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One Water, One Health: Water, Food and Public Health in a Changing World

THEME III

What opportunities lie in the improved cooperation between water, food, and public health sectors?

KEY POLICY MESSAGES

- Formal and informal institutional relationships need to be developed and fostered across the water, food, and public health sectors to break barriers and to develop collective actions.
- Resources are needed to support partnerships and to engage communities in solutions to cross-sectoral challenges.
- Technologies, tools, and data are important to inform public policy and to reduce risk.
- Alternative crops and monitoring trends in food production is needed in regions experiencing climate-related shifts in water availability.

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The water, food, and public health sectors are inter-related in multiple and complex ways. Water is essential to agricultural production and it is also the foundation for public health, hygiene, and sanitation services. Similarly, food is a key determinant of health, yet food production and sanitation services can have direct impacts on water quality, water availability for other uses, and ecosystem health. Environmental components – air, water, land, and ecosystems – provide essential services to humans, while also creating potential pathways for exposure to pathogens under conditions of poor hygiene, inadequate infrastructure, inundation, scarcity, a lack of standards and codes, and incomplete public education. Water management is a focal point that tethers and enables all other sectors. Water, food, and public health share many common goals, but there has been a lack of coordinated cross-sectoral initiatives.

Leveraging opportunities to improve cooperation between and among each of these sectors will serve all sustainable development goals (SDGs), especially SDG 3 (good health and well-being), SDG 6 (clean water and sanitation), and SDG 11 (sustainable cities and communities).

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FRAGMENTED POLICY APPROACHES CAN BEGIN TO BE RESOLVED THROUGH BOTH FORMAL AND INFORMAL INSTITUTIONAL RELATIONSHIPS

The role of water in agricultural productivity, and the importance of food for public health, have been studied extensively, but independently. Despite an impressive body of research in each of the fields, there are few formal linkages, organizations, or systems to develop research, policy, and programs across the sectors. Both formal and informal institutional relationships should be developed to begin to resolve the fragmented policy and research approaches.

COLLECTIVE ACTIONS ARE NEEDED AT THE INSTITUTIONAL LEVEL FOR CROSS-SECTORAL COOPERATION

To break barriers and resolve organizational stovepipes, joint inter-agency programs are needed. Essentially, stovepipes refer to the propensity of each sector to secure

Food and public health sectors rely on sound water management.

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individual incentives instead of collective benefits, or bureaucracies that operate with a narrow political agenda. Many solutions exist, but they do not reach implementation due to fragmentation. Non-government organizations (NGOs) can play a role in integrating cross-sectoral actions, especially when NGOs have capacity to assist where government resources may be overextended or existing systems are not nimble enough to respond to identified needs. There are cases around the globe of NGOs facilitating collective action to empower farmers and other citizens to break barriers arising from fragmented water management, for example to improve irrigation water quality downstream from a city, to reform irrigation practices in a water-stressed region, and to manage rural water supply and sanitation (Global Water Partnership). It is important to build on examples of collective action.

RESOURCES ARE NEEDED TO SUPPORT PARTNERSHIPS AND TO ENGAGE COMMUNITIES IN SOLUTIONS

Partnerships between universities and government health departments can create opportunities to improve community safety and health. Resources need to be allocated to support these and other such partnerships. Similarly, resources are needed for community engagement, which is key to understanding the complex and interwoven social, cultural, and economic factors contributing to cross-sectoral problems. Stakeholders need to be heard when developing and implementing solutions at municipal, regional, or water basin scales. Special efforts are needed to ensure the voices of vulnerable, disadvantaged, or disabled persons are included in decision-making. For example, access to water, sanitation and hygiene (WASH) facilities can pose challenges for persons with disabilities, even where those services have been well-established. Policy, guidelines, infrastructure designs, and investments are needed to support the development of WASH infrastructure that serves persons with physical disabilities, taking care to understand the needs of this population.

CLIMATE-INDUCED CHANGES TO WATER HAVE IMPLICATIONS FOR AGRICULTURE AND PUBLIC HEALTH

Climate change has far-reaching implications for food production with many changes in climate expected to occur as changes to the natural water cycle, for instance as altered

Collective action catalyzes cross-sectoral cooperation.

Changes to water availability will affect crop choices.

precipitation patterns, increased evaporation rates, warmer water temperatures, melting glacier water sources, and shifts in aquatic ecosystems. The viability of traditional crops, the length and timing of growing seasons, and other impacts are anticipated for the agricultural sector, leading to food and nutrition insecurity in affected regions. There is a need to consider alternatives in crops and to closely monitor trends in food production and related factors. Also, certain crops prone to high water usage may need to be avoided in regions with increasing risk of water scarcity. Drought-resilient plants in community gardens and cultivation of traditional medicinal plants can support local food security.

TECHNOLOGIES, TOOLS, AND DATA ARE IMPORTANT TO INFORM PUBLIC POLICY AND TO DEVELOP SOLUTIONS

Food is a dominant pathway for exposure to fecal-contamination, creating a health burden, in particular within low-income countries. There is a need to identify and manage critical control points of the food chain where potential contamination occurs, including production, processing, distribution, preparation, and consumption of foods. There is also a need to build water knowledge for populations such as farmers and consumers, in particular where urban agriculture is practiced but there is inadequate sanitation, and where inadequate solid waste handling results in pollution of river channels.

Tools and analytics are important to inform public policy, as well as to design location-specific behaviour change programs. Rigorous data collection is important to understand public health risks. Assessment of individuals' behaviours can identify needed support or capacity development, such as personal hygiene practices and prevention of the consumption of certain raw foods where water quality has been compromised.

One analytic technique that has been applied to map out water-food-public health interactions is system dynamic modelling, which can help to understand and better communicate surface water pollution pathways, feedback loops, and risks of waterborne diseases, for example. This technique can be employed to identify long-term solutions like health care investments, land use planning, water and environmental protection initiatives, communications about improved hygiene practices, among others.

WASTEWATER TREATMENT TECHNOLOGIES CAN BENEFIT FOOD, ENERGY, WATER, AND POPULATION HEALTH

Treatment technologies are also part of the solution. Research into wastewater treatment processes is on-going to identify feasible options to remove contaminants. Antibiotics and metals are examples of water contaminants that are introduced to waste streams, in part, through public health and agricultural practices. For example, attention to antimicrobial resistance in wastewaters is needed to reduce the risk of drug-resistant diseases being introduced via water waste streams. Ferrate, which is an active iron oxide compound, has potential wastewater treatment technology applications that could benefit food, energy, water, and population health. Ferrate trials indicate it is effective in removing antibiotics in wastewater as well as metals. Nanofiltration and electrocoagulation are other emerging technologies to remove toxic substances from water. Effectively treating wastewater to appropriate standards results in a water resource that can be reused for agriculture or by other industries, as well as for hygiene purposes, and for cooking and human consumption. Even well-established technologies, such as private wells and septic systems, require on-going efforts to ensure individuals have the capacity to maintain and test their water and sanitation systems.

Education, outreach, communications materials, websites, and inter-agency partnerships to maximize available resources are all part of a comprehensive approach to protect water supplies, food sources, and public health.

Public education is needed for new and existing water technologies.

REFERENCE

Global Water Partnership website, Case Studies.
www.gwp.org/en/learn/KNOWLEDGE_RESOURCES/Case_Studies/

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