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Legal pluralism, hydraulic property creation and sustainability: the materialized nature of water rights in user-managed systems

Rutgerd Boelens[1,2,3,4] and Jeroen Vos[1]

Worldwide, most irrigation systems are managed by farmer collectives, in contexts of legal pluralism. National and supranational legislation and policy-making, however, focus on governance frameworks established by State and market actors. Consequently, development planning often ignores farmers' rationality regarding sustainable water control. This paper's literature research examines how the notion of 'hydraulic property creation' in contexts of legal pluralism may support sustainable, self-governed irrigation systems. User-investment in hydraulic infrastructure generates collective water property relations. This socio-natural foundation of farmer-managed systems embeds (materializes) and entwines collective and individual water rights in hydraulic works, triggering collective action. Being fundamental to sustainable management, even well-intended policies and legislation ignoring this practice-based property notion may jeopardize well-functioning systems.

Addresses
[1] Department of Environmental Sciences, Wageningen University, PO Box 47, 6700AA Wageningen, The Netherlands
[2] Centre for Latin American Research and Documentation, University of Amsterdam, Roetersstraat 33, 1018WB Amsterdam, The Netherlands
[3] Department of Geography, Planning and International Development Studies, University of Amsterdam, PO Box 15629, 1001NC Amsterdam, The Netherlands
[4] Department of Social Sciences, Catholic University of Peru, Av. Universitaria 1, Lima, Peru

Corresponding author: Boelens, Rutgerd (rutgerd.boelens@wur.nl)

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Introduction

National and international water policies, legislative frameworks and water reform programmes commonly assume that irrigation water rights and rural water management institutions are framed, enacted and governed by State or market actors. In many parts of the world, however, most irrigation systems are managed by smallholder communities and farmer groups [1,2,3••,4]. And in most places, these user-managed systems have developed their own traditional, diverse and often 'hybrid' water rights and management frameworks [5–8].

A literature review reveals how most countries' national water intervention and development programme policies consider that water rights definitions are or should be universally applicable — or, at least uniform and enforceable nationwide [9••,10,11]. Water rights and governance institutions are conceptualized as a tool and condition for State regulation and/or to enable water exchange and trading through market regulation.

Adopting these State or market-centred normative views and conceptualizations of water rights commonly gears policy to socially and legally engineer rational water use organizations and efficient water management. This is often done by establishing 'modern' water rights and enforcing the Rule of Law [12–15]. This policy effort presents modern water rights simultaneously as representative technical-legal norms for understanding water governance, the legitimate instruments for monitoring and planning water development, and the ultimate objectives for accomplishing modern water governance [16].

Indeed, State and market-centred water rights and governance discourses both assume the existence of globally applicable water rules and universally valid water values and energetically institute them [17]. A direct consequence is little legal, financial and political support for local water control and rights realities, such as water rights and management forms in user-developed irrigation or drinking water systems [18,19•,20,21]. The basic rationality of well-functioning local water rights and governance institutions may remain unknown, be misrepresented, or become undervalued by this skewed water policy focus [22•,23•,24•,25]. This paper's literature review focuses on the consequences of such under-representation or misinterpretation of local governance systems by new water reforms and policy interventions [26], and the implications for their socio-ecological and environmental sustainability (e.g., [27,28]).

The review concentrates on literature findings regarding one emerging and seriously undervalued fundamental mechanism for effective, sustainable management of

user-developed irrigation systems: creating and re-creating hydraulic property. Specifically, how user groups simultaneously generate, conserve and entwine the normative water allocation system, the technological water use system and the organizational water management system, thereby creating water property and functionally connecting individual water rights, collective water rights and infrastructure system management.

This primary water development and governance mechanism driving many smallholders/indigenous irrigation systems around the world goes unnoticed by most water policy frameworks, technological development interventions, and is even entirely absent from national water laws. Most scientific disciplines lack the trans-disciplinary perspective to identify and understand how water rights, firstly, operate in conditions of legal pluralism combining official and non-official legal systems; secondly, are embedded in contexts of cultural-historical specificity and socio-ecological settings that elude uniformity and universality, and finally go beyond just legal, sociological and political science disciplines to also deeply involve their moulding by material artefacts and technology use systems.

As part of this Special issue on Legal Pluralism, this paper reviews hydraulic property creation in smallholder irrigation systems, plus a broader search including water rights creation and connection with legal pluralism and environmental sustainability [29]. The paper presents, first, an overview of important conceptual building-blocks that connect the notions of water rights, legal pluralism and the creation of hydraulic property rights; second, three key domains that sustain hydraulic property rights and explain their relation to environmental sustainability; and third, an overview of the pitfalls in development of smallholder irrigation systems led by government agencies. The paper concludes with an overview of implications for water policies and irrigation development interventions.

Water rights, legal pluralism and the creation of hydraulic property

Irrigation systems controlled by smallholder groups and communities position water management within their social and production systems. Water allocation logic distributes a certain volume/time of water among various canals, fields or irrigators, reflecting not just the region's agro-climatic and geophysical circumstances but equally the prevailing social, cultural and political forces. Water allocation rules, therefore, are entwined with a diversity of social norms in local community settings, inside and outside the domain of water control. These include overall community rights and obligations, family and gender relationships, political structures, historically generated organizational forms, etc., which vary from one locality to another.

Water distribution in collective smallholder systems has commonly become consolidated through lengthy experiments and modifications adapting to both social relations and physical needs. Therefore, irrigation water plays a social and technical role far beyond just helping plants grow efficiently. Literature shows that, beyond just 'crop water requirements', water distribution in many systems is concretely rooted in historically generating and conserving water rights, investments made by families to gain these rights, and the rules governing inheritance and exchange of rights [30–33].

In general terms, water rights in farmer-managed water use systems can be defined as 'authorized demands to use (part of) a flow of water, including certain privileges, restrictions, obligations and penalties accompanying this authorization, among which a key element is the faculty to take part in collective decision-making about system management and direction' [32: 3]. A water right legitimizes claims to use particular quantities and qualities of water and decision-making privileges, under specified conditions and for specified purposes. The terms, obligations, penalties (i.e., the definition and contents of 'water rights') differ per system, as do the mechanisms considered legitimate to acquire and maintain water rights.

Rather than embodying a natural or material object in a user's hands, water rights are socio-technical arrangements and both constitute and distribute power relationships among humans. They involve distributing and deploying scarce resources and explain decision-making. Human-made patterning (ecology, including infrastructure, human skills and organizing collective labour) is essential to capture water, operate water use systems and materialize concrete rights. Therefore, beyond just legal constructs, water rights become manifest concurrently in hydraulic technology, normative arrangements and organizational frameworks — ingrained in particular political-economic and cultural-symbolic settings [33].

Literature references to distinctions among water governance property regimes commonly involve: public (State-owned), private (individual ownership), common (collective ownership) and free access (without regulations) (e.g., [34–36], and see also [29] for historical origins). In practice, at multiple scales, these regimes often combine and overlap. These distinctions clearly exemplify different ways of organizing water rights, whereby the authorizing entity and its regulations, powers and legitimacy are commonly contested [37•,38–40].

Water user collectives in many parts of the world, particularly in contexts of (former) external occupation (e.g., [41–43]), inward colonization (e.g., [44,45]), and/or with polycentric governance traditions (e.g., [46,47]), perceive that legitimate water authority and rights are