

ThinkWater II: Growing Knowledge to Solve Water Problems

ThinkWater is a national initiative supported by the U.S. Department of Agriculture to help people of all backgrounds and ages think and care deeply about water. It does so by applying systems thinking to existing water education and research efforts and by actively engaging people in a new way around water issues. Our Mission-Vision is to Engage, Educate and Empower 7 Billion Systems Thinkers to solve wicked water problems.

WATER: the greatest challenge of our time?



Few issues are as important to the well-being of our nation and planet as water. We increasingly face short- and longer-term crises due to a host of complex factors involving climate, ecology, and human use patterns.



FINDING SOLUTIONS: time for new thinking?

If we are to find truly innovative solutions to the water-related problems that continue to plague humankind, we will need to see and address these problems from new perspectives.

ThinkWater utilizes groundbreaking research that isolates the four underlying rules of systems thinking: recognizing Distinctions, Systems, Relationships, and Perspectives (DSRP). DSRP-based systems thinking provides a new and unique way to approach water-related issues. This approach emphasizes that to build knowledge and skills requires more than purveying information. This is summed up as the equation Knowledge = Information x Thinking.

$$K = I \times T$$

A rigorous systems thinking inquiry encourages innovation by critically questioning prevailing conceptions and challenging preconceived ideas.

DSRP

DISTINCTIONS
(Identity-Other)



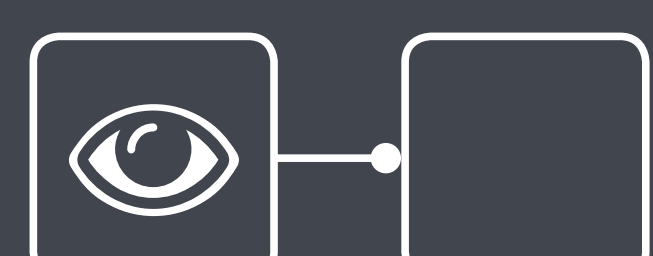
SYSTEMS
(Part-Whole)



RELATIONSHIPS
(Action-Reaction)

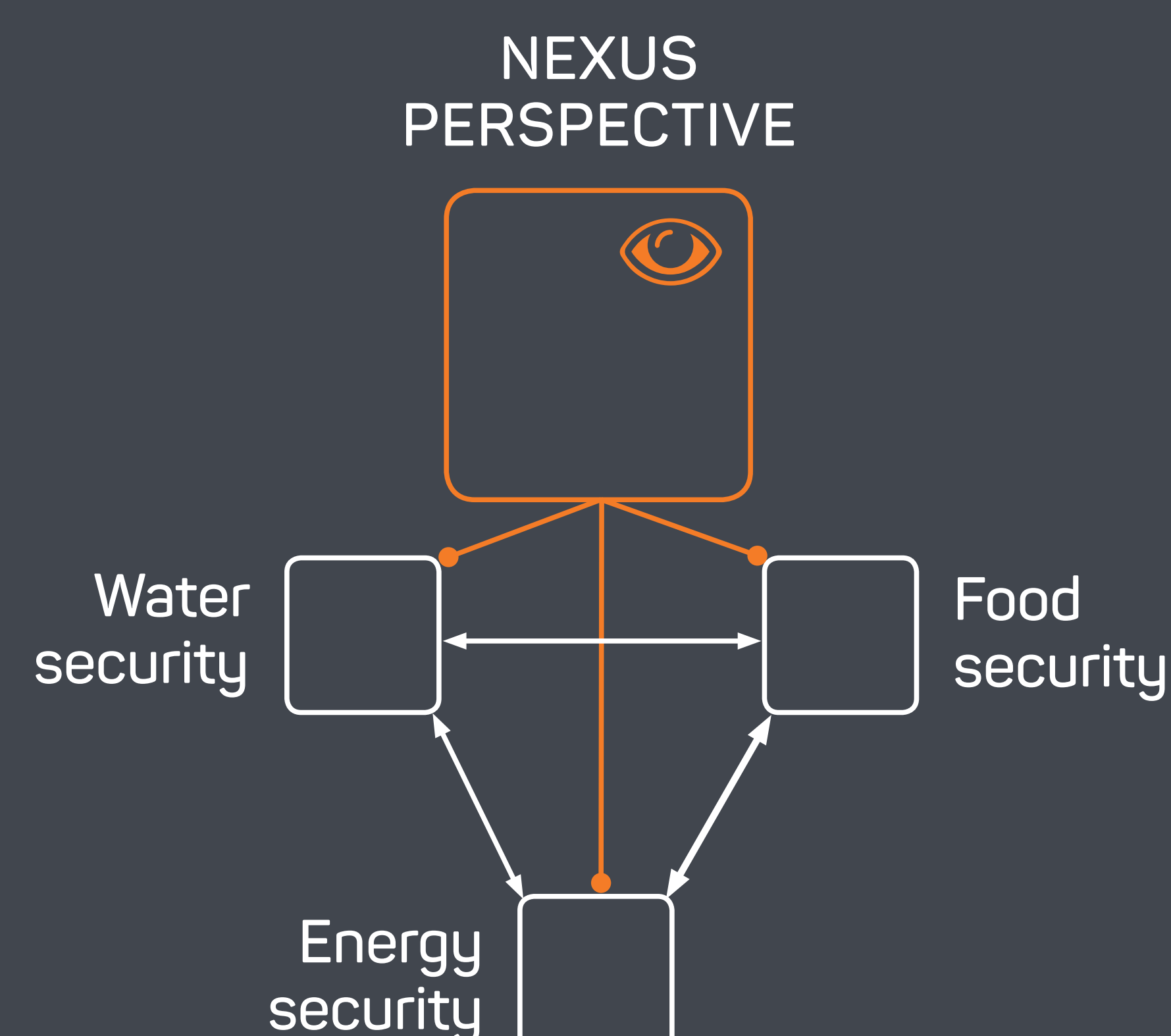


PERSPECTIVES
(Point-View)



Ideas Visualized

Utilizing systems thinking and modeling software has proven to be invaluable for students, teachers, researchers, and the public alike. Ideas are readily understood when visually articulated. A shared repository of maps allows for the comparison and evaluation of the underlying structure of complex concepts.



The main idea of this metemap is the water-food-energy nexus, which is viewed as the crux of finding a solution to pending global resource shortages. The map depicts this idea structurally, telling us that the nexus is comprised of three parts—water security, food security, and energy security—that are inextricably related. This indicates that we should focus on thoroughly examining the critical relationships among these three parts.

Reprinted with permission. Cabrera, D. & Cabrera, L. (2015) Systems Thinking Made Simple: New Hope for Solving Wicked Problems. Odyseean. Ithaca, NY.

APPLICATION

RESEARCH

ThinkWater facilitates the application of systems thinking to complex water-related issues to produce more expansive, interdisciplinary, and comprehensive research and problem-solving among water investigators.

The 2016 USDA ThinkWater Fellows represent a variety of disciplinary, methodological, and topical approaches to the study of complex, interdisciplinary water issues. Fellows will present short TED-style talks at a live-broadcast symposium on December 6, 2016, explaining how DSRP has influenced the trajectory of their research.

EDUCATION

ThinkWater is building educator and organizational capacity to apply systems thinking in educational settings by providing teaching materials and online trainings to educators of all types across the country. We do this through a variety of methods. For example, we are creating a free online training, holding webinars, disseminating informational posters and blogs, and offering in-person systems thinking workshops. We offer professional development and extensive teaching models and tools for educators, and are training top-level researchers how to improve their water-related research through the application of systems thinking/DSRP.

OUTREACH

ThinkWater is conducting a multi-pronged national outreach strategy to promote access to and use of its multimedia resources and teaching and technological assets (including multiple online trainings) to build capacity to apply systems thinking to water-related issues. This includes events, publications, social media, livestream conferences, infographics, and film.

ThinkWater is implementing a coordinated, multi-organization statewide effort to apply systems thinking to education, research, and Extension in Wisconsin. From this we are creating a toolkit of instructions and online resources for ThinkWater implementation in any US state or geographic region.

EVALUATION

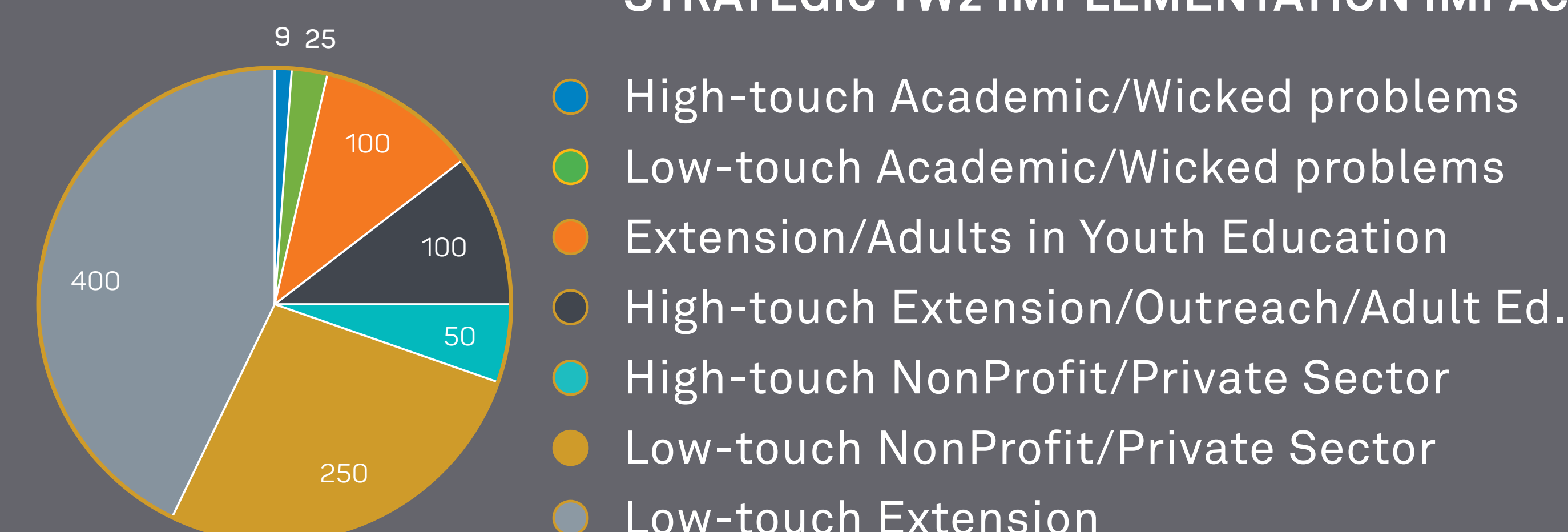
ThinkWater offers a detailed theoretical model in systems evaluation, but also practical tools for use by evaluators, educators, Extension agents and other water professionals.

To improve the theory and practice of evaluation, we are authoring an article that applies systems thinking to improve the most popular evaluation tool, the logic model. We are also developing companion resources—practical tools—to enable evaluation of projects, initiatives, and programs of all scale in the water area and beyond.

RESULTS TO-DATE

- Supplementing top national water lessons with brief instruction in systems thinking increased middle-school students' deep understanding of water content (compared to a control group). Students educated in DSRP also developed awareness of their own thinking processes and demonstrated increased caring/concern about water.
- After training three teachers from Arizona Project Wet in how to enhance understanding of existing water curricula by embedding systems thinking training, those 3 teachers trained several others teaching the Water Investigations Unit. We have survey evidence from their students supporting the effectiveness of DSRP in increasing understanding of water lessons. Between 80 and 90% of 283 students agreed or strongly agreed with the following statements:
 - *I am a more capable learner as a result of the Water Investigations Unit.*
 - *After the Water Investigations Unit, I better understand the importance of differentiating ideas when learning a new concept.*
 - *I paid more attention to what I was thinking during lessons in the Water Investigations Unit.*
 - *It was clear what we were trying to learn in the Water Investigations Unit.*
 - *The Water Investigations Unit taught me that relationships exist between and among ideas.*
- Using Wisconsin as a demonstration for other state and regional implementations, ThinkWater is creating a network of partner organizations united by an interest in using systems thinking to enhance their ongoing educational, outreach, and research efforts.
- Created Wisconsin Water Thinkers Network as a catalyst for change and implementing systems thinking models. In addition to ongoing consultation with nonprofits, held 3 Introduction to Systems Thinking workshops with 3 organizations including 67 educators.
- Dozens of ThinkWater infographics and posters to build systems thinking skills can be found at: thinkwater.us

STRATEGIC TW2 IMPLEMENTATION IMPACT BY WATER SEGMENT



TW2 COLLECTIVE IMPACT BY OUTREACH/GENERAL

