

Institutional function and urbanization in Bangladesh: How peri-urban communities respond to changing environments

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ABSTRACT

Urbanization processes are characterized by rapid change. The peri-urban context represents such a transition zone during urbanization. Here, change creates new realities and new demands, for which existing institutions may no longer suffice. Yet institutions do not change easily, as they typically exist to provide stability and predictability during social interactions. It poses a challenge for peri-urban actors looking for ways to manage their needs within this changing context. In peri-urban Khulna in Bangladesh, this refers to drinking water access. Our research examines how actors in two peri-urban communities in Khulna responded to changes in drinking water access via institutional mechanisms.

We do so using the credibility thesis as the starting point, complemented with theories from the field of institutional economics. We expect that system change will lead to institutional change based on (1) actors' evaluations of institutional function and credibility, (2) a process of satisficing, whereby the costs, resources, and benefits of institutional change are considered in selecting an alternative that produces a satisfactory outcome, (3) whereby the nested structure of institutions strongly influences associated costs and resources available to actors to affect institutional change. The analysis is undertaken using the Institutional Analysis and Development framework. Case study findings offers insight into institutional function in peri-urban contexts. It demonstrates the difficulty of achieving institutional change and highlights the role of the informal context in peri-urban areas. Our paper shows the added value of understanding the institutional context during urban transitions and offers insight into the design of empirical studies on institutional change.

1. Introduction

In our urbanizing world, one of the challenges faced, particularly in the global south, is that of land use management during urban transitions. In land use management, due consideration to the institutional context is needed, given their important role in society. Institutions refer to the rules that guide decision making and interaction in society (North, 1990). These rules serve as a reference point for actors during the selection of their strategies, as they help actors predict the likely outcomes on the system and potential behaviour of other actors within it (Ostrom, 2005). In this way, institutions provide a stable environment for coordinated action and mediation of conflicting interests and objectives, by offering guidance on appropriate response strategies.

But what happens to the decision making process when the system for which institutions exist is undergoing change? In areas undergoing rapid urbanization, actors could be faced with unfamiliar situations for which existing institutions no longer suffice as suitable guidance mechanisms. The question that we address in this paper is how actors

respond to such system changes, whether this would result in institutional change, and if so, the conditions under which this occurs.

The peri-urban interface is the area most affected by rapid urbanization. Peri-urban areas can be defined as the transition zone during urbanization experiencing a two way flow of goods, services, and population with nearby urban centres (Narain, 2010). They typically feature a blend of rural and urban activities with an overall shift towards the latter (Allen, 2003; Narain and Nischal, 2007). We can observe the replacement of traditional land uses like agriculture with industrial activity and infrastructure development to support urban expansion and population growth (Vij and Narain, 2016). Moreover, its social composition is also evolving. There is typically a diverse mix of actors found in peri-urban areas including farmers, industrial entrepreneurs, informal settlers, and urban middle class (Allen, 2003). These actors differ in their lifestyle, economic, and educational background that contributes to not only varied objectives but also varied responses to peri-urban problems.

There is a need for actors to adapt to this changing context, which

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could trigger a change in institutional function. The institutional context in peri-urban areas, however, is unclear, and often overlapping as administrative arrangements typically follow a rural-urban dichotomy (Allen, 2003; Vij and Narain, 2016). This creates an institutional void, particularly in the formal institutions which can have various consequences. It may result in conflicts, as described for instance by Hudalah et al. (2016) between pro-development and pro-environment coalitions in peri-urban gentrification processes. A formal institutional void could also lead to a reliance on informal institutions, as Adam (2014) shows for a case in Ethiopia where informal institutions bridge the gap between inefficient formal housing policies and the interests of peri-urban landowners. At the same time, when formal institutions do change in response to urbanization, the relation between this institutional change and the subsequent change in actors' behaviour is also not easy to predict. For instance, pressures of urbanization can lead to changing regulations and government policies, to which different responses from farmers were observed in peri-urban areas around Brussels (Vandermeulen et al., 2006). As a result, the peri-urban interface reflects a challenging institutional context, particularly in relation to land use management as reflected in these studies among many others.

Existing research on institutions helps understand when and how institutional change might occur in a changing context. Literature suggests that institutions change when they no longer enable societal actors to realize valued outcomes. The credibility thesis put forward by Ho (2014, 2016) states the persistence of institutions is a reflection of the function they provide to societal actors. Ho (2013) further explains that institutions that cease to offer any function can become empty and over time; either vanish or transform into alternate institutions with new functions. Other notable institutional scholars such as Ostrom (2005) and North (1990) suggest that actors review and assess outcomes resulting from their social interactions. Their evaluation of outcomes, over time, may result in institutional change. Referring back to our own research question, we would expect actors to respond to system changes by first referencing the existing institutional context for appropriate rules. In the course of seeking institutional function, or as Ostrom puts it, achieving a desired objective, actors may select alternate strategies that could ultimately result in institutional change (Ho, 2014; Ostrom, 2005).

These theories offer a useful starting point for investigating the relationship between system change and institutional change. However, further clarity behind the mechanisms that underlie this process is required to advance our understanding of this relationship. This entails exploring how actors evaluate institutional function, and outcomes; and how this prompts actors to search for alternatives and modify institutions. Moreover, we need to consider the circumstances under which actors will cross the threshold to institutional change. These issues are not yet well documented in the credibility thesis and other perspectives on institutional change. In this paper, we attempt to shed light on the mechanisms that shape institutional change as part of the response strategies of actors to their changing peri-urban context.

The paper is structured as follows. In the following section, we review relevant institutional literature, in particular the credibility thesis and theories from the field of new institutional economics. This section concludes by outlining our own conceptual ideas of how and when system change leads to institutional change. In the methodology section, we outline the steps taken to analyse institutional change in peri-urban Khulna, Bangladesh. Results from two case studies are presented next, highlighting the mechanisms taken by peri-urban actors in response to changes in drinking water access. This results in further insights and conclusions regarding institutional credibility and change.

2. Theory: institutional change in the peri-urban interface

The topic of institutional change is addressed by many disciplines, including economics, political science, and resource management to name a few. We highlight key insights from a few disciplines, beginning

with a perspective of institutions and their function in society that is adopted in this paper. We then explore the motivations and potential mechanisms of institutional change that suit the conditions of the peri-urban interface. These insights are then synthesized into a conceptualization of institutional change in peri-urban areas along with a suitable framework for studying this in the real world.

2.1. Institutions as societal 'rules'

Institutions structure all forms of social, political, and economic interactions in society (North, 1990). These interactions are a means for managing a larger system that is of collective interest (Ostrom, 2005, 2009). The peri-urban context, like most situations in society, typically involve multiple interacting actors. Here, institutions are expected to provide the enabling and constraining rules for behaviour (North, 1990).

Rules can be formal or informal depending on their codification and enforcement. Formal rules are externally enforced and codified within regulations, policies, and judicial procedures; whereas informal rules are internally enforced, socially transmitted from generation to generation (North, 1990; Williamson, 1998).

Scholars stress the importance of the perception and sharing of institutions by societal actors. Ostrom (2005) for example describes the structural attributes of institutions. In a given situation, institutions define the participants, their positions, actions, information, control, potential outcomes, and its net costs and benefits. In doing so, they provide structure to interpret and navigate social dilemmas. With this structure, institutions also create stable expectations of behaviour (Greif, 2006; Hodgson, 2006).

The 'Credibility Thesis' (Ho, 2013, 2014) that explores the function of institutions also stresses this. It states that, by supporting actors' decision making process, a symbol of this function, institutions gain credibility in society. This credibility is built from a shared perception of jointly agreed upon rules, in other words, an expectation of behaviour according to some common arrangement (Ho, 2014).

In this way, institutions, not only shape actions and outcomes in multi-actor situations, but credible institutions offer some assurance that other actors will behave in a certain way. In an evolving peri-urban context with changing actors, such institutional credibility in the long-term may be difficult to achieve. Here, it becomes necessary to explore what motivates institutional change in this dynamic peri-urban context.

2.2. Drivers of institutional change

Societal situations, particularly in peri-urban areas are rarely stable. They evolve as a result of exogenous factors that vary depending on boundaries and timescales along which these situations are analysed. Ostrom (2005) explains that situations rarely exist independently of one another, but rather outcomes in one situation having its own set of rules and participants can result in changes in another situation. In a peri-urban context, such exogenous drivers may include demographic changes due to urbanization, bio-physical changes as a result of climate change, as well as introduction of new rules and regulations nationally or even internationally.

Actors respond to these exogenous drivers, as well as to other system changes, by evaluating system feedback. They do this by reflecting on the outcomes of past decisions with respect to how well those strategies fulfilled the actor's goals and values (Ostrom, 2005). Positive feedback justifies continuing with the same strategy whereas, negative feedback prompts a reconsideration of appropriate strategies. Here, actors can respond by selecting alternate strategies within the existing set of rules or invest in institutional change to produce an outcome that better meets their objective (North, 1996; Ostrom, 2005).

In this way, institutions shape system outcomes, and in the process of evaluating outcomes, actors form opinions about the performance of underlying systems, including the institutions. Using the argument of

the credibility thesis, institutional change is triggered by a perceived gap in function (Ho, 2014). The ability to respond to changes in exogenous drivers via endogenous institutional change is however constrained by several factors as highlighted below.

2.3. Constraints to institutional change

An interesting feature of institutions, particularly, with respect to the topic of institutional change, is their arrangement in society. Institutions are found to exist in a nested structure from lower level operational rules to higher level collective choice, constitutional, and even meta constitutional rules (Ostrom, 2005). This hierarchy means that rules at one level (e.g. operational rules) are based on the set of rules at a higher level (e.g. collective choice rules) and that institutions become increasingly more embedded in society as we move higher up this nested structure (Ostrom, 2005; Williamson, 2000).

This nested structure bears significance to the feasibility of institutional change. Institutional change requires actors at one level of the nested structure to refer to a higher order rule changing situations. In other words, for actors to change rules at the operational level requires visiting the collective choice level, where the rules are being shaped that govern operational interaction situations. Moreover, these institutions become increasingly embedded as we move up the nested structure, and thus, the cost of changing them also increases (Ostrom, 2005). This is reflected in the timescales along which higher order rules typically change (Williamson, 2000).

Effectuating change involves mobilizing resources. Resources are needed in the new arenas where rules can be changed, or in the existing arenas if actors desire is to change outcomes in existing situations without changing the rules that apply there. However, these resources are unevenly distributed (Ostrom, 2005). Meizen-Dick and Bruns (2000) explains that differences in economic, social, political status can create power imbalances. Such kinds of power dynamics similarly exist in peri-urban areas given its evolving and heterogeneous social composition.

Klijn and Koppenjan (2006) highlights that institutional change is a result of negotiations and interaction processes in various (institutional) arenas. Research by Meizen-Dick and Bruns (2000) also refers to this, using the concept of legal pluralism to explain how water rights are distributed in reality. During such negotiations, power dynamics play an important role in either supporting or constraining institutional change. These actor interactions, during which institutions are negotiated are moreover, continuously occurring processes, often conflicting (Ho, 2016). Thus, he describes institutional change as a dynamic disequilibrium in which a steady state is never reached but the rate of change may vary.

Furthermore, North (1990, 1996) explains that institutions aren't socially efficient meaning that outcomes typically favour those with the most bargaining power. As a result, actors with more bargaining power are more successful in achieving institutional change. Therefore, when it comes to institutional credibility, it is important to understand whether this perception is shared by all actors. Ho's (2014) credibility thesis is based on the theory that institutions which lack function will be ignored, changed or fade over time. However, institutional function and thus credibility is subjective. While some actors might seek institutional change, others that derive function from existing rules, can use their resources to maintain the status quo and protect their vested interests.

Aside from the costs of negotiating institutional change, actors' own cognitive limitations can also deter such strategic considerations. Decision making in the real-world is found to occur in a context of bounded rationality (Simon, 1972). This means that actors are still partially motivated by utility and goal-seeking behaviour, but that there are also clear limitations to this process. Decisions involve trade-offs between utility and internal value judgements or codes of conduct that may evolve over time (North, 1990; Ostrom, 2005). Reasoning is

constrained by incomplete information about a system, cognitive limitations that constrain the amount of information actors can digest and process, and unstable preferences that also reflect in their selection of strategies (North, 1990).

These constraints together may either prevent institutional change strategies from being considered or being realized. Therefore, we must also consider how actors go about evaluating and selecting a response.

2.4. Satisficing approach to system change

Unlike the rational choice perspective, the above mentioned constraints suggest that actors assume a 'satisficing' strategy in response to system changes, in line with Simon (1972). Actors will not look for the "best" or the "optimal" solution to their problems, but will settle for any solution that improves their situation to meet a certain standard. This is not the result of a complete analysis of all pros and cons, but more a result of a somewhat haphazard weighting of readily available options.

Similar ideas about satisficing between strategies can be found elsewhere, albeit in somewhat different terms. Ostrom (2005) explains that actors unable to activate higher-level institutions to change rules, may look for solutions in parallel institutional arenas or create informal rules as a way to circumvent costly formal channels. The notion of utilizing existing rules is highlighted by other scholars as well. Klijn and Koppenjan (2006) refer to an implicit reinterpretation of rules while Cleaver (2002) and Lanzara (1998) highlight institutional 'bricolage' where new institutions are built using the properties of existing ones. Another approach can result in the creation of empty institutions over time, meaning that actors simply ignore them (Ho, 2013; Klijn and Koppenjan, 2006; North, 1990). Finally, if change does occur, there is a natural tendency for incremental change rather than large scale change (North, 1996; Williamson, 1998). The timescales along which change occurs also varies as we move to higher order rules in the nested structure (Williamson, 2000). In this way, actors can evaluate potential courses of action for improving outcomes of a given situation.

2.5. Conceptualizing institutional change in the peri-urban interface

This research aims to examine the process of institutional change in the peri-urban interface of Khulna, Bangladesh. The dynamic nature of this context implies that institutions may lose their credibility over time, requiring actors to invest in institutional change. However, the heterogeneous nature of peri-urban areas implies conflicting interests and potentially different perceptions of institutional function. We explore whether existing institutions can mediate these conflicting interests or whether local peri-urban actors can negotiate alternate institutional arrangements to meet their needs. We propose a synthesis between the various perspectives described above to conceptualise three interrelated mechanisms of institutional change:

- a Institutional function and credibility: Actors respond to system changes via institutional change to get a certain function that is currently not provided by the existing institutional context. This can be a new function, as the changing system produces new needs and requirements, or it can be an existing function for which the 'old' institutions are no longer suitable.
- b Satisficing: The process of responding to system changes occurs through a satisficing process, whereby actors engage in a limited scanning and trial of alternative courses of actions, until they reach a new situation that produces outcomes that are sufficiently satisfactory. This satisficing process is the result of cognitive and resource limitations of actors.
- c Nested structure: Actor's satisficing process is influenced by the nested structure in which institutions exist. This nested structure influences the resources required and available to actors for satisfactory institutional change.

To examine this mechanism of change in peri-urban Khulna, we apply the Institutional Analysis and Development (IAD) framework (Ostrom, 2005) given its compatibility with the selected theories and relations of interest, in particular, the feedback loops for studying institutional change in relation to function; the action arena to examine multi-actor interactions as results of bounded rationality and satisficing; and the exogenous variables that reflect the nested structure of institutions. Our analysis is also structured along these three main components. The IAD framework was also selected based on its proven results in other real world applications relating to natural resource management. Imperial and Yandle (2005) highlight the suitability of the IAD in both developed and developing countries for a comparative and context specific analysis of institutional performance for fisheries management. Similarly, in a comparative study of land reforms in Vietnam, the IAD framework highlighted the importance of not only how institutions ‘fit’ the local conditions but the importance of favourable political and economic discourses to support successful implementation (Clement and Amezaga, 2013). The IAD framework was also successfully applied to examine what institutional elements support adaptive water management in the Rhine basin (Möllenkamp et al., 2008). For these reasons, the IAD framework offers a suitable basis for structuring and analysing peri-urban institutions in Khulna.

The framework is designed around the *action arena* where actors (both individual or groups of actors) labelled as *participants*, interact on specific *action situations* they are faced with. We can animate these action situations further using Ostrom’s (2005) structural attributes. Strategies taken by each actor in a given action situation jointly produce an outcome.

The action arena is nested within a set of *exogenous variables* that includes the biophysical conditions, the community attributes or socio-economic conditions, and rules or the institutional context. The IAD framework also recognizes the prevalence of the nested structure between institutional levels and other action arenas. Although this is not made explicit in the figure above, the framework allows for such specification by unpacking its components (Ostrom, 2005).

Outcomes of the action situation produces a change in some aspect of the system via the exogenous variables. This outcome is evaluated by actors using evaluative criteria that includes, although not limited to, economic efficiency, equity, accountability, adaptability, resilience, and robustness (Ostrom, 2005: 66–67). This reflection process triggers a behavioural response that could result in strategic changes within the existing institutional context or changes to the institutions themselves. These changes are depicted as feedback loops from the outcomes in the IAD framework (Fig. 1).

3. Methodology

This study was conducted in the peri-urban interface of Khulna city, located in the south-western region of Bangladesh (Fig. 2a). We selected

two peri-urban communities from the sub-district of Phultala based on a 2016 site selection study undertaken by project partners. These are Matumdanga village located in Atra-Gilatola union, and the headquarters of Phultala union. The location of the two communities in relation to Khulna city is shown below in Fig. 2b. Details regarding methodologies and evaluative criteria used for selection of peri-urban case studies can be found in the report (Banerjee, 2016).

Both peri-urban communities share a common dependency on groundwater for drinking water purposes and both face a similar action situation; that of changing access to groundwater resources as a result of urbanization. Their main objective is to secure access to drinking water, but differences in geographic location and socio-economic conditions affords them different opportunities and constraints to do so. Therefore, we are able to examine the variations in actor responses between the two communities.

An embedded case study approach was used for this institutional analysis of groundwater access in Matumdanga and Phultala. While other methods like surveys cover a wider sample set, case study research involves a strategic sampling of a few research units based on the conceptual framework and information needs (Hevner, 2007). Yin (1989) explains this approach consists of multiple units of analysis within the same case study that together explain the outcomes of the overall case. The sub-units to be analysed are described earlier in the description of the IAD framework.

We also utilized multiple data sources for triangulating between different lines of inquiry, offering greater depth into causal relations as well as more convincing conclusions (Hevner, 2007; Yin, 1989). Data for this study included secondary data, primary data gathered during a field visit in 2015, and a 2016 survey. Secondary data sources refers to existing academic papers on related research as well as project reports on peri-urban issues from the proposal development phase of the Shifting Grounds project (Jagrata Juba Shangha, 2013a,b; Thissen et al., 2013). It also includes personal communications with local project partners during the planning of field activities.

A preliminary stakeholder analysis was conducted first using this information. It helped create an inventory of key actors, actor objective, relations between actors, and perceptions of the problem (Enserink et al., 2010). Stakeholder analysis is a particularly useful method for collecting and structuring actor information for an initial analysis of strategies in a given problem (Hermans and Thissen, 2009). By itself, it is insufficient to draw formal inferences but it identified key actors to interview and appropriate lines of questioning for the pre-scoping visit that followed. This step was also useful in defining our problem boundary for further analysis.

The next step was to conduct more in-depth data collection activities around the variables of the IAD framework. A key component of the exogenous variables in our study is the institutional context. Here, secondary sources such as websites were scanned for policies, laws, and regulations and coded based on their year, level of implementation (e.g.

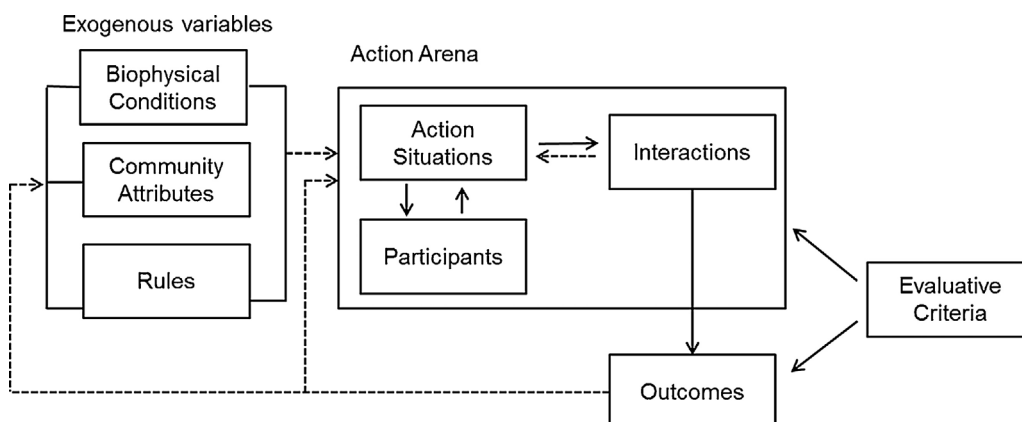


Fig. 1. IAD framework (Ostrom, 2005).

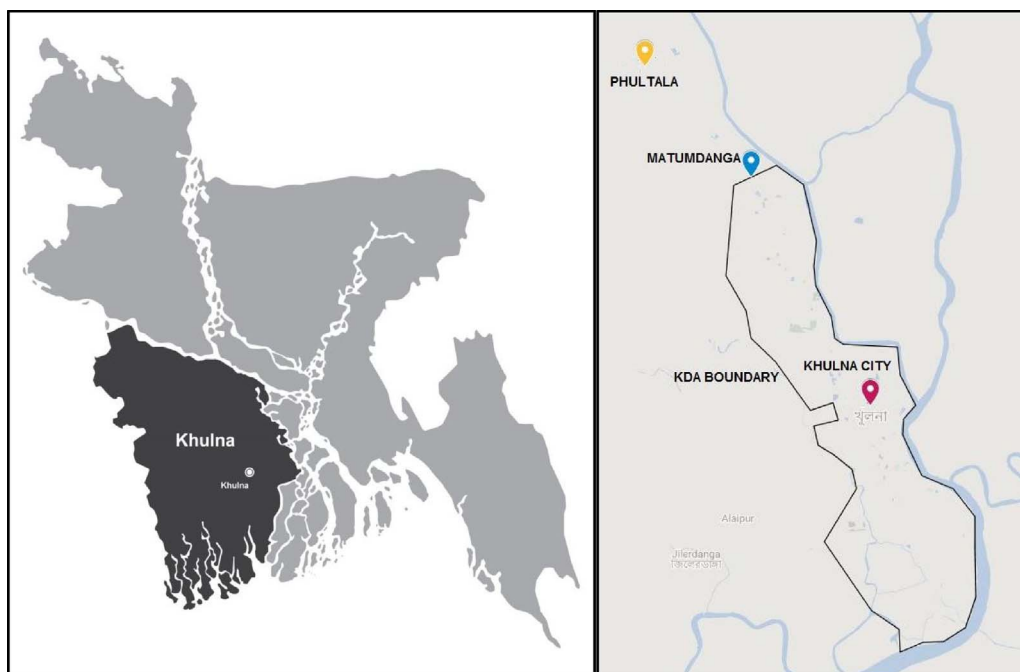


Fig. 2. a,b: Map of Bangladesh indicating Khulna city location (Created from image by [Aranjuezmedina, 2017](#)); Location of peri-urban case studies: Phultala (yellow) and Matumdanga (blue) in relation to Khulna city (red) (Created using [Google My Maps, 2017](#)). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

national, regional and local administrative levels), concerned parties (i.e. actors), and issues they are connected to (eg. groundwater supply, urban planning etc). This database of institutions evolved over time following the field visit to Khulna. In particular, informal and operational level formal rules could only be identified via interviews and focus group discussions with local stakeholders.

Primary data collection activities was conducted between May–June 2015 by the primary author. This included eleven key informant interviews with representatives from national, sub-district, and local government departments involved in groundwater management, urban development, agriculture, and rural administration. Key informants are those with first-hand knowledge of the research context or organizations which they represent ([Hardy and Koontz, 2009](#)). They were contacted through local project partners but we also used snowball sampling methods once in the field ([Harrell and Bradley, 2009](#)). Interviews typically lasted between one and two hours in length (depending on availability) and were recorded both digitally and manually by the author.

In addition to this, focus group discussions were held in both Matumdanga and Phultala. The one in Matumdanga was attended by eighteen local groundwater users representing different age groups, genders and water user groups (drinking water and agricultural users). This diversity helped profile historical peri-urban changes within the community and its impact on gender and different types of users. The discussion also covered the issue of groundwater access for drinking purposes. In Phultala, the participants in the focus group discussion included the secretary and six members of the civil society group, the Phultala Paani Andolan Committee (PPAC) that played a major role in the resolution of the groundwater access issue between Phultala and Khulna city. These focus group meetings covered a wide variety of perspectives, local experiences, and allowed actors to respond to other comments. This was helpful in uncovering aspects of the problem not often discussed within the community, like for example the institutional context ([Harrell and Bradley, 2009](#)).

Interviews and focus group discussions were semi-structured around the key variables of the IAD framework that was assigned a corresponding interview question. The interview questions were also customized for specific categories of actors: government, civil society, and local water users. This helped frame similar questions (eg. the formal rules) in a more specific way. This was necessary given that interviews

took place in the local language, requiring careful translation by local colleagues.

Primary data from this visit was subsequently verified during a debriefing meeting held at end of the field visit with 16 participants representing the key stakeholder groups previously interviewed. Here, we presented an initial analysis of the problem using the IAD framework. Participants could reflect and comment on how realistically it captured their situation over time. For this meeting, collected data was coded with respect to the nested level, action arena it belonged to at different stages of the problem and mapped using the IAD framework. Snapshots of the action situation over time was then analysed with respect to the contextual variables and its outcomes to describe the changes that occurred. These snapshots are referred to as the previous, interim, current, and future situations depending on the case study.

In October 2016, survey results also became available for comparison with previous analytical findings for the Matumdanga case study adding another level of detail and opportunity for verification. This survey was conducted by our local project partner in 92 households from Matumdanga on socio-economic conditions and livelihood practices but included aspects of drinking water supply also. It was designed based on the multi-dimensional poverty assessment tool ([International Fund for Agricultural Development, n.d.](#)), adapted to suit the local context. Responses relating to drinking water supply were compiled by our project partner and emailed to us (M. Jatav, personal communication, December 17, 2016).

4. Peri-urban institutional change: results from Khulna

Rapid and largely uncontrolled urban expansion in Khulna city has affected drinking water availability in both peri-urban communities. In Phultala, groundwater access was threatened by urban demand. Here, a proposed urban water supply project utilizing groundwater created competition between Phultala residents and the Khulna City Corporation (KCC) over local aquifers. Meanwhile in Matumdanga, drinking water users face a shortage of tube well infrastructure to meet their needs. This section presents the findings of how actors responded in each case study.

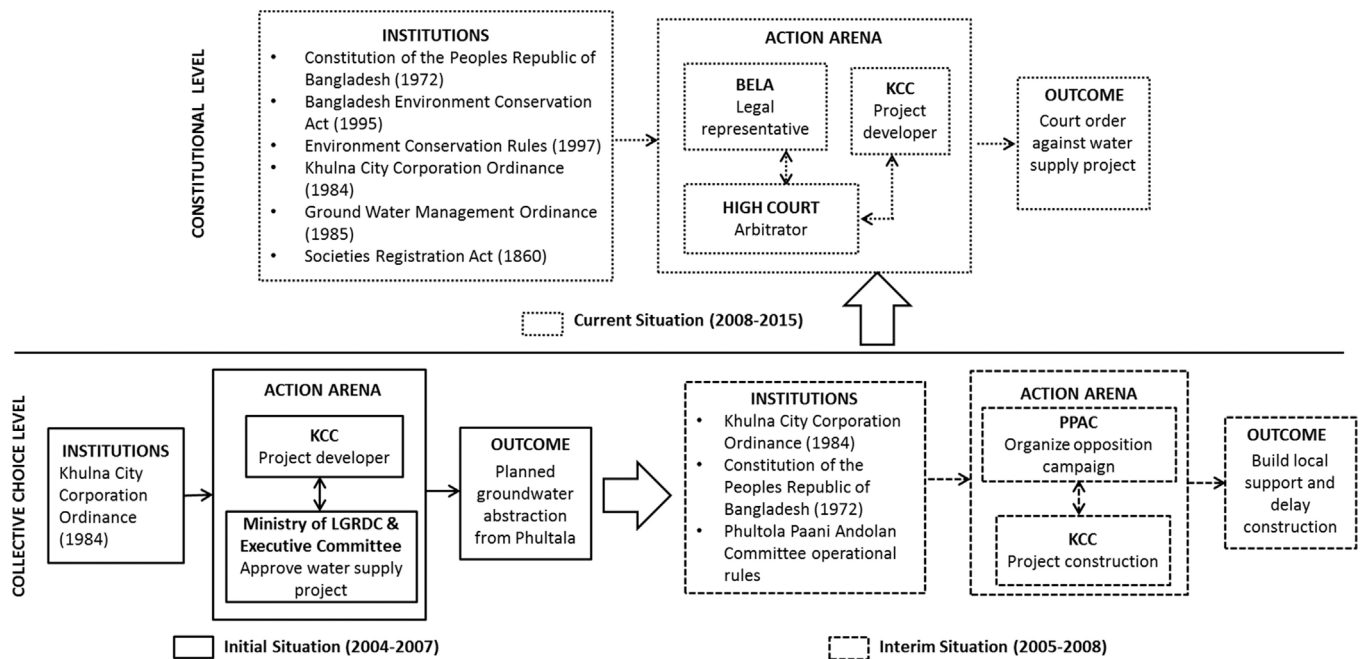


Fig. 3. Evolution of groundwater access situation between Phultala and KCC.

4.1. Drinking water access in Phultala

4.1.1. Previous situation (2004–2007)

Prior to the creation of the Khulna Water Supply and Sewerage Authority (KWASA) in 2008, urban water supply was the responsibility of Khulna City Corporation (KCC) as per the 1984 KCC ordinance which represents the institutional context in the framework. In 2004, a KCC project titled ‘Khulna City Interim Water Supply Project under Crash Programme’ was approved by the Executive Committee of the National Economic Council. The project was expected to withdraw 3.4 million litres of groundwater per day from aquifers in Phultala sub-district via 40 deep tube wells to increase Khulna city’s daily water supply by 30% in an effort to close the existing demand gap. Construction activities in Phultala began in 2007 with the installation of pipelines and booster pumps, following approval by the Ministry of Local Government, Rural Development, & Cooperatives (LGRDC). The project proposal stage represents the action arena at the collective choice level. The outcome is the approval of large-scale groundwater abstraction from Phultala for Khulna city residents (Fig. 3).

4.1.2. Interim situation (2005–2008)

Phultala’s residents rely primarily on groundwater resources for drinking and domestic purposes. Information regarding this proposed project was circulated via the local and national media which is how locals became aware of it. A number of prominent local residents came to the realization that large-scale abstraction was approved without any community consultation, threatening the lives and livelihoods of nearly 200,000 people. It was their impression that such a project would only make them worse off. This motivated them to take action.

In 2005, the Phultala Paani Andolan Committee (PPAC) was established, with the sole intention of preventing groundwater abstraction in order to protect Phultala’s resources. Some of the original members had worked with each other in 1998 on a local movement against water logging problems in another locality. However, at the time they were not formally organized as the PPAC. PPAC’s initiatives in Phultala began even before the project was approved and construction activities began. Their initial activities focused on raising local awareness via meetings, rallies, letters of appeal etc. Over time, they gained support from other like-minded locals, research organizations,

political parties, and neighbouring unions. Their activities were initially self-funded but over time, nearly 300 people got involved, some of whom also offered financial support.

Local self-organization is supported by the Bangladesh Constitution (1972) under Article 37. The PPAC operated under its own set of collectively agreed upon rules. For example, it was composed of a secretary, chair, and 21 committee members including academics, journalists and local businessmen. Their activities against the KCC projects represents the collective choice action arena in the interim stage of the issue (Fig. 3).

4.1.3. Current situation (2008–2015)

In 2008, PPAC approached the Bangladesh Environmental Lawyers Association (BELA) to formalize their grievances and seek legal representation. Since then, BELA has represented Phultala’s interests and filed a case at the High Court against several concerned government agencies including KCC over the groundwater abstraction project. These activities take place in a higher, constitutional level action arena. In 2009, an Environmental Impact Assessment report was prepared and submitted as per the request of the High Court during which time project construction activities were temporarily halted.

Institutionally, BELA is registered under the Societies Registration Act (1960). Legal arguments were based on a number of existing formal rules at the constitutional level. Referring to Articles 32, 40, and 42 of the Bangladesh Constitution (1972), their case claimed that the project violated the right to life, property, and livelihoods of affected Phultala citizens. Failed attempts at obtaining proof of environmental clearance directly from the project authorities also prompted allegations against its legal status and brought into question its adherence to environmental protocols. In this regard, the Environmental Conservation Act (1995) and its corresponding Rules (1997) state that water distribution projects under ‘red’ category, such as this, requires environmental clearance certificates and location clearance certificates from the Department of Environment prior to implementation. Furthermore, BELA stated that failure to procure groundwater abstraction licences from the sub-district committee was in non-compliance with the Groundwater Management Ordinance (1985).

Although the official final court ruling documents are not publicly available, both KCC and PPAC confirmed that the groundwater

abstraction project is no longer being pursued. Instead, the current water service provider of Khulna city, Khulna Water Supply and Sewerage Authority (KWASA) is exploring alternate projects including a 5.5 million litres/day surface water treatment plant outside Phultala, that would utilize part of the installed transmission line from the earlier KCC project. An overview of the current situation is shown above in Fig. 3.

4.2. Drinking water access in Matumdanga

4.2.1. Current situation (1996–2015)

The action situation in Matumdanga begins at the collective choice level. The Department of Public Health Engineering (DPHE) is the drinking water provider for all rural areas of Bangladesh. This includes peri-urban areas such as Matumdanga. DPHE installs drinking water infrastructure (mainly deep tube wells) following approval of a tube well licence by a Water and Sanitation (WATSAN) committee at the sub-district level. Households can apply for tube well licenses via written applications through their union office. The committee consists of a chairman, concerned government departments, and representatives

tube wells. This shows the dependency on the deep tube well for drinking water supply. Moreover, 49% of survey respondents collect water 2–4 times a day from their community well, while 35% of households visit over 5 times a day. This gives an idea of the inconvenience that locals face every day.

The institutional context is likewise, nestled between the collective choice and operational levels. The National Water Policy for Safe Water Supply & Sanitation (1998), the National Water Policy (1999) and more recently the Bangladesh Water Act (2013) places the right to potable water, and water for hygiene and sanitation as the highest priority right with special attention to under-served areas. The WATSAN committee exists at the collective choice level to supervise local WATSAN projects and allocate licences as per these rules. Allocation of licences is supposed to be based on a quota system, however, it is unclear whether these allocation rules are actually implemented or enforced formally by a higher authority. Internal committee politics is also believed to isolate less visible communities like Matumdanga from tube wells. The need to manage relationships with member constituencies is also believed to influence this decision making process. Fig. 4a provides an overview of the action arenas in the current scenario.

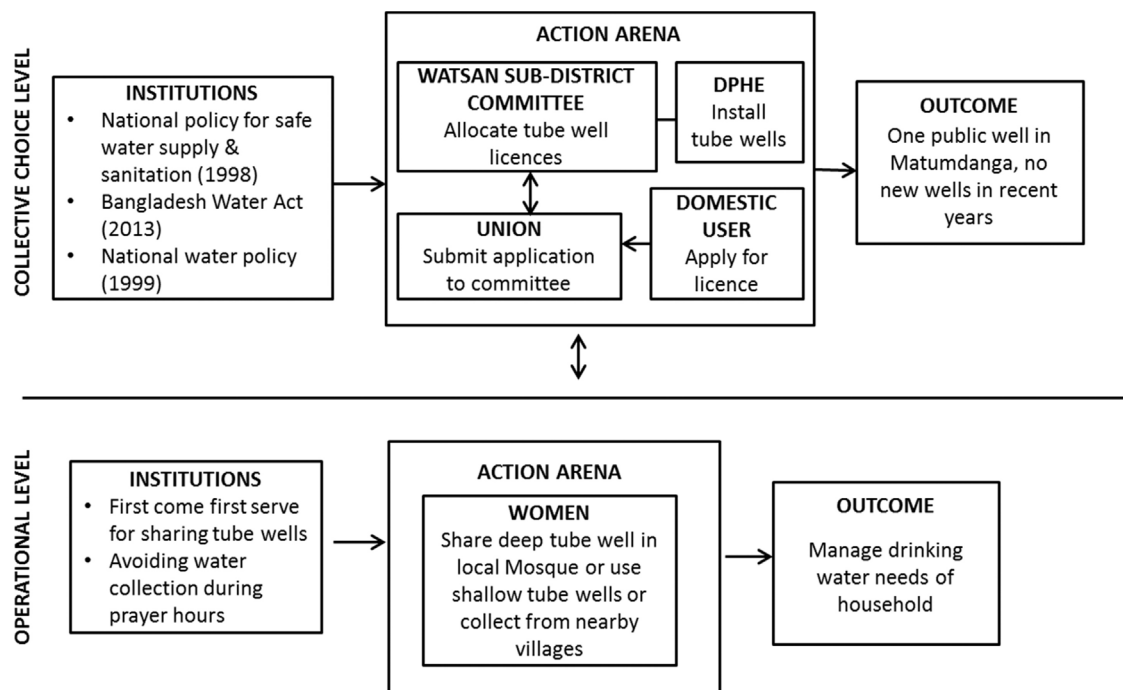


Fig. 4a. Current drinking water situation (1996–2015).

from local unions that collectively take decisions on where to allocate tube well licenses within the sub-district.

However, since 1996, DPHE has installed only one deep tube well in the village despite repeated applications from Matumdanga. The effect of this is felt at the operational level within the local community. Here, women are the ones traditionally responsible for household water collection. Around 20–25 years ago, some households have also started investing in shallow tube wells (200 ft. depth). Depending on the location of the household and availability of water (as a result of seasonal scarcity issues), locals visit the public deep tube well; use shallow tube wells; or travel to nearby villages to collect water. The deep tube well is located at the local mosque and is shared by nearly 150 families. As a result, drinking water users have their own jointly agreed upon rules for sharing the this tube well. Women use a queue system and respect religious norms by avoiding water collection during hours of prayer. Only 22% of households surveyed use water from shallow tube wells for drinking, the majority of the households (58%) are without shallow

4.2.2. Future situation (post 2015)

A change in drinking water access is also likely in the future as a result of urban expansion (Fig. 4b). In 2007, Khulna City Corporation (KCC) submitted an proposal to extend Khulna city boundaries from 45 km² to 70 km² and increased it in 2014 to 114 km². This extension proposal was designed as per the Khulna Master Plan (2001). Once approved by the Ministry of local government, rural development and cooperatives, communities like Matumdanga will be brought under urban jurisdiction.

Thereafter, the Khulna Water Supply and Sewerage Authority (KWASA) will become the official drinking water service provider as per the WASA Act (2008) for Khulna city. If this happens, drinking water users from Matumdanga will get their drinking water supply from KWASA. Other institutions continue to apply in this future scenario. For example, the National Policy for Safe Water supply and sanitation (1998) and the Bangladesh Water Act (2013) apply in this collective choice arena.

As of 2015, however, KWASA faced a supply gap of 47% and issues of leakage and pressure problems with their existing infrastructure. As a result, residents of Khulna city currently rely on private tube wells. Moreover, 95% of water supply today is from tube wells rather than household connections. KWASA does have plans to increase surface water supply through treatment plants and pipeline extension projects. The surface water project mentioned in the Phultala case study is one such planned infrastructure project. However, these projects will target the existing supply gap rather than projected demand based on urban expansion. Thus, women from Matumdanga would likely still need to share tube wells or invest in private tube wells like other Khulna city residents. Therefore, it is unclear whether drinking water access will improve in the future for this community.

institutional function in terms of how it helped local peri-urban actors access drinking water. In Matumdanga, drinking water access is based on rural institutions, operationalized via a WATSAN committee. However, unsatisfactory outcomes in terms of tube well infrastructure numbers, distance travelled, and time spent for water collection has made locals from Matumdanga less confident in formal rules. This is evident from their use of informal rules since 1996. Thus, in this case, (formal) institutional function, and thus credibility in Matumdanga has become eroded over time due to repeated failures experienced at the individual or household level in securing groundwater access. Here, the operational level is where institutional function is realized or debated.

Outside this community, it is unclear whether actors find these formal institutions as credible or not. Ho (2013) explains that institu-

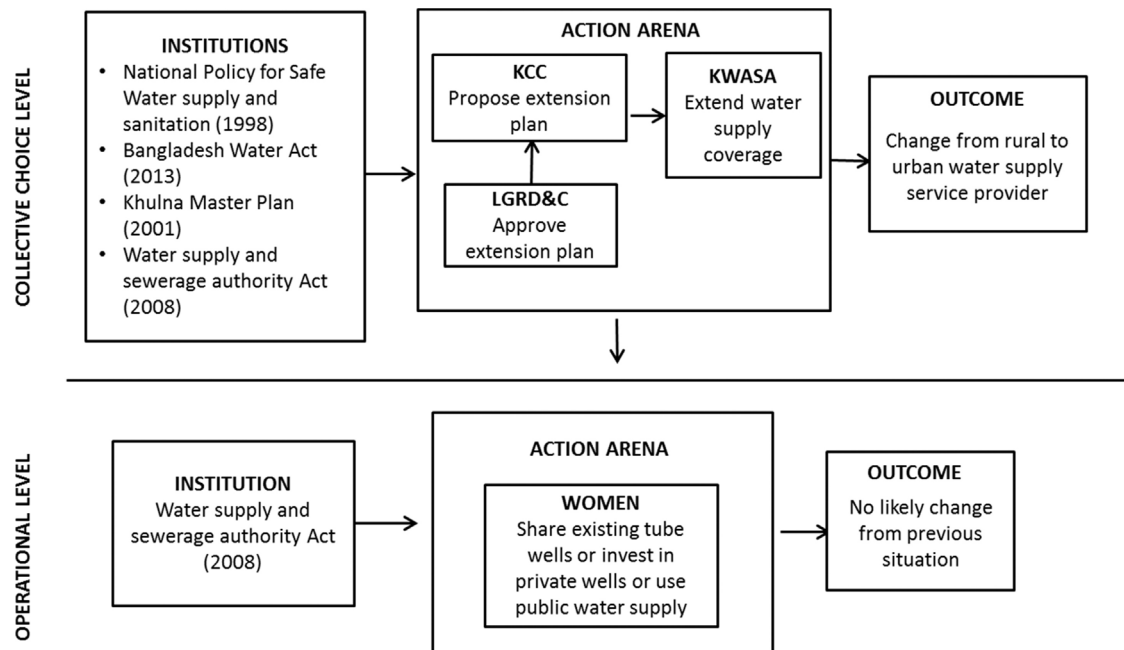


Fig. 4b. Future drinking water access situation (post 2007).

5. Discussion

Our examination of drinking water access in peri-urban communities of Matumdanga and Phultala reveals interesting insights about how actors respond to system change via institutional mechanisms. This section explains the significance of these case studies with respect to our three perspectives on institutional change mechanisms regarding institutional credibility and function, satisficing approaches, and the nested structure.

5.1. Institutional credibility and functional dynamics of peri-urban drinking water access

In general, peri-urban drinking water access is changing in many ways as a result of urbanization. In Phultala, increasing demand for water in Khulna city had an impact on groundwater access in the peri-urban context. Here we see how processes occurring in a parallel action arena (i.e. the urban context) effects the larger geographic region such as the peri-urban interface. In peri-urban Matumdanga, the system will likely change in the near future as well, as a result of changes in jurisdictional boundaries. These two examples reflect an exogenous change in the biophysical and community attributes. In both cases, drinking water access is affected in some way, prompting local water users to look for appropriate response strategies involving considerations of institutional function and thus, credibility.

Peri-urban responses in these two case studies offer insights on

tions that lack credibility can trigger institutional change as a potential outcome, however, this has not yet occurred in the case of Matumdanga. Discussions thus far, suggests the allocation process is the result of internal committee politics. However, primary data on the decision-making processes within the WATSAN committee is missing from this study due to limited access to its members. Historical tube well licencing data, for example, could highlight spatial differences in institutional function based on where licences have historically been allocated. Conversely, no enforcement of licencing rules might reveal the fact that these are empty institutions which exist but aren't actually implemented (Ho, 2014). Similarly, we could also examine the potential benefits to be gained from inequitable licencing or the supply and demand aspects of tube well licences. At this time, however, we can only speculate based on the perceptions of actors outside the committee and are unable to draw any further conclusions on this topic.

In the future, system changes driven by urbanization, will see a change in formal rules. However, it is uncertain whether credibility will improve for Matumdanga residents. On the one hand, future urban residents might benefit from more convenient, better quality drinking water through the water supply projects that are being planned. On the other, existing residents might be prioritized over new residents. Therefore, the credibility of institutions depends on which actors stand to benefit at a given point in time. This is also seen in the Phultala case study, where the KCC groundwater abstraction project if successfully implemented, might have improved urban groundwater access at the expense of access in Phultala. Therefore, as the credibility thesis

suggests (Ho, 2014), evidence of spatial and temporal institutional function and thus credibility can similarly be found in peri-urban Khulna.

5.2. Satisficing mechanisms in managing drinking water access

Although the operational level is where system change and the failures of existing institutions is experienced, the collective choice level is where appropriate response strategies are taken. This is expected, given that institutional change is driven by a shared, rather than individual perception that an institution is no longer credible (Aoki 2007 cited in Ho, 2014). In other words, response strategies via the application of alternate rules relies on a collective agreement of these rules. We find evidence of this particularly in the Phultala case study. Although, Phultala residents admitted their awareness of the proposed extraction project was through the media, it was only through collective action (with the creation of PPAC), that appropriate response strategies were implemented. Similarly, in Matumdanga, sharing of the one public tube-well by nearly 150 families for example, requires well-organized local efforts via collective agreement of informal rules that will be applied.

The type of response strategies adopted in both case studies is also reflective of the satisficing approach described by Simon (1972). In Phultala, local actors responded to an imminent threat of large-scale groundwater abstraction from urban areas in order to safeguard their own groundwater access. Their response to KCC's abstraction project was through the creation of PPAC, whose actions were driven by internal (and informal) rules and objectives. Moreover, this strategy was already familiar to the founding members of PPAC, given their previous experience with dilemmas in other peri-urban arenas. Over time, PPAC was able to mediate the problem through formal channels by escalating the problem to the high court with BELA's involvement. While no institutions were changed in the process, already existing (and credible) constitutional level rules were invoked to challenge the legal basis of this abstraction project.

Similarly in Matumdanga, an informal strategy was adopted to deal with the gaps in existing formal rules. These informal rules for sharing tube wells (e.g. queue system) are most likely not newly devised rules, but existed and were used for other purposes. Therefore, in both case studies we find institutions from other arenas utilized for mediating drinking water access problems. These types of parallel institutions are indicative of institutional fragmentation commonly described for peri-urban contexts (Allen, 2003). And similarly, to theories of legal pluralism, that features various institutional repositories (both formal and informal) used for negotiating water rights for example (Meizen-Dick and Bruns, 2000).

5.3. Resource constraints in addressing drinking water access

Our two case studies highlight the importance of resources in investing in institutional change. Phultala's response over time began by initially adopting feasible informal strategies via PPAC. This strategy was helpful in building support and resources (both financial and political) to sustain the local movement. Eventually, their efforts got the attention of BELA whose resources helped escalate the issue to a higher level institutional arena. Compared to local residents, KCC is a more powerful actor. Thus, the success of peri-urban efforts can be attributed to their ability to utilize other more powerful actors who were able to contest the project in a judicial arena on their behalf.

On the other hand, drinking water users from Matumdanga thus far, have been unsuccessful in improving their access to tube well infrastructure via the WATSAN committee. Although these formal institutions fail to meet the needs of this peri-urban village resulting in insufficient drinking water infrastructure users have been unable to challenge the inequity of licencing mechanisms and obtain a more favourable outcome from the status quo. Discussions suggest that the

location of this village away from the sub-district headquarters isolates them from the action arena in which the WATSAN committee operates. As a result, they are unable to influence formal rules or their implementation by the WATSAN committee to receive a better outcome in the situation. Therefore, the community continues to rely on sharing existing tube wells, a strategy that is far from ideal according to local women.

6. Conclusion

This paper set out to explain the mechanism of institutional change in peri-urban areas. Our goal was to analyse how well peri-urban institutions are able to mediate conflicting interests and help local actors adapt to system change or whether actors are able to negotiate alternate institutional arrangements to meet their needs. For this, we examined two case studies from peri-urban Khulna faced with a similar situation of changing drinking water access as a result of processes relating to urbanization.

Based on literature, we developed three related mechanisms of institutional change. The first is based on the notion of credibility and function to suggest that actors respond to system changes through their institutional context to address a gap in institutional function. Arguments to support this are found in the credibility thesis (Ho, 2013, 2014) which states that institutional change stems from a lack of credibility; credibility that depends on institutional function that is spatially and temporally defined. The second draws from Simon (1972) that describes a satisficing approach rather than completely rational, optimal solutions for managing change. Third, responses are influenced by the nested structure and the costs associated with changing institutions at a particular level (Ostrom, 2005; Williamson, 2000). The case studies of Matumdanga and Phultala were similarly analysed along these three assumptions.

Our case studies help demonstrate how institutional function evolves as a result of urbanization. In Matumdanga, we find a shift in the dependency on informal institutions for drinking water access over time, given the failures of formal rules. Institutional function is also spatially distributed. In Phultala, urban drinking water projects was likely to marginalize peri-urban communities from drinking water access at the expense of improving drinking water supply in urban areas. Similarly, in the future, depending on how drinking water supply is managed, we might also see spatial differences between urban localities that received public water services versus those that do not.

Further, the response strategies adopted in peri-urban Khulna are indicative of a satisficing approach. Sharing of tube wells in Matumdanga, via informal rules is feasible compared to changing allocation rules given the community's isolated position in the sub-district. Similarly, local campaigning strategies adopted by Phultala was built on readily available resources such as a shared interest in the problem and local connections. It was only after Phultala secured the help of BELA that legal strategies could be taken against the KCC project to secure future groundwater access. These responses suggest that peri-urban actors in these two case studies opted for available strategies from parallel institutional arenas to address drinking water access issues.

Finally, the role of the nested structure is also visible in the responses taken by peri-urban actors. Our results are reflective of North's (1996, 1990); notion that institutions favour those with the most bargaining power. For drinking water users in Matumdanga, we see a clear gap in institutional function but little change in the outcome as actors so far are unable to successfully influence the action arena of the WATSAN committee. Whereas in Phultala, initial informal strategies to protest the KCC project proved effective in the long-run as it opened up new solutions at higher level arenas. Eventually, Phultala access to judicial arenas through BELA, enabled constitutional rules to legally prevent the abstraction project from continuing further.

Overall our case studies suggest that actors respond to system

changes brought about by urbanization related processes, but this does not necessarily result in institutional change. In both cases, actor motivations developed at the operational level, as this is the level where actors were directly affected by system outcomes. Meanwhile, the collective choice level is ultimately the most dynamic as actor responses in both cases were taken at this level. This is in line with the notion of satisficing actors, as the collective choice level is where changes seem least costly, especially in local informal rule-setting arenas. Furthermore, we observe that this process of change is slow moving and evolutionary as Ho (2014) suggests. The timeline between system changes, actor responses, and institutional change is not always clear, which is why the selection of appropriate boundaries and timescales of analysis is a particularly important step. It is also what makes the study of institutional change challenging, particularly in dynamic contexts. Yet this analysis in peri-urban Khulna reveals the value of real world examples in furthering our understanding of institutional change.

Our research also highlights the institutional complexity of governing peri-urban areas. For one, the typical rural-urban administrative set up can lead to gaps in institutional function which can have spatial or temporal effects on peri-urban management, as demonstrated by the issue of drinking water access. This research highlights the important role of the informal context as well as parallel institutional arenas in enabling marginalized peri-urban actors to cope with system changes during the urbanization process.

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