensive period of overnight rainfall triggered flash flooding of up to 3 m within the Matina catchment in Davao City. Peak floodwaters hit downstream urban communities hardest, directly impacting over 13,000 families and resulting in 30 casualties (Depra, Sambale, & Simpol, 2012). After initial emergency response efforts were completed, local and international stakeholders were invited to conduct field surveys to investigate the range of factors that may have contributed to the flash floods. The field visits were followed by meetings where participatory analysis of the available science was

Table 2. Key interventions identified by respondents that aided establishment of understanding, the diffusion and mainstreaming of HELP concepts, and building relationships.

Intervention	Reported outputs	Level of influence	Impact on relationships*
Cross visits	<ul style="list-style-type: none"> • Linking upstream and downstream communities • Appreciation of indigenous knowledge systems 	Operational	+
Community based activities	<ul style="list-style-type: none"> • Empowerment of marginalised riverside communities. 	Operational	+
Twinning and international symposiums	<ul style="list-style-type: none"> • Sharing of experiences and knowledge transfer on international best practices, 	Operational	+
Post event assessments	<ul style="list-style-type: none"> • Understanding and planning targeted responses • Risk reduction strategies • Appreciation of water–sanitation–livelihood connections 	Planning, operational	+
Capacity building and data sharing	<ul style="list-style-type: none"> • Relationship building between different organizations. (e.g. IWRM Guidelines) 	Planning, operational	+
Dialogues for science in decision making	<ul style="list-style-type: none"> • Harmonizing conflicting uses (e.g. aerial spraying ban) • Appreciation of interconnections between food, water and energy (e.g. use of groundwater for coal power) • Integrated policies 	Planning, operational, strategic	+
Regional/strategic planning	<ul style="list-style-type: none"> • Science based decisions • Mainstreaming of concepts and approaches • Convergence of resources 	Planning, strategic, policy	+
Policy development	<ul style="list-style-type: none"> • Collective framework for decision making focused on protection of water resources (e.g. Watershed Code) 	Strategic, policy	+/-

* + Positive impact. – Negative impact. +/- Conflicting opinions.

undertaken and contextualized responses were designed. The initiative highlighted major gaps in hydrological data and triggered a number of government and research projects on water flows and climate change (Hearne, 2011b). A local academic commented:

Such HELP meetings were very helpful in terms of bringing people from different backgrounds together to build common understanding of what happened and to explore what solutions could be used to mitigate future risks.

Looking more broadly at how science was used to inform local policies, stakeholders were asked to rate five recent policies from local and regional levels that have direct impact on ICM. The vast majority of stakeholders reflected satisfaction with the science used to inform decision making. However, levels of satisfaction differed according to different sectoral perspectives. The Watershed Code of 2007 was the most significant of these local policies (Estremera, 2013).

The network played a significant role in the development of a biophysical and socio-economic framework for the crafting of the watershed code. This science-based framework enabled greater objectivity in local council hearings while the enactment of the code was debated (Hearne & Monsanto, 2011). While the code has established a strong policy environment for the protection of critical watershed areas, corporate actors felt that due process had not been followed in the enactment of the code and that the resulting policy is ‘anti-development’. Implementation of the code has been slow and has reinforced strong divisions between different interest groups and resulted in perceptions of win–lose outcomes. Corporate actors acknowledge the need to protect water resources while pursuing ‘sustainable development’. However, they view the current version of the code as having ‘failed to serve its purpose’ and call for a substantial revision. Corporate actors reflected:

[They] came up with a Watershed Code for protecting the sources of water for drinking, but now no one can touch it until it reaches the sea. The farmers can’t use it, you can’t use it for hydropower ... and now you can’t even dam it for drinking water. So what is it for?

On the other side, non-government organization (NGO) actors considered the code to have brought balance into the development of the watersheds and to have put in place “the building blocks for conservation of critical recharge areas and designation of prime agricultural areas” (NGO actor).

While the watershed code provides for the creation of a Watershed Management Council, a range of bottlenecks have persisted, including a lack of consistent coordination and leadership from the council; slow progress in ground mapping and delineating conservation and prime agriculture areas; and stagnant investments in monitoring or rehabilitating watersheds. While actions have been stimulated by local NGOs and the HELP Davao Network, disputes between NGOs and the corporate sector have strained progress in implementation of the code. It is concerning when governments delegate *de facto* management and implementation of the policy–implementation interface to third-party organizations while retaining exclusive decision-making powers (Cook et al., 2013).

Building social capital

While plans, policies and actions are key outputs that have informed decision making, increased social capital is one of the major outcomes that has increased capacity of stakeholders to reach shared decisions. Social capital is difficult to measure (Eames, 2005; Field, 2003), and cannot be legislated for (Fukuyama, 2001), and yet stakeholders in Davao have reported evidence of increased social capital. Shared knowledge, awareness, active participation, effective relationships and trust are all observed proxies for social

capital (Labonne & Chase, 2011; Pretty & Ward, 2001). The HELP Davao Network has been described as “the glue that bonds stakeholders together” (academic actor).

Participation

Participation is critical to generate support and legitimacy of a network (Knieper, Holtz, Kastens, & Pahl-Wostl, 2010). Drivers for participation in the network included both shared and individual goals. Results from interviews identified a list of drivers for participation in the HELP Davao Network. Stakeholders identified “pooling of resources for shared outcomes” as the most frequent reason for participation. Other motivations included: to learn more about watershed management; and to build relationships with other stakeholders. Impartiality, trust, access to sound knowledge, and international networks were given as further reasons for participation in the network.

While participation is critical, Cooke and Kothari (2001) highlight the folly of blindly expecting participation to deliver improved developmental or conservation outcomes. Who is participating can also influence the legitimacy of outcomes. The HELP approach prescribes participation of a full spectrum of stakeholders, including scientists, decision makers, economists, managers, industry members, community members and end users (Bonell, 2001). For networks to extend their influence and legitimacy, Folke, Hahn, Olsson, and Norberg (2005) suggest careful exploration of partners at the boundaries of a network. Boundary-spanning activities can help expand the radius of trust of a network and thereby extend its legitimacy (Brown, 2011).

Social capital in Davao

Bonding social capital is built through reciprocal interactions between different actors around a shared interest (Woolcock, 2001). In Davao, “decision-making is done collegially, where power resides not only in one person but through shared decision making of the members” (government official). This collegial decision making has fostered bonding social capital within the network. The benefits of bonding social capital can include increased knowledge and capacity to lobby for shared goals (Floress, Prokopy, & Allred, 2011).

The network appears to have empowered individuals so that they can draw on their bank of social capital when required. This has not happened quickly; it has been operating for nearly 10 years. Even though the network’s initiatives tend to be *ad hoc*, it is still considered “a very effective mechanism for bringing on board different partners, and with them their mandates, human and financial resources, ideas and knowledge” (government official).

The interorganizational and vertical integration of actors with shared interests within the network reflect increased cohesion and trust, and are likely to have been additional factors for sustaining participation and interest. Likewise, the *ad hoc* nature of the network is recognized as a resource-efficient and adaptive strategy for sustaining bonds within the network (Toffler, 1971).

The array of issues tackled over the history of the HELP Davao Network reflects an adaptive capacity that has enabled the network to engage a range of stakeholders operating across the watersheds. Bridging and linking social capital are considered more delicate and require a greater level of effort to maintain and ensure that the mix of social-capital types do actually lead to positive outcomes (Field, 2003). In Davao the introduction of new knowledge through HELP activities has been a key approach for building bridges and linking different stakeholder groups. One HELP activity involving a study on urban drainage systems helped to “trigger different universities to recognize the need to work

together to address the extensive challenges related to urban drainage” (academic actor). While this example demonstrates *bridging* social capital horizontally, across network members and non-members, there is also some evidence of strengthened linking social capital and vertical integration with decision makers and other influential actors.

The network is recognized as a knowledge broker by international organizations such as the Network of Asian River Basin Organisations and the Asian Development Bank for disseminating knowledge to local government units. The opportunities provided by these linkages serve “to strengthen the bonds between members as they provide a venue for capability upgrading, information exchange, and benchmarking” (government official). Despite concerted efforts to influence elected council members, there remain challenges in ensuring that “knowledge gained is translated [vertically] into policy and implementation” (government official).

Within local government in the Philippines, power is strongly held by the municipal or city mayor (Lange, 2010), and if a conservation or development programme is to succeed, “then you have to have the mayor on your side” (NGO actor). Conversely, there is a need to engage end users to explore the economic potential for converting policy decisions into actions (Lubell, 2004). This points towards the importance of *linking* social capital if a network is to have influence vertically (upwards and downwards) and enable redistribution of decision-making power.

In Davao there is little evidence of strong strategic linkages being formed with the city mayor, suggesting a limit in the network’s influence. Some note that the network is “sometimes overlooked” when government agencies organize watershed initiatives, further evidence of a vertical integration gap. Barriers to action were also observed horizontally across different interest groups.

In Figure 3 the key indicators for social capital at the watershed level are peeled apart by sector. On a scale ranging from ‘strongly agree’ to ‘strongly disagree’, there was no reported disagreement or strong disagreement with the five statements. This lack of disagreement initially seems to present positive results in relation to the proxy indicators for social capital; however, positive bias in self-reporting is common, and participant dispositions probably motivated a propensity towards socially acceptable answers. Close inspection of the corporate-sector graph reflects higher rates of uncertainty with regard to trust and relationships, compared with other sectors, further supporting interview findings (Table 1). Doubt associated with increased trust was also reflected by NGOs. These findings raise the question of the existence of a negative aspect to social capital and whether the glue that originally bonded stakeholders has become an impenetrable wall to different interest groups.

A dark side to social capital?

The strength of bonds between academics, government and civil society can be considered as a positive outcome from the collaborative nature of the network. Shared social and environmental concerns are identified as common threads reinforcing these bonds. On the other hand, while private-sector actors “respect both environmental and social concerns”, they are driven by economic profitability, placing them on a potentially conflicting pathway (Burkhard, Petrosillo, & Costanza, 2010). Over time, the groups have formed conceptual boundaries for themselves and for others, and the watershed code, and gaps in its interpretation and implementation, have become drivers to reinforce these bounded positions.

Internal boundaries reflect bonded social capital and are often achieved as a consequence of hostility towards external groups, creating an environment primed for

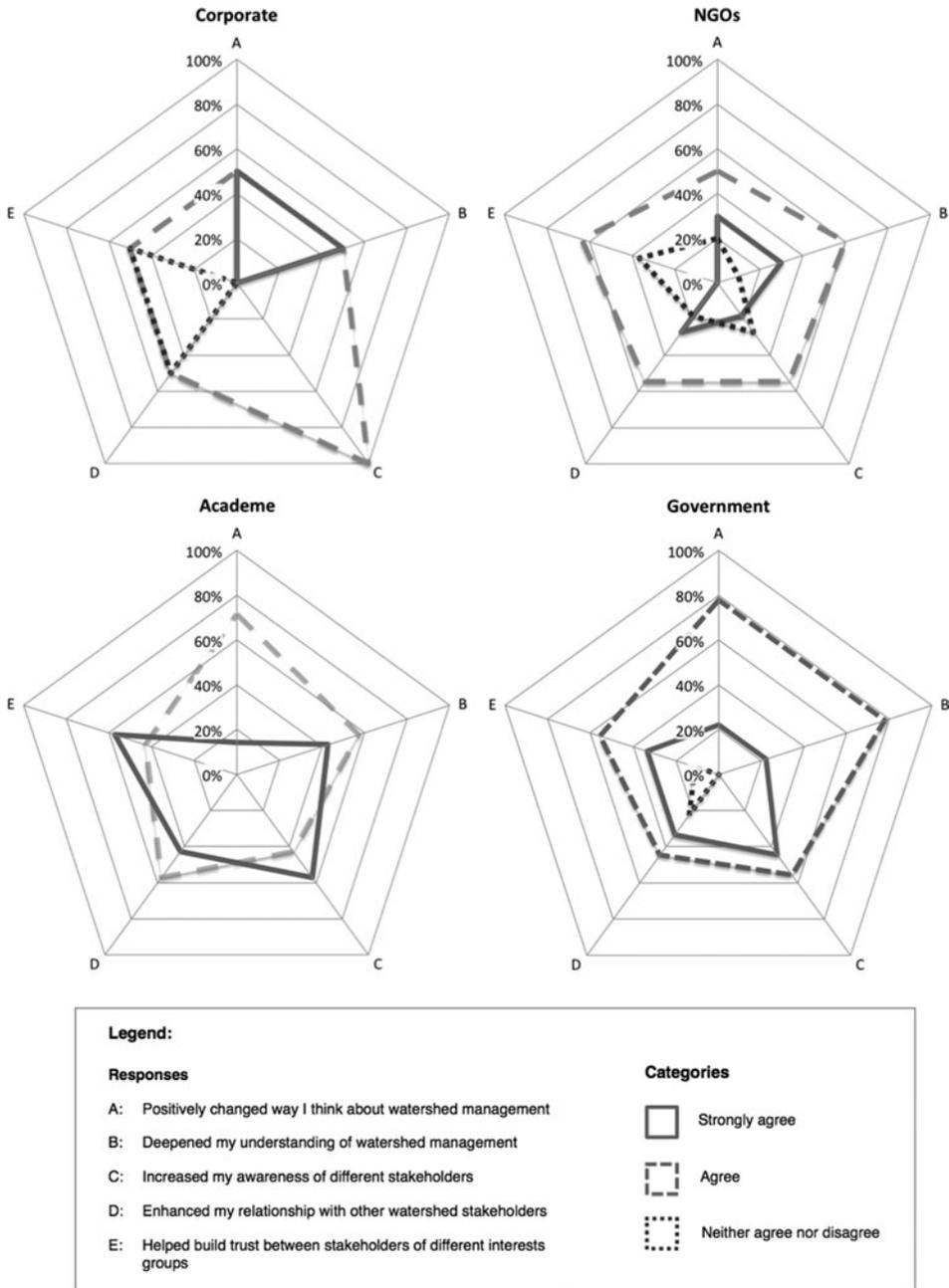


Figure 3. Indicators of social capital per sector. The corporate-sector graph reflects higher rates of uncertainty with regard to trust and relationship, compared with other sectors. This is reflected in the dotted triangle between D and E: corporate stakeholders neither agreed nor disagreed that relationships or trust had been increased. The NGO sector also reflected higher levels of uncertainty in relation to trust.

win–lose outcomes (Fukuyama, 2001). While there are some signs of improved relations between corporate stakeholders and other sectors, remnants of old hostilities are not far from the surface and are evident in the remarks of one corporate stakeholder: “At least we can now exchange ideas and opinions about watershed management without resorting to name-calling and sarcastic remarks.”

This reflects that improvements are tentative and the risk of disputes between stakeholders remains. Figure 3 also reflects higher levels of uncertainty associated with trust among NGO respondents, and in interviews this mistrust was most evident between NGOs and corporate actors. The corporate sector expressed concerns over “hidden agendas of NGOs”, while an NGO actor accused the corporate sector of “reaching deals with decision makers behind closed doors”.

The results have found that the strong bonding capital within groups has reinforced sectoral positions. However, bridging and linking social capital can facilitate collaboration and reduce the transaction costs of decision making, even when stakeholders of competing interests are involved (Field, 2003). To break the cycle of win–lose outcomes, these findings suggest the need to build trust between different interest groups.

Unbinding positions and social learning

A central objective of the HELP approach is to create a framework for collaboration and interdisciplinary decision making between hydrological, environmental, social and economic stakeholders and end users (Bonell, 2001). Exploration of the partners both at the centre and at the boundaries of the network has shown that the corporate sector is an obvious boundary partner that could be more meaningfully engaged, but likewise more genuine engagement with elected officials and budget holders is required.

Social learning is an emerging approach for bridging relationships in basin management (Craps, 2003; Falkenmark, 2013; Pahl-Wostl et al., 2007). Keys for social learning in ICM include: participation; integration (of scales and interests); negotiation; and critical self-reflection (Mostert et al., 2008). Participation, integration and negotiation have been demonstrated in Davao, but critical self-reflection seems to be a missing piece in the puzzle. Cook et al. (2013) notes that critical reflection on individual positions and issues is critical to shifting from win–lose scenarios towards shared outcomes.

The process of unbinding positions and reframing to build new linkages is complex and uncertain and requires effort and commitment on all sides (Tippett, Searle, Pahl-Wostl, & Rees, 2005). The persistent need for careful reflection on positions was evidenced in nearly all stakeholder groups.

Academic, corporate and NGO sectors all expressed concern with local government leaders, who “still pay too little attention to science or the collective voice from collaborative watershed groups”. While challenges persist, there is also evidence of opportunities to reach out and bridge sectoral interests. Environmental advocates acknowledged that “building of relationships is very critical, but kulang pa [still insufficient]. We still need to build relationships with the private sector . . . as they are major drivers of change” (NGO actor). Academic actors have expressed awareness of increased “good will and sincerity” from a range of corporate organizations.

The results corroborate findings from Labonne and Chase (2011), who demonstrated the risks of poorly facilitated social capital. To counter this risk, Field (2003) recommends thoughtful design and facilitation to ensure that desired outcomes are achieved. While social capital places emphasis on existing relationships between people (Cramb, 2007), social learning can be considered as a process of collective learning for particular management

objectives (Craps, 2003). Social learning places strong emphasis on process, and recognizes that for ICM, no single organization will have sufficient resources or capacity to respond to the full range of challenges on its own. This highlights the importance of stakeholders to be able to visualize opportunities for bridging and linking with different groups.

Bridging and linking social capital can produce positive externalities, increasing collaboration across different levels and expanding a group's radius of influence (Fukuyama, 2001). Figure 4 illustrates how each group will have its own radius of influence, which is built on reciprocal trust between different actors (Fukuyama, 2001). Deeper exploration of the boundaries of each group's radius of trust and the strength of bonds connecting groups can be useful for visualizing where effort is required to unlock bottlenecks. Careful facilitation can assist actors and organizations to reflect on current positions and transcend individual interests (Eames, 2005). Similarly, the identification of secondary areas of interest can help break down bounded positions (Borowski, 2010). Change does not happen just at organizational levels but must also occur at individual levels. Borowski (2010) emphasized a focus on building individual capacity to embrace and lead change. One senior government official stressed that:

HELP champions must have a transcendent quality ... where individual members must be able to rise above his or her personal goals and recognize the need for compromise if we are to move beyond win-lose scenarios.

This strong acknowledgement of the interdependence between different interest groups presents a landscape ready for change. While win-win outcomes may not always

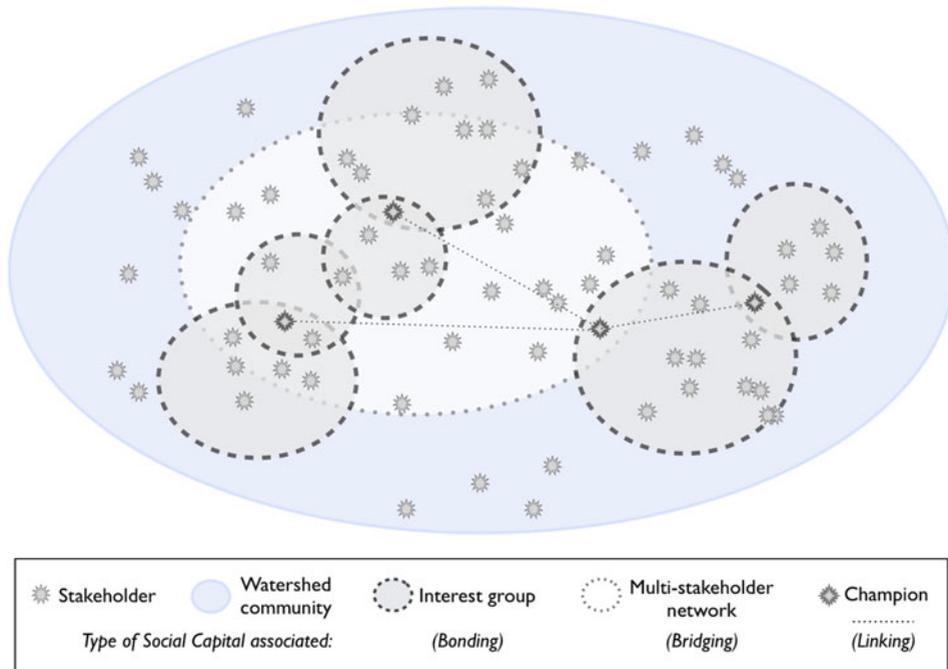


Figure 4. While shared-interest groups have the strongest bonds, bridging heterogeneous groups can be enabled through collaboration and can lower transaction costs in decision making. However, to expand the radius of influence of a network, water champions need to have a transcendent leadership quality to rise above sectoral interests and link competing interest groups and stakeholders at the boundary of the network. Such “linking social capital” is difficult to maintain and often requires much higher levels of thoughtful facilitation. Adapted from Fukuyama (2001).

be achievable, if there can be clear evidence of compromise on all sides, second-best options can emerge to provide balanced opportunities to advance social, environmental and economic concerns (Molden et al., 2010).

Conclusion

To reverse the continued degradation of watersheds, responsive governance systems are required. Critical elements of such governance systems include local capacity to adapt and contextualize knowledge and science, coupled with collaborative processes that can ensure cohesive support for decisions from a range of different interest groups. In essence this is the dual challenge identified in the HELP paradigm.

Research findings from Davao confirm that the local HELP network has driven a knowledge-transfer process that has enabled customization of concepts to match local needs. This process has resulted in science and local knowledge systems being integrated to better inform local and regional plans and policies. The network has also demonstrated an effective collaborative approach that has strengthened social capital within the network and across shared interest groups. These findings suggest that the HELP Davao Network has been successful in contextualizing science to drive evidence-based and collaborative aspects of ICM.

Limits to the extent of influence of the network and the nature of collaborative relationships also reveal a dark side to social capital. The interpretation of policy for implementation has become a contested space and continues to divide different interest groups. Careful reflection on current positions, and genuine engagement of boundary stakeholders (political, grass-roots and corporate), coupled with attention to vertical and horizontal linkages to build social capital, will prove critical if Davao is to transition away from win-lose policy outcomes. The adoption of a social-learning framework could guide careful reflection and unbinding of sectoral positions. This unbinding of long-held positions will be critical for creating new spaces for more productive interpretation and implementation of existing policies and identification of new opportunities for collective decisions and actions.

Limitations and future work

A potential limitation of the study was the appropriateness of a remote approach for examining ICM in a developing context. Respondent rates to the online survey demonstrated high levels of Internet access among most stakeholders, though on-the-ground intervention was required to capture the opinions of marginalized communities. This assistance was provided by the HELP Davao Network. The pre-existing relationship between the lead researcher and stakeholders was deemed important for enabling a good response rate.

Given the lack of comparable studies from other developing-country basins, practitioners need to consider the extent to which these results are generalizable to other collaborative watershed groups. It would be beneficial to explore the transferability to formal watershed organizations in the Philippines and also whether this low-cost methodology could be scaled up to examine other HELP basins.

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Supplemental data

Supplemental data for this article can be accessed at <http://dx.doi.org/10.1080/07900627.2014.898579>

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