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From Formal-Informal to Emergent Formalisation: Fluidities in the Production of Urban Waterscapes

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ABSTRACT: Urban waterscapes are understood to be a tapestry of formality-informality, but this categorical scheme needs closer interrogation. Its conceptual integrity, theoretical relevance and empirical viability have been questioned in its application to other phenomena, such as the organisation of economic activity, labour, land and housing. Is its use in characterising systems of water provision any less marked by similar issues? Do alternative understandings of the formal-informal, such as in respect of the functioning of organisations, display greater conceptual strength and empirical fit? We address these questions, using the conceptual and theoretical challenges to the categorisation raised in the economic literature, and the realities of formal and informal water provision in two areas in Bhubaneswar, India. Significant limitations are revealed in the way the frame is currently used for organised systems of water supply in the urban South. Organisational-institutional understandings of the formal and informal, as elements that exist simultaneously in all organisations and interact to produce *emergent formalisations*, are found to be both conceptually stronger and a better fit with the observed realities. We therefore suggest using this alternative conceptualisation, for its descriptive power and greater theoretical and practical potential. Formality is then a dynamic condition that emerges from the interplay of the formal and informal in *all* kinds of organised systems for water provision in developing locations.

KEYWORDS: Formal-informal, water governance, institutions, India

INTRODUCTION

The formal-informal conceptual scheme has been ubiquitous in discussions of urban water provision in the Global South, and the attention to 'informal' modes has provided both descriptive and prescriptive width. However, the conceptual strength and empirical viability of this categorisation, and the definition of the terms, need further interrogation. Some important issues in the application of the terms have already been discussed. Categorisation of many kinds of water provision arrangements (small-scale, traditional, non-statutory) as 'informal' has been questioned; that formal and informal systems are interrelated and sometimes, mutually constitutive, has been recognised; informal aspects of formal systems discussed; and the value of 'formalisation' of the 'informal' has been critiqued (for e.g. Cleaver, 2000; Blanc and Botton, 2010; Hossain, 2011; Anand, 2012; Ahlers et al., 2013). These discussions problematise the kinds of water provision arrangements that may be considered 'formal' or 'informal', the extent to which they are separable, the privileging of modern notions of formality, and if formalisation improves water provision. Despite this, the use of the terms as descriptors of different arrangements for water provision, and the categorical scheme that is implicit, continue. Other categorisations of systems observed in the South (e.g. Bakker, 2003), do not explicitly discuss the structure of difference in formalities, and the use of the binary persists.

Use of the terms in describing systems of water provision arrangements has indeed become so 'naturalized' that few authors feel the need to categorically define 'formal' and 'informal'. Implicit in their discussions is that the 'formal' connotes systems with some form of statutory or legal recognition; and predominantly, networked systems of supply by state or incorporated private entities, though

sometimes other arrangements with legal status are also considered formal.¹ 'Informal' typically connotes all other modes without legal status, and therefore includes a wide variety of arrangements – from self-, group and community provision, to vending by small producers, retailers and re-sellers. This is captured also in the definitions occasionally offered, such as the following:

the term informal suppliers refers to all types of water suppliers who are *not operating in the legal framework* of water management in an area. It refers to *any form of non-utility water service* and it includes *all small-scale entrepreneurs that are institutionally and contractually independent of the utility*. 'Informal' is related both to the technical systems of provision (which may include the infrastructure and the sale of water) and the resulting relationships (Angueletou-Marteanu, 2008: 1, italics added for emphasis)

However, is such use of the formal-informal binary conceptually and empirically tenable? It has been extensively applied in several contexts, including economic activity, labour, land, housing, and organisational and institutional functioning. But its use has also been rife with limitations, terminological confusion, internal inconsistencies and theoretical issues (Castells and Portes, 1989; Gerxhani, 2004; Rakodi, 2006; Sindzingre, 2006; UNCHS, 2006). Is its application to water provisioning free from similar issues? Also, to what extent is this conceptual scheme relevant and complete in describing the variety of observed arrangements in the cities of the South, in both organisational *and* institutional aspects?

We explore these questions by first examining if the terms as used in describing water provision are devoid of the issues raised in the context where the categories originated and are extensively used, namely, the 'informal sector' in the economy.² We then examine how formal and informal are understood in relation to organisations and institutions, as our concern is with the variety of organisational and institutional arrangements for water provision. Formulations in the organisational-institutional literature emerge as conceptually more robust and normatively oriented to understanding how the interplay of the formal and informal in organisational systems yield (a dynamic) stability, regularities and therefore, effectiveness.

To find how well the current conceptualisation captures the realities of water provision in developing contexts, we examine water provision in the city of Bhubaneswar, India. A planned city and the state capital with over a million residents (GoI, 2012), it is governed with an overarching state interest in keeping the capital 'beautiful' – well laid-out, well-serviced and clean – in effect, formal. The city is therefore an excellent site for examining our questions. Two locations where water provisioning arrangements ostensibly fit the current characterisations of 'formal' and 'informal' were studied. Significant limitations were found in applying the formal-informal binary, which could not be resolved merely by further refinement of the categories, sub-categorisation or gradation along a continuum. The complex relationships observed between the differentiated formalities appear to be better explained by the alternative understandings of formality/informality, and their dynamic interplay, in the organisational-institutional literature.

In the third section we discuss how the alternative framings from the organisational literature capture a more accurate picture of the formal and informal in the observed arrangements. It provides a more differentiated understanding that recognises not only a spectrum of formalities but also the contingent and dynamic nature of their production. The nature and extent of formality are always

¹ Although some authors (Hossain, 2011; Anand, 2012) point to informal aspects of such formal systems, most assume the formal is homogeneous. See, for example, Llorente and Zerah, 2003; Angueletou-Marteanu, 2008; Pangare and Pangare, 2008; and, in the rural context, Shah, 2007.

² We have used the discussion of the conceptual and theoretical issues in the literature on economic activity, which have been used to interrogate the formal-informal binary as used in the water literature, bypassing other contexts such as housing, settlements or land development. We are not suggesting a special relationship between economic activity and water provision, or that the limitations of the formal-informal binary have not been recognised in relation to other phenomena.

emergent, and the variety of arrangements reveals a spectrum of '*emergent formalizations*'. This alternative framing allows us to recognise and legitimate a range of existing water practices in the urban South that are otherwise elided or actively rejected in the search for equitable, affordable, sustainable and empowering arrangements.

WHAT IS 'FORMAL' AND 'INFORMAL'?

Following Hart's use of the term 'informal' to connote self-employment outside the formal wage economy (Hart, 1973), the binary formal-informal formulation has been extensively used in relation to economic organisation, production and exchange. The formulation was soon revealed to be untenable in respect of the diverse labour relations and employment conditions in developing economies, such as short-term, casual and disguised wage employment, and different types of self-employment (Bromley and Gerry, 1979). Its use nevertheless expanded, particularly in the attention to the 'informal', and it is now a useful heuristic in directing attention to the (earlier) 'hidden' (Harding and Jenkins, 1989), 'underground' (Hansen, 1989), 'casual' (Bromley and Gerry, 1979) and/or unrecorded parts of economic processes. Its usage persists despite a clear recognition of the ambiguities of the term 'informal', the differences in its definition and application by authors, and the conceptual weaknesses, empirical difficulties and theoretical limitations (Castells and Portes, 1989; Gerxhani, 2004; Sindzingre, 2006).

Reviewers of informal-sector literature consistently note the lack of a consensual definition, and that most authors therefore begin with (their own) definitions (e.g. UNCHS, 2006). In the various definitions, the most common markers are *organisational characteristics* such as *legality*, *size/scale* and *structure*, *capital intensity*, *kind of technology used*, *skill levels* and *ease of entry*.³ Informal is associated with small-scale, individual and family enterprises that have few and low-skilled workers, lack legal incorporation, registration, recognition or licence, are labour-intensive with indigenous or adapted technology, and have low barriers to entry. The formal is defined as the obverse. For the formal and informal to be conceptually distinct, the characteristics need to be discriminating factors that identify clear differences between the two categories. However, these features are non-discriminating, because the observed reality displays a continuum on most of them without analytically significant breaks. Moreover, in practice the 'formal' and the 'informal' cannot be readily parsed, often being indivisibly linked and interdependent, for example, in an organised, incorporated, large, high-technology factory that employs a significant proportion of its labour on short-term contract or casual basis. The categorical definitions, therefore, fail on both counts – on substantive and discriminating content and on boundary specification (Becker, 2004; Gerxhani, 2004; Sindzingre, 2006; UNCHS, 2006).

Relevance of the definitional criteria has also been questioned from a normative and outcome-oriented perspective. Is sorting along these aspects important in terms of socially desirable outcomes, such as better livelihoods, wider employment and efficiency in production systems? For example, size may not be important, and there may be little substantive difference between firms with 10, 20 and 30 employees (UNCHS, 2006). Also, aside from clearly criminal and illicit activities (Castells and Portes, 1989), legality (registration or licensing) may not be relevant to whether an activity provides a livelihood and produces value. However, from the perspective of macro-economic and sectoral governance, the formal-informal distinction is perceived as relevant for enumeration, regulation and taxation purposes (e.g. Feige, 1989). This makes features such as registration or licensing (that is, official/statutory recording and 'legality') a useful discriminator between the formal and the informal.

³ In the context of economic activity, ownership is not always considered relevant. In water provision, ownership by the state or by an incorporated entity with statutory recognition is taken to be characteristic of the 'formal' (for example, Angueletou-Marteau, 2008).

Though legality then emerges as a strong differentiator, if used alone to define the 'formal', it makes the latter term redundant. More worrying, pluralist and processual understandings reveal legality to be mutable and place-time contingent (Benton, 1994; Leduka, 2001). This produces a tautology; the 'formal' are those that are statutorily recognised as legally-formal. Also, if legality is produced through socio-political negotiation, then so is formality. Formality then becomes contingent on negotiated processes rather than on the intrinsic properties of the activity/entity (Castells and Portes, 1989), and loses much of its analytical utility.⁴

Socio-political perspectives have indeed found the formal-informal differentiation to be contingent, mutually constituted and continually contested in their content and boundaries. These observations, often resting explicitly or implicitly on an understanding of law as a social process and legalities as differentiated and plural, still retain the formal and the informal as distinct (if ever-changing) spheres with 'moving boundaries'. They are still seen as objectively characterised spaces for descriptive, analytical and policy attention (Castells and Portes, 1989). Others who look specifically at processes of metropolitan transformation recast informality as the 'organizing logic' of a deregulating and neo-liberalising state that produces differentiated rationales for recognising the formal and the informal in politically and geographically contingent ways (Roy, 2005; Roy and AlSayyad, 2004). The informal (and formal) are therefore no longer groups of objects/phenomena with certain common features, but are baptisms and recognitions that are granted (or not) for political considerations. The state is the locus of formalisation (through legalisation), but there is no pattern either in the legalising process or in the object being formalised. The notion of formal-informal is therefore disembodied and released from objective association with any kind of organised activity or entity. This analysis demolishes the conceptualisation of the formal-informal as a categorical frame to classify empirical realities such as economic activities, housing developments and water provision, either on the basis of shared characteristics or common legalities.

Formality-informality in organizations

The institutional-organisational literature offers a very different conceptualisation of the formal and the informal. Institutions, broadly conceived, are rules and constraints that structure the operation of (political, economic, social) organisations and interactions of individuals and groups, while organisations are structures developed for the realisation of definite goals and purposes (Scott, 2001). The functioning of any organised entity or system (organisation) is structured both by its internal institutional arrangements and its institutional environment. The formal-informal dichotomy is applied to both institutions and organisations. Formal institutions comprise rules, regulations and codes of conduct that are intentionally created and written. The informal consists of unwritten norms, customs, traditions and conventions that emerge and evolve over time. Similarly, formal organisations are purposively created entities with an explicit design, stated goals and written rules and procedures. Informal organisations are communities of common interest that emerge and evolve organically and spontaneously in response to the needs, aspirations and interests of individuals, and are structured by shared norms, values, personal networks and patterns of interaction (Barnard, 1938 cited in Scott, 1992; Scott, 2001).

Analytically, the formal and informal are well differentiated in this formulation. Empirically, however, *formality and informality reside in the same space and operate simultaneously*. That is, both the formal (e.g. rules) and the informal (e.g. norms) act together to structure individual and collective

⁴ For example, it would mean that a seasonal, small trading outfit with 2-3 family members working out of home is as 'formal' as a public utility with a large permanent workforce, when and if the former is registered/ licensed (due to, say, political mobilisation). But if the small and large unit are then both 'formal', the formal-informal categorisation becomes sterile, and unhelpful in distinguishing between widely different types of production arrangements.

behaviours and, therefore, the patterns of operation of any activity/organisation. This is observed at all institutional levels: in the institutional environment of organised systems and the intra-organisational institutional arrangements (Selznick, 1949, 1996; DiMaggio and Powell, 1991). Organizational functioning is also understood to be structured by informal (implicit, emergent, unwritten) norms, behaviours and interactions as well as the formally laid out (explicit, deliberate, written) rules, role definitions and procedures. Due to their simultaneous existence and interplay in organisational spaces, the formal and informal vitalise each other and, if aligned and coherent, produce order, regularity and stability (Barnard, 1938; Williamson, 1999; Scott, 2001). Organisational realities are dynamically constituted from the interplay of the imperfectly aligned formal-informal, by processes of communication and social negotiation (Weick, 1979, 2009; Feldman, 2004). Organisations (or organised activities/ entities), therefore, are not formal or informal, but *continuously 'emergent' in the nature and extent of formalisation due to the interplay of formal and informal elements in the same space*. Nor are organisations permanent in the sense that they have a specific, enduring configuration and a static, stable order; instead, they are permanent only to the extent that a dynamic order is brought to "a sea of continuous change" (Chia, 2003: 130) by efforts at organising (Weick, 2009).

This understanding is orthogonal to the conceptualisations in the economic literature and suggests that *both 'formal' and 'informal' entities and activities (as categorised in the other literatures) are simultaneously formal and informal in structure and functioning*. Moreover, all formal structures are vitalised, supplemented and supported by informal systems. Institutional and organisational structures are then understood to be formalised to the extent that the rules governing behaviour are precisely and explicitly formulated, and have moved from being unwritten norms to written and codified rules. Formalisation is, therefore, understood to be *a process* of abstraction and disembodiment of roles and associated behaviours; "a structure is formalized to the extent that rules and role relations are prescribed independently of the personal attributes of the individuals occupying positions in the structure" (Scott, 1992: 23). This is quite a different definitional attribute from those used in the other approaches.

The normative underpinnings of this formulation are also different. Interest in the play of the formal-informal in institutions and organisations is animated by questions of how uncertainty is reduced in organisations to produce regularity and stability and thereby increase effectiveness and reliability. An allied interest is to discern the features that power institutional and organisational changes. This directs attention to patterns of action and communication that reduce misalignments in the formal and informal and lead to effective achievement of any valued ends (Scott, 1992; Weick, 2009).

The link between formality and legality is also posited differently. Formal institutions, by definition, include legal, statutory, and regulatory frameworks that also constitute the institutional environment of organisations. However, organisations (or organised activities) *need not be legally or statutorily recognised to be formal*. The operation and effects of formal structures are tied to extant informal institutional elements (norms, belief systems, customary practices, etc); therefore, the terms are not categorical differentiators for real situations, entities and structures. That is, formality of an organised entity is conceptually delinked from its legal and statutory status, even though the latter might determine if there are written specifications of roles, rules, and procedures. To what extent it can be termed 'formal' will depend on the extent to which the values, beliefs, norms, customs etc, that is, the informal structuring behaviour of participants, cohere with the formal specifications. Where this coherence is low, the actual functioning of even a statutory entity (such as a municipal water board) may diverge substantially from that specified in its written rules and procedures. This is because formal prescriptions are continuously translated by the (informal) norms and practices of staff and consumers. On the other hand, an entity without any legal or statutory status (such as an 'informal' water provider) may have formalised rules of operation, explicitly recorded transactions and a more stable operation

because the formalised elements match the behaviour of members. From an organisational perspective, the latter is as clearly a 'formalised' system as the former.

The definitions of formal-informal in this conceptualisation are arguably much stronger, with markedly different content, distinct boundaries, and empirical observability. It precludes the description of organised systems or entities as either formal or informal. Instead it posits a process of formalisation, in the interaction of the formal and informal within the same space. Entities differ in both the nature and extent of formalisation.⁵ Moreover, formalisation is dynamic and emergent rather than static and permanent, resulting from the actions and communication of participants.

In sum, the formal-informal binary is conceptualised differently in relation to economic activity, and organisations and institutions. In the former, the terms are used to characterise entities. But there is little consensus on the defining features, and some key features used in the various definitions are both non-discriminating and empirically inadequate. Also, socio-political perspectives reveal formality/informality to be contingent and negotiated, and not tied to inherent characteristics of material systems. The definition of the formal-informal in the institutional-organisational literature is more robust conceptually and empirically. It applies to specific elements observed in all organised systems, which interact to create different formalities. This formulation does not support a binary categorisation of observed systems, but places them in a spectrum of *emergent formalisations*. This formulation is also normatively attractive, as it explores the production of stability and regularity for effective and sustained outcomes.

In light of this, use of the formal-informal categories in water provision begs scrutiny. Organisational arrangements in water provision include modes of production, provision, distribution and access, while institutional frameworks are the rules, policies, and legal and regulatory structures that govern these material arrangements. Limitations in either the conceptual strength or empirical applicability of the formal-informal categories would compromise their descriptive power, analytical heft and policy implications in regard to both.

Formality-informality in water provision

Unlike the differences in the use of the terms formal-informal in the economic literature, there appears to be a common, implicit understanding of what constitutes formal and informal in water provision. Though the prevalent understanding is questioned by some authors, the underlying formulation in most analyses is that the 'formal' has statutory or legal recognition, is owned by the state or an incorporated private entity, and frequently, uses modern technology and networks. The latter characteristics are not always considered essential, and some other arrangements with legal status are also considered formal. 'Informal' is the residual category, which applies to all other modes without legal status, and therefore includes a wide variety of arrangements. The definitions occasionally offered in the literature echo this.

The strongest distinguishing feature here is 'legality' or some form of statutory incorporation of the system. Though the other defining features used in the economic literature – *size, technology, capital intensity, entry conditions* and *skill levels* – also implicitly figure in distinguishing formal-informal water provision systems, they are less definitively applied in the latter. That is, except for legality, none of the other factors are consistently applied as discriminating features.

Size/scale fails as a strong discriminator, since arrangements serving a few households to entire cities can be formal. Large-area networks owned and/or operated by public and/or large private entities are clearly formal by definition, but small-scale private providers can also be legal and formalised

⁵ From the more extended discussions, it can be inferred that the *nature* of formalisation would emerge from the particular organisational aspects or elements that are formalised; the *extent* would then depend on how many aspects are formalised and with what strength or level of persistence.

because of registration or recognition as tail-end or peripheral agencies of larger providers (WSP, 2009; WSUP, 2011). Also, novel arrangements between large and small entrepreneurs are difficult to classify by size, like the kiosks run by water providers in low-income communities for regional commercial utilities (Mehta and Virjee, 2002).

Barriers to entry are also not always different – they may be as high for small and informal providers in respect of finance, source access and distributional arrangements as for larger firms (Angueletou-Marteau, 2008; Ahlers et al., 2013). Incomes for small providers, vendors or resellers can be as high as, or higher than, in larger formal water supply organisations; and the cost of water for households is usually found to be higher when sourced from 'informal' suppliers (Segerfeldt, 2005; Kellen and McGranahan, 2006; Angueletou-Marteau, 2008; UNDP, 2011). Similarly, other features implicit in the definition, such as technology or skill levels, do not necessarily differ across systems identified as formal and informal.

Also, as in economic activity, the formal and informal are not always separable, for there are important and substantive linkages and interdependencies. The informal often augments supply to households connected to formal systems (Allen et al., 2006). Small water vendors and resellers sometimes function as local agents of the formal utility for distribution to peripheral and low-income areas, or use the formal network to source water for onward distribution, with or without legal sanction (Angueletou-Marteau, 2008). Large, privately owned water utilities use informal or small vendors to cover poor-revenue areas, or fall back on 'participation' of different kinds, often to meet their contractual obligations to public authorities (Jaglin, 2002). Public utilities sometimes install hand pumps and tube wells, which are thereafter maintained by users (Misra, 2004a,b, 2009). Village-wide networked systems with household connections, almost fully funded by the state, are developed, owned and maintained by the community (Gram Vikas, 2002; Misra, 2009; Cullet, 2011). Even in a public utility – considered most 'formal' by definition – informality is observed (Anand 2012; Hossain, 2011). In all these instances, the formal and informal are inseparably related and act together.

Since the other characteristics do not clearly differentiate formal and informal systems, and a boundary between the two cannot always be established, formality finally hinges only on 'legality', in current understandings. This is conceptually problematic, as discussed before. If legality is the sole differentiator, then the terms formal-informal are redundant. A plural understanding of legalities, as emerging from processes of socio-political negotiation, implies that formalities are also contingent and not systematic or patterned, and not related to any characteristics of the system. Indeed, processual examinations of water provision do show that formality is an ascribed status, emerging from contestation and negotiation (Hossain, 2011; Anand, 2012). This also resonates with recent understandings of formality as the 'organising logic' of a deregulating and neo-liberalising state (Roy and AlSayyad, 2004; Roy, 2005). In sum, formal and informal as currently understood lose their salience as descriptors that can be used to categorise different kinds of water provisioning systems.

The prevailing conceptualisation of formal-informal has also been problematised from normative and outcome-oriented perspectives. Authors have explicitly or implicitly contested the typing of traditional, stable, effective and/or locally valued systems as informal; others question the (assumed) relationship between formality with better outcomes; and yet others have questioned the intent and utility of legalising/formalising the so-called informal, as noted at the beginning. These discussions unsettle the prevailing understanding of formal-informal both in respect of its application to specific systems and its value in helping to achieve desirable outcomes such as equitable access, sufficient supply, safe quality and system reliability.

In all, therefore, the formal-informal classificatory scheme is as untenable in regard to water provisioning systems as in typing economic activity or other phenomena.⁶ However, the heuristic cannot be abandoned without examining if and how formality and informality feature in the variety of actual water supply arrangements. Whether the alternative conceptualisation of the formal and informal in the organisational-institutional literature, as different elements present and interacting in all organised systems, is more tenable and useful also deserves consideration. The organizational formulation has been largely ignored in the water literature (some exceptions are Shah, 2007; Merrey and Cook, 2012), but is promising, as attention to the formal-informal in both water provisioning and in other organised systems is driven by a common interest in organisational effectiveness.

We explore both questions below, by examining water provision in two locations in Bhubaneswar – in the state-developed residential area of Chandrasekharpur Housing Board Colony (CHBC) with a clearly 'formal' water system, and in Saliasahi, the largest informal settlement in the city, where the water systems are ostensibly 'informal'. Multiple approaches and methods were used in the study, undertaken from mid-2010 to mid-2012. The search for published and grey literature, including documents from the city government and relevant state departments, as well as from non-government development and research organisations, yielded much less documentation of the water supply situation in Bhubaneswar or the different parts of the city than expected in a 'designed' city. Extensive open-ended interviews were conducted with a variety of key informants from the Bhubaneswar Municipal Corporation (BMC), the Bhubaneswar Development Authority (BDA), the Directorates of Town Planning (DTP) and Public Health (PHED), the state department of Housing and Urban Development which includes the Odisha Public Health Engineering Organisation (OPHEO) and the Odisha State Housing Board, and long-time residents at each location and the staff of local organisations working in Saliasahi. Residents' perspectives and practices were captured through focus group discussions and small surveys at both locations.

BHUBANESWAR – THE FORMAL/INFORMAL IN CITY DEVELOPMENT AND WATER PROVISION

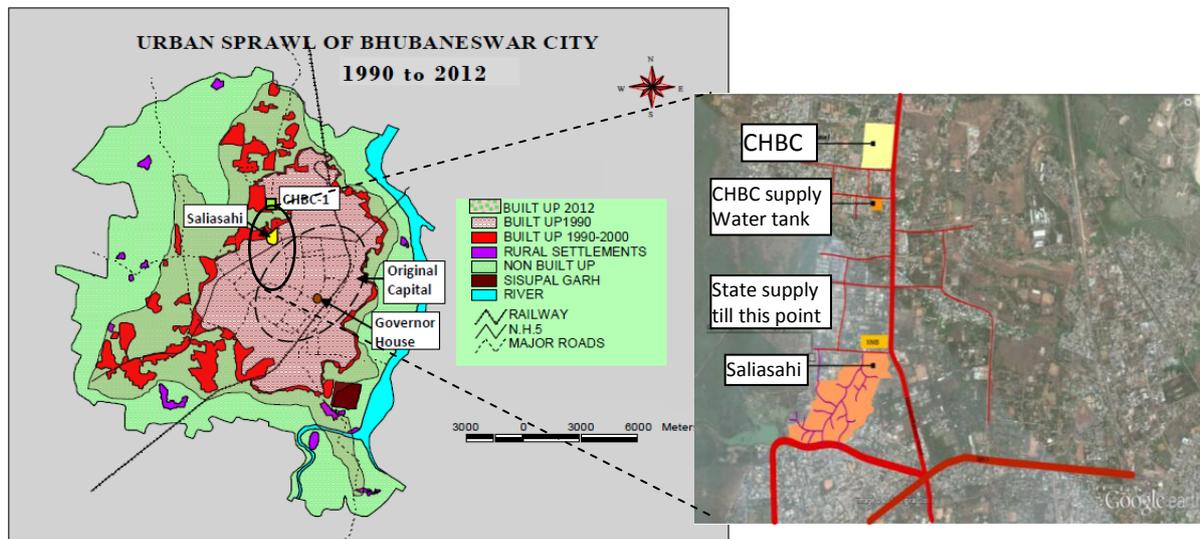
Bhubaneswar, the 'New Capital' of Odisha state, was planned on a curvilinear grid, with careful layout and regulation until the late 1970s. Designed in a tropical variation of the modernist 'city-beautiful' aesthetic, the low-rise, orderly development was facilitated by parcelling all land in the new Capital area to the government and registered owners. The political imperative of keeping it a 'model city' was helped by the relatively small size and the ease of panopticonic regulation, for the new capital remained less populated than anticipated until the early 1980s (BDA, 2009; interviews). The first mid-rise multi-family housing developments were then constructed by the Odisha State Housing Board (OSHB) and the Bhubaneswar Development Authority (BDA) at Chandrasekharpur. Adhering to the formal grid and general aesthetic, these developments introduced regularly spaced three-storey multi-family units; the first apartment blocks in the state. The Chandrasekharpur Housing Board Colony (henceforth, CHBC), with 2,200 residential units, is an exemplary case of planned development, with a formal, state-run, networked water supply system.

With post-liberalisation growth, the few pockets of 'informal' housing have grown into more than 300 slums across the city; 109 of them are 'recognised' by the BDA and the BMC (BDA, 2009; interviews). The largest, Saliasahi, is in the centre of the city and now houses an estimated 40,000 families (about 150,000 people), one-fifth of whom are floating or new migrants. Saliasahi offers a complex picture of informalities in water provision, which we examine as our second case.

Maps of the city with the major orienting features, and the study locations are given in Figures 1.

⁶ For example, Rakodi (2006) explicitly rues the limitations of the formal-informal binary (along with others like legal/illegal, etc) in capturing the diversity of transactions in land development.

Figure 1. Study locations with road and water network adjacencies (right) and Bhubaneswar development phases (left).



Water supply in Bhubaneswar

The piped water supply system, owned and operated by the Public Health Engineering Department (PHED), covers only 17 of the 44 electoral wards in Bhubaneswar fully, and another 26 partially. The remaining area – including four full wards – is self-served in diverse ways. A summary is given in Table 1.

The city needs 195 million litres per day (mld) of treated water,⁷ but currently the PHED supplies 206 mld to 59% of the population. Even by the higher norms used by the PHED, this is 38.8% over the standard requirement, taking the per capita availability of water to 251 litres per capita per day (lpcd) in the covered area (Government of Odisha, 2012). The combined excess use and transmission loss in the piped network is about 100 lpcd.

Table 1. Water Provision in Bhubaneswar.

Agency	Source	Volume	System	Population	Area covered
PHED total 249 million litres per day (mld)	Surface water (rivers, source 10-30 km away)	206 mld (81%)	Piped network to households (plus a few standpipes)	767,000 (59%)	17 wards fully
	Groundwater (bore wells)	43 mld (19%)			26 wards partially
Self- and community provisioning	Groundwater	Not known	Bore wells, tube wells, standpipes	533,000 (41%)	four wards
Private firms (10)	Groundwater	Not known (est. 0.25 mld in 2006)	Tankers	Not known	Slum pockets; other places in summer

Sources: CSE 2012; PHED unpublished data 2005-2006; BMC 2006.

⁷ By the national standard of 150 lpcd set by the Central Public Health Organisation (CPHEEO).

The rest (41%) depend primarily on groundwater, through wells, bore wells and hand pumps. Construction of bore wells is not prohibited, nor do they have to be registered.⁸ Groundwater is available at a depth of 12-15 metres in most parts of the city, but falls by another 5-10 metres in summer. Biological contamination is recent, and is prevalent in some areas, but the city area has always had problems with high iron content. Since neither permission nor registration is required, there is no record of the number of tube wells or bore wells in the city or the volumes sourced from them, except for the 40 mld of groundwater pumped daily by the PHED system. Tankers deployed by about ten private firms supplied about 0.25 mld of water to low-income and squatter settlements (in 2005-2006), and almost the same amount to places that are affected by low supply during summer (CSE, 2012; GoO 2012; PHED, 2012).

The PHED has 63,767 individual household connections and 212 standposts connected to its city network. Water supply is intermittent; it is usually supplied twice a day up to six hours every day. The standposts and some 1,060 hand pumps and tube wells augment supply in areas that are partially covered and uncovered. The agency also has on record another 30-odd hand pumps that have been constructed either privately or by NGOs. The PHED does not use public tankers to supply water, except as an emergency measure during system breakdowns or extreme scarcity in summer. The government provides drinking water to the 109 slums 'recognised' by the municipal and development authorities, including Saliasahi, through 155 tube wells, 365 standposts and 92 wells; households without access to these depend on private tube wells and other sources.

Water tariff is INR3.4 for 1000 litres (where metered) or INR65 per month for the first two taps and INR21 per month for every extra tap. Bulk or commercial connections are charged INR8 per kilolitre. Of the total connections, only 706 are metered. About 34% of the cost of providing water is recovered by the agency; the balance is covered by state subsidy. Energy consumption accounts for 56% of costs; 91% of the income comes from user charges, with the rest from connection fees. Since metering is not widely used, including for bulk (non-domestic) consumers, it is difficult to estimate actual water usage. Data on daily hours of supply at the main distribution points are not aggregated.

'Formal' water supply system in CHBC – How formal is the formal?

The Chandrasekharapur Housing Board Colony Phase 1 (CHBC)⁹ was developed in 1987 in as formal a process, status and design as could be – by the State Housing Board, on government land, with a formal modernist aesthetic. The layout faithfully followed the wide spacing, well-laid-out roads and service networks, generous open spaces and areas for local commerce emblematic of the planned core. The significant difference was in the *type* of housing. The multi-family apartment blocks, three-storied with six, eight or 12 family units off a single central staircase, were a radical departure from the typical pattern in the state, of single-family residences on their own plots of land. Like most public housing in the 1980s, CHBC included five types of blocks for buyers at different income levels (High Income Group(HIG), Middle Income Group-II (MIG-II), Middle Income Group-I (MIG-I), Low Income Group (LIG) and Economically Weaker Section (EWS)) in a government-designed process.¹⁰

Space was allocated to each HIG apartment ('flats'), but not to other types, for the construction of a one-car garage. The fringe areas and margin spaces around each block in the layout was not allocated

⁸ The Orissa Ground Water (Regulation, Management and Development) Bill 2011, which brings these under regulation, is in the process of being effected.

⁹ Most housing in the original planned city area was government accommodation for elected leaders, staff and officers, and was constructed by the Public Works Department. Some sectors were divided into plots for private buyers. Constructed housing for public sale (on lottery basis) began with CHBC.

¹⁰ The cost of housing for the LIG and EWS was subsidised in a graduated manner. It is not clear how much of the cost of CHBC development was actually recovered; apparently, such an assessment was not considered important at the time.

as private property or to any other body (such as an association of adjacent home-owners). Therefore, legally it remained government property. Infrastructure and basic services followed government standards of the time – well-lighted, metal-surfaced roads, piped-water supply systems and sewerage networks with local distribution and collection points, and power supply from a local substation. The systems were designed for the projected population, estimated from the number of housing units and other activities in the layout. Water is supplied by the PHED from its local pumping station to a storage facility at the highest point. Each residential unit (flat) has one registered water connection, with tariffs based on the number of taps that were originally provided in each flat.

Water has always been supplied twice a day, for a few hours, to fill the overhead water storage tanks designated for each flat. However, the intermittent supply, summer scarcities, and poor water pressure have changed the volumes of water actually drawn by households. Most households have attached pumps to boost water pressure, and also constructed additional tanks (on the ground, underground, or overhead) or added huge storage containers inside their houses. Key informants estimated that half of the households had pumps and all had additional storage.

Full occupation of CHBC was quickly overtaken by expansion, with additions to existing units to accommodate the high demand for rental housing in that area. Garages were constructed in the designated spaces next to HIG flats, and were built up to two more floors to form additional housing units for sub-letting. In the MIG and LIG units without legally allocated space for additional construction, extensions were constructed on margin land around the units. Owners collaborate in constructing the vertically stacked flats so that all units benefit equally from this 'extra-legal' extension. With compound walls also being constructed by ground floor flat owners to enclose some land around their units, almost all the margin spaces have been 'privatised' and built up. This has added, in the estimation of key informants, almost 200% to the original designed floor space in that area. More than double the designed population now resides in the area; this includes expansions in families, relatives and sub-tenants. The house extensions and the many additional water storage tanks are shown in Figure 2.

Figure 2. CHBC in two decades, showing extensions and additional water storage tanks.



All the extra construction (except for the HIG-unit garages) is 'informal' – they are undocumented, without municipal sanction and, therefore, unmindful of the municipal by-laws. Technically, they are illegal. The additional families living in these 'unrecognised' and undocumented flats therefore cannot have separate, registered water connections. They are linked to the water connection of the original flat, and most also have overhead or underground storage tanks (or both). The owner of the original flat

pays the tariffs based only on the number of taps in the original flat. In sum, all the additional extensions and constructions are not only informal/illegal/undocumented, but also officially 'invisible' in the services they draw, including power and water.¹¹ Moreover, their 'invisible' water consumption only extends the invisibilities that existed before such extensions. With household pumps and additional storage tanks already in place, the additional pumps and tanks for the extensions were not a 'new process' to be noticed by water agency personnel.

The water production and supply network, and the number of official household connections in the area remain the same as when it was designed. Officials of the PHED are worried about the extra water provisioning practices, as they create a false supply deficit. Complaints about poor supply find political traction and create pressure for augmentation, while the reason for supply deficits (undocumented extensions and additional population load) remains outside formal discourses. If the informal/undocumented/illegal developments in such areas were to be recognised or regularised, the reality of unplanned, extra-legal encroachments would break the prevailing myth of the 'planned' city with well-developed services. The true picture of use volumes, usage patterns, and incidence of costs of various kinds and on various actors are, therefore, largely invisible in official discussions of water provisioning by the state agency. The operational risks of the excess pumping affecting the pressure valves in the main distribution network and causing a major breakdown of the system are therefore officially non-existent.

Informal water supply in Saliasahi – How informal is the informal?

Saliasahi is the largest squatter colony in Bhubaneswar, and home to more than 40,000 families.¹² The central location and access to both water and electricity have made it the fastest growing 'informal' settlement in Bhubaneswar. The structure is typical of such settlements – very small *kutchas* (literally, 'not-solid') dwellings grouped around common spaces, with narrow access roads less than 2 metres wide. The settlement grows organically, both into the open at the margins and into the interstices of the existing fabric. There are no networked water or drainage lines, but there is power supply; some public lighting is also installed near open spaces and along the unpaved 'main roads'. The location is shown in Figure 1.

In 1988, the Municipal Corporation (BMC) registered Saliasahi as a 'recognised' slum with an estimated 9,000 families, and NGOs began welfare activities. Households initially sourced water from a nearby canal and a few private wells. Although the residents had no legal tenure on land, local organisations report that both power connections and water supply points (metered standposts) were provided by the respective government departments. In 1992, about 64 hand pumps were also installed by a NGO. In 1998 the first 'formal' (legal) power connection was provided, and within a year almost 90% of the families had access to electricity with household metered connections, which provided the power to run pumps and source water from bore wells.

Bore wells have become popular water sources in Bhubaneswar since the late 1990s, as city development outstripped the municipal supply network, which does not reach about 40% of the households. Saliasahi was no exception; even as a few of the older residents who could afford it created their own wells, others formed groups to develop community bore wells. Today, nearly 4,000 bore wells

¹¹ The concrete, 'pucca' (literally, solid) nature and formal aesthetic of such developments also camouflage the departures from formality in both land use and water supply systems.

¹² Based on estimates by NGOs working in the area and local councilors. No enumeration has been done by municipal authorities, although it is a 'recognised slum'. However, 'families'/households in the parlance of residents often connote individuals, who are typically migrants; hence the average family size would be much lower than the 5.5 used in official statistics. The total population, estimated at about 150,000 is, therefore, lower than would be expected from the number of households.

are found in different pockets of Saliasahi that are group-owned and managed with common rules. The practices evolved from a few people coming together with the initial investment for a community bore well, but the arrangements are currently well defined and institutionalised in the area. Some are run by resident associations (RAs) that also provide other services. Although they are not 'registered' or recognised as water suppliers in official records, they figure as such in the cognitive frame of city water planners who consider the area as 'having water'.¹³ The area is also considered 'covered', since there are still a few scattered standpipes provided by the municipality.¹⁴ Moreover, since the self- and group-provisioning work well, there is little political demand for additional standpipes or municipal water services.

Figure 3. Group provisioning arrangements in Saliasahi.



The community wells, now the most extensive water source for residents, are managed by a group of adjacent households with a collective contribution for their operation. In some groups, members share a common social or demographic characteristic, such as caste or place of origin, but as often, the group is heterogeneous and defined only by physical proximity. The water is pumped as required by a dedicated operator, who is paid up to INR 3000 per month, and stored in large elevated storage tanks. Supply is either through one fitted pipe, or a small network of extended surface pipelines connected to taps in the immediate area. Between 10 to 50 households draw water from a single bore well. Figure 3 shows some of the arrangements. The tariff varies from INR 50 to 300 per month depending on family size and use patterns. Initial investors, who are often referred to as 'owners' although the structure is located in a common space, pay a lower rate. These 'owner' households, and often one or two of the largest contributors to the original investment, also act as 'managers' of the source. Transactions (water payments) are recorded in some groups, and electricity payments made by the owner-manager.

¹³ A municipal official who is also an Executive Engineer of the PHED referred to this area as 'having water' and cited it as one reason for its faster growth compared to other slums in the city. The reasoning was that since the residents did not have tenure on land, municipal networks could not be officially extended; yet they had ensured that there was no major hardship by providing several standpipes (taken from the peripheral municipal grid) and knew that the self-provisioning was 'working well'.

¹⁴ Most of the standpipes and hand pumps installed over the years have disappeared after a few years of breakdown; parts have been cannibalised for household or group installations, or stolen for sale as scrap. Only a few remain standing and operational.

Residents reported occasional conflicts and issues, but more often testified to a fairly smooth working of the systems.

These arrangements, however, are not permanent or settled. Most evolve, expand and are adjusted in response to negotiations among the participants, in a continuous and dynamic process that nevertheless remains effective and reliable.¹⁵ Newcomers are inducted, either as members of the resident household or as separate rate-paying members, as in-migrating relatives, friends from their home villages and others join existing residents. Rates are also revised periodically (though electricity rates rarely change) and on occasion are extended to negotiations and bargaining. Owners of private wells also sell water to neighbouring residents, tenants and intermittent migrants; the rates are generally similar to those for the group-owned systems, but supply times, quantities and rates are subject to the whims of the owner, transactions are typically verbal and unrecorded, and more instances of disputes have been reported.

These community and private supply systems, which are institutionalised to the point of being naturalised both for residents and the city planning officials, are the predominant water supply systems in Saliasahi. Of the approximately 60 water points – standpipes and hand pumps – installed by the municipality and NGOs, only about 10 currently work. There is no group management or payment system, and since municipal supply is unreliable, few users now see it as their primary source. In parts of the settlement near the feeder lines of municipal supply, illegal sourcing by hidden connections have been reported, but estimates of the locations and extent of this practice vary widely. It appears to be very limited, and knowledge and control of the connections change with fluctuations in the local power relations and the transactions with department staff. Private operators selling water through tankers have increased in the past decade, as summer scarcities have been worsening. Although there are no reliable data on the extent and coverage, people in Saliasahi report (and this is corroborated by water agency officials) that they do not need the tankers except in some new pockets; this is unlike other informal and low-income housing areas in Bhubaneswar.

FROM FORMAL/INFORMAL TO EMERGENT FORMALISATION

The realities of the water systems in the CHBC and Saliasahi areas clearly do not fit neatly into the formal-informal categories, because they are internally heterogeneous in their construction, operation and content. The water supply system in CHBC is unequivocally formal in the current understandings of formality in water provision, namely, public ownership, operation and regulation by the state utility, large-scale networked supply, modern technology and high investments. Just as clearly, there is a dissonance with this picture of formality, in the household-level undocumented modifications and extensions to the system, and the unrecorded and unpaid withdrawals. But these 'extra' parts do not exist or operate differently from the formal system; they are not separate, informal *systems*. They are household-level adaptations that exist and are made viable only by the configuration of the formal, but in turn, significantly alter its configuration and operational parameters. These internal realignments cannot also be termed 'illegal', because changes in the water system inside the house are not required to be registered in the water utility.¹⁶ The extensions are officially invisible, though the pipelines and storage tanks are physically visible from outside. They are officially invisible because of the institutional assumption that since all units were given a formal connection to start with, there would be no need for

¹⁵ Interestingly, the staff of an NGO working in the area was initially at a loss when asked about the water systems in Saliasahi – the variety and continuous adaptations in the systems did not lend themselves to an easy description of a standard or typical system.

¹⁶ Since there is no rule about the internal arrangements in the house unit, there are also no inspections. Instead, there are (infrequent) checks to ensure that no additional connections have been made from the distribution lines up to the point where they reach individual households.

further connections or changes in the system. The total withdrawal is automatically limited by the total volume of water supplied at the specified times. In sum, while the formal system ostensibly functions as designed, extending decorously to each house and its internal connections, and with a regular supply of water and payment of rates, the *actual system that delivers water to all the residents is a contingent and changing combination of the formal and informal*. As such, the reality lies outside the formal-informal or legal-illegal binary. It is also not a continuum, since the unrecorded and unregistered additions are varied, resulting in a spectrum of realities across parts of CHBC. Moreover, this spectrum is dynamic, because residents make their own adjustments to ensure an effective and reliable water supply, which results in a constantly emergent configuration of formality.

Moreover, the additions, which began with pump installations to get the minimum quantity of water due, started as correctives to a poor design of the formal water system. Similarly, the extensions exist without record or notice because they were never anticipated nor were rules made. That is, the additions existing within are embedded in, and therefore operate as part of the formal as private correctives and extensions to system deficiencies. Additional regulation is elided as the authorities step carefully around the issues in an area with high-profile residents. The fluid nature of water, the hidden nature of the infrastructure (underground and inside homes) and the prevailing governmentalities, that on the one hand hesitate to regulate the high-profile area and, on the other, need to maintain the fiction of a well-serviced city, conspire to hide the extensive informality within the formality.

The water provisioning systems in Saliasahi are equally heterogeneous, as much in the variety of systems used in the same space as in the internal construction of their informalities. At first glance, the 'informal' label can be easily applied: there is no authorised, registered or legal entity (state, city, private) that provides water, and a variety of 'informal' systems operate – self-provisioning, private vending, group provisioning (artisanal systems, cf. Bakker, 2003), and (illegal) drawing from municipal supply. However, there are significant markers of formality. There is implicit recognition of the systems in the municipal and state bureaucracy, which consider this area as 'with water' and include it in their official reports as 'covered area'. In some cases, the resident associations managing the systems are legally registered and/or recognised.¹⁷ The electricity is used from the registered household connections and is (mostly) paid for. Moreover, none of the systems (except tapping into the city network) are illegal; all are based on self-provisioning, which is legal in the state and the city. Therefore, to label the systems in Saliasahi as informal, or an archipelago of informal systems (Bakker, 2003), would elide the systematised aspects that are tenets of formality. But these visible markers of formality do not fit the systems neatly on a continuum towards what is currently understood to be formal, except in terms of legality.

However, if these practices are framed in the organisational-institutional understanding of formality, there is a better fit. Many attributes of the group-provisioning systems are then understood to be formal: the organisations are *purposively created entities*, sometimes *incorporated or registered*, with *intentionally created* (though unwritten) rules, procedures and codes of conduct and, in some groups, *recorded transactions* for electricity payments, user fees and operator salaries. Although they were originally informal in that they emerged from the common needs of the community/group and have evolved organically and spontaneously in response to changing group needs, formalisation has been achieved and is continuously (re)created. Moreover, because the rules and procedures are closely aligned to shared norms, values, personal networks and patterns of interaction of the group members, the systems are as (dynamically) stable, reliable and effective as those in CHBC. The CHBC situation is also better framed by this conceptualisation; the formal structure, rules and functioning of the PHED supply are augmented, animated, and completed by the informal arrangements made by the residents.

¹⁷ The community water supply groups are not registered, but there are several RAs (by different names) in different parts of Saliasahi; in some cases, the local RA operates the group water supply systems.

In both cases the formal rules, structures and procedures coexist and operate simultaneously with informal norms and patterns of behaviour that produce a variety of emergent formalisations.

In view of this empirical fit and, therefore, better theoretical and practical potential, we suggest the use of the organisational-institutional understandings of formal-informal instead of those currently used to understand water provision. There is a substantial conceptual and theoretical loss in applying the prevalent formal-informal categorisation, and also a failure in recognising and legitimising the possibilities for more equitable, sustainable, and empowering arrangements. The use of the binary hides the informalities in the formal and obscures the promising formalities in the informal. This leads to sub-optimality of many kinds; for example, the formal system of CHBC conceals the extra use beyond designed levels, and therefore significant underpayment of costs, as well as misuse and waste of the water. The system is, therefore, at risk from both extra loads beyond the designed levels as well as the unsustainable financial patterns. Moreover, the 'extra-use' is primarily by the higher income groups who have space to extend their flats (or build over their garages) and can afford to install and run additional pumps; the LIG and EWS residents are constrained on all these counts. In contrast, the 'informal' system of Saliasahi is highly regulated: in the amount of water used through tacit (and overt) group-monitoring, in the cost-recovery and maintenance through the need to pay for electricity and recover investments, and in the tariff-setting through the need to maintain a balance between costs/profit-making and the feasibility of recovery from users living within a reasonable radius. It is also empowering in that users self-provide on their own terms or have the space to negotiate within the group. Certainly, the 'abjection' noted by Anand (2012) is less evident in Saliasahi than among the LIG and EWS residents of CHBC who have to depend on, and continuously negotiate with, the state water agency and its staff. Categorising the Saliasahi arrangements as 'informal' delegitimises the systematised modalities while privileging the apparently 'formal' system of CHBC; in reality, the 'informal' is revealed to be relatively more equitable, sustainable (as a system), and empowering. It could also be more ecologically sustainable in its tendencies to limit usage and check wastage and overuse.

Others have urged the recognition of informal systems and their conversion and incorporation into formal structures (for example, Allen et al., 2006), but such conversions do not adequately address the 'legitimacy' question. It would be more appropriate to recognise the intrinsic contradictions within both, wherein 'formal' systems have concealed informalities and 'informal' systems are inherently formalised in many ways and display many valued attributes. The dynamics of emergent formalisations must also not be missed.

RECOGNISING THE COEXISTING FORMAL-INFORMAL AND EMERGENT FORMALISATIONS

Our conceptual and empirical interrogation of the formal-informal binary that is currently used in understanding water provision reveals that it is untenable in the context of the multifaceted and variable range of modalities observed in Bhubaneswar and, no doubt, other cities in India.¹⁸ The categories are revealed to be internally variegated and inconsistent. In systems that are typically considered formal, the informal reconfigurations that make them effective undercut this typing. On the other hand, the 'informality' of other systems – including self- and group-provisioning – conceals a host of attributes that are considered markers (or goals) of formal systems, such as rule-based functioning, regulation of water use, appropriate pricing, system maintenance, and user participation and contribution.

¹⁸ The observations match both the findings from systematic research (Misra, 2004, 2009, 2011 unpublished) and the tacit knowledge of the author as a native, about the water supply in several Indian cities and towns (Classes I -IV in the Census of India classification).

The understanding of informal-formal in the organisational literature, as different elements that characterise all organised systems, is both conceptually stronger and empirically more powerful in capturing these patterns. *Formalisation* is dynamic and varied, and produced by the interplay of the formal and informal elements in any organised activity, for water provisioning as for other objectives. The variety and the dynamic nature of formality are therefore best captured by the notion of *emergent formalisations*, that characterise *all* kinds of arrangements. What is important here is to understand the specific patterns of formal-informal that make any system effective.

We argue for use of this conceptualisation in analysing water provisioning systems, for it helps in identifying the specific configuration of formal and informal elements – and the patterns of interaction – that make any system effective in its own context. This is more correct and useful than classifying the variety of systems found in reality as formal or informal. Instead, recognising that the diverse systems in operation are not captured in a formal-informal binary (or a singular formal-informal continuum) but inhabit a three-dimensional conceptual space of *emergent formalisations* facilitates a more conceptually rigorous, empirically suitable and practically useful exploration. Understanding the production of formalities as a process towards reliable and effective functioning also enables a more useful scheme of differentiation, and helps in deriving appropriate policy and action interventions.

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