# Synthesis, Lessons, Conclusions: “Water for Food in a Changing World”

Photo: P. Gleick 2008

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# Summary

- The challenges of growing food are increasing because of growing constraints on water, energy, land, and more.
- We've made great progress (expansion of irrigated land; better yields); but progress is slowing (or must speed up).
- We have two major challenges:
  - Find new ways to tackle old problems
  - Understand and address new problems

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# Major Issues?

- Water needs for food will grow substantially without improvements in efficiency or changes in demand/diet/population size.
- We anticipate increasing competition/conflicts with water for urban and ecosystem needs.
- Traditional sources of supply are increasingly constrained… (e.g., "closed" river basins, limits to new dams in some regions, unsustainable groundwater withdrawals.)
- Investments in irrigation are falling or mis-directed.
- Climate change is a reality.

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# Synthesis: Five Themes

- Ignore Ideology
- Integrate, don’t Isolate
- Innovate
- Improve Information
- Initiate and Implement

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# Ignore Ideology; Expand Thinking

- Ideological fights? Fun but not productive…
  - Infrastructure versus no infrastructure?
  - Markets, privatization versus rights
  - International trade wars; subsidies
  - GMOs
- It is too easy to get the technology right but the institutions wrong (Briscoe, Catley-Carlson, Ingram, others)
- Solutions for X (Africa or small landholders) may look different from solutions for Y (Asia or large-scale systems) (Fereres, Bahri,…)
- Challenge fundamental beliefs
  - Stationarity of climate? Silver-bullet solutions?

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# Integrate; Do Not Isolate

- Examples of the failure to integrate?
  - Biofuels policy is an excellent example of how to do the wrong thing with enthusiasm and of the failure to integrate across issues (energy, food, land…)
  - Increased water use in one sector has traditionally come at expense of other users, esp. the environment; groundwater pollution; salinity (Loucks, Bahri, Safriel, Garrido,...
  - 20th century water policy focused on narrow set of benefits (hydropower, flood protection, irrigation, recreation) without integrating impacts on ecosystems, local communities, culture…

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# Integrate; Do Not Isolate

- Sustainable water solutions inevitably come from a merging of approaches.
  - Technology *and* non-structural solutions.
  - Non-traditional sources of water (Falkenmark/Hoff, Llamas,…
  - More comprehensive view of food system: not just field/farm productivity, but entire "food chain" – from "field to fork" (Hoff, Barghouti, …
  - Understand needs from other sectors: energy, food, health, ecosystems…(Fereres, Safriel, Barghouti, Dinar, Ortega,…)
  - Broader conception of trade (e.g., virtual water) (Yang, Falkenmark,…) and environmental policy (e.g., Spain, western North America) (Ingram, Garrido, Wilder, Varela Ortega,…

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# Innovate: New Thinking

- Rethink water "supply" (Kraik, Falkenmark, Yang, Safriel, Loucks, Briscoe…
  - Look at both blue *and* green water.
  - Use the concept of "virtual water" as tool for planning.
  - Evaluate "non-traditional" sources (treated wastewater; rainwater harvesting, conjunctive use of groundwater, desalination.)
  - Don't forget quality issues: Match the "qualities" of water available with the quality of water needed.
  - Don't forget ecosystem issues: Must meet human and environmental needs together.
  - Build traditional supply infrastructure where/when needed, but to new standards.

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# Innovate

- Rethink water "demand" (Fereres, Bahri, Craik, Garrido,…

Move away from idea of using "water" toward idea of maximizing "benefits" that water provides: e.g., more "crop per drop," through improving yields or reducing water use per unit of production.

- New crop varieties;
- New irrigation methods (deficit irrigation)
- New irrigation technologies

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# Innovate

- Rethink "institutions" or "management" (Briscoe, Catley-Carlson, Ingram, Garrido, Wilder, Varela Ortega,…
  - Bringing natural science, social science, politics, and water together more effectively.
  - Equity as central; not peripheral
  - Participation is key, but is hard to do and doesn't always lead to substantive change.
  - "Basin management" is key, but is hard to do and doesn't always lead to substantive change.
  - "Trading" is key, but…

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# Improve Information

- Monitor and measure; the role of science
  - Collect key data; we cannot make good decisions in the absence of good information.
  - We cannot make good decisions with bad information.
- Communications/Education
  - Scientists to Policy Makers (What do we know? How do we communicate it?)
  - Policy Makers to Scientists (What do we *need* to know to make decisions?)
  - Everyone can communicate better with the public. (Footprint…)

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# Initiate and Implement: Priorities for Food in a Changing World

- Meet needs of the poorest, but especially Africa.
- Don't ignore population.
- Improve efficiency/productivity.
- Focus on effective approaches to technology and investment.
- Focus on effective approaches to management.

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# Water for the Future?

- Successful solutions to water problems are available and being implemented every day. Build on success; learn from failure.
- Successful solutions will be those that move beyond ideology, integrate concepts, communicate new information in new ways, and lead to new actions.


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# Suggestions for Future Forums?

- Emphasize solutions and success stories, not just problems.
- Explore ideas of integration and interdisciplinary tools.
- Explore ideas for communicating ideas.
- Continue integrating science and policy.
- Invite policy makers.

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# Thank you

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