Without households, water management is not integrated

K. Harriden

New Flows Research; Australian National University. E-mail: newflowsresearch@bigpond.com

Abstract

With the institutional and personal relationship building vital to integrated water resource management (IWRM) in practice stopping at the community scale, households and householders are largely neglected from the framework. Domestic water users are viewed as a homogenous group requiring only continuous, single-use potable supply, with equal, unproblematic access to the supplied water. Reflecting the reality of few households, this construct contributes to the development of inappropriate and ineffective institutional water management policies and practices. Using evidence from Water Diaries conducted in the ACT region, including household adoption of water conservation practices and acceptance of water restrictions, this paper demonstrates that householders are active water managers. Outlining the benefits to IWRM of incorporating household water management expertise, this paper argues it is appropriate to formally include this sector in the IWRM framework.

Key words: Australian Capital Territory (ACT), domestic water management, households, IWRM, water conservation practices, Water Diary

Integrated water resource management (IWRM) provides a framework to co-ordinate the sustainable management of natural resources, and relies on active institutional relationships across sectors, scales and time (Radif 1999). However, the relationship building appears to end at the community scale, with households and householders largely absent from IWRM-based policies. This absence is particularly evident in an industrialized context such as Australia, where access to reliable potable supply direct to multiple points in a residence is often seen by water institutions to typify the sum of household water users water management interests (Allon & Sofoulis 2006). Underlying this view of domestic water users is institutional water managers adherence to a positivistic ‘water reality’, with ‘one consistent, all encompassing narrative’ (Zwarteeven 2009:S190); a view that ultimately makes the household water user invisible to the institutional domestic water manager. Regardless of location, the absence of household water management expertise in formal water management processes persists in spite of the Global Water Partnership’s (GWP) benchmark IWRM background paper (2000) noting the importance of not only accommodating, but incorporating, household water management expertise (pp. 16–17), particularly women’s (17–18).

The nature of those elements of traditional institutional water management that contribute to the neglect of household water management expertise in the development and implementation IWRM policies and practices provide the context for this paper. That is, why households are so readily neglected in a formal context and how this neglect is reflected in IWRM-based polices and practices is outlined. Evidence of expressions of householders as active water managers, gathered in part from Water Diaries conducted in the ACT region, is then provided. The concluding discussion demonstrates the appropriateness of this sector’s inclusion in the IWRM framework and expands on the advantages of institutional acknowledgment of domestic water users as water policy officers and managers. This discussion includes an outline of how this acknowledgement could facilitate household-inclusive IWRM practices. Essentially, this paper seeks to demonstrate that institutional domestic water policies and practices developed within an IWRM framework could be strengthened by the
systemic identification and inclusion household water management and policy development expertise. Within this context, it will become clear that what is required to redress this neglect is more than orchestrated public participation exercises (Neef 2008).

**CONTEXT**

The starting premise of this paper is to accept IWRM as a strongly supported and widely adopted water management approach that is unlikely to abandoned in the immediate future. As with others before (for example, Jonch-Clausen & Fugl 2001; Grigg 2008) this paper identifies and explores an emerging weakness in the development and implementation of IWRM policies and practices. The emerging weakness that is the subject of this paper is the on-going unwillingness or inability of institutional water authorities to incorporate the knowledge and expertise of household water users into the IWRM framework. This section outlines why, and some of the ways, this neglect is perpetuated.

As already noted, a key reason for Australian institutional water managers neglecting household expertise is the commitment to ‘a water reality’ composed of ‘separate and interchangeable knowers’ (Zwarteveen 2009:S190), regardless of their context in time and place. When applied to domestic water users, the notion of ‘interchangeability’ encourages the perception that all households require the same simple, uncontested water needs, regardless of the differences in social, cultural or economic circumstances commonly found among households. This traditional understanding of domestic water users as homogeneous has contributed to a water management system where institutional management ‘practices focussed solely on maximizing the quantity of water available for direct use and only considered cost and benefits of the project’ (Radif 1999:151), not the diverse water needs and desires of domestic users or the cost to communities, cultures or ecosystems.

The image of interchangeable, homogenous water users persists in the institutional environs of domestic water management, in spite of evidence that householders are water managers with diverse water demands (GWA 2006; Bolitho 2008) and the intent of the GWP’s ‘commonly applicable principles’ for IWRM to incorporate the outcomes of ‘real participation’ (GWP 2000:15) to the ‘lowest appropriate scale’ (GWP 2000:17). The GWP explicitly recognizes that ‘for some decisions the appropriate decision making unit is the household’ (GWP 2000:17), although there is limited guidance provided as to which areas of decision making, or the nature of the water management decisions, that may be appropriate for households to make. The relevant principles are Principle II Participatory Approach and Principle III The important role of women. Principle III is as relevant to the Australian context as Principle II. Although gender questions in domestic water use may seem settled, below the surface inequitable water allocation patterns persist. The question of domestic water chore performance is one example of persistent gender inequity in water resource allocation and access. Both Principles seek to establish meaningful roles for people who make daily household water use management decisions and acknowledge the importance of non-institutional experience and expertise in water management at all scales. Adherence to the spirit of these principles could strengthen the link between people, policy and practice by increasing the likelihood of policies reflecting the diversity household needs and therefore more likely to garner widespread acceptance and compliance.

Institutional water’s reality of ‘interchangeable users’ obscures the heterogeneity of domestic water users supply needs and practices (Harriden in press). The ‘averaging out’ of household water use diversity required to allow such an ‘all encompassing narrative’, supported by a lack of household scale data, inhibits the development of effective and relevant domestic water management policies. Domestic water users can continue to be seen as passive recipients’ of institutional water decisions and demands. This tendency to a ‘command and control’ approach in the domestic sector is demonstrated in a number of ways, including through water institution policies and practices and the language used in institutional and academic documents. Regardless of the intent of universal
IWRM documents, such as the GWP IWRM Technical Paper (2000) and UN Declarations, local implementation often fails to encourage, let alone incorporate, householder expertise. Evidence of the institutional failure to incorporate IWRM’s paradigm changing principles in domestic water management is provided in the following examples.

Institutional water managers’ habitual neglect of households and their water management expertise, and the associated expectation of householders unquestioned compliance with water authorities edicts is demonstrated in both the nature of household policies and the language used in institutional documents. In terms of policy implementation, it is apparent that institutional water authorities expect not to have any contribution or dissent from domestic users. From the 1960s-1980s traditional household practice, such as securing supply (notably with rain water tanks) and outdoor dunnies were abolished as water authorities sought to create an urban environment reliant on readily accessible, one-use potable supply. As environmental and population pressures have risen, water authorities have moved to a demand management focus, placing the emergence of ‘water security’ issues at the door of households, nominally due to their profligate use of high quality water (Sofoulis 2005). Just as households had no influence over the pre-eminence of supply management, they have also been expected to change water practices, those encouraged by earlier water utilities, to suit the new water demand management focus. It is as if institutional water believes domestic water users are marionettes – stringed puppets waiting to be manipulated by a higher authority.

That households are little more than institutional water managers’ marionettes is evident in the way households are discussed in institutional documents. Largely absent from official publications, households are mostly likely to be directly noted when institutional water wants something from them, for example, water use behaviour change or to encourage retrofitting residences with water saving technologies (for example, Environment ACT 2004). Households are also included in, the usually brief, discussions of participatory processes. Such sections can be written to limit household roles or discourage involvement. As already noted about the GWP framework document, the European Union Water Framework Directive too calls for the ‘active involvement of the public’, and also fails to define this term (Neef 2008:92), although it did define other technical terms. A very clear example of writing households out of water policy and management is found in a Sydney Water Corporation’s definition of integrated resource planning: ‘a process whereby the water utility determines the options that…provide customers with the water-related services that they demand’ (Howe & White 1999). This definition has the effect of writing out a role for households, and the water management expertise contained within them, in formal water management policies while reinforcing the water agency’s ‘water reality’ of their role as the domestic sector’s knowledge leader.

Yet there are many reasons to include a greater diversity of water user expertise and experiences. Additional to the GWP’s recognition of the importance of including women and adopting a participatory approach, Neef neatly encapsulates six attractive consequences of including different voices in IWRM, of which two are particularly relevant in relation to household water users:

- ‘making use of local knowledge in water resource management’; and
- ‘empowering marginalized groups who have been left out of environmental decision-making’ (2008:89).

I would add a further two beneficial consequences to including householder water policy and management expertise.

- to influence the nature and direction of institutional water policies to more adequately reflect the values and needs of household water users; and
- to increased personal accountability for water behaviours (due to increased awareness/knowledge of institutional water management policy and management priorities and concerns).
These ideas are further explored in the discussion section of this paper. The next section provides tangibles expressions of household water management expertise before continuing with the discussion of the relevance of household water management expertise to IWRM.

**HOUSEHOLD WATER MANAGEMENT EXPERTISE**

The existence of household water management expertise is not a new or profound discovery. Research in development contexts regularly identifies expressions of household water management expertise (for example: GWA 2003; Lemcke 2008). Research into domestic water use in Australia to identify household water management expertise is not as well developed, but does occur (for example, Allon & Sofoulis 2006; Bolitho 2008; Lahiri-Dutt & Harriden 2008). Most of the data supporting the following examples of household water management expertise are from Water Diaries run in the ACT region during summer 2007/08 and October 2008 and 2009. Water Diaries require participants to record all their household water use by volume, activity, who and when for a seven day period. As well as the quantitative information provided by recording water use, the accompanying questionnaire provides qualitative data (Lahiri-Dutt & Harriden 2008). The ACT region Diaries highlight three key water use behaviours demonstrating household water management expertise: the range of water conservation practices employed; potable supply reuse; and the decision to adopt an allocation approach to domestic water management rather than the water supplier sanctioned prohibition/restriction approach.

**Water conservation practices**

Early in the demand management processes undertaken by Australian water suppliers and management agencies, a number of domestic water conservation practices were promoted. Those commonly promoted practices included shorter showers, turning taps off when brushing teeth, installing low flow shower heads and collecting the first flush from hot water taps. While these practices are easy for most householders to adopt and focussed primarily on the ‘low hanging fruit’ of obvious water waste, as rainfall remained below average, an increasing number of conservation practices were promoted. Some of these later practices required more effort on the householder’s part than others, however the result was household water users were provided a smorgasbord of conservation practice choices. Households do not have to use all of them; however by having enough households adopt enough practices, it is anticipated there will be meaningful savings beyond the household and behaviour change within.

As well as adopting some of these ‘formal’ water conservation practices, many households have sought their own ways to reduce demand on potable supply. The range of ‘informal’ conservation practices recorded in the Water Diaries provide clear evidence of not just a willingness to develop water management practices but of householders already actively managing their water use and behaviours (Harriden in press). Domestic water conservation practice expertise is not a ‘flash in the pan’; rather it has the rigour and richness necessary to meaningly contribute to the strengthening of IWRM practices, as the following examples demonstrate. Not flushing the toilet with every use is a very common water conservation practice. The ACT region Water Diaries recorded 74% of 2008 and 70% of 2009 participating households adopting this practice. This represents a significant reduction in water use, with no technological or infrastructure intervention. Commonly an informal practice, this conservation practice is now increasingly advocated by water utilities. Practices such as disconnecting the toilet from the main supply and flushing with reused potable supply, a brick in the cistern or partially flushing of a full flush toilet are designed to reduce toilet water demands. Other examples of water conservation practices demonstrating active water management include keeping to a daily
limit of water use by ensuring multiple heavy water using activities do not occur on the same day, such as no baths or long/multiple showers on laundry day. Some households chose not to shower every day, wash clothes when they are dirty (not after one wear, for example) or wash the dishes in a tub in the sink so the water can be reused.

**Potable supply reuse**

As with water reuse at a municipal or treatment plant scale, household water reuse seeks to get the most number of uses from a quantity of water, with the most appropriate ‘fit for purpose’ characteristics for the least cost and effort. The domestic reuse of potable supply can be a complex undertaking, incorporating a range of water conservation practices, technology and infrastructure. Mostly, however, it comes back to carting water of various quality and volumes in (primarily plastic) buckets, bins or basins, (collectively referred to as buckets from hereon) from one location to another, occasionally a third and even less frequently, a fourth location. Figure 1 illustrates the complexity of the reuse paths articulated by Water Diary users in the ACT region. The widespread nature of potable supply reuse in the ACT regions is shown by approximately 91% of Water Diary 08 and 09 participants combined recording they performed at least one water reuse practice.

The initial decision to reuse (or not) potable supply is a significant water management decision for many households, with concerns about infrastructure needs and insufficient water or technical knowledge (Sofoulis 2005) important influences. From the decision to reuse potable supply, a multitude of other decisions flow. Quantity of water for reuse is an obvious limiting factor in decision making. For

![Figure 1 | Reported potable supply reuse paths (Harriden in press).](https://iwaponline.com/wpt/article-pdf/7/1/wpt2012020/505389/20.pdf)
example, left over school bottled water or hot water bottle water is more likely to be put on a pot plant than into the toilet cistern or onto the veggie patch. Quality issues present more pressing concerns for households, with the paths chosen for reused water highly dependent on water’s (perceived) quality. Consider the reuse of laundry of laundry water recorded in the Water Diaries for example. While some households refuse to reuse any laundry water in the garden, on quality grounds, others reused all their laundry water, although many do not use it to irrigate edible plants. Other households reused only the second rinse cycle water, on their lawn and others again only use it only as an emergency ad hoc measure during the height of summer.

**Allocation not prohibition water management approach**

The prohibition approach of water restrictions represents an externally imposed management requirement on households. As unilaterally imposed blanket regulations, or prohibitions, on arbitrarily selected practices and behaviours, water restrictions are a quintessential outcome of domestic water management policies being made in ‘a water reality’, with all households assumed to have similar water behaviours, values, allocation priorities and management practices.

Diary evidence shows that in the ACT region water restrictions are well-known and well-accepted. Many households have willingly attempted to accommodate the restrictions and reduce water use by modifying their household practices (as is the point of water restrictions); some to the extent residents get repetitive strain injuries from bucketing potable supply from inside the house for reuse outside. Compliance, however, is patchy. Two households expressed an intention to follow water restrictions; three an intention to not; and eight did not express an intention either way. Thirteen of the 16 applicable households in the 2008 Water Diary breached restrictions in some way. The breaches were mostly minor – watering on the ‘wrong’ day or at the ‘wrong’ time – and, in the main, had little consequent result on the household’s overall water consumption.

Those households overtly adopting an allocation approach appeared to take a more flexible view of water conservation. Rather than focussing on specific activities, these households considered the overall consumption of an individual resident or the household. For example, Household Four does ‘try to stay to restrictions – but will go outside of these occasionally as our water use is low; times inconvenient, especially winter’; Household Seven would ‘prefer to use water outdoors as required, not dictated … level 3 restrictions give me a nominal [sic] allowance of 200 L/day – that I never use entirely so what can it matter if I use it having long baths or watering my carrots every day?’. Household Fourteen wanted flexibility in the water restrictions as ‘overall use is more important than sticking to the rules’. This respondent’s specific example of the need for flexibility was the difficulty in meeting the watering time restrictions with responsibilities for small children and full-time work, especially in Canberra’s winter.

These households ability to operate an allocation approach to their water management, and remain with the water utility’s consumption guidelines provides compelling evidence of the effectiveness of household water management expertise. The adoption of an allocation approach, rather than the sanctioned restrictions regime is also evidence of some householders’ confidence that their domestic water management expertise outweighs that of the institutional water authorities.

This section has demonstrated the rich and robust nature of household water management expertise; a diversity of domestic water practices beyond that imagined in an institutional ‘water reality’. The range, and complexity, of water management practices adopted by households is a stark contrast to the role domestic water users are given in institutional water management. The following discussion outlines how a weakness in IWRM implementation, namely the neglect of household water management expertise, can be rectified, improving the likelihood of achieving the water management aims.
INTEGRATING HOUSEHOLD AND INSTITUTIONAL WATER MANAGEMENT EXPERTISE

The vital initial step in strengthening the application of IWRM’s applications is for institutional water managers to renounce their hegemony over knowledge about domestic water service provision and infrastructure and to see beyond their positivistic understanding of water. Acknowledging household water management expertise offers institutional water managers opportunities to develop more effective IWRM policies, including the ability to target different types of domestic water users. In Australia there is some evidence of the beginnings of a virtuous cycle in this respect, with the results of household water use research filtering into institutional water management agencies ‘corporate knowledge’, with the boundary between ‘formal’ and ‘informal’ water conservation practices becoming increasingly blurred. That is, institutional water management agencies are now likely to promote a greater range of water conservation practices in community education material, partly as they recognize many households have already adopted them. The widespread promotion provided by institutional support, in turn, encourages more households to adopt a greater range of conservation practices. This is one example of how acknowledging household water management expertise has already strengthened water management policies. As institutional water management agencies recognize that there is not ‘a water reality’ in the domestic sphere, the confidence to pursue greater variety in water sources and supply, including installing ‘purple pipes’ for non-potable supply, recycling for potable supply or strategic interruptions in supply, may increase.

The next step from acknowledging household water management expertise, in light of the GWP’s IWRM Principles II and III, is to incorporate it into formal, institutional water management policies and practices. Incorporating household expertise allows the perspectives and knowledge from the finer scales of society to ripple across social scales. For example, the complexity inherent in household water reuse decisions is not dissimilar to those encountered in municipal water recycling. It is primarily the scale of the decisions are made and the relevant processes operate that distinguishes the two practices. Given many households are already comfortable with the process complexity at a household scale, there is little reason to doubt their ability to manage the complexity, properly supported, at larger scales in more formal environments.

Incorporating household expertise in IWRM reflects two of Neef’s (2008) identified advantages of genuine participation in policy development. The first is the ability of institutional water authorities to take advantage of local water management expertise, as demonstrated by the blurring between formal and informal water practices. The second advantage of incorporating household expertise is that to do so includes those previously marginalized from water resource management decision-making. As already outlined, through policies and publications, water management priorities from a household perspective have rarely been considered by institutional water managers.

If institutional water managers were to explore water management from a household perspective, a more nuanced understanding of the nature of domestic management expertise would develop. The presence of adequate structures to capture and incorporate this expertise would provide opportunities for this expertise to influence the nature and direction of institutional water policies, rather than simply react to them. For example, rather than persisting with uniform, unilateral water restriction regimes, recognizing water use diversity at the household scale could prompt water utilities and government water agencies to adopt an allocation approach. Particularly for those water suppliers supported by smart meters, enforcing such an approach would be no more onerous than the compliance enforcement practices currently in place with water restriction regimes. An allocation approach would certainly allow for more effective and sustainable IWRM practices at the household scale than offered by water restrictions.

In Australia, at least, a more nuanced understanding of the nature of domestic water use would alert institutional water managers to the gendered nature of water access and management at the household scale. Australian suppliers might be able to assume women’s greater water use, due to their
performing a higher proportion of water chores than men. However, they would be unlikely to assume the strong role women, particularly in rural areas, have in supply provision (Lahiri-Dutt & Harriden 2008), including technical expertise (such as maintaining rain water tanks and associated pumps and plumbing) and water management (including water allocation and reuse decisions). For IWRM policies to either meaningfully incorporate or effectively influence households, women’s water management expertise cannot be assumed to be limited to operating the washing machine and bathing the children.

While a preferred outcome of bringing IWRM relationships and approaches to the household scale is to close policy gap between household and institutional water managers, it will also have the inevitable consequence of reducing institutional water’s management power. This may not be a preferred outcome for the authorities affected (Sofoulis 2005) but has potential to improve local implementation of IWRM practices. With the profusion of home-built or ‘off the shelf’ household scale water technologies, institutional water management authority over domestic water services is already being eroded. This erosion of authority ultimately aids the prevention of IWRM being a new name for ‘the same old stuff’ (Biswas 2008:13). If institutional water management structures change to accommodate household water management expertise and their philosophical approach becomes less rigid, the IWRM framework could extend from individuals in households to transboundary catchments and the paradigm shift would be felt in the entire water sector. One advantage for institutional water managers of extending the influence of IWRM relationships, and the associated reduced policy distance between households and institutions, is that better informed and engaged individuals are likely to be more willing to independently engage in ‘appropriate’ behaviours, on a sustained basis.

Closer engagement with household water managers might positively influence institutional policy development practices for, reflecting policy making and management at its best, households review the results of their decisions and modify as evidence indicates. For example, while water conservation is both a widespread ethic and practice in the ACT region, many householders incorporate other factors, such as recent weather, the current season, or their stage of life, into the decisions about which water conservation practices to perform, when. Such considered decision making reflects positively on household water management expertise. A more intimate example is the musty smells coming from the drain pipe of the sink that a household rarely uses, as they do their washing in a bucket in the sink. The smell has prompted this household to occasionally do the dishes in the sink, resulting in no more musty smells (Household 17 Water Diary 2008). In these cases the householders did not persist with preferred water conservation practices in the face of evidence of their inappropriateness. By observing the results of their actions they were able to readily implement appropriate and acceptable modifications. Thus these examples indicate householders’ ability to perform key aspects of the policy development cycle: to monitor and review as well as develop and implement.

CONCLUSION

As intimated in the introduction, to collect and incorporate household water management expertise for use in an IWRM framework requires practices and approaches beyond those of standard community consultation. Truly novel participatory approaches are necessary. While any approaches adopted would need to be relevant and appropriate to local water values and culture, at the least they would need to allow individuals to be both represented and representatives. That is, some mechanisms for the collective representation of household water management expertise would be required. As would some mechanisms for householders to be represented as individuals. Ideally the expertise extracted through these mechanisms would contribute meaningfully to water management policies and priorities.
Whatever mechanisms might be designed to incorporate household water management expertise formally into IWRM, this paper has clearly identified why the inclusion of this expertise is important. As a key component of IWRM (GWP 2000), the inclusion of non-institutional voices at all scales of water management is designed to contributed to the creation of new water allocation strategies that IWRM is said to promote. More importantly, households fit easily into IWRM framework and operations as they manage their water use in a sustainable, integrated manner on a daily basis.

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