

ABSTRACT VOLUME



World Water Week
25 - 30 August 2019

Water for society – including all

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World Water Week in Stockholm

25 – 30 August

Water for society – including all

Contents

Seminar: Women and youth: Living apart together	3
Seminar: Water governance with and for all: Is it working?	27
Seminar: Sanitation for society, including all	61
Seminar: Transforming societies to meet the SDGs: The role of finance	75
Seminar: Water (in)security, migration, and regional integration: Is there a nexus? ...	101
Seminar: Equity in climate change adaptation	117
Seminar: Entrepreneurship driving water impact for all	141
Seminar: Linking biodiversity with inclusive development to achieve the 2030 Agenda	155
Seminar: Innovation: Business as Unusual	169

Seminar: Women and youth: Living apart together



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Contents

Mainstreaming women/youth in stakeholder engagement in the Kura River Basin	5
Analysing gender effectiveness of groundwater governance frameworks	7
Barriers to inclusion: insights from Bangladesh, Nepal and Uganda	9
WASH enterprises in Cambodia and Indonesia: A pathway for empowerment?	11
Women, water, access and finance: the right recipe.....	13
Gendered tenorial niches and access to the irrigation in Africa.....	15
Menstrual hygiene management in the workplace and women's economic empowerment	17
Unravelling gendered practices in the public water sector in Nepal.....	19
Youth and Women for drinking water security.....	21
Gender Mainstreaming in Sanitation: Implementation Experience from Narsapur, India.	23
Unravelling the concept of water governance in SDG era	53
The Opportunities of Water Diplomacy to Complement Regional Water Governance	55
Quantifying laws and regulations for better water resources management.....	57
The paradox and progress of rural water sustainability in Africa	59

Mainstreaming women/youth in stakeholder engagement in the Kura River Basin

Authors: Dr. Jeanene Mitchell, United Nations Development Programme, United States

Keywords

Women, youth, gender mainstreaming, stakeholder engagement

Highlights

This paper describes how the mainstreaming of women and youth voices in water management occurs through stakeholder engagement initiatives in the Kura River Basin.

Combining high-level dialogues, joint research programs and targeted trainings forges new connections between transnational, state, and local actors germane to women, youth, and water.

Introduction and objectives

To achieve sustainable mainstreaming of women and youth voices in transboundary water management within the Kura River Basin of Azerbaijan and Georgia, the UNDP-GEF Kura II project is engaging in stakeholder engagement initiatives that are novel because they span the transnational, state and local scales. These initiatives - including high-level dialogues, multilateral research programs and targeted trainings for capacity building - are being developed with the input of women and youth in collaboration with key institutional stakeholders in water management. The objective is to move beyond one-off mainstreaming initiatives to co-production of water management policies by and for women/youth.

Methodology approach

This paper uses ethnographic and anthropological methods to explain the processes of translating high-level stakeholder engagement on gender/youth mainstreaming to the state and local scale in the Kura River Basin. These methods describe the process of increasing women and youth voices in institutional stakeholder dialogues on the relationship between water, women and children; to increase women's knowledge of rational water use, such as through access to more efficient irrigation technologies; and to address the disproportionate impacts of drought and flooding on women and youth.

Analysis and results

Stakeholder engagement that incorporates the voices of women and youth in transboundary water management creates synergies among actors that help to better identify and address problems specific to these groups. The challenge, however, is twofold: 1) cultivating forms of engagement in relation to women and youth that are sustainable beyond a one-off initiative, and 2) engaging with local women and youth in a way that fosters a connection and information exchange with key institutional stakeholders.

These challenges are addressed in three ways: 1) through repeated and varied forms of engagement with groups of actors germane to women/youth issues and water management, ranging from roundtables to trainings; 2) through on-the-ground research conducted with these actors that gives primacy to the voices of women and youth, allowing them to identify problems and help set the agenda for capacity building, and 3) by beginning with high-level support from key institutional stakeholders for engagement at multiple levels. Specific examples are provided.

In the Kura River Basin, the result is that women and youth can help to identify priority issues and establish a capacity building agenda that meets the needs of their communities, while building their connections with transboundary and state stakeholders.

Conclusions and recommendation

Including women and youth voices in transboundary water management within the Kura River Basin helps identify multiple priority issues: women and children's relationship to water in the Kura River; bolstering women's knowledge of rational water use, including through access to more efficient irrigation technologies; and addressing the disproportionate impacts of drought and flooding on women and children. Taking a multi-level, multi-stakeholder approach to mainstreaming the voices of women and youth in water management promotes sustainable, replicable engagement between these groups and other key stakeholders.

Presenter biography



Dr. Jeanene Mitchell, United Nations Development Programme, United States

Dr. Jeanene Mitchell has 17 years of experience in water, energy, and environmental policy, with an area studies focus on Turkey and the South Caucasus. She is currently managing the stakeholder engagement component of the UNDP-GEF Kura II Project: Advancing IWRM across the Kura River Basin in Azerbaijan and Georgia. Her research interests include gender mainstreaming, state-society relations, and understanding the interconnection between local, national, and international actors in solving environmental problems.

Analysing gender effectiveness of groundwater governance frameworks

Authors: Ms. Paola Piccione, UNESCO World Water Assessment Programme, Italy

Keywords

Groundwater governance, Gender mainstreaming, Policy, Sex-disaggregated water data

Highlights

- Call for mainstreaming gender into groundwater governance frameworks to achieve the 2030 Agenda
- Share case studies and policy recommendations based on the results of the application of the UNESCO WWAP Toolkit and methodology on Sex-disaggregated Water Data within the UNESCO “Groundwater Resources Governance in Transboundary Aquifers” (GGRETA) Project.

Introduction and objectives

Groundwater and gender are intrinsically linked. Nevertheless, groundwater studies conducted so far have mainly focused on individual (male) farmers' control over resources and technology, with little attention to governance frameworks and even less focus on their gender impacts and the key role of women in the water realm.

The 2019 policy paper produced by UNESCO WWAP and IHP aims at filling this gap by analysing how gender issues are currently addressed in groundwater governance frameworks and programming on the global, regional/transboundary and national levels. In addition, it provides recommendations to policy-makers and practitioners for engendering groundwater governance through different tools.

Methodology approach

The global and regional groundwater governance framework analyses are based on review of existing literature, policies and frameworks. The regional focus is on Southern Africa, Central America and Southeast Asia.

The case study of the Stampriet Transboundary Aquifer System (STAS) located in Southern Africa is informed by two gender surveys conducted within the Groundwater Governance in the Transboundary Aquifers (GGRETA) Project, led by UNESCO and funded by Swiss Development Cooperation (SDC).

Analytical elements of the gender-responsive water data collected are discussed to analyse the consistency of national water policies and laws of Botswana and Namibia with the gender-related patterns on the ground.

Analysis and results

The analysis of the global and regional/transboundary levels showed that, although the need to mainstream gender in water governance is increasingly being recognized, further efforts are needed at the implementation and policy levels.

A transboundary mechanism for coordinated actions/management of the STAS by the countries that share the aquifer could represent a valuable opportunity for both ensuring women's empowerment in groundwater governance, and for setting a good practice for the management of other transboundary aquifers elsewhere.

At the national level, two intra-household surveys were conducted in the Stampriet transboundary aquifer area (in Ncojane village - Botswana and in Stampriet Town – Namibia) by applying the UNESCO WWAP Toolkit on the collection of sex-disaggregated water data and key indicators. The selected gender-responsive

indicators included access to safe drinking water, sanitation and hygiene, water governance, decision-making, water for agriculture and income generation.

The findings of the field testing suggest, among other things, that men still emerge as primary decision makers in household water-related decision making, in contrast with the national water policy's goal of empowerment and full inclusion of women in issues and decisions relating to sustainable development and management of water resources.

Conclusions and recommendation

The lack of gender responsiveness in groundwater governance frameworks at all levels can exacerbate existing inequalities between women and men in the use, management and decision-making related to groundwater resources.

For this reason, this report calls for gender mainstreaming and analysis into groundwater governance frameworks at all level including transboundary, urging policy-makers and practitioners to fully acknowledge these two interlinked areas and inform, with scientific evidence, national and regional/transboundary water programmes and policies for future gender-transformative action planning.

Presenter biography



Ms. Paola Piccione, UNESCO World Water Assessment Programme, Italy

Paola Piccione is the Gender and Water Specialist at the UNESCO World Water Assessment Programme (WWAP). In this capacity, she contributes to implementing WWAP gender portfolio, supporting Member States to incorporate gender considerations into water policies.

Prior to joining WWAP, Paola has worked for more than ten years on mainstreaming gender into policies and development programmes, results-based management and partnerships for the United Nations Development Programme (UNDP), the Italian Ministry of Foreign Affairs and NGOs in Italy, Thailand, South Sudan and Iraq. She holds a master's degree in Gender and Development from the London School of Economics and Political Science-LSE.

Barriers to inclusion: insights from Bangladesh, Nepal and Uganda

Authors: Ms. Sara Ahrari, Simavi, Netherlands

Keywords

GESI, SDGs, barriers, inclusion, LNOB

Highlights

- Relationships and differences found challenged some of our assumptions and expectations on barriers to inclusion.
- Insight in specific barriers to inclusion is needed to make sure 'no one is left behind'.
- WASH programmes need to go beyond inviting women to meetings and ensure they can influence decisions.

Introduction and objectives

The WASH SDG programme (2017-2022) is being implemented in seven countries by a consortium consisting of the WASH Alliance International (WAI), Plan Netherlands and SNV aiming towards an improved WASH situation for all. Simavi as lead implementing organisation of the WAI-programme in Bangladesh, Nepal and Uganda designed and conducted the baseline assessment to gather evidence on the barriers to inclusion and identify who are left behind in access to / use of WASH services and participation in related decision making processes. Data analysis provided insights on how exclusion works in these countries which challenged some of our previously held assumptions.

Methodology approach

The following research questions were asked and answered:

- How are the WASH practices different for different (marginalized) groups?
- How does this differ per country?
- What are the barriers for inclusion?

The baseline study consisted of a household survey (around 1000 respondents per country, including water quality assessments) to find out the WASH practices (following the JMP ladders), disaggregated for different wealth quintiles, urban/rural settings and gender. Additionally, Key Informant Interviews with key stakeholders and a Gender and Social Inclusion (GESI) Assessment are done to find out more about the barriers to inclusion.

Analysis and results

The baseline studied showed that barriers to inclusion vary per country and even per locality, and general perceptions such as that the poor have less access to safe sanitation might not be true in all circumstances. Relationships and differences found challenged some of our previously held assumptions. In Bangladesh for example, the poorest group of people does not seem to be left behind in terms of sanitation services – probably because many development programmes have been targeting the poor there. In terms of use of safe drinking water the differences between the different wealth groups are much smaller compared to the use of safe sanitation services – probably because drinking water is more easily taken care of at community level whereas sanitation facilities are much more organised at household level.

Limited control and decision making power of women over household and community investments/resources, and women carrying most of the unpaid work within the household were identified as the main barriers to economic inclusion. On the other hand women were the main recipients of the loans from saving and or credit groups, which combined with their limited decision making power can lead to their exposure to violence within and outside family.

Conclusions and recommendation

Gender stereotyping, patriarchal system, limited female mobility outside house, discriminatory beliefs and stigma's against minorities, women lack of decision making power, and lack of knowledge of men and boys were among the major social and cultural barriers in these countries.

Stigmas related to disability within family and menstrual health might have affected the response to some questions. We hope to learn more about the real situation during the programme.

However, comparing three countries shows how important it is to be specific in identifying the barriers to inclusion in each context to make sure 'no one is left behind'.

Presenter biography



Ms. Sara Ahrari, Simavi, Netherlands

Sara Ahrari is Simavi Programme Manager. She is Iranian/Dutch and has a master in Civil Engineering. Prior to joining Simavi has worked with oil & gas companies, emergency response and disaster risk reduction programmes with international NGOs (namely World Vision, International Medical Corps, Asian Disaster Preparedness Center) and UN agencies (UNICEF and UNOPS) in Iran, Pakistan, Indonesia and Thailand. Since 2009 she is working with Simavi. She uses her technical background and field experience combined with the social skills to strengthen the inclusiveness and sustainability of WASH services in her work.

WASH enterprises in Cambodia and Indonesia: A pathway for empowerment?

Authors: Prof Juliet Willetts, University of Technology Sydney, Australia

Keywords

Women's empowerment, economic empowerment, WASH enterprises, women's entrepreneurship, enablers and barriers

Highlights

- First research in Cambodia and Indonesia to examine empowerment of women in WASH enterprises
- Whilst the study showed evidence of empowerment, challenges and negotiations were equally observed
- Socio-cultural and religious norms, mobility and reproductive and productive workloads need consideration by NGOs, donors and governments incentivizing women's involvement in WASH markets.

Introduction and objectives

This study examined the extent to which women's involvement in economic activity in the WASH sector led to their empowerment, including economic empowerment in Cambodia and Indonesia. This study was the first of its kind to systematically investigate the experiences and needs of female WASH entrepreneurs with reference to women's empowerment frameworks.

In alignment with this seminar session, this research presents examples of gender equality outcomes and empowerment experiences by individuals and institutions involved in WASH markets and the implications of these for improving WASH programming.

Methodology approach

This study adopted a primarily qualitative methodology, allowing for the in-depth exploration of women's participation in WASH economic activity leading to their empowerment. An empowerment framework was adopted which conceptualized four types of power: 'power within', 'power to', 'power over' and 'power with' (Eyben, Kabeer & Cornwall, 2008; Taylor & Perezniето, 2014). A semi-structured interview guide focused on 45 participants' personal and family situation, motivations, key enablers and barriers to managing a WASH enterprise and potential support strategies. Thematic analysis was conducted including identification of common and exceptional experiences, and elucidation of key factors affecting women's empowerment pathways and

Analysis and results

This study found that whilst there was evidence of empowerment, including economic empowerment, the complexity of the empowerment process, challenges and negotiations were equally observed. This aligns with accepted knowledge that describes empowerment as an ongoing, relational and context-specific process, which is complex to measure (Cornwall 2016, Mosedale 2005, Kabeer 1999).

In Cambodia, the study found that key barriers and enablers to establishing successful water enterprises were influenced by local gender norms and expectations, in line with other literature (Leahy et al., 2017). The majority of entrepreneurs reported managing enterprise finances, but had concerns about access to finance, their freedom of movement, and their need for additional technical training. High interest rates, the double burden of work (such as housework and running a business) were reported by several entrepreneurs.

In Indonesia, women's experiences in WASH enterprises were highly varied. Women mostly believed they had equal capabilities to men due to their communication, negotiation and managerial skills. However, socio-cultural gender norms, particularly concerning women's reproductive roles (also highlighted by Arsana and

Alibhai 2016), meant that only few participants experienced support from close relationships enabling their decision-making, leadership and financial independence. Similar to Cambodia, access to finance and mobility presented

Conclusions and recommendation

This study showed that women's empowerment outcomes can be achieved through their leadership of and involvement in WASH-enterprises. However, gender norms were also limiting women's empowerment in WASH markets in terms of mobility, household and family duties, and traditional views about women and men's domains. As such, targeted strategies are needed to address such constraints. The findings of this study can assist NGOs, donors and governments incentivising WASH markets to ensure these interventions are not gender blind, and to draw on evidence of the barriers and enablers for female entrepreneurs and how these are influenced by gender norms.

Presenter biography



Prof Juliet Willetts, University of Technology Sydney, Australia

Professor Juliet Willetts leads applied research to inform policy and practice in water and sanitation in Asia-Pacific. With a background in engineering, her work has contributed to technical solutions, institutional and governance settings, private sector roles, gender equality, and more effective sector and program monitoring.

She is a founding member of the Australian Water, Sanitation and Hygiene Reference group and has been recognised by several research excellence and leadership awards. Juliet has led six major research grants, undertaken more than 80 research projects and published more than 70 peer-reviewed articles.

Women, water, access and finance: the right recipe

Authors: Ms. Lesley Pories, Water.org , United States

Keywords

WASH, access, women-headed households, microfinance, subsidy

Highlights

- When government subsidies are paired with complementary financing opportunities, women's access to household water and sanitation will substantially increase.
- Existing data demonstrates that low-income women are successfully borrowing and repaying microloans for water and sanitation.
- Microcredit is an important tool in the global effort to increase women's access to WASH

Introduction and objectives

Increasing women's access to safe water and sanitation is intricately connected with direct access to finance. The enormous projected costs of SDG6 have shocked the sector into exploring non-traditional approaches to finance, and one method that is gaining momentum is the provision of microloans for household water and sanitation. Drivers for this growth in interest will be examined in the Philippines by uniting World Bank data from a recent study with four years of loan data from Water.org's WASH microfinance portfolio. Together, these sources will demonstrate the potential for micro-lending to enable low-income women to meet their WASH needs.

Methodology approach

This presentation will integrate the recently completed World Bank Endline Survey for the Impact Evaluation of Overcoming Barriers to Adoption of Sanitation for the Poor Households in the Philippines with Water.org's database of loan data from WASH lending in the same country. The World Bank study was a two-year randomized control trial of low-income, predominantly female-headed households in the Philippines. Water.org has been assisting several microfinance institutions (MFIs) in the Philippines to offer WASH microloans for the past four years and has a rich database that contains data about borrower gender, income level, household size and repayment progress.

Analysis and results

The World Bank impact assessment revealed that sanitary toilet uptake increased by 38% when provided a 50% subsidy and a microfinance loan. The population group in this study featured 90% female respondents, 21% of whom are head of their household. Participant households that took loans (551) had a 98% repayment rate, suggesting that when offered a loan terms that are designed to meet the needs of low-income clients, repayment is manageable. Water.org loan data in the Philippines corroborates this theory, with 97% of borrowers for 532,000 water and sanitation microloans being female and an overall portfolio of a 99% repayment rate. Further dis-aggregation of loan data reveals 75% of those loans have been disbursed for sanitation. The study further identifies that households that installed toilets saw increases in ownership of luxury items such as television, refrigerators and motorbikes, suggesting that toilet investments had positive impacts upon household income. Deeper analysis of the impact evaluation data is forthcoming to derive additional understanding about decisions that were made at different income levels (within the poor) and comfort levels with borrowing.

Conclusions and recommendation

Microcredit can be an effective method of securing access to water and sanitation for women, and the potential to reach increasingly poor women is greater when effectively paired with a government subsidy.

The structure and impacts of the combined program should be reviewed by governments with strong mandates to reach the underserved to assess opportunities to model similar programs. Another recommendation is for policymakers to consider the value of consistently pairing subsidy programs alongside microcredit to maximize uptake and impact. Finally, these findings can be shared with MFIs to encourage their willingness to participate in the implementation of such programs.

Presenter biography



Ms. Lesley Pories, Water.org, United States

Lesley Pories is Manager of Sector Strategy at Water.org. Before joining the team that builds Water.org's strategic relationships with sector influencers on global stages as well as at country level, she managed part of Water.org's portfolio in India. Lesley's previous work experience includes the World Bank, World Resources Institute, UNDP and the Carter Center. She holds degrees in City and Regional Planning as well as International Environmental

Gendered tenurial niches and access to the irrigation in Africa

Authors: Dr. Everisto Mapedza, International Water Management Institute, Ghana

Keywords

Gender, tenure, irrigation, Africa, SDGs

Highlights

This paper contributes towards a better understanding of gender in irrigated agriculture and how such knowledge could help enhance fulfillment of the Sustainable Development Goals in Africa. The study hinges on land and water rights for women and how gender places barriers on women for increased agricultural productivity.

Introduction and objectives

The objective of the study is to better understand how land and water rights affected women access to irrigated agriculture in rural Malawi and drawing lessons of experience for Africa. Formal cadastral boundaries are perceived as an incentive for individuals to invest in land. De soto and his supporters have emphasized the key role of well-defined cadastral boundaries as an incentive for land based investments. This study looks at how gender and tenurial niches overlap as decisions on irrigated agriculture are undertaken within the context of fuzzy and shifting land tenure boundaries which, however, have enabled gendered investments in agriculture.

Methodology approach

The study used mixed methods to triangulate research findings. Firstly, a questionnaire survey was conducted in Malawi. The questionnaire covered issues such as household profiles, assets ownership, farming activities, access to land and water as well as agricultural inputs and agricultural extension. All the data thematic topics were sex-dis-aggregated. Secondly, Focus Group Discussions were conducted with men, women and youths separately. The concluding Focus Group discussions were combined. Thirdly, field participant observation was conducted with one of the authors residing in study area, attending meetings and social events to have a better understanding of gender beyond the formal research process.

Analysis and results

Gendered land ownership and skewed access to water resources for irrigation was clearly demonstrated. Out of a total 75 irrigators, 53 were women with 22 men. This is ironical in that the study area is matrilineal where land is inherited through the females yet for irrigated irrigation you still found men ‘owning’ land and having access to irrigation water. This finding further demonstrated the need to go beyond the binary of matrilineal and patriarchal land ownership. This calls for scholarship that engages with the gradient of land landownership that brings out the multiple and competing stories on how both women and men are accessing land for irrigated agriculture. Decision making within the irrigated schemes was clearly gendered. In terms of decision making within Water User Associations senior positions were all held by men. The only senior position held by a woman was treasurer. Most of the decisions on how irrigation rules, scheduling, and other governing regulations were largely made by men despite women being the majority in the irrigation scheme. The study also demonstrated that women had less access to agricultural extension. For credit, men had 41% access compared to 59% for women despite comprising 70% of the

Conclusions and recommendation

Gender does matter on who accesses land and water resources for improved livelihoods within Africa. One of the conclusions is also that whilst it is important for women to have access to land it is also important to have mechanisms that protect women’s rights to irrigated land that is considered more ‘valuable’ than rain

fed land. Whilst land ownership is necessary, on its own it is not adequate. Women who own land need further support in terms of extension, access to capital, access to enhanced social capital, access to assets, access to markets and access to decision making institutions such

Presenter biography



Dr. Everisto Mapedza, International Water Management Institute, Ghana

Everisto Mapedza is a Senior Researcher at the International Water Management Institute (IWMI) based in the West Africa office in Accra, Ghana. Everisto was previously a Research Fellow at the London School of Economics and Political Science (LSE).

Menstrual hygiene management in the workplace and women's economic empowerment

Authors: Dr. Aditi Krishna, Iris Group, United States

Keywords

Menstrual hygiene management (MHM), gender, economic assessment, empowerment, inclusion

Highlights

- This study fills a gap in research on the effects of MHM on women's economic empowerment.
- The economic model demonstrates the social and economic returns of MHM in the workplace.
- Expected benefits of adequate MHM in the workplace include reduced absenteeism, increased productivity, and greater job security

Introduction and objectives

MHM research has largely focused on the links between MHM and schooling outcomes with less attention to the effects of MHM on later, economic outcomes for women. Indeed, inadequate provisions for MHM have lasting and compounding effects across the life-course. These economic disadvantages are rooted in poor educational attainment and reinforced by poor MHM conditions in the workplace contributing to absenteeism and lower productivity. Our study surveys the existing evidence on MHM and women's economic empowerment and uses the relationships established by preliminary work to develop a model that estimates the economic impacts of MHM conditions in the workplace.

Methodology approach

As part of USAID's Water, Sanitation, and Hygiene Partnerships and Learning for Sustainability (WASHPaLS) project, we will review the evidence on MHM and economic empowerment to glean inputs for the economic model. Two research questions will guide this work:

- What is the evidence of the cost-effectiveness, sustainability and scalability of approaches to address MHM in the workplace?
- What are the links between MHM in the workplace and women's economic empowerment? What losses ensue from poor MHM in the workplace?

The economic model will use social cost-benefit methods to estimate impacts on outcomes such as social isolation, workforce productivity,

Analysis and results

To our knowledge, there is a paucity of evidence on MHM and women's economic empowerment. Broadly, sanitation programs have demonstrated economic, social, and health benefits for all individuals. Pertaining to MHM, interventions have improved psychosocial outcomes and reduced sanitation insecurity especially for adult women. Consistent with these findings, we anticipate that identified resources will show positive relationships between adequate MHM and economic empowerment for women. The economic model also will corroborate these findings, quantitatively demonstrating the social and economic returns of improved MHM in the workplace. More specifically, MHM in the workplace will reduce absenteeism and increase productivity and promote women's sense of job security and satisfaction. There are likely intergenerational effects of improved MHM because economically empowered women are better able to advocate for and invest in the empowerment of their daughters.

Conclusions and recommendation

This study contributes to the body of knowledge on MHM, gender and sanitation in the workplace, and links to women's economic empowerment, filling a key gap in the evidence on the effects of MHM later in the

life-course. The contributions of this work shed light on the importance of MHM in the workplace and garners support for greater investment in initiatives to improve MHM conditions for women in pursuit of economic empowerment.

Presenter biography



Dr. Aditi Krishna, Iris Group, United States

Aditi Krishna, PhD, MS, is a Senior Associate at Iris Group. She is a social epidemiologist with expertise in water, sanitation and hygiene (WASH), maternal and child health, nutrition, child development, family planning, and reproductive and sexual health. At Iris Group, Aditi provides key technical services on WASH through two USAID-funded projects: (a) a WASH and integrated water resource management project in Tanzania, and (b) a global project to learning and partnerships to improve WASH programming by identifying, sharing and guiding the use of best practices for the delivery of WASH services and sustained behavior.

Unravelling gendered practices in the public water sector in Nepal

Authors: Ms. Gitta Shrestha, International Water Management Institute, Nepal

Keywords

Gender, Institutions, Nepal, professional culture, water user associations

Highlights

- Institutionalisation of gender in public organisations alone is unlikely to achieve gender equality.
- The masculine professional culture of the water sector contributes to reproducing gendered inequalities across work spaces.
- Attention to masculine spaces, practices and attitudes is imperative to address equity and justice issues in water sector.

Introduction and objectives

Despite decades of gender mainstreaming in the water sector, a wide gap between policy commitments and outcomes remains. This study aims at offering a fresh perspective on such policy gaps, by analysing how gendered discourses, institutions and masculine professional culture contribute to policy gaps. By doing so, this research deals with policy and institutional aspect of water governance issues at different levels– in central or local level offices, in development project units, in meetings, in the field etc. thereby, offers an important contribution to the aim of the session which is to achieve inclusive and equitable water governance.

Methodology approach

We reviewed public policies in the water sector. We draw on a series of semi-structured interviews with water professionals from public agencies operating in the water sector, representatives from the civil society and non-government organisations (NGOs). Interviews were conducted in Kathmandu in February-March 2017. Respondents represented a mix of engineers, sociologists and gender experts, at different seniority levels. Altogether, 21 interviews (12 females, 19 males) were conducted in February and March 2017. To analyse our data, we relied on the TPC framework for strategic change management (Tichy, 1983). It was adapted for gender mainstreaming by Oxfam Novib (2010).

Analysis and results

Our research confirms and adds to the emerging scholarships on masculinities and gendered organisations and its impact on gender equality goals in Nepal (Zwarteveen, M. Z. 2008; Liebrand, J., & Udas, P. B. 2017). Our findings evidence how dominant discourses, formal rules and professional culture, intersect to support and reproduce hegemonic masculine attitudes and practices of water professionals. Such attitudes and practices in turn favour a technocratic implementation of policy measures.

The predominant narratives, institutional arrangements and professional culture in the water sector have negatively influenced the implementation of policy efforts towards gender equality. Gender issues are delimited to the 'WUA space', with well-delineated experts, the sociologists, institutional set-up, the GESI unit, and activities. There is no space or incentives to reflect and learn on GESI-related challenges. This has contributed to the technocratic implementation of democratic and participatory decision-making in water management –limited to following fixed procedures that does not address the root causes of injustices. Gender is perceived as a frivolous ethical gloss imposed by donors rather than as a technical subject. The narrow focus on WUA and the lack of involvement of engineers in improving gender equality infer that many opportunities for more gender-sensitive interventions are lost.

Conclusions and recommendation

We argue that gender equality policy initiatives in the water sector have overly focused on local level formal institutions and have not adequately considered the effects of masculine discourses, norms and culture. We contend that as long as water agencies do not acknowledge the social nature of water and the hegemonic masculinity of the professional culture, policy commitments towards gender equality will have little effect on the ground. It is important that water institutions pay attention to their own masculine spaces, practices and attitudes, in order to address equity and justice issues in water resource management at the ground level.

Presenter biography



Ms. Gitta Shrestha, International Water Management Institute, Nepal

I am a post graduate [M.Phil] in human geography from the University of Bergen, Norway. Currently, I work as a senior research officer at the International Water Resource Management, Nepal. My research interest involves inquiring into the reproduction of social and gender inequalities, role of norms, trust and emotions and its impact on the changing human-environment relations. My ongoing research investigates water governance at the organisational and at the community level in Nepal.

Youth and Women for drinking water security

Authors: Ms. Amrita Gautam, Water Youth Network, Women for Water Partnership, World Youth Parliament for Water, Technische Hochschule Köln and Universität zu Köln, Germany

Keywords

"Youth and Women", Drinking Water Security, Water Quality Monitoring, Information and Communication Technologies (ICTs)

Highlights

- Drinking Water Quality Monitoring in developing regions is a big challenge (No baseline Data).
- 'Youth Inclusion' Strategy helps in managing drinking water quality data using digital application (Mobile app).
- Local expertise of Women Groups play guiding role in the framework of integrated ICTs and Youth-led citizen science for water quality monitoring system.

Introduction and objectives

Despite huge investment in implementing the Water Safety Plan (WSP) approach in developing regions, many countries still lack the baseline water quality data in the water supply system. "Youth and Women" are active stakeholders in many water-related projects but their knowledge and capabilities are not properly valued and scaled up in drinking water quality monitoring plan. Thus, my research project aims to develop a systematic approach to assess and monitor water quality by proposing relevant technical solutions (HydroInformatics) incorporating needs, capabilities, and support of local communities (esp. Youth and Women) including responsible local institutions for safe drinking-water monitoring.

Methodology approach

The main research questions were to understand, why existing water safety plans are not working completely to fill the information gap on water quality; How can 'Youth & Women Groups' be included in drinking water monitoring plan using ICTs?, and What is the adequate design of integrated ICTs and Youth-led citizen science for water quality monitoring system?, and how can it be optimized?

The situational analysis, design, and testing of a mobile application were done with interviews/workshops/experts' consultation to understand the existing situation and to develop the strategy to include youth and women in drinking water monitoring plan.

Analysis and results

The research approach focused mainly on the selection of HydroInformatics tools (like mobile application: dWaterInfo, smart water quality sensors) in combination with stakeholders' participation/Citizen Science (through water user's committees, local schools/universities and authorities) including co-learning interfaces (mobile e-learning), which in conjunction aims to provide a suitable data management system: Techno-Socio-Institutional (TSI) Model towards drinking water security. The Youth and Women showed great interest from the beginning of the study and have been actively involved in data collection training and session connected by Water Supply Provider (Department of Water Supply and Sewerage Management), local schools/universities, Karkhana (educational company), Soroptimist International (member of Women for Water Partnership). This research is on-going and more methods will be applied (Technology Applicability Framework and Technology Introduction Process for detailed implementation of the model and to check the reliability and scalability), and more results will be obtained and analyzed during this summer field research plan (by June/July 2019) before coming to Stockholm WWW (August 2019).

Conclusions and recommendation

This research aimed to investigate the roles of Youth (through Water Clubs) in monitoring water quality in water supply systems using ICTs, where Women's group of the localities are also considered as the active collaborators/ facilitators. The long term financial support to Water Clubs is the crucial part of the responsibility and it is still under discussion and needs to be followed in a timely manner so that the positive results of the model will get an opportunity to grow in replicating this idea in many other adjacent regions and beyond.

Presenter biography



Ms. Amrita Gautam, Water Youth Network, Women for Water Partnership, World Youth Parliament for Water, Technische Hochschule Köln and Universität zu Köln, Germany

Amrita Gautam, a Ph.D. research scholar in Technical University of Cologne (TH Koeln), Germany, is originally from Kathmandu, Nepal. She is Civil Engineer by profession and has worked for different United Nations (UN) Projects in Nepal, Germany and America. Her ongoing doctoral research is about “Water Supply and Quality Monitoring via emerging technologies”, and the case study area is Pokhara Metropolitan City (PMC), Nepal. The case study area of master thesis was Rio de Janeiro, Brazil. As a Young Water Professional, Amrita has been handling active roles in different organizations in water sector like IWA, RWSN, WYPW, WfWP and SI.

Gender Mainstreaming in Sanitation: Implementation Experience from Narsapur, India.

Authors: Dr. Y. Malini Reddy, Administrative Staff College of India, India

Keywords

Women, Gender, Sanitation, India, Vulnerabilities

Highlights

Narsapur, a town with 60% of its population living in informal settlements aspires to achieve city wide inclusive sanitation to benefit the often neglected poor, vulnerable and marginalized communities. The Mayor of the town, a lady, envisioned a gendered approach towards planning and provisioning of sanitation services.

Introduction and objectives

Narsapur Municipal Corporation took practical steps to involve women and vulnerable groups in sanitation planning for achieving citywide inclusive sanitation. This paper presents the framework and practical actions initiated for mainstreaming gender in FSM. The approaches taken by the city to address gender gaps and barriers to women empowerment are discussed. Also discussed are the potential solutions to address the challenge of strengthening institutions and individual capacities for gender mainstreaming in FSM. The initiatives aimed at mainstreaming gender in FSM have yielded positive results and have enthused the city to apply a gender lens to all sanitation activities.

Methodology approach

A detailed survey incorporating gender lens and inclusive approach was undertaken to cover the 12,000 households/properties in Narsapur with an aim to understand access to sanitation infrastructure and services as well as the attitudes and behaviors related to sanitation and hygiene practices. Focus group discussions and key informant interviews at 43 informal settlements were conducted to map vulnerabilities. The analysis brought to light sanitation practices, challenges and requirements in the town. It revealed the existence of deep-seated gender discrimination and exclusion faced by women, children, elderly and vulnerable groups (fisher folk, pig rearing community, differently abled) in accessing sanitation

Analysis and results

Basis the results, the city council and municipality have taken transformative initiatives towards mainstreaming gender in sanitation:

- Workshops to involve women self-help groups in addressing sanitation, related gender issues, extending funding towards construction of toilets and promoting livelihoods/entrepreneurship.
- Identification of change champions and formation of Gender Forums (GF) in all the urban poor settlements to bring insights and concerns to a formal institutional structure, a Gender Resource Centre (GRC) established at the municipality.
- Gender sensitisation and budgeting workshops for municipal functionaries and key stakeholders
- Expansion of City Sanitation Task Force (CSTF), a multi-stakeholder platform, to include a sub-group on gender to bring the voices into policy and decision making.
- Inclusion of gender components in City Sanitation Plan (CSP): sex disaggregated data on usage patterns; inclusive designs; gender budgeting; Menstrual Hygiene Management in schools
- Involving women groups in maintenance of community and public toilet facilities, extending loans to women for construction of toilets to promote livelihoods/entrepreneurship.
- Encouraging entrepreneurship in emptying and transportation services – the only town in India to have a woman entrepreneur providing desludging services.

- The Faecal Sludge Treatment plant in Narsapur is operated and run by women.

Conclusions and recommendation

The city continues to collect evidence on gender gaps and building capacities to apply gender lens in sanitation investments. Mechanisms to identify opportunities to empower women, poor and vulnerable and to engage them in sanitation planning, decision making and delivery are now institutionalised.

While the city deepens its understanding of gender influences on sanitation and strives for gender equity, it also continues to face the challenges of rigid social norms, lack of active involvement of men in driving gender equity initiatives and limited capacities and financial resources with the the municipality to support and sustain the initiatives.

Presenter biography



Dr. Y. Malini Reddy, Administrative Staff College of India, India

A multi-disciplinary researcher and practitioner in the area of urban governance and service delivery, Dr. Malini is a specialist in management, ICT for development, social marketing, gender integration, policy and social entrepreneurship. She has more than 22 years of professional experience working with academic institutions, business organizations, Indian national, state and local governments, international foundations and not-for-profit organizations. She leads several international and national large and long duration assignments in the areas of sanitation, smart cities and improvements in public infrastructure as well as service design and delivery.

Gender and youth transformational laws

Authors: Ms. Alexandra Campbell-Ferrari, The Center for Water Security and Cooperation, United States

Keywords

WASH law, water, sanitation, gender, youth

Highlights

Women often are excluded from decision-making and planning processes. Law and policy play an essential role in making sure women and youth are represented in decision-making bodies. Laws and policies are also essential to ensuring that the unique needs and interests of women and youth are considered.

Introduction and objectives

Laws and policies can be gender unintentional, gender intentional or gender transformational. This means that laws can ignore the role of gender; acknowledge, but not advance gender; or transform how gender is addressed in decision-making regarding water and sanitation. Women are disproportionately impacted by poor water quality, water scarcity, and lack of sanitation. They often also have the clearest understanding of the needs of its communities but are excluded from key discussions and decisions. Laws and policies are essential to requiring that these shortcomings be addressed.

Methodology approach

We are examining laws more than five countries in Africa in order to determine whether the laws are gender unintentional, gender intentional or gender transformational. We are identifying those laws which specifically address or acknowledge gender as relevant to the mandate, implementation or enforcement of the law and the depth to which gender is acknowledged. For example, this would mean identifying whether a certain number of women must sit on a relevant decision making body (e.g. a water commission) which is more gender transformational in comparison to a law which states that women "can" serve as members of the Commission.

Analysis and results

Our research is ongoing. Based on our preliminary results, very few laws address or acknowledge gender. The degree to which gender is addressed varies widely, especially based on the topic (e.g. water rights v. sanitation v. governance/institutions). As we finalize our results we will develop a sliding scale to show the variation, as well as to demonstrate what countries can do to adopt more gender transformational laws. Laws that acknowledge gender and seek to engage more women are essential to generating broader and deeper change, especially in frequently disenfranchised communities (e.g. informal settlements and slums). Furthermore, laws mention youth and children even less.

Even when these groups are mentioned, there is very little specificity which allows for implementation of the law and actual elevation of women and women's interests and needs.

Conclusions and recommendation

The looming question is, if laws are not gender intentional or gender transformational, how do we write a law that is? We will offer suggestions for how the gender shortcomings in the laws we have examined can be addressed. For example, if a law requires public notice and comment on water-related regulations, one recommendation could be to require that input from women and women owned businesses be specifically requested. What is clearly evident is that the laws do not do enough to elevate women and youth in gaining access (and maintaining access) to water and sanitation, and more is needed.

Presenter biography



Ms. Alexandra Campbell-Ferrari, The Center for Water Security and Cooperation, United States

Alexandra Campbell-Ferrari is the Co-Founder and Executive Director of The Center for Water Security and Cooperation. Alexandra teaches Water Law at the University of Maryland Carey School of Law and American University Washington College of Law, and previously taught Legal Research and Writing at The George Washington University Law School. Alexandra is a member of the U.S. National Drinking Water Advisory Council and Co-Chair of the Water, Wastewater and Waste Pillar for Denton's Smart Cities and Communities Think Tank. Before co-founding the CWSC she was a Fulbright Scholar in Spain researching water law in Spain and the European Union.

Seminar: Water governance with and for all: Is it working?



ABSTRACT VOLUME

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Water for society – Including all

Contents

Improved water services cooperation through clarification of rules and roles	29
Community Based Water Tenure: The Missing Piece in Inclusive Governance	31
Social accountability and water integrity: three case studies	33
Hybrid water rights systems for pro-poor water governance in Africa	35
Social connections program for full access in Tangiers - Morocco	37
Water stress and human movement: eco-camps as exemplary solution	39
Political Economy of Domestic Water Scarcity in Eastern Himalayan Towns.....	41
Cenagrap, a public-communal alliance: a model for water management, Ecuador	43
Experiences from the 2016-2018 water crisis in Brazil's Federal District	45
Water Users Associations in Tanzania: local governance for whom?	47
Governing water (re)allocation in South Africa: insights from a crisis	49
Updating Ukraine's water governance system: From infrastructure to governance-oriented institutions ...	51
Unravelling the concept of water governance in SDG era	53
The Opportunities of Water Diplomacy to Complement Regional Water Governance	55
Quantifying laws and regulations for better water resources management.....	57
The paradox and progress of rural water sustainability in Africa	59

Improved water services cooperation through clarification of rules and roles

Authors: Ms. Laura Inha, Tampere University, Finland

Keywords

Good governance, institutional diversity, stakeholder collaboration, rules, roles

Highlights

Using a soccer analogy, inclusive institutional development requires skillful players, team play, proper coaching, supporters, managers, and referees. We argue that institutional diversity and player/stakeholder collaboration are the foundation for enhancing good multi-level water governance, and that water management, although fragmented, should be seen as a connector of different sectors.

Introduction and objectives

Water management is a complex issue where solutions depend on local conditions. While technical solutions may fit in several places, institutional frameworks are likely to vary more. Here we discuss governance paradigms for water services (inclusive community water supply and wastewater) in Finland with reflections from other countries.

This paper aims at exploring governance principles for various institutions. It questions two arguments: firstly, that sector fragmentation is a major problem in water services governance and, secondly, that the major challenges of water services such as aging infrastructure, vulnerability, and staff competence can be solved merely by increasing utility size.

Methodology approach

Instead of an individual study, the paper is based on long-term experiences of some 120 research projects and close to 20 doctoral dissertations by the Capacity Development of Water and Environmental Services (CADWES) research team since 1998, currently at Tampere University, Finland. Their mission is "to produce usable knowledge and education, based on multi- and interdisciplinary research, on the evolution and development of sustainable use of water services and water resources in a wider institutional context: organizations, governance, management, economics, legislation, policy, rules and practices". The theoretical base of the paper lies on new institutional economics (NIE).

Analysis and results

As a framework of institutional development, we analyze water services development by using the "soccer analogy" of D.C. North, a Nobel Laureate: institutions are the "formal and informal rules of the game" while organizations are the "players." As in good soccer, we need skillful players (competent staff), good team play (good governance), proper training and coaching (education, capacity building), active supporters (citizens, media), managers (policy-makers), referees (legislation, permit authorities), other bodies, and a playground (infrastructure). We can play good soccer using various tactics. Very good players are able to change their roles (changes in career), read the game and react accordingly. Even a world-class team should not rely too much on one player, but on smooth collaboration. In the center we need a player to structure the game. Additionally, supporting services such as physiotherapy for recovery (operation and maintenance) are needed.

In Finland, "water soccer" is played i.e. water services are provided and produced at four interconnected scales: on-site systems, cooperatives (water user associations), municipal utilities and various inter- and supramunicipal arrangements. Multiple scales enhance institutional diversity, flexibility, and thus better resilience for different playgrounds. In Finland choosing the right scale varies according to conditions in urban and rural areas.

Conclusions and recommendation

While increasing the size of utilities may sometimes be justified, it is often more feasible to develop collaboration between utilities, municipalities, private sector, and other players. In all of them it is vital to include all the stakeholders through cooperative actions and inclusion within the Political, Economic, Social, Technological, Ecological, Legislative and Ethical (PESTELE) framework. Instead of worrying too much about the water sector fragmentation, we should admit that while water is a sector, it is also, and in particular, a connector of many sectors. Thus, proper water management and collaboration are needed for reaching any of the 17 SDGs.

Presenter biography



Ms. Laura Inha, Tampere University, Finland

Laura Inha is a doctoral student in Tampere University, Finland researching policies for resilient water services both in developing and developed countries, and in rural and urban settings. For her degree, she spent a year as a Valle Foundation visiting scholar in the University of Washington in Seattle, USA. Inha has a master's degree in civil engineering majoring in water and environmental engineering. She has gained over seven years of work experience in stormwater management consulting in Finland, and in international development in the Global Water Practice, World Bank, concentrating on water security, groundwater management, and sanitation issues in India.

Community Based Water Tenure: The Missing Piece in Inclusive Governance

Authors: Ms. Jessica Troell, Environmental Law Institute, United States

Keywords

Community, Indigenous Peoples, Rights, Legislation, Land

Highlights

- Inclusive access and governance of freshwater are critical for Indigenous Peoples and local communities.
- Despite fundamental linkages between land and freshwater governance, insufficient attention is paid to community-based water rights.
- RRI and ELI address these gaps in the first global baseline conceptualizing and tracking legal recognition of community-based freshwater tenure.

Introduction and objectives

Analysis by RRI/ELI on the status of community-based freshwater rights across 16 African, Asian, Latin American, and Oceanic countries is motivated by the following objectives:

Conceptualize community-based “water tenure” and build consensus around the legal rights comprising communities’ water security, enabling comparison with existing RRI analyses assessing the strength of communities’ terrestrial resource rights;

Highlight communities’ insecure water rights, motivating increased recognition and implementation; and

Foster collaboration among governments, civil society, international organizations, and others to promote harmonization across sectoral laws and governance institutions, thereby strengthening resource tenure rights of Indigenous Peoples, local communities, and rural women.

Methodology approach

The Water Tenure Methodology uses four threshold questions and five legal indicators to assess whether and how community-based freshwater rights are recognized within national legal frameworks regulating freshwater across 16 countries. The unit of analysis is the community-based water tenure regime – a national-level legal framework establishing freshwater rights of use and at least either governance or exclusion at the community level. Threshold questions consider legal recognition of the human right to water, customary and women’s rights, and the land/water nexus. Legal indicators assess freshwater rights of use, transferability, exclusion, governance, and due process and compensation.

Analysis and results

Over 35 community-based water tenure regimes (CWTRs) were identified within the focus countries. Findings are currently under peer review and remain preliminary. However, final results will be published prior to World Water Week. While most countries’ national laws recognize the human right to water, the following results necessitate urgent and concerted action from a variety of stakeholders:

Communities’ freshwater rights are typically dependent on recognition of their land rights, meaning communities’ land and water tenure security are intrinsically linked.

Procedural obstacles for communities to hold recognized water use rights, such as permits and incorporation requirements, are formidable and consistently hinder the accessibility and affordability of communities’ freshwater resources.

Rights most essential to communities’ ability to protect their territorial waters are inadequately recognized. Rights necessary for communities to establish community enterprises requiring freshwater inputs are not adequately recognized and are commonly burdened by onerous procedural requirements.

Laws regulating community-based freshwater rights are most often gender-blind and the specific entitlements of indigenous and rural women are seldom acknowledged.

Baseline findings of the analysis will equip communities and other stakeholders with crucial data to inform policy-decisions and legislative reforms, support advocacy, and track progress towards development goals.

Conclusions and recommendation

To ensure that Indigenous Peoples', local communities', and rural women's governance rights are respected, the following recommendations should be prioritized:

Lack of legislative harmonization and inter-sectoral collaboration critically undermines community-based water tenure. Consequently, efforts to foster collaboration among actors/sectors to harmonize legislation and natural resource governance institutions are needed.

Advocacy efforts should prioritize eliminating procedural burdens, with a particular emphasis on eliminating permitting requirements for domestic/livelihood uses of water.

Pass, reform, and implement legislation enabling communities to protect and profit from their territorial waters.

Legislative reform efforts must explicitly affirm the specific freshwater rights of rural/indigenous women.

Presenter biography



Ms. Jessica Troell, Environmental Law Institute, United States

Jessica Troell is a Senior Attorney and the Director of the Environmental Law Institute's (ELI's) International Water Program. Ms. Troell has over 15 years of experience in international development and environmental law with a focus on developing and implementing inclusive, equitable and effective legal, policy and institutional tools for sustainable water resource management. She is a recognized authority on international and comparative water law and governance, gender and water governance, water and resource tenure issues, community-based water rights, public participation in resource management, and the nexus between water governance and peacebuilding. Ms. Troell is based in Zimbabwe.

Social accountability and water integrity: three case studies

Authors: Dr. Birke Otto, Water Integrity Network, European University Viadrina, Germany

Keywords

Social accountability, integrity, transparency, participatory budgeting, qualitative case study

Highlights

- Participatory and transparent budgeting fosters social accountability by creating opportunities to voice disagreements, building rights awareness and trust
- Challenges pertain to the resilience of local power dynamics and the mismatch between the scope of donor measures and user expectations
- Building a culture of water integrity takes time and does not

Introduction and objectives

Social accountability measures in the water sector have proliferated, yet few studies have so far assessed their direct impact on improving water integrity at a local level. To approach this gap, this study compares three measures of participatory and transparent budgeting (PTB) in three countries in relation to their effects on transparency, accountability, participation and anti-corruption (TAPA). Addressing the difficulty to measure integrity - as crucial requirement for effective local governance system - , this study responds to calls for more nuanced approaches of social accountability (McGee and Gaventa, 2010). In so doing, it highlights soft factors such

Methodology approach

The present study conducted a multiple case study analysis with qualitative methods (Yin, 2003) in three countries – Nepal, Ethiopia and the Philippines. Three research teams each conducted one in-depth case study on a particular participatory and transparent budgeting measure in each country through interviews and observations by following a joint research protocol. The case studies discuss similar approaches in a different context and were analyzed according to how the mechanism worked, its specific contextual challenges and successes. In a second step, a cross-case study analysis juxtaposed these three individual studies along the above mentioned integrity categories of the research

Analysis and results

While PTB has shown positive effect in other sectors (Fox, 2014), less is known about the effectiveness of such measures in the water sector. This study of participatory and transparent budgeting finds that while the outcomes of these measures vary strongly according to their different contexts, similar challenges pertain to the resilience of local power dynamics as well as to the mismatch between the scope of the measures and user expectations. Yet, these PTB measures have created spaces for deliberation and stakeholder collaboration that build rights awareness and fostered trust. Their demands and disagreements gave community members an opportunity to be heard, but as they often went beyond the scope of the water project, they also created moments of disappointment. While often more privileged community members dominated these discussions, each case showed instances in which marginalized voices came to the fore.. By involving community members in the planning, discussion and monitoring, the PTB measures can be considered as social learning exercises for citizens to hold local governments and service providers accountable. In terms of inclusive governance systems, these measures fill a space left open by weak institutions, or, carve out this space in the case of a more authoritarian setting.

Conclusions and recommendation

This multi-case study analysis has shown that a causal relationship between transparency, accountability, participation and anti-corruption cannot be taken for granted. Thus PTB mechanisms should be considered as part of a broader and continuous adaptive programming and management process to strengthen the links between TAPA. Donors, development practitioners and governments should appreciate that trust building and voicing disagreements is already a major outcome of such measures - beyond their more narrowly defined specific goals. Practitioners should recognize that building such a culture of accountability and water integrity takes time and it is not always a linear process.

Presenter biography



Dr. Birke Otto, Water Integrity Network, European University Viadrina, Germany

Birke Otto, PhD is an associated consultant for the Water Integrity Network and a postdoctoral scholar at European University Viadrina and Copenhagen Business School.

Hybrid water rights systems for pro-poor water governance in Africa

Authors: Ms. Barbara Schreiner, Water Integrity Network, South Africa

Keywords

Permits, customary law, hybrid water rights, pro-poor water rights

Highlights

- Lack of capacity to implement permit systems across Africa criminalises the water use of millions of small-scale users;
- These users are critical in small-scale farmer-led irrigation development;
- An effective alternative is a hybrid water rights system based on a suite of tools: permits, customary law, and others.

Introduction and objectives

Global IWRM discourse has promoted water permit systems as an important element of effective water regulation. There are, however, significant challenges for millions of small-scale water users. Lack of implementation capacity has criminalised and marginalised their water use.

Our study examined water permit systems in Kenya, Malawi, Uganda, Zimbabwe and South Africa and their implications for the water security of small scale water users. Arising from the results we designed a hybrid system that draws on a combination of permits, customary water law, and other tools to enable effective regulation and pro-poor water use authorisation in Africa.

Methodology approach

The study involved a literature review, country studies by in-country researchers, a workshop with senior decision makers from the five countries and the research team, resulting in a research report and a practical guideline on the design of the hybrid approach for water managers. A Problem-Driven Iterative Adaptation (PDIA) approach was used and a vibrant science-practitioner partnership created.

The main research question was how to transform permit systems to both enhance regulatory efficiency and protect the most vulnerable, with consideration of how to decolonize permit systems, recognize customary water law, and to transform permit systems to ensure legal protection of

Analysis and results

The study, building on previous research, revealed how permit systems legitimised colonial water grabs and delegitimised the water use of Africans. The more recent expansion of permit systems to cover all water resources and users, including small-scale farmers, continued this exclusion. Limited resources prevent states from administering permits across large numbers of small-scale users who either do not know about the requirements for permits or have little incentive to apply. Thus, while the water use of larger scale, administratively competent water users is legitimised and regulated through permits, the water use of small scale farmers is rendered illegal. Lack of enforcement means states take little action to address this illegality, but, in the face of competition, small scale users have no legal protection for their water use. Permit systems, as increasingly recognised, including in the media, enhance, rather than reduce, the water insecurity of small scale water users.

A major innovation arising from our research is the design of a hybrid approach that combines permits, customary law and other tools for effective, pro-poor water governance. A further innovation saw the translation of this into a practical guideline for water managers to apply.

Conclusions and recommendation

The failure of water permit systems in Africa requires a new system that provides effective regulation and equal protection for small-scale and large-scale users. The proposed hybrid system enables the effective and selective use of a suite of tools:

- Permits for large-scale, high impact water users
- Statutory recognition of customary water law, within constitutional imperatives and
- Other tools such as general authorisations and/or collective permits

These tools can be applied selectively and differentially within an adaptive management approach that responds to specific water resource challenges on the ground enabling effective and fair regulation of water use.

Presenter biography



Ms. Barbara Schreiner, Water Integrity Network, South Africa

Barbara Schreiner is Executive Director of the Water Integrity Network. She has over 20 years' experience in water and natural resources management in developing countries with a focus on good governance and addressing poverty and inequality, including gender and other forms of social and economic marginalisation.

Barbara van Koppen (PhD) is Principal Researcher in the International Water Management Institute. She leads multi-country (action-) research in Anglophone and Francophone Africa and Asia on community-driven water development, plural water laws and policies reform, including from a human rights perspective.

Social connections program for full access in Tangiers - Morocco

Authors: Mr. Naoufal Salama, Amendis , Morocco

Keywords

Access, social connections, rural exodus, water supply, least favoured populations

Highlights

The Tangiers area, with 575,000 inhabitants in 2002, faced challenges of demographic growth (+4.4% yearly), and limited access (72%) to water supply. The social connection program, and the local operator's efficiency enabled Tangiers to overcome population growth and increase coverage to more than 99% of households in 2018

Introduction and objectives

The city of Tangiers and its 7 surrounding municipalities were seeing a rapid economic growth but urban planning was not keeping pace with the demographic pressure and rural exodus, resulting in uncontrolled development of unserved quarters, sheltering low-income households. The city committed to attain full coverage with water and sanitation services. Initially, the number of social connection was estimated to reach 28,000 households in 60 quarters, but it became soon obvious that the adjusted number was 47,400 households, corresponding to an estimated 237,000 habitants in 136 quarters.

Methodology approach

In 2002, drinking water supply reached 72% of the population and wastewater collection reached 65%. Using a unitary cost of connection of 23,150 DH (water and wastewater), full coverage meant investing 1,042 MDH. However, studies concluded that low-income households could not pay more than 12,600 DH for connection. Tangiers therefore decided to implement 2 policies:

Social rates for low-income households, and subsidised connections;

Outsourcing the management of potable water, wastewater and electricity (awarded in 2002 to Amendis, Veolia group), to enhance the service efficiency to reach full coverage as early as possible.

Analysis and results

The Tangiers' area is characterised by a challenging topography, narrow streets, and general absence of networks maps. The authority crafted financial engineering settings combined with social programs: Pre-existing block tariffs, pre-financing, cost-sharing between beneficiaries, operator, and authority; Subsidised connection rates (average 45%), with payment facility up to 10 years (105 DH / month). The authors observed that their consumption is on average 10 m³/month (i.e. in the lowest tariff) compared to an average household consumption of 14 m³/month.

On its side, the operator developed a bespoke outreach approach using:

A mobile office visiting least-favoured quarters to meet populations and process customer data on site.

A program for raising awareness, in collaboration with elected officials and local NGOs, to explain the change from free, though remote, water, to billed consumption

Internal efficiency improvement programs relying on extensive training.

The social connection Program connected more than 47,400 households between 2006 and 2018, ultimately representing a population of 237,000. A supporting performance is the bill recovery ratio, close to 97% for connection costs, the average bill recovery being 90%.

Conclusions and recommendation

The Tangiers experience exemplifies the OECD Principles for Water Governance, i.e. clearly allocate and distinguish roles and responsibilities for water policymaking, policy implementation, operational

management, and regulation, and foster coordination across these. Moreover, enhancing access in the context of rural exodus and urban sprawling cannot happen without commitment of local elected officials to broker the dialogue with citizen, the operator to manage performance, and NGOs to change habits of newly connected populations.

Finally, this project was recognized within the National Initiative for Human Development of the Kingdom.

Presenter biography



Mr. Naoufal Salama, Amendis, Morocco

Mr. Naoufal SALAMA, training engineer, was born on 15 June 1970 in Tangier, of Moroccan nationality. He began his career in 1993, as a research engineer in the field of water resources. From 1998 to 2006, he was responsible for several territorial development programmes within the Agency for the development of the northern provinces of Morocco.

He joined the VEOLIA group – Amendis in 2006 to manage the social connections programme with a view to generalising access to drinking water and liquid sanitation.

He has since held several positions, head of hydraulic studies from 2007 to 2012, Director of water

Water stress and human movement: eco-camps as exemplary solution

Authors: Kholoud Al Ajarma, Mediterranean Youth for Water network (MedYWat), State of Palestine

Keywords

migration, water, climate change, eco-camp

Highlights

- The aim is to contribute to water and migration solutions through the model of eco-camp.
- This analysis takes into consideration climate change and the need to pay attention to possible solutions.
- Examples of environmental issues in existing refugee camps are provided in the paper.

Introduction and objectives

The numbers of migrants and displaced people due to climate change and environmental hazards is likely to increase in the coming years. Often, migrants and refugees find themselves in refugee camps and other settlements where living conditions can be very poor or inadequate. In this paper, therefore, Eco-camp is presented as solution that focuses on developing integrated adaptation strategies to solve issues related to migration, water and climate change. In this paper, key actions and components of an eco-camp model that could be used to respond to the need of accommodating migrants in the Mediterranean region are identified and proposed.

Methodology approach

To understand climate change and migration deeper, the research team first engaged in reviewing existing literature on climate change, water stress, and migration (mainly in the Mediterranean region). The team, then, analyzed the existing literature together with relevant publications of environmental institutes, media agencies and human rights organizations in the region. Following this review, and taking the concept of 'leaving no one behind' as a starting point, the team developed and suggested the idea of the eco-camp and its components as a wholistic approach in tackling the effects of climate change and migration in the region.

Analysis and results

The literature reviewed reflected how adverse weather conditions such as increased droughts, and water-stress might cause increased migration. Case studies from migrant settlements in Syria, Jordan, and Lebanon provided some examples of the environmental hazards that migrants are facing including inadequate access to clean water, energy supply problems, and waste management issues. Taking the information gathered as a point of departure, the idea of eco-camp is then proposed as an exemplary solution on how to deal with migration within the framework of climate change. The proposed system aims to provide solutions to reduce the negative impact of environmental change on the affected communities. The Eco-camp offers a holistic approach that considers all basic needs of migrants and displaced people and aims to provide a set of sustainable and integrated solutions for what concerns lodging, energy supply, water and sanitation, nutrition, health, education and employment. Planning ahead and managing migration flows to the extent that this can be done will help reduce the risk of humanitarian crises.

Conclusions and recommendation

This paper proposed a settlement model that takes into consideration environmentally and socially friendly management strategies. For these strategies to be materialized, there is a need for good governance, collaboration and allocation of resources. There is a humanitarian importance in providing decent conditions for those who flee their homes through force or fear. The eco-camp is a model that should insure both the

dignity and human rights of migrants and host communities and a step of mitigating the effects of climate change. Other measures and models of tackling migration and climate change should be further studied.

Presenter biography



Kholoud Al Ajarma, Mediterranean Youth for Water network (MedYWat), Palestine, State of

Kholoud Al-Ajarma is a Palestinian award-winning photographer, filmmaker, anthropologist and refugee right's advocate. She is a Ph.D researcher in anthropology, a graduate of International Studies, Peace Studies and Conflict Resolution (MA), and Anthropology and International Development Studies (Mphil). Al-Ajarma has various experiences developing and leading projects among refugee communities in the MENA region including the 'Refugee Youth Forum', an innovative platform for active youth participation within human rights research and media. In 2018, Al- Ajarma was one of the winners of the Mediterranean Water Heroes Context organized by the Center for Mediterranean Integration of the World Bank.

Political Economy of Domestic Water Scarcity in Eastern Himalayan Towns

Authors: Ms. Rinan Shah, Ashoka Trust for Research in Ecology and the Environment, India

Keywords

Domestic water scarcity, Eastern Himalayan Region, Mountain towns, Accessibility, Political economy

Highlights

- Understanding of drivers of water scarcity in a volumetrically “water-rich” region
- The uniqueness of domestic water scarcity in the mountain towns due to their biophysical and social characteristics
- Definition of the practice of the right to water and water security by the communities

Introduction and objectives

Mountainous regions, known as water towers of the world, face water paradox where communities experience water scarcity despite receiving substantial amounts of rainfall. To understand various drivers that create water scarcity, this work adapts the human development approach to water. It will focus on Darjeeling in the Eastern Himalayan Region of India, one of the highest rainfall receiving regions in the country where people face persistent scarcity throughout the year. This work aligns with “Water governance with and for all: Is it working?” because it studies marginalized communities and interrogates the general notion about mountainous regions facing no water issues.

Methodology approach

Human development approach uses four orders of scarcity physical, economic, adaptive capacity, and socially constructed. This approach is necessary because scarcity cannot be equated to limited natural resources as it is a property which emerges out of human interaction or social provisioning. Political economic and institutional forces influence the undertakings of formal and informal institutions to alleviate scarcity. Access of the communities to infrastructural setups and water provisioning provides an insight into the effectiveness of such undertakings. Non-neutral nature of scarcity across socio-economic conditions and spatial location of the communities in the region highlight accessibility of the communities to water resources.

Analysis and results

For this work, I focus on one of the four research questions of my PhD regarding second and third orders of scarcity. It looks how varying political regimes and formal and informal institutions address the supply and distribution of water. The multiplicity of water institutions and the way in which they are intertwined reveals the complexity of urban water governance.

Creation of a household water bundle by communities through complex interactions with institutions illustrates the difficulties they face in acquiring water. A general clustering of the various kinds of water sources which make up a household water bundle has been discovered. The town can be largely divided into three clusters which use a variety of sources such as municipal supply, springs, self-drawn supplies, private suppliers, and tankers to make up their water bundle.

While comparing municipal coverage of Darjeeling to 20 other Indian cities, its coverage was lowest at 15%. Most of the urban mountain towns are heavily dependent on tourism for their economy and also are home to numerable boarding schools and colleges. This causes a high influx of seasonal population which overlaps with the dry season creating additional stress on water resources.

Conclusions and recommendation

Access to water resources in urban mountain towns varies from plains. Use of wells is absent and springs are primary resources. Formal and informal systems are dependent on springs. Even in a region which receives high amounts of rainfall, the communities have water access issues which are perpetuated by the multiplicity of institutions.

Springs being primary resources, their property regimes need to be explored further because they have primarily been called common pool resources but ground reality is complex. Additionally, socio-political perspectives of scarcity need to focus on discursive and materialist to understand the nexus of power, ideas and social.

Presenter biography



Ms. Rinan Shah, Ashoka Trust for Research in Ecology and the Environment, India

Rinan is a PhD candidate at The Academy for Conservation Science and Sustainability Studies at Ashoka Trust for Research in Ecology and the Environment, Bangalore. Her areas of interest encompass environment and development in the political economic context. She is currently studying manifestation of domestic water scarcity in urban mountain towns of the Eastern Himalayan Region. She is a Senior Research Fellow under the National Mission on Himalayan Studies. She was also a member of the HI-AWARE Academy for Doctoral Students. She has a Masters degree in Climate Change and Sustainability Studies from TISS, Mumbai and a Bachelors degree in

Cenagrap, a public-communal alliance: a model for water management, Ecuador

Authors: Ms. Katrien Van Hooydonk, Join For Water - Protos, Belgium

Keywords

Ecuador, Cenagrap, drinking water management, public-community partnership, inclusiveness

Highlights

This work describes the first public-community alliance Cenagrap in Ecuador to assure the management of 112 drinking water provision infrastructures in rural communities. It is the result of an institutional crafting coordinated by Protos -CEDIR in cooperation with the municipality of Canar and the water users committees.

Introduction and objectives

The various reforms against the privatization of natural resources, as in Bolivia and Ecuador, have made it possible to dismantle public-private partnerships for water management. In 1997, Protos launched a program for drinking water in Cañar. At this time, income levels were very low and communities are distant from each other. The drinking water coverage did not reach 50% and there was a lack of regulations, women had little access to certain decision positions, operators did not have real formations and drinking water infrastructure lack maintenance. Protos wanted to build sustainable drinking water infrastructures in 80 rural communities in Canar.

Methodology approach

The establishment of this partnership in the province of Cañar was done in different phases. The preparatory phase made it possible to identify, through a survey, the interests of the various local actors involved, such as municipalities, NGOs and water committees. The construction phase allowed the previous actors (local municipalities, water committees, NGOs) to develop a sustainable strategy and an outline of the umbrella organisation. The implementation phase was accompanied by actions such as the formalization of the partnership and institutional crafting. The roles of the actors concerned were clearly defined, by the actors present, with a distribution of responsibilities.

Analysis and results

The structure of CENAGRAP is today composed of a board of directors in which there are 3 representatives of the water committees and 2 representatives of the municipality who are in charge relationship with the municipality. These representatives are in constant dialogue to meet the new challenges of the partnership and to perpetuate this management of the 112 drinking water systems in rural areas. In addition to the board of directors, there is an operational team composed of technical, social and shop stewards and an administration.

The success of CENAGRAP has mainly led to an increase in the rate of drinking water coverage in the province and the 112 small community systems serve 6,764 families (33,020 people). At the same time, there was the formation of a technical team and water committees, the setting up of follow-up visits by this technical team for the maintenance of the infrastructures of drinking water networks, monitoring campaigns and monitoring of water quality and increasing women's participation in senior positions.

Public-community partnership is an institutional arrangement that since the constitution of 2008 in Ecuador and the new water law is recognised as a model for water management.

Conclusions and recommendation

- The alliance has allowed everyone to win. The municipal government has gained popularity and saved resources, and management is more efficient with a representative organization than with

112 water committees. Rural communities gained access to continuous and quality water. The NGOs achieved their purpose, promoting a model that was scaled and appropriated by the State, at the local level, and at the national level, as it was incorporated into the National Constitution.

- Sustained technical and economic support from local government and international cooperation have been essential for CENAGRAP.
- The model is replicable, depend on political context

Presenter biography



Ms. Katrien Van Hooydonk, Join For Water - Protos, Belgium

As a water expert I defend the right to water and sanitation for everybody (men-women, young-old, rich-poor,...), with respect, with knowledge, with dedication and -off course- a lot of fun! I am specialized in drinking water, sanitation chain, water for agriculture, integrated water resources management and international cooperation. Water is -undeniable- necessary for life.

As a bio-engineer, specialised in Soil and water science I worked at Flemish government in ecohydrology, at private consultancy organisation in hydraulic modelling of rivers and at Join For Water in Ecuador to coordinate the water and sanitation program in Esmeraldas.

Experiences from the 2016-2018 water crisis in Brazil's Federal District

Authors: Dr. Jorge Werneck Lima, Regulatory Agency for Water, Energy and Sanitation of the Federal District (Adasa), Brazil

Keywords

Drought, water crisis, resilience, governance

Highlights

The 2016-2018 water crisis case study highlights how Brazil's Federal District overcame the worst water shortage in its history based on strong governance, effective technical work, adaptive management and trust building, in the eve of the 8th World Water Forum, the world's main water event.

Introduction and objectives

This is a case study on how the Federal District overcame the worst water crisis in its history by deploying strong governance and on-the-ground actions. It is registered in the book "Experiences from the 2016-2018 water crisis in the Federal District, Brazil", which presents a palette of applicable actions, such as: creation of governance instances; strengthening of hydrological information and monitoring systems; law enforcement and regulatory measures; water rationing; communication and education campaigns; good agricultural practices; improvement and renovation of water supply systems. The lessons learned will help practitioners in different countries who may face similar challenges.

Methodology approach

The case study is structured in three parts. First, a diagnosis explains the reasons of the crisis: intensive influx of migrants and the consequent lack of water and sanitation systems to meet the additional demand, increased water consumption, illegal land occupation, and an unprecedented drought. The second part presents a menu of 21 actions taken by key stakeholders to overcome the crisis. It was designed as a toolbox to help practitioners from other countries to manage extreme drought events. The conclusion, in the third part, synthesizes the lessons learned from the crisis, providing recommendations in line with the 2030 Agenda.

Analysis and results

- The hydrological information system was improved. The number of monitoring stations increased from 95 to 139 for water flow and 27 to 54 for rainfall.
- Three governance groups were created involving 27 institutions, which deployed 100 urgent actions.
- Negotiated water allocation with farmers avoided the loss of 3.700 hectares of crops, worth € 3 million.
- Adasa published 45 regulatory acts and closed 18 illegal irrigation channels and 30 water abstraction points, saving 563 L/s, enough to supply 350.000 people.
- Per capita water consumption dropped by 12,2% (from 147 to 129 L/person/day).
- In the Descoberto basin, the recovery of 36 km of unpaved roads resulted in 15.600 m³ of water recharged to the aquifers. 45 springs were restored in 30 hectares.
- Water use in rural areas dropped by 40% (2.000 to 1.200 L/s) in response to rationing measures. This avoided a collapse in the system according to the models developed by Adasa.
- Two new water supply systems were inaugurated: Bananal and Paranoá Lake, adding 1.400 L/s to the current network (expansion of 15%). With the new Corumbá IV system, which will add 2.800 L/s, water supply capacity will increase by 26%.

Conclusions and recommendation

Main conclusions are:

- 1) Prevention programs to avoid new crises;
- 2) Adaptation plans for the Federal District and resilience measures with systematic implementation are necessary;
- 3) Crises require trust, strong communication, transparency and technical and timely decisions.

Main recommendations are:

- 1) Prioritize the 2030 Agenda, especially SDG's 6, 11, 13, as means of prevention of new crises;
- 2) Develop climate-smart plans that incorporate regional climate models for different sectors;
- 3) Support decentralized water supply systems (e.g. rainfall water harvesting, springs restoration, etc.);
- 4) Maintain the level of engagement and awareness of the population with campaigns and incentives for good

Presenter biography



Dr. Jorge Werneck Lima, Regulatory Agency for Water, Energy and Sanitation of the Federal District (Adasa), Brazil

Dr. Jorge Werneck is an Agricultural Engineer (Viçosa University), MSc. Irrigation and Agro environments and PhD in Environmental Technology and Water Resources from the University of Brasília. He is currently the Director of the Federal District Regulatory Agency for Water, Energy and Sanitation. He has more than 20 years of experience in water resources including a career in the Brazilian Company of Agricultural Research (Embrapa) as Researcher in Hydrology. For the 8th World Water Forum he was representative in the Bureau of the International Steering Committee, vice-president of the Thematic Process Commission and member of the “Water and Development” group.

Water Users Associations in Tanzania: local governance for whom?

Authors: Ms. Nathalie Richards, King's College London, United Kingdom

Keywords

Water Users Associations; Tanzania; regulatory water management; water allocation.

Highlights

- The formalisation of water permitting is benefiting to foreign direct investment and not to local communities, even with the presence of local WUAs.
- Currently, Tanzanian WUAs are accountable upwards and downwards, creating contradicting patterns
- There is a need to redefine the roles of WUAs within current regulatory frameworks

Introduction and objectives

In order to implement Integrated Water Resources Management (IWRM) according to good practice, governments and development agencies have promoted the setting-up of Water Users Associations (WUAs) as a broadly applicable model for water management at the local level. WUAs are promoted as key to the rolling out of IWRM principles through a participative process. This paper discusses Tanzanian WUAs in light of the regulatory framework within which they operate. I argue that although the government's objectives are to achieve equitable and sustainable allocation of water resources, the formalisation of water allocation has led to the exclusion of specific water users.

Methodology approach

Results informing this paper stem from four years of studying WUAs in Tanzania and Kenya during my PhD (2015-2019). The main research question is what is the role of WUAs in sustainably managing rivers? I adopted an ethnographic method of enquiry over 12 months of field work. This allowed for an in-depth understanding of the social embeddedness of WUAs, including observing the relationships between WUAs and a wide range of stakeholders. I also explored the processes by which and the results of water governance policy being implemented in practice.

Analysis and results

Water allocation has been discussed in Northern Tanzania before (see Komakech et al., 2012); however, the role of WUAs in shaping water allocation lacks analysis, particularly in a dynamic environment such as the Great Ruaha River Catchment (GRRC). Suffering from water scarcity resulting in competition between investors and small-scale water users, the GRRC is also an environment in which formal and informal practices overlap, due to legal pluralism and incremental implementation of water governance frameworks. This has resulted in a double standard for water allocation, where informal practices prevail at the local level, whilst formalities are followed at regional levels. WUAs, as participative bodies attached to the regional basin authority, struggle between their regulatory role and their community advocates roles. Initiatives to secure water access finally trespass WUAs to adopt conforming and contestatory strategies: indeed, water users adopt a range of "hydraulic property creation" (Coward, 1986) strategies - such as built infrastructure or drawing on historical claims. WUAs can therefore not be at the same time the local arm of the basin authority, and advocates to help local water users claim water access and rights.

Conclusions and recommendation

This study calls for a reassessment of the role of WUAs in Tanzania. Currently, WUAs in the GRRC are unable to function effectively, as they are held accountable upwards to the regulatory (basin) authority, and

downwards to their local community claiming ancestral rights over water. The unsuitable design WUAs has led to a situation in which the authority of the WUA is bypassed. Without its local arm, the basin authority has little leverage to control water use throughout the basin. Meanwhile water investors with developed irrigation infrastructure forge their rights to water, and small-holders contest.

Presenter biography



Ms. Nathalie Richards, King's College London, United Kingdom

Nathalie Richards has currently submitted her PhD thesis at the Geography department at King's College London. Through an ESRC-CASE studentship, Nathalie partnered with WWF-UK and local WWF teams on her doctoral work exploring Water Users Association in the Great Ruaha River Catchment, Tanzania, and the Mara Basin, Kenya. By using interdisciplinary methods (ethnographic tools and hydrological modelling), she assessed the impacts of WUAs on the sustainable use of water resources and livelihoods.

Governing water (re)allocation in South Africa: insights from a crisis

Authors: Mr. Jonathan Rawlins, OneWorld Sustainable Investments, South Africa

Keywords

Water reallocation; equity and efficiency; Western Cape drought; political economy; water governance

Highlights

- Policy-based equity outcomes are simultaneously the main driver of and barrier to effective water reallocation in South Africa;
- Water allocation reform pathways should integrate reallocation mechanisms that balance equity and efficiency criteria within extant political institutional frameworks;
- Legal and policy objectives defining reallocation priorities need to be harmonised and decision-making decentralised.

Introduction and objectives

Water (re)allocation challenges represent a fundamental component of water governance because of the inherent trade-offs that benefit some at the cost of others. Reallocation is becoming increasingly recognised as an important management tool in the face of unpredictable water supply systems and rapidly changing demand dynamics (Hall et al. 2014). There is a paucity of context-specific research on the interactions between the political economy and governance arrangements that enable or prevent effective reallocation. This research addresses this gap by analysing the complex aspects influencing water reallocation in South Africa (SA) through a case study of the recent Western Cape drought.

Methodology approach

A mixed methods approach was adopted including 34 key-informant interviews with key private, public and civil society stakeholders. Secondary data was analysed to determine gross value add and employment for different levels of sectoral water dependence by municipality. This data facilitated a systematic political economy analysis of the drivers of and barriers to reallocation in SA. Following Dinar et al. (1997), Marston and Cai (2016) and Meinzen-Dick and Ringler (2007) the analytical framework included eight assessment criteria: acceptability, administrability, efficacy, efficiency, equity, flexibility, predictability and security. A structured content analysis revealed key trade-offs, institutional and policy limitations, and governance challenges.

Analysis and results

Over the past two decades, unconstrained development resulted in increased dependence on limited water supplies and ever-growing tensions around unequal allocations rooted in Apartheid allocation structures. A dearth of leadership, technical, regulatory and administrative capacity within the Department of Water Affairs combined with centralised decision-making, institutional misalignments between spheres of government and conflicting policy objectives are severely limiting implementation of reallocation. Ultimately resulting in critical principal-agent problems between local and national government with key veto players undermining post-Apartheid water allocation reform ambitions and limiting promising options such as share-equity models.

The case study highlights increasing conflict between water users and growing resistance to water reallocation options, largely underpinned by equity-efficiency trade-offs that are closely interwoven with institutional structures and norms through varying applications and conflicting perceptions of fairness, efficiency and tenure security. Equity-efficiency trade-offs manifest through two dominant perceptions. Firstly, there is a direct trade-off between these two outcomes; improving equity outcomes compromises

economic efficiency. Secondly, efficiency follows equity in the long term. Widespread insecurity surrounding land tenure related to proposed reallocations further limits socio-political buy-in to allocation reform. These conflicting perceptions and governance challenges emphasise the complexity of using reallocation as the primary reform pathway in a rapidly developing society.

Conclusions and recommendation

Severe climatic stressors have exposed political, regulatory and institutional water governance deficiencies throughout the Western Cape and SA at large. SA presents a paradigmatic example of equity being the fundamental driving force for reallocation. However, responding to water misallocation necessitates the integration of reallocation mechanisms that balance equity and efficiency criteria within the framework of extant political institutions. Thus, legal and policy objectives defining priorities for both new allocations and reallocations need to be harmonised within an increasingly decentralised institutional framework. In this way, blanket reallocation decisions can be avoided, and collaborative water sharing practices will define new reform pathways.

Presenter biography



Mr. Jonathan Rawlins, OneWorld Sustainable Investments, South Africa

Jonty is an early-career development professional specialising in water, climate change and natural resource management. He is experienced in technical, applied and academic research modalities, particularly around water policy and governance, environmental economics, sustainable landscape management, climate change adaptation and transboundary environmental management. He is passionate about sustainability and aspires to contribute towards solving complex environmental and socio-economic challenges through his work, with particular emphasis on poverty alleviation and development in Africa. Jonty is currently works as a Technical Advisor at OneWorld Sustainable Investments in Cape Town, South Africa.

Updating Ukraine's water governance system: From infrastructure to governance-oriented institutions

Authors: Ms. Yelysaveta Demydenko, Deutsche Gesellschaft für Internationale Zusammenarbeit, Global Water Partnership Ukraine, Ukraine

Keywords

IWRM, water governance, understanding of risk, water security, inclusive stakeholder engagement

Highlights

Governance gaps in implementing water reform in Ukraine:

- scattered roles and responsibilities with unclear common goals
- non-participatory approach in RBMPs
- insufficient capacity of civil servants to meet water challenges
- 1% of water funds allocated to IWRM, 99% - to infrastructure development

Introduction and objectives

A water governance reform in Ukraine was foreseen in the country to hand over water responsibilities from the Agency for Water Infrastructure (Vodkhoz) (inherited from the Soviet Union) with a mandate focused on infrastructure development, to a Water Resources Agency with a wider mandate.

Global Water Partnership - Ukraine studied compliance of Ukraine's reform with OECD Water Governance Principles. Revealed gaps include: scattered roles and responsibilities in multiple governmental entities with unclear common goals and effective coordination mechanisms, non-participatory approach for the development of RBMPs, insufficient capacity of civil servants to meet water challenges, 1% of water funds allocated to IWRM

Methodology approach

A water governance reform in Ukraine was foreseen in the country to hand over water responsibilities from the Agency for Water Infrastructure (Vodkhoz) (inherited from the Soviet Union) with a mandate focused on infrastructure development, to a Water Resources Agency with a wider

Global Water Partnership - Ukraine studied compliance of Ukraine's reform with OECD Water Governance Principles.

Analysis and results

Revealed gaps include: scattered roles and responsibilities in multiple governmental entities with unclear common goals and effective coordination mechanisms, non-participatory approach for the development of RBMPs, insufficient capacity of civil servants to meet water challenges, 1% of water funds allocated to IWRM, 99% - to infrastructure development.

Conclusions and recommendation

Overall, the results of the assessment are the following:

- 1) GWP-Ukraine points to scattered roles and responsibilities for management water “for all” in multiple governmental entities with unclear common goals and effective coordination mechanisms;
- 2) GWP-Ukraine claims a non-inclusive approach to the development of river basin management plans;
- 3) GWP-Ukraine reports on insufficient capacity of civil servants to meet water challenges;
- 4) GWP-Ukraine suggests that too small portion of water funds are allocated to integrated water resources management.

Presenter biography



Ms. Yelysaveta Demydenko, Deutsche Gesellschaft für Internationale Zusammenarbeit, Global Water Partnership Ukraine, Ukraine

Ms. Yelysaveta Demydenko is a young professional with strong legal background and experience in environmental management. Previously she was engaged with UNECE Water Convention and is currently working on climate change and energy efficiency projects of GIZ-Ukraine. Her areas of interest include IWRM, environmental assessment of post-conflict areas and human rights to water and environment.

Unravelling the concept of water governance in SDG era

Authors: Panchali Saikia, Stockholm International Water Institute, Sweden

Keywords

water governance; governance functions; governance outcomes and impacts; governance attributes; governance monitoring

Highlights

- The core governance functions of the water sector are defined and interpreted for three different subsectors: WASH, IWRM, and TWM.
- Linkages between governance functions, the expected governance outcomes and the attributes of governance processes are identified and addressed.
- A pragmatic definition of water governance is proposed

Introduction and objectives

An enabling environment creates the conditions for a country to ensure sustainable, at-scale management of water and sanitation for all. It includes two categories of factors: i) Structural Factors, and ii) Institutional Factors. The latter includes what we call the core governance functions of the water sector. The literature has developed a variety of frameworks that support the conceptualisation of these water governance functions. However, despite sharing the concept and the approach, these proposals i) are too narrowly focused on one specific water subsector, and ii) fail to address the links between the governance functions, governance outcomes, and governance processes.

Methodology approach

This study addresses the following research questions:

- Which are the main core governance functions in the water sector?
- How are these governance functions influenced by, and in turn influence, the expected governance outcomes processes?

By revolving around these two pivotal issues, the study seeks to 1) gain a better understanding of those functions that influence the processes, the outcomes and the impacts of water governance, and 2) present in a pragmatic way how and at what level they take place and interrelate.

The study is mainly based on a literature review and consultation with relevant experts.

Analysis and results

To start with, the paper identifies a set of nine core governance functions that should be undertaken by the government to enhance the delivery of water services to all citizens: Policy and Strategy; Coordination; Preparedness & Planning; Financing; Institutional arrangements; Regulation; Capacity Development; Monitoring, Evaluation & Learning; and Disaster management. Each of these governance functions are then defined and adapted to specific water sectors: drinking water, sanitation and hygiene, integrated water management, and transboundary water management. By way of example, the paper discusses about the institutional landscape in the water sector, and compares the necessary arrangements for improving access to water and sanitation to those needed for managing transboundary waters.

However, the performance of the core governance functions can only be understood when linked to the desired governance outcomes (e.g. universality, resilience, equity, etc.) and the attributes which determine the governance approach (e.g. inclusiveness, transparency, accountability, etc.). On this basis, by unpackaging the governance functions, and by linking them to specific outcomes and procedural attributes, the paper supports decision-makers to better design and implement governance processes in water resources and services.

Conclusions and recommendation

This study discusses about the core governance functions that govern the water sector. By linking them to governance outcomes and attributes of governance processes, it helps decision-makers to put these functions into an operational framework. Then, a pragmatic definition of water governance is proposed: “water governance entails a combination of functions and processes with certain attributes to achieve one or more desired outcomes”.

In practical terms, the proposed approach supports decision-makers and practitioners to increase understanding of the water governance concept and, from there, improve the analysis of the sector (e.g. strengths, weaknesses and gaps) and design, implement sector reforms.

Presenter biography



Panchali Saikia, Stockholm International Water Institute, Sweden

Panchali Saikia is a Programme Officer, Water Governance, SIWI. She has a Masters in Political Science from University of Delhi (India), with 8+ years' work experience. Panchali is a qualitative researcher with expertise in international relations theory, institutional analysis and gender in water governance, transboundary water cooperation, and governance for water resilience. Prior to SIWI, Panchali worked for 5 years with the International Water Management Institute (IWMI) regional office in New Delhi. She has worked on research projects across South Asia, Southeast Asia and Central Asia, along with field work in these regions.

The Opportunities of Water Diplomacy to Complement Regional Water Governance

Authors: Mr. Erik Salminen, Aalto University Water & Development Research Group, Finland

Keywords

Water Diplomacy, Water Governance, Scenarios, Central Asia, Iraq

Highlights

- Discussing the opportunities of water diplomacy to promote and complement water cooperation and regional water governance
- Establishing an analytical framework for regional water diplomacy analysis, using basic data analysis, trend analysis and scenario techniques.
- Presenting results from two case study analyses on Central Asia and Iraq

Introduction and objectives

Water-related tensions will increase due to intensifying water scarcity, population growth and climate change. Water diplomacy can complement existing water governance and cooperation activities through its focus on politics and utilization of diplomatic negotiation tools, facilitating peaceful solutions to the conflicts over shared waters (see EU Council Conclusions on Water Diplomacy, 19.11.2018).

Recent studies have used past water interactions, geographic and socio-economic data plus megatrend analyses to assess future hydro-political risk on a global scale. This analysis develops a framework for finer scale i.e. regional water diplomacy analyses, and tests it in two case study regions: Central Asia and Iraq.

Methodology approach

Much research exists on transboundary water cooperation and governance, while research is emerging on quantitative analysis of hydro-political tensions particularly at global scale. Such studies would benefit from more detailed region-specific analyses that focus on water diplomacy and combine data analysis with forward-looking scenario thinking.

We establish a framework for regional water diplomacy analysis, using basic analysis and scenario techniques and focusing on the potential of diplomatic tools (e.g. negotiations, mediations and arbitrations) to complement existing governance arrangements. The framework builds on theories related to security, geopolitics and diplomacy as well as those related to water governance and cooperation.

Analysis and results

Our study has two main results. Methodologically, the main result is the establishment and testing of a framework for regional water diplomacy analysis, including three steps: i) analysis of current situation in the case study region, ii) recognition of two potential water conflict paths (based on basic trend analysis and scenario formulation), and iii) policy guidelines for potential water diplomacy actions to complement existing water governance arrangements. Current analysis builds on on-going research activities at Aalto University, including recent Water Scarcity Atlas. The two potential water conflict paths were created for year 2030, with one path focusing on water as a key source of conflict and other on geopolitical tensions extending also to water resources management.

Context-specific results from our case studies highlight the potential and limitation of water diplomacy efforts to prevent and mediate water-related conflicts in Iraq and in Central Asia. As such, our study complements the recent global analyses on hydro-political tensions (e.g. Farinosi et al. 2018) as well as regional analyses on transboundary cooperation and conflict in the case study regions (e.g. EPRS 2018, SIPRI 2018). As such, we believe that our results and particularly the established framework can be of use also in other regions.

Conclusions and recommendation

Our study –while small and on-going– highlights the multifaceted nature of regional water governance, complementing transboundary water cooperation literature with a water diplomacy view. Our results indicate the potential for more thorough use of water diplomacy tools such as mediation and arbitration to complement on-going cooperation and governance activities. Water diplomacy can also be the most feasible way forward in heavily politicised contexts such as Iraq, paving way for longer-term water cooperation. We must therefore focus more on understanding the mechanisms behind water tensions, combining technical, socio-economical and (geo)political perspectives and having clear policy guidelines for water diplomacy actions.

Presenter biography



Mr. Erik Salminen, Aalto University Water & Development Research Group, Finland

I am a recently graduated Master of Science (Tech.) in water and environmental engineering at Aalto University, Finland. I am currently working as a research assistant for a water diplomacy related project in the Water and Development Research Group at Aalto. My current interests are water diplomacy, water governance, water resources management and sustainable development. The topic of my master's thesis was Water Diplomacy - Creating an Analytical Framework for Water Diplomacy Analysis.

Quantifying laws and regulations for better water resources management

Authors: Mr. Bill Garthwaite, The World Bank Group, United States

Keywords

Law, regulation, governance, water resources management

Highlights

- To better understand whether current approaches to water governance are working, we first need to better understand what is being done.
- Law is one foundational component of water governance.
- Quantitative analysis of the legal frameworks of 80+ countries will provide new insights into what countries are trying.

Introduction and objectives

How much do we really know about what legal tools are available to water managers in each country? This study asks: what is the current state of water law around the world, and what does this mean for improving water governance in the years running up to 2030? This study uses quantitative legal analysis and a range of data sets to contribute to better understanding country legal frameworks within the socioeconomic and water-related contexts in which they were developed.

Methodology approach

This study brings together exhaustive legal analysis with numerical analysis. For each country, all legal provisions relevant for water resources management are reviewed, cataloged, and assessed for the presence of 500+ conceptually-distinct legal elements. In total, the content of approximately 2,000 laws and regulations will be analyzed, representing the complete legal frameworks for water resources management in 80+ countries. This legal data will then be analyzed in conjunction with country-level socio-economic and water-related data to better understand the context for the development of legal frameworks for water resources management.

Analysis and results

This analysis will provide a broad indication of the extent to which basic legal provisions have been put in place to support water information systems, water resources planning, allocation, and protection. There are bright spots in each region with countries leading the way in developing innovative legal frameworks to support their water resources management activities. But the level of comprehensiveness of laws and regulations is highly variable, with many weak spots evident. For example, among countries within shared international basins, the comprehensiveness of water laws and regulations can vary widely. Also, rather worrying, many of the countries facing the most severe water challenges – such as the most water-scarce countries – tend to have the least comprehensive laws and regulations for water resources management.

Conclusions and recommendation

This study will aim to provide a quantitative picture of the basic legal tools which are currently available to water managers as they work to make progress on SDG 6.5.1. As it takes years to fully implement new legislation and regulations, now is the time to consider whether today's laws and regulations can provide the needed support in the lead up to 2030. It will also provide a picture of the strength of one key component of water governance, and could potentially contribute to diagnostic efforts to try to better understand water governance challenges across different country contexts.

Presenter biography



Mr. Bill Garthwaite, The World Bank Group, United States

Bill Garthwaite works on water laws and regulations for the World Bank. He holds a B.S. in environmental engineering from MIT (USA), and a J.D. and LL.M in international and comparative Law from Cornell University (USA).

The paradox and progress of rural water sustainability in Africa

Authors: Dr. Johanna Koehler, University of Oxford, United Kingdom

Keywords

Water governance, pluralism, professional service delivery, institutional change, Kenya

Highlights

- This paper proposes a new framework to understand how cultural regimes of water governance emerge and persist.
- It examines drivers of change that allow new paradigms to develop.
- The framework is tested in Kenya where decentralisation and the professionalisation of rural water services permit new approaches to the water SDG.

Introduction and objectives

Halting progress towards rural water sustainability can be partly attributed to challenges in balancing universal drinking water services with financial sustainability. This paradox involves the latter often requiring institutional and financial regulations that to be effective may exclude the poorest, which will weaken or undermine the former. In recent years the rural water sector in large parts of sub-Saharan Africa has experienced processes of change towards greater uniformity through the spread of technologies and voluntary institutional arrangements.

Methodology approach

This paper puts forward a framework suggesting the reconceptualisation of rural water sector planning and investment by unpacking the theoretical and practical tensions between homogenisation towards a community, market, or state solution, and pluralism, which dynamically realigns the three.

A survey with all 47 county water ministries of the first devolved county governments in Kenya and three case studies of professional service models in geographically diverse parts of Kenya drawing on extensive data collection over three years provide insights into the potential of pluralist arrangements to increase the sustainability of rural water services.

Analysis and results

First, we advance a framework combining institutional isomorphism and cultural theory to offer insights into the theoretical tension between homogenisation and pluralism and how it is reflected in the practical tension between the professionalisation of water services and local diversity. We argue that coercive, normative and mimetic processes have led to the establishment of cultural regimes, while at times neglecting local pluralist institutions. However, the alignment of isomorphic processes allows arrangements combining the state, market, and communities.

Second, the framework is tested in Kenya, where two types of institutional change – legal and institutional reform through devolution, and professionalisation of rural water services – are aligned to potentially enable sector transformation. The study compares three professional maintenance service models for drinking water infrastructure. The theoretic framing helps to understand which entity – state, market or community/NGO – these models align most closely with and how sharing risks and responsibilities among these institutions can produce more effective outcomes.

Finally, this study provides an approach to examining the establishment of cultural regimes, and examining which forces lead to the homogenisation of approaches across diverging contexts. It also provides insights into the circumstances that can lead to regime changes in the rural water sector.

Conclusions and recommendation

We contend that reconsideration and reconceptualisation are required to avoid previous investment mistakes and to promote new thinking set in motion through the limits of current models and emerging approaches that are empirically documented through field experience. We conclude with a reflection on how this new thinking might contribute to policy and practice in the rural drinking water supply sector in redefining approaches to promote multi-level water governance in order to leave no one behind, thus advancing the SDG of universal, equitable and safely managed water services.

Presenter biography



Dr. Johanna Koehler, University of Oxford, United Kingdom

Dr Johanna Koehler works as Research Associate and Programme Manager of the Water Programme, Smith School of Enterprise and the Environment, University of Oxford. She is also a Postdoctoral Research Fellow at Christ Church, Oxford. Her research examines the interplay of water risks and institutional change in terms of political and institutional transformations in the water sector as well as new market-based water service delivery models emerging across sub-Saharan Africa. Her work as part of the Smith School Water Programme has also contributed to developing a business model for maintaining drinking water infrastructure in marginalised areas of Kenya (FundiFix).

Seminar: Sanitation for society, including all



ABSTRACT VOLUME

World Water Week, 25 - 30 August 2019

Water for society – Including all

Contents

Sanitation law: the enabling environment for SDG6 success	63
Business innovations in sanitation for refugee settlements in East Africa.....	65
Gender Mainstreaming in Sanitation: Implementation Experience from Narsapur, India.	67
Barriers to physically disabled school children inclusion in Sanitation Services	69
Establishing City-wide sanitation strategies through community led processes	71
Inclusive and Gender Responsive WASH budget Monitoring Tools in Bangladesh	73

Sanitation law: the enabling environment for SDG6 success

Authors: Ms. Alexandra Campbell-Ferrari, The Center for Water Security and Cooperation, United States

Keywords

Sanitation, law, gender, inclusiveness

Highlights

Sanitation law provides an essential framework and enabling environment for achieving the sanitation goals, whether they be SDG6, the N'gor commitments, or national-level goals. Our research provides comprehensive insight into the role and effectiveness of law and policy in advancing identified sanitation goals.

Introduction and objectives

Sanitation law is an under-researched area of law that provides essential direction to achieving sanitation-related goals. The objectives of our research are to identify the laws and policies governing the provision of sanitation at the national to the local level and to demonstrate shortcomings that if resolved will create the right set of enabling conditions for advancing sanitation goals at the international, national, and local levels.

Methodology approach

We first identified the relevant laws and institutions governing sanitation in three countries (South Africa, Ethiopia, Ghana), four provinces (all located within South Africa, Cape Town, eThekweni, Johannesburg, and Tshwane) and the European Union. We then examined how the laws governed the sanitation value chain (for both centralized sanitation and non-sewered sanitation). Finally we examined how the laws addressed specific topics such as: gender, tariffs, low-income households and affordability, vulnerable communities, monitoring and reporting, use of NSS and FSM, citizen engagement, and a variety of other factors.

Analysis and results

We are currently in the process of analyzing the collected information. However, our initial results show significant variation from one country to another in addressing these various themes as well as significant gaps that weaken the enabling environment for achieving SDG6.

This work is part of a larger initiative to draft the Africa Sanitation Policy Guidelines. Therefore, we are also looking to this desk work to inform what should be included in a model sanitation law.

Conclusions and recommendation

There are two conclusions that can be drawn from the existing analysis. The first is that governance over and responsibility for sanitation is spread across different governmental bodies/agencies, which make delivery on certain requirements more challenging. Second, many of the laws lack specific milestones and targets that make achievement of identified goals.

The more that is known about existing laws and policies governing sanitation, the more that can be done to improve legal frameworks governing sanitation and thereby the likelihood of success in achieving sanitation-related goals.

Presenter biography



Ms. Alexandra Campbell-Ferrari, The Center for Water Security and Cooperation, United States

Alexandra Campbell-Ferrari is the Co-Founder and Executive Director of The Center for Water Security and Cooperation. Alexandra teaches Water Law at the University of Maryland Carey School of Law and American University Washington College of Law, and previously taught Legal Research and Writing at The George Washington University Law School. Alexandra is a member of the U.S. National Drinking Water Advisory Council and Co-Chair of the Water, Wastewater and Waste Pillar for Denton's Smart Cities and Communities Think Tank. Before co- founding the CWSC she was a Fulbright Scholar in Spain researching water law in Spain and the European Union.

Business innovations in sanitation for refugee settlements in East Africa

Authors: Dr. Miriam Otoo, International Water Management Institute, Sri Lanka

Keywords

Business models, solid waste and fecal sludge management, resource recovery and reuse of waste, refugee settlements, East Africa

Highlights

The paper shows that different waste-reuse business models have great potential to support the provision of sustainable sanitation service delivery and improve livelihoods of refugee communities, by using generated revenues from recovered resources to bridge financial gaps and complement other supporting mechanisms for waste management, and catalyzing small business creation.

Introduction and objectives

There are significant opportunities to generate social benefits from solid waste and fecal sludge treatment and also monetize the reuse value in ways that enable refugee communities to provide better delivery of sanitation services. In East Africa, refugee camps have to cope with thousands of tons of organic human waste daily. Although rich in nutrients and energy, the magnitude of planned collection and treatment of waste is extremely limited. With many waste reuse businesses operating in sub-Saharan Africa with models ready for transfer, this presentation will show examples of innovative models for sustainable sanitation services delivery in refugee settlements.

Methodology approach

The conceptual framework was based on an in-depth assessment of empirical waste reuse cases to understand factors driving their success and sustainability; and scalability barriers. The assessment drew on data from developing country case studies, together with expert interviews, focal group discussions/beneficiary surveys, including stakeholder roundtables per camp with due consideration of social inclusion. Using standardized indicators, the cases were assessed based on key criteria that shed light on the financial flows, production factors, resources or capacities requirements, and economic benefits to help understand the financial sustainability, scalability and development impact potential, and applicability of the models for refugee settlements.

Analysis and results

1. Social and environmental value can be maximized while targeting provision of sustainable sanitation service delivery especially in refugee settlements located in very arid regions where biomass is a scarce resource and solid fuel (briquettes) manufactured from organic solid waste and fecal sludge is of high importance for households as noted in Kenya, Uganda and Ethiopia.
2. Where waste reuse models have been locally adjusted, they proved to be sustainable, socially inclusive, profitable and environmentally friendly as well as gender-responsive. Water recovery for irrigation, and nutrients and energy recovery can support the provision of sustainable sanitation services delivery for refugee communities, and also catalyze small business creation particularly benefiting women. In Kenyan camps women stated that they have no source of employment or income generating opportunities. Production and sale waste-based solid fuel can change this, allowing women to produce enough for home use and sell surplus as a source of income.
3. Whilst recovering valuable resources from waste can help prevent groundwater contamination and allow cost recovery for waste management, building capacity in safe treatment of human waste for

reuse as well as its use can be a culturally sensitive issue as noted in the Bambasi refugee settlements in Ethiopia.

Conclusions and recommendation

Market-driven mechanisms are increasingly being adopted in the sanitation sector to catalyse higher degrees of cost recovery or profit generating to better deliver waste management services, and this applies to refugee settlements and rural host communities. Resource recovery and reuse of waste has an important role to play in the provision of sustainable sanitation service delivery, however limited to no cultural acceptance of production practices and end-use of recovered resources from human waste can hinder business creation in the sector. Capacity development that directly engages both refugee and host communities will be critical to mitigate the effects of these barriers.

Presenter biography



Dr. Miriam Otoo, International Water Management Institute, Sri Lanka

Dr. Miriam Otoo is an international researcher and subtheme leader of the research group on Resource Recovery and Reuse based at the International Water Management Institute's (IWMI) headquarters in Colombo, Sri Lanka. She is a trained agricultural economist and specialized since she joined IWMI in 2011 in the economics of waste reuse, business development and entrepreneurship, agricultural markets and productivity in developing countries. Her research focuses on understanding the linkages between agriculture, sanitation and organic waste management to enhance food security via the analysis of business opportunities in the waste reuse sector in Africa, Asia and Latin America. Miriam led the development of a multi-criteria methodological framework which has formed the basis for the development and assessment of waste reuse business models for their feasibility, replicability and scaling-up potential in low-income countries.

Gender Mainstreaming in Sanitation: Implementation Experience from Narsapur, India.

Authors: Dr. Y. Malini Reddy, Administrative Staff College of India, India

Keywords

Women, Gender, Sanitation, India, Vulnerabilities

Highlights

Narsapur, a town with 60% of its population living in informal settlements aspires to achieve city wide inclusive sanitation to benefit the often neglected poor, vulnerable and marginalized communities. The Mayor of the town, a lady, envisioned a gendered approach towards planning and provisioning of sanitation services.

Introduction and objectives

Narsapur Municipal Corporation took practical steps to involve women and vulnerable groups in sanitation planning for achieving citywide inclusive sanitation. This paper presents the framework and practical actions initiated for mainstreaming gender in FSM. The approaches taken by the city to address gender gaps and barriers to women empowerment are discussed. Also discussed are the potential solutions to address the challenge of strengthening institutions and individual capacities for gender mainstreaming in FSM. The initiatives aimed at mainstreaming gender in FSM have yielded positive results and have enthused the city to apply a gender lens to all sanitation activities.

Methodology approach

A detailed survey incorporating gender lens and inclusive approach was undertaken to cover the 12,000 households/properties in Narsapur with an aim to understand access to sanitation infrastructure and services as well as the attitudes and behaviors related to sanitation and hygiene practices. Focus group discussions and key informant interviews at 43 informal settlements were conducted to map vulnerabilities. The analysis brought to light sanitation practices, challenges and requirements in the town. It revealed the existence of deep-seated gender discrimination and exclusion faced by women, children, elderly and vulnerable groups (fisher folk, pig rearing community, differently abled) in accessing sanitation

Analysis and results

Basis the results, the city council and municipality have taken transformative initiatives towards mainstreaming gender in sanitation:

- 1) Workshops to involve women self-help groups in addressing sanitation, related gender issues, extending funding towards construction of toilets and promoting livelihoods/entrepreneurship.
- 2) Identification of change champions and formation of Gender Forums (GF) in all the urban poor settlements to bring insights and concerns to a formal institutional structure, a Gender Resource Centre (GRC) established at the municipality.
- 3) Gender sensitisation and budgeting workshops for municipal functionaries and key stakeholders
- 4) Expansion of City Sanitation Task Force (CSTF), a multi-stakeholder platform, to include a sub-group on gender to bring the voices into policy and decision making.
- 5) Inclusion of gender components in City Sanitation Plan (CSP): sex disaggregated data on usage patterns; inclusive designs; gender budgeting; Menstrual Hygiene Management in schools
- 6) Involving women groups in maintenance of community and public toilet facilities, extending loans to women for construction of toilets to promote livelihoods/entrepreneurship.
- 7) Encouraging entrepreneurship in emptying and transportation services – the only town in India to have a woman entrepreneur providing desludging services.

- 8) The Faecal Sludge Treatment plant in Narsapur is operated and run by women.

Conclusions and recommendation

The city continues to collect evidence on gender gaps and building capacities to apply gender lens in sanitation investments. Mechanisms to identify opportunities to empower women, poor and vulnerable and to engage them in sanitation planning, decision making and delivery are now institutionalised.

While the city deepens its understanding of gender influences on sanitation and strives for gender equity, it also continues to face the challenges of rigid social norms, lack of active involvement of men in driving gender equity initiatives and limited capacities and financial resources with the the municipality to support and sustain the initiatives.

Presenter biography



Dr. Y. Malini Reddy, Administrative Staff College of India, India

A multi-disciplinary researcher and practitioner in the area of urban governance and service delivery, Dr. Malini is a specialist in management, ICT for development, social marketing, gender integration, policy and social entrepreneurship. She has more than 22 years of professional experience working with academic institutions, business organizations, Indian national, state and local governments, international foundations and not-for-profit organizations. She leads several international and national large and long duration assignments in the areas of sanitation, smart cities and improvements in public infrastructure as well as service design and delivery.

Barriers to physically disabled school children inclusion in Sanitation Services

Authors: Dr. Richard Kimwaga, University of Dar es Salaam , United Republic of Tanzania

Keywords

Inclusion, physically disabled school children, Barriers, Awareness creation, Decision Making

Highlights

- Only small fraction of surveyed schools had included special sanitation facilities for physically disabled pupils.
- There exist technological, social and institutional barriers that hinder access and use of latrines for physically disabled school children.
- Awareness creation, full participation and active involvement of disabled in decision making is essential

Introduction and objectives

An inclusiveness in sanitation and hygiene interventions remains one of main threats and challenges to attaining SDG target 6.2. One of major inclusive sanitation issues is primary school children with physical disabilities. To address the inequalities in school sanitation, an understanding of barriers to inclusion of primary schools children physical disabilities in sanitation services is imperative. This study was conducted to assess the extent to which school children with physical disabilities were included in sanitation services in primary schools in Dar es Salaam. Specifically, it was to understand the barriers faced by physically disabled children in accessing sanitation services.

Methodology approach

The study which was conducted in Dar es Salaam city, covered both public and private primary schools which have children with physical disabilities. The focus was on general schools which had registered physically disabled pupils. For this reason, purposive sampling technique was used. A total of 30 (29 schools being test group and one was a control school) schools were sampled and surveyed. The two groups of test and control schools each had two groups of respondents; the physically disabled pupils and teachers. The study employed four data collection tools; semi-structured interviews, focus group discussion, observation checklists and document reviews.

Analysis and results

The study has revealed that physical disabilities were hemiplegi, monoplegia, diplegia. triglegia and amputated hands. Only 21% of surveyed schools had special sanitation facilities for the disabled pupils, an indication of magnitude of the problem. 64% of the physically disabled pupils were observed to encounter difficulties in accessing and using school latrines; in positioning feet on latrine foot rest (20%); bending down for squatting (24%); balancing the body while in squatting position and getting up (51%) and self cleansing after latrine use (38%). The technological barriers encountered in accessing and using school latrines were the underlying source of social barriers. The barriers deprived pupils' freedom of independence and privacy in using latrines, as about 32% depend on others for toileting. Latrine use dependence causes them to be uncomfortable, shy and unconfident; something which leads to self stigma, potential contributor that can lead into dropping out of school. More than two third (79%) of teacher's understanding on physical disability was contrary to the definition of physical disability. This made 22% of the teachers to be unaware of the available physically disabled pupils. Legal framework provides for inclusion of disabled people's needs in sanitation and hygiene. The challenge was on their implementations.

Conclusions and recommendation

The barriers encountered by the physically disabled pupils in accessing and using school latrines had negative consequences on their education as school dropout was the greatest risk observed to be anticipated. Appropriate inclusion strategies should involve awareness creation, full participation and active involvement of the disabled in decision making. All general schools should effect do minor modification on their existing latrines by installing supportive handrails (grab bars) in getting balance while using the latrines. School interventions on hygiene promotion should also address issues related to appropriate means and materials for anal cleansing, particularly for the physically disabled pupils.

Presenter biography



Dr. Richard Kimwaga, University of Dar es Salaam, United Republic of Tanzania

Dr. Richard Joseph Kimwaga (PhD), born on 28/03/1970, married and blessed with two sets of twins holds Bachelor of Science in Civil Engineering, M.Sc. Water Resources Engineering, M.Sc. Environmental System Analysis and PhD in Environmental Engineering. He has attended a number of professional and short courses trainings on various water resources management, sanitation management and hygiene promotion related issues. Currently, he is a Senior Lecturer at the College of Engineering and Technology - Water Resources Engineering Department, University of Dar es Salaam with major specialties in WASH. Dr. Kimwaga has more than 15 years of relevant professional experience in WASH.

Establishing City-wide sanitation strategies through community led processes

Authors: Mr. Zilire Luka, Federation of the Rural and Urban Poor, Malawi

Keywords

Community data, Pro-poor, Participation, Partnerships, Situational analysis

Highlights

The project developed and tested approaches to pro-poor citywide sanitation strategies. It focused on identification of precedents through a bottom-up participatory method. Community data was central to the process. Communities were organized and supported in the establishment of partnerships with government and other stakeholders. scaling-up of the project is underway.

Introduction and objectives

This is a response to the failures of conventional approaches to urban sanitation in the cities of Malawi. The project supported city councils and communities in developing community-driven approaches and provided the capacity to adapt and apply these model on a larger scale. The project was piloted in Blantyre City and it has been scaled-up to other cities. The project's objectives were to understand obstacles preventing the urban poor from accessing improved sanitation; developing approaches that overcome barriers to sanitation improvements; identify a pro-poor sanitation financing facility and build and strengthening partnerships with government and stakeholders.

Methodology approach

At the core of the project is a community led data collection, analysis, dissemination and partnership building led by the federation. The project started with informal settlements mobilisation; profiling; enumeration and mapping. Detailed situational analysis report depicting challenges and opportunities was produced for the city. Communities then started engaging with resource wielding authorities and sanitation issues which are affecting urban poor communities were presented at these meeting. The engagement platforms resulted in the identification of five precedents setting and three of them were prioritised namely household ecological sanitation toilets; public ecological sanitation toilets; and dewats.

Analysis and results

Project noted that there is lack of community organisation and this has hampered the communities' ability to come together and address sanitation challenges. The federation was tasked with the responsibility of organising communities.

There is also a poor working relationship between communities and government. This is negatively affecting co-production of ideas and solutions. In a bid to overcome this challenge, the Blantyre City Council created a community engagement department and employed 3 people to be contacts persons. Further, the council has created a forum where Directors and community leaders are meeting once a quarter. Communities are also participating in councils participatory budgeting process.

The project also reviewed that most approach to sanitation are based on technologies and financing systems that do not work to the advantage of poor people - affordability. This issue resulted in the identification of three precedents setting projects namely household ecological sanitation (Ecosan) toilets- longevity; public Ecosan toilets - easy to management and the community managed anaerobic decentralized waste water treatment systems (DEWATS) - can be used by more.

The federation's Urban Poor Fund was identified as the financing arm of the process but there is a high demand that cannot be sustained by the fund- more players needed.

Conclusions and recommendation

The need to strengthen partnerships to consolidate the project gains – these include the established partnership and forums created.

The need to identify more funding players or capitalize the UPF to manage demand for sanitation loans that the project has created.

To expand the project to other cities and regions.

Learning exchange visits should be encouraged between cities and communities.

The need to strengthen the support organisations if the scale up is to work.

Thinking holistically, not only about sanitation - but water and hygiene should also be part of the conversation as they complement each other in the fight against diseases

Presenter biography



Mr. Zilire Luka, Federation of the Rural and Urban Poor, Malawi

My name is Zilire Luka and I am working with the Centre for Community organisation and Development (CCODE) - a local NGO in Malawi. CCODE works as a support NGO to a movement of organised urban poor people operating under the umbrella name the Federation of the Rural and Urban Poor (Federation). I have a passion of working with urban poor and I believe in co-production of knowledge in the development sector where poor people are involved in all the project cycle beginning from designing to monitoring and evaluation.

Inclusive and Gender Responsive WASH budget Monitoring Tools in Bangladesh

Authors: Ms. Sara Ahrari, Simavi, Netherlands

Keywords

tool, social accountability, budget tracking, public finance

Highlights

- Use of social accountability tools at community level give voice to the voiceless and encourages demand based budget allocation and service delivery
- Incorporation of specific gender and social inclusion indicators in monitoring tools is necessary to control that no one is left behind.

Introduction and objectives

For this poster presentation, we would like to demonstrate how use of our inclusive and gender responsive public WASH budget monitoring tool has resulted in increased allocation of public resources for women, elderly, disabled and excluded groups in 2 Municipality and 5 Unions of two upazilas in Barguna and Bhola districts in Bangladesh. In addition, we will elaborate the process of community, in particular women and those socially excluded, engagement and participation in this process which has led to their empowerment.

Methodology approach

Development Organisation for the Rural Poor (DORP) supported by Simavi have been using a social accountability tool called “WASH budget monitoring” since 2011 to monitor annually allocation and expenditure of public WASH budget in rural Bangladesh. In 2017 indicators to monitor gender and social inclusion were integrated in the tool.

This monitoring tool is used to monitor local government and department of public health engineering (DPHE) budgets for WASH. Further, communities, in particular women and socially excluded groups are made aware and empowered to engage with these public service providers in “Pre” and “post” budget meetings to voice their demands.

Analysis and results

Although the Act on “Right to Information” in Bangladesh, provides a steady ground for employing the WASH budget monitoring tool, its application still is challenging at the local level. Part of these challenges are caused by using different budget lines at local level compared to the nationally approved budget lines. Despite these challenges application of this tool succeeded in 12-18% increase in public WASH investment and enhanced transparency and participation of women and socially excluded in the allocation of the budget. This tool, however, did not provide the information on “Who” benefited from the allocated (increased) public WASH budget. Realising this shortcoming, under new phase of the programme, started in 2017, we incorporated the principle of inclusive and gender responsive budgeting into the tool. Extensive consultation took place with various stakeholders to identify what data can be and need to be collected and analyzed at local level to ensure public WASH budgets allocation and utilization are inclusive and gender responsive. Taking into account our previous experiences the inclusive and gender responsive WASH budget monitoring was developed. This tool is applied at three levels: Local line departments (civil servants), Union Parishad/Municipality (public representatives) and Local Citizens

Conclusions and recommendation

- Most people in the communities are neither aware of their WASH rights nor of the national policies. Therefore they are not holding their government accountable to provide or facilitate provision of WASH services.
- Lack of clarity and overlap of roles and responsibilities of different service providers is a major obstacle for communities to demand their WASH rights.
- Use of gender responsive public WASH budget monitoring tool can facilitate demand based allocation of the resources.
- Women and socially excluded groups need to be accompanied to empower themselves and be able to overcome the barriers to their inclusion.

Presenter biography



Ms. Sara Ahrari, Simavi, Netherlands

Sara Ahrari is Simavi Programme Manager. She is Iranian/Dutch and has a master in Civil Engineering. Prior to joining Simavi has worked with oil & gas companies, emergency response and disaster risk reduction programmes with international NGOs (namely World Vision, International Medical Corps, Asian Disaster Preparedness Center) and UN agencies (UNICEF and UNOPS) in Iran, Pakistan, Indonesia and Thailand. Since 2009 she is working with Simavi. She uses her technical background and field experience combined with the social skills to strengthen the inclusiveness and sustainability of WASH services in her work

Seminar: Transforming societies to meet the SDGs: The role of finance



ABSTRACT VOLUME

World Water Week, 25 - 30 August 2019

Water for society – Including all

Contents

\$1 Billion Mobilized in Household WSS Investment: Evidence from Peru.....	77
Exploring Development Impact Bond for Safe Sanitation	79
Kigali Bulk Water PPP, PPP means Prepare Prepare Prepare	81
Community women regularizing accounts to improve customer service (Women Partners).....	83
Accelerating sanitation access through financial incentives: Demystifying subsidies	85
Unlocking payment behaviours of the rural poor.....	87
Women WASH Entrepreneurship: Barriers and Opportunities in Bangladesh.....	89
Getting the foundations right to increase sustainable and pro-poor finance	91
Transforming societies through Hybrid Corporate Social Responsibility(CSR) Funding Model	93
Breaking Down Barriers to Financial Access for sanitation and Businesses.....	95
Impact of Devolution on Financing the WASH Sector in Kenya.....	97
Financing sustainable equity for all in the Okavango River Basin.....	99

\$1 Billion Mobilized in Household WSS Investment: Evidence from Peru

Authors: Mr. Matt Morrison, Water.org, United States

Keywords

financing, low-income, households, WaterCredit, loans

Highlights

- USD 1 billion in household financing was mobilized for water supply and sanitation (WSS) solutions, demonstrating potential to help meet SDG6 targets.
- Financial institutions create sustainable approaches that reach marginalized populations, including low-income households and women
- Collaborative approaches to policy and practice foster financial streams for private WSS financing.

Introduction and objectives

To close the financing gap to meet SDG6, the WSS sector has recognized that multi-faceted financial streams are required to achieve SDG6. To this end, Water.org's WaterCredit initiative has partnered with local financial institutions and governments across the globe to mobilize over USD 1 billion in WSS finance through loans to low-income households and the enterprises that serve them. This pitch will present key evidence and learnings from the program in Peru to build a case for additional funding from the panel. By highlighting previous success in WSS financing, the pitch will deliver a call to replicate the model.

Methodology approach

The research uses a mix of diverse methods, drawing from multiple program evaluations and Water.org's monitoring database to assess:

- Program performance: achievement of the programs on key metrics
- Household level impacts: quasi-experimental methods to estimate the impacts of the initiative on borrower households on various outcomes.
- Impact on microfinance institutions (MFIs): profitability and sustainability studies undertaken to evaluate the MFIs' progression toward sustainable and profitable water and sanitation loan portfolios.
- System level impacts: qualitative approaches, including outcome harvesting, used to measure the degree to which the programs made favorable headways in the WSS financing landscape.

Analysis and results

- WSS financing leverages much needed funding to achieve SDG6: In Peru, Water.org's targeted technical and financial assistance leveraged \$297 in private sector WSS investments for every \$1 invested by Water.org
- Key drivers and challenges among financial institutions; most WSS portfolios had progressed toward operational and financial viability, indicating financial sustainability.
- Improved household wellbeing: households that availed loans to improve their water and sanitation facilities witnessed improvement across a range of human development indicators.
- Opportunity for increased influence and uptake of WSS financing model: the size of Peru's finance sector is large and its microfinance sector is relatively mature making it prime for attracting larger financial institutions and umbrella organizations to WSS financing.

Conclusions and recommendation

Financing has emerged as the most pressing need to meet SDG6. Water.org's landmark achievement of mobilizing \$1B for WSS financing- over \$500M mobilized in Peru alone- i has the following implications for market-based

- Affordable financing directed to the poor has a huge potential to help meet the financing gap for SDG6.
- Financial institutions will encounter contextual challenges, but best practices are emerging that can be followed to ensure WSS portfolios can grow and sustain over time.
- Governments play a critical role in developing a conducive environment for WSS financing.

Presenter biography



Mr. Matt Morrison, Water.org, United States

Matt Morrison serves as Water.org's Development Finance Advisor, based in Washington DC, to help mobilize capital for water and sanitation from development finance institutions and commercial sources of finance. Matt has spent his career working in development finance, including 24 years with International Finance Corporation, much of which focused on catalyzing external sources of financing. Matt was head of IFC's loan syndications program for Asia and subsequently created and headed IFC's investor relations team in treasury. Before joining Water.org, Matt worked in impact investing and then set up the syndicated loan program and syndicated transactions for Overseas Private Investment Corporation.

Exploring Development Impact Bond for Safe Sanitation

Authors: Prof. Meera Mehta, CEPT University India, India

Keywords

Development Impact Bond, sanitation, Innovative Finance

Highlights

Many desludging operators working in small towns in low-income countries find it difficult to make profit. The cost base (both capex and opex) is significant, there are significant working capital needs and customers' willingness-to-pay for is limited. Meeting "safely managed sanitation" goal of SDG 6 requires sustainable finances

Introduction and objectives

CEPT supports small and medium towns in Maharashtra for implementation of citywide inclusive Faecal Sludge and Septage Management (FSSM) services. It has helped cities move from the practice of "emergency complaint redressal system" for emptying of septic tanks to a 'citywide scheduled emptying service' in two cities through a performance linked contract with private service provider. This is for all households and properties, and is linked to a local sanitation / property tax. CEPT is exploring a DIB option to bring in impact investment and CSR funding. The involvement of private sector will ensure scaling up across other cities.

Methodology approach

The private service provider identified for emptying and treatment in cities will have a performance based contract with a urban local government. It will receive capital funding and working capital from impact investors to carry out scheduled desludging over three years in the selected city. The investment will be transferred through the implementation manager or a Special Purpose Vehicle (SPV) for the project. A research institution will be identified for continuous monitoring and develop evaluation report of the project. Based on the outcome achieved, outcome funder either a foundation or a corporate, will disburse payments to investors.

Analysis and results

A number of development impact bonds have been recently developed in India which focus on education, health and skill development. Our initial inquiries suggest considerable interest among investors to develop a DIB for sanitation in relation to the SDG. A DIB is proposed to be developed for citywide scheduled emptying service and a faecal sludge treatment plant. Both together deliver on outcomes of equity and inclusion for ensuring emptying service to the entire city, and environmental outcomes related to treatment of waste water as per standards and its reuse.

The proposed DIB structure enables focus on private sector through a performance based contract with a urban local government. Impact investors will finance the private sector provider. Performance will be assessed through the contract with the local government as well as through an independent monitoring agency. Investors will be repaid on the basis of actual performance achieved. Higher performance will mean higher returns for the investors. Investors will be rapid by outcome funders. The ongoing work in cities in Maharashtra suggest that the total costs are likely to range from USD 0.3 million to 1 million. The DIB value can be enhanced by combining 2 to 3 cities in one bond package.

Conclusions and recommendation

Impact Bonds are one way to structure sanitation projects. They can help mobilise finance through private investors and/or donors. They also allow a balance between profitable operations by private sector

operators with serving the poor and for achieving positive environmental across the sanitation value chain. Developing a DIB structure will require involvement of urban local governments, private service providers, impact investors, outcome payers such as HNIs, Foundations or corporates through CSR. It will also help introduce robust monitoring through performance related to number of septic tanks emptied, including in the poor areas, and environmental benefits of treatment of septage.

Presenter biography



Prof. Meera Mehta, CEPT University India, India

Meera Mehta is a Professor Emeritus at CEPT University, Ahmedabad, where she teaches courses on urban infrastructure and finance. She is also Executive Director of its Centre of Water and Sanitation (C-WAS) at the university where She leads the work on Sanitation and Financing. Prof Mehta has over 40 years of experience in water and sanitation, urban development and infrastructure finance.

Dr. Mehta was Director of School of Planning, at CEPT. She led major initiatives on municipal bonds under a USAID project in India. She worked with the World Bank in India and its Water and Sanitation Program in Africa.

Kigali Bulk Water PPP, PPP means Prepare Prepare Prepare

Authors: Mr. Sebastien Mellot, Mott MacDonald , France

Keywords

PPP, Bulk Water, Supply shortage, Stakeholders management, Private Investment

Highlights

The Kigali Bulk Water PPP is the first ever large water public private partnership reaching financial close in Sub-Saharan Africa. It proves that finance can lead to sustainable water supply in Africa. The reason of this success is that for once the public was as well prepared as the private.

Introduction and objectives

Kigali is growing rapidly, and a rising population and burgeoning urban development is putting a strain on the city's water system. When plans to increase supply were first mooted in 2011 there was not enough clean water to meet the demands of about 450,000 people in the city. The government of Rwanda with the support of the IFC looked at how to finance additional infrastructure and sustainable water services. This could be made possible through a Design Build Operate and Finance 27 years PPP contract balancing public and private sectors interests. An approach which never worked before in similar countries.

Methodology approach

IFC appointed Mott MacDonald in the first place as technical advisor to support with development of a sustainable technical solution, prepare a PPP contract appealing to private sector and fair to the public sector, support in the private sector selection process to ensure full transparency in the project and enable the project to reach commercial close. Then to ensure an enabling environment was in place for convincing the private sectors lenders and additional another technical advisory was implemented to prepare the ministry of infrastructure of Rwanda and WASAC the national water utility to negotiate a sustainable financial deal.

Analysis and results

PPPs are often perceived as the solution for financing complex and expensive infrastructure developments whilst partnership and services provision dimensions are ignored. The consequence of this bias is the development of projects which technically can address water issues but can not be implemented without the public sector having to propose deals which terms are either unattractive to the private sector or unsustainable to the public sectors. The consequences being the projects are continued water shortages as the infrastructure is not financed or the public signs an unsustainable deal and the population must pay unaffordable costs (tariffs or taxes).

This project differs because by receiving additional adequate support the public sector selected a project which technically addresses the shortage issue sustainably but with a technology familiar to the water utility, so the local water utility already has the capacity to monitor if the private sector is developing and operating the infrastructures well. The contract prepared, and the tender managed on behalf of the government of by renown institutions contributed to improve attractiveness to the private sector. Additional support after the commercial close helped to the government of Rwanda to negotiate and agree on a sustainable deal with lenders that is affordable.

Conclusions and recommendation

The key lessons drawn from this success are:

- the scales of advisory and preparedness were even between public and private;
- the project was technically simple; and

- the PPP was only for a strategic infrastructure not a privatisation.

This approach enabled a USD 75million 27 years deal for the development of new 40,000m³/d water treatment plant which will be operated for 26 years by the private sector on an agreed tariff per m³ for water meeting required quality standards. WASAC the off taker will pay the provider only for the actual water produced put in the water network.

Presenter biography



Mr. Sebastien Mellot, Mott MacDonald, France

Sebastien Mellot, is an international development project principal at Mott MacDonald. He is directing water, sanitation, and development projects. He specialises in introducing project finance and digital innovation in international development.

His 15 years of experience include award-winning Kigali Bulk Water PPP, the 1st water PPP of sub-Saharan Africa. His work on how PPP can sustainably solve the lack of public funding includes studies in Kenya on how PPP can finance NRW reduction, Lilongwe Water PPP and developing private operator PPP contract in DRC. He has just returned in Europe as after being country manager for Rwanda.

Community women regularizing accounts to improve customer service (Women Partners)

Authors: Mr. Jorge Eduardo Perales Lara, Veolia, Mexico

Keywords

Women partners, Social Responsibility, Social Inclusion, Gender, Billing

Highlights

In 2016, Veolia, in association with Women's Foundation "Tlanemani," launched a social program to regularize clients with high and historical debt to improve customer service through women empowerment in communities, in Aguascalientes, Mexico. This program helped the company improve the debt recovery and build a strong partnership with the community.

Introduction and objectives

In association with the Women's Foundation "Tlanemani", aligned with UN's 17 SDG, unemployed women head of family are employed to visit the people in their neighborhood and offer them all the options to regularize their water service payment. They present options to create consciousness on water issues and to generate social link. Through the salary provided to the women, Veolia not only contributes to the local development, but it also helps the users to pay in function of their revenues, bringing well-being and empathy in the neighborhood.

Methodology approach

Women Partners are currently working on a project called "Social Benefit Plan" whose objective is to regularize users with a large debt through certain commercial discount policies, previously defined by commercial management. The proposals are reflected in an invitation letter that they deliver directly to the homes and motivate our clients to approach Veolia agencies. When clients arrive to our agencies, we offer financing plans according to their needs or attractive discounts for payment in a single exhibition. It is important to mention that this project is 100% focused on regularizing clients with large economic needs and large debts.

Analysis and results

At the beginning of 2018, Veolia Agua de Aguascalientes had 280,000 users of the potable water service, of which 80% are located in popular areas, mainly in the eastern part of the city, where we find greater deficiencies.

The advantages of working with the Women partners team are:

Operating costs: Cost with Women Partners 2018: 1.5 Million MXN vs. 2.3 MXN with External Agencies

Security: Women know perfectly their neighborhoods, whereas external agencies manage different neighborhoods, which increases their risks.

General Results: More than 36,000,000 MXN recovered November 2018, More than 30,000 regularized homes

- Presence in more than 174 Colonies
- Security
- Women partners manage within their neighborhood, they know it perfectly.
- External Agencies manage different neighborhoods, which increases the risk of insecurity.
- General Results
- More than 36,000,000 MXN recovered November 2018
- More than 30,000 regularized homes

- Presence in more than 174 Colonies

Conclusions and recommendation

The “Women Partners” program helped Veolia implement efficiency in the commercial collection, to involve communities, especially women who are head of families, from the neighborhood in the water issue and payment culture. It permits direct revenue in those communities and complies with Veolia’s goal of social responsibility as well as SDG.

As a conclusion, the “Women Partners” program enables the achievement of the economical equilibrium required for the sustainability of the water service, excluding any political risk. Veolia mitigates the risk transforming users into strategic partners for portfolio recovery.

Presenter biography



Mr. Jorge Eduardo Perales Lara, Veolia, Mexico

Mr. Jorge Perales was born in Guadalajara, Mexico, on November 11, 1987. He's an economist with Finance master degree. He has 10 tenure experience years of Commercial Management main focused on collection areas. He began his career in 2010 as coordinator of collection projects for a financial group in Mexico. In 2014, he was commissioned to implement new technologies to increase the collection results aligned with better customer service.

He serves to Veolia México as Commercial Manager in Aguascalientes water project, since 2016, with two core objectives: Keep sells and collections increasing for the project, improving customer experience.

Accelerating sanitation access through financial incentives: Demystifying subsidies

Authors: Ms. Doreen Mbalo, Deutsche Gesellschaft für Internationale Zusammenarbeit, Germany

Keywords

Financing, Leave no one behind, Urban, Human Rights, Subsidies

Highlights

Given the growing urban sanitation crisis, there is need to unlock the potential of household toilet subsidies to achieve SDG 6. This session demystifies sanitation subsidies and discusses how smart subsidy design for the urban poor can help reduce inequalities, based on Burkina Faso as a country example.

Introduction and objectives

Rapid urban population growth and a growing financial gap hinders progress towards achieving SDG 6. The 2018 SDG 6 synthesis report points out that effective policies, strategies and subsidies must be developed to ensure that no one is left behind.

The objective of the abstract is to provide an overview why subsidies are still relevant based on the leave no one behind principle and the experience of Burkina Faso. The presentation will focus on aspects such as financial sustainability, legal and institutional framework, existing markets, targeting, tradeoffs and ownership.

Methodology approach

The study debunks the myths and analyses possible unintended negative consequences based on GIZ's in-country experience in Kenya, Burkina Faso, and Burundi. It then draws recommendations on targeting, trade-offs, policy objectives and strategies. It covers aspects such as financial sustainability, roles and responsibilities, legal and institutional framework, existing markets, targeting and ownership. Lastly, the study comprises a subsidy matrix, a tool to chart out the design parameters and visualize the trade-offs to facilitate smart subsidy design. The tool is intended for development practitioners and national mandated institutions tasked with the design of household sanitation subsidies.

Analysis and results

The perception that household toilet construction is a private affair and not the responsibility of the government goes against the human rights and the goal of universal sanitation access outlined in Agenda 2030. Sanitation should not be perceived as charity but as a legal entitlement - even for the poor and the marginalized. Investment in sanitation promises huge economic and social returns. The risk of ill-targeted subsidies can be reduced by smart subsidy design. Key is setting clear transparent criteria about the conditions under which the subsidy can be obtained to ensure that the target group actually benefits from the subsidy. The amount of subsidy has to be carefully determined as it influences the level of ownership. Measures such as sanitation marketing campaigns with strong institutional mandated back-up, clear communication and donor coordination further enhances ownership. Designing of smart subsidies requires transparency from all stakeholders. Improving the effectiveness of subsidies is pivotal taking into consideration design variables such as financing sources, legal and institutional framework, selection, timing and exit and performance criteria such as effectiveness, efficiency, resilience, transparency and private sector participation.

Conclusions and recommendation

Household toilet subsidies are an important financing tool to improve the quality of sanitation infrastructure and service delivery. Furthermore, there is a need to institutionalize investments made in the form of

subsidies. This will reduce the inequities in allocation of finance in the sector. Clear communication with target groups and clients, expectation management and coordination among stakeholders are key to success. The risks of ill-targeted subsidies can be reduced by smart subsidy design.

Presenter biography



Ms. Doreen Mbalo, Deutsche Gesellschaft für Internationale Zusammenarbeit, Germany

Doreen Mbalo comes from Nairobi, Kenya and currently works for the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) in Bonn, Germany. She has been working in the sanitation sector for the past 8 years primarily focussing on Urban Sanitation, Faecal Sludge Management and On- site Sanitation, Gender and Financing Mechanisms.

Unlocking payment behaviours of the rural poor

Authors: Prof. Rob Hope, University of Oxford, United Kingdom

Keywords

Choice experiment, finance, Kenya, payment behaviours

Highlights

If rural water users are to contribute money to reduce the SDG funding gap then investments in service delivery models need to understand their priorities to improve water payment behaviours. A choice experiment of over 45,000 observations models trade-offs between water service levels and payments to inform performance-based financial models.

Introduction and objectives

Sub-Saharan Africa is most off-track to meet the Sustainable Development Goal for drinking water and requires three times more relative investment than any other region. Systemic late or non-payment by rural water users is poorly understood leading to poor returns on current investments. Why tens of millions of rural water users do not pay is not well understood. We design an experiment to test if a more reliable service model would lead to more people paying for the service. We ask: Are payments contingent on service delivery? And, how can the most vulnerable benefit and not be left behind?

Methodology approach

The behavioural responses of rural people to alternative water supply attributes and management arrangements is not understood well. Current policy is agnostic on service delivery attributes assuming 'improved water supplies' will be managed with equitable tariffs and reliable performance. Increasing evidence disputes these assumptions but provides limited evidence if investing more in a reliable service will elicit higher and more regular payments. Do non-wealthy women prefer water quality more than reliability? Do water users have a preference between government, market or community management? We design a choice experiment to test and model trade-offs from over 45,000 choice observations in Kenya.

Analysis and results

The choice modelling strategy has two stages. First, a conditional logit model estimates the attributes of (1) maintenance service provider, (2) guaranteed time to repair, (3) payment storage, (4) monthly household payment. Attributes are interacted across four hypotheses of behavioural change: (a) multidimensional wealth, (b) education, (c) sex of respondent, and (d) household concerns. Second, a latent class model specified by discrete distribution of preferences.

Descriptive results indicate seven of ten households vote for the choice alternatives with remainder preferring to continue with community management. Of the former, the majority require a repair service within four days (66%), are willing to pay up to USD1.0 (52%), and are split between alternative payment storage (bank at 38%, mobile money at 34%) and management arrangement (private at 58%, public at 42%). Modelling results indicate higher user payments are associated with faster repairs by public or private maintenance models. Preference heterogeneity for payments is influenced by wealth, education, gender and concerns separating seasonality and congestion from water quality, reliability and satisfaction. The traditional community management model remains the choice of one in three households, who are characterised by lower wealth, no willingness to pay and tolerance of slower repairs.

Conclusions and recommendation

Understanding choice heterogeneity may explain why current policy progress is slow and uneven in Africa, and point to behavioural interventions to make public policy more effective and equitable. We propose three

recommendations. First, examining drinking water as a composite good with different attributes across service levels and management arrangements. Second, learning from behavioural responses to different service delivery arrangements. Third, designing service delivery to influence the payment behaviours of rural people to co-finance and sustain water services. On the latter, performance-based enterprises are emerging across rural Africa and there is an opportunity to learn from their progress and limitations.

Presenter biography



Prof. Rob Hope, University of Oxford, United Kingdom

Rob Hope is Professor of Water Policy at the University of Oxford. His works focuses on the links between water economics, policy and poverty in Africa and Asia.

Women WASH Entrepreneurship: Barriers and Opportunities in Bangladesh

Authors: Mr. Mahiul Kadir, Simavi, Bangladesh

Keywords

Women, Entrepreneurs, Problems, Opportunities, Economic Empowerment

Highlights

- Women entrepreneur can play a significant role in increasing access to WASH products and services
- This capacity of women is not sufficiently tapped into at the WASH market
- Women entrepreneurs need to be supported to economically empower themselves to decide about their income and have control over their resources

Introduction and objectives

Women entrepreneurs are playing an important role in the global business environment, sustainable economic development and social progress. In Bangladesh, half of the total population is women. They are an essential and fundamental force in the development process that is the main factors of socio-economic progress. In the society women have key domestic role, but their entrepreneurial ability have not been properly tapped into due to lower status of women in the society.

This study was conducted to identify the barriers women entrepreneurs face in WASH sector in Bangladesh.

Methodology approach

Hope for the Poorest is a sister concern of ASA, world renowned microfinance organisation in Bangladesh. HP establishes entrepreneurship approach on diversified social issues and integrates with financial services provided by ASA. HP has a good track record on WASH and MHM entrepreneurs' e.g. local sanitation, small scale water vending and low cost sanitary napkin entrepreneurs at the local level supported by Simavi, a Dutch donor organisation. Find out and how to overcome the problems, Fifteen WASH and other women entrepreneurs are selected randomly and well-structured interviews conducted on their personal and business experiences.

Analysis and results

This poster presentation will elaborate on the barriers the studied women entrepreneurs face in Bangladesh. Some of the main barrier identified for women to be a successful entrepreneurs included traditional culture, care and domestic responsibilities and fear of failure at home. Further, lack of access to finance, starting up problems, being excluded from ownership of and control over property and assets, make it difficult for women to have access to formal-sector financing systems and build a support network at institutional levels. Insufficient experience, skills and knowledge regarding business development as business entry, marketing, finding customers / suppliers, maintaining accounts, developing high-value products based on market awareness, access to government services and regulations such as incentive and licensing requirements are among other problems women are facing.

If those problems are overcome to women entrepreneurs, the level of participation of women in WASH activities and the percentage of women in WASH business will be increased and those will help to raise their contribution from 10% to 25% in the GDP of Bangladesh.

Conclusions and recommendation

Women entrepreneurship development is important constituent of the development process and an integral part of the socio-economic transformation process. Women entrepreneurship is a purposeful pursuit towards initiating, promoting, innovating and mainstreaming economic activities for production and

distribution of wealth. Women prefer to be entrepreneurs for independent occupation, get over financial difficulties and liberalization of economics. Therefore increased attention and support from governments, international donors, and non-government organisations (NGOs) for women to become and stay entrepreneurs, have access to (micro) credit/ loans/ assets/resources and empower them to decide over and control their income and assets.

Presenter biography



Mr. Mahiul Kadir, Simavi, Bangladesh

Md. Mahiul Kadir, 34, is Executive Director at Hope for the Poorest (HP) which focuses on entrepreneurship development in the areas of WASH and MHM in Bangladesh.

He is a standing committee member of the Bangladesh WASH Alliance, and member & debater of the Bangladesh National Debate Federation.

He is a business graduate from the Shahajalal University of Science & Technology in Bangladesh and holds an advance business certification from the Institute of Business Administration at Dhaka University. Mr. Kadir also has a professional master's degree on Disaster Management & Vulnerability Study from the University of Dhaka.

Getting the foundations right to increase sustainable and pro-poor finance

Authors: Ms. Catarina Fonseca, IRC, The Netherlands

Keywords

finance, enabling environment, investment, sustainability, blended finance

Highlights

- Unpacks the enabling environment for WASH investment and highlights examples of sector innovators
- Draws attention to unintended negative consequences of Business as Usual aid and donor practices
- Analyzes the capacity needs of service providers, governments and suppliers of finance with real examples

Introduction and objectives

Responding to the substantial finance gap for achieving SDG 6.1 and 6.2, the Water and Sanitation (WASH) sector has mobilized to launch new blended finance vehicles with increasing frequency. The sustainability and potential for scale-up of any financial solution intended to support increased access to unserved, marginalized populations, however, will need to fix basic foundational weaknesses. Without addressing underdeveloped national financial sectors, ineffective regulation, low cost recovery, weak governance, and weak efficiency of service providers, any solution will be short-term, effectively promoting dependence on external support rather than building self-sufficiency. The presentation will provide concrete examples of innovative solutions.

Methodology approach

This research is a collaborative effort of IRC WASH, the World Bank Water Global Practice and Water.org that is being published in March 2019. The information compiles the latest research on blended finance for water and sanitation as well as enabling environment, including World Bank and OECD data, as well as the co-authors' own observations from working in the field of water and sanitation finance long before SDG-6. The co-authors additionally draw upon the breadth of expertise resident in their organizations to highlight case studies that offer examples of pitfalls to avoid as well as how to overcome the challenges.

Analysis and results

We are not on track to meet SDG 6.1 and 6.2 targets, and there is not enough funding available through traditional sources.

Domestic commercial finance is an important source of finance, but commercial lenders are typically unfamiliar with the water sector and hesitant to lend to borrowers with weak cashflows, which is the profile of most service providers in developing countries.

To manage these challenges, domestic commercial finance is being blended with sovereign or grant financing and guarantees through various financing mechanisms to provide loans on reasonable terms to the sector. The sustainability of impact or scope for scale-up of such mechanisms is less likely if certain core, foundational issues in a country are not addressed, including weakly-developed national financial sectors, limited regulation; weak governance at decentralized levels, and low efficiency of urban and rural WASH service providers. Unfortunately, these institutional reforms take time and are more complicated to implement and fund.

Much of the impetus to date has come from the donor community and has been on supply of finance. Finance solutions that are sustainable and which work at scale will require foundational reforms on both the supply and demand sides, as well as government leadership.

Conclusions and recommendation

Investing time, energy and funding into getting the foundations right will establish a healthy enabling environment that can support the long-term investments in the sector to ensure that all people have access to clean water and sanitation. Better coordination among all development partners and governments, including a collective commitment to and prioritization of working on these foundational issues, is a necessary first step. Financial accountability incentives, such as Key Performance Indicators and payment-by-results types of instruments should be adopted by development finance actors and key sector Ministries, and efforts should be made to enhance WASH stakeholder understanding of finance ecosystems.

Presenter biography



Ms. Catarina Fonseca, IRC, The Netherlands

Co-author Catarina Fonseca, The Netherlands, is an economist with 21 years of experience in development cooperation and 18 in the water supply and sanitation sector. She has pioneered sector development on the understanding of life-cycle costs and financing. She leads IRC's work on finance. Catarina has a passion for evidence and data in support of good governance (acknowledging it's a tough call). Before IRC, Catarina worked with a Portuguese NGO on participatory approaches in urban slums with a gender and equity focus.

Transforming societies through Hybrid Corporate Social Responsibility(CSR) Funding Model

Authors: Mr. Sekhar Rayaprolu, Western Coalfields Limited , India

Keywords

India, Cooperatives, SDG, Entrepreneurship, Innovation

Highlights

Western Coalfields Limited a coal mining company operating in drought prone Vidarbha Region of Western India, is transforming societies by financing water through its Hybrid Corporate Social Responsibility(CSR) Funding Model – where assets are owned and operated by the company but generate revenue for both company & community

Introduction and objectives

Western Coalfields Limited (WCL) is one of the foremost public sector company employing more than 50000 workers in Drought prone Vidarbha region of Maharashtra, India. With an aim to align CSR initiatives to the extent possible with business objectives WCL has created a new Hybrid CSR funding model where funds are invested to create community assets which are owned, operated and maintained by the company, but used by the company and community together in-turn generating revenue for both.

Methodology approach

WCL has constructed High Capacity Water Purification(Reverse Osmosis-RO) plants across various villages in Maharashtra. Once constructed, the water plants are operated and maintained by WCL. However, the purified water from the plant is used by both WCL and the villagers. Water is distributed to the villagers through a network of Water Entrepreneurs. They are trained and recruited from local unemployed Youth associations. They work in collaboration with WCL staff in day to day management of water plant. Also, since the plant is of high capacity, the excess capacity after distribution to the villagers is bottled and used by WCL

Analysis and results

Our First project was launched at Patansaongi Village, where a 1000 litres per hour capacity 5 stage(RO-UV) water purification plant is installed. With an operating time of 10 hours, 10000 litres of water is purified everyday and stored in storage tanks. The water is then sent through pipelines free of cost to Water Entrepreneurs who distribute the water to villagers at nominal charge of Rs 5 (1/16th of a Euro) for a 20 litre can which is 25% of actual cost charged in cities. The water treatment plant is also attached with bottling plant where the filtered water is bottled(under brand Coal-Neer) and distributed across all the corporate offices of WCL.

The overall advantages of this project are:

Villagers are provided with low cost purified water at 1/4th price

Water Entrepreneurs earn a livelihood by distributing water without investing any money

WCL saves money spent on purchase of bottled water from external agencies

The investment of ₹30000 has been recovered within 3 years of its operation

This is a sustainable and inclusive financing model promoting Water Entrepreneurship and also providing access to clean and safe drinking water to villages. Our community based water projects have benefitted more than 136,000 population so far.

Conclusions and recommendation

Community-based Water Treatment Plants are not sustainable as villagers find it difficult to buy water at high prices and due of lack of maintenance they become dysfunctional. Through Hybrid model, WCL is not

just investing in water plant but also maintaining it and is able to provide low cost purified water to villagers and also create new age water entrepreneurs who earn revenue without any investment. Our Hybrid Corporate Social Responsibility (CSR) funding model has been highly successful in non-water areas as well like skill-development, Mine Tourism and low-cost housing, all of which are creating newer opportunities for young entrepreneurs

Presenter biography



Mr. Sekhar Rayaprolu, Western Coalfields Limited, India

Sekhar Rayaprolu is a Community Development Professional working at Western Coalfields Limited(WCL), a coal mining company based in India. He works on Rural Development Projects being taken up by WCL for the community affected by its mining operations. He specialises in Gainful Utilisation of Mine Discharge Water, among others. Prior to this Sekhar worked under a Fellowship on Rural Development for Govt of India where he worked on setting up of Model Water Cooperatives in Tribal Areas. Sekhar has done his Post Graduation in Rural Management at Institute of Rural Management, Anand(IRMA) after working in IT sector for 3 years

Breaking Down Barriers to Financial Access for sanitation and Businesses

Authors: Mr. Stephen Birungi, Caritas Fort Portal - HEWASA, Uganda

Keywords

Barriers, Businesses, Financial Access, Sanitation

Highlights

In this abstract, HEWASA and WASTE Netherlands are sharing their experiences on breaking down barriers to financial access through building a sustainable system that brings together Financiers (FIs), Private sector, Government and Households (Customers) that has accelerated sanitation access, Healthier and Economically Empowered Communities.

Introduction and objectives

Since 2013, HEWASA and WASTE Netherlands have been implementing the Rwenzori urban Sanitation Programme (RUSP) using a market-based approach for sanitation. The major objective for the Programme has been Universal access to safe and well managed sanitation facilities, healthier and economically empowered Communities in Rwenzori region, Uganda. Focus has been on building sustainable Systems that propel sanitation access while promoting and strengthening the value chain for sanitation. Based on the achievements of and lessons from of RUSP, a new Sanitation Programme called FINISH Mondial has been developed starting from Rwenzori region with plans to scale to the rest of Uganda.

Methodology approach

HEWASA and WASTE Netherlands are using the Diamond Approach to scale Sanitation access in Uganda. The Diamond approach is a market-based innovation that brings together Private Sector (Business), Financing Institutions, Government, and Households (customers). Under this approach, a viable system was built, connecting all these stakeholders to work together. Demand was created among Households using sanitation marketing. Private sector (sanitation Businesses) were supported to see business opportunities in sanitation. Financing institutions were engaged to offer credit products to customers and businesses while Governments were engaged to provide an enabling environment through setting and implementing regulations. These four stakeholders were linked.

Analysis and results

Implementation of the Rwenzori urban Sanitation Programme (RUSP) has yielded significant results that have had a substantial positive effect on sanitation access in the target areas. These achievements range from increased household sanitation from 36% to 56% to increased public latrine coverage being managed under the business approach. There has been improvement in people's health due a reduction in sanitation related disease incidences, youth have been provided with employment as sanitation service providers and promoters, and sanitation businesses have expanded due to high demand. A self-sustaining system that links Households, Private Sector, Government and Financiers is in place and is now being strengthened under the new FINISH Mondial Programme. Three Financing Institutions (Post Bank, Centenary Bank and Finance Trust) have developed and are marketing WASH products thus bridging the financing gap. From 2013 to date, a total amount of UGX 1,560,000,000 (Approximately Euro 371,428) has been disbursed to households for sanitation investment and to entrepreneurs for boosting their sanitation businesses, increasing the WASH loan portfolio from zero (0) in 2012 to Euro 371,428 to date with a 98% recovery rate. Four (4) Urban Councils (Fort Portal, Kyenjojo, Kamwenge and Kyegegwa) have WASTE Management Master plans.

Conclusions and recommendation

The Diamond Approach has been tested and found to be effective in accelerating sanitation access. It is hereby recommended that sanitation actors adopt this approach for accelerated attainment of SDG 6. Collaboration is sought on resource recovery from and reuse of faecal sludge. There is need for pitching the Business Case to the Banks and other Financiers. Partnership is sought on demand creation and Strengthening of the Supply chain Partnership to scale.

Presenter biography



Mr. Stephen Birungi, Caritas Fort Portal - HEWASA, Uganda

Mr. Stephen Birungi Works with Caritas Fort Portal - HEWASA as a Programme Officer.

With over 8 years experiences in the Water and Sanitation Sector, Stephen has shared his Sanitation related experiences and research work as articles in several international Journals and conferences.

He is a Service-focused professional with a strong commitment towards development and social response efforts for the needy and less privileged populations, including the children and youth.

Impact of Devolution on Financing the WASH Sector in Kenya

Authors: Dr. Barbara Kazimbaya-Senkwe, USAID WASH-FIN Project, Zambia

Keywords

Finance; Devolution; Urban; Utilities: Africa

Highlights

This paper highlights the opportunities and impacts of devolution of authority from national to sub-sovereign entities, on the ability of the WASH sector to access commercial financing. Using the example of Kenya, the paper shows how lack of clarity on new roles can have a negative impact on sector development.

Introduction and objectives

Kenya is among the leaders in decentralization on the African continent with the 2010 Constitution laying a strong foundation for devolving service delivery to the 47 County governments. For the WASH sector, the devolution effort is further strengthened through the Water Act of 2016 which among other things, gives the Water Service Providers the right to seek financing to invest in infrastructure development. This paper examines how the repositioning of power as part of the devolution process impacts the ability of the water service providers to make financial decisions and ultimately leverage financial resources into the sector.

Methodology approach

Based on experiences of the USAID's Water Sanitation and Hygiene Finance (WASHFIN) and other programs in Kenya, the paper highlights the opportunities and challenges presented by the devolution process, emphasizing the roles that county governments and central government agencies must play to enable the sector to leverage non-traditional financing. The lessons from this paper are instructive for both the continued devolution as well as the reform of the WASH sector in Kenya and in other countries undergoing similar devolution processes.

Analysis and results

The paper shows that the devolution process in Kenya could have been used to aid mobilization of private financing. However, due to a number of factors including repositioning of power bases amongst the key players, devolution has constrained mobilization of private financing in Kenya. A series of examples from across the country shows that by end of 2018, potential private financing transactions totaling over USD24m were forfeited as a consequence of governance challenges related to the devolution process, essentially depriving about 60,000 people of improved WASH services and also constraining the country's journey to self-sufficiency in the WASH sector.

Conclusions and recommendation

The paper concludes that creditworthiness of a water utility is not sufficient to unlock private sector financing, but must be supported by credible and supportive governance structures and systems that allow the public water utilities the space to explore options and the private sector the comfort of knowing that they can trust the public entities that are approaching them for financing. Potential lenders consider integrity and sector leadership as critical as a company's creditworthiness. Countries like Kenya pursuing devolution must therefore find the right balance between control and enabling the water service providers to thrive.

Presenter biography



Dr. Barbara Kazimbaya-Senkwe, USAID WASH-FIN Project, Zambia

Dr. Barbara Kazimbaya Senkwe is the Knowledge Management and Communications Lead for USAID's Water Sanitation and Hygiene Finance (WASH-FIN) program, working in Kenya, Senegal, Mozambique, South Africa, Zambia, Cambodia, Nepal and Philippines. Prior to this, she worked as the Africa Coordinator for WASH-FIN; as Urban Sanitation Specialist for USAID's SUWASA program in South Sudan; as Water and Sanitation Specialist for the World Bank's Water and Sanitation Program in Zambia, Malawi, Kenya, Tanzania, and Cameroon; and as a lecturer at the Copperbelt University in Zambia. Barbara is a keen researcher and author with an interest in municipal services provision.

Financing sustainable equity for all in the Okavango River Basin

Authors: Mr. Michael Vice, Climate Resilient Infrastructure Development Facility Pegasys, United Kingdom

Keywords

Fund, Livelihoods, Conservation, Ecosystems, Africa

Highlights

Promote equitable benefits for all people in the remote rural areas of the Cubango-Okavango River Basin (CORB).

Conserving the integrity of the ecosystem services in the CORB, whilst prioritising transboundary development imperatives.

Providing a sustainable financing mechanism to support livelihoods betterment and conservation over the long-term.

Introduction and objectives

The Okavango Delta is a Ramsar site and was UNESCO's 1,000th World Heritage Site. Climate change, land degradation and the unsustainable use of the Cubango-Okavango River Basin's (CORB) natural resources pose major threats to the Delta. The Permanent Okavango River Basin Water Commission (OKACOM) commissioned the establishment of a Fund to address the stark Climate Change threats whilst providing equitable benefits to the CORB's poor inhabitants. This novel approach aims to target twelve SDGs and demonstrate how an innovative finance mechanism can support inclusive and transformative development for rural communities, and provide lessons for other river basins and conservation areas.

Methodology approach

To ensure adequate resources to tackle the Climate Change threats in the CORB, OKACOM took a decision in 2015 to establish an innovative fund as a long-term sustainable financing model. OKACOM's technical committee and contracted experts reviewed a range of alternative fund options to respond to the inclusive development imperatives in the basin. Three collaborative partners, namely: The Permanent Okavango River Basin Water Commission (OKACOM), the Climate Resilient Infrastructure Development Framework (CRIDF) and The Nature Conservancy (TNC), have combined their livelihoods and conservation expertise to safeguard the basin's ecosystem services and drive enhanced socio-economic opportunities for all in the CORB.

Analysis and results

The Fund's conception, formulation and establishment processes have taken three years, driven by the proactive involvement of OKACOM's Member States, technical committees and long-term development partners. OKACOM, supported by CRIDF, is working to seed the Fund, whilst TNC and CRIDF teamed up to construct the Fund's business case. The business case sets out the Fund's value proposition, which demonstrates its transformative and sustainable impact on the societies in the CORB, and is the key resource to attract funding from potential donors and investors. The CORB Fund is structured much like the Water Funds which TNC has established in other parts of Africa. It makes use of two investment mechanisms: a sinking fund vehicle to support the proof-of-concept interventions in the first few years of operations, and a much larger endowment fund vehicle for long-term implementation. The novelty of the CORB Fund, when compared to Water Funds, is its innovative theory of change which centres on the symbiotic relationship between the basin's poor communities, the integrity of its ecosystem and transboundary development imperatives. The Fund therefore seeks to improve the living conditions of its inhabitants, whilst championing the preservation of the basin's ecosystem services and the Member States' water security.

Conclusions and recommendation

The Fund aims to develop community-centric and conservation interventions that target no fewer than twelve of the seventeen Sustainable Development Goals (SDGs). The five SDGs most prominently aligned with the Fund's targeted objectives are: SDG 1: to address and end extreme poverty in the basin, SDG 6: to ensure sustainable water management and sanitation for rural communities, SDG 14: conserve and sustainably use the source waters in Angola, SDG 15: protect, restore and promote sustainable use of the basins ecosystems and halt land degradation, and SDG 17: strengthen partner institutions and their ability to implement livelihoods interventions.

Presenter biography



Mr. Michael Vice, Climate Resilient Infrastructure Development Facility Pegasys, United Kingdom

Michael is a registered Professional Engineer and strategy consultant responsible for mobilising finance for sustainable infrastructure in Africa. He has a multi-faceted consulting background in technical, financial and institutional disciplines, across small- and large-scale infrastructure sectors. He has researched, designed and implemented innovative financing mechanisms to leverage public and private investment for infrastructure in Africa. Michael has a BSc Civil Eng (Hons) from the University of Cape Town (UCT), a Diploma in Corporate Leadership, and an MSc (Eng) in Sustainability from the Future Water Group at UCT. He also co-founded the Manna Children's Outreach in Langa Township, South Africa.

Seminar: Water (in)security, migration, and regional integration: Is there a nexus?



ABSTRACT VOLUME

World Water Week, 25 - 30 August 2019

Water for society – Including all

Seminar: Water (in)security, migration, and regional integration: Is there a nexus?

Contents

“Hotel Middle East:” Migration and Adaptation in Jordan’s Water Sector	103
Governing water (re)allocation in South Africa: insights from a crisis	105
Water and sanitation, migration and the 2030 Agenda.....	107
Water, Migration and Conflict: A Subnational Analysis	109
International Laws of Water Access: Experiences of Displacement and Statelessness	111
Addressing the water-migration nexus from a governance perspective	113
Sanctuary: Footing the Bill for the Costs of Migration	115

“Hotel Middle East”: Migration and Adaptation in Jordan’s Water Sector

Authors: Ms. Natasha Westheimer, University of Oxford, United States

Keywords

Migration, adaptation, water governance, regional integration, social shocks

Highlights

In 2018, 68.5 million people were forcibly displaced worldwide. These major demographic changes fundamentally alter the way regions can advance water security, and they require rapid adaptation to meet changing demands. Building preparedness now for future social shocks, like migration, enables regions to build more resilient water sectors.

Introduction and objectives

Political and climate-related displacement is anticipated to rise in future decades. This reality stresses the urgency for theoretical and empirical research into social shock adaptation to better understand processes that occur in host communities, its implications for regional resource management, and pathways for building resilient and adaptive systems. Despite facing extreme water scarcity, Jordan has thus far been able to cope with frequent waves of migration – most recently with the Syrian Refugee Crisis – providing water to its population. Understanding the mechanisms by which Jordan coped can guide researchers and policy-makers in efforts to prepare and adapt to shocks.

Methodology approach

In this midst of the Syrian Refugee Crisis in Jordan, nineteen key informants from various stakeholder groups involved in Jordan’s domestic water sector provided a rich understanding of the adaptation processes surrounding migration shocks in Jordan. This research, shaped out of climate-change adaptation theory, allowed researchers to answer the following questions:

How do adaptation processes to periods of mass migration in Jordan’s domestic water sector compare to existing adaptation theory and practice?

How does Jordan’s experience of social shocks, such as demographic change, inform preparedness for future social shocks?

Analysis and results

Following the onset of the Syrian Conflict in 2011, an estimated 1.5 million Syrians live in Jordan. As one interviewee in this research suggested, Jordan is the ‘Hotel Middle East,’ absorbing endless waves of refugees since the early 20th century. Each wave brings a rapid increase in demand for services, including water, and adds additional pressure to transboundary resources. As one of the most water-scarce regions in the world, understanding how this water-poor country has adapted to these migration shocks is an important insight into how socio-ecological systems adapt to social shocks.

Research findings indicate that adaptation to migration events in Jordan is comparable to the processes of adaptation to climate-related shocks. Further, in the Jordanian context, feedback loops from past migration influxes have reinforced a reactive mode of governance. This reactivity has been shown to lead to maladaptive responses, including on the regional level. Further, the consistent state of crisis that has emerged from this reactive mode has allowed for Jordan’s water sector to be deeply dependent on the donor community. This cycle of crisis-mode governance is reinforced by the fact that Jordan has yet to institutionalize a formal mechanism of preparedness for social shocks like mass migration.

Conclusions and recommendation

The implications of this research are clear. If we can understand migration events as a shock to a socio-ecological system within the existing literature on adaptation to climate shocks and natural hazards, then it recognizes that planning for migration shocks – including on a regional level – can build greater resiliency in these systems. Jordan should be considering this within its adaptation responses. Building preparedness now for future shocks may be one mechanism for breaking the reactive governance mode, building a more resilient and self-sufficient water sector, and mitigating the potential for maladaptation following future shocks.

Presenter biography



Ms. Natasha Westheimer, University of Oxford, United States

Natasha Westheimer is a Senior Economic Development Associate on the Water Team at the Office of the Quartet in Jerusalem, where she specializes in Palestinian-Israeli water diplomacy. Natasha holds an MSc in Water Science, Policy, and Management from the University of Oxford and a BA in International Development & Conflict Management from the University of Maryland. Since 2013, Natasha has worked on transboundary water management, water diplomacy, as well as economic development and regional security in the Middle East through various developmental, research, and humanitarian roles. Her research explores water-sector resilience to environmental and social shocks in fragile areas.

Governing water (re)allocation in South Africa: insights from a crisis

Authors: Mr. Jonathan Rawlins, OneWorld Sustainable Investments, South Africa

Keywords

water reallocation; equity and efficiency; Western Cape drought; political economy; water governance

Highlights

- Policy-based equity outcomes are simultaneously the main driver of and barrier to effective water reallocation in South Africa;
- Water allocation reform pathways should integrate reallocation mechanisms that balance equity and efficiency criteria within extant political institutional frameworks;
- Legal and policy objectives defining reallocation priorities need to be harmonised and decision-making decentralised.

Introduction and objectives

Water (re)allocation challenges represent a fundamental component of water governance because of the inherent trade-offs that benefit some at the cost of others. Reallocation is becoming increasingly recognised as an important management tool in the face of unpredictable water supply systems and rapidly changing demand dynamics (Hall et al. 2014). There is a paucity of context-specific research on the interactions between the political economy and governance arrangements that enable or prevent effective reallocation. This research addresses this gap by analysing the complex aspects influencing water reallocation in South Africa (SA) through a case study of the recent Western Cape drought.

Methodology approach

A mixed methods approach was adopted including 34 key-informant interviews with key private, public and civil society stakeholders. Secondary data was analysed to determine gross value add and employment for different levels of sectoral water dependence by municipality. This data facilitated a systematic political economy analysis of the drivers of and barriers to reallocation in SA. Following Dinar et al. (1997), Marston and Cai (2016) and Meinzen-Dick and Ringler (2007) the analytical framework included eight assessment criteria: acceptability, administrability, efficacy, efficiency, equity, flexibility, predictability and security. A structured content analysis revealed key trade-offs, institutional and policy limitations, and governance challenges.

Analysis and results

Over the past two decades, unconstrained development resulted in increased dependence on limited water supplies and ever-growing tensions around unequal allocations rooted in Apartheid allocation structures. A dearth of leadership, technical, regulatory and administrative capacity within the Department of Water Affairs combined with centralised decision-making, institutional misalignments between spheres of government and conflicting policy objectives are severely limiting implementation of reallocation. Ultimately resulting in critical principal-agent problems between local and national government with key veto players undermining post-Apartheid water allocation reform ambitions and limiting promising options such as share-equity models.

The case study highlights increasing conflict between water users and growing resistance to water reallocation options, largely underpinned by equity-efficiency trade-offs that are closely interwoven with institutional structures and norms through varying applications and conflicting perceptions of fairness, efficiency and tenure security. Equity-efficiency trade-offs manifest through two dominant perceptions. Firstly, there is a direct trade-off between these two outcomes; improving equity outcomes compromises

economic efficiency. Secondly, efficiency follows equity in the long term. Widespread insecurity surrounding land tenure related to proposed reallocations further limits socio-political buy-in to allocation reform. These conflicting perceptions and governance challenges emphasise the complexity of using reallocation as the primary reform pathway in a rapidly developing society.

Conclusions and recommendation

Severe climatic stressors have exposed political, regulatory and institutional water governance deficiencies throughout the Western Cape and SA at large. SA presents a paradigmatic example of equity being the fundamental driving force for reallocation. However, responding to water misallocation necessitates the integration of reallocation mechanisms that balance equity and efficiency criteria within the framework of extant political institutions. Thus, legal and policy objectives defining priorities for both new allocations and reallocations need to be harmonised within an increasingly decentralised institutional framework. In this way, blanket reallocation decisions can be avoided, and collaborative water sharing practices will define new reform pathways.

Presenter biography



Mr. Jonathan Rawlins, OneWorld Sustainable Investments, South Africa

Jonty is an early-career development professional specialising in water, climate change and natural resource management. He is experienced in technical, applied and academic research modalities, particularly around water policy and governance, environmental economics, sustainable landscape management, climate change adaptation and transboundary environmental management. He is passionate about sustainability and aspires to contribute towards solving complex environmental and socio-economic challenges through his work, with particular emphasis on poverty alleviation and development in Africa. Jonty is currently works as a Technical Advisor at OneWorld Sustainable Investments in Cape Town, South Africa.

Water and sanitation, migration and the 2030 Agenda

Authors: Dr. Guy Jobbins, Overseas Development Institute, United Kingdom

Keywords

Migration, WASH, Water resources, sustainable development

Highlights

Examines narratives and assumptions about relationships between water, migration and sustainable development;

Explores evidence on impacts of migration on WASH access and provision, and achievement of WASH-related SDGs;

Presents top-level policy recommendations on improve WASH access for migrants and strengthen the potential of WASH to support successful migration.

Introduction and objectives

This briefing explores the relationships between water, sanitation and migration, and how they may affect the 2030 Agenda for Sustainable Development and achievement of the Sustainable Development Goals. Specifically, we discuss the fact that while water and sanitation do not appear to drive migration, the process of migration can radically shape access to water and sanitation services – particularly for undocumented migrants and people in transit. We question whether attaining universal access to safely managed water and sanitation services is possible without specific measures to address the needs of refugees and other migrants.

Methodology approach

The briefing note is based on a review of the academic and grey literature. It is part of a wider series on migration and the 2030 Agenda from the Overseas Development Institute and the Swiss Agency for Development and Cooperation.

Analysis and results

The dominant story about the relationship between water and migration is that water drives migration, and that migrants put stress on resources and services in host communities. However, the evidence for these narratives is far from conclusive.

The 2030 Agenda for Sustainable Development introduces a different set of questions and challenges for water resources management and access to WASH services: how do we ensure access to WASH services is universal, including for hardest-to-reach groups; and how can providing WASH services and improving water resources management help reduce poverty?

Refugees and migrants pose specific challenges to service providers and host governments attempting to meet these targets. Migrants are often excluded from WASH services by a range of financial and non-financial barriers, have limited voice, and are rarely captured in monitoring data; there is also limited accountability and political will to address their needs.

Providing WASH services and improved water resources management in both origin and destination communities can support successful migration – enabling planned migration and reducing the challenges that migrants face in making a success of their new lives. It also can have indirect benefits on poverty reduction (SDG 1), public health (SDG 3), and safe and sustainable communities (SDG 11).

Conclusions and recommendation

- 1) Migration isn't driven by a lack of water and sanitation services, but governments which provide services can support successful migration.

- 2) Achieving universal WASH access will not be possible unless all people have access to water and sanitation services, regardless of their migratory status.
- 3) Challenges stem from failures in governance, not the amount of water available, numbers of migrants or rates of migration; strengthened water governance can help better cope with the impacts of migration.
- 4) The poor visibility of migrants in data limits understanding of their needs and reduces the accountability of governments and service providers.

Presenter biography



Dr. Guy Jobbins, Overseas Development Institute, United Kingdom

Guy Jobbins is a Research Associate with the Overseas Development Institute's Sustainable Environments and Societies Programme. After Bachelors and Masters' degrees in Ecology, Guy worked on marine conservation in the Red Sea and completed a PhD in Public Policy. Following six years with the International Development Research Centre's Climate Change Adaptation in Africa Program, Guy joined ODI's Water team, and was Co-Principal Investigator of the 5-year/6-country Pathways to Resilience in Semi-arid Economies Consortium. Guy's work focuses on the political and institutional aspects of poverty reduction and environmental sustainability in drylands.

Water, Migration and Conflict: A Subnational Analysis

Authors: Mr. Stefan Döring, Department of Peace and Conflict Research, Uppsala , Sweden

Keywords

Water scarcity, security, violent conflict, migration, pollution

Highlights

Our research scrutinizes linkages between migration, water security, and violent conflict. Employing a subnational approach allows for a more fine-grained perspective. With data on precipitation, flooding, groundwater depth, water pollution, and other water-related variables, the work offers a comprehensive analysis of several factors that are crucial when understanding the links.

Introduction and objectives

Extreme water shortages have been frequently associated with security threats. Likewise, flooding also creates water shortages as well as migration flows. Yet, some areas witness more cooperative actions when facing droughts, or flooding. This begs the question why some places facing water-related hazards are more likely to see cooperation around water while others do not. Existing quantitative research (in contrast to case studies) has almost exclusively focused on state- or basin-level comparisons, largely disregarding subnational levels of analyses. This research fills this gap by using more disaggregated data: the work empirically analyzes flooding and water scarcity as drivers for migration.

Methodology approach

Our studies capture subnational variation by using georeferenced event data on water related cooperation, violent conflict incidences, and migration flows. Using 55 by 55 km grid cells (and low administrative units) allows for a much more nuanced analysis of available water resources which also takes into account factors such as agriculture, economic development, ethnic discrimination or prior exposure to violence. We use different regression model specifications, with different analyses covering Africa, the Middle East and Southern Asia for 1990 to 2016. Some data in this study however requires cross-sectional approaches.

Analysis and results

The results show that the association between migratory flows, water shortages and conflict are conditional on government type, infrastructure, and economic conditions. We also distinguish between rapid onset hazards from gradual climatic changes in order to gauge differences between types of migration. The findings suggest that research on water and conflict ought to include measures beyond rainfall data. This research shows that without access to groundwater or experiencing unusually low rainfall are associated with an increased risk of violent communal conflict. Further, groundwater access can be a key adaption tool for areas

This research also explores whether areas affected by environmentally induced migration tend to be at risk of conflict, and to what extent state institutions (e.g. disaster aid distribution mechanisms) and public policies (e.g. early warning systems) might mediate the impact of displacement on likelihood of conflict.

More results on how short and long-term environmentally induced migration affects security will be presented during the seminar.

Conclusions and recommendation

Governments are positioned to alleviate both issues with migration and water shortages by implementing environmental policies that involve disaster risk reduction, resource conservation, or redistribution. Yet, this also underlines the importance of non-governmental actors which can significantly support policy efforts. This research identifies not only broader regions that are of higher security concerns; moreover, the work

highlights where actions are required within a country. Problems with water allocation are not ubiquitous and demand actions depending on the context. This research enables us to differentiate between different sources of conflict and migration, thereby unpacking some of these complexities.

Presenter biography



Mr. Stefan Döring, Department of Peace and Conflict Research, Uppsala, Sweden

Stefan is a PhD candidate and teacher at the Department of Peace and Conflict Research at Uppsala University. He is member of the Research School on Water Cooperation, which is part of the International Centre for Water Cooperation (UNESCO) hosted by the Stockholm International Water Institute (SIWI). Stefan has also been a visiting researcher with UN Environment in Nairobi. His work focuses on the role of water scarcity in violent conflict as well as cooperation. Using both statistical and qualitative methods, his research employs geo-referenced data for violent conflict events and various measures for water quality and quantity.

International Laws of Water Access: Experiences of Displacement and Statelessness

Authors: Ms. Carly Krakow, London School of Economics and Political Science (LSE), United States

Keywords

international water law, refugees, IDPs, water policy, environmental crimes

Highlights

- I offer unprecedented analysis of international criminal law's role for grappling with water access restrictions.
- The stateless/displaced/armed conflict zone residents are disproportionately impacted by lack of water, yet uniquely vulnerable under international law.
- I propose remedies for international law's struggle to guarantee the human right to water for refugees/IDPs.

Introduction and objectives

This paper, completed while based at Cambridge and LSE, analyzes international law regarding the human right to water as it impacts people who are stateless, displaced, and/or residents of armed conflict zones in the contemporary Middle East. Cases considered include Israel/Palestine, Syria, Iraq, and Yemen. Deficiencies in international law, including humanitarian, water, human rights, and criminal, are examined to demonstrate international law's strengths and weaknesses for functioning as a guarantor of essential rights for vulnerable groups already facing challenges resulting from ambiguous legal statuses. What international legal protections exist to protect these vulnerable groups when affected by water access denial?

Methodology approach

Analysis is framed by Hannah Arendt's assertion (and related works of political and legal philosophy) that loss of citizenship renders people without the "right to have rights", as human rights are inextricably connected to civil rights. Fieldwork in Israel/Palestine, Geneva, and The Hague informs this work. I conducted ethnographic interviews with Palestinian refugees in the West Bank and Syrian, Iraqi, and Afghan refugees in Diavata camp in northern Greece who are impacted by water access limitations. Expert interviews were conducted with UN officials, NGO directors, and academics. Fieldwork took place at the ICRC, WHO, UNHCR, and ICC.

Analysis and results

In addition to its unique status as the "most water-stressed region" (Joffé 2016), the Middle East contains several active conflicts and top source countries for refugees/IDPs. International humanitarian and refugee laws were designed to cope with civilian rights during conflict, displacement, and statelessness. A substantial body of international water law exists to deal with transboundary water usage. There is a significant lacuna, however, regarding law regulating water access and environmental destruction for people facing challenges resulting from ambiguous legal statuses because they are stateless/displaced, or vulnerable as armed conflict zone residents. Stephen McCaffrey argued, "emphasis on prevention is important" in water law—this paper examines what happens once prevention is no longer possible. In the Palestinian case, international law's impacts on water for stateless civilians in the West Bank and Gaza are considered. In Syria and Iraq, IS's 'weaponization of water' is analyzed, while in Yemen I focus on destruction of infrastructure and the resulting cholera epidemic. The Geneva Conventions address "objects indispensable to the survival" of civilians, including "drinking water installations and supplies and irrigation works". The Additional Protocols, however, address destruction of civilian water infrastructure only during violent conflict, not redress procedures once water access is impeded.

Conclusions and recommendation

Increased dialogue between water and humanitarian law is analyzed (e.g. UN Watercourses Convention, Geneva Conventions). The ICC and ICJ's roles are evaluated to assess possibilities for making post-conflict reparations to victims of water access denial. The ICC's 2016 declaration that it would prioritize environmental crimes suggests that the Court is amenable to grappling with water access denial as an international crime—a potentially unprecedented development. I recommend support for the ICC to expand the Trust Fund for Victims to make reparations to water crimes victims, particularly those who are stateless/from states unable or unwilling to make reparations (e.g. Yemen, Syria).

Presenter biography



Ms. Carly Krakow, London School of Economics and Political Science (LSE), United States

Carly A. Krakow is a PhD researcher in International Law and Judge Higgins Scholar at the London School of Economics. Her current work focuses on environmental injustice in the contexts of international law and political philosophy. Carly earned her BA summa cum laude at NYU, and her MPhil at Cambridge. Her MPhil thesis, awarded Distinction, analyzed international law regarding water access for stateless and displaced people. Carly has conducted research in the West Bank, Greece, The Hague, and Geneva, supported by awards including the Gallatin Global Fellowship in Human Rights. For more information about her work please visit: www.lse.ac.uk/law/people/phd/carly-krakow

Addressing the water-migration nexus from a governance perspective

Authors: Fatine Ezbakhe, Mediterranean Youth for Water (MedYWat) network, Morocco

Keywords

Water, Migration, Water Governance, MENA

Highlights

- The aim is to contribute to the ongoing debate about water and migration interlinkages.
- A ‘drivers for migration’ conceptual framework is used to analyse the triggering factors for Syrian migration.
- The analysis highlights the complexity of the water-migration nexus and the need to pay attention to existing water governance frameworks.

Introduction and objectives

At a time when water crises are considered one of the most critical global challenges and the number of refugees have reached an all-time high, there is a growing need to understand the interlinkages between water and migration. While it is tempting to over-simplify the links between these two issues, it is crucial, however, to develop a deeper analysis of their complexity. This study contributes to the ongoing debate on the water-migration nexus, in particular from a governance perspective. As such, our work lies at the centre of the “Addressing migration through regional integration and water security for all” session.

Methodology approach

To understand the water-migration nexus, two research questions are formulated for this study: (i) how can we analyze the interlinked drivers for migration in a holistic manner?; and(ii) what role can water governance play in migration policy? The first step to address these two questions was to review existing literature on the effects of water resources – in particular their scarcity – on human migration; and available conceptual frameworks to assess the effect of environmental factors on migration. After this review, the ‘drivers for migration’ framework developed by Black et al. (2011) was selected and applied to the Syrian migration case.

Analysis and results

Using the framework developed by Black et al. (2011), the study identified the drivers for Syrian migration at three different levels. First, at the macro level, water scarcity interacted with a combination of other elements, including poverty and unemployment, political uncertainty, population growth, social networks and drought. Second, at the micro level, the decision to migrate was influenced by the household and individual characteristics of Syrians, such as age, wealth, gender and education level. Furthermore, at the meso level, the governance structures in place also shaped the migration response. Poor water governance, in particular, exacerbated the consequences of the environmental drivers. Evidence of such inadequate governance of the water sector was found in its arcane institutional framework (i.e., highly bureaucratic and fragmented, overlapping responsibilities, poor coordination and rivalries); lack of transparency and accountability; and inability to implement sustainable water management policies and practices.

Indeed, the analysis shows that proper water governance frameworks could be an instrument for eliminating or mitigating water-related drivers of migration. In this sense, progress in terms of better water governance will be needed in order to increase the resilience to water challenges, and provide long-term solutions to the global migration phenomenon.

Conclusions and recommendation

Although not exhaustive, the analysis of the Syrian migration confirms two key points. First, the complexity of the water-migration nexus requires focusing on all underlying drivers in order to develop effective policies for environmental migration. Second, special attention must be paid to the water governance frameworks in place, as they can constitute both barriers and facilitators to migration. The time is now ripe for more in-depth research to better understand the linkages between water governance and migration policy. Furthermore, more dissemination of this research on water and migration is needed to help practitioners and policy-makers address the migration challenge.

Presenter biography



Fatine Ezbakhe, Mediterranean Youth for Water (MedYWat) network, Morocco

Fatine Ezbakhe is a researcher at the Technical University of Catalunya (Spain). She holds a BEng+MEng degree in Civil Engineering from the Technical University of Valencia (Spain), and a MSc degree in Water and Sanitation for Development from Cranfield University (UK). She is currently a member of the “Engineering Sciences and Global Development” research group, completing her PhD dissertation on the use of decision analysis tools to promote evidence-based decision-making for water and sanitation services. Apart from her data-driven research, she is also involved in examining the steering water governance frameworks to achieve the human rights to water and sanitation.

Sanctuary: Footing the Bill for the Costs of Migration

Authors: Prof. Luke Wilson, The Center for Water Security and Cooperation, United States

Keywords

financing, migrants, disasters, conflict, rights

Highlights

This paper/presentation will discuss how the costs of migration are allocated between nations, including who is legally responsible to cover those costs. For many water poor countries, providing basic services to refugees, migrants, and internally displaced persons (IDPs) can be overwhelming. Are they alone in footing the bill?

Introduction and objectives

This presentation will lay out the basic rules, as well as developing international law, in the field of international responsibility. Evolving customary rules have created a new playing field for states who are willing to accept migrants and refugees. Despite its evolution, the law has not created clear rights for States who accept the majority of these migrating persons: are they entitled to compensation from the country creating the crisis? Should other states in the region provide financial or other assistance? What regional arrangements have been attempted--both financial and otherwise--to stabilize these receiving states? This presentation will address those questions.

Methodology approach

Through an investigation of current customary international law, and a discussion of evolving norms, this presentation/paper lays out the legal rules that have applied in the past. However, the recent refugee and migrant crises, breathtaking in their magnitude, have forced new approaches, new practice and new responses from receiving states. This evolution of law is occurring right now, and this paper will take one of the first looks at the financial repercussions and the impact on resources to determine what responsibility neighboring states have to assist, bolster and compensate states bearing the brunt of migration.

Analysis and results

Customary law and treaty law treat migrants and refugees differently, with refugees being entitled to basic services. Migrants are not entitled to the same protections or the same services at the international level, though some states have domestic law mandates that require provision of services. For some of these receiving states, the provision of these services to refugees and migrants alike has made it difficult to provide for their own citizens, taxing natural resources and financial capacity. For regions, a lack of a clear mandate to bolster the receiving state has create a no-win situation for receiving states: they are providing for migrants, which benefits the region, but doing so without knowing if they will be compensated. This has the potential to undermine development, stability and the very future of some of these states. This paper will discuss ad hoc arrangements between some states--some legal, some illegal--that have attempted to address the imbalance. This research will show that regions are not providing effective assistance, which then begs the question: is a receiving state doomed to bear the financial, economic and resource-intense burdens alone? Where can they get relief, and what relief is available?

Conclusions and recommendation

This paper will suggest novel approaches to the idea of internationally wrongful acts that allows receiving states to seek compensation from states that create or foment refugee and migrant crises. These states are exporting economic and political crises, including scarce resources, to receiving states, and the legal regime has evolved to create the possibility of legal redress for this burden. For other states, obligations to assist

the receiving state with resources and money is an evolving rule of law, which will be fully addressed in the presentation when the research is completed.

Presenter biography



Prof. Luke Wilson, The Center for Water Security and Cooperation, United States

Luke Wilson is co-founder and Deputy Director of the Center for Water Security and Cooperation where he specializes in transboundary water issues and issues of international law including human rights and international criminal law. Professor Wilson has worked with The World Bank, The American Bar Association, the U.S. Government in various capacities, and as a law clerk at the International Court of Justice. Professor Wilson focuses on law systems, dispute resolution, and enforcement issues in the water realm.

Seminar: Equity in climate change adaptation



ABSTRACT VOLUME

World Water Week, 25 - 30 August 2019

Water for society – Including all

Contents

Peru's first drought management plan: Caplina - Locumba Basin	119
Equity and Climate Change's impact on Water Supply in Vanuatu	121
Community-Responsive Flood Adaptation: Initial results from a 4 year study	123
Promoting climate equity through global city partnerships	125
Community-based storytelling as a tool for inclusive climate change adaptation.....	127
Integrating Equity and Climate Resilience into Southern African Water Infrastructure	129
Less to lose?: Drought vulnerability assessment in the disadvantaged regions	131
Ensuring flood insurance is socially inclusive: some challenges and solutions	133
Addressing inequities in water masterplans through participatory approaches	135
Flood risk mapping for all: a flexible methodology and toolbox	137
Andean Women's agency to deal with Climate Change in Peru	139

Peru's first drought management plan: Caplina - Locumba Basin

Authors: Dr. Neil Lazarow, Commonwealth Scientific and Industrial Research Organisation, Australia

Keywords

Peru, drought, evidence, participatory, culture

Highlights

- Peru's first ever operational drought management plan, in hyper-arid Tacna, southern Peru.
- Characterisation of Socio-Hydrological-Vulnerability-Index and Water-Culture-Index to support decision-making under water stress.
- Advanced water resource management model and strategic scenarios to support identification and evaluation of development options under climate and regional change.
- Guideline/Manual to support implementation of plan.

Introduction and objectives

The Tacna Region in southern Peru is hyper-arid, with highly variable seasonal-and-annual rainfall. Despite significant investment, there are competing demands from urban, irrigated agriculture and mining sectors for limited water resources, leading to real and perceived tensions over allocation. The Drought Management Plan (DMP) for the Tacna basins provides an agreed evidence-base and common definition of risk levels are used to identify and prioritise responses such as equity measures that better link hydrological hazards with-socio-economic vulnerability. Participation of key stakeholders in the elaboration of the DMP ensures roles and responsibilities are clarified and greater empowerment is recommended for local authorities.

Methodology approach

CSIRO developed a proactive approach to the management of risk associated with droughts, structured around responding to three primary questions:

- When to act?
- Who is responsible?
- How to act?

Based on global leading practice, we developed a replicable 8-step workstream that can be carried out in parallel or bypassed, depending on the local context – from formulation-implementation, to review-update. Four operational stages correspond to proposed risk levels: Normal, Pre-Alert, Alert and Emergency; supported by Preparation and Recovery. Risk levels are linked to water deficit indicators (obtained through a water resource management model) and constructed at temporally and spatially policy-relevant scales.

Analysis and results

Through the development of the DMP for the Tacna basins, CSIRO has delivered:

The most advanced surface water resource management model (in Peru) for the region that couples existing groundwater models.

A series of tools for obtaining drought indices and other important variables (water balance, understanding of the supply-demand relationship) for drought management.

A map that combines a socio-economic vulnerability index and a drought index at the level of drought (normal, pre-alert, alert and emergency respectively), thus quantifying the overall drought risk for each sub-basin in time. This map of 'hotspots' allows decision-makers to identify areas where water deficit is more likely to generate socio-economic difficulties; and to identify solutions in advance for the most vulnerable users.

A series of strategic development scenarios, agreed collectively with key stakeholders to identify and evaluate potential water resource development and management options.

A Water Culture Index that allows key actors to identify, prioritise and monitor the success of the water culture investments over time such as water quality, value of water, legitimacy, shared knowledge, governance, innovation, natural capital, and water stress (using SDG guidelines).

The DMP offers a template for the development of holistic DMPs in other regions.

Conclusions and recommendation

The importance of mining to the regional and national economy, growth of the commercial sector in Tacna, and the value of the agriculture sector for subsistence, national and international markets, has led to continued concerns about the long-term sustainable use of water resources in what is the most arid region of Peru. The development of the first DMP in the Tacna Region, has produced a series of innovative tools to improve the management of water resources under conditions of scarcity; and also contributes to the dialogue and vision for sustainable development in the region.

Presenter biography



Dr. Neil Lazarow, Commonwealth Scientific and Industrial Research Organisation, Australia

Dr Neil Lazarow leads the international water resource management program with Australia's national science agency the Commonwealth Scientific and Industrial Research Organisation. His interests focus on how society makes complex trade-offs in resource constrained environments. His work extends to global challenges such as climate, water security, sustainable cities and food security, as well as coasts, recreation and tourism.

Neil has 20 years of national and international experience across academia, government, industry and the not-for-profit sector. He recently led a team to deliver Peru's first drought management plan in the Caplina-Locumba Basin in southern Peru.

Equity and Climate Change's impact on Water Supply in Vanuatu

Authors: Emily Rand, United Nations Children's Fund, Vanuatu

Keywords

Climate Change, Equity, Adaptation, Water Safety Plans, Gender

Highlights

Access to safely managed water is limited in Vanuatu, especially among poor and rural residents. It is projected that climate change will worsen the situation. Current government policy includes adapting water safety plans and addressing inequities to reach the SDGs and mitigate the impacts of climate change.

Introduction and objectives

Vanuatu is a small island nation ranked the most at-risk for natural hazards globally. It is often stated that climate change is complicating current efforts to reach the Sustainable Development Goals target for "safely managed water". Current government policy requires community water supplies to have a Drinking Water Safety and Security Plan. These plans try to address climate change, improve water safety and reduce inequities. The challenge is to ensure plans are implemented in an inclusive manner that provides safe and secure water for the most vulnerable. However, there are no female technical staff working for the Vanuatu water department.

Methodology approach

This review analysed: 1) technical, operational, financial and institutional characteristics of 4,713 existing water systems in rural Vanuatu, 2) 150 drinking water safety and security plans which included possible improvements and upgrades to both water and sanitation systems and 3) 553 water quality test results. In addition, government, university researchers and UNICEF worked together to review gender roles, government policy and climate change trends. These reviews examined what potential impacts, equity challenges and climate change may have on future Water Supplies in Vanuatu.

Analysis and results

It is anticipated that climate change will increase the frequency of extreme weather events, increase the intensity of tropical cyclones, overall temperatures and wet season rainfall. Currently, 44% of rural households in Vanuatu are primarily dependent on rainwater for their drinking water. Of rainwater systems surveyed, 57% do not provide year-round supply, resulting in rationing. As climate related high winds, flying debris, floods and sea level rise damage water systems, Vanuatu's limited water supply could be at further risk.

There are large inequities in the quality of drinking water. While urban wealthy populations have access to safely managed drinking water, over half of all rural water samples tested were contaminated with E. Coli. Community level participatory plans enable communities to identify and implement solutions to improve the quality of their water, however, some activities have not resulted in a decreased level of water contamination.

There are also gender inequalities in water governance, with 27% of water committees lacking any female representation and 47% of committees lacking a female in a key position. This is despite findings showing that piped water systems exhibit better operational performance when women are involved in a decreased level of water contamination.

Conclusions and recommendation

It is largely accepted that climate change will negatively impact Vanuatu's limited water resources, through cyclone damage, droughts, and seawater contamination. To address this threat, current government policy

requires water safety plans to also address water security and sanitation. The intent is that these plans will enable the most vulnerable communities to address climate change and move beyond water access targets to reaching the Sustainable Development Goals “safely managed water” target. However, in order to be successful, efforts need to focus on being more inclusive to truly benefit the most vulnerable.

Presenter biography



Erie Sami, United Nations Children’s Fund, Vanuatu

Erie Sami is the acting head of the Vanuatu Department of Water Resources Monitoring and Evaluation unit. He has worked as the department Water quality testing officer and Hydro-Geologist for 9 years. Erie has a Bachelor of Science in Environmental Science from the University of the South Pacific Laucala Campus.

Community-Responsive Flood Adaptation: Initial results from a 4 year study

Authors: Ms. Vera Bukachi, Kounkuey Design Initiative , Kenya

Keywords

Flood-Risk, Equity-Building, Urban-Informal, Participatory-Processes, City-Citizen-Adaptation

Highlights

The first systematic evidence on the impact of a program of community-responsive (or citizen-city) adaptation to flooding in the urban informal context. This innovative, Sida-funded four-year (2017-2020) study in Kibera, Nairobi, brings together an international research team; local government; and civil society, and integrates quantitative and qualitative approaches to evaluation.

Introduction and objectives

A large and growing number of the world's population live in slums, where the twin trajectories of rapid urbanisation and increased flood risk due to climate change collide. Slums consistently form in riparian zones, where land is available and formal settlement constrained. Top-down policies designed to reclaim urban riparian zones create tensions with residents and often prove unenforceable. Observers propose integrating government and community initiatives to co-create interventions, an approach we call "Community-Responsive Adaptation". Real-world examples of these initiatives are scarce, with no systematic evaluation in terms of cost, social or environmental impact. This study addresses this knowledge gap.

Methodology approach

Between 2017 and 2020, a team of researchers from Kenya, Sweden and the USA is partnering with an NGO, Kounkuey Design Initiative, and with slum residents and local government, to co-design, build and evaluate three community-responsive adaptation projects in Kibera, Nairobi's largest informal settlement. The projects integrate social and economic resilience opportunities alongside environmental remediation, flood compensation, and improved sanitation. We are evaluating the projects using both quantitative data from a multi-wave household survey and rich qualitative data on implementation processes and participant experiences.

Analysis and results

We will present mid-term findings from the study. The final quantitative dataset will comprise 6 waves of household surveys, in 250 households at each of three intervention sites and three matched control sites, totally 1500 households. By August 2019, we will have completed interventions at two sites; 4 waves of surveys at the first pair of intervention and matched control sites; and 2 waves of surveys at the second pair of sites. Our presentation will outline preliminary quantitative findings from the household surveys and preliminary qualitative assessments of the first two completed projects, integrating the perspectives of community participants.

Our quantitative results will describe the scale, distribution, and temporal variance of flood risk; patterns of in- and out-migration, and how these patterns correlate with flood risk; and a description of the local housing market, including how rent and tenure correlate with flood exposure and understanding of flood risk. In particular, we will provide descriptive evidence on how vulnerable groups – such as women, children, and the disabled – are affected.

Our qualitative results will describe the experiences of residents going through the participatory design process and the short-term impacts of the completed projects, from the perspective of residents and local government.

Conclusions and recommendation

Our study addresses an important evidence gap in urban planning policy and practice by providing the first systematic evidence on the impact and costs of a program of community-responsive (or citizen-city) adaptation measures to flooding in the informal context. Our results will inform policy locally in Kibera, and other informal settlements across Kenya, with relevance to other rapidly urbanizing cities worldwide. Preliminary findings suggest that while the cost of participatory approaches and integrated infrastructure solutions are significant, the benefits in terms of resident support and robustness to climate change are commensurate.

Presenter biography



Ms. Vera Bukachi, Kounkuey Design Initiative, Kenya

Vera is the Research Director and co-lead of KDI Kenya. She has dedicated her career to learning from, supporting and scaling community-led initiatives related to water, sanitation, waste and sustainability. Vera oversees KDI's research projects with a practical focus on marrying environmental risk mitigation with economic and social community priorities. A civil engineer and certified project manager, Vera's experience includes eight years of water engineering and project management of infrastructure development in consultancy and the nonprofit sector. She previously worked with the engineering consulting firm Arup and taught engineering at University College London. She has worked in Kenya, Tanzania, Uganda,

Promoting climate equity through global city partnerships

Authors: Mr. George Beane, Arup, United Kingdom

Keywords

Resilience, cities, knowledge-sharing, partnerships, CWRA

Highlights

The City Water Resilience Approach project has confirmed consistent needs between global cities attempting to improve water resilience and has proven avenues for knowledge sharing between cities in the global north and global south will be critical in arriving at effective approaches for building water resilience.

Introduction and objectives

Arup has partnered with the Stockholm International Water Institute (SIWI) and OECD to develop the City Water Resilience Approach (CWRA), a global approach to building water resilience in cities. The CWRA was developed to help cities grow their capacity to provide high quality water resources for all residents, to protect them from water-related shocks and stresses, and to connect them through water-based transportation networks ("provide, protect, connect"). A key element of this approach is sharing knowledge and experience between city partners operating in diverse geographic and political landscapes, but confronting similar climatic effects and natural hazards.

Methodology approach

Arup, SIWI and OECD developed the CWRA to respond to a demand for innovative approaches that help cities build water resilience. The approach is based on a desk research, collaborative partnerships with subject matter experts, fieldwork with eight city partners and over 700 individual stakeholders and hosting a global knowledge exchange. Through this process, the team identified 1,577 factors that either helped or hindered resilience-building in cities, which were open-coded to form a globally-applicable framework. This approach highlighted the similar resilience-building challenges facing cities in diverse contexts and the need to develop community of practice for sharing experience across cities.

Analysis and results

The research established a globally-applicable framework of understanding of resilience. The framework has four dimensions. The first dimension outlines the need for effective leadership and strategy that drive long-term decision-making around water resources and services, and collaborative decision-making between key actors. The second dimension is planning and finance, which outlines the need for integrated processes around designing, regulating and funding water programmes and projects. Infrastructure and ecosystems is the third dimension and describes the necessary management of natural and man-made elements that make up the water system and that helps cities provide, protect and connect citizens through water. Such elements are critical in ensuring the health and wellbeing of citizens and relate to the final dimension on the framework, which describes the basic conditions that sustain human life and the ways water can be a driver of attractive, vibrant and prosperous communities.

The framework is accompanied by a methodological approach to guide its implementation. This approach includes a step-by-step approach to understand the water system and governance system; to use the framework with indicators to assist with self-identification of resilience gaps, to develop an action plan, and to monitor and learn from the implementation of the action plan.

Conclusions and recommendation

The project has developed a flexible, globally-applicable, evidenced-based framework. There are two main conclusions:

First, there exists a great degree of consistency across cities ranging in geographic area and socio-political contexts. Irrespective of the city, in each city we found a need for improved coordination and collaboration, better funding mechanisms, and improved data sharing for improved resilience.

Second, the project has confirmed the need for learning between cities. A great deal of CWRA's success owes to transferring learning between cities, to bring together partners confronting similar challenges from different perspectives and resources.

Presenter biography



Mr. George Beane, Arup, United Kingdom

George Beane is an urban planner in Arup's International Development team, whose work focuses on urban resilience, WASH, water governance and spatial analysis.

Community-based storytelling as a tool for inclusive climate change adaptation

Authors: Mr. Niels van den Berge, www.next.blue, Netherlands

Keywords

Community resilience, storytelling, climate change, communication, co-creation

Highlights

Community-based storytelling is an effective method to bridge the gap between the worlds of local communities and academics. It helps co-creating and innovating coping strategies for climate change. In this interactive session we will present the results of our innovative storytelling approach. We will launch the trailer of our documentary.

Introduction and objectives

Extreme flooding, growing delta cities and millions of climate refugees. These are the challenges faced by delta and riverine people. Demand for water knowledge increases and so does the complexity of water challenges. This research anticipates the need for thorough analyses of the local context, because it increases the chance that adaptation approaches are effective in practice.

Our research involves the development of an interactive documentary called 'Me & Mekong' in which local people share their knowledge, experiences and coping strategies through stories. We use storytelling to connect stakeholders, motivate climate action, and evoke recognition in a jointly formulated goal.

Methodology approach

Local-level anecdotal evidence or tacit knowledge is the foundation of community-based storytelling. Local people know their environment best and have been coping with the effects of climate change for decades. By combining their bottom-up innovations with international water and climate expertise, we can help them leapfrog major barriers for development.

Local communities often do not have access to the newest scientific data, neither do they have a forum to share their experiential data. Storytelling helps linking the scientific arena with the reality of those most vulnerable to climate change. This unique approach brings local citizen journalists and scientists together.

Analysis and results

We will present data resulting from our research work and show how our storytelling products contribute to co-creation, bridging gaps and synergizing local, scientific and governance efforts.

In 2018 we trained young experts of the Dutch Young Expert Programme (YEP) and students of the universities of applied sciences in Rotterdam and Bern. They applied community-based storytelling in their research projects in several African and Asian countries. We will present the highlights.

After this presentation, we will launch the trailer of our interactive web documentary Me and Mekong, followed by Q&A. Me and Mekong is based on Joep Janssen's book Living with the Mekong and collates experiential data and anecdotal evidence on local strategies for climate change adaptation in the Mekong delta. We are currently working on this documentary with Postdoc researcher Long Hoàng Phi. The making of the documentary is endorsed and supported by Dutch Special Water Envoy Henk Ovink and the Dutch Embassy in Hanoi.

Conclusions and recommendation

Local people know their environment best and have innovative and creative answers to climate change. In mainstream scientific research, their anecdotal and experiential data are often not included. Community-based storytelling gives local people a place in academic debates and research.

It is therefore recommended to apply community-based storytelling more often as a tool to include all and leave no one behind in developing climate change adaptation strategies. Providing trainings on storytelling to young experts and local inhabitants of deltas is likely to catalyse co-creation and partnerships for climate change adaptation.

Presenter biography



Mr. Niels van den Berge, www.next.blue, Netherlands

Niels van den Berge (34) is ecologist, former Member of the Dutch Parliament, development practitioner and climate expert. After his work as a politician in the Netherlands, he left for Bangladesh in 2012. Ever since, Niels worked with international organisations, governments and local communities on adaptation strategies for climate and water challenges. Knowledge sharing, collaboration and co-creation run as a common thread through his career. Niels got impressed by the resilience of local communities in Bangladesh and other countries. He co-founded Nextblue to help giving local people a voice in climate change adaptation and international collaboration on water.

Integrating Equity and Climate Resilience into Southern African Water Infrastructure

Authors: Dr. Jeremy Richardson, Pegasys, South Africa

Keywords

Climate Change, Risk, Equity, Southern Africa, Water Infrastructure

Highlights

- Climate change is exacerbating the need for the systematic consideration of equity water sector plans and projects in southern Africa.
- The Climate Resilient Infrastructure Development Facility (CRIDF) has developed and applied tools to enhance integration of procedural and distributional equity issues in both strategic planning and project preparation.

Introduction and objectives

Equity and justice are often discussed in terms of their distributive and procedural dimensions covering both positive and negative impacts. Throughout southern Africa, climate change is exacerbating poverty levels with vulnerable communities lacking the adaptive capacity to respond to extreme events. Since 2013, the Climate Resilient Infrastructure Development Facility (CRIDF) has endeavored to mainstream issues of equity and resilience into its work, spanning both project level designs and strategic support to the region's governments and river basin organisations. Through CRIDF's project screening and preparation processes, both distributive and procedural equity considerations inform CRIDFs project design and delivery.

Methodology approach

CRIDF has developed several tools to mainstream its core mandates on pro poor and climate resilience into its project screening and preparation process. The screening tool acts as a check list ensuring the project is focused on poverty reduction as part of its selection criteria. A vulnerability mapping tool is used to ensure that the potential project location is vulnerable to climate change. A climate change risk assessment supports projects pre-feasibility and feasibility studies and helps ensure procedural equity is integrated into the project through the participation of the beneficiaries in the project design and its operation.

Analysis and results

CRIDFs tools draw on existing data sets, national consultations and primary community level data. The CCRA is based on understanding the climate vulnerability of the poorest. It uses consultation and house hold surveys, as-well-as participative workshops, to ensure that stakeholders can influence the project process. It also addresses issues of distributive equity through identifying the winners and losers of a project and ensures that the benefits are focused on the poorest. A case study from Zimbabwe illustrates the approaches taken to involve local beneficiaries in both the preparation and operation of the scheme. This has resulted in changes to the project design and the formation of a community committee to manage the operation of the irrigation project; resulting in buy-in and ownership of the scheme and helping to ensure it's long term sustainability'. CRIDF's extension of the CCRA to strategic trans-boundary infrastructure planning was also based on a participative process. In the Okavango river basin, the CCRA showed that planned infrastructure would only benefit the core economic areas of the basin's countries, whilst leaving the peripheral areas where planned mega-projects were located, with dis-benefits. Finally, it led to the development of an infrastructure option focused purely on local beneficiaries.

Conclusions and recommendation

Climate change is already exacerbating vulnerability and inequality. Preparing successful infrastructure programmes and projects to address climate change must be accompanied by a systematic assessment of the climate change risks. CRIDF has shown that CCRAAs which are well designed and effectively executed, help address issues of both procedural and distributional equity. Moreover, to be truly effective at addressing climate induced equity considerations, in terms of both access to decision making and an understanding of who benefits and who loses, then assessments must be carried out at both the strategic planning and at the individual project preparation levels.

Presenter biography



Dr. Jeremy Richardson, Pegasys Capital, South Africa

Jeremy is a Climate Change and Sustainability specialist working for Pegasys Capital, a south African based consultancy focused on water, climate change and cities. He has over 18 years of experience working in consultancy, the UN, academia and the NGO sectors. He has worked in Africa, and in Europe, Asia, Latin America and the Caribbean. He holds a PhD in Environmental Policy. Currently, Jeremy is the climate resilience lead for the Climate Resilient Infrastructure Development Facility (CRIDF), a DFID funded climate change and water infrastructure project preparation programme, working in trans-boundary river basins in southern Africa.

Less to lose?: Drought vulnerability assessment in the disadvantaged regions

Authors: Dr. Caroline King, The Borders Institute (TBI), Africa and Centre for Ecology and Hydrology (CEH), United Kingdom

Keywords

Drought, vulnerability, inclusive, adaptation, marginal drylands

Highlights

Fundamental practical and methodological challenges confound assessments of the costs of drought in disadvantaged dryland communities. To overcome these challenges a proactive global vulnerability assessment approach should apply the available methods inclusively and iteratively. The UNCCD offers international coordination for such an approach to assess reductions in vulnerability to drought.

Introduction and objectives

Droughts and water scarcity hit hardest where people are least able to adapt. Growing inequalities are not only between world regions, but also at country level, and within countries, between urban and rural areas. They also occur at catchment and community levels where increasing access to water for some can leave others ever more exposed. However, fundamental practical and methodological challenges hamper global efforts to account for the costs of drought in disadvantaged dryland communities. This study reviews available methodological approaches for drought impact and vulnerability assessment. The objective is to identify recommendations for an inclusive international drought policy initiative.

Methodology approach

The review focused on methods for assessment that should be integrated across sectors, scales and timeframes, and include particular consideration of the most vulnerable groups. The extent to which the assessment methods could inform adaptation actions was also explored. The experiences of practitioners in drought-affected countries were collected through a series of key informant interviews. This process was supported by targeted keyword searches of peer reviewed international scientific publications and a review of gray literature on the assessment of drought impacts and vulnerability at the global, national and sub-national levels.

Analysis and results

Findings suggest that most of the available assessments fall short in their consideration particularly of the longer-term impacts and vulnerability associated with hydrologic and socio-economic drought. Extensive guidance is available for assessment of drought impacts on national GDP in developing countries. However, this is still incomplete and is rarely applied. Most national accounting systems fail to recognize the contributions that vulnerable communities and individuals make to the formal and informal national economies, nor the value of the ecosystem services that they rely on. The avoidable costs of drought, degradation and desertification are therefore underestimated globally, and simple preventive actions are routinely underfunded.

For vulnerability assessment, the review highlights three broad methodological approaches available: a livelihoods approach; ecosystem-based mapping and modelling; and basin-wide resource accounting. Each connects to an infinite range of evolving tools and methods that are broadly complementary and can be adapted according to context. These should be applied iteratively through inclusive bottom-up processes to ensure participation by members of affected communities. They can identify and enhance adaptation capabilities, highlight opportunities for actions to reduce drought impacts and help to build the economic case for these actions to be taken locally, as well as at other levels.

Conclusions and recommendation

Better informed assessments at all levels should help decision-makers to prevent further exacerbation of multi-dimensional global threats and hazards by droughts occurring in the marginal dry areas of developing countries. There is no shortage of methods for assessment of vulnerability to drought. A coordinated international process is needed to ensure that the available methods for drought vulnerability assessment are applied systematically, coordinated and improved so that adaptation can reduce drought impacts on the most vulnerable.

Presenter biography



Dr. Caroline King, The Borders Institute (TBI), Africa and Centre for Ecology and Hydrology (CEH), United Kingdom

Caroline King-Okumu's affiliations include The Borders Institute (TBI), Africa, the Centre for Ecology and Hydrology, and the GeoData Institute at the University of Southampton, UK. She provides independent research and advice to international organizations such as the UNCCD, IUCN, local government, and others on international environment and development issues in water scarce environments. Her activities on drought and climate change adaptation in the Horn of Africa were hosted by the Kenyan National Drought Management Authority.

Ensuring flood insurance is socially inclusive: some challenges and solutions

Authors: Mr. Mohamed Aheeyar, International Water Management Institute, Sri Lanka

Keywords

Floods, climate change, insurance, social inclusion, gender

Highlights

- Affecting on average over 82 million people annually, floods can undermine numerous Sustainable Development Goals especially in the developing world.
- Many affected are rural farmers, with limited ability to withstand crop loss.
- This research explores how insurance schemes for flood-based crop loss can be accessible to the most vulnerable groups.

Introduction and objectives

On average 82.6 million people were affected annually by water related disasters between 2006 -2015. Floods accounted for 99.6% of these (Guha-Sapir D et al. 2016). At stake are the livelihoods of millions of small and marginal farmer households. The lack of compensation or other buffering mechanisms can result in deepening cycles of debt, especially when cultivation is often financed by borrowings. Climate change threatens to exacerbate these risks. This study identifies the local socio-cultural, economic and structural barriers that can prevent the most needy households from accessing technical interventions such as flood insurance schemes, and strategies to overcome

Methodology approach

By evaluating IWMI's Index Based Flood Insurance scheme piloted in Bihar (India), and the ADB funded Weather Index-Based Crop Insurance pilot in western Bangladesh, this study addresses the globally relevant question of what localised obstacles small and marginal groups face in accessing these schemes, and how these can be overcome to ensure insurance serves the most vulnerable, and not only large farmers. Information was generated through a questionnaire survey, Focus Group Discussions and Key Informant Interviews, covering different farmers from castes and ethnic minority groups; farmers who did and did not purchase insurance; women farmers, tenant farmers; local government

Analysis and results

Marginal and small-scale farmers, tenant farmers and women face several obstacles in accessing flood insurance, linked to their own capacities, their position in local social structures and norms, and the extent to which the insurance providers (external actors) recognize and provide for these challenges. They may not know of an insurance scheme due to poor social networks. Low literacy impairs their ability to understand complex insurance mechanisms, creating a lack of trust. This is corroborated by Akter et al (2017) in Bangladesh who found that maize farmers' understanding of climate change risks and insurance scheme design, condition the likelihood of their investing in insurance. Women are further disadvantaged in cultures that restrict their mobility, and when agricultural decisions are taken by men. The insurance premium may be unaffordable, while eligibility criteria that require a land title may exclude tenant farmers.

Reaching these groups requires strong local networks at village level and mobilisation skills that most private insurance companies lack. This can be overcome by partnering with an NGO with well-established networks and trust. They can help communicate features of the product including price, model uncertainties and pay-out triggers through locally appropriate written, verbal and visual media located in spaces accessible

Conclusions and recommendation

Floods affect millions of poor farmer households annually. Flood insurance can build their resilience to losses, but poor finance, social networks, illiteracy, and gendered norms can undermine access to and understand the insurance amongst vulnerable groups. The complex structure of flood insurance requires thoughtful product rollout to build farmer trust and minimize unrealistic expectations. Partners with extensive knowledge of rural social structures, institutional capacity and credibility at village level can help overcome these challenges through a systematic and locally appropriate rollout process. These need to be incorporated from the outset in product design through dialog between the insurer, local partner(s)

Presenter biography



Mr. Mohamed Aheeyar, International Water Management Institute, Sri Lanka

Aheeyar holds a M. Phil (Agric. Economics) from Imperial College at Wye, University of London, U.K. and a B.Sc. Agriculture (Hons.) University of Peradeniya, Sri Lanka. He has been working with IWMI as a researcher since June 2014. Prior to joining IWMI, he was the Head, Environment and Water Resources Management Division of the Hector Kobbekaduwa Agrarian Research and Training Institute in Colombo. Aheeyar has a large number of publications on various agrarian related topics in his 27 years research career. Aheeyar has worked as a consultant/Researcher in the past for various International and national organizations.

Addressing inequities in water masterplans through participatory approaches

Authors: Mr. Giacomo Galli, Both ENDS, Netherlands

Keywords

Masterplan, adaptation, Civil Society Organisations, Equity, Exclusion

Highlights

- Climate change adaptation masterplanning processes are currently excluding the most vulnerable, particularly women.
- Climate change adaptation already happens at grassroots levels. Interventions should build on these initiatives.
- Equity in planning processes can be promoted by empowering water users to assert their rights and ensuring equal opportunities for negotiations.

Introduction and objectives

Masterplans have become a popular approach to inform climate change adaptation. Critiques on masterplanning show that such processes are led by technical experts, accommodating the interests of elites while overlooking the disenfranchised, thereby increasing climate change vulnerabilities. Participatory approaches building on principles of inclusion and equity exist, yet these are rarely put in practice in masterplanning processes. This study builds upon these critiques and presents case studies led by Civil Society Organisations in five countries, where plans build upon the interests, rights and knowledge of water users. Lessons are drawn on how to overcome inequities in masterplanning.

Methodology approach

The paper presents a comparative analysis of five case studies of civil society engagement with Dutch-funded water masterplans in the Global South. The study answers three research questions: how is climate change adaptation masterplanning currently excluding water users?; in which ways can inclusion and equity be promoted in planning processes?; how can these approaches be included in adaptation planning? The practice-based case studies provide insights on the mechanisms of in- and exclusion as experienced by civil society organisations. Comparative analysis hereof allows the identification of emerging patterns, generating relevant inputs to improve the policy and practice of adaptation planning.

Analysis and results

Water masterplanning processes hold the premise of co-defining problems through multi-stakeholder platforms, allowing for the joint identification of integral solutions which draw on wide societal support. Social sciences critiques demonstrate however that masterplans largely accommodate the interests of (business) elites over those of residents and water users. In the Global South this results in a preference of infrastructure-oriented solutions hinging on property development, leading to displacement of slumdwellers and loss of livelihoods for the already disenfranchised. The effects of such measures fall disproportionately hard on women, whose roles are neglected.

The study compares five ongoing cases of civil society organisations critically engaging with water-masterplans and/or promoting participative approaches to adapt to climate change. Exclusion to masterplanning occurs through various mechanisms: tight timeframes and short notices of attendance; tensions between multi-stakeholder approaches dependent on upholding diplomatic relations and rights-based principles; and pre-set 'business-case' conditionalities. Approaches to promote equity in water governance prioritise self-motivated action as a starting point, empower water users to assert their rights and negotiate simultaneously at different levels for favourable outcomes. Adaptation masterplans can

promote equity by building upon existing local initiatives, facilitate equitable access to multi-stakeholder dialogues and ensure a level playing field for negotiations between

Conclusions and recommendation

Despite limitations of comparing five cases studies which hold similarities and also divergences in their contextual richness, the following generalities can be inferred. Adaptation (master)plans shape a sense of common urgency to guide collective action, these processes allow for opening up the limits to what is feasible and acceptable. Even adaptation plans which are not executed generate societal effects, both positive and negative. If adaptation planning is to be equitable and reduce vulnerabilities it should therefore be opened up to a wider range of expertise and accountability mechanisms than is currently the case, civil society plays a crucial role herein.

Presenter biography



Mr. Giacomo Galli, Both ENDS, Netherlands

Giacomo Galli is a Policy Advisor Water at Both ENDS, a Dutch non-governmental organisation active in the domain of international development, environment and human rights. Mr Galli holds an MSc in International Water Management at Wageningen University. In his work he bridges international water policy arenas with on-the-ground realities, working with organisations and individuals asserting their right to have a say on the resources on which they (and their constituencies) depend.

Flood risk mapping for all: a flexible methodology and toolbox

Authors: Ms. Hanne Glas, Ghent University, Belgium

Keywords

Flood hazard map, vulnerability, flood risk, open source, Haiti

Highlights

- An extensive methodology for flood risk mapping was developed to work with a minimum set of open source input data.
- The mapping methodology was translated into a robust and modular working toolbox.
- The risk mapping toolbox was tested for the catchment of the river Moustiques in Haiti showing promising results.

Introduction and objectives

As material and human losses caused by flood events increase year by year, so does the importance of an adequate estimation of these losses. Flood risk assessments predict the potential consequences of flooding and indicate the high-risk areas. Such assessments lead to more effective risk management and strengthen resilience. However, an adequate assessment relies on large quantities of high-quality input data. Unfortunately, many developing countries, which are often most vulnerable to flooding, lack reliable data or funds to acquire them. This research aims to develop a flexible, low-cost methodology for mapping flood hazard, vulnerability and risk in data poor regions.

Methodology approach

A generic risk mapping methodology was developed based on state-of-the-art practices. This methodology was customized for freely available data with global coverage, enabling risk mapping worldwide. This default data can be enriched with region-specific, detailed information when available. The practical application is assured by means of a modular toolbox developed on GDAL and PCRASTER. The toolbox provides a generic set of algorithms and spatiotemporal calculations for mapping flood hazard, vulnerability and risk and it can be enhanced easily to account for local specificities. A user-friendly interface allows access to the toolbox and modification of the algorithms without any programming experience.

Analysis and results

The developed toolbox was tested for the catchment of the river Moustiques, situated in the northwest of the island state Haiti. For this study area, several flood hazard maps were developed. Then, the core modules of the toolbox were used to create social, economic and physical vulnerability maps. These maps were combined with the hazard maps to create the three corresponding flood risk maps. In a first step, these maps were created following the basic algorithm, only using the default, freely available input data. In a next step, more detailed information on the study area, gathered during field work, was added as input data. This enabled the testing of the optional modules, providing extra in-depth information, and other algorithms in the toolbox. Moreover, the results of the basic workflow were verified with this new set of more detailed vulnerability and risk maps.

Conclusions and recommendation

The developed methodology and toolbox allow policy makers in developing countries and data poor regions to perform reliable flood risk assessments and generate the necessary hazard, vulnerability and risk maps. The first case study for the catchment of the river Moustiques shows promising results. In a next step, the toolbox shall be tested further on case studies in other countries and on different scale levels, thus improving the validation and verification of the toolbox for flooding. Finally, additional natural hazards will be

incorporated in the mapping methodology to develop a multi-hazard risk assessment tool, applicable worldwide.

Presenter biography



Ms. Hanne Glas, Ghent University, Belgium

Hanne Glas is a PhD student at the department of Civil Engineering at Ghent University in Belgium. Her research focuses on flood hazard risk assessment in the Small Island Developing States. She has worked on case studies in Jamaica and Haiti, with promising results. In the last steps of her PhD, she's working together with Antea Group on developing an automated, easy-to-use tool that includes all parts of risk assessment, from developing flood maps to incorporating climate change and evaluating potential measures.

Andean Women's agency to deal with Climate Change in Peru

Authors: Dr. Juana Vera-Delgado, Water Justice and Gender , Netherlands

Keywords

gender, agency, vulnerability, water scarcity, Peruvian Andes

Highlights

- Understanding poor women's agency and empowerment to deal with climate change;
- Roots and determinants of vulnerabilities that enhance or restrict the adaptive capacity of poor people;
- 2 cases of women's empowerment contrasting experiences to deal with water scarcity in two different climate and water regimes in Peru.

Introduction and objectives

Most evolving discourses and understanding on climate change adaptation and disaster risk reduction tend to portray poor women and children as the most vulnerable groups of climate extreme impacts, without questioning the actual drivers of this vulnerability. This paper critically analyses the different drivers of vulnerability that limit women's adaptive capacity to climate disasters – including how contemporary development interventions, unintentionally, can sometimes reinforce rather than challenge existing unequal gender power relations. Based on ethnography and participatory action research, developed in two different Andean communities', the agency of women to handle uncertainties and negative effects of water scarcity are scrutinized

Methodology approach

Main questions that guided the writing and analysis of this paper:

- Which are the main drives of poor women's vulnerability in the Andes of Peru?
- How have institutions and development intervention shaped local women's and men's agency to respond climate disasters in two different settings of climate and water regimes?

The cases are analysed with the 'lenses' of feminist political ecology. This framework is useful for understanding both the structural and manufactured roots of vulnerability, as well as the gendered responses of people to uncertainties and extreme situations in specific historical, political, cultural, institutional, and climate/environmental settings.

Analysis and results

This research has been developed in two Andean communities, Lullucha (Q'enqomayo Valley, Cusco) and Coporaque (Colca Valley-Arequipa). Although climate and water regimes are quite different in both valleys, conflicts exacerbated every time 'El Niño' shows up.

The degree of vulnerability and the agency of local women and men in both regions have strongly been shaped by (post)colonial imaginaries about development and progress, as well as by ideas and meanings attached to gender/ethnic identity, and recently, by the presence of development intervention.

What comes out clearly from this study is that women of Coporaque are more capable and knowledgeable than of Lullucha in dealing with climate and water crisis and patriarchy. The most determinant factor had been the establishment of a particular system of production and reproduction. For instance, 'hacienda' did not establish in Colca Valley; this allowed indigenous people to keep their lands and their traditional engendered way to do local politics. In contrast, in Q'enqomayo 'hacienda' systems drove off indigenous people from their land. This feudal system went hand in hand with the establishment of patriarchy, setting up clear gender boundaries. Indigenous women were placed at the bottom of the hierarchies, making them extremely vulnerable.

Conclusions and recommendation

- The resilience capacity and agency of women have strongly been influenced by: process of occupation and patterning of production/reproduction systems, discourses and imaginaries of gender roles and rights linked to these roles, and climate adversities.
- Ownership of land and access to water in rural areas are determinant in empowering people,
- Concepts of resilience and agency needs a better understanding, as both mutually interact and determine peoples' capacity to recover from calamities.
- it is also important to analyse local meanings attached to water and climate, when intervention aims to support a more equitable and place-based solutions.

Presenter biography



Dr. Juana Vera-Delgado, Water Justice and Gender, Netherlands

Juana Vera Delgado is both an agricultural engineer and a doctor in social science. She has a PhD degree in Gender and Political Ecology of Water awarded by Wageningen University, the Netherlands, in December 2011 (see thesis: <http://edepot.wur.nl/188580>). She also obtained an MSc Degree in Gender and Irrigation at the same university in 1999. Her degree as Agricultural Engineer was awarded by the Agricultural University 'La Molina', in Peru in 1988. Juana has a wide experience (over 25 years) working with international and local NGOs in issues related to water and environmental justice, food security, climate change and sustainable Development.

Seminar: Entrepreneurship driving water impact for all



ABSTRACT VOLUME

World Water Week, 25 - 30 August 2019

Water for society – Including all

Seminar: Entrepreneurship driving water impact for all

Contents

SMART Centres Training entrepreneurs in market-based, affordable water technologies	1
Exploring Financing Experiences in WASH in Bottom of Pyramid Markets	3
Open Innovation towards water access for all	5
Water Entrepreneurs Promote Economic Growth and Protect Ecosystems.	7
Toilet Accelerator: Business innovation & entrepreneurship for the Sanitation Economy	9
Scaling Water and Sanitation Access through Loans to WSS Enterprises	11

SMART Centres Training entrepreneurs in market-based, affordable water technologies

Authors: Mr. Henk Holtslag, SMART Centre group , Netherlands

Keywords

SDG6, Capacity building, Reaching the last mile, Affordable water technologies, Business development

Highlights

- Reduce cost, increase sustainability of rural water systems. New low cost options, affordable for small rural communities
- Training entrepreneurs. Build commercial supply chains of market-based, affordable technologies
- Productive use of water. Wells for families and farmers increase income so funds for maintenance. Also reduction of poverty

Introduction and objectives

An option to reach water and poverty SDGs in Africa is applying SMARTechs. SMART stands for Simple, Market-based, Affordable, Repairable Technologies. Examples are manual well drilling, locally produced hand pumps like Canzee, Rope and EMAS pumps, Tube recharge system to avoid wells drying up, Household water filters etc. These innovative technologies reduce cost of rural water supply by 50% or more compared to conventional options. SMART Centres train small, local entrepreneurs in these options with the objective to build up commercial supply chains of technologies that are affordable for small farmers. Farm watersources are key for rural development.

Methodology approach

There are SMART centres in 4 Countries in East Africa and starting in 4 other countries. SMART centres are member of the SMART centre group which is coordinated by the social enterprise MetaMeta. Each Centre is part of an NGO or government institute and generate their own funding which is used to install wells and training in technical and business skills. After training companies make profit with selling products to families, communities, governments or NGOs so there is a “profit based sustainability” and supply chains are build up. Since technologies are produced locally knowledge and spares are also available.

Analysis and results

A SMARTech example is the Rope pump. There are an estimated 110.000 installed worldwide of which some 40.000 in Africa. Although these pumps are simple, experience is “Simple is not easy” and the introduction went wrong in countries like Ghana, Mozambique and Ethiopia. Errors were made in the construction and installation due to the lack of long term follow up training. Errors in the approach included pumps installed in communities without funds for maintenance. However if done right, Rope pumps, manual drilled wells and other SMARTechs have much potential to increase water access, including water for “the last mile”, poor families in small rural communities where conventional technologies are too expensive or not possible. SMARTechs also make water affordable for small farmers with positive impact on poverty reduction and food security.

Results of SMART Centres

- 600,000 people with an improved water source at an average cost of 25 US\$/person for hardware and training
- 12.000 Rope pumps. Of which 50% Self supply, paid for by families, still
- 60 local companies. Selling SMARTechs
- 200 new jobs. Created directly in well drilling, pump production
- employment. Created indirectly in livestock, growing vegetables, etc

Conclusions and recommendation

Impact of SMART centres include:

- Cost reduction, increased sustainability of Communal rural water supply
- Increased range of options for Self-supply, families, farmers
- Farm water systems increase; incomes (SDG1), food security (SDG2), employment (SDG8)
- Commercial supply chains of SMARTechs with a “Profit based sustainability”
- Technologies are in place, lessons learned, impact is clear and proven

Recommendations:

- A Marshall plan for capacity development.
- Include knowledge on SMARTechs in national vocational education systems. A tool to do that are SMART Centres

Presenter biography



Mr. Henk Holtslag, SMART Centre group, Netherlands

Henk Holtslag is senior advisor in SMARTechs, being Simple, Market-based, Affordable, Repairable Technologies that in general are produced by the local private sector. Examples are manual well drilling, Rope pumps, groundwater recharge, household water filters etc. He has 30 years experience in both failures and success with these and other technologies in rural water supply in 18 developing countries in Latin America, Asia and Africa. He is co-initiator of the SMART Centre group which are water training centres in Tanzania, Malawi, Mozambique, Zambia, Ethiopia and starting in other countries.

Exploring Financing Experiences in WASH in Bottom of Pyramid Markets

Authors: Mr. Myles Elledge, Biomass Controls, South Africa

Keywords

BOP, Water Sanitation and Hygiene, Sales model, funding

Highlights

- Determining the most appropriate sales model for sales of communal-scale WASH products to BOP markets
- Leveraging institutions capacity and strategic expansion of the business portfolio to generate alternative revenue streams to subsidize costs to clients.
- Strategic development of products to meet needs of users and necessary precursors for public funding.

Introduction and objectives

Biomass Controls LLC is a Small-to-Medium-Enterprise (SME) offering sanitation treatment services, including proprietary technologies adapted to the non-sewered off-site sanitation treatment sector. As a for-profit business, all financial activities are required to be sustainable whilst products are required to be market-leading innovative user-based solutions.

Providing community-scale solutions for Bottom of Pyramid (BOP) markets present a notable challenge in establishing financial affordability of solutions and financial feasibility of operations.

Creative financing models were required to raise capital to sustain entrepreneurial activities in WASH whilst developing and providing sanitation treatment solutions to BOP markets, and alternative revenue streams were utilized.

Methodology approach

How can SME entrepreneurs leverage proprietary sanitation treatment knowledge and technology solutions to address critical Water Sanitation and Health (WASH) needs while generating sustainable revenue streams from product sales and alternatives utilizing their intellectual property?

Several finance models were tested during sales of solutions to clients in India, and monitoring uptake and feedback on sustainability of sales models and support models.

Alternative indirect funding mechanisms were explored to either generate capital separate from sales or to offset existing overheads, in order to improve the affordability of products and solutions.

Analysis and results

Intensive product development and new research was required to develop new solutions that met specific user requirements of BOP markets. To achieve this, in-house Research & Development capacity was expanded to acquire new research funding, to off-set product development costs and overheads. The company technology portfolio was increased outside of the core products to include on-site sanitation solutions (smart toilets), menstrual hygiene incinerators, and software controls systems, providing increased stability and robustness of income revenue. Patenting and licensing of proprietary technologies and software controls has also supplemented core revenue streams.

Products are actively developed to meet standards and features beyond user-based requirements to enable access to alternative revenue streams, such as directly addressing Sustainable Development Goals to qualify for blended finance portfolios, and meeting International Standards to de-risk investments sufficiently to qualify for other public sector investment. Reuse potential of byproducts such as biochar was investigated for cost recovery and marketed.

Sales models for product have evolved from outright sale to leasing-based models to better align with market penetration strategies for BOP markets, with community-lead teams playing the roles of operation and maintenance partners, providing entrepreneurial opportunities within the communities. Models also capitalized on subsidies for sanitation treatment.

Conclusions and recommendation

Biomass Controls has demonstrated that SMEs in WASH require creative financing models and a diverse portfolio of intellectual property to sustain entrepreneurial activities in WASH whilst developing and providing sanitation treatment solutions to BOP markets.

The company leveraged proprietary knowledge, expanded their R&D portfolio, and developed their technology products to suit both users-based requirements and qualifiers for investors.

A leasing-based model has been shown to be the most appropriate sales model for sales of communal-scale WASH products to BOP markets, as well as facilitating easier navigation of public procurement policy.

Presenter biography



Mr. Myles Elledge, Biomass Controls, South Africa

Myles Elledge is the Executive Director for Health and the Environment with Biomass Controls PBC. Myles has over 25 years of experience in development policy and planning in over 30 emerging markets. He has a passion for environmental health and is leading technology innovation and adoption initiatives in water, sanitation and clean energy

Open Innovation towards water access for all

Authors: Ms. Chandana DAS, Veolia, India

Keywords

Innovation, Access, Essential Services, Cocreation, Incubation

Highlights

Developing access to safe drinking water in urban India is paramount. It can develop faster with a greater reliance on local entrepreneurs and NGOs, which is why Veolia launched “Pop Up India”, a social incubator to boost open innovation in municipal water supply.

Introduction and objectives

Getting access to 24/7 pressurized water is a cultural and economic jump into the unknown: Veolia has set up a Social Welfare Team intermediating the Nangloi Authority, the technical teams and the population to help with this transition. An Open Innovation program is organized to complement this team with selected partners that can contribute their building blocks to ensure access to safe water for all.

Methodology approach

In 2013, the board of Delhi awarded to Veolia the development of access to 24/7 pressurized water supply in the Nangloi area within 15 years, connecting the entire population which exceeds one million, including the ca. 30% people dwelling in least favoured areas. The Social Welfare Team needed complementary skills which were called for and selected through “Pop Up India”, a social incubator. The selection process is done in two parts: preselection of the two best candidates and a 6-week test, assessed using qualitative Performance indicators followed by the implementation of the best solution over 6 months.

Analysis and results

At the beginning of 2018, 130,000 households were connected to the network and the Social Welfare Team faced the challenge of scaling up the number of connections to reach 250,000 families.

The Pop-Up sets a competitive selection process, jointly overseen by Veolia India, an incubation partner-Ennovent & Nangloi team. The call initially attracted 18 bidders, of which two organizations were shortlisted to run a 6-weeks pilot in Nangloi to evaluate their mediation skills and collaboration spirit with the Social Welfare Team. The results of the pilot were assessed based on mostly qualitative criteria along four axes: the reach of the campaigns, the fit with the existing team, the understanding of the local context and the constructive mindset of the potential partner. At the end of the process, an MOU was signed between Veolia and “FORCE”, an NGO which refined its approaches thanks to an incubation period of 6 months: innovative communication channels such as street plays and water connection camps in addition to an active involvement with community leaders. It will also train the Social Welfare Team as effective facilitators for a long-term impact on the contract.

Conclusions and recommendation

Getting access to 24/7 water is a disruptive change for many, which needs “social welfare teams” to intermediate the dialogue between the populations, the operators and the authorities. These teams need specific supports from local businesses and NGOs, here identified through a participatory, transparent and competitive process: the “social incubators”. In Nangloi, the selected NGO will be reaching 9,000 households over 6 months. Based on commonly defined Key Performance Indicators, it will be gradually extended to the full Nangloi area.

Presenter biography



Ms. Chandana DAS, Veolia, India

Chandana Das is a professional with 8 years of experience in urban development. She has also worked with non-profits, self-help groups, small scale corporations, urban think-tanks and has also been actively engaged in various UN process. With her MSc in Urban Management and Development from Erasmus Rotterdam University, she is working with Veolia India as the Social Innovation Manager. Chandana is steering two programs - first, Grameen Veolia Water - a social business that address the issue of access to safe drinking water in Bangladesh and second, Pop-up India program that co-creates innovative solutions with social incubators and social entrepreneurs

Water Entrepreneurs Promote Economic Growth and Protect Ecosystems.

Authors: Mr. Dammika Sirisena, MCB Bank Limited , Sri Lanka

Keywords

Successful,Funding,Entrepreneurs,Innovative,Financing

Highlights

World Bank says investments need to triple to reach the water-related SDGs, as why the Sri Lanka government promote water and sanitation entrepreneurship towards inclusive sustainable development increasing economic growth and protecting ecosystems. It explores potential bottle-necks and solutions ensuring clean and affordable water and sanitation for all.

Introduction and objectives

In Southern Sri Lanka Hambantota is the largest provincial city. Where the rapid urbanization and industrial boom, Air port, Naval port and such public and private entrepreneurs have produced severe water crisis, exploiting the poor through irresponsible and unsustainable production and waste. Objective of the EU support Water Supply & Sanitation Project (EUWSSP) contribute substantial investment in water infrastructure through new regulatory body called Water Recourses Trust Fund (WRTF) by allocating, valuing promoting water and sanitation entrepreneurship initiatives trading water and utilities extend and improve water supply and sanitation services contributes to SME development.

Methodology approach

This paper is a findings of an empirical research, funded by the EUWSSP. Ruhunu University analyzed the data. Data was collected through qualitative research method selecting 175 samples from the province. The overall approach is a participatory integrated management process with close cooperation, partnerships and good governance based on comprehensive policies, and involvement of all stakeholders. It examines the basic concepts initiated by the Ministries, Universities and MCB bank. The paper reveals that public and private actors, funds and SMEs contribute more to sustainable development by achieving an equitable water sharing for all society sectors and for healthy ecosystems.

Analysis and results

EUWSSP and the Ministry of Regional Development provide US\$ 476 investments through WRTF by promoting water and sanitation entrepreneurship in communities and businesses in environment towards sustainable development. Ministry financed to 12091 ventures concerning social-environment rather than profit, prioritizing technology options in terms of costs, benefits and local capacities, including 4590 small water purification units, MCB financed to 5640 CBOs to operate as water entrepreneurs. A new innovative approach and technologies introduced in waste water treatment and sludge handling strategies at Rice mills and Sugar factory using total energy saving and water purity systems. Project facilitated investment in institutions and human capital aiming a knowledge-based community to manage water resources wisely. Removing the obstacles and opportunities for growth acceleration in lacking regulations and laws against polluters, the WRTF enforced and enact new reforms transforming societies to meet the SDGs. MCB invested to rehabilitate 12 irrigation and eco systems by the stakeholders covering hundred of productive lands, reusing drainage water prioritizing food production and animal husbandry specially for Muslim entrepreneurial sector empowered to create inclusive, community-based solutions targeting women and children. They promote the economic incentives to achieve an equitable water sharing for all society sectors & health eco systems.

Conclusions and recommendation

The project is highly successful, applying an international and local funding and entrepreneurs innovative financing models, broad-based water service interventions through SME development directly leads to deviate negatively affect water availability and provide quality water for all. society sectors and for healthy ecosystems. It is highly recommend that global business leaders should finance for water in achieving SDG goals where proper planning and management needs to be taken for all issues where an entrepreneurial sector should be empowered to create inclusive, community-based solutions through unique organizations, awareness and incorporate women as potential entrepreneurs.

Presenter biography



Mr. Dammika Sirisena, MCB Bank Limited, Sri Lanka

Dammika Sirisena-Branch Manager attached to MCB Bank Limited in Galle Branch (Southern Sri Lanka). Professional Banker with over 13 Years experience in SME Banking, Retail Banking & Corporate Banking having worked at several leading banks in Sri Lanka namely DFCC Bank, NDB Bank & MCB Bank. Researcher at University of Colombo. He has a Bachelors Degree in Business Administration & a Masters degree in Financial Economics. He has published several research papers regarding Irrigation & Water Management projects in Sri Lanka.

Toilet Accelerator: Business innovation & entrepreneurship for the Sanitation Economy

Authors: Ms. Cheryl Hicks, Toilet Board Coalition, Switzerland

Keywords

Sanitation business solutions, entrepreneurship, economic models, private sector, innovation

Highlights

Since 2016, the Toilet Board Coalition's Toilet Accelerator has been providing a unique platform for large companies-entrepreneurs-innovators to collaborate on scalable Sanitation Economy business solutions. There is now a growing portfolio of innovative business solutions for the sanitation sector and sanitation systems that leave no one behind.

Introduction and objectives

The Toilet Accelerator supports entrepreneurs and innovators with bespoke mentorship, partnership and visibility from multinational brands to scale their sanitation economy businesses.

More than toilets alone, we identify, support and co-innovate commercially viable businesses across the Sanitation Economies - including innovative sanitary-ware infrastructure, products & service providers; toilet resource collection, treatment, and transformation (circular resource recovery and up-cycling to water, energy, nutrients); and digital applications for sanitation systems and preventative healthcare.

Participants in the annual Toilet Accelerator programme are building a new sanitation sector for the future, providing a global evidence base for new sanitation business solutions.

Methodology approach

The Toilet Accelerator focuses on partnerships between entrepreneurs with sanitation businesses in low-income markets and multinational corporations with expertise for scale, in addition to pathways to profitability that attract commercial investment.

The SDG impact of the businesses supported by the Toilet Accelerator are measured based on their business performance in delivering the increased access, use and adherence to improved sanitation for all.

Performance metrics address the business model viability for scale, management team, unit economics, operational efficiency, invest-ability and overall impact. Businesses selected for the 12-month programme graduate into the Toilet Board Coalition business platform membership.

Analysis and results

On average Toilet Acceleratees have at least doubled their revenues, customer base, and access to commercial investment during the programme. Many cohort companies also graduate with continuing partnership commitments from Toilet Board Coalition member companies and network.

Further results of the programme to be shared in this session:

- Evidence of growing pipeline of sanitation business solutions.
- Evidence of increases in sanitation system user base via businesses we support (toilet sales & usage; toilet resource capture and re-use; toilet & sanitation system user behaviour & insights)
- Evidence of new value drivers (biological resources & data) within sanitation systems for business engagement
- Evidence of new product categories, new product and service markets
- Evidence of increasing private sector investments in Sanitation Economy sectors
- Evidence of system level change
- Monitoring of market demand for sanitation system products, services and resources
- Monitoring of market valuation of sanitation system products, services and resources

- Evidence and learnings about economic viability of business solutions and commercial investment opportunities
- Evidence of supportive enabling environments for Sanitation Economy business models via government policy and NGO engagement
- Evidence of market influence

Conclusions and recommendation

It is widely believed that the private sector can play a significant role in bringing new, more efficient, sustainable and resilient solutions to the sanitation sector to achieve SDG 6.2.

We encourage broader private sector engagement and investment into the sector by leveraging this unique Accelerator programme dedicated to the sanitation sector.

There is now mounting evidence that leading businesses are championing and activating the multi-billion dollar Sanitation Economy. We need more companies and entrepreneurs to transform the sector from unaffordable public costs into a global marketplace of business opportunity that will deliver significant benefits to business and society.

Presenter biography



Ms. Cheryl Hicks, Toilet Board Coalition, Switzerland

Appointed as the Toilet Board Coalition (TBC)'s inaugural Executive Director in 2015, Cheryl is an experienced business, investment and sustainable development professional. Cheryl brings over 20 years of experience developing innovative approaches to responsible business strategies, impact investment strategies, and high performing multi-stakeholder collaborations. Before joining the TBC Cheryl was the Sustainability Investment Partner and Head of Impact at Quadia Impact Finance in Geneva. Throughout her career Cheryl has held several positions with sustainable development platforms, and worked with fortune 500 global companies, investors and start-ups across sectors such as healthcare, consumer goods, food, forestry, chemistry, and renewable

Scaling Water and Sanitation Access through Loans to WSS Enterprises

Authors: Ms. Mary Ngunjiri, Water.org, Kenya

Keywords

Finance, Enterprises, Businesses, Supply Chain, Entrepreneurs

Highlights

- Lending to small and medium enterprises increases access to water supply and sanitation by strengthening businesses that provide materials, small-scale water systems, and supply chain delivery.
- Financing WSS SMEs can reach more people faster and complement household lending.
- Catalyzing private finance helps the Kenyan government meet its objective of providing WSS services.

Introduction and objectives

The need for financing in the WASH sector is even more compounded for small and medium enterprises (SMEs) providing water supply and sanitation (WSS) services, due to their unique challenges and sometimes seasonal revenue. Water.org's innovative WaterCredit model partners with private sector financial institutions (FIs) to promote access to credit for both SMEs and households for WSS improvements. In Africa and Kenya in particular, WaterCredit has been able to address this challenge by customizing loans for WSS service providers, manufacturers, and suppliers. This is key to streamlining the value chain so the last mile can access products or services.

Methodology approach

Findings are based on desk research, qualitative interviews with Water.org's Kenya partners Family Bank and Equity Bank, a loan study conducted with Equity Bank, and ongoing program monitoring surveys of WSS loans disbursed. The qualitative interviews explored topics around how the banks structure their WSS SME loans, the challenges they've faced with lending, and lessons learned. The loan study conducted September-November 2018 tracked the number of WSS SME loans that Equity Bank disbursed and related metrics. The program monitoring surveys verified that the SME loans were used for WSS and capture the types of SMEs that were financed.

Analysis and results

National government development spending in recent years amounted to Kshs. 29 billion, less than a third of the required annual investments of Kshs. 100 billion towards achieving universal access to water services by 2030. This leaves a financing gap of Kshs. 71 billion (Kenya 2018 WASREB Impact Report). Water.org's loan data demonstrates the role that lending can play in addressing this gap: 15 million people reached through 3.4 million loans globally disbursed as of September 2018. That is equivalent to US\$1.1 billion in loan capital leveraged from the private sector through FIs. Further, by lending to growing WSS businesses, Water.org and its FIs have found a new way to reach a much larger scale of people in need of WSS, for example up to 20,000 people through one SME loan. A 2018 loan usage study with Equity Bank Kenya showed that approximately 9% or 40,800 of their total loans disbursed during October 2015 to July 2018 went to WSS SMEs. These loans, averaging USD 4,000, help enterprises deliver water; install community borehole wells, water connections, large-scale water storage tanks; and provide pit emptying services. This presentation will also discuss the obstacles to WSS SME lending and opportunities for growth.

Conclusions and recommendation

The initial evidence from lending to WSS SMEs shows the great potential and scale that can be reached through private sector FIs. Recommendations include:

- continue to build and share evidence, including with government, to encourage more FIs to lend to WSS SMEs;
- increase technical support to WSS SMEs to enhance their operations and viability for attracting financing through development partners (e.g. bilaterals and NGOs);
- encourage blended financing to support the more nascent SMEs and entrepreneurs with mix of subsidies and/or loan guarantees for FIs to lend to this riskier segment.

Presenter biography



Ms. Mary Ngunjiri, Water.org, Kenya

I am Mary Ngunjiri, a program Manager working with Water.org for two years. I manage Water.org programs in Kenya and Tanzania. I have a wide experience in microfinance and lending to Small and Medium Enterprises (SMEs), having worked both in a microfinance and in one of the largest commercial bank in Kenya for a total of over 15 years. I supported and witnessed many micro businesses graduate to become SMEs.

I studied Agricultural Engineering in my undergraduate and an MBA in Entrepreneurship. I am passionate about bringing transformation to the lives and livelihoods of people.

Using revolving funds as catalyst to accelerate self-supply in Bangladesh

Authors: Mr. Shaikh Ali, Simavi Netherlands , Bangladesh

Keywords

Self-supply; revolving funds; Bangladesh; WASH

Highlights

- Generated a Revolving Fund as catalyst to accelerate self-supply at the community.
- Within two years 360 Deep Tube Wells (DTW) were installed to ensure safe water for more than 7200 people with 108% recovery of the cost.
- Provided soft loan to 6 sanitation entrepreneurs for establishing their business.

Introduction and objectives

SLOPB, a Bangladeshi NGO is implementing a WASH program in the coastal areas of Bangladesh using revolving funds (RF) for self-supply in a sub-district. This project started in 2016 with financial and technical support of Simavi Netherlands and since then 360 Deep Hand Tube Wells were installed. The project had 108% cost recovery which 100% goes back to revolving fund and the rest enables SLOPB to continue as a social business. Through signing MoU with the house-owners who use RF for self-supply, SLOPB also ensures that those who cannot afford having their own DTW have access to safe water supply.

Methodology approach

The Revolving funds is used for installing DTWs with 108% recovery and providing this services with options;

1. Full payment of € 470 before DTW installation
2. Payment in six installment of total € 490 and
3. Payment in 12 installments adding to € 512. Average 20% customers are using 1st option, 50% are using 2nd option and 30% are using 3rd option

The recovery rate is 100% and the service charge of 8% is being used to pay two staff's cost and required admin costs.

Sanitation entrepreneurs received €6000 and they paid back in 12 installments with 10% interest.

Analysis and results

After closing of Simavi funded project SLOPB provides of water and sanitation services using the Revolving Funds as a sustainable business. Since 2016 a total 360 DTWs were installed with 108% cost recovery and more than 7200 people got access to safe water. Using 8% service charges has enabled SLOPB to cover the costs of two staffs and their administration costs.

For the financial sustainability increasing community investment in self-supply is important. More significantly using the business approach and providing proper follow up after installation services have changed people's attitude towards investing in water and sanitation rather looking for the charity/subsidy. Meanwhile it has been evident that the approach will contribute to acceleration of access to water for all.

Through the initiatives poor and marginalized people are supported for safe water as before the installation of the DTW a MoU is signed with the house owner to make sure they keep the water point open for the poor and marginalize people living in the vicinity and cannot afford their own self-supply systems.

The sanitation entrepreneurs who used RF increased their sale for 30 % and have sold 4000 household pit latrines in the last two years.

Conclusions and recommendation

During last two years it has been found that using proper motivation is the key to bring change in people's practice in investing in their safe water and improved sanitation and this practice is contributing to the development of entrepreneurship that will have its impact for the long run to ensure safe water and sanitation.

Using RF as a catalyst has proven to be very effective to accelerate the self-supply and create a viable social business. The methodology can be used to reach more people in a cost-effective manner and can be replicated in other places.

Presenter biography



Mr. Shaikh Ali, Simavi Netherlands, Bangladesh

I am Shaikh Md. Zunaed Ali has been working in the development field of Bangladesh for 27 years in the area of Human Resource Management, Capacity Building, Partnership Management and Program Development in the area of WASH, Livelihood Security and Social Business. Currently I am working as the Executive Director of SLOPB Bangladesh, a Dutch Organization and managing different projects and programs of WASH, Livelihood Security and Social Business and specially working for the organizational sustainability through adopting business approach in all the projects/programs to ensure generation of own funds to continue supporting poor and marginalized people.

Linking biodiversity with inclusive development to achieve the 2030 Agenda



ABSTRACT VOLUME

World Water Week, 25 - 30 August 2019

Water for society – Including all

Seminar: Linking biodiversity with inclusive development to achieve the 2030 Agenda

Contents

Water awareness before and after Cape Town's three-year drought.....	17
Olona River: from most polluted European river to local pride	19
Citizen scientists supporting SDG achievement.....	21
Pathways to Resilient Livelihoods in the Kavango-Zambezi Transfrontier Conservation Area.....	23
Combating climate change with SIT-IN for Wetland Conservation	25
Pipiripau's Project: using PES for sustainable rural development in Brazil	Error! Bookmark not defined.

Water awareness before and after Cape Town's three-year drought

Authors: Dr. Johan Enqvist, University of Cape Town, South Africa

Keywords

Water management, home gardens, Cape Town, plant traits, drought resistance

Highlights

- Cape Town recently endured a record-breaking drought putting households under severe water restrictions
- Pre- and post-drought surveys of nursery customers reveal a changes in preferred plant traits
- Increased concern for drought resistance shows that gardeners' ecological knowledge impact water conservation
- Endangered and endemic flora are particularly useful for water-wise gardens

Introduction and objectives

During three years of drought, Cape Town's residents faced increasingly harsh restrictions on water use and still nearly had their household taps cut off before rains returned in 2018. Anecdotal evidence suggests many home gardeners switched to drought-resistant indigenous plants. The aim of this study is to investigate how a critical resource crisis impacts people's relationship to nature. Specifically, our objectives are a) to document home gardeners' consideration of and preference for drought resistant traits among their plants, b) to compare preferences before and after the crisis, and c) to reflect on the indirect implications of the drought on urban biodiversity.

Methodology approach

We follow up a study conducted in 2015-2016, where 157 nursery customers participated in a 10-20 minute qualitative interview survey about plant trait preferences (Goodness 2018). Revisiting the same five nurseries in different socioeconomic areas, we survey close to 200 customers with identical questions and adding specific queries about how the drought and water restrictions impacted their practices. Responses were coded to identify reasons for selecting specific plant species, including traits relating to the plant itself as well as external factors.

Analysis and results

Final data collection and analysis is still underway and will be completed February 2019. Tentatively, we expect to see a strengthened preference for drought-resistant species – indigenous ones in particular. Respondents are likely to have altered their gardening practices both during the drought and as water restrictions were eased; however some are likely to have implemented technology-based water-saving solutions such as drip irrigation and rainwater harvesting, while others may have shifted away from living plants entirely and instead use artificial alternatives such as tiles and astroturf.

Further, we expect to see a stronger expression of local ecological knowledge, where species indigenous to the Cape are valued for their ability to withstand dry conditions and sandy soils. Gardening is a source of pride as well as knowledge about nature, and we expect to find examples of people investing considerable effort and resources into maintaining a beautiful garden while also doing their part in the city-wide efforts to save water.

Conclusions and recommendation

Cape Town's unique floral riches and harsh climate links two crucial environmental challenges - biodiversity loss and climate change. By capturing some social and behavioral impacts of severe environmental stress,

this study will build important knowledge about what role citizens can play for addressing complex sustainability issues. This is particularly important in an urban context, where important 'stepping stone' places of greenery are found around private homes and managed by residents themselves. Changes in their behavior due to water scarcity is likely to impact both biodiversity as well as ecosystem service generation more broadly.

Presenter biography



Dr. Johan Enqvist, University of Cape Town, South Africa

Johan is a postdoctoral fellow at the African Climate and Development Initiative at the University of Cape Town. His current work aims to explore the governance of urban resilience and water security in Cape Town. This is part of a broader research interest in how people living in cities relate to nature and the ecosystems that support them, especially understanding what social-ecological factors enables, encourages and sustains more sustainable behavior. His doctoral project focused on the notion of stewardship, as expressed through civic engagement for protecting urban ecosystems.

Olona River: from most polluted European river to local pride

Authors: Ms. Martina Spada, Istituto Oikos NGO, Italy

Keywords

river basin restoration, community engagement, multi-scale approach, ecological corridors

Highlights

- Without a common vision for the Olona River Basin, local protected areas and agreements achieved only partial habitat restoration.
- Success at landscape scale is achieved through multi-scale approach, extensive community engagement and several restoration interventions.
- Successful restoration requires meaningful participation, multi-scale approach and global theory of change.

Introduction and objectives

In the 1950s, the Olona River in Northern Italy was considered as the most polluted river in Europe. But, since 2003, 9 local protected areas have been established, and a regional agreement signed to address hydrogeological instability and protect the whole river. These were small, separated projects which – albeit not organized under a common framework – indeed started to ameliorate river and habitats. To complement these efforts, several stakeholders have started to work together to develop a common vision for the Olona River Basin: a multi-scale approach and significant citizen engagement drive this effort, animated by Istituto Oikos.

Methodology approach

To restore the Olona River and ecological processes at landscape level (including fully rehabilitate the ecological corridor), the following is being undertaken:

engagement of local communities in scientific monitoring (citizen science) and to raise awareness on the issues and the potential of the river - making people conscious of the beauty of the area and promoting sustainable habits.^{[1][2][SEP]}

Detailed analysis, with local stakeholders, of the need for ecological restoration and permeability of linear infrastructures, with special attention to wetlands restoration.^{[1][2][SEP]}

Use of the public and private funds spent on the area to attract additional funding.

Analysis and results

Local administrations were keen on protection, especially thanks to citizens' pressure, but they lacked the power and competence required to exert real influence and attract funds to make real changes. Furthermore, local administrations and small protected areas lacked a landscape approach and vision and did not act as a single entity. Thus, after gaining the interest and commitment of all interested parties, a common vision for the middle sector of the Olona River Basin was developed and the following activities started to be implemented to address the lack of knowledge and the need for ecological restoration:

21 interventions for restoration of wetlands and forests and defragmentation of linear infrastructures - one is an innovative railway underpass for amphibians, reptiles and small mammals, planned with a train company; if successful, it will be replicated along their entire railways.

1 training course for citizens on monitoring plant and animal species and using citizen science platforms.

Community engagement to make citizens aware of their role in the protection of the environment, the difference they can make by changing habits, and how to increase biodiversity.

Together these activities will contribute to achieving the common vision for the Olona River Basin.

Conclusions and recommendation

Monitoring of the interventions in place already shows an increase in the density and number of wetland-related species. As community engagement and on-the-ground restoration proceed, more positive results will be reported, confirming that wide participation allows for inclusive and effective solutions. In particular, it was confirmed that:

- successful restoration needs multi-scale approach and global theory of change.
- Habitat restoration at landscape scale requires a broad network of actors.
- Citizens must be willing to change habits to sustain desired changes.
- The value of biodiversity must be acknowledged, even where human impact was enormous in the past.

Presenter biography



Ms. Martina Spada, Istituto Oikos NGO, Italy

I am a zoologist with a PhD in Analysis, Protection and Management of Biodiversity from the State University of Insubria, Italy. As a freelance zoologist and ecologist, from 2009 to 2017 I worked on mammal conservation, protected area management and habitat restoration. I am currently affiliated to Istituto Oikos, an NGO dedicated to safeguarding biodiversity and strengthening communities in Europe, Asia and Africa. I develop and manage projects for the management and conservation of natural resources, the restoration of habitats, especially in water-related ecosystems, and the development of ecological connectivity in Europe.

Citizen scientists supporting SDG achievement

Authors: Dr. Steven Loiselle, Earthwatch, United Kingdom

Keywords

SDGs, citizen science, ecosystem services, climate change, resilience

Highlights

- Identifying the benefits and limitations of freshwater citizen science to inform sustainable management, meet the goals of SDG 6.3 and increase water stewardship.
- Inclusive participatory methods allow for improved management of multiuse freshwater environments.
- Inclusion in citizen science has shown a nine-fold increase in awareness and participation in catchment-related actions.

Introduction and objectives

The planet's aquatic ecosystems are under increasing pressure with an unprecedented loss of basic services to local communities and our shared environmental heritage. Inclusive participatory methods provide fundamental tools to meet regional and international agreements and conventions. Citizen science is a collaborative endeavour with potential benefits for the participants, scientists and society as a whole. In this presentation, we will explore the benefits and limitations of citizen science using results from the global citizen science Freshwater Watch programme. The scale and diversity of projects within Freshwater Watch allows for a comparison of approaches and an optimisation of methodologies.

Methodology approach

To explore the benefits and limitations of citizen science programmes we will show results from lake communities in East Africa and Sweden, urban waterbodies in China and Europe and water supplies in villages in West Africa. We will look at the challenges in data gathering, knowledge exchange and long term engagement and the benefits to programme proponents and participants. We will position this analysis in the context of SDG 6.3 with respect to the possibility to fill important knowledge gaps and in the context of creating long-term engagement that promotes local stewardship of these valuable resources.

Analysis and results

The results indicate that citizen science can complement agency monitoring, when present, and fill needed data gaps when no regulatory information is available. By comparing the spatial and temporal distribution of citizen scientist-generated data to regulatory monitoring, we show an improved spatial coverage, but a clear temporal bias. In cases where no regulatory data was available, citizen scientist-generated information provided key insights to identify and avoid the degradation of water resources as well as habitats. From an engagement and stewardship point of view, inclusion in citizen science activities shows a nine-fold increase in awareness and participation in catchment related actions. Restoration and catchment-based management programmes show particular benefits from participative processes like citizen science.

Conclusions and recommendation

We show that participation in freshwater citizen science helps to create a critical mass of informed local persons. These persons have an increased knowledge and awareness of local, national and global issues and support efforts to achieve SDGs. By generating new information, citizen scientist acquired data support improved management and ecosystems restoration as well as improved monitoring to meet SDG reporting requirements.

Presenter biography



Dr. Steven Loiselle, Earthwatch, United Kingdom

Dr Steven Loiselle is a Senior Research Lead at Earthwatch Europe (UK) and an Associate Professor at the University of Siena (Italy). His research has focused on new approaches to monitoring and management of freshwater environments. Through Earthwatch's FreshWater Watch, he has worked with corporate, regulatory and research partners to increase stewardship of freshwater resources. He coordinated international research in African Great Lakes, Paraná wetlands, Mediterranean lakes, and shallow lakes in the Yangtze valley. Dr. Loiselle's research has focused on the dynamics of ecosystems in the context of global megatrends, resulting in 120 publications, chapters and books.

Pathways to Resilient Livelihoods in the Kavango-Zambezi Transfrontier Conservation Area

Authors: Ms. Caroline Brown, Climate Resilient Infrastructure Development Facility, South Africa

Keywords

livelihoods, tourism, pro-poor, southern Africa, biodiversity economy

Highlights

- Establishing localised value chain partnerships in the KAZA TFCA enables vulnerable communities to benefit from the region's lucrative tourism industry.
- The approach promotes climate resilient livelihoods whilst also preserving wildlife corridors and natural assets within and between the five KAZA Member States of Angola, Botswana, Namibia, Zambia and Zimbabwe.

Introduction and objectives

The KAZA area hosts the finest biodiversity and wilderness of the five Member States, whilst also providing a home to some of the poorest, most vulnerable communities who rely on consumptive and often unsustainable use of natural resources.

The ability of the tourism sector to unleash the full economic benefits of transboundary cooperation depends on the preservation of these natural assets, which in turn will depend on the transformation of KAZA communities from a state of vulnerable subsistence to full participants in the local economy. This study explored climate-resilient, pro-poor growth opportunities within the tourism value-chain to improve local livelihoods.

Methodology approach

Using questionnaires, available literature and online sources, datasets were developed on: trade of agricultural products within and between the KAZA Member States and beyond; existing agricultural production; tourism facilities within KAZA (number and distribution); and tourism consumption and supply chain patterns. The data was used to determine virtual water and carbon footprints of trade, and the estimated volume and value of consumption of various agricultural products by the tourism sector. The supply chains within key "tourism supply hubs" in the KAZA TFCA were determined based on questionnaire responses, and thereafter validated through field verification missions.

Analysis and results

The study determined that the KAZA tourism industry's annual expenditure on agricultural produce is estimated at \$64.2 million – a substantial portion of which is imported. Diverting even a fraction of this expenditure to local agricultural enterprises would create alternative income streams for local communities. Moreover, it was established that the tourism sector is willing to purchase from local producers, provided quality and quantity of supply is guaranteed.

Creating localised tourism supply hubs to service the tourism industry would not only increase the economic benefit to local communities, but also help attract subsistence farmers away from core wildlife areas (and KAZA-identified cross-boundary wildlife dispersal areas), thus alleviating the incidence and impact of human wildlife conflict and increasing the potential for wildlife and tourism growth, resulting in a win-win situation. The study showed that by introducing modern irrigation and climate-smart farming techniques, localising agricultural production for the tourism sector can be done without negatively affecting water resources. Through engagement with local stakeholders, the study went on to identify viable value chain partnerships between producers, intermediary suppliers and tourism facilities within key "tourism supply hubs".

Conclusions and recommendation

The potential for symbiotic, sustainable and inclusive growth exists, but new and innovative uptake pathways will be required going forward. A number of value-chain ‘products’ are being developed as prototypes to demonstrate how communities can break into lucrative tourism supply chains. Taken to scale, the livelihoods approach will ensure that KAZA communities have a seat at the regional and sustainable tourism growth table.

Governments and support organizations can play a key role by recognizing the importance of the “biodiversity economy” and focussing on transitioning communities from subsistence to small-scale commercial production systems, creating local level economies through “tourism supply hubs”.

Presenter biography



Ms. Caroline Brown, Climate Resilient Infrastructure Development Facility, South Africa

Caroline has spent the past five years working on donor-funded water and climate resilience programmes in southern and eastern Africa. She has developed strong technical and managerial expertise in the planning, design and delivery of water projects across the region - focusing predominantly on gender, social inclusion and livelihood issues. She has led the research and development of bespoke climate risk and vulnerability assessments, and gender guidelines for the UKAID-funded Climate Resilient Infrastructure Development Facility. Caroline was part of World Water Week 2018's Young Scientific Programme Committee, responsible for coordinating the gender seminar and speaking during the Closing Plenary.

Combating climate change with SIT-IN for Wetland Conservation

Authors: Prof. Deepthi Wickramasinghe, University of Colombo, Sri Lanka

Keywords

wetlands, climate change, conservation programmes, school children

Highlights

The present project identifies an effective mechanism to include future leaders, in order to combat climate change and achieve sustainable developmental goals. The SIT-IN programme presents how a missing link, the school children, is included in wetland conservation action loop and to make nature's contribution to human wellbeing enhanced.

Introduction and objectives

Healthy ecosystems could provide vital solutions for climate change, where wetlands are a key component. Wetlands help reduce atmospheric carbon dioxide by acting as carbon stores with housing many green plants and algae and accumulate carbon in soils. Secondly, these habitats reduce adverse impacts of changing climates: help cycling of water, replenish ground water and ameliorate the effects of natural hazards of floods and droughts. Cooling effects of wetlands reduce urban "heat island effects". The present study intends to explore a range of solutions to combat climate change by including school children in the action loop in conservation of wetlands.

Methodology approach

Sri Lanka Water Partnership (SLWP), a network of water professionals initiated a multi approach project on conserving wetlands. The project carried out eco sociological surveys in many urban wetlands in the Colombo district. Many wetland conservation programme are being implemented in the country including the governments and NGOs focusing on different sectors in the society. Yet, we found that a key stakeholder is missing in the loop of conservation action: Leaders of tomorrow, the school children and a novel programme is initiated to address the gap.

Analysis and results

The following actions are some highlights of the school programme, which are being successfully implemented by SLWP:

The SIT-IN (School Initiative for Training, Interaction and Networking for wetland conservation) programme provides a base for enhanced involvement of school children:

Training programmes in wetland sites to demonstrate how these habitats help reducing "carbon issues" supplemented with educational programmes to enhance knowledge about how climate change could be reduced by sustaining healthy wetlands

Interactive sessions where school children presents their experience as posters, poems, essays

Networking opportunity – distribution of wetland conservation newsletter among schools with ideas, experiences and suggestions

This programme is designed to enhance innovative ideas, critical thinking, interaction and knowledge sharing among students that will ensure the sustainability of wetland to act as a natural defense infrastructure to fight climate change.

Conclusions and recommendation

The preset project presents a platform for and encourages the younger generation to get involved in two key items in current development agendas: conservation of ecosystems and climate change. It was observed

that novel and interactive approaches in SIT-IN project made school children participate effectively and continuously in conservation programmes.

Presenter biography



Prof. Deepthi Wickramasinghe, University of Colombo, Sri Lanka

Professor Deepthi Wickramasinghe serves as the Head, Department of Zoology and Environment Sciences in the University of Colombo. She has more than 20 years of experience in the water sector in academia and in nonprofit organizations. Prof. Wickramasinghe held many positions in organizations both in national and international levels. She was the President of the Institute of Biology, Sri Lanka in 2010. She is a member of Programme Committee of Sri Lanka Water Partnership and a Regional Council member of Global Water Partnership. She is involved in several national and international level activities related to research and policy in water.

Pipiripau's Project: using PES for sustainable rural development in Brazil

Authors: Dr. Jorge Werneck Lima, Regulatory Agency for Water, Energy and Sanitation of the Federal District (Adasa), Brazil

Keywords

Development, governance, water conflicts, BMPs

Highlights

Pipiripau basin (235 km²) presents a significant water conflict between the sanitation company (water supply) and small farmers (irrigation). A Payment for Environmental Services program is used as an instrument to improve environmental conditions (water and biodiversity), but also to promote inclusive rural development and better governance in the basin.

Introduction and objectives

Pipiripau Project is part of the Water Producer Program, which seeks to implement soil conservation practices (BMPs), restoration of degraded areas, maintenance of back roads, and other actions in rural watersheds with water conflicts in Brazil. The main focus of the program is to improve water quantity and quality, but the impacts of the actions go far beyond this, integrating and including all in a real integrated land-use and water management (IWRM). The objective of this work is to present the implementation experience of this project and how it is fostering the sustainable rural development in the basin.

Methodology approach

The Project started with the articulation of the main local stakeholders involved with the basin management. A diagnosis of the basin highlighted the main problems to be addressed. An agreement was signed among 16 institutions, where the governance framework of the Project was defined. There are 7 working groups: (i) soil conservation; (ii) vegetation restoration; (iii) PES; (iv) restoration of the Santos Dumont canal; (v) project monitoring; (vi) education; (vii) communication. The mobilization of the farmers is made through open calls, but they have support to prepare their individual projects. Results will be analyzed considering more than what was predicted.

Analysis and results

- 380,000 native trees seedlings were planted (about 200 ha in restoration process);
- Terraces implemented in 1,400 ha; • Interventions in 134 km of rural roads; • 1,200 small water retention basins; • 1,858 transverse undulations; • Today, about 1/3 (200) of the basin farmers (590) are participating in the Project and receiving Payment for Environmental Services (PES); • 8 km of the Santos Dumont Canal were reconstructed (total length: 17 km); • Many events, visits, seminars were promoted involving farmers, technicians, journalists, politicians, students and others; • After only 5 years, it is not yet possible to scientifically verify any impact on water quantity and quality (watershed scale); however, at farm scale, people are satisfied and proud of being a Water Producer. • The first generation of farmers highlight the following benefits: more water for plants (resilience and production), less runoff, better roads, return of wildlife, microclimate improvement, feeling of being environmentally friendly, and others; • Many farmers have organized themselves into organic producer's associations, undergoing an ecological transformation; • Regarding governance, the project was fundamental in connecting the

small farmers with the water regulatory agency (Adasa) and the sanitation company (Caesb), that was crucial for overcoming the 2016-2018 water crises.

Conclusions and recommendation

1. The impacts of green infrastructure on hydrological processes are not always immediate and easy to measure, depending on the scale of the intervention and its relation with the area to be affected.
2. The result of the Pipiripau Basin Water Producer Project goes far beyond on the improvement of the quantity and quality of water that arrives for the sanitation company.
3. The synergy of actions between the 16 partners (institutions) and the farmers triggered the sustainable rural development in the Pipiripau basin, connecting people for achieving the 2030 agenda having water as the connector

Presenter biography



Dr. Jorge Werneck Lima, Regulatory Agency for Water, Energy and Sanitation of the Federal District (Adasa), Brazil

Dr. Jorge Werneck is an Agricultural Engineer (Viçosa University), MSc. Irrigation and Agro environments and PhD in Environmental Technology and Water Resources from the University of Brasília. He is currently the Director of the Federal District Regulatory Agency for Water, Energy and Sanitation. He has more than 20 years of experience in water resources including a career in the Brazilian Company of Agricultural Research (Embrapa) as Researcher in Hydrology. For the 8th World Water Forum he was representative in the Bureau of the International Steering Committee, vice-president of the Thematic Process Commission and member of the “Water and Development” group.

Innovation: Business as Unusual



ABSTRACT VOLUME

World Water Week, 25 - 30 August 2019

Water for society – Including all

Contents

Law for the last mile	31
Leaving None Behind: Innovative Approaches for Drinking-water, Sanitation and Hygiene	33
Water Diaries of the Poor	35
Extending services to the poor: creating creditworthy utilities	37
Agua del Sinai (Ecuador)	39
Defining the Last Mile – Piped Water to Every Home	41
Community-Governance action partnerships to attain SDG 6: A Lagos Slum	43
Microsoft's Pathway to Off-Grid Water: Majik Water	45
Enabling the Digital Transformation of Water Management through Data Science	46
Decentralized water purification using membrane filtration to improve community health	48
Water Wide Web 3.1: Circulating Urban Water System for Renewable	50
VeriSan: Accelerating sanitation scaling through mobile IT	52
The Implications of a Sustainable Source of Potable Water	54
Increasing Access to POU Water Disinfection with UVC LEDs	56
Innovation in Low-Cost Water Treatment using Conventional and Nanotechnologies	58
Building consumer-focused household sanitation solutions in Haiti	60
Providing Sanitation to Off-grid Areas: a Successful Story from Cambodia	62

Law for the last mile

Authors: Ms. Alexandra Campbell-Ferrari, The Center for Water Security and Cooperation, United States

Keywords

Law, accessibility, online, solutions

Highlights

RENEWAL is the first pan-African water and sanitation law platform and will change how law is revised, amended, implemented and enforced by creating an accessible evidence-base for responsive and problem-focused law-making. We expect to have started a similar platform for The Americas, starting with South America.

Introduction and objectives

Information about laws and policies is difficult to find and even harder to understand. This has allowed law and policy to become a political football, amended at changes in governing political parties rather than in response to periodic reviews that show weaknesses or failures in the law and policy. The objectives of RENEWAL are: 1. make information about governing laws publicly available, 2. to make information accessible and easier to understand so that all citizens can engage in law-making, and 3. set forth the evidence base that allows water to be understood and planned for across all sectors and jurisdictions.

Methodology approach

RENEWAL examines (collects, catalogues, analyzes, and evaluates) water and sanitation laws across 10 different nexuses - 1. agriculture, 2. natural resources and services, 3. energy production and use, 4. natural and manmade disasters, 5. sanitation, drinking water, health and hygiene, 6. infrastructure, 7. peace and conflict, 8. national security, 9. the global economy, and 10. governance and institutions - and from the international to the local levels. Our work is being conducted first in 5 countries - Cote d'Ivoire, Kenya, Nigeria, South Africa, and Sudan - with in-country research partners (universities, nonprofits, and law firms).

Analysis and results

The first stage was to collect and catalogue the laws governing across these 10 nexuses from the international to the local level. Based on the work completed, there is significant variation in the presence and robustness of laws governing certain nexuses from country-to-country. The different structures of governance also mean that the amount of law produced at the national level versus devolved to the local level differs from country-to-country. Researchers are currently completing the analysis stage whereby specific questions will be answered within and across each nexus. The analysis is an impartial discussion of how the law addresses the nexus and for the first time we will be able to compare and contrast how countries address the nexuses from a comprehensive source of evidence. Determinations of shortcomings, gaps, inconsistencies, unintended consequences and strengths are reserved for the evaluation stage where researchers are tasked with identifying opportunities for improvement as well as opportunities to share successes. This information will be published online in a free, accessible format for citizens, academics, governments, and other stakeholders.

Conclusions and recommendation

The Platform is a powerful tool by which citizens and other stakeholders can determine whether proposed laws and revisions are responsive to actual shortcomings in the law or political antics. It will allow citizens and stakeholders to be proactive in the identification of opportunities, implementation and enforcement of the laws and policies. It will allow stakeholders across countries to collaborate in legal innovation, like

scientists have for millennia. RENEWAL changes the future of law by driving awareness, engagement and innovation in a way that has not been possible before.

Presenter biography



Ms. Alexandra Campbell-Ferrari, The Center for Water Security and Cooperation, United States

Alexandra Campbell-Ferrari is the Co-Founder and Executive Director of The Center for Water Security and Cooperation. Alexandra teaches Water Law at the University of Maryland Carey School of Law and American University Washington College of Law, and previously taught Legal Research and Writing at The George Washington University Law School. Alexandra is a member of the U.S. National Drinking Water Advisory Council and Co-Chair of the Water, Wastewater and Waste Pillar for Denton's Smart Cities and Communities Think Tank. Before co- founding the CWSC she was a Fulbright Scholar in Spain researching water law in Spain and the European Union.

Leaving None Behind: Innovative Approaches for Drinking-water, Sanitation and Hygiene

Authors: Ms. Shubhangi Sharma, St Edmund College, Shillong , India

Keywords

Leaving no one behind, Innovative approach, Youth groups, Drinking water and sanitation, Shillong city of India

Highlights

A volunteer youth-groups approach was devised to make people aware of water-related issues of safe drinking water, water management, sanitation and hygiene. The groups consisted mainly of students who worked with people in their spare time. The approach has far-reaching impact and people have become more clean water conscious.

Introduction and objectives

Shillong, located in the midst of Himalayan landscape, has a population of 500 thousand people. It carries all the features associated with mountain areas such as marginality, isolation, fragility, ethnic diversity and resource heterogeneity. Traditional approaches have failed to deliver drinking water, sanitation and water management. With increase in demographic pressure, these systems have almost collapsed and have lost their element of sustainability. Two options were; improve these systems scientifically with modern technologies or to go all-out for dynamic, eco-friendly and sustainable approach. We opted for the latter. Gender mainstreaming was one of the guiding principles for the study.

Methodology approach

The water supply to Shillong city is untreated stored water collected from perennial mountain source. Water having bacteria and suspended matter, more severity during rainy season, make people suffer from water-borne diseases like cholera, typhoid, dysentery and diarrhoea. Different locality-wise youth-groups were formed to work with the people and make them aware of the importance of safe drinking water, hygiene and sanitation. Whole city has been divided 10 zones with five sub-zones in each zone. The zones have no strict boundaries. Ten major youth-groups have been formed, dividing each major group to five sub-groups and allocating them each sub-zone.

Analysis and results

Recognizing the important role played by women in managing water, we designed a women empowerment component to trigger women's participation in decision making process and management of approach. Meetings held once a month helped to improve the capabilities of young-groups through a series of skill based discussions. Involving women as major stakeholders not only empowered them but also brought into the approach their knowledge and experience to ensure sustainability of water supply and sanitation interventions. The results of the approach undertaken showed that the access of people to safe drinking water, hand wash, sanitation and hygiene has increased and made the people, more so women, conscious of 'WASH'. This has been found to be linked with improved human rights too. Active participation of men and women in the decision making of the type of water and sanitation service installed, as also shared responsibility of managing the water and sanitation services, has improved environment. A focus on gender differences is of particular importance with regard to sanitation initiatives, and gender-balanced approaches have encouraged in plans and structures for implementation. Simple measures, such as providing schools with water and latrines, has helped girls in being healthy, especially after they reach puberty.

Conclusions and recommendation

With the involvement of all the stakeholders in our approach, no one has been left behind in getting the benefits of our novel approach of making people aware through youth groups with regard to sanitation, hygiene, water management and access to safe drinking water. Volunteer youth groups were more acceptable to the people over the traditional government approaches and had better understanding with the women, who are the real decision makers as far as sanitation and water related issues are concerned. The changed behavioral attitude of the people towards sanitation and judicious water management is testimony to this.

Presenter biography



Ms. Shubhangi Sharma, St Edmund College, Shillong, India

Shubhangi Sharma holds a Bachelor's degree in Biochemistry. She's a 22 year old water activist from the Northeastern state of Meghalaya, India. Built a network of about 200 young water leaders who were mostly concerned college students, to address various issues of potable water availability, waste disposal, reducing the use of plastic bags, sanitation & menstrual hygiene. Over the last four years the group has conducted a number of campaigns promoting the use of safe drinking water and water harvesting among others, in slum areas, villages, schools and colleges in the state.

Water Diaries of the Poor

Authors: Dr. Sonia Hoque, University of Oxford, Bangladesh

Keywords

Affordability, diaries, culture, gender, poverty

Highlights

Daily water diaries provide insights into the choices of poor people in water insecure environments in Bangladesh, Ethiopia and Kenya. Common assumptions which inform global monitoring of affordability, water quality and reliability are challenged. Gendered inequalities, cultural norms and climate risks identify issues and opportunities to leave no one behind.

Introduction and objectives

Little is really known of the daily water choices of the poor. This matters for global monitoring, national planning and local service delivery to meet SDG6.1. Do people always use and prefer improved drinking water sources? Are they affordable all the time? Does water quality affect choices? Do cultural norms, gendered inequalities and rainfall variability influence choices? A water diary method is administered in Bangladesh, Ethiopia and Kenya to document the sources, volumes and cost of water collected with weekly expenditure data. Qualitative methods explore the choices made in each cohort to understand the reasons for behavioural change and policy responses.

Methodology approach

We designed a water diary method to document the sources, volumes and cost of water collected by households every day, along with self-reported changes in sufficiency by consumptive, hygiene and productive uses. It also collates weekly household expenditure data to explore variation in payment behaviours across food, farming, health, education, transport, energy, water and other domains. This method is being implemented across four sites (two urban and two rural) in Ethiopia, Kenya and Bangladesh, with 100-120 households being studied for a one-year period in each site.

Analysis and results

Limited public provision of safe and reliable water supplies cause resource-constrained households to experience trade-offs in quality, costs and collection distance. Findings reveal different payment behaviours with significant proportion of households in rural environments never using paid sources, while others shifting to free alternatives following rainfall events. In urban contexts, unreliable piped supplies lead to frequent purchase of water from neighbours or vendors, along with occasional use of surface or rainwater during the wet season. Analysis of diary data in combination with interdisciplinary evidence from infrastructure mapping, rain gauges, household surveys and qualitative interviews suggest multiple environmental, infrastructure and cultural drivers at play. Rainfall and seasonal variation in water levels, water point breakdowns, proximity to alternate sources, periodic income shortfalls and differential priorities for expenditures are among the underlying factors shaping trade-offs in decision making. While women are primarily responsible for water collection across all settings, gender inequalities are particularly stark in rural Kenya, where women and children carry heavy loads for long distances in arid conditions as men migrate to towns for work.

Conclusions and recommendation

Diaries can complement existing national and global monitoring systems for SDG6.1. To leave no one behind it is necessary to understand and respond to the priorities of the poor. The choices of the poor are shaped by cultural, economic and environmental factors, not simply by differential access to water infrastructure.

Gendered inequalities remain pervasive and demand new thinking and investments in alternative institutional approaches rather than to keep building infrastructure. Understanding and addressing affordability by drinking service levels can better uncover the existing socio-spatial inequalities and guide innovative technological and financial mechanisms to reach those left behind.

Presenter biography



Dr. Sonia Hoque, University of Oxford, Bangladesh

Sonia Ferdous Hoque is an environmental social scientist, currently working as a Postdoctoral Researcher in water security and society for the REACH programme at the University of Oxford. Her research focuses on the environmental, financial and social risks to drinking water services in Bangladesh, Ethiopia and Kenya, with particular interests in exploring the socio-spatial inequalities in household water security and wellbeing.

Extending services to the poor: creating creditworthy utilities

Authors: Ms. Lesley Pories, Water.org , United States

Keywords

Utility finance, water service provider finance, Southeast Asia, assistance, utility strengthening

Highlights

- Financial management and marketing support to rural and urban utilities in Southeast Asia has resulted in doubled monthly revenue and approval for government funds – a first step towards securing private investment
- Utilities assign highest value to the assistance with bookkeeping and business plan development
- Utility improvements are encouraging domestic replication

Introduction and objectives

Water.org has been working with urban and rural utilities since 2014 in efforts to build their ability to access finance and thereby extend service coverage deeper into low-income populations. These efforts have evolved over time into distinct programs: 1) rural (CBOs) and 2) urban (PDAMs) in Indonesia, and 3) public rural and private urban in the Philippines. The scope is limited to existing partner utilities of Water.org, as it uses examples from all 4 programs to extract major takeaways of benefit to anyone working to increase the efficiency and service delivery of utilities in the region and possibly beyond.

Methodology approach

The research questions focus on what types of assistance the partner utilities have found to be the most valuable to driving improvements that 1) advance them towards financial self-sufficiency as well as 2) position them more favorably when evaluated by potential investors. Semi-structured Interviews with utility managers, as well as the Water.org teams assisting them, form the core of the data, in addition to recorded revenue and documentation regarding successful or unsuccessful applications for finance.

Analysis and results

A lot of discourse around making utilities credit-worthy focuses upon technical efficiency gains such as the reduction of Non-Revenue Water (NRW) – water lost via leakage or illegal siphoning. However, because investors are generally risk-averse, successful applications for investment hinge upon the demonstration of solid financial management and administration. Consequently, financial and administrative management assistance, including marketing, is where participating utilities found maximum benefit. Public rural utilities valued assistance in developing business plans that helped establish targets for client acquisition and monthly revenue goals. They also valued training in client acquisition outreach techniques - as a public utility, marketing their services to attract more clients was not in their strategy. Urban utilities similarly highlighted the assistance received in administrative activities such as the development of Standard Operating Procedures for financial service offerings, financial recordkeeping and reporting, and human resources recruitment – best practices that helped them appear more credible to financial investors – in addition to guidance developing internal payment facilities for customers. Private utilities valued assistance with concept design for developing digital payment and loan application platforms, the establishment of which would drive down personnel costs for loan collection and appraisal and facilitate extension into low-income communities.

Conclusions and recommendation

Participating study utilities overwhelmingly value financial and administrative management assistance. It is easy to forget that utilities, when operated as a public service, do not think like companies that require

business plans, marketing and outreach strategies, or SOPs for recordkeeping, and these are the areas where a little investment goes a long way. Additionally, stakeholders should have realistic expectations and not expect all utilities to go directly from operating at a loss to securing private investment – successfully receiving grant funds from the local government, for example, can be a great indicator of progress.

Presenter biography



Ms. Lesley Pories, Water.org
Water.org, United States

Lesley Pories is Manager of Sector Strategy at Water.org. Before joining the team that builds Water.org's strategic relationships with sector influencers on global stages as well as at country level, she managed part of Water.org's portfolio in India. Lesley's previous work experience includes the World Bank, World Resources Institute, UNDP and the Carter Center. She holds degrees in City and Regional Planning as well as International Environmental Resource Policy.

Agua del Sinai (Ecuador)

Authors: Mr. Frederic CERTAIN, Interagua, Ecuador

Keywords

Responsibility, Smart Technology, Efficiency, Solidarity, Fair pricewater supply

Highlights

The Guayaquil water supply system does not cover the “Monte Sinai” informal settlements. In 2018, Interagua started the “Agua del Sinai” project, to organize the management of water tankers supplying water to the 120.000 inhabitants using smart technology, improving the customer service, and reducing the price charged to the households.

Introduction and objectives

The project seeks to improve the efficiency of the water distribution through use of water tankers to the population in a modern, secure and friendly way, using intelligent routes of water distribution and GPS control that guarantees the coverage and timeliness for the inhabitants. Rates can be reduced by 25%, while expanding the service quality. The construction of a loading station within a reasonable distance from the community guarantees efficient service and improves the water tankers’ performance. The Guayaquil Municipality, Interagua-Veolia, the guild of water tankers transporters, neighborhood leaders and the community are strongly involved in the project.

Methodology approach

A census is done in Monte Sinai in order to know the (a) number of inhabitants; (b) water consumption per family; (c) supplying frequency; (d) prices. This information is needed to optimize the routes of water distribution.

Water tanker operators are trained and their trucks duly identified. A subsidy to the water tankers is initially paid by Interagua to promote the operation.

Community leaders are informed about the regulation, new scheme, supply routes, schedules and the rate. The deployment starts, with the construction of the filling station and the positioning of each water tank using applications with Smartphones.

Analysis and results

In two months of operation (the first 2 phases), 18,711 inhabitants have benefited from the 25% price reduction for their potable water, with an increase in quality and continuity of service. The new distribution scheme increases in efficiency by 75%, the daily trips per water tank from 4 to 7 trips, and having shorter routes, which allows a lower and more sustainable price with improved customer service.

In the zones already covered with the new system, 100% of vehicles that distribute potable water in the coverage area are duly controlled, ensuring the adherence to the assigned routes and the continuous coverage of the zone. The supervision is implemented using a handling and control room and a mobile phone application where each tanker describes and records each transaction.

Several communication channels have been established, in order to attend to the requirements of the Monte Sinai inhabitants, who have no direct relation with the company prior to the project.

Conclusions and recommendation

With the municipal regularization program, the city aims at including communities which are currently in unfavorable economic situations and not covered with services and water networks. The “Agua del Sinai” project concretely embodies this aim by designing an alternative coverage for informal population settlements and professionalizing the distribution of potable water through use of water tankers, ensuring

continuity of service at a fair price. The authors want to highlight the collective, bottom-up, commitment of the Municipality, the operator staff, the community and the local providers, to design and implement this solution.

Presenter biography



Mr. Frederic CERTAIN, Interagua, Ecuador

Mr. Frédéric CERTAIN serves as CEO at Veolia-Ecuador since 2017. Previously, Frédéric held various managing position with Veolia Water in Spain and France. From 1985 to 1989, he was with Agronomic Research Institute IRSTEA (in France) developing hydraulics numerical application. He also worked at the Food and Agriculture Organisation (FAO) in Rome. Mr CERTAIN graduated from Agro-Paris Tech (Engineering school).

Defining the Last Mile – Piped Water to Every Home

Authors: Ms. Marla Smith-Nilson, Water 1st International , United States

Keywords

water supply, household taps, water use, health, gender equality

Highlights

- People need 50 l/c/d to maintain a healthy environment
- There are clear patterns of water use associated with different service delivery approaches
- The only service delivery approach that comes remotely close to meeting the established health standard of 50 l/c/d is household level service provision

Introduction and objectives

Water1st has funded different variations of piped water networks around the world for 12 years. In our follow-up monitoring, one pattern has been highly consistent across continents. When water supply is on-premises, consumption is 100+ liters of water per day per household. When water supply is derived from a shared water distribution point, use falls dramatically to 25 liters per day per household or less. The WHO recommends a service level of 50 l/c/d to ensure users have sufficient water for consumption and hygiene purposes. Our data suggests that household water supply is the only way to achieve this standard.

Methodology approach

Water1st-funded projects are entirely household level service or a combination of household level service and shared distribution points. Shared distribution points are designed with multiple taps to reduce queuing time. The projects with the combination of service delivery approaches are particularly interesting from an evaluation perspective. With most operational variables held constant, one can more confidently draw conclusions about the relationship between on-premises water supply and water use. Using meter readings at the point of use, Water1st's monitoring protocol includes calculating volume of water used per person and compares it to established standards for protecting human health.

Analysis and results

We analyzed meter readings from rural Ethiopian and Mozambican communities that have piped water service with a combination of household service and shared public taps.

- Households collecting water from shared distribution point use 25% of the volume compared to households with on-premise water service.
- Households with on-premise service use an average of 75 liters per day
- Households with on-premise water use share in the capital cost for connecting to the system and pay a monthly water bill based on volume of water used.

Our experience to date has led us to believe that we need to approach water systems in low-resources settings using the same best practices as the developed world with the goal of 24/7 water service on-premise. We believe progress in the WASH sector has been unequal and exclusive, not been because of lack of innovation, but because we are not giving users the opportunity to have the same service level that the developed world expects. Household level water service meets our public health goals and also eliminates the burden of water collection, which is primarily borne by women and girls.

Conclusions and recommendation

Households need 150-300 liters of water per day to effectively practice the hygiene behaviors required to maintain good health. Based on the data collected from project participants in multiple countries, Water1st has concluded that there is only one approach that will reliably lead to that level of water use: household

level water service. We predict that any other approach will result in dramatically lower (25% of the goal) use, which will result in ongoing health challenges for the community and reduced productivity.

Presenter biography



Ms. Marla Smith-Nilson, Water 1st International, United States

Marla is the founder and Executive Director of Water1st International based in Seattle, USA. A respected leader in the water sector, Marla is a civil engineer who brings more than 25 years of hands-on field experience with water supply and sanitation projects in developing countries. She is an expert in identifying and partnering with on-the-ground implementing organizations. Throughout her career, Marla has remained steadfast to her mission to advocate for and support effective international development—supporting local, long-lasting solutions to the water and sanitation crisis.

Community-Governance action partnerships to attain SDG 6: A Lagos Slum

Authors: Ms. Belynda Petrie, OneWorld Sustainable Investments, South Africa

Keywords

Urban supply, quality, women & children, health, Africa's megacities

Highlights

- Youth-centric inclusive approaches are integral to increasing awareness of the water-health nexus crisis in Africa's mega cities
- Polluted water in dense urban spaces affects the hygiene of women and girls the most
- The most highly affected must own the clean and safe water agenda – this is central to achieving

Introduction and objectives

Africa's rapidly-growing mega cities such as Lagos (pop. ~21 million) are enormously challenged to scale up their almost universally inadequate water infrastructure to ensure that clean and safe water is accessible to all. Women and children (especially girls) are the most adversely impacted, with many dropping out of school once they begin menstruating, due to poor sanitation. Lack of awareness around hygiene/sanitation means that people often use water sources, used for fishing, as defecation sites. The project attempts to use arts education to engage and educate school-children around water and sanitation issues, in a project to 'tell their water stories'.

Methodology approach

An inclusive partnership between a slum community and Nigeria's Ministry of Health, sees 500 school children each illustrating a donated jerry can with their daily water issues/requirements. A multidisciplinary expert team (e.g. water, health) analyses the emergent patterns of inequality, loss of education and governance. These are communicated with the children. The same children illustrate a further 500 cans with their respective visions of a different water future for themselves/their communities, highlighting the positive impacts of improved water quality, hygiene and education and the pathways for attaining these. Expert analysis reflects a Lagosian community in an SDG6-positive world.

Analysis and results

Current behaviour and governance patterns have severe impacts on health (e.g. gastroenteritis), education (e.g. school drop-outs) and family welfare (reduced incomes). However, many of these impacts are self-inflicted. Children living in the Makoko slum, built over water, prefer to use the jetty to defecate rather than available toilets as it is easier to do so. Exploring their water stories through art enables the children to engage with issues of contaminated water and the cause and effect pathways. In turn, this helps them to envision a different water future and understand how changing their own behaviour can empower them to influence change and accelerate its pace. Their enhanced insights into the links between clean water, improved hygiene and enhanced education opportunities promotes behaviour change, greater gender equality and a better way of

Through individually painting jerry cans and collectively illustrating boats, children learn that a different future is possible, partly enabled by alternative behaviours. They are encouraged to engage in community work to filter the lagoon water and are taught techniques for cleaning the water (e.g. allum, charcoal etc.). Although infrastructure remains inadequate, empowered communities, who own the safe water agenda through decentralised solutions, promote SDG 6.

Conclusions and recommendation

Arts education is an inclusive means of translating water and health issues into tangible messages, stimulating behaviour change and raising awareness of solutions. Youth and households that understand the impacts of their choices are empowered to adopt healthier practices. This is the highest possible resolution of decentralised water resource management and is key to joint action in community partnerships with Lagos' governance and institutions for promoting SDG 6 – neither party

Educators and curricula incorporating the outcomes promotes sustainability; comprehension of cause and effect pathways – and how to change them through healthier practices is thus institutionalised.

Presenter biography



Ms. Belynda Petrie, OneWorld Sustainable Investments, South Africa

Belynda Petrie is an expert and leading figure in climate change and water resource development. She has pioneered a systems analysis approach to water, energy, climate change and food nexus issues in the developing world. Her strength lies in pulling together multidisciplinary teams to deliver large, or complex projects. Belynda is an author of numerous research paper policy briefs, strategies, books and peer reviewed articles in the fields of water, energy and climate change/finance and is a frequently invited speaker at international conferences. She currently leads a sustainable development consultancy based in South Africa.

Microsoft's Pathway to Off-Grid Water: Majik Water

Authors: Dr. Priscilla Johnson, Microsoft, United States

Keywords

Cape Town, Water Crisis, Air-to-Water Generation, Entrepreneurship, Off-grid solution

Highlights

Cape Town's Water Crisis prompted Microsoft to deliver an innovative strategy to provide water for its operations that would not impact the region's drinking water

Introduction and objectives

In January 2018, Cape Town declared a state of emergency that began a countdown to Day Zero, the day the taps would be shut off. In 2018, Microsoft committed to delivering cloud services through its Africa Hyperscale launch. We had to find an alternative solution to potable water usage. During SWWW 2018, Young Water Solutions introduced Microsoft to Majik Water, an Imagine H₂O Urban Drinking Water Challenge winner. Microsoft engaged them to conduct what has now become a successful off-grid solution in Cape Town.

Methodology approach

Microsoft engaged Majik Water by conducting a Technology Readiness Level (TRL) review of their atmospheric water generation (AWG) approach. This methodology allowed us to decide whether or not the AWG was a good fit from a capacity and engineering level for our site.

Analysis and results

As of January 2019, Majik Water has installed and commissioned a successful off-grid solution in Cape Town.

Conclusions and recommendation

Feeder organizations such as Young Water Solutions and Imagine H₂O do important work to highlight entrepreneurs with creative approaches. The platform that SWWW provides is excellent to connect entrepreneurs to corporations like Microsoft that can catapult them to the global stage and amplify the good work that smaller businesses are attempting to solve in their local areas.

Presenter biography



Dr. Priscilla Johnson, Microsoft, United States

Priscilla Johnson, Ph.D., LEED AP O+M, is Director of Microsoft's Datacenter Water Strategy. With an enduring passion for the environment, she enables organizations to achieve sustainable growth. As an inventor, she launched a line of eco-friendly, plant-based cleaning products in 2009 to help protect consumers and aquatic life from harsh cleaning chemicals.

Dr. Johnson holds degrees from NYU (B.S.) and Purdue (M.S., Ph.D.) in Civil and Environmental Engineering and is a LEED AP.. Her experience spans environmental remediation to promoting energy efficiency at a major US utility. She believes that cloud services can be provided without depleting our natural resources.

Enabling the Digital Transformation of Water Management through Data Science

Authors: Mr. Paul Fleming, Microsoft, United States

Keywords

Digital transformation, artificial intelligence, data

Highlights

This session will highlight Microsoft's AI for Earth program and describe how the program is enabling organizations to use artificial intelligence to address challenges in four areas, including water.

Introduction and objectives

Highlight how data science techniques can be and are being utilized to generate new insights, inform decision making, and improve sustainable management of water resources. We will also explore what situations particularly lend themselves to a data science approach and what are key building blocks for successfully deploying data science, which seminar attendees can use to assess potential data science applications in their own work.

Methodology approach

Microsoft established the AI for Earth Program to put the Microsoft cloud and AI tools in the hands of those working to solve global environmental challenges related to biodiversity, agriculture, climate change and water. The 5 year, \$50 million Program builds on Microsoft's mission to empower every person and every organization on the planet to achieve more and aligns with our strategy to partner and enable. As such, this session will focus on how Program grantees have enhanced their capacity to use data science to address water challenges and opportunities.

Analysis and results

Nearly 200 grants in 50 countries have been awarded since the AI4E Program was announced just over a year ago; approximately 40 of those grants have been for water projects. The level of interest in the Program is one indication of the appetite that exists to explore how data science can be brought to bear to advance solutions to some of the world's most pressing environmental challenges. At the same time, the Program is still in its infancy and there exists significant potential to deploy data science to truly transform the sustainable management of water resources.

Conclusions and recommendation

The proliferation of data provides an opportunity, if not the imperative, to determine how and when to deploy data science techniques that can best leverage the increasing deluge of water and related data; generate new insights, products and services; and help transform water resources management in order to achieve SDG6.

Presenter biography



Mr. Paul Fleming, Microsoft, United States

Paul is the Corporate Water Program Manager for Microsoft where he is responsible for developing and implementing the company's water stewardship strategy. Previous to joining Microsoft, had extensive experience working on strategic, policy and technical issues in the water utility sector. Paul worked for the Seattle Public Utilities where he directed the climate resiliency group, focusing on building partnerships between research groups and utilities to build capacity to assess and prepare for the impacts of climate change.

Decentralized water purification using membrane filtration to improve community health

Authors: Dr. Jochen Raimann, Easy Water for Everyone, United States

Keywords

Membrane filtration, health outcomes, diarrhea, acute kidney injury, developing countries

Highlights

Provision of a membrane filtration device has the potential to significantly improve health outcomes within rural communities drinking contaminated water.

Introduction and objectives

In rural communities in regions with limited resources the provision of clean water remains difficult. Fecal contamination of water is very common and results in a high incidence of diarrhea, subsequent acute kidney injury and mortality particularly in the very young and old. Membrane filtration is a practical solution to this problem and a recent innovation allows membrane filtration using recycled hemodialyzers. We, Easy Water for Everyone (www.easywaterforeveryone.org), have attempted to quantify the systematic effect on health outcomes of providing clean water.

Methodology approach

Between 06/2015 and 12/2018, 17 communities in rural Ghana (Ashanti-Ghana and Greater-Accra region; village size ranging in size from 5 to 591 people) were provided with high-volume membrane filtration devices (NUF 500; NuFiltration using recycled dialyzers). Health data from household surveys and chart review in local healthcare facilities were collected with approval from Ghana Health Services. Specifically, data was collected on gastrointestinal disease, acute kidney injury and therapeutic interventions. Incidence rates for 12 months periods before and after implementation of the device were calculated.

Analysis and results

Data from 3611 villagers from the 17 studied communities in rural Ghana (around 13% 5 years or younger and 6% older than 65 years) were included in this analysis. The overall incidence rate of diarrhea showed a declining trend following the implementation of the filtration device in the village structure and was reduced from 1.5 to 0.8 cases per 1000 person days from the before to the after period. Further analyses of rate reduction and multi-level time-series analyses are currently underway.

Conclusions and recommendation

Provision of a membrane filtration device has the potential of significant improvements of health outcomes within rural communities. While our data requires a larger sample size and further statistical analyses accounting for village characteristics, seasonality and subject demographics, the obvious decline in incidence rates supports widespread use of membrane filtration devices, particularly in rural regions. Multi-level longitudinal analyses will even further increase our understanding in terms of risk and preventive factors.

Presenter biography



Dr. Jochen Raimann, Easy Water for Everyone, United States

Dr. Raimann holds a medical degree from the Medical University Graz, a PhD from Maastricht University, and a Master in Public Health from the City University of New York School of Public Health. As the Senior Manager of Clinical Data Analytics at the Renal Research Institute Dr. Raimann conducts and directs epidemiological research in dialysis and currently also teaches biostatistics at Yeshiva University. Dr. Raimann joined the foundation of the non-profit organization “Easy Water for Everyone” (www.easywaterforeveryone.org) which provides clean water to communities in need and supports the organization’s research efforts together with a diverse team of researchers, epidemiologists and statisticians.

Water Wide Web 3.1: Circulating Urban Water System for Renewable

Authors: Mr. Odwa Ntsika Mtembu, Department of Water and Sanitation South Africa, International Water Association, United Nations Office for Disaster Risk Reduction , Water Youth Network World Merit South Africa, South Africa

Keywords

Decentralised, energy, water, cities

Highlights

It is important to have other sources of energy; both wind and solar energy have consistency limitations and therefore we need the above effective storage and distribution system coupled with heat recovery and energy generation from water as it flows from the source, to households and back to the source.

Introduction and objectives

Optimisation of energy circulation from utilised urban water sources to develop self-supportive cities and islands on decentralised water and energy systems.

Problem statement: Lack of other sustainable energy sources to be used in the near future to develop self-supportive cities and islands on water and energy with a 100% reliable sustainable energy supply.

Research questions:

- How can we realize this 'Water Wide Web' considering the fact that the infrastructure in Amsterdam is very dense, but centrally organized?
- What are the first steps according to you to store energy on different levels and how can we decentralize our energy supply?

Methodology approach

Storage:

At household level we use the Blue Battery to store energy generated by Solar panels and other renewable resources. The blue battery is more efficient storage system which is 100% sustainable. It consists of water and table salt and it provides an eco-friendly system of storing energy.

On new development areas or cities with less intense infrastructure underground, Ecovat systems can be used as thermal reservoir for underground storage.

Reuse and Recycling:

Waste water from the households contains a lot of wasted heat. Heat from wastewater can be reused by using a SHARC-System which is a heat exchanger on a larger scale.

Analysis and results

Designed circulated Energy System

Production and distribution:

In the SWWTP the solids and the waste water are collected to generate energy on a smaller scale than a normal WWTP. This energy will be stored in a so-called Molten Salt battery and can be distributed wherever there is demand for energy. Molten Salt battery (tanks) are ideal both for new development areas and can easily be connected to existing infrastructure.

Energy Security: Energy productions for Buiksloterham - 10 TJ/year for 2000 households with 4 TJ retrieved from WWTP , 5 TJ from Heat Recovery system and 1 TJ from other sources.

Energy Equity: Flexible storage capacity, decentralised and centralised energy storage and distribution scales.

Environmental sustainability: High quality renewable energy, reuse and recycling waster networks, easily disposable batteries

Conclusions and recommendation

For 2040, cities like Amsterdam has the ambition that all the energy used in the city comes from renewable resources. The energy demand is growing and water companies like Waternet has developed the sustainable development plans to increase the pace of improving sustainability in Amsterdam, which has the 2020 goal to be climate neutral concerning with CO₂. This includes seeking ways to decentralise energy from water sources but the lack of other sustainable energy sources to be used in the near future to develop self-supportive cities and islands on water and energy with a 100% reliable sustainable energy supply.

Presenter biography



**Mr. Odwa Ntsika Mtembu, Department of Water and Sanitation South Africa
International Water Association, United Nations Office for Disaster Risk
Reduction, Water Youth Network, World Merit South Africa, South Africa**

Mr Mtembu is the co-founder and President of World Merit South Africa and Southern African representative for the African World Merit Network. His alma mater is the University of Cape Town where he majored in Geology, and Environmental and Geographical Sciences. He is currently a Master of Science candidate at the University of The Witwatersrand, Republic of South Africa, where he is conducting research focused on issues relating to geomorphological disasters by integrating water, climate change, land use and cover change, and geomorphological issues especially in areas with intense agricultural activities.

VeriSan: Accelerating sanitation scaling through mobile IT

Authors: Ms. Mary Roach, Container Based Sanitation Alliance, Loowatt, United Kingdom

Keywords

Reporting, capacity, inclusive, affordable, IT

Highlights

The Container Based Sanitation Alliance is developing a mobile application and web-based platform to support the efficient delivery of household sanitation across multiple countries and to enable the growth and replication of affordable and safely managed CBS services for all.

Introduction and objectives

The Container Based Sanitation Alliance is developing a mobile application and web-based platform to support the efficient delivery of inclusive sanitation across multiple countries and to enable the growth and replication of CBS services. The platform will address customer relationship management, billing and mobile payments, and tracks the safe disposal of waste from household to treatment. It is creating scalable management, operational and reporting capacity through the provision of IT systems to CBS providers and government counterparts. We will share practical lessons learned (from Antananarivo, Cap Haitien, Naivasha and Lima) while developing the platform and invite peer inputs from audience members.

Methodology approach

Container-based sanitation (CBS) consists of an integrated, end-to-end service that collects waste hygienically from waterless toilets built around sealable, removable containers, and transports the waste for safe disposal or treatment and transformation into valuable end-products. Building off the experience of its members, the CBSA is developing a mobile application and web-based platform (called VeriSan) to consolidate existing technology and develop a platform and application that is modular yet customisable. The development and trial of the system is funded by the latest GSMA M4D. System development has been led by a Ghanaian IT company.

Analysis and results

The phases of the development process include:

- Discovery phase – data collection to assess current IT system functionality (i.e. strengths and weaknesses), essential required features, and to understand the status and potential for mobile payments (May-June 2018)
- Consolidation and technical specification – Identifying various modules to be integrated, or agreeing a build-from-scratch approach, using group knowledge. Technical specification / platform architecture development (June-July 2018)
- Software development and testing – Agile development with modules released for user acceptance testing on an on-going basis. Trials with CBS providers in Madagascar, Kenya, Peru, and Haiti (August 2018-January 2019)
- Full trial and roll-out – Incorporation of feedback and peer inputs (February-September 2019)
- Lessons gathering – parallel activity running throughout. This proposed presentation will share lessons learned to date and elicit inputs from other FSM/CBS providers. The project will impact all the low-income customers of the four partner organisations. In December 2017, an estimated 2,120 households were being serviced by the pilot partners and this is estimated to grow to 6,400 by early 2019.

Conclusions and recommendation

CBSA organisations have experimented with off-the-shelf or custom-built applications; however, each has identified challenges with their existing systems - they require extensive customization and are prohibitively expensive. The VeriSan platform will help accelerate the adoption of operational best practices across CBS providers and support the uptake of services by others. The platform will be used to provide stakeholders (government, donors, mobile industry) real-time information on financial sustainability and service quality (e.g. collection efficiency and waste removed). This information can inform future policies, target investment to reach the poorest, or develop financial products (e.g. results-based financing) to facilitate service scaling.

Presenter biography



Ms. Mary Roach, Container Based Sanitation Alliance Loowatt, United Kingdom

Mary Roach is the Chief Operating Officer at Loowatt, a waterless toilet company based in the UK. Previously, Mary worked for: Ceniath, a single-family office, where she was responsible for their energy access portfolio; GSMA's M4D Utilities Innovation Fund supporting organizations leveraging mobile technology to improve access to energy, water and sanitation; M-KOPA to create a pay-as-you-go product; GE Power Generation; and a decade of involvement with Engineers without Borders Canada at home and abroad. She holds an MBA from Oxford University and a Bachelors in Chemical Engineering from McGill University.

The Implications of a Sustainable Source of Potable Water

Authors: Mr. Joseph D’Alba, Sun Fresh Water, LLC , United States

Keywords

Innovative, sustainable, water purification, system

Highlights

A discussion of the implications of a sustainable source of potable water for health, immigration, and global warming.

Introduction and objectives

Sun Fresh Water, LLC, in partnership with the City University of New York, has developed a system that replicates the Earth’s natural process of fresh water production. Within the framework of a clear acrylic tube water containing saline, and/or other contaminants is introduced and the Earth’s vaporization/condensation process utilizing solar energy is duplicated, similarly producing potable water. The inexpensive, portable, and scalable characteristics of the system make it ideal for use by the people in greatest need for potable water – those disenfranchised, geographically isolated, economically marginalized, and the least vocal members of the human community.

Methodology approach

As mankind advances into the 21st Century we are faced with unprecedented opportunities as well as challenges. While these opportunities provide the promise of great advances, the challenges, resulting from the consequences of a rapidly increasing population within a finite ecosystem, threaten our social fabric, civility and the prospect for the health, vitality, and continuity of the human race. This article will explore the implications of a sustainable source of potable water for three of the greatest challenges facing us today – health, migration, and global warming.

Analysis and results

The genesis of the article is found in the development of the solar powered water desalinization and purification system under development by the City University of New York and Sun Fresh Water, LLC of Ormond By-the-Sea, Florida. See www.SunFreshWater.com. This system is a portable, inexpensive, scalable and easy to use and maintain water purification system. Recently this system has been awarded Patent Protection by the United States Patent Office at numbers 10150049 and 10150050.

The simplicity of this system is found in its replication of the earth’s natural system of potable water production via vaporization and condensation within the framework of a clear acrylic tube wherein the Earth’s vaporization/condensation process utilizing solar energy is duplicated producing potable water .

Water is the necessary for human existence along with food and air. Little water is left on Earth that is safe to drink without purification. Only 1% of Earth's water is in a fresh, liquid state, and nearly all of this is polluted by diseases and/or toxic chemicals. For this reason, purification of water supplies is extremely important.

The inexpensive, portable, and scalable characteristics of the system make it ideal for use by the disenfranchised people in greatest need for potable water.

Conclusions and recommendation

The implications of a sustainable source of potable water on the issues of health, immigration, and global warming are profound. This article seeks to call attention to the importance of a sustainable source of potable water to address these issues and to initiate a dialogue about this often-ignored potential solution. This article will introduce utilizing a sustainable source of potable water to address these issues, the challenges involved with implementing this solution, and it hopes to serve as a starting point for discussions

regarding enhancing the health, civility, and perpetuation of humanity through a sustainable source of potable water.

Presenter biography



Mr. Joseph D'Alba, Sun Fresh Water, LLC, United States

Joseph D'Alba is the President of Sun Fresh Water, LLC. In partnership with the Center for Advanced Engineering Design and Development of The City University of New York, they have developed a proprietary solar powered desalinisation system that is inexpensive, sustainable, scalable, easy to use and maintain, and of high production. They are now developing a system to convert deserts to agricultural production.

The topic that he will be addressing is 'The Implications of a Sustainable Source of Source of Potable Water'. These implications include addressing the global challenges of health, hunger, migration, water wars, and climate change.

Increasing Access to POU Water Disinfection with UVC LEDs

Authors: James Peterson, Crystal IS, United States

Keywords

UVC LED, water disinfection, Legionella, point-of-use, consumer safety

Highlights

New research from the University of Colorado Boulder and Crystal IS found that when applied to water flowing at a rate of over two liters per minute, UVC LEDs reduced key pathogenic organisms like *E. coli*, *Pseudomonas*, and *Legionella* levels by over 99.99 percent.

Introduction and objectives

An October 2018 vote on proposed water guidelines in Europe ruled in favor of more stringent quality standards for consumer drinking water, expanding monitoring and limits on certain pollutants, including *Legionella* in buildings and *Pseudomonas* in bottled water. These organisms, along with *E. coli* contamination, are critical target organisms for benchmarking technologies to assure safe dispensed or bottled water access across the globe. Crystal IS in conjunction with the University of Colorado conducted independent testing of the Klaran AKR, an on-demand UVC LED-based water disinfection reactor intended for long service lifetime consumer and commercial water purification.

Methodology approach

Utilizing a novel reactor chamber and product design suitable for low power, intermittent use, and long service life UV treatment of water at the Point of Use, the Klaran AKR with UVC LEDs was evaluated against three challenge organisms, *E. coli*, *Legionella pneumophila*, and *Pseudomonas aeruginosa* in dechlorinated tap water. Performance was evaluated by flowing the challenge solution through the AKR at flow rates between 0.5-3 Liters per minute to replicate consumer dispensing flow rate needs. Cultured plate counts of treated solutions are collected and summarized as results.

Analysis and results

UVC LEDs applied to water treatment through the use of the AKR reactor design were able to demonstrate greater than 4 Log Reduction Value of all target organisms at flow rates sufficient to provide water service to individuals and households. This performance enables UVC LED based water treatment to reduce waterborne pathogen risks while increasing access to treated water by requiring less power, low maintenance, and a lower cost of treatment overall than comparable POU UV lamp or cartridge systems. The target organisms selected reflect a range of leading water safety needs in both the developed and developing world, which experience challenges providing treatment directly before consumer consumption. *E. coli* serves as a primary indicator of microbial contamination from waste water in distribution systems. *Pseudomonas* serves to monitor the safety of bottled and stored water. *Legionella* currently leads to the highest health burden of any waterborne pathogen in the EU.

Conclusions and recommendation

UVC LEDs can serve as an effective treatment method at point of use flow rates against pathogenic organisms. The technology additionally supports novel and cost effective approaches to distributed treatment methods for municipal supplies, off-grid, and water challenged regions to improve consumer access to safe drinking water. The long service life and lowered capital costs of low flow solutions provide reliable, low power treatment for years upon implementation, which holds potential to greatly lengthen the timespan of impact of humanitarian efforts to improve water safety across the globe.

Presenter biography



James Peterson, Crystal IS, United States

James is responsible for the strategic direction of Crystal IS' products focused on water disinfection. He develops business models for UVC emitters and solutions and ensures product lines meet specific customer needs. Prior to Crystal IS, he co-founded Vital Vio, a company that designs, engineers and manufactures LED lighting systems that reduce bacteria and other organisms from at-risk environmental surfaces. James holds several patents in using light for disinfection and was named to the 2016 Forbes 30 under 30 list. He has a BS in Mechanical Engineering from Rensselaer Polytechnic Institute, New York.

Innovation in Low-Cost Water Treatment using Conventional and Nanotechnologies

Authors: Mr. Yolwin Jed Perales, Water Youth Network, Mindanao Mineral Processing and Refining Corporation, Philippines

Keywords

Water Treatment, Low-cost, Wastewater, Contaminated Water, Zeolite

Highlights

- In the Philippines, more than 20 million Filipinos rely on unsafe improvised water treatments for drinking water.
- Diarrheas and typhoid fevers are prevalent in the Philippines primarily due to unsafe drinking water.
- The potential of nanotechnology applied to zeolite is promising in designing an effective low-cost water treatment.

Introduction and objectives

Philippines is facing a water crisis, Water.org estimates that nine million Filipinos lack access to safe water and over 19 million lack access to improved sanitation. Moreover, it is estimated that 58% of the country's groundwater intended for drinking is contaminated with coliform bacteria. Safe drinking water had been a luxury for most Filipinos due to expensive fees for water purification, which are often unavailable most especially to rural areas. This project aims to design a cheap and simple yet effective water treatment equipment made out of local materials that could be easily maintained at low cost.

Methodology approach

The water treatment equipment was made of three removable layers out of used plastic water bottles with cheese clothes in between. These three layers consist of 1) sand and pebbles 2) activated charcoal and 3) silver nanoparticle activated zeolite in particular order. Water samples from rain, pump, spring and faucet from one barangay were tested for pH, total dissolved solids, conductivity and presence of coliform before and after running it to the equipment. Desorption and cleaning was done by continuously passing hot water to the equipment. The ease of use and interest with the equipment were also rated by respondents.

Analysis and results

Results show that all samples were semi-acidic with rainwater having the lowest pH of 5.8. Total suspended solids (TDS) were relatively high but acceptable with spring water having the highest average of 784 mg/L. Conductivity shows that pump and faucet samples were highly contaminated with ions and are unacceptable for drinking with average of 88 uS/m and 64 uS/m. Additionally, coliform tested positive in most samples. Elemental testing also revealed the presence of iron and traces of lead in water samples from pump and faucet. After running the water samples through the equipment, pH was neutralised, TDS was <300 mg/L, conductivity were lowered to <20 uS/m, trace elements were lowered to acceptable concentrations and coliform was undetectable. Cheesecloth served as initial filter for particles >0.1 mm, sand and pebbles removed small particles and trap bacteria, activated charcoal adsorbed ions while Ag-zeolite served as pH neutraliser and final filter for remaining bacteria and ions, with Ag having excellent antibacterial properties. The total cost for one equipment was estimated to be 10 USD/200L. Desorption was successful in bringing back the efficiency of the equipment to 80%. Moreover, 100% of the respondents approved the ease of construction, cost and effectiveness of the equipment.

Conclusions and recommendation

Cost and effectiveness had been the two most critical issues in designing water treatments. Conventional techniques had been proven to be insufficient most especially with emerging pollutants while modern techniques are usually expensive and inaccessible. The results of this pilot study suggest the big potential of combining conventional and nanotechnologies applied to zeolite in overcoming the challenges we continuously face in providing sustainable access to safe drinking water most especially to the marginalised. It is recommended to try the equipment to more polluted waters and create a more comprehensive logistical and business model for the product.

Presenter biography



Mr. Yolwin Jed Perales, Water Youth Network, Mindanao Mineral Processing and Refining Corporation, Philippines

I am a metallurgical engineer based in the Philippines and a member of the Water Youth Network. My research interests include hydrometallurgy, wastewater treatment, sustainable engineering solutions, water policy formulation, and WASH. My projects held range from risk assessment of water bodies such as rivers and seas, designing and creating low-cost water treatment, innovations in alleviating challenges in sanitation and clean drinking water, and nature-based solutions for industrial wastewater discharges. I had been awarded the World Water Week 2017 Poster Prize and the UNLEASH Innovation Lab 2018 Silver Award for SDG 6.

Building consumer-focused household sanitation solutions in Haiti

Authors: Ms. Leah Page Jean, SOIL, United States

Keywords

Urban, sanitation, container-based sanitation, social business, innovation

Highlights

SOIL is building a customer-focused household toilet service in urban Haiti designed to increase access to equitable, affordable sanitation and waste treatment services. By taking an innovative, circular economy approach and working in partnership with key stakeholders, SOIL believes this service can cost-effectively reach those left behind by traditional technologies.

Introduction and objectives

SOIL's EkoLakay service successfully provides cost-effective, dependable, and environmentally-sound household sanitation in informal urban settlements (where over 3 billion people are expected to reside by 2050), and this work represents an elegant public health and environmental intervention for a vulnerable base of the pyramid population. Given the sheer number of people requiring access to these services, there is significant demand to drive large-scale replication globally. This talk will discuss SOIL's consumer-focused approach, the need for new financial mechanisms, and how we can leverage new collaborations and public sector support to sustainably scale similar innovations in different contexts.

Methodology approach

SOIL seeks to address the sanitation challenge in vulnerable urban communities through a technology called Container-based Sanitation (CBS). CBS is a system where toilets collect human excreta in sealable, removable containers that are transported to treatment facilities when full. SOIL is taking a consumer-focused approach to sustainable sanitation that combines an innovative service delivery model and new technology with a strategic, catalytic approach to financial sustainability. This talk will explore how to most effectively mobilize value-adding and sustainable revenue streams that can finance scale up, further incentivize innovation, and create a market for new entrepreneurs to enter the

Analysis and results

To move beyond traditional sanitation technologies that have been expensive, resource-dependent and prone to perpetuating significant inequalities in access, cost and service quality, practitioners need to be open to exploring financial mechanisms that can bring more entrepreneurs to the sanitation sector and create a bridge to future public financing to increase access where ability to pay is low. SOIL is currently in dialogue with the Inter-American Development Bank and the government of Haiti to set up a results-based financing (RBF) mechanism to scale the provision of container-based sanitation services in Cap-Haitien, Haiti. This partnership will be an important test of how innovative financing can encourage the scale up of non-sewered sanitation solutions in an equitable way in vulnerable communities.

Conclusions and recommendation

SOIL and other CBS innovators have made significant progress in building local-optimal, cost effective services, but further support is needed for them to continue to improve efficiency, reduce costs, achieve scale, and secure public sector support.

RBF with funds provided by large donors or development finance institutions can play an important role in covering unmet losses from sanitation service delivery to historically difficult-to-reach populations, improving equity and sanitation access.

Collaborations like the Container Based Sanitation Alliance can help practitioners develop standardized metrics and share best practices, speeding up the rate innovation and supporting new entrepreneurs entering the sector.

Presenter biography



Ms. Leah Page Jean, SOIL, United States

Leah has been working with SOIL since 2007 where she has helped develop and refine SOIL's approach to sustainably providing sanitation services in rapidly expanding urban communities. Before joining SOIL, she worked for a range of international organizations in positions focused on helping create more impactful and sustainable responses to global challenges. She has a bachelor's degree from Reed College in Portland, Oregon.

Providing Sanitation to Off-grid Areas: a Successful Story from Cambodia

Authors: Mr. Michael White, Asian Development Bank, Philippines

Keywords

Off-grid sanitation solutions, solar septic tanks, innovation, Asian Development Bank

Highlights

Solar septic tank installation in remote, off-grid areas, which are not reached by traditional infrastructure; Innovative technology application in remote communities to address sanitation issues in areas with vulnerable women and children.

Use of complete sanitation value chain approach amidst geographical and spatial limitations.

Introduction and objectives

Communities living nearby the Ton Le Sap Lake in Cambodia are vulnerable to water-borne diseases, frequent flooding and improper sanitation conditions. Hence, there is an urgent need to develop cost-effective, non-invasive fecal sludge containment solutions which can be replicated in the whole catchment area surrounding the lake. It is equally important to ensure proper treatment of collected fecal sludge and disposal of any emergent effluent. This can positively contribute to enhance community living conditions while protecting the lake water quality.

Methodology approach

During the pilot study phase, five innovative proven on-site sanitation technologies have been installed around the Ton Le Sap Lake. These require zero electricity, low water consumption and minimal civil works. Solar septic tanks use solar energy to increase their internal temperature. They rely on elevated temperatures to inactivate pathogens and convert organic waste into biogas. Such technologies eliminate the logistical and environmental problems associated with fecal sludge transport in conventional septic tanks while providing high-level effluent treatment. This contributes to improved effluent discharge and lake water pollution reduction.

Analysis and results

Site analysis is critical to ensure that the technology being tested is suitable for various conditions and user profiles. In this regard, solar septic tanks should be placed only where enough solar heat can be harvested. The location should also consider the security of the unit. The selected sites at Ton Le Sap Lake include dry, flood prone and inundated areas. The number of users ranges from 20-2000 people, including women and children. Firstly, stakeholder engagement was critical to inform the community about proper usage and septic tanks care. Consultations with the community included government officials, teachers, health center officials, community leaders, user and non-users in the community. These provided an opportunity to inform the public about the solar septic tanks as well as to obtain real-time feedback and improvement suggestions. Most importantly, stakeholder perception was taken into consideration to ensure the sustainability of solar septic tanks. Secondly, regular water quality and temperature log monitoring were critical to ensure that units were performing as designed, and operations adjusted as necessary. The positive results proved that this innovation can be replicated in the other areas around the Ton Le Sap lake.

Conclusions and recommendation

This study showed that it is possible to provide complete sanitation services to all areas reaching the 'last mile'. Difficult site conditions can be hurdled by appropriate technologies and methodologies, combined with proper coordination with local communities and government support. Innovative technologies can be

encouraged for mainstreamed use after they have demonstrated their effectiveness. Piloting innovative technologies is an effective way to test the suitability of new systems. In addition, training local operators and the larger community on technology operation and maintenance is paramount.

Presenter biography



Mr. Michael White, Asian Development Bank, Philippines

Michel White is a Senior Urban Development Specialist (Water Supply and Sanitation), Southeast Asia Regional Department, Asia Development Bank (ADB). Mr. White is a civil / environmental engineer holding an honours degree in civil engineering from Liverpool John Moore's University, UK, and a master's degree in water and waste engineering from Loughborough University, UK. Before joining ADB in July 2009, he gained 22 years of professional experience in the water and urban

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