



## Analysis

# The scope for collective action in a large groundwater basin: An institutional analysis of aquifer governance in Western Australia



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## ABSTRACT

The Gnamptara groundwater system in Western Australia supports multiple ecological systems and human uses, and is under unprecedented stress. This paper examines some of Ostrom's 'situational variables' for the analysis of institutional choice in common-pool resources, as they relate to the Gnamptara case. The institutional analysis identifies elements of the current governance institutions that could be altered to facilitate collective action. We use data from a set of water licensing documents obtained from the state's Department of Water. A number of factors are identified as inhibiting the potential for collective action. Current arrangements are top-down in nature, with all rules, monitoring, and any enforcement supplied by the state-level management agency. Norms and expectations among appropriators appear to be competitive rather than co-operative, and discount rates appear to be high. Monitoring and enforcement are under-supplied, and opportunistic behaviour affects compliance. The interactions between user and regulator influence the appropriation of flows, and have resulting impacts on the resource stock. We conclude that several factors in this case prejudice the development of collective action institutions by appropriator efforts alone. The study highlights important aspects of the institutional arrangements in place, and their likely effects upon the attitudes and behaviours of appropriators who, along with wildlife and ecosystems, depend on the common-pool resource.

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## 1. Introduction

Successful management of common-pool resources (CPRs) is one of the most difficult and pressing problems facing natural resource management and environmental economics. Environmental problems at all scales can involve common-pool aspects. Examples include global-scale issues such as rising greenhouse gas levels, and damage to ocean fisheries, across their range of scales, by extraction in excess of flows to the detriment of stocks. Groundwater basins are an important instance of common-pool resources, and there is widespread evidence of failure to manage these resources sustainably (e.g., Glennon, 2002; Esteban and Albiac, 2011).

A reason for the difficulty is the fundamental tension – often brought to the surface by the governance regime in place – between private rights in the flow and common interests in the viability and wellbeing of the stock. Pure public goods are both non-subtractable and non-excludable, the lighthouse being the oft-cited example. In such cases it is unnecessary to distinguish between a stock and flow. In common-pool resources, however, this distinction is important. CPRs are subtractable resources of sufficient size that exclusion of “potential

beneficiaries” from their use is “costly but not impossible” (Ostrom, 1990, p. 30). The stock – a fishery for example – may be owned by a group of users, whereas the flow of benefits from use of the resource – in this case the catch in a given period – is appropriated by individual users. Thus there is a common interest in the viability of the stock, but private interests in the flow. Approaches which allow private rights in flows to dominate common interests in the stock (thus depreciating it) will be unsuccessful.

As in society more broadly, much thinking on the subject of CPR management has been dominated by neo-classical economic concepts, both in Australia and elsewhere (e.g., re Australia: GHD et al., 2011; Grafton, 2005; Bjornlund, 2003; Brooks and Harris, 2008; Crase et al., 2000; Skurray et al., 2012; re the United States: Howe, 1997; Glennon, 2009; Howitt, 1994; Sunding, 2000; re Chile: Hearne and Easter, 1997; and as described by Bauer, 2004). Such is the pervasiveness of this paradigm that, in some quarters, norms and orthodoxies have formed, favouring market-based approaches to resource management. This is despite the fact that these approaches may not be best suited to accommodating the tension between private and common interests.

There are strong arguments that there are subjects to which market concepts ought not to be applied. As Ostrom (1990) stresses the dangers of applying models out of their range, Sandel (2009, at minute 9) makes clear that markets have limits outside which it may be neither appropriate nor desirable to apply them, recommending that we “rethink the

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reach of markets into spheres of life where they don't belong". Schumacher warned in 1973 against applying economics itself out of its range (Schumacher, 1973). Sandel's cautions show the extent to which Schumacher's earlier ones have yet to be heeded. In this environment it has been easy for alternative governance approaches – even those borne out by extended histories of success – to be left with a smaller share of the discourse than they deserve.

Contributing to this problem, and reinforced by it, has been the misconceived dichotomy between markets and market-based instruments on the one hand, and command & control regimes on the other.<sup>1</sup> This perceived dichotomy has tended to draw attention from the fact that markets and command & control are not the only two options. It has also been a distraction from the important insight that markets in fact exist within the institutional context established by legislation and regulation, meaning that the two are far from being opposites (Haddad, 1996; Blomquist, 1998; Norgaard, 2010).

Collective governance is characterised by institutional innovation and investment by resource users, thus – ideally – aligning the interests in flows with those in the stock's wellbeing. Since many environmental problems consist in the excess private appropriation of resource units to the detriment of an associated stock, the prospect of aligning interests in the two is compelling. As Ostrom observes, "the earlier image of individuals stuck inexorably within social dilemmas has slowly been replaced in some theoretical work with a recognition that individuals face the possibility of achieving results that avoid the worst outcomes and, in some situations, may even approximate optimality" (Ostrom, 2010, p. 159). Collective governance arrangements operating (with at least some success) include, as examples:

- the management of traditional common lands in Japan (McKean, 1986);
- the Oukaimedene agdal (rangelands) in Morocco (Gilles et al., 1986);
- commonfield farming in Peru and Bolivia (Campbell and Godoy, 1986);
- Spanish irrigation institutions at Valencia, Alicante, and elsewhere (Ostrom, 1990);
- Filipino irrigation societies (Ostrom, 1990);
- Southern California groundwater basins (Ostrom, 1990; Blomquist, 1992);
- the fishery at Alanya, Turkey (Ostrom, 1990);
- the Eastern La Mancha aquifer in Spain (Esteban and Albiac, 2012; López-Gunn, 2012);
- pilot programmes in New Zealand for 'audited self management' (Holley and Lawson, 2015). Additional case-studies can be found, for example, in Gibson et al. (2000) and, regarding the Maine lobster fishery, in Acheson (2003).

Based on her study of CPR cases Ostrom (1990) presents a framework of factors that influence the ability of resource users to develop and sustain effective institutions for the management of common-pool resources on which they depend. This paper applies Ostrom's framework to a West Australian case study with the goal of assessing the potential for collective action as an alternative (or complementary) governance regime in the case of the Gngangara groundwater system (GGS; first G silent). It is clear that collective action will not emerge spontaneously (i.e., without outside assistance) in the Gngangara case under current conditions. The question underlying this study is whether and how conditions could be altered such that collective action could be facilitated. The primary objective is the identification of the impediments to collective action in this case, via an examination of the states of Ostrom's 'situational variables'. A secondary objective is the assessment of whether self-governance is a realistic management option in

this case, given the nature and tractability of the impediments identified.

Collective management or governance is an alternative to – or may complement – both centralized and market-based management approaches to CPRs.<sup>2</sup> Despite its successes and history of academic attention, collective governance is not given due consideration as a potential management option. This may be due to insufficient awareness among users and management agencies of its potential. Other reasons may include insufficiency of social capital at the large scale at which some environmental problems occur, and the lack of jurisdictional congruence with resource boundaries.

In terms of the potential tractability of self-governance arrangements, the question of the number of decision-makers looms large. As Ostrom notes, "a core theoretical hypothesis has been that the number of participants will likely reduce the probability of achieving any form of collective action or at least diminish the amount of joint benefits that could be achieved" (2010, p. 157). Although Ostrom (1990) analyses several successful cases of large numbers of appropriators (up to 13,500) providing their own governance institutions, temptation may remain to use size as a justification for dismissing this governance mode. It is true that, for CPRs with many users, impediments may exist across a wider range or on a larger scale. The number of users with divergent interests and high discount rates may be larger, and absences of mutual trust and transparency of actions more costly to overcome. It is not clear, however, that these costs increase constantly with the number of users; they may even decrease at the margin. For example, "[i]f the tasks of managing a resource ... such as monitoring extensive community forests in India, are very costly, larger groups are more able to mobilize necessary labor and other resources. Thus, group size is always relevant, but its effect on self-organization depends on other [system] variables and the types of management tasks envisioned" (Ostrom, 2009, p. 421).

It can be argued that conditions currently prohibitive to collective action – even in large-scale CPRs – are not necessarily natural or immutable ones. For example, the issues presented by the size of the Gngangara groundwater system, and by the non-hydrological origins of its internal administrative sub-divisions, do not constitute fundamental impediments but present challenges because of current human conceptual and behavioural norms. These are not static.<sup>3</sup>

Indeed, existing impediments arise from the cumulative effects of past decisions. Path dependence is important, both in terms of formal institutional choices, and informal or tacit societal decisions.<sup>4</sup> Present-day impediments reflect the effect of past and current institutions on the potential for collective action.<sup>5</sup> One of the deepest influences may arise from the tension between neo-classical economic instruments and social capital. Markets are not neutral. Their application and operation promote particular attitudes toward the exchanged good (Sandel, 2009). Sandel (2009, at minute 9) points out that "[o]ften, market incentives erode – or 'crowd out' – non-market incentives". Similarly, Vatn notes that "environmental stewardship [...] may demand the

<sup>1</sup> For example, while Harrington and Morgenstern (2004, p. 13) acknowledge that most of their studied policies used "at least some elements of both approaches", their paper preserves and perpetuates the clear distinction.

<sup>2</sup> Indeed, as noted by Blomquist (1998, p. 4), "while common-property arrangements are distinguishable from completely governmental/regulatory and completely private/market arrangements, they are not inherently incompatible with either, and often coexist and overlap with both". Sarker et al. (2008) advocate for the deliberate integration of elements from all three approaches.

<sup>3</sup> Eloquent cases for reforming current societal norms are made by, to give two prominent examples, HRH et al. (2010) and Jackson (2009).

<sup>4</sup> An example is the disproportionate influence of the mining industry in Australia. The recent resources 'boom' – despite its wide-ranging social and environmental impacts – has allowed a perception of the industry as nationally important. This is possible only as a result of earlier decisions, such as not to limit dependence on finite resources, the legislation governing limited liability companies, and their permissible interactions with the political and financial sectors of society.

<sup>5</sup> Blomquist and Schlager (1997, p. 3), for example, seek to account for the potential effects of "institutionally created heterogeneities on the abilities ... of resource users to voluntarily ... devise governing arrangements for coordinating their use of ... groundwater and surface water".

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