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RESEARCH ARTICLE

Thick narratives and the persistence of institutions: using the Q methodology to analyse IWRM reforms around the Yellow River

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Abstract A dominant form of integrated water resources management (IWRM) assumes that existing parochial path dependencies need to be overcome to transform fragmented, contested regimes into the integrative design of IWRM. This paper is an exploratory study of stakeholder perceptions around China's Yellow River, which has been hailed as a successful case of IWRM. We find that while water reforms have ostensibly achieved a programme that adheres to the formal discourse of IWRM, subjective perceptions of the stakeholders, as revealed by the Q methodology, still display elements of a localized, fragmented narrative, requiring constant negotiation. Primary elements of the discourse include the following positions: (1) localized, contextual approaches to governance persist; (2) market efficiency and environmental protection are seen as competing goals; and (3) technology creates new gains, but constant negotiation is needed to distribute them fairly. These narratives show that rather than "overturning" old paths, the water reforms created a deliberatory arena in which old and new ideas meld into what we refer to as a "thick" institutional narrative. Our work provides a new perspective on policy change, as well as the persistence of institutional life.

Keywords Integrated water resources management (IWRM) · Institutional change · Ideas · Q methodology · Narratives · China

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Introduction

Integrated water resource management (IWRM) has been promoted as having substantial *prima facie* advantages, both economic and operational. Promoted vigorously in the 1990s and 2000s, it was thought to be an efficient and democratic approach to water governance (Matondo 2002; Newson 2000; Ohlson 1999), with significant social and economic benefits (Global Water Partnership 2007; UNEP 2006). It has, however, been difficult to put into practice. In explorations of several failed IWRM projects, the case has often been put in this manner: despite being rational in design, the implementation of IWRM has been stymied by parochial self-interest and the inertia of existing institutions (Harris 2011; Doukkali 2005; Ingram and Fraser 2006).

This framing makes intuitive sense—on an interests-based analysis, it is natural that individuals would favour individual over collective interest, which conflicts with the integrative and collaborative discourse of IWRM.

Institutional designs for water resource management also tend to be highly path dependent and inflexible (e.g. Ingram and Lejano 2009). Indeed, much empirical research has been conducted around the path dependence of water institutions (Ingram and Fraser 2006). Such research has been useful in illuminating why IWRM efforts fail; they do not, however, tell us how IWRM efforts succeed.

IWRM envisions the redesign of institutions towards a more integrative, jointly collaborative model. But how does this institutional change occur? Does it happen because of an emergence of a unitary collective interest that overcomes entrenched, parochial interests? If so, what are the dynamics of this process? These are the questions that we will explore in this paper.

Our thesis is that collective, reform-minded interests can coexist with, instead of displace, path dependencies. Further, we posit that formal regulatory changes, being interpreted and implemented by the communities which they affect, create a new deliberatory arena for the creation of new institutional narratives. In cases of successful IWRM implementation, existing and collective interests are both legitimized as part of a new meta-narrative. This is reflected in stakeholder discourse—i.e. the institutional milieu, instead of being transformed according to one common narrative, becomes a plurality of multiple discourses or narratives that somehow manage to cohere, what has been referred to as a discourse ecology (Dodge and Lee 2015).

It may be useful to note that there are two important aspects of IWRM: (1) formal integration in terms of infrastructure and operations and (2) a discursive aspect wherein the practice of IWRM requires new efforts at constant negotiation, joint deliberation, and participation.

The first, formal integration is described by the Global Water Partnership, as "a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems" (2007). This positivist concept comprises two elements—infrastructural integration and governance coordination. In the first, IWRM involves physical, sectoral, and organizational integration (Kidd and Shaw 2007), requiring "hard" infrastructural integration such as at the basin level or catchment scale of a water body. In the second, the integration of institutions includes formal decision-making structures in water allocation and management (Bressers and Kuks 2004). This latter is what Mukhtarov and Gerlak (2014) calls a

"prescriptive epistemic" form of IWRM, which often takes the form of implementation guidelines.

The second aspect of IWRM concerns discourse and practice. This involves new patterns of inter-agency communication, knowledge sharing, and joint decision-making (Kemper et al. 2007). This is reflected in recent research on IWRM that incorporates values and stakeholder perceptions (Hijdra et al. 2014; Gallego-Ayala and Juizo 2014). One key normative advantage of the IWRM is that it allows for multi-stakeholder participation and an incorporation of knowledge and interests from different groups (Brunner and Steelman 2005), but in fulfilling this role, IWRM cannot be merely a sort of organizational aggregator, a calculating machine that takes different interests and devises an outcome. It is instead a deeply interpretive concept, one that not only allows, but requires that different stakeholders hold a collective interest, one that perhaps has priority over their own parochial ends. As Shomar et al. (2014) point out, IWRM per se does not provide sufficient implementation guidance. This concept applies too, when examining cases of failure of IWRM.

Empirically, while there is no conclusive evidence on what variables lead to reform success in IWRM, current research points to two factors as being key challenges.

First, integration needs to take place across existing organizations and different departments (Kidd and Shaw 2007; Fischhendler and Heikkila 2010). Getting people in these different organizations to agree on joint new policies and institutional structures is often a problem, given the large number of people and diverse interests at play (Blomquist and Schlager 2005). Agreement is difficult to achieve. The first obstacle therefore is created by entrenched interests. Second, there is an obstacle created by high sunk costs—a function of the nature of such large-scale infrastructure. The scale and dimensionality of a physical landscape can have important implications for adaptive capacity (Van Cleve et al. 2006; Ingram and Fraser 2006). For example, historical emphasis on infrastructural solutions to supply problems (e.g. reservoirs) makes it harder for water agencies to consider demand-side reforms like conservation pricing. In studying IWRM therefore, it has been argued that this persistence in agency mindsets, practices, and beliefs conspires to make significant change (whether in infrastructure or in rules and processes) difficult.

This paper is an attempt to verify the converse that a collective, integrated governance model of water management can coexist with path dependencies and agency fragmentation.

Ideas and institutional change

"Path dependence" is defined by Mahoney (2000: 507) as "those historical sequences in which contingent events set into motion institutional patterns or event chains that have deterministic properties". The path dependency explanation for institutional change is probably the most instinctive—that what happens in water reform is the accumulated result of what happened in the past, and is captured in the body of literature on historical institutionalism (HI).

In this section, we discuss two major schools of historical institutionalism: (1) the classic model, which studies macro-level factors such as path dependence and exogenous elements, and (2) the ideational model, which looks at micro-scale, endogenous elements.

Classical model of historical institutionalism: exogenous factors

A typical case is that by Harris (2011) in an analysis of a water market in Victoria, Australia. She examined a water reform in which the irrigation sector attempted to move away from a government-led allocation of water, to a more market-based system, which holds the promise of greater efficiency gains. These gains, however, were not completely realized due to rigidities created by path dependence. For example, Harris points to "administrative restrictions" and "historical decisions" which prevented farmers from trading their water freely. In explaining the existence of these inefficient institutions, she points to the "element of lock-in" which is created as each decision is made so that "a path's trajectory, once established and built on by subsequent decisions, is costly to change" (Harris 2011).

The same argument has been made specifically about IWRM by Bhat and Blomquist (2004), who examine the IWRM in formal processes in Spanish water law since 1985. While in formal regulations, IWRM seems to be in place, closer examination of institutions working on the ground found that there are factors such as values and interests that affect the willingness of stakeholders to convert policy to practice.

According to this version of HI, change is explained by reference to exogenous forces. Take, for example, the case of water reform in Morocco (Doukkali 2005), where path dependencies limited institutional changes to those that were incremental and evolutionary. Large-scale reforms, such as from centralized to decentralized governance, from subsidies to a more market-based approach, and sectoral approaches to integrated management, cannot be explained from the "inside". Rather, they were attributed to exogenous factors such as droughts and macroeconomic crises.

Path dependence can be described by the so-called Polya urn model. A number of two different coloured balls are placed in a container. Every drawn ball is returned to the container, and another ball of the same colour is added to it. This very slightly increases the chances of drawing a ball of this colour in the next round. Each draw is random, but over the long run, one colour is likely to dominate due to the increased chances of balls of over-represented colours being drawn. Only in the increasingly unlikely event of a balancing out of both colours would there be no long-term positive feedback in either direction. In this model, the notion of path dependence (PD) can be simply thought of as the path of increasing returns in economic terms (David 1985). In this non-ideational model, institutional change is a matter of repeated chance events carving the trails of history.

This version of historical institutionalism can be seen, for example, in Ingram and Fraser's investigation of California water, where they acknowledge that there are path dependencies in water policies that make them especially impermeable to abrupt policy change (Ingram and Fraser 2006). Changes occur, however, when conditions are right—in the case of California water, this included evidence of the failure of current policies, the emergence of the market-like water transfer mechanism as a viable idea and intriguingly, a policy frame which allowed what was in fact a sharp departure from past policy to be accepted as a permanent fixture, because of the notion of "adaptive management".

Ideational model of historical institutionalism: endogenous factors

The other, ideational, form of HI is described by Blyth (2002), who argues that ideas are the causative factor behind institutional change, closely linked but not identical to interests. Interests are a "cluster" concept that includes beliefs and desires. "If interests are a function

of beliefs and designers and if agents are confused about their desires—for example, in situations of high uncertainty—then logically, agents' interests are unstable too" (Blyth 2002, p. 30) Given this, holding ideas apart from interests makes little sense for Blyth, since ideas allow people to diagnose the situation and pick the institutional form that best reduces their uncertainty. Tang's (2010) model offers another ideational pathway—he postulates that institutions change by way of evolution. Ideas are "solidified institutions", with competition of ideas and a struggle for rule-making power at the heart of this process. In this, he works in the tradition of Durkheim (1950), Boland (1979: 964) and Hayek (1960).

More recent literature has described a closely related concept called discursive institutionalism (DI). Schmidt (2008) writes that DI is a collective term for all "methodological approaches that take ideas and discourse seriously, by focusing on the substantive content of ideas and/or on the interactive processes that serve to generate those ideas and communicate them to the public" (Schmidt 2008, p. 3). Her work builds on past scholars who have thrown their weight behind the "ideational turn in policy" (Campbell and Pedersen 2001; Hay 2001, 2006). Specific to policy reform, Wilder and Howlett (2014) locate change within a marketplace of ideas, as per Blyth, but instead of an evolutionary process, where discursive conflict and hermeneutic competition take place, actors compete to influence solution sets in a process of "policy bricolage" (p. 183). Viewed in this lens, policy-makers are less strategic thinkers and policy-solvers than "institutional bricoleurs" engaged in a process of "ideational and knowledge construction".

In this paper, we build on the ideational form of historical institutionalism—agreeing that some account of ideas in institutional change is required. At the same time, we recognize that there is a current gap in understanding what this means empirically. Our work lends to the sparse but important literature that argues the power of narratives in creating new movements towards institutional reform (Roe and van Eeten 2002; Lejano and Leong 2012).

In this literature, authors argue and demonstrate how political coalitions achieve success in forging new institutional change by first coalescing around overarching narratives or storylines that can bind the groups together and generate impetus for the proposed changes. It is, in part, due to the strength of the narrative "plot" that the movement gains power. While actors in the coalition may each maintain slightly differing "storylines" (as in Lejano et al. 2013), at the level of overarching themes, or what Schon and Rein (1995) call meta-narrative, there is sufficient agreement across the coalition.

This paper proposes to examine the ideational elements influencing institutional change around the Yellow River. The case of the Yellow River was chosen because of the puzzle of its apparent success in IWRM implementation. The water governance institutions are long standing, and hence, paths and interests are deeply entrenched. The problem is too complex and long standing—since the early 1970s, the river had a problem of "zero flow"—that is, so much water was taken out by agriculture and industry that it no longer flowed to the sea. But between 1997 and 2002, IWRM was introduced. Since then, the outcome can be seen as a qualified success—the river has run to the sea every year, although tussles for water between industry and farmers remain and pollution of the river continues to be severe.

We investigate this puzzle by undertaking an empirical investigation using the Q methodology, which allows us to identify key participant viewpoints and perceptions. This method allows us to identify key themes in the overall narrative in support of IWRM. These themes act as parts of the overall storyline that help give the group durability and connectivity.

The case of the Yellow River

The Yellow River presents one of China's largest ecological challenges. Running at 5464 km, it flows through nine provinces (Qinghai, Sichuan, Gansu, Ningxia, Inner Mongolia, Shaanxi, Shanxi, Henan, and Shandong) and provides water to a population of more than 140 million and irrigates 0.16 million km of farmlands.

When the river floods, it destroys both agricultural and property through severe sedimentation; during the dry season, both farmers and industrial users suffer through long stretches of dry beds. As a result, there is intense competition among local governments for water during the dry season. Those in upper and middle reaches exploit their geographical advantage by closing sluices and gates to trap as much water possible, leading to conflicts with the lower reaches.

The seasonal fluctuation in water supply is aggravated by the prodigious increase in demand. In the 1980s, some 9.3 billion m^3 was extracted each year. By the late 1990s however, the amount increased to 12 billion m^3. By 1999, more than 90 % of underground water had been extracted. As a result, the lower Yellow River suffered from zero flow—running dry inland hundreds of kilometres from the sea. The first time this happened was in 1972; by the 1990s, it had become a nearly annual event. In 1997, the length of dry land stretched to 704 km, double the length in the 1970s.

This is a long historical trend, and the creeping nature of this trend created a high degree of inertia and made it difficult to implement any change to the complex array of institutions and practices in place.

This zero flow was an ecological and economic disaster—hundreds of bird and fish species became extinct. The economic loss of agriculture and industry in the lower Yellow River amounted to CNY 2.22 billion in 1970s and CNY 21.64 billion during 1990–1996 (Liu, Wang and Sui 2007). The lack of water was also politically salient. During dry spells in the early 1990s, water trucks had to be sent out to many villages to provide drinking water.

The crisis prompted some 160 scholars and scientists to lobby the government for urgent action. In April 1997, the Ministry of Water Resources, the State Planning Commission, and the National Science and Technology together announced a system of "unified water management". This set off one of the most thorough and far-reaching regulatory reforms in China.

Formal institutional changes in YRCC

Before the reforms, the Yellow River was governed by an extremely complex bureaucratic system of water resource management. By the 1990s, the administration of the river had grown into a grinding bureaucracy of "a multitude of dragons managing the waters". Nine ministries regulated the river, with a complex interplay of local and economic interests (Zhao et al. 2002). These included institutions overseeing water resource, electric power, environmental protection, and agriculture, which shared power and held different (sometimes competing) interests. Overlaying these divisions, the three reaches of the Yellow River were separately administrated by the nine provincial governments located in the river basin.

The implementation of IWRM in the Yellow River was prompted by the enduring poor ecological performance despite the increasing bureaucratic effort. Translated into policy,

this meant a move from a fragmented, decentralized governance structure into one that is more integrated and centrally planned. In terms of structure, the move meant that water resource management now integrates water resource exploration, utilization, administration, allocation, conservation, and protection.

The most significant reform is the designation of the Yellow River Conservancy Commission (YRCC) as an umbrella body to govern the river. The YRCC had existed before the reforms, but its authority was limited to the northern streams and lower reaches —its power was unclear with regard to the upper or middle reaches (Wang et al. 2001). In other words, the YRCC did not have any authority in mediating trans-provincial water disputes, let alone the disputes among ministries. After the reforms, the YRCC had recourse to *Yellow River Water Allocation Bill*, which was approved by the State Council in 2006.

This bill was a key piece of legislation that allowed the YRCC to implement integrated water resource management. The regulations provided the broad principles for the YRCC to allocate water among the nine provinces, for example, requiring for the balancing of interests of all three reaches, nine provinces, and industrial and agricultural sectors. However, it did not specify *how* these interests were to be balanced.

The YRCC also initiated institutional reforms at the local level—organizations were established in each province to coordinate the allocative process. Meanwhile, there was a great deal of supervision and inspection to ensure that the local managers kept to the agreed targets. For instance, the YRCC inspection team was required to undertake site supervision, tours inspection, spot checks, and other inspection mechanisms to ensure effective policy implementation of the water allocation quota. Again, IWRM was seen as integrating across local levels—but local managers remained important.

Third, the reforms set out objective standards. Water pricing was standardized, based on different water usage levels, and according to domestic, industrial, and agricultural consumption. Any water usage beyond the quota was charged at a higher rate to reduce over consumption. These were implemented with a new set of scientific and engineering techniques, for example, in remote sensing and automation. These were used to collect real-time river system information and coordinate the operation of the reservoirs.

According to the YRCC, there has been no zero flow occurrence since 2000 (Zhang et al. 2009; Yang et al. 2012; Xia and Pahl-Wostl 2012). Basic industry, agricultural, and household demands have been met (Ingram and Fraser 2006, Harris 2011). The ecology of the area appears to have improved (Ang 2007).

The formal institutional changes point to the move away from a fragmented system into a more integrated one. In new policy and economic regulations as well as new laws, we see a move towards the norms of IWRM. But at the same time, we see too that there remained a negotiated, local approach in actual operations and implementation.

How do these two apparently contradictory approaches work out in the minds of the stakeholders? For example, do the people on the ground conceive of their interests as being melded into one large, collective one, or are there still perceptions of local interests? Is governance a centralized idea or are there still elements of a fragmented, negotiated approach? In short, is IWRM one creature in formal institutional terms, and quite another when implemented on the ground?

Our thesis is that institutional change on the Yellow River was supported by the broad agreement over a number of factual and/or normative positions. These positions are expressed as statements or claims that are part of the overall narrative supporting IWRM. This narrative, we find, does not display a transformation from a fragmented to an integrated system. Rather there are elements of a continuing fragmented approach, which

nonetheless did not lead to conflict over the changes. If true, this shows that IWRM is a more complex concept than commonly appreciated, especially in its tolerance of an enduring, fragmented, locally determined approach. As such, an important policy implication is that IWRM's implementation may in fact encounter less resistance if conceived of in this, more complex, form.

To address our thesis regarding the evolution of IWRM despite diverse stakeholder positions and path dependencies, we employ a methodology that allows us to analyse the different aspects (or narratives) that make up the complex discourse around IWRM in the Yellow River.

Methodology

The Q methodology was chosen because we are interested in the discourses that informed this IWRM implementation. The Q's factor analysis reveals groups of people according to the shared collection of views which they hold—that is to say, each factor is a particular interpretive community of shared beliefs (Durning 1999; Lynn 1999; Pelletier et al. 1999).

This is a significant difference from the usual R method (or regressions) which captures, particular traits, rather than clusters of people sharing the same discourse (Steelman and Maguire 1999).

In narrative analysis, these factors are useful because it shows the number of viewpoints that exist in the situation—that is, the unique stories that different groups of people tell themselves. In so doing, the Q allowed us to uncover coalitions within the hermeneutic marketplace where the process of "policy bricolage" takes place. For example, in a study which employed the Q methodology in understanding public perception of wind farms in the UK, Ellis et al. (2007) show how dialogue on the ground is far more complex than at first imagined—although the stakeholders can be grouped broadly into "objectors and supporters" of the scheme, in terms of discourse elements, the different narratives show that the two groups do not so much disagree with each other, as talk past each other. Ellis writes that "while there are clearly gradations of support and objection, for the most part, these two groups engage in very different discourses" (2007: 537). The same finding presents in a recent application of the Q investigating cognitive learning in water management (Raadgever et al. 2012).

There are three points we want to make in regard to the use of the Q—first, on the selection of the 51 respondents. In a Q, respondents need not be a representative sample, but are chosen instead to represent the "diversity and variety in beliefs and opinions" (Hoppe 2009). We chose respondents from the three key stakeholder groups—the government officials, industrialists, and farmers and residents who live close to the river—because we are interested in the complexities of discourses that can exist in the ideational marketplace at any one time. As *per* Ellis et al. (2007), rather than a crude "for or against" IWRM, we hope to explore the different perceptions that people have towards collective action in the Yellow River.

Second, we have pointed out the important difference between Q and ordinary regressions. Rather than a correlation of traits (or disembodied characteristics), we have factors which are "an in-depth portrait of the typologies of perspectives that prevail in a given situation" (Steelman and Maguire 1999). Because the factors are a typology, *naming* the factors is often a difficult creative task. In this paper, we have named the factors according to the broad themes embedded in the collection of statements which the discourse coalition has said that they "strongly agreed" with.

Third, we note that one key limitation of this study is that there still remains a gap between a typology of perceptions and the more substantial concept of *ideas*—the latter being where we had located the impetus for institutional change. In this paper, we have used one as a proxy for the other, but we recognize that there is future work to be done to make the case that a collection of perceptions translates then to ideas. In this paper, our weaker claim is that the uncovering of the perceptions of IWRM supports an ideational form of institutionalism.

To operationalize the Q, some 1700 statements relating to water use in the Yellow River, from the years 1997 to 2008, were gathered from online media, local newspapers and documents. These statements are views, opinions, factual declarations, and policy statements about the Yellow River. These were reduced to 69 after deleting those that were similar in meaning.

These were then used for a Q sort by 51 interviewees from different provinces, including water managers, farmers, and government officials. They were presented with these statements and asked to rank these according to whether they agreed or disagreed with them, on a continuum scale of one to five. This data set was originally conceived of as a comparative tool to study the differences in narratives between the Yellow River and the Ganges, to understand collective choice rules in very large rivers (Leong and Mukherjee 2015).

In this paper, we used the Q sort to reveal the broad outlines of different interpretive communities along the Yellow River and their shared "plots", which consists of a number of foundational statements/claims as discussed below. Each of these can be regarded as part of the "moral" of the story much like an overarching normative claim which can be identified in each of Aesop's fables.

These summary themes or storylines are what some narratologists refer to as the fabula (e.g. Balfour and Mesaros 1994). These summary themes are labelled, below, as "factors". We also included an analysis of the "distinguishing statement" (DS) of each of these factors. The DS is special because this statement distinguishes that factor from all other factors ("Appendix 2").

Our motivation for conducting this investigation was to find out what distinctive coalitions existed within the community of the water reforms—the subjective viewpoints, perceptions, and sentiments. The factors resulting from the Q factor analysis inform this directly because they grouped the people with similar discourses together, showing us both the broad discourse coalitions and the shared beliefs within each coalition.

Factor 1	Environmental protection as policy goal
Factor 2	Competition for water
Factor 3A	Role of technology
Factor 3B	Role of science
Factor 4A	Negotiations as a distributive mechanism
Factor 4B	Local interests
Factor 5A	Normative incentives: Personal responsibility
Factor 5B	Normative incentives: National pride

Results and discussion

Our analysis builds on the finding, as seen in the literature, that binding narratives serve to bring coalitions for policy change together. What we uncovered are not complete narratives per se, which require exposition of an entire plotline, with characters and a complex

sequence of events. Such full explication of plots can only be had through a deep, ethnographic analysis of narratives told by individual policy actors.

However, our interests in this research are: first to establish how far the current assumption of a switch from a fragmented to an integrated approach is true, in a real-life application of the concept, and second to establish the broad outlines of the narrative that is widely shared across a large number and spectrum of important policy actors. These factors, which consist of around 13 statements each, are examined in the next section.

The economics of water use (Factors 1 and 2)

The first two factors speak to the economics of water use and illustrate the important relationship between industry and farmers.

First, it is useful to note that the coalition represented by factor 1 shared a basic disagreement with the two statements—namely that "Less water in the Yellow River means wells running dry and ordinary people will problems finding drinking water" (34) and "Ecological Protection of the Upper Yellow River has seen benefits go mainly to the lower reaches so the central government should establish a special fund for ecological compensation for the Upper Yellow River" (5).

This is a complex narrative that recognizes that there remains keen competition for water ("The primary goal of a health Yellow River is to ease the conflicts between demand and supply" (20). At the same time, it also recognizes that not all users of water are equally efficient ["Irrigation using the yellow river has increased crop production, but the wasteful use of water in irrigation causes the river drying up in a long-term" (7)]. This explains why the distinguishing statement for factor 1 is one that rejects a simplistic, zero-sum view of water—less water does *not* mean that ordinary people will have problems finding drinking water, *if they learn to use it more efficiently.*

One example of this would be farmers trading their quota to more efficient users such as industries. In Inner Mongolia, for example, they are given an incentive to do this by the industries, who provide them with better farming technology and water-saving devices that increase their crop yield even while using less water. In our interviews with farmers, we find that they have limited farming activity in winter because of the cold. Because of funding by private companies however, they are able to build temperature-controlled tents and continue to harvest in winter (temperatures can plunge to −32 °C). The money also goes towards water-saving technologies such as drip irrigation and water proofing canals.

Private companies are incentivized to give funds to farmers because they need their water. These companies are given a strict water quota by the government. But they can transfer water from farmers; hence, the incentive to help farmers increase their income and to use water more productively. Farmers gain in terms of increased harvests and improved technology, industry gains because, without water, economic activities would be severely curtailed. The net gain from this exchange is estimated to be CNY 26.6 billion—after squaring off all the investments made (Wang et al. 2001).

The impact of science and technology (Factors 3A and 3B)

This pair of factors relates to the role of science and technology. From the distinguishing statements, it can be seen that these statements are largely pro-economic development—both 3A and 3B show that there is disagreement with the sentiment that "it is better to sacrifice economic development…than to allow the water to run dry". There is also a strong preference taking national considerations into account.

The participants in these groups believe that science and technology can make a difference in the river with statements such as "We should use science to accelerate the modernization of the Yellow River management, while keeping a balance between water use for homes, industry and the environment" (11).

However, while technology can create gains, there is also fear that these gains accrue to selected groups—"If we do not effectively manage the Yellow River, the 'hanging river' in the upper reaches is bound to lead to frequent drying up in lower reaches, threatening people's lives, property and the economic development of the basin" (38).

Hence, there is a strong thread in the narrative about what is perceived as a "fair distribution" of gains, through statements such as those below:

1. National considerations should take priority over local ones in the management of the Yellow River Basin (28)
2. When the interests of the river and the needs of the province conflict, the needs of the river should take priority (57).

Here, the larger national goal is held prior to the local provincial one; also in the tussle between farmers and industry, neither side is held to be more "deserving"—instead the narrative confers this benefit to the river itself. This resonates with the two pair of factors, but also creates an atmosphere for negotiations, as neither one of the antithetical pairs of interests (farmer versus industry, self versus collective) is held to be prior. In this, there is a strong frame of collective interest as represented by statements such as "The Yellow River has life, and intrinsic value, and should be respected for that" (51).

These two sections resonate with existing research which shows that competition in water use should not just be about quantity, but also in quality of use, that is to say, IWRM as a concept should take into account both demand and supply in a more nuanced matter. Rather than just supplying to stated demand (which does not embed scarcity-sensitive parameters), the new paradigm speaks to benefit sharing among different users (Tilmant and Kinzelbach 2012).

A local approach (Factors 4A and 4B)

These two factors show both the existence of local interests and the preference for a negotiated approach to take these interests into account. While formal reforms in regulatory and institutional design appear to create a centralized, coordinated institution in the YRCC, the two factors show that the public still perceives the existence of a local, fragmented approach. This is seen in statements such as

1. "The local governments should ensure that water allocated to each province should also be used to contribute to improving the ecological environment" (8).
2. "The integrated approach has reduced the income of the Yellow River gate management officers, who also have to cope with the unhappiness of end-users when they do not get enough water" (18).
3. "When there is a conflict between provinces, the provinces should settle it between themselves" (65).

The latter (Statement 65) is also the distinguishing statement for factor 4B. The existence of a local approach resonates with the factors 3A and 3B, which spoke to the need for a negotiated approach to take ecological as well as environmental interests into account. Taken together, these four factors counter the common understanding of IWRM as a centralized, coordinated approach, which "improves" the existing fragmented one. Rather, in the case of the Yellow River at least, we see that there exists a collective goal (as per

factors 1 and 3B) but also a recognition of different legitimate claims to water—from farmers, industries and people who live along the river.

Normative incentives (Factors 5A and 5B)

Perhaps the two most important factors in the discourse are the key ones providing the normative incentives for all the factors above. These are Factors 5A "Personal responsibility" and 5B "National pride". The role of actors and their ideas emerges strongly in factor 5. At the same time, there is also a clear recognition of the direct costs of poor river governance on the people. These are evidenced in statements as below:

1. "Everyone has the responsibility to keep the Yellow River healthy since it would be shameful for the entire nation if it were to run dry" (36).
2. "Less water in the Yellow River means wells running dry and ordinary people will have problems finding drinking water" (34).
3. "The Yellow River drying up leads to uncertainty and anxiety in the lives of ordinary people" (32).

There is also a sense that the health of the Yellow River is not just of private concern but a national one.

1. "The Yellow River is a river seeped in Chinese history and culture and it would be a tragedy if the river flow disappeared" (40).

Conclusion

What then have we learned about overcoming path dependencies in IWRM? How do we deal with path dependency as we attempt to accomplish institutional change? Our most intriguing finding is that path dependencies do not go away—indeed, we found coalitions gathered around statements that diverged from the IWRM narrative. Policy actors overlay the old paths with new ones—provide new logics to old ways of knowing and doing, such that it becomes possible and reasonable to pursue new paths while treading along the old paths. This is akin to the way Schon and Rein describe the combination of two, originally distinct competing narratives into one meta-narrative that might use compromise or appeal to larger issues to resolve their differences (Schon and Rein 1995). In an important sense, our work also illustrates how institutional change occurs both exogenously and endogenously (see Lejano and Shankar 2013). Moreover, how the different factors affect the outcome of IWRM depends on contextual elements, including who the players are (Ramesh et al. 2010).

In addition, we find that among these interpretive communities, ideas about IWRM coexist with those about more parochial rights, claims of economic interests, and local, negotiated governance models. We had set out to find what IWRM *means* for communities of actors—we find that it does not, as commonly thought, eradicate existing, competing claims with one common, overarching notion of collective interest. What IWRM provides is a narrative frame for different discourse coalitions to interact and, in this instance, to work through and resolve tensions that may be present among different groups. We see this in the factors of analysis which provides for local interests, even as a new narrative about collective interests, and the "health of the river" is constructed. At the same time, the IWRM approach has not eradicated old competitive pressures on the river—rather it has allowed new policy innovations such as water trading, to take place within a narrative

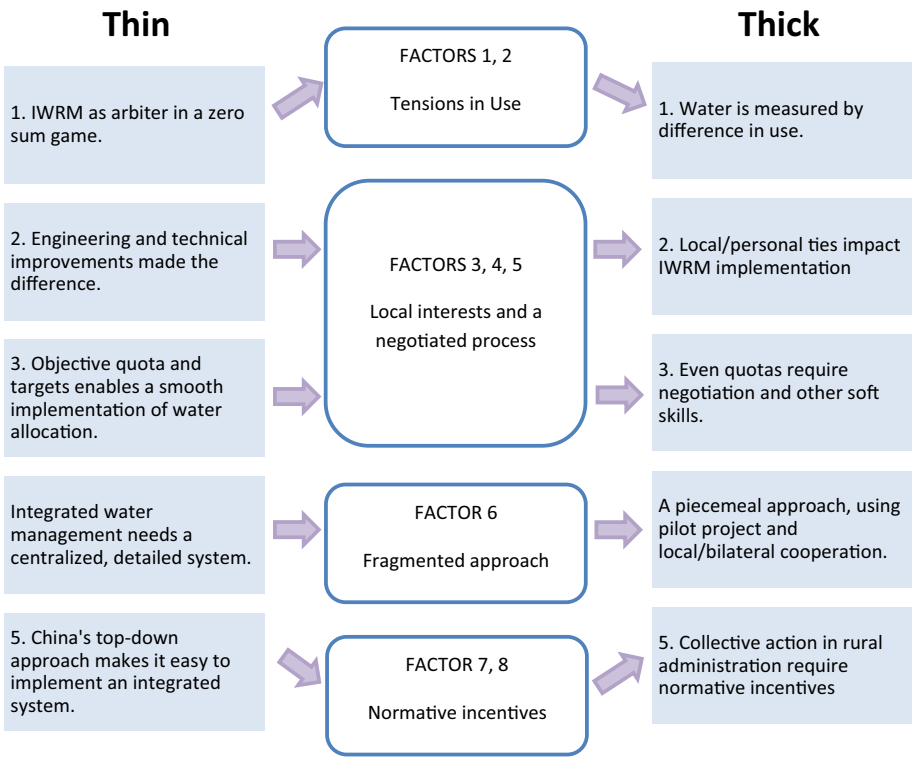

Fig. 1 Transformation to thick narratives

frame, in this case—that outlined by factors 1 and 2—on the economics of water use. A practical implication for water managers is that IWRM may not need to overturn existing entrenched interests, but rather to find a narrative fit between them and a new more integrated mode of governance.

The formal, overt discourse behind a programme is what we have elsewhere referred to as a thin narrative, while deeper, more embedded discourse is described as a thick narrative (see Lejano and Leong 2012). These are described below and illustrated in Fig. 1.

Thin narrative

1. Water use is a zero-sum game, and where more for one user means less for others
2. Engineering and technical improvements have made a big difference
3. Objective quota and targets enable a smooth implementation of water allocation
4. Integrated water management needs a centralized, detailed system
5. China's top-down approach makes it easy to implement an integrated system

Thick narrative

1. Water can be measured by use, as well as by quantity (factors 1 and 2)
2. Softer aspects such as negotiations and personal ties can make a difference (factors 3A, 4A, and 4B)
3. Targets obtained by consensus require negotiation and other soft skills (factors 3A and 4A)

4. A piecemeal approach, using pilot project and local and bilateral cooperation, has made the difference (factors 4A, 4B, and 5)
5. Rural administration and implementation are not easy for a centralized system (factors 1 and 5B)

These narratives, with the factors shown in brackets, reveal that, rather than "overturning" old paths, the water reforms included these in a new meta-narrative which encompassed shared responsibility as well as individual rights for water (Fig. 1).

Lastly, one important question is—to what extent do all the factors jointly form a coherent narrative? While each of the factors form a key idea or narrative representative of a particular community, such as local water managers, we can identify a "thick narrative" that contrasts with the ostensibly "thin" one that has been presented in current IWRM discourse. A thick narrative is characterized by plurivocity—i.e. different actors are allowed to tell distinctly differing stories that somehow cohere in the overall programme narrative. It is "thick" in the sense of having multiple plots, representing multiple narrators, overlaid into one. In contrast, the formal programme narrative behind IWRM is "thin", in that it purports to be a unitary message, while actually masking the more complex, multiple, and often tacit motivations and voices that come together around the programme.

Given these findings, we can make a contribution to the larger understanding of institutional change. In constructing an ideational form of historical institutionalism, we see that trajectories can change not in a process of new paths replacing the old, but as a matter of hermeneutic interaction among multiple narratives. This understanding of the dynamics of institutional change also has an important practical implication—policy-makers implementing IWRM need not therefore look towards eradicating old norms of behaviour and replacing them with new, but rather to look for a narrative solution that reconciles them.

Though any new arrangement may appear reasonably successful, in terms of reconciling competing interests into a new integrative arrangement, policy-makers will really discover the merits of the new arrangement when serious resource issues, such as droughts and floods emerge (e.g. Mumme and Barajas 2003). And, correspondingly, it will be interesting to study how the always-shifting narratives change over time. Lastly, future work should look into how thick narratives emerge in different policy situations and what institutional changes they enable.

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Appendix 1: Details of Q sort

Each factor has about 13 statements which the participants "strongly agree with". Five are extracted to illustrate the key theme of each factor.

	1	2	3	4	5	6	7	8
Factor 1: Environmental protection as policy goal								
The Yellow River basin management organizations should pay more attention to the ecological protection and maintenance of healthy life of the river when handling the relationship between economic development and environmental protection. (13)	2	2	2	1	1	1	0	1

	1	2	3	4	5	6	7	8
Preservation of the ecological system is important for long-term stability. (14)	2	1	0	0	0	2	2	0
The primary goal of a healthy Yellow River is to ease the conflicts between water supply and demand. To reach that goal, an optimal mechanism of water resources allocation should be developed. (20)	2	0	2	0	−1	1	0	2
The local governments have the responsibility to protect the ecological environment along with economic development in the Yellow River Basin. (24)	2	1	2	0	1	−2	1	2
The water shortage of the Yellow River will inevitably slow down the process of industrial modernization in the region and will also cause deterioration of the ecological environment of the river. (12)	2	1	−1	−1	0	−1	−2	−2
Factor 2: Competition for water								
The lack of water along the Yellow River has led to lower crops yields and lower agricultural income for farmers. (3)	1	2	0	−1	0	−2	0	1
A constant river flow maintains the healthy life of the Yellow River and ensures drinking water safety in urban and rural areas along the river. (6)	0	2	0	2	−2	−1	0	−1
When the interests of the river and the needs of the province conflict, the needs of the river should take priority. (57)	0	2	2	−1	1	0	−1	1
National considerations should take priority over local ones in the management of the Yellow River Basin. (28)	1	2	2	−2	1	2	1	1
It is better to sacrifice the economic development of the river banks than to allow the water to run dry. (53)	1	2	−1	−2	2	1	2	1
Factor 3A: Role of technology								
We should use science to accelerate the modernization of the Yellow River management, while keeping a balance between water use for homes, industry and the environment. (11)	2	1	2	2	−1	0	0	0
Integrated water management of the Yellow River strengthens sustainable water use for the sake of sustainable economic and social development; meanwhile, it should strengthen ecological protection, pollution prevention and soil erosion control. (10)	−1	0	2	2	0	−1	1	1
The Yellow River management should be governed by an integrated, scientific approach, and local governments should not be allowed to develop projects at will. (27)	0	0	2	2	0	−2	1	2
Ecological Protection of the Upper Yellow River has seen benefits go mainly to the lower reaches so the central government should establish a special fund for ecological compensation for the Upper Yellow River. (5)	−2	1	1	1	2	1	0	0
Climate change puts further stress on the balance between water supply and demand in the Yellow River Basin. (41)	−2	−2	1	−1	2	−1	−1	0
Factor 3B								
We should use science to accelerate the modernization of the Yellow River management, while keeping a balance between water use for homes, industry and the environment. (11)	2	1	2	2	−1	0	0	0
The Yellow River management should be governed by an integrated, scientific approach, and local governments should not be allowed to develop projects at will. (27)	0	0	2	2	0	−2	1	2

	1	2	3	4	5	6	7	8
If we do not effectively manage the Yellow River, the "hanging river" in the upper reaches is bound to lead to frequent drying up in lower reaches, threatening people's lives, property and the economic development of the basin. (38)	−1	0	2	2	0	0	0	0
Ecological destruction of the Yellow River source has severe consequences for the livelihood of animal herders. (2)	−2	−2	−1	2	2	1	0	2
The work of the water utilities should be given higher priority. (69)	0	2	1	1	−1	2	2	0
Factor 4A: Distribution of gains								
Ecological Protection of the Upper Yellow River has seen benefits go mainly to the lower reaches so the central government should establish a special fund for ecological compensation for the Upper Yellow River. (5)	−2	1	1	1	2	1	0	0
Irrigation using the yellow river has increased crop production, but the wasteful use of water in irrigation causes the river drying up in a long-term. (7)	−2	2	0	−2	2	0	−1	−2
Less water in the Yellow River means wells running dry and ordinary people will problems finding drinking water. (34)	−2	1	0	1	2	0	0	2
Climate change puts further stress on the balance between water supply and demand in the Yellow River Basin. (41)	−2	−2	1	−1	2	−1	−1	0
The local governments should ensure that water allocated to each province should also be used to contribute to improving the ecological environment. (8)	1	1	−2	1	2	−2	2	0
Factor 4B								
The Yellow River water resources build a national agricultural base, since it provides sufficient water irrigation to the farmlands along the river. (9)	−1	2	0	0	−1	2	1	−2
Preservation of the ecological system is important for long-term stability. (14)	2	1	0	0	0	2	2	0
When there is a conflict between provinces, the provinces should settle it between themselves. (65)	−2	−1	−2	0	−1	2	−2	−2
When there is a conflict between provinces, the state should mediate. (66)	0	0	−1	0	1	2	−2	−2
The work of the water utilities should be given higher priority. (69)	0	2	1	1	−1	2	2	0
Factor 5A: Personal responsibility								
The work of the water utilities should be given higher priority. (69)	0	2	1	1	−1	2	2	0
I know that the Yellow River used to run dry. (52)	2	−2	−1	2	2	2	2	0
It is better to sacrifice the economic development of the river banks than to allow the water to run dry. (53)	1	2	−1	−2	2	1	2	1
The Yellow River flood control ensures people's safety, and overall national stability and development. (37)	0	2	0	0	0	−1	2	0
The Yellow River has life, and intrinsic value, and should be respected for that. (51)	2	1	0	2	1	0	2	0
Factor 5B: National pride								
Everyone has the responsibility to keep the Yellow River healthy since it would be shameful for the entire nation if it were to run dry. (36)	1	0	0	2	1	0	2	2

	1	2	3	4	5	6	7	8
Less water in the Yellow River means wells running dry and ordinary people will problems finding drinking water. (34)	−2	1	0	1	2	0	0	2
Water supply is the first task of yellow river governance. (45)	−1	2	−1	−1	0	2	0	2
The Yellow River drying up leads to uncertainty and anxiety in the lives of ordinary people. (32)	1	0	−2	0	1	−1	−1	2
The Yellow River is a river seeped in Chinese history and culture and it would be a tragedy if the river flow disappeared. (40)	2	−2	−1	2	2	0	2	1

Appendix 2: Distinguishing statements for each factor (*Z*-scores in parentheses)

	1	2	3A	3B	4A	4B	5A	5B
Factor 1: Environmental protection as policy goal								
Less water in the Yellow River means wells running dry and ordinary people will problems finding drinking water. (34)	−2 (−1.43*)	1 (0.68)	0 (0.00)	1 (0.35)	2 (1.38)	0 (0.00)	0 (−0.33)	2 (1.62)
Ecological Protection of the Upper Yellow River has seen benefits go mainly to the lower reaches so the central government should establish a special fund for ecological compensation for the Upper Yellow River. (5)	−2 (−1.54*)	1 (0.88)	1 (1.09)	1 (0.58)	2 (1.86)	1 (0.73)	0 (0.10)	0 (−0.37)
Factor 2: Competition for water								
My home is located near the Yellow River basin. (42)	1 (0.65)	−2 (−1.35*)	0 (−0.31)	2 (1.59)	0 (0.00)	1 (0.73)	0 (−0.02)	2 (1.91)
Factor 3A: Role of technology								
Particularly in dry seasons, the local governments of the Yellow River Basin should follow the State's coordination and give priority to key economic zones. (21)	−2 (−1.43)	−1 (−0.68)	0 (0.31)	−2 (−1.24)	−1 (−0.67)	−2 (−1.46)	−1 (−0.79)	−2 (−1.62)

	1	2	3A	3B	4A	4B	5A	5B
It is better to sacrifice the economic development of the river banks than to allow the water to run dry. (53)	1 (0.77)	2 (1.35)	−1 (−0.63)	−2 (−1.33)	2 (1.47)	1 (0.73)	2 (1.72)	1 (0.59)
Factor 3B								
When there is a conflict between provinces, the provinces should settle it between themselves. (65)	−2 (−1.43)	−1 (−0.88)	−2 (−1.40)	0 (0.00)	−1 (−0.95)	2 (1.46)	−2 (−1.73)	−2 (−0.96)
It is better to sacrifice the economic development of the river banks than to allow the water to run dry. (53)	1 (0.77)	2 (1.35)	−1 (−0.63)	−2 (−1.33)	2 (1.47)	1 (0.73)	2 (1.72)	1 (0.59)
National considerations should take priority over local ones in the management of the Yellow River Basin. (28)	1 (0.89)	2 (1.35)	2 (1.40)	−2 (−1.48*)	1 (0.76)	2 (1.46)	1 (0.56)	1 (0.37)
Factor 4A: Distribution of gains								
Ecological Protection of the Upper Yellow River has seen benefits go mainly to the lower reaches so the central government should establish a special fund for ecological compensation for the Upper Yellow River. (5)	−2 (−1.54)	1 (0.88)	1 (1.09)	1 (0.58)	2 (1.86)	1 (0.73)	0 (0.10)	0 (−0.37)
Factor 4B								
The integrated approach has reduced the income of the Yellow River gate management officers, who also have to cope with the unhappiness of end-users when they do not get enough water. (18)	−1 (−0.89)	0 (−0.10)	−1 (−0.54)	−2 (−1.75)	0 (0.34)	2 (1.46)	0 (−0.36)	−2 (−1.91)
The Yellow River floods are not something to be afraid of as the government has taken decisive action to avoid floods and drownings. (30)	−2 (−1.54)	−2 (−1.55)	−2 (−1.40)	−1 (−1.08)	−2 (−1.86)	2 (1.46*)	−2 (−1.88	0 (−0.37)

	1	2	3A	3B	4A	4B	5A	5B
When there is a conflict between provinces, the provinces should settle it between themselves. (65)	−2 (−1.43)	−1 (−0.88)	−2 (−1.40)	0 (0.00)	−1 (−0.95)	2 (1.46)	−2 (−1.73)	−2 (−0.96)
The Yellow River management should be governed by an integrated, scientific approach, and local governments should not be allowed to develop projects at will. (27)	0 (0.23)	0 (0.00)	2 (1.40)	2 (1.32)	0 (−0.06)	−2 (−1.46*)	1 (0.90)	2 (1.25)
The local governments have the responsibility to protect the ecological environment along with economic development in the Yellow River Basin. (24)	2 (1.54)	1 (0.58)	2 (1.40)	0 (0.28)	1 (0.67)	−2 (−1.46*)	1 (0.61)	2 (1.55)
Effective governance of the Yellow River allows the lives of residents along the river to flourish. (31)	0 (0.12)	0 (0.00)	0 (0.00)	1 (0.53)	0 (0.00)	−2 (−1.46*)	0 (0.37)	0 (0.15)
Factor 5A: Personal responsibility								
None								
Factor 5B: National pride								
The Yellow River drying up leads to uncertainty and anxiety in the lives of ordinary people. (32)	1 (0.42)	0 (−0.20)	−2 (−1.71)	0 (0.08)	1 (0.54)	−1 (−0.73)	−1 (−0.62)	2 (1.32)
The Yellow River floods are not something to be afraid of as the government has taken decisive action to avoid floods and drownings. (30)	−2 (−1.54)	−2 (−1.55)	−2 (−1.40)	−1 (−1.08)	−2 (−1.86)	2 (1.46)	−2 (−1.88	0 (−0.37)

$p < .05$; * significance at $p < .01$

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