Water Security: An Emerging Paradigm

Workshop Proceedings Report
UBC Liu Institute for Global Issues
September 29, 2009

November 2009

Acknowledgements

This report provides a summary of the discussion during an all day workshop on water security held on Tuesday September 29th 2009 in Vancouver, BC. The workshop is part of the first phase of a four-year (2008–2012) research project funded by the Canadian Water Network. The project, *Developing a Canadian Water Security Framework as a Tool for Improved Governance for Watersheds*, will create a Water Security Framework (WSF) that includes decision-support tools for water managers. The overriding objective of this research project is to create tools to support the improvement of water security in Canada, specifically through improving governance for source protection and land use. This multidisciplinary research project consists of researchers from 5 Canadian Universities, 14 project partners including Environment Canada, Health Canada and Natural Resources Canada, and our 2 case study communities the Grand River Conservation Authority and Township of Langley.

This research has been made possible through financial contributions from the Canadian Water Network (CWN) and the Walter and Duncan Gordon Foundation. We would also like to extend a special thank the BC Ministry of Environment for funding the workshop, as well as the Social Sciences and Humanities Research Council of Canada (SSHRC) for financially supporting the dissemination of the project research reports.

CANADIAN WATER NETWORK
RÉSEAU CANADIEN DE L'EAU

Walter & Duncan
GORDON FOUNDATION

Social Sciences and Humanities
Research Council of Canada

Table of Contents

Water Security: An Emerging Paradigm

Introduction

On September 29, 2009, sixty participants from across Canada attended the workshop, "**Water Security: an emerging paradigm**". The participants represented a variety of different sectors including: consultants, provincial and federal public agencies, academics, municipalities and water utilities and non-governmental organizations (research institutes, environmental groups and industry associations). The workshop was held at the Liu Institute for Global Issues in Vancouver, BC, and was coordinated by the Program on Water Governance at UBC. The workshop is part of the first phase of a four-year (2008–2012) research project funded by the Canadian Water Network. The project, *Developing a Canadian Water Security Framework as a Tool for Improved Governance for Watersheds*, will create a Water Security Framework (WSF) that includes decision-support tools for water managers. See Appendix C for a list of the members of the Water Security Team.

The objectives of the workshop were to:

1. Solicit input on views and definitions of water security as a concept, particularly as introduced in the *Water Security Primer* draft document;
2. Share information about examples of water security from across Canada;
3. Share information about assessing water security, focusing on indicators and on the findings contained in the *Canadian Approaches to Assessing Water Security: An Inventory of Indicators* draft document; and
4. Solicit feedback on proposed research strategies, focusing on the Water Security Framework.

Plenary and small group discussions were supported by two background documents: the *Water Security Primer* and *Canadian Approaches to Water Security: An Inventory of Indicators*. Participants expressed an interest in further clarification on the concept of water security in Canada and internationally and on how to facilitate the implementation and attainment of water security in Canada.

The main themes that emerged during the workshop include: **Actions over Aspirations**, **Indicators and the End-User**, **An Information Deficit as a Major Barrier to Change**, **Policy Changes Required to Reinforce Strong Water Management**, and **A Vision and Values**. This report summarizes the discussion surrounding these five themes and suggestions made by participants to improve the two supporting workshop documents.

Defining Water Security in Canada and Beyond

The definition of water security presented at the workshop and in the supporting draft documents is:

> *"sustainable access to adequate quantities of water, of acceptable quality, for human and environmental uses, on a watershed basis."*

Emphasis was placed upon the broad goals of water security: protecting environmental and human health, which are viewed as synergistic and complementary. Thus, the concept of Water Security is a complement to existing frameworks such as IWRM: if water security is our goal, then IWRM provides a potential means to achieve that goal. During the workshop, this working definition of water security was explored, and a number of helpful suggestions were made:

1. ***Dimensions:*** Though the definition invokes several different dimensions of water security, workshop participants pointed out that the relationships between these dimensions should be made clearer. Furthermore, participants suggested that the dimensions were not exhaustive.

2. ***Scope:*** Participants felt that the current definition, while already very broad, could be further expanded. Specifically, some participants expressed the desire to see a broader scope in the definition, which would include other dimensions such as temporal, regional, international and holistic. It was also suggested that other forms of water, particularly atmospheric water and groundwater be taken into account. Furthermore storm water systems, sewage, and other infrastructure issues should also be considered.

3. ***Application:*** The need for a more detailed, and process oriented concept of water security was recognized. The working definition does not give any guidance on how to adjudicate competing demands, which is a major concern for both decision makers and end-users.

4. ***Security vs. Sustainability:*** The use of the term 'security' rather than 'sustainability' was also discussed. Though there were problems with both terms, there seemed to be a consensus that the implications of security might be more closely related to the goals of the program than those of sustainability. While the term 'security' might invoke notions of national security and safety, the term 'sustainability' was largely deemed to be ineffective due to the lack of clarity and overuse. Furthermore, it was felt that 'security' had positive connotations of safety in a variety of capacities as well as being action-oriented. Notably, using 'security' in the concept of water security does not guarantee no risk, but rather an acceptable level of risk understood in terms of thresholds.

5. ***Uses vs. Needs:*** The word 'uses' was also questioned, with some participants feeling that the term 'needs' would be a better fit. Some participants perceived the working definition as potentially sanctioning the status quo, whereas the term 'needs' forces people to reexamine the status quo.

6. ***Decision-making*****:** It was suggested that decision-making could be included in the definition. This is in accordance with the definition of governance used within the project: governance may be defined as the decision-making process whereby users provide input, decision-makers take decisions and are held accountable.

Water Security Workshop Tuesday 29th September
(Break-out group)
Photo by Albert Teng

THEME 1: ACTIONS OVER ASPIRATIONS

One of the major concerns raised during the discussion of the definition of water security was that it is "*aspirational* rather than *actionable*," particularly in light of growing concerns such as climate change. The need to act in the face of uncertainty is paramount. Moreover, governance changes will be necessary to create action.

1.1 Feasibility

Feasibility of the goals of water security was identified as a major concern. Actions that are intensive in terms of time, human and financial resources are unrealistic. Existing shortfalls in both human resources and funding pose major constraints in achieving water security and these shortfalls need to be considered. Best practices provide helpful guidance, but implementation requires full support.

1.2 Moving Forward in the Face of Uncertainty

Despite a considerable amount of uncertainty both in terms of the availability and application of water management information (present and future), participants expressed a strong need to move forward. Key issues identified included the need to make tradeoffs between conflicts and competing demands and the need for defined thresholds of acceptability. Here it was suggested that the federal government could provide support by strengthening its role in water issues, including a "jump back into jurisdictional issues".

1.3 Need to Align Scales

Participants expressed a need to align scales, both where decisions are made and also where the information is being gathered for decision-making. This raised the question of whether water managers and decision-makers should work within the current scale of governance, or attempt to work on a different scale altogether. Recognizing there would be no perfect system, it was agreed that linking scales might improve the coherency of decision-making for whatever objective might arise. Several of the participants also suggested that governing at the watershed scale allows for a more proactive and adaptive approach, rather than "wait for crisis" mode.

Participants also expressed concerns that different scales should be associated with different indicators of water security. One suggestion was that each community should measure its own water security on a watershed basis, and that monitoring would happen on a smaller scale while reporting happened on a larger scale.

THEME 2: INDICATORS AND THE END-USER

Although participants agreed that emphasis on end-users was positive. Additionally, they suggested that greater emphasis on indicators would improve the outputs usefulness. The benefit of indicators is as a starting point for integrating and prioritizing information. In order to be effective indicators need to be formulated in such a way that they are workable and useful to the end-user.

2.1 What Do End Users Need to Manage Water More Effectively?

Ultimately, end users voiced the desire for a comprehensive list of indicators, which would include:

- Specific, threshold-based alert system,
- Checklist of criteria that would indicate a shift towards water security, and
- Mapping and risk tools

These suggestions are all intimately linked to Theme 3, as they require much more information than is currently available to be able to produce indicators that are helpful.

2.2 Different Needs Have to be Acknowledged

Not all end-users will have the same needs when it comes to indicators. Indicators will not fit all cases, and one decision-tree model will not work the same way for all groups of users. Thus, it is important to consider who the critical end-users really are, and to create data that can accommodate different groups of users.

There will be variation not only between different groups of users, but also across regions in Canada. These regional differences will result in diverging priorities. For example rural areas might experience issues relating to access to water, whereas in other areas, water quality issues might be more pressing. These varying concerns all need to be taken into account.

2.3 The Right Indicators

No set of indicators will be perfect. Two important considerations raised by workshop participants were that:

- Indicators with associated thresholds are more meaningful, and

- Multiple indicators are needed, indeed preferred over one composite index, which some participants feared would not be actionable

An inherent trade-off exists between indicators and indices. Indices offer an easily understood snapshot of a situation, at the expense of significant information. There needs to be an adjudication of the balance between the simplicity (and potential inaccuracy) provided by indices, and the complexity (and accuracy) provided by indicators.

THEME 3: AN INFORMATION DEFICIT AS A MAJOR BARRIER TO CHANGE

Participants identified information deficits on many levels as major barriers to change. End-users need better aquifer data; assembled data sets; and improved education of end-users on the whole. Data collection should be funded, standardized, and shared. A sound knowledge base was widely recognized as a fundamental component of water security. A particular complaint was the frequency with which decisions are made about things like land use planning without an adequate understanding of groundwater and aquatic systems.

3.1 Not Just Information, but Cohesive Information

Data gathering and governance needs to be more closely aligned to produce more cohesive information. Information needs to be contextualized and cohesive so that it is useful on multiple scales.

- Required data is not being collected
- Unintegrated data is problematic
- Land use and water management schemes are decoupled
- Human impact on ecosystems is unacknowledged
- Surface water and groundwater are governed by completely different entities, with insufficient coordination
- Decision making and data collecting are not necessarily linked
- Policy makers lack both data and an appreciation of the importance of data in decision-making

3.2 Tools Geared Towards Decision Makers

Decision makers do not have all the tools they need to perform their jobs effectively. Jurisdictional fragmentation exacerbates the problem. Specific tools geared towards decision makers would provide clearer, more effective information, and facilitate stronger, more informed decision-making. Models were suggested as a tool to be used in conjunction with indicators - at the

appropriate scale. Another suggested tool was integrated demand management strategies.

3.3 Research and Training for End-Users

In addition to tools geared towards decision makers, integrated skill sets and resources for coordination and collaboration are also important for end-users. End-users often find themselves faced with immense gaps, not only in the data, but also in ways to process and use the data in a constructive way. Development of integrated skill sets to better facilitate communication and cooperation would help overcome many of the barriers that end-users find themselves faced with. These skills sets and resources include:

- "Jargon bilingualism" which would allow for ease of communication across different sectors
- Incentivize interdisciplinary research
- Integrate traditionally divergent groups such as scientists and engineers in interdisciplinary training
- Improve training of water managers

THEME 4: POLICY CHANGES REQUIRED TO REINFORCE STRONG WATER MANAGEMENT

Though information can arm end-users with a greater capacity for strong water management, end-users emphasized that they could not do the job in absence of policy changes. Ultimately, participants felt that water security could not exist without enforceable regulation that would work to enable or constrain action.

4.1 Threats to the Physical System

One of the breakout groups highlighted a variety of points relating to water security in relation to physical systems. These multidimensional problems need complex solutions that require further consultation, monitoring, and enforcement at upper levels of government. Problems such as sea level rise and flooding will continue to pose a threat in the future. The introduction of strong policy measures that would allow for the proactive development of adaptation plans could reduce the negative impacts of these types of events.

4.2 Threats to Human Health

Threats to human health emphasize that human and social dimensions are critical to the concept of water security. Participants argued that health should be involved in more than just health outcomes. There is a need to understand

things like source-to-tap, and how the water system design works to affect health.

Surveillance of the community and early warning signs should be considered tools for measuring water quality. Pollutants such as heavy metals, pharmaceuticals, and emerging contaminants should be given more serious consideration.

Water quantity is just as significant to human health as quality. Water scarcity is becoming a real issue for some Canadians, while for others, flooding and sea level rise present real threats. Limits to water quantity can be imposed by geography, infrastructure, or over-use. The utilization of potable water for uses other than drinking should be drastically reduced. Emergency planning measures that take all of these factors into account should be considered.

4.3 The Right to Say "No"

The point was made that policy usually focuses on minimizing the effects of development as opposed to outright refusal. Some participants argued that in order for water security to be helpful and valuable, it should include the ability to say "no," with policy backing, to things like development when water security is compromised, rather than saying *"let's minimize the damages but go ahead with it"*. If 'backlash' associated with limiting development is reduced, water security has a greater chance of being implemented and sustained.

THEME 5: A VISION AND VALUES

Some participants emphasized that clearer values and vision of water and water security needs to be expressed. The inherent inability to communicate values has potentially led to a devaluation of water, and has detracted from the ability to implement full cost accounting. In part this might be addressed by reinforcing the importance of water in the eyes of the public. This can be achieved through:

5.1 Strong Leadership

Strong leadership is especially crucial at all levels of water management. A re-engagement of the federal government is necessary not only because of their instrumental role in knowledge generation but also because of their transboundary role both between provinces and territories in Canada and other nations. Strong leadership should also integrate knowledge of Indigenous and First Nations groups, and make use of their unique perspectives. A clear message that water is a government priority and valued highly is needed.

5.2 Reengaging the Public

Several participants expressed that a lack of education and public awareness about water security is a concern. A reengagement of a number of players in the water world would also necessitate a reengagement of the public.

Engaging with the community both civil society and business and industry to create partnerships was identified as a positive step. High profile education activities (such as Public Service Announcements) were suggested as a way to create incentives for the public to become more engaged in water stewardship. Green technologies in water management and progressive city bylaws and codes are changing the way we use water and should be shared with the public.

Participants supported linking academic research with community experience (and informing academics of on-the-ground efforts) as a benefit from all sectors. Workshops and public lectures are useful in keeping the lines of communications open.

5.3 Legacy Thinking

A lack of legacy thinking was identified as one of the key threats facing water security in Canada. Governance can and will only go so far without a shift in how our society views water. Working towards water security demands long-term thinking that sees water as not just a resource for exploitation, but as part of the common heritage of humanity.

Observations made during the workshop included that historically speaking, there were generations that built with the future in mind. However, the sort of values that are emphasized in today's "me" generation ignore the kind of long-term thinking that would see water as more than just a resource to be exploited, but as something that is valuable and should be preserved in the long-term. Not only do societal values have to reflect long-term thinking, but long-term sustainable thinking.

Summary

The workshop explored aspects of water security and many of the challenges in working towards water security. Participants appreciated the project's focus on end-users and tools like the Water Security Index and offered suggestions to strengthen the definition of water security and strengthen and market the project better.

In terms of meeting the workshop objectives, participants generally felt satisfied that the objectives had been met.

1. *Solicit input on views and definitions of water security as a concept, particularly as introduced in the Water Security Primer draft document*

   Input on views and definitions of water security as a concept is covered in the first section of this document, titled **Defining Water Security in Canada and Beyond**.

2. *Share information about examples of water security from across Canada*

   Information about examples of water security from across Canada was covered in some of the presentation at the workshop, but none of these examples in particular formed the basis of the many discussions that went on at the workshop.

3. *Share information about assessing water security, focusing on indicators and on the findings contained in the Canadian Approaches to Assessing Water Security: An Inventory of Indicators draft document*

   A considerable amount of discussion focused on indicators, which is summarized in **Theme 2: Indicators and the End-User**.

4. *Solicit feedback on proposed research strategies, focusing on the Water Security Framework.*

   Much feedback was generated on proposed research strategies, and some of these are presented in **Theme 3: An Information Deficit as a Major Barrier to Change** and **Theme 4: Policy Changes Required to Reinforce Strong Water Management**.

Appendix A: Water Security Primer

The draft *Water Security Primer* was one of the key background documents used to inform discussion during the workshop. The role of the *Water Security Primer* is to explain the concept of water security as well as to illustrate how the concept could be applied in Canada.

Participants indicated a desire to see more information or signaling about international or transboundary water governance in the Primer. This would include international views and approaches to water security, so as to provide a basis for comparison. In understanding how Canada's approach compares with that of other countries (either lagging or leading), it would also help to highlight what Canada's unique challenges are given such characteristics as large size and low population density and see how these variables come into play.

Furthermore, the Primer could be strengthened by recognizing that each of the dimensions that are highlighted can have a very specific take based on First Nations or Indigenous peoples' relationship to water, and their specific protective rights and special relationships with the federal government are very unique issues that come up under each dimension.

Participants also indicated a strong interest to in a checklist (to be included in the Primer or in subsequent documents produced by the research team), and to see the case studies compared against checklists as indicators of progress.

It was pointed out that the concept of a watershed, though brought up in the definition of water security, was not dealt with as effectively as it could have been in the Primer – this raises the question of whether water security is really something that makes sense to apply at the watershed scale. Participants raised many concerns around the scale on which water security should be developed. One idea was that of the "water management unit" which would encompass all relevant aspects of water and would therefore be more manageable.

Appendix B: Canadian Approaches to Water Security: An Inventory of Indicators

Many participants expressed their view that the Inventory was an extremely useful document. Many participants also expressed a desire to see a checklist (as discussed in Theme 2) made available, as a complement to the inventory of indicators.

The implementation of indicators was also seen as an issue. Indicators can be made available, but the question was raised as to how to ensure that these indicators have an impact. Validity was raised as a concern in relation to the indicators, more specifically, are these indicators actually measuring what they are supposed to measure? Does the data dictate what the indicators are, or do the indicators dictate what data we should be collecting?

There was also an interest in other integrative categories that may cut across the five dimensions of water security examined in the inventory.

Water Security Workshop Tuesday 29th September
(Break-out group)
Photos by Albert Teng

Appendix C: Water Security Research Team Members & Project Partners

In 2008, the Canadian Water Network (CWN) awarded the UBC Program on Water Governance (PoWG) a four-year grant to lead a multi-disciplinary team of researchers from five Canadian universities on a project to improve water security in Canada. The cross-Canada research team comprises of the following members:

Research Team Members:	
Dr. Karen Bakker	University of British Columbia (Principal Investigator)
Core Researches	
Dr. Diana Allen	Simon Fraser University
Dr. Ed McBean	University of Guelph
Dr. Kay Teschke	University of British Columbia
Dr. Monique Dube	Saskatchewan Research Council
Advisory Collaborators	
Dr. Murray Journeay	Natural Resources Canada
Dr. Judy Isaac-Renton	University of British Columbia
Dr. Rob de Loe	University of Waterloo
Dr. Graham Daborn	Acadia Univeristy
Dr. Michael M'Gonigle	University of Victoria
Dr. Michel Robin	Associate Professor
Oliver Brandes	POLIS PROJECT – University of Victoria

The **Project Partners** including the two case study communities:

- Environment Canada
- Natural Resources Canada
- Health Canada
- BC Ministry of Environment
- BC Ministry of Agriculture
- City of Guelph

- City of Brantford
- Clearbrook Waterworks District
- Golder Associates
- Walter & Duncan Gordon Foundation
- Okanagon Basin Water Board
- Institute of Resources Environment and Sustainability (UBC)
- Two Case-study Communities: Township of Langley & Grand River Conservation Authority