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# GLOBALWATERS

VOLUME VI ISSUE 1 MARCH 2015



# PILLARS

of WATER & DEVELOPMENT

**SUSTAINABILITY  
of WASH SERVICES**

**NUTRITION**

**WATER  
QUALITY**

**AGRICULTURAL  
WATER MANAGEMENT**

**SANITATION**



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In celebration of World Water Day and the recent passage of the Water for the World Act, we devote this issue of Global Waters to five key topics emphasized in our Water and Development Strategy. They focus on sustainability of WASH services; WASH and nutrition; agricultural water management; sanitation; and water quality. Our five articles show what success in each of these areas looks like. By focusing our efforts, we believe we can make lasting change.

We start with sustainability. Making sure impacts last for the long term has always been important to us, but lately we have been thinking more about how to build sustainability best practices into our water programs. In a thought provoking op-ed, USAID Global Water Coordinator Chris Holmes writes that through long-term monitoring and evaluation, building the capacity of stakeholders on the ground, and collaborating more closely with you, our partners, we can ensure that WASH services are more sustainable.

The Strategy commits to concentrating our efforts on priority countries to ensure we make the most transformative impact. In Nepal, a priority country for both WASH and food security interventions, we look at WASH-nutrition and agricultural water management projects that have already boosted the health, livelihoods, and food security of thousands of vulnerable families.

The Suaahara project simultaneously addresses WASH and nutrition with a toolbox that includes everything from government capacity building to an educational radio soap opera. The Hill Maize Research Program helps farmers adapt to climate change by working with them to improve water management and to develop high-yielding, climate-resistant maize varieties.

Another prominent aspect of our Strategy is its special focus on embracing science, technology, and partnerships for development. We take you inside our WASH For Life partnership, which supports sanitation innovations around the world, including two cutting-edge toilets that could solve the problem of disposing of waste cheaply and sustainably. Finally, we spoke with John Feighery, co-founder of USAID-supported mWater, a nonprofit tech startup that developed mobile technology that uses GPS and cloud computing to monitor water quality. He had a lot of interesting things to say about water quality, development, and technology.

We hope you enjoy this issue, and look forward to working with you toward sustainable impact in the water sector, on World Water Day and beyond!

*The Water Office*  
waterteam@usaid.gov



**LINING UP:** The U.S. Feed the Future Initiative works in Mozambique to boost water productivity and food security.

Photo Credit: Arturo Sanabria, Courtesy of Photoshare

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Back Cover Photo Credit: Suaahara Project, USAID/Nepal

**Sus·tain·abil·i·ty of WASH Ser·vices** is achieved when host country partners and communities take ownership of the development processes and when local systems and resources are in place to deliver and maintain results beyond the life of external support.

# WATER for the POOREST of the POOR: MAKING OUR PROGRAMS LAST

By Christian Holmes, USAID Global Water Coordinator

**We** are gratified that the Senator Paul Simon Water for the World Act passed both houses of Congress unanimously and was signed into law by President Obama on December 19, 2014. In addition to helping address the needs of the 2.5 billion people who do not have access to sanitation and the 750 million people who live without safe drinking water, the Water for the World Act emphasizes that those services need to be sustainable.



**Christian Holmes**

The focus on providing sustainable safe drinking water, sanitation, and hygiene (WASH), central to both the Water for the World Act and the USAID

Water and Development Strategy, is vital. Up to 40 percent of rural water systems fail prematurely, and less than one percent of WASH projects have long-term monitoring.

Understanding what we mean by WASH sustainability requires a distinction between the physical infrastructure – pipes and pumps – and the services they provide. Water service is the flow of water with certain quantity, quality, and

continuity characteristics, while sustainable water service is the maintenance of that flow of water over time. Sustainability of WASH services is achieved when host country partners and communities on the ground are empowered to take ownership of the development processes, and when the local systems are in place to deliver the inputs and resources needed to maintain results and deliver impacts beyond the life of external donor support.

The evidence of service failure along with an increased drive for aid effectiveness has resulted in increased research, analysis, and thinking around sustainability of WASH services over the last few years. The Dutch Government triggered the global

movement to ensure sustainable services following a 2012 study of its WASH programs, which highlighted that despite “...numerous references to sustainable development, policies and programs are still oriented too much towards short-term delivery of physical infrastructure and institutions, partially driven by the emphasis on visible short-term results and by spending pressure. The need for institutional maintenance of services... is insufficiently recognized.” This has reinforced what we know to be true: In rural settings in particular, donor and NGO interventions too often fail after the external partner leaves the scene.

Under our Water Strategy, we commit to an overarching Strategic Objective: Improve health outcomes through the provision of sustainable safe water, sanitation, and hygiene. This commitment gives us a mandate to look at different ways of thinking about sustainability and designing our WASH programming to be directly attentive to sustainability issues. In 2012, USAID joined the steering committee of the Sanitation and Water for All

(SWA) global partnership. We join with host countries and other development partners to harmonize our efforts toward development effectiveness and to work together toward achieving first the MDGs and, soon, the Sustainable Development Goals for WASH services. At the SWA High Level Meeting in 2012, Administrator Shah committed to an Agency investment in the knowledge around sustainable service provision, a commitment that we are now working to operationalize.

USAID’s Water Office is currently working to develop a suite of tools to help Missions apply global, Agency, and Congressional best practice sustainability requirements to its WASH programming. The ultimate responsibility for service sustainability rests with local stakeholders and governments, so our guidance and resources will be rooted in local systems and will take into account primary factors that affect sustainability: technical, environmental, financial, social, and institutional/governance. By deliberately structuring analysis, planning, design, implementation, and monitoring with regard to these factors, there is greater

potential that our programming will achieve sustained delivery of WASH services in the countries where we partner. We need to recognize that this approach will take more time, resources, and thought than just providing hardware, but that it will ultimately lead to better development outcomes and prevent the constant need for reinvestment in unsustainable WASH systems.

The Strategy also calls for the Agency to make longer-term investments in monitoring and evaluation of water activities in order to assess sustainability beyond the typical USAID program cycle and to enable reasonable support to issues that arise subsequent to project implementation. This is an important way for us to know when we have been successful in our drive to foster environments for sustained service. Here again, we need to be mindful not just of our own monitoring and reporting needs, but of the need for governments and local stakeholders to have ownership of these monitoring systems. And we need to design our interventions to build local capacity to monitor, evaluate, research, and learn.



**SERVICES THAT LAST:** There is a distinction between pipes and pumps and the services they provide

Photo Credit: USAID

We are currently developing methodology to look at whether the systems around WASH services are functioning. We are also trying to understand how best to benchmark and track those systems.

It’s time to think of sustainable WASH services at scale. If we tailor our approach and work with our global and local partners to think long term and big picture, we can achieve real sustainability of WASH services and tangible and effective development outcomes.



**START WITH SUSTAINABILITY:** USAID’s projects work to find sustainable solutions to improve the availability and management of water facilities.

Photo Credit: USAID/SWSS

**WASH-Nu·tri·tion** is the integration of WASH and nutrition interventions to improve health by more than the sum of the parts.

# Mothers Know Best

Keeping Nepal's Children Healthy

**T**hroughout Nepal, mothers are rising up to improve health, hygiene, and nutrition. The movement's most visible leader is Deumaya, a straight-talking, forward-thinking Nepali mother-in-law.

Deumaya is the titular character of *Bhanchhin Aama*, or Mother Knows Best, a radio soap opera broadcast in three languages in 25 of Nepal's poorest districts. But this soap opera has a twist – each episode focuses on nutrition-related topics such as safely disposing of children's feces, a balanced diet, and the importance of handwashing and toilet use. The show is a true sensation. Half of all radio owners tune in, and thousands of calls and texts pour in after each episode airs. Four out of five listeners say the show has influenced how they feed and care for their children.

But the movement isn't just taking place on the airwaves. Mothers of young children also flock to nutrition-learning groups. Tara Baykotai, an 18-year old from a traditionally marginalized socio-economic group, said that her local mothers' group spurred her to plant a vegetable garden to better feed her family, to teach her 15-month-old daughter Ayushma to wash her hands, and to work with her husband Deepak to build a latrine. "Now our family has changed," she said. "We started using soap at home and making other changes."

**GENERATIONS OF LEARNING:** Suaahara teaches mothers about handwashing, safe disposal of feces, and other WASH-nutrition topics through learning groups, comic books, trainings, and a soap opera.

Photo Credit: Suaahara, USAID/Nepal

## AN ESSENTIAL NUTRIENT

Both the soap opera and the mothers' groups are part of Suaahara, USAID/Nepal's trailblazing five-year, \$54 million nutrition project that launched in 2011. Nepal is one of the most undernourished countries in the world, and 41 percent of children there have stunted growth.

Suaahara is novel because it addresses the wide range of root causes of undernutrition, such as food insecurity, poverty, inadequate healthcare, and poor access to water, sanitation and hygiene (WASH) by training and supporting everyone from farmers to health workers to local and national governments.

Improving WASH has been a particularly important priority, as ensuring healthy, well-nourished children is impossible when WASH conditions are poor. "There are both direct and indirect links between WASH and nutrition," said Rochelle Rainey, Senior Environmental Health Advisor at USAID's Global Health Bureau.

Lack of safe water, poor hygiene, and especially lack of sanitation are strongly correlated with acute malnutrition and stunting. Poor WASH leads to diarrhea, gut inflammation, and intestinal worm infections, all of which reduce a person's absorption of nutrients. Improving WASH not only lessens the incidence of these ailments, but it also reduces the pathogen load of the environment. High pathogen environments are associated with poor health and nutrition.

"Handwashing with soap before touching food and after exposure to feces should be the first step of food preparation or breastfeeding, and an adequate amount of safe drinking water is an essential nutrient just like vitamin A or iron – you can't have good health without it," said Ms. Rainey.

But improving WASH isn't easy – it requires entire communities to make fundamental changes. Suaahara inspires these transformations by educating families about small, doable actions that improve health. Suaahara uses posters, comic books, flip charts, and the soap opera; trains villagers in toilet construction; demonstrates the ways that food and water get contaminated by fecal matter; and provides counseling and support in the mothers' groups.

**“Safe drinking water is an essential nutrient just like vitamin A or iron – you can't have good health without it.”**

*Rochelle Rainey*  
USAID Environmental Health Advisor

## BRINGING EVERYONE IN

Implementing such a wide-ranging, community-centered project necessitates keeping track of different interventions in disparate geographic areas and coordinating with a multitude of stakeholders, which can be challenging. Sometimes, improvements in one area struggle to keep pace with other areas.

Lack of infrastructure impedes some villagers from acting on their newfound WASH knowledge. "Suaahara has been able to increase individuals' WASH knowledge, but practical application of these

skills remains low, often due to water shortages," said Pragma Shrestha, Environmental Health Specialist at USAID/Nepal.

Suaahara addresses these challenges at regular district-level summits that bring together educators, health workers, journalists, government officials, and other local leaders. These summits use discussions, songs, dramatizations, and a public commitment process to rally a diverse set of local stakeholders for initiatives such as a district sanitation campaign. Suaahara also brings government officials along with project staff to monitor the impact of its activities.

The hope is that educating and engaging decision-makers will enable them to better serve their communities' needs. "When multi-sectoral government representatives jointly visit activity events, they learn about women's practical needs, such as the length of trips to fetch water or shortage of land for gardens, and can better address them," said Ms. Shrestha.

Despite obstacles, Suaahara is already seeing results that will lead to improved health and nutrition. The percentage of women washing their hands at critical times rose from just 35 percent before the project started to 60 percent, and the percentage of

households with latrines increased from 78 percent to 84 percent. Sixty-two villages have now been declared "open-defecation free."

Moreover, Nepal's mothers are now armed with WASH and nutrition knowledge that they can apply for life. "My biggest challenge was not knowing – if I would have known that leaving my child on the ground in our yard would lead to diarrhea and loss of appetite, I would have been careful," said new mother Saraswati Acharya. "I have learned many practical, small, doable things thanks to Suaahara, like washing hands with soap, drinking boiled water at home, and proper disposal of my child's feces... I make sure to practice the things I've learned."

*C. Zeilberger*

## More Information

[Suaahara Video](#)

[USAID Multi-Sectoral Nutrition Strategy 2014-2025](#)

[Global Waters November 2014 op-ed by USAID Nutrition Division Chief Anne Peniston](#)



**A GROWING MOVEMENT:** Suaahara has taught tens of thousands of women about nutrition and WASH.

Photo Credit: Suaahara, USAID/Nepal

# CURRENTS

Water and sanitation professionals work tirelessly to improve health, promote food security, and boost livelihoods. To further USAID's knowledge sharing goals, the Water Office holds learning events that present solutions and challenges common to water programs. In Currents, we share the solutions discussed at the events and other venues. Email us at [waterteam@usaid.gov](mailto:waterteam@usaid.gov) if you would like your project to be considered for *Global Waters*.

## CONGRESS UNANIMOUSLY PASSES WATER FOR THE WORLD ACT

On December 19, 2014, President Obama signed the Senator Paul Simon Water for the World Act into law, following unanimous passage by both Houses of Congress. The Water for the World Act will help to address the needs of the 2.5 billion people who do not have access to sanitation and the 750 million people who still live without safe drinking water.

"The Water for the World Act of 2014 provides a solid platform for USAID to work toward our goal of a water-secure future, free from the diseases caused from inadequate access to clean water and sanitation, where food is available and affordable, and where populations are less vulnerable to the risks of a changing planet," said USAID Administrator Rajiv Shah.

The Water for the World Act focuses on sending resources to the countries and communities most in need of WASH. It works to ensure that U.S. Government agencies and all other groups currently working on WASH work together to achieve long-term impacts, including WASH programs and other critical measures that address child survival, global health, food security and nutrition, and gender equality. The Act also addresses reviewing WASH projects to increase transparency in reporting.

To read Administrator Shah's statement on the Water for the World Act, visit USAID's [website](#).



Photo Credit: U.S. Embassy, New Delhi

## USAID ANNOUNCES NEW WASH PARTNERSHIPS WITH INDIA

During a trip to India from November 4-5, 2014, USAID Administrator Rajiv Shah announced several partnerships between USAID and the Government of India aimed at improving water, sanitation, and hygiene.

Dr. Shah announced a new financial commitment of up to \$20 million to support India's efforts to improve water and sanitation. He also announced a new Urban WASH Knowledge Partnership with the Indian Ministry of Urban Development and other key partners such as the Bill & Melinda Gates Foundation. The Urban WASH Knowledge Partnership will share knowledge and best practices in order to demonstrate innovative and scalable models for urban water and sanitation. In addition, Dr. Shah announced USAID's support for a multi-stakeholder coalition including Unilever, the Federation of Indian Chambers of Commerce and Industry, Sesame Workshop India, Coca-Cola

India, McCann Health, and the Jindal Steel and Power Foundation, to catalyze nationwide sanitation and hygiene behavior change. These initiatives support the Government of India in its efforts to extend clean water and sanitation services to all Indians.

"The relationship we have with India - the world's largest democracy - is among the most lasting, effective, and vital partnerships that America currently enjoys," said Dr. Shah. "Together, we are working to unlock opportunity for India's most vulnerable people and pioneer solutions that will help end extreme poverty across the globe."

To learn more, visit the USAID/India [website](#).

## USAID SUPPORTS THE FIGHT AGAINST EBOLA

"Ebola is a horrific disease," said President Obama at the United Nations in September.

"If ever there were a public health emergency deserving an urgent, strong, and coordinated international response, this is it."

USAID has been a leader in this international response. It activated a Disaster Assistance Response Team, comprised of team members in Liberia, Guinea, Sierra Leone, and Mali, to coordinate planning, operations, logistics, administrative issues, and aspects of the interagency response to the epidemic. It also built and staffed a new hospital in Liberia devoted to treating those afflicted with the disease.



Photo Credit: Morgana Wingard, USAID

The Agency's WASH programs have been instrumental in preventing the spread of the disease. Ebola is spread through bodily fluids such as urine and excreta. Therefore, ensuring uncontaminated water supply and proper disposal of waste, along with encouraging the widespread adoption of hygiene behaviors such as handwashing, are essential if the epidemic is to be contained. USAID supports a number of programs throughout West Africa that bring safe water and sanitation to millions.

USAID is also identifying and supporting innovations that will help treat and prevent the spread of disease and protect health workers through Fighting Ebola: A Grand Challenge For Development. The competition invited the general public to submit proposals for innovative solutions to address the epidemic. Announced in December 2014, the activities selected for support include healthcare worker protective suits, a topical antiseptic that protects against pathogens, and a spray-on barrier that kills and repels microbes. They will receive funding and support from USAID to test the innovations and ensure readiness for field deployment.

To learn more, visit USAID's Ebola [website](#) or join the Ebola Grand Challenge [mailing list](#).



Photo Credit: Meena Kadri

**San-i-ta-tion** is the act or process of prevention of human contact with the harmful waste.



**CIRCLE OF LIFE:** A worker in Nairobi collects waste from a toilet developed by the startup Sanergy. The waste will later be converted to fertilizer and bio-gas.

Photo Credit: Nestlé

# THINKING OUTSIDE — the latrine —

## Startups Test New Toilets

### The key to protecting the health of billions may be...worms?

Indeed, USAID is supporting the field-testing of a latrine, dubbed the Tiger Toilet, which is powered by worms. The toilet looks like a typical latrine and provides a normal pour-flush experience for users. But inside its compact tank, Tiger Worms reduce the system's excrement by more than 80 percent.

The Tiger Toilet pilot is one of a number of solutions that USAID is testing in efforts to improve access to adequate sanitation, arguably one of the greatest threats to public health worldwide. More than 2.5 billion people lack this access, and often practice open defecation as an alternative. This leads to the spread of diseases including cholera, typhoid, and diarrhea, which alone kills more than one child each minute.

## SEARCHING FOR SOLUTIONS

While this challenge is not new, USAID has been trying a different approach to solving the sanitation crisis. Recognizing the dearth of effective, affordable, and sustainable solutions as a contributor to the world's failure to meet the Millennium Development Goal for sanitation, USAID launched a Water and Development Strategy in 2013 with commitments to forging partnerships and embracing science and technology. Part of this strategy aims to bring sustainable improved sanitation services to 6 million people within five years.

“Innovation is critical because sanitation is a challenge we haven't gotten right by doing things the way we always have,” said Jesse Shapiro, WASH Advisor and Sanitation Focal Point at USAID.

The Strategy bolstered interest in a partnership between USAID's water experts, USAID's venture capital-style investment fund, and the Bill & Melinda Gates Foundation. Established in 2011, this \$17 million WASH for Life partnership identifies and supports cutting-edge water, sanitation, and hygiene (WASH) solutions through Development Innovation Ventures (DIV), USAID's open innovation fund.

“Any individual, non-profit, start-up, or social enterprise can apply to this competition, any day of the year. If they win, these innovators can tap into USAID and the Gates Foundation's funding, support and expertise,” said Sarah Burch, a team member at DIV.

In the past three years, the WASH for Life partnership has invested in 13 innovations in 10 countries.



**SUSTAINABLE SANITATION:** The Tiger Toilets are new latrines which contain worms that eat excrement, reducing the system's waste by more than 80 percent.

Photo Credit: Bear Valley Ventures



**SANITATION FOR ALL:** Sanergy is currently scaling up its low-cost latrines with USAID funding. They are building 700 toilets to be placed throughout Nairobi, including in schools.

Photo Credit: Nestlé



**CHANGE MAKERS:** Innovators work with the DIV team to test and scale their solutions.

Photo Credit: USAID/DIV

## INNOVATION IN ACTION

The Tiger Toilets are just one example of the partnership's investments at work. Through an early stage investment of \$170,000, the toilets are being piloted in India, Burma, and Uganda in rural and peri-urban environments, and at a displaced persons camp. Initial monitoring has revealed that users find the toilets preferable to traditional latrines. Because the worms break down the solid waste, the toilets emit fewer odors and attract fewer flies than traditional latrines. "I visited a village in India a couple months ago and spoke to villagers who use the toilets," said Walter Gibson, CEO of Tiger Toilet developer Bear Valley Ventures, a start-up which specializes in market-led hygiene and sanitation technologies. "The first thing they talked about was the smell and the flies. They said they feel safer going to the toilet now."

Another pioneering toilet, invented by the startup Sanergy, has also

received support from the WASH for Life partnership. Sanergy's innovation is two-fold: They created toilets that cost just \$350 to assemble (traditional community toilets can cost up to \$25,000) and developed a system that converts waste from these toilets into fertilizer and electricity-generating biogas. The company franchises the toilets to local youth groups and entrepreneurs, who make up to \$1,000 per year by charging small fees for use and selling hygiene products.

During its pilot phase, Sanergy tested 60 toilets in Mukuru, Nairobi. With the additional support from the WASH for Life partnership, Sanergy is building 700 toilets with the hopes of providing sanitation to 70,000 Kenyans and fertilizer and energy to thousands more.

## FINDING WHAT WORKS

Innovators like Bear Valley Ventures and Sanergy win funding through the WASH for Life partnership for

activities that will either pilot, test, or scale – depending on their previous evidence of impact. By testing gradually, the partnership ensures resources are used judiciously and that innovations are optimized.

"We are able to test innovations at a small scale, so we can see the strengths and areas that need work before USAID commits more resources," said Ms. Burch.

Once selected, innovators work with the DIV team to test and scale their solutions, while rigorously monitoring and evaluating whether their innovation is meeting the desired impacts and at what costs.

"We are an active partner to our innovators. By leveraging the experience of the venture capitalists, management consultants, and prior-entrepreneurs on the DIV team, we are able to help our innovations grow," said Ms. Burch.

The WASH for Life partnership continues to source new ideas on a daily basis through the DIV

competition, where organizations pitch their innovation in an initial five-page business plan.

Beyond WASH for Life, USAID is now forging more partnerships to support its Water Strategy goals. It recently joined forces with the Government of India to find sanitation solutions there, and it is reaching out to scientists in developing countries to discover new urban sanitation solutions through its Partnerships for Enhanced Engagement in Research (PEER) Program.

Mr. Shapiro said that partnerships like these are instrumental to alleviating the sanitation crisis. "Sanitation is a challenge that we haven't solved yet, but we are making progress every day," he said.

*C. Zeilberger*

## More Information

[USAID Water and Development Strategy](#)

[WASH For Life Website](#)

[Follow DIV on Twitter](#)



**A CLEANER TOILET:** Despite containing worms, the Tiger Toilet looks like an ordinary latrine from the outside. Because worms eat much of the waste, the latrine smells less and attracts fewer flies than other latrines.

Photo Credit: Bear Valley Ventures



**Water Quality** refers to the chemical, biological, and radiological characteristics of water.

# MOBILES *for* MONITORING

*A Conversation With John Feighery, Co-Founder of mWater*

**J**ohn and Anne Feighery, husband and wife team with backgrounds in global health, water, sanitation, and technology, founded mWater, a non-profit tech startup that creates mobile technology to monitor water quality using GPS and cloud-based computing. The startup has secured investments from USAID, WaterAid, and other partners and is currently working in a number of countries including Tanzania, Nigeria, and Mozambique. We sat down with John Feighery to learn more about mWater and the cutting-edge of water quality testing.



**A WATER PIONEER:** John Feighery co-founded mobile water quality testing startup mWater with his wife, Annie, to provide safe water and sanitation to people who still lack it.

Photo Credit: Dustin Goodwin

**Global Waters: What motivated your commitment to testing water quality?**

**John Feighery:** My first career was at NASA, where I managed systems used to test the water and air quality inside spacecraft. There we developed a very simple test for fecal contamination in drinking water that later became the inspiration for mWater's suite of cheap and simple tests. I had this growing realization that we at NASA were able to provide safe water and sanitation to astronauts in space, yet billions of people still lacked these basic human needs here on Earth. I didn't want my children to inherit a world with such disparities in basic human dignity, so I left to work in the water sector.

**Why is it important to focus on water monitoring and water quality?**

This year marks the end of the UN Millennium Development Goal era, which made great strides toward increasing access to a water source. However, we now know that many of these so-called improved water sources are contaminated at levels that are not even safe for bathing, much less drinking. It used to be difficult to perform water quality testing due to the cost of the equipment and the expertise required. But now we have very cheap and reliable methods to perform basic testing. Preliminary estimates show that as many as 2 billion people are drinking contaminated water. We won't achieve the health benefits related to improved water sources if that water is not also safe.

**How accurate is the sampling method?**

We support a number of different methods, including a very simple presence/absence test for E. coli that costs less than \$5 and does not require special equipment or experience to conduct. We also support more quantitative methods where you actually count the number of bacteria on a plate, and the app even helps with the counting using the onboard camera. Since bacteria such as E. coli are used as indicators of fecal contamination, it is less important to know exact counts unless you are conducting scientific research. For public water supplies that are functioning properly, E. coli should not be present at any level.



**QUALITY CONTROL:** mWater makes it easier to perform water quality testing in Tanzania.

Photo Credit: mWater



**USER-FRIENDLY:** mWater supplies cheap and reliable methods to perform basic testing.

Photo Credit: mWater



**TECHNOLOGY TRAINING:** People in Nigeria learn how to use mWater's simple water quality tests.

Photo Credit: mWater

**How expensive are the sampling and analysis?**

Our basic kit, which detects E. coli at the safe drinking and safe bathing levels recommended by the World Health Organization, costs less than \$10. The design is open source and we publish all the contents on our website, so our users are free to put together their own kits if they like.

**What are the logistical challenges of sampling and analysis? And how have you overcome them?**

For our partners in Tanzania and other developing countries, the biggest challenges are often transport related. Fuel and vehicles to use in monitoring are very expensive, but mobile technology can help with this. Often providing a cheap smartphone to a trained local person is more cost effective than making repeated trips in a vehicle.

**Has the sampling caused fewer people to gain access to drinking water?**

We have not heard of any of our partners shutting down a water source due to a negative test result and we would not encourage that unless we know that there are better sources available. Instead we encourage governments and local organizations to use the data to motivate

investment in improved water sources or remediation of contaminated ones. For example, our partners in the Public Health Office of Mwanza, Tanzania, decided to shift city policy away from construction of new shallow wells within the city limits based on the data we collected together. This includes a decision to not give permits to NGOs to create shallow wells, instead encouraging them to build a kiosk or borehole.

**Which partner country institutions do you work with? How do you work with them?**

In Tanzania and Nigeria, we have worked directly with governments and water utilities. In other countries we support the work of our investors who have strong commitments to collaborating with local institutions and government. One of the ways that mWater enables local partnerships is our pricing model: All of our software is completely free for unlimited use.

**Have there been any human local capacity limitations? How about laboratory capacity? If so, how have you overcome them?**

We find very few human capacity limitations, at least in terms of the ability of people to learn to use the technology and their desire to use it. We design our software to be very easy to use and similar to popular

smartphone apps such as Facebook or WhatsApp, which are becoming more and more common in the countries where we work. Laboratory capacity is a big issue in developing countries. Often you will see a very costly piece of equipment that is broken or rarely used; it was probably supplied by a donor or a big project, but now there is no money left for repairs or replacing consumables. We have addressed this by creating a suite of simple, one-time use kits that can capture the most critical water quality parameters without needing any laboratory equipment or special training.

**Why does mWater work?**

mWater provides a model for building infrastructure that does not perpetuate dependency cycles. Using the software market model, mWater does not charge end users, but rather stakeholders. Just as end users don't pay for software like Facebook or Google does, mWater identifies investing partners who benefit from the features and charges them. The platform is free to those who need it most and the software budgets of the investing partners become a way of turning over what was once sunk costs into a philanthropic, social investment.

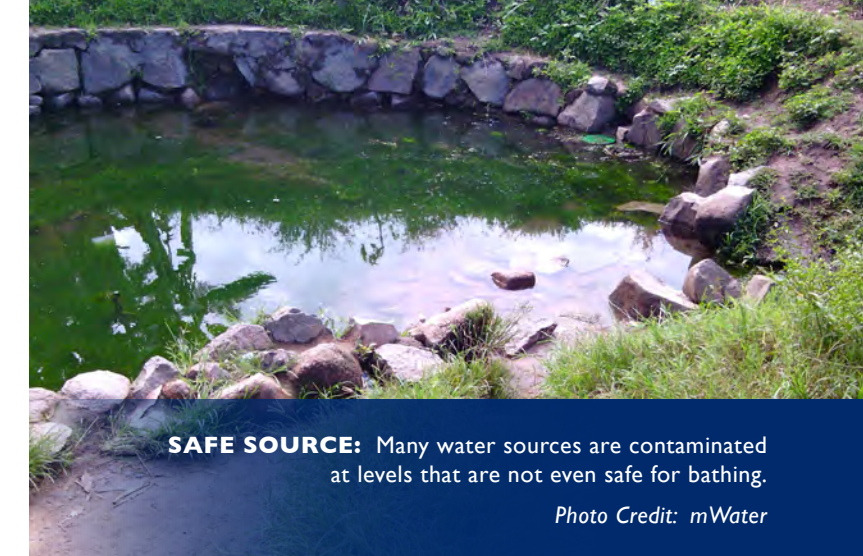
**Where will you go with mWater next? How did you choose where to go?**

Our immediate goals for 2015 are to increase the number of free mWater users by at least 10 fold and to build automated analysis and visualization features so that you can use mWater not just for data collection, but all the way through analysis and presentation of results. For our in-house projects, we will be using data to create innovative approaches to expanding or improving water services in an equitable, cost-effective, and sustainable manner.

A. Gambrill

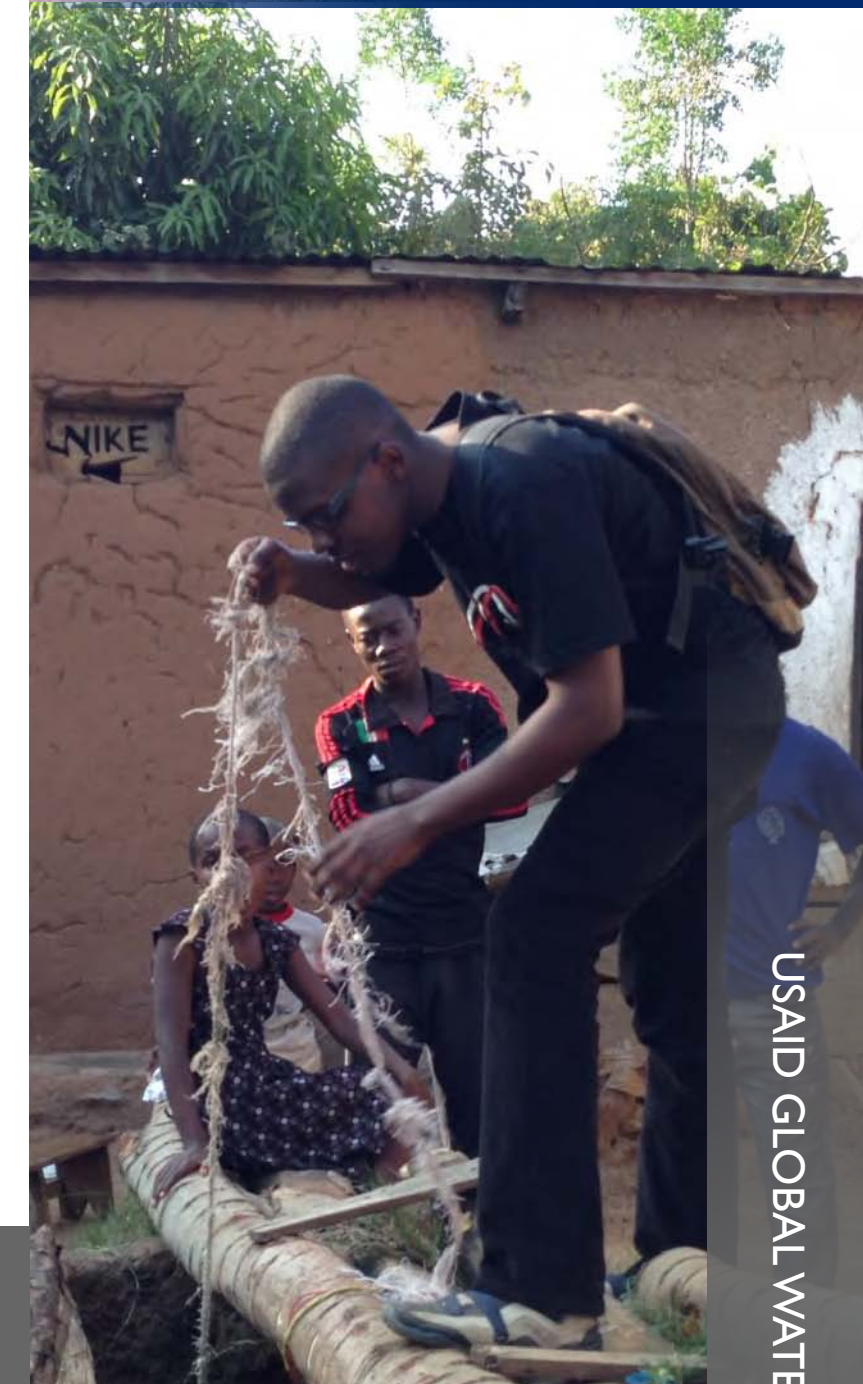
**More Information**

- Download mWater App
- Follow mWater on Twitter
- Learn about a USAID/mWater collaboration



**SAFE SOURCE:** Many water sources are contaminated at levels that are not even safe for bathing.

Photo Credit: mWater



**ENSURING QUALITY:** mWater has created one-time use kits to help users know if their water is safe.

Photo Credit: DIV at USAID

**Ag·ri·cul·tur·al Wa·ter Man·age·ment** is using water in a way that provides crops and animals the amount of water they need, enhances productivity, and conserves natural resources for the benefit of downstream users and ecosystem services.

# SEEDS of change

Growing Maize Sustainably in Nepal



**T**here is a common saying in Nepal, “If there is no maize, there is nothing to eat.” Yet this staple crop, which makes up about a quarter of the country’s food grain supply, is in jeopardy. Climate change and limited access to new information and technology in the hill region are key challenges. Many families are consequently trapped in a cycle of extreme poverty, chronic hunger, and undernutrition.



**FLOURISHING FUTURES:** The majority of HMRP beneficiaries are women or those from socially or economically disadvantaged groups.

Photo Credit: USAID/Nepal

USAID’s Hill Maize Research Program (HMRP IV) has taken aim at the issues of food insecurity, poverty, and climate change through improved seed varieties and better crop management technologies. The program, part of the U.S. Government’s Feed the Future initiative and implemented by the International Maize and Wheat Improvement Center (CIMMYT) in partnership with government, NGO, and community stakeholders and private seed companies, is working across the middle hills of Nepal to boost maize production, empower disadvantaged populations, and strengthen communities in a sustainable way.

HMRP’s first three phases were funded by the Swiss Agency for Development and Cooperation from 1999 to 2010. In 2010, USAID stepped in to jointly

fund the program’s fourth phase. In this phase, the program is increasing the food security, nutrition, and incomes of more than 56,000 farm families in 20 hill districts by developing improved maize varieties and introducing conservation agriculture techniques that improve agricultural water management and nutrition.

### LOCAL FARMERS DECIDE THE BEST FIT

First, the program’s researchers worked to develop a maize variety that could tolerate drought and, in some areas, water logging – critical issues in Nepal’s hill region. “With climate change and variability, maize farmers in the hills of Nepal were facing serious crop losses every year and the entire maize value chain was at

risk,” said Nirmal Gadal, former HMRP team leader for CIMMYT.

HMRP extension and research partners joined forces with men and women farmers from disadvantaged communities throughout the country to learn which maize varieties would be most effective in their local contexts. Participating farmers worked with scientists to compare five or six new maize varieties with their own local varieties and shared the results, yielding new types of seeds that HMRP proposed for wider adoption in the region. “This community-based seed production program was a key approach,” said Dilli KC, Seed Value Chain and Marketing Expert, HMRP CIMMYT-Nepal.

Yields increased by up to 75 percent with the new maize varieties, which are not only

**A STAPLE CROP:** USAID is helping more than 56,000 farmers in Nepal’s hill districts to grow maize more sustainably.

Photo Credit: USAID/Nepal

higher yielding, but also more climate and disease-resistant. HMRP then worked to institutionalize participatory variety selection in the national research and extension systems. In 2013, the Government of Nepal approved the nation's first seed policy document, "National Seed Vision: 2013-2025," which HMRP helped to develop. HMRP also collaborated with the Ministry of Agriculture Development to draft a national seed policy that enables new climate-resistant seeds to be distributed across the country. "The slow nature of bureaucracy made the process challenging, but the program worked side-by-side with the Government of Nepal to start to address the needed updates to seed regulations and policies," said Mr. Gadal.

The project also helped farmers form seed producers' groups. Members benefit from increased income, and their peers benefit from a reliable means of

"With climate change and variability, maize farmers in the hills of Nepal were facing serious crop losses every year and the entire maize value chain was at risk."

*Nirmal Gadal, CIMMYT*

accessing the improved seeds. Nanu Maya Ghatani, chairperson of a women's seed cooperative, said that her income has doubled due to the program.

**MORE THAN SEEDS – SUSTAINABILITY**

HMRP is not just about working with seeds. It is also working with farmers to combat climate change in 10 hill locations through conservation agriculture trials. "We need to be more productive

with the water we have," said Beverly McIntyre, USAID Water Resources Advisor. "Successful agricultural water management is holistic in its approach." And HMRP is doing just that.

The program encourages farmers to keep about 30 percent of their crop residue on the soil surface to improve water moisture and better meet the biological and chemical needs of the soil and promotes minimal crop tillage to retain water and nutrients in the soil. It also encourages crop

rotation and intercropping of maize and vegetables (high value crops such as tomatoes, cabbage, and ginger) and maize and legumes, which result in better soil quality and nutrition for families.

These new techniques have been particularly life changing for Nepal's most vulnerable farmers, including women, Dalits (socially and economically disadvantaged populations), and Janajatis (indigenous nationalities). New technologies have taken tedious activities traditionally assigned to women and mechanized them, making time for more productive work. "Women farmers are not only able to send their children to school, but also feel more safe and sound in their family and society," said Ms. Ghatani, the women's cooperative chairperson. Sixty-three percent of the farmers in the program are women and 71 percent are disadvantaged.

Now the project's public-private partnerships will continue to ensure quality maize production while strengthening communities for the long term. "The program's holistic approach addresses both the natural resources and the people who depend on them, through gender and social inclusion and community governance," said Dr. KC. Without including all of these, there is truly nothing to eat.

*A. Gambrill*

**More Information**

[HMRP Website](#)

[Feed the Future Nepal Website](#)

[USAID/Nepal on Facebook](#)



**MAIZE FOR DAYS:** Maize is the staple crop in Nepal, but it is in jeopardy. HMRP is working to make it more sustainable.

Photo Credit: USAID/Nepal



**LIMITLESS POTENTIAL:** Maya, above, is a widowed mother-of-three from a socially disadvantaged group who benefitted from HMRP's work.

Photo Credit: D. Mowbray, CIMMYT



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