WATER AND DEVELOPMENT ALLIANCE
WAMI-RUVU BASIN, TANZANIA

A Learning Review of Interventions Under the Water and Development Alliance (WADA) I Project

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Acknowledgements

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Disclaimer

This Learning Review was not intended to be an evaluation of WADA in Tanzania, the agencies responsible for it’s funding or implementation, or an assessment of the program’s impacts. It was instead expected to identify and draw upon selected learning opportunities from the WADA experience between 2007 and 2009 that can enable the follow-on WADA funding to be used as appropriately, effectively and sustainably as possible.

The review was made possible by the generous support of the American people through the United States Agency for International Development (USAID) and The Coca-Cola Foundation. The contents of this report are the responsibility of an independent consultant and do not necessarily reflect the views of the Global Water for Sustainability (GLOWS) program, Florida International University, USAID, the United States Government or The Coca-Cola Foundation.

Matthew Owen
Nairobi, Kenya.
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<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>CLTS</td>
<td>Community-Led Total Sanitation</td>
</tr>
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<td>COWSO</td>
<td>Community-Owned Water Supply Organisation</td>
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<tr>
<td>EFA</td>
<td>Environmental Flows Assessment</td>
</tr>
<tr>
<td>EMS</td>
<td>Environmental Management System</td>
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<tr>
<td>FIU</td>
<td>Florida International University</td>
</tr>
<tr>
<td>GETF</td>
<td>Global Environment and Technology Foundation</td>
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<tr>
<td>GLOWS</td>
<td>Global Water for Sustainability Program</td>
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<tr>
<td>iWASH</td>
<td>(Tanzania) Integrated Water, Sanitation and Hygiene Program</td>
</tr>
<tr>
<td>PHAST</td>
<td>Participatory Hygiene and Sanitation Transformation</td>
</tr>
<tr>
<td>SWASH</td>
<td>School Water supply, Sanitation and Hygiene</td>
</tr>
<tr>
<td>TCCC</td>
<td>The Coca-Cola Company</td>
</tr>
<tr>
<td>TCMP</td>
<td>Tanzania Coastal Management Partnership</td>
</tr>
<tr>
<td>THESA</td>
<td>Tanzania Health and Environmental Sanitation Association</td>
</tr>
<tr>
<td>UDSM</td>
<td>University of Dar es Salaam</td>
</tr>
<tr>
<td>USAID</td>
<td>United States Agency for International Development</td>
</tr>
<tr>
<td>VWC</td>
<td>Village Water Committee</td>
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<tr>
<td>WADA</td>
<td>Water and Development Alliance</td>
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<tr>
<td>WRBWO</td>
<td>Wami-Ruvu Basin Water Office</td>
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</tbody>
</table>
Executive Summary

Introduction
The Water and Development Alliance (WADA) of USAID and The Coca-Cola Company (TCCC) supported a program for the improved management of water and watershed resources, access to sustainable safe water and provision of sanitation services and hygiene education in the Wami-Ruvu and Pangani River basins of Tanzania in 2007 and 2008. Follow-on funding was provided by USAID Tanzania in 2008/09. The program was coordinated by the Coastal Resources Center of the University of Rhode Island through the Tanzania Coastal Management Partnership (TCMP). A further round of USAID/TCCC support, referred to as WADA II, is now underway within the Tanzania Integrated Water, Sanitation and Hygiene (iWASH) program under the management of the Global Water for Sustainability Program (GLOWS) at Florida International University. A Learning Review was commissioned to capture the experiences of “WADA I” and draw out the main implications for iWASH/WADA II.

Achievements and program strengths
The inputs provided by WADA I/TCMP at the level of overall water basin management were appropriately targeted and well received, and included technical support to the implementation of an initial Environmental Flows Assessment of the Wami River and strengthening of the GIS capacity of the Wami-Ruvu Basin Water Office (WRBWO). Both established good working relations with WRBWO, upon which iWASH/WADA II can build.

WADA consultants provided technically sound advice on environmental management systems (EMS) to industries in the Wami and Pangani basins, from which suggestions were taken up by a sugar company. Wider uptake of the recommendations may have been possible if they had been more commercially realistic.

WADA’s contributions to school latrine construction were a much needed response to the total inadequacy of sanitation in most beneficiary schools. WADA also innovated in school-based hygiene by introducing four different hand-washing technologies. These activities contributed to the credibility of iWASH as a key player in school sanitation, facilitating current iWASH engagement with the development of national school water, sanitation and hygiene guidelines.

Two community exchange tours were mutually instructive and added to understanding of intra-basin dependency.

Challenges and program shortfalls
Short financing cycles constrained multi-year planning and favoured one-off interventions over systemic, process-based interventions. WADA project sites were very dispersed, generating a high supervisory burden and constraining the depth of engagement with partner communities. Shallow engagement was compounded by the sub-contracting of most activities by TCMP.

The tree planting component lacked any plausible link to WADA’s core water and sanitation objectives. It relied fully on external funding and had poorly thought-through benefits.

An initial community needs assessment did not lead to any variations in the training packages subsequently introduced. The training also overlooked the legal shift in Tanzania from the management of water supplies by village governments to community-based organisations.
WADA used the Participatory Hygiene and Sanitation Transformation (PHAST) methodology for promoting hygiene-related behaviour change. This proved effective at conveying key health messages but not at changing behaviours. WADA should have recognised and responded to the concerns that have developed in relation to PHAST and considered more progressive approaches. This, together with a lack of understanding of the policy environment, were symptoms of a lack of real engagement in the wat-san sector.

WADA’s sanitation and hygiene-related interventions were appended to a natural resources management program. Staff lacked wat-san expertise and were poorly qualified to design and supervise WADA activities. This resulted in little analysis and redirection on the basis of lessons being learned, limited innovation, faulty design of latrines and rainwater harvesting systems, and poor construction quality due to weak contractor supervision.

The engagement with the Basin Office leaves iWASH with a valuable platform for further capacity-building and technical support, and the work with private companies is potentially scalable, but WADA’s work at village level generated few sustainable benefits: several school latrines have yet to be commissioned due to poor build quality; maintenance and pit emptying were not adequately considered; some rainwater harvesting systems are inoperative; few residual impacts from PHAST or water committee training are apparent; and long-term benefits from the tree planting component will be very limited.

WADA I was well publicised, with numerous media events and launches. PR was sometimes disproportionate to the scale of work on the ground. High profile events at village level raised hopes falsely and created the impression that resources were unlimited, leading to residents’ unwillingness to contribute to WADA-supported activities.

**Implications for WADA II**
Targeted follow-up work is suggested to bring particular interventions to a close: repairs to rainwater harvesting systems; finalisation of EMS work at Mlibwa Sugar; and additional support to WRBWO. The review has more generic implications for the wider operation of iWASH / WADA II:

**Nature of financing:** Funding for wat-san should be channelled through specialised programs with appropriately qualified professional staff. This has already been acknowledged and incorporated into iWASH. Multi-year funding should be assured to permit longer-term planning. Fortunately it has already been agreed that USAID will sustain WADA II for three years.

**Site selection and geographic focus:** Interventions to improve water access may be directed separately from sanitation and hygiene measures, depending where respective needs are greatest. This challenges the traditional integration of water, sanitation and hygiene interventions. From a base in Morogoro and with no budget for field-based staff under the WADA component, the tighter focus of WADA II on the Wami-Ruvu Basin and (for service delivery) on Morogoro Rural District is justified.

**School latrine designs:** Resource limitations justify challenging current thinking on numerical targets and designs for school latrines, e.g. more pupils per latrine may be better than no latrine at all, and latrines could be smaller with shallower pits designed for more frequent emptying.
**Contract management:** Construction budgets should be realistic and costings accurate at the outset. Sub-contractors require close supervision from appropriately qualified program staff.

**Hand-washing culture:** Providing hand washing facilities is necessary but not sufficient to ensure that hand-washing in schools takes place. Systemic cultural changes are required through long-term engagement at practical and policy levels, e.g. through village governments and the Ministry of Education inspection system. It would benefit iWASH/WADA II to focus on a limited area for an extended period, working through multiple channels in adjacent communities to maximise message reinforcement. District sanitation league tables for schools are worth exploring.

**Moving beyond PHAST:** A successor to PHAST is required that focuses on a smaller range of behaviours, is simpler to introduce and contributes in a more integrated way to a multi-channel approach to behaviour change promotion. WADA II is well placed to work with others (e.g. CARE, WaterAid, Water and Sanitation Program) to explore hybrid approaches incorporating the best elements of PHAST, Community-Led Total Sanitation and social marketing.

**Engagement with water users and water polluters:** There is a need to conduct a more comprehensive assessment of the different industries, farming operations and settlements within the Wami/Ruvu basin that are using surface water or discharging into surface water bodies, and to develop a clear strategy for how to work with them for maximum effect.

**PR management:** iWASH should retain firm control over PR for WADA, ensuring that community expectations are not falsely or unfairly raised by publicity events and media releases, and that donors generate publicity that is proportionate to the scale of the activities on the ground and their relative contributions. There is a role here in relationship management for GETF, working with USAID and TCCC.
1. Introduction

1.1 WADA Background

The Water and Development Alliance (WADA) is a collaboration between USAID and The Coca-Cola Company (TCCC) that works in 14 developing countries to improve water resource management and expand access to improved drinking water and sanitation services for poor and marginalised people. Together with the USAID mission in Tanzania, WADA provided $575,213\(^1\) to the Improved Community Livelihoods and Sustainable Water Management Program in the Wami-Ruvu and Pangani River basins, Tanzania (see Figure 1) between January and December 2007.

![Locations of the Pangani and Wami-Ruvu river basins](image)

WADA aimed to support sustainable management of water and watershed resources, improve access to sustainable safe water and provide sanitation services and hygiene education. This was addressed through school latrine construction and rainwater harvesting, tree planting, PHAST\(^2\) training, support to village water committees, community exchange visits, environmental flows assessment (EFA), development of environmental management systems (EMS) for agro-industry and technical capacity-building of the Water Basin Offices. The program was coordinated by the Coastal Resources Center of the University of Rhode Island through the Tanzania Coastal Management Partnership (TCMP). Implementing partners also included Florida International University (FIU), World Vision Tanzania and the Tanzania Health and Environmental Sanitation Association (THESA).

With separate financing of $620,000 through USAID’s Sustainable Coastal Communities and Ecosystems (SUCCESS) program, the WADA activities were extended to August 2008 and a follow-on phase was then implemented from November 2008 to September 2009, also under

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\(^1\) 60% from TCCC and 40% from USAID.

\(^2\) Participatory Hygiene and Sanitation Transformation.
TCMP management. The combined WADA/SUCCESS funding covered a total of 30 months over three years with a total budget believed to be just under $1.2 million\(^3\).

A further round of USAID/TCCC support, referred to as WADA II, began in September 2010 with a Year 1 budget of $1.05 million\(^4\). This is an integral but distinct component of the Tanzania Integrated Water, Sanitation and Hygiene (iWASH) program, a $12.6 million USAID-funded initiative managed by the Global Water for Sustainability Program (GLOWS) of FIU from an operational base in Morogoro. Both WADA II and iWASH are working in the Wami-Ruvu Basin and the Ruaha Sub-Basin. The WADA component focuses on the provision of water, sanitation and hygiene services to communities in ecologically sensitive areas, and the improvement of water resources protection and management through training, capacity-building and better governance. It aims to benefit 17,000 people directly in addition to informing policies and development strategies through innovation and cross-cutting approaches.

### 1.2 Learning Review: Approach and Scope

It was specified in the WADA II funding proposal that the program would build on the experiences of “WADA I” from 2007-2009. A Learning Review was therefore commissioned by GLOWS to capture, analyse and document those experiences. The Review was carried out by an independent consultant between September 6\(^{th}\) and 17\(^{th}\) 2010. The Statement of Work (Annex A) asked the reviewer to consider the objectives of the WADA I program interventions, implementation modalities, achievements, impacts, benefits, sustainability and overall challenges and shortfalls. The consultant was also asked to identify learning opportunities, examples of good practice, mistakes or pitfalls to be avoided, and any areas for follow-up work.

The consultant reviewed available documentation at the offices of iWASH in Morogoro and TCMP in Bagamoyo. In the company of the former TCMP Water and Sanitation Coordinator and the iWASH Sanitation Engineer, he also visited nine\(^5\) WADA-supported villages in Bagamoyo, Kilosa and Mvomero Districts, and the Mtibwa Sugar Estate in Mvomero, to inspect program-supported infrastructure and interview key informants. The review itinerary, list of people met and documents consulted are in Annexes B, C and D respectively, while a map of the WADA I target communities is in Annex E.

Details of the first WADA phase (2007/08) are available in an implementation plan (USAID Tanzania, 2007), a close-out report (TCMP, 2009) and in more general terms within a TCCC-commissioned multi-country WADA evaluation (Khulisa Management Services, 2009). Information concerning the follow-on phase (2008/09) could be found only within the final report of SUCCESS (see TCMP, 2010). Together with the fact that only the Wami Basin communities were visited, this limitation precluded a comprehensive review of all WADA I activities. But this not the intention; the aim was rather to draw out lessons from selected WADA experiences, and this was addressed by investigating in detail a subset of the program’s interventions. This report documents the main findings of the Learning Review in Chapter 2 and goes on to identify the main implications for WADA II in Chapter 3.

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\(^3\) Budgetary information is uncertain, as TCMP and USAID in Tanzania were unable to confirm the total channelled through SUCCESS.

\(^4\) A further $0.8 million will come directly from USAID in Years 2 and 3.

\(^5\) WADA I operated in 13 villages on the mainland but the review concentrated on those in the Wami-Ruvu Basin, where WADA II will now be working.


## 2. Review Findings

### 2.1 WADA goals, objectives and approach

WADA I had three goals:

1. **Watershed management**: to support government efforts to achieve sustainable management of water and watershed resources in the Wami-Ruvu and Pangani basins;
2. **Water**: to improve community access to sustainable safe water; and
3. **Sanitation and hygiene**: to provide sanitation services and hygiene education to local communities.

The program also had seven objectives, which are presented in abridged form in Table 1, together with the means by which they were to be achieved. The last column shows the implementing organisations for each component and what they accomplished.

*Table 1: WADA I objectives, means of delivery and main implementing agencies*

<table>
<thead>
<tr>
<th>Goal</th>
<th>Objectives</th>
<th>Means of delivery</th>
<th>Implementers</th>
</tr>
</thead>
</table>
| **Water, sanitation and hygiene improvement** | 1. Develop and improve wat-san systems in selected communities in Wami-Ruvu and Pangani Basins | Community needs assessments in 9 villages, PHAST sanitation training in 13 villages, latrine construction in 11 primary schools, rainwater harvesting systems in 3 primary schools, water pipe extension at 1 primary school, tree planting in 7 schools and communities, 2 exchange visits between upstream and downstream communities in Wami Basin | 2007/08:  
- **RECODA**: 9 community assessments  
- **World Vision**: 7 latrines, 9 PHAST trainings  
- **TCMP**: tree planting.  
2009:  
- **THESA**: 4 latrines, modifications to existing latrines; 12 PHAST trainings, (incl. 9 repeats); 3 rainwater systems  
- **TCMP**: 2 community exchange visits |
| | 2. Promote participatory decision-making processes and local ownership and management of wat-san services of communities in targeted basins | Formation or strengthening of 13 Village Water Committees (VWCs), through 5-day training sessions | 2007/08:  
- **World Vision**: 9 VWC trainings  
2009:  
- **THESA**: 12 VWC trainings (incl. 9 repeats) |

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6 Research, Community and Organisational Development Associates.
### Watershed Management

<table>
<thead>
<tr>
<th>Goal</th>
<th>Description</th>
<th>Activity</th>
<th>Responsible Party</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.</td>
<td>Delineate drainage basins and characterise surface catchment in relation to longitudinal and vertical dimensions of Wami River</td>
<td>Geomorphological profiling of Wami River, including surface catchment maps</td>
<td>FIU &amp; UDSM technical experts; coordination by Wami-Ruvu Basin Water Office (WRBWO)</td>
</tr>
<tr>
<td>4.</td>
<td>Determine credible measure of river basin flows, as well as water quality and quantity requirements of household and private sector water users, and flow required to maintain biodiversity and ecosystem processes</td>
<td>Initial EFA to determine current and projected water available for human uses and ecosystem maintenance in the Wami Basin, water allocation planning, identification and prioritisation of threats to biodiversity</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Identify sources of pollution and fresh water use that have potential to affect sanitation and health related to water contact and extraction, and advocate for cleaner production practices in agro-industrial water use and reduce business operating costs</td>
<td>Assessment reports detailing opportunities for better practices, to facilitate voluntary adoption of EMS in industrial operations</td>
<td>2007/08: • THESA, with Bonite Bottlers, Mtibwa Sugar Estate, Tanganyika Planting Company, Kigombe Sisal Estate. 2009: • ENVICON: Follow-up at Mtibwa.</td>
</tr>
<tr>
<td>6.</td>
<td>Strengthen capacity of WRBWO in use of spatial information and database management</td>
<td>Training of WRBWO staff in GIS and database management</td>
<td>Prof. P. Mwanukuzi, UDSM</td>
</tr>
<tr>
<td>7.</td>
<td>Mainstream participation of both genders to optimise use of water resources and improve sanitation and hygiene</td>
<td>Community needs assessments, educational awareness campaigns, water supply and sanitation systems, strengthening and training of VWCs in local ownership and management of water supply and sanitation services and water resources management, village water use management plans</td>
<td>No separate activities</td>
</tr>
</tbody>
</table>

**Note:** Trainings for Pangani East and Pangani West were combined, hence 13 villages were covered but only 12 PHAST and VWC trainings were carried out.

### 2.2 Areas of Operation

Some of the WADA I activities were wide-ranging and were intended to deliver basin-wide impacts - such as the Wami River initial EFA and the GIS training provided to the Basin Authority. The EMS work, meanwhile, was site-specific to the industries which were approached, namely Bonite Bottlers, Kigombe Sisal Estate and Tanganyika Planting Company in the Pangani Basin and Mtibwa Sugar Estate (Mvomero District) in the Wami Basin.

The targeting of the community-level interventions was more complex. ‘Phase I’ covered ten villages and an additional three villages were brought in during the 2008/2009 follow-on periods,
but various support was also sustained in the first round of villages (such as repeats of the PHAST and VWC training, and modifications to the school latrines). The targeted villages and the phasing of support are summarised in Table 2.

*Table 2: WADA I activities by target community*

<table>
<thead>
<tr>
<th>District</th>
<th>Villages</th>
<th>2007/08</th>
<th>Activities</th>
<th>2009</th>
</tr>
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<tbody>
<tr>
<td>Msowero</td>
<td>• School latrine</td>
<td>• Latrine modifications</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>• Tree planting (school, riverbank)</td>
<td>• PHAST &amp; VWC re-training</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• PHAST &amp; VWC training</td>
<td></td>
<td></td>
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<tr>
<td>Madizini</td>
<td>• School latrine</td>
<td>• Rainwater harvesting (5,000 l tank)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• PHAST &amp; VWC training</td>
<td>• Latrine modifications</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• PHAST &amp; VWC re-training</td>
<td>• PHAST &amp; VWC re-training</td>
<td></td>
<td></td>
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<tr>
<td>Dumila</td>
<td>• School latrine</td>
<td>• Rainwater harvesting (2 x 5,000 l o/head tanks, 3 u/ground tanks, 4 tap-stands, elec. pump)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• PHAST &amp; VWC training</td>
<td>• Latrine modifications</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• PHAST &amp; VWC re-training</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dumila Juu (sub-village)</td>
<td></td>
<td>• School latrine (2 disabled access stalls)</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• Rainwater harvesting (1,000 l tank)</td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td>• PHAST &amp; VWC training (under Dumila)</td>
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<tr>
<td>Mvomero</td>
<td>• PHAST &amp; VWC training</td>
<td>• School latrine, Mwembeni sub-village</td>
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<tr>
<td></td>
<td></td>
<td>• PHAST &amp; VWC re-training</td>
<td></td>
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<tr>
<td>Miono</td>
<td>• School latrine</td>
<td>• Latrine modifications</td>
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<td></td>
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<tr>
<td></td>
<td>• Tree planting in school</td>
<td>• PHAST &amp; VWC re-training</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>• PHAST &amp; VWC training</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Mandera</td>
<td>• Tree planting (school, community)</td>
<td>• Latrine modifications</td>
<td></td>
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<tr>
<td></td>
<td>• PHAST &amp; VWC training</td>
<td>• PHAST &amp; VWC re-training</td>
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<tr>
<td>Kikaro</td>
<td>• Extension of water pipe to pri. school</td>
<td>• Latrine modifications</td>
<td></td>
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<tr>
<td></td>
<td>• Tree planting in school</td>
<td>• PHAST &amp; VWC re-training</td>
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<tr>
<td></td>
<td>• PHAST &amp; VWC training</td>
<td></td>
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<tr>
<td>Saadani</td>
<td></td>
<td>• School latrine (2 disabled access stalls)</td>
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<tr>
<td>Matipwili</td>
<td></td>
<td>• PHAST &amp; VWC training</td>
<td></td>
<td></td>
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<tr>
<td>Pangani East</td>
<td>• School latrine</td>
<td>• Latrine modifications</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>• Tree planting in school</td>
<td>• PHAST &amp; VWC re-training</td>
<td></td>
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<tr>
<td></td>
<td>• PHAST &amp; VWC training</td>
<td></td>
<td></td>
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<tr>
<td>Pangani West</td>
<td>• School latrine</td>
<td>• Latrine modifications</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>• Tree planting (school, prison)</td>
<td>• PHAST &amp; VWC re-training</td>
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<tr>
<td></td>
<td>• PHAST &amp; VWC training</td>
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<tr>
<td>Korogwe</td>
<td>• School latrine</td>
<td>• Rainwater harvesting (22,000 l ferrocement tank)</td>
<td></td>
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<tr>
<td></td>
<td>• Tree planting in school</td>
<td>• Latrine modifications</td>
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<td>• PHAST &amp; VWC training</td>
<td>• PHAST &amp; VWC re-training</td>
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Note:
(i) The review visited all ten villages in Bagamoyo, Kilosa and Mvomero Districts (strictly speaking nine, Dumila Juu being a sub-village of Dumila).
(ii) No details were available on activities in Mjini Magharibi and Bweleo on the Fumba peninsula in Zanzibar, which are excluded from the table.
(iii) The school latrines had 20 stances (10 for each sex), except those in Madizini, Dumila Juu and Saadani, which had 16.
(iv) 2009 latrine modifications included installation of fly screens above doors and addition of handwashing facilities with soak-aways.

This report will not dwell in detail on the design and management of the program and the precise content and outcomes of each activity. It will instead move directly to an analysis of selected achievements and strengths (2.3) followed by some of the key challenges and shortfalls that were identified (2.4).

2.3 WADA I achievements and program strengths

2.3.1 Support to catchment management

The inputs provided by WADA/TCMP under Goal 1 at the level of overall water basin management were appropriately targeted and well received.

WADA (and now iWASH) was already one of the first wat-san programs in Tanzania to operate according to the boundaries of water basins rather than administrative areas (the World Wildlife Fund being one of the few others to do so). The watershed-defined approach is in line with Government of Tanzania (GoT) policy to move from interventions based on regions or districts towards integrated water resources management.

The program catalysed the Wami EFA, which was conducted both quickly and cheaply, completed in less than six months for around $45,000 (excluding FIU’s technical support). The chosen methodology was simple enough to be used by other water basin authorities, and indeed was subsequently adopted in the Ruaha Basin. It was pitched at an appropriate technical level for the staff of the Basin Office and they were hence able to participate as partners and equals, not simply enumerators in a process led by external advisors. While the review is not qualified to comment on the scientific validity of the assessment, its published outputs are clear and understandable, and form an excellent basis for more informed decision-making regarding use of the Wami River’s water in different years and at different seasons (see text box overleaf).

The process of developing the EFA is reported to have been a team-building success and is fondly remembered by those who were involved. It brought together a key network of scientists, planners and resource managers, and the inclusive nature of the process gave its recommendations an added level of credibility. This enhanced the reputation of the Basin Office within the regional IUCN-led Eflows initiative, in which the Wami EFA compares favourably to those being carried out on the Pangani, Mara and Rufiji at significantly greater expense.

Finally, when Tanzania’s Basin Offices have at times struggled to elaborate a clear and valued role, the EFA has been a source of pride for the Wami-Ruvu authority and has armed it with the ability to give a basic - but now suitably informed - opinion on future abstraction proposals as they arise.
**Environmental flow assessment (EFA)** is a scientific planning tool that can determine how much water can be withdrawn from a river for human uses and the amount needed to maintain natural ecosystems. With technical guidance from FIU, an EFA for the Wami River was conducted in 2007 under the auspices of WADA I and the WRBWO. From more than 200 methodologies that exist for conducting EFAs, a simple set of tools based on the “Savannah River” and “Building Block” approaches was chosen to suit the available time and finance. The findings were summarised in a 34 page glossy publication (see CRC & FIU, 2008). Supporting technical documents (on Aquatic Ecology, Geomorphology, Hydraulics, Hydrology, Riparian Vegetation and Socio-Economics) are available at [http://wami.fiu.edu](http://wami.fiu.edu)

The EFA suggests that the Wami is in relatively healthy condition through most of its course, at least compared with the Ruvu to the south. In wet years the minimum required environment flow (EF) is met throughout the year and in average years the minimum required EF is met in all months except October. However during the driest years on record, minimal EF is not achieved for the five months from October to March, and other water extraction cannot be supported during this period.

The report suggests that the Basin Office should exercise caution in controlling wastewater discharge into the river and its tributaries, and in authorising further water abstraction, given the vital nature of the basin for agriculture, fisheries and environmental services. This is especially so in light of significant forest clearing affecting water quality and riverine habitats, growing water pollution from industrial, agricultural and domestic sources, and increased withdrawals from the river and its wetlands both for direct human use and the irrigation of crops for food and biofuels.

Recommendations are made for a repeat EFA in the wet season, more detailed water quality monitoring, evaluation of the freshwater needs of the estuary, collection of better socio-economic information on human uses of water and the value of ecosystem services, and the development of better systems for collecting rainfall and streamflow data.

The support that WADA provided to the Basin Office to improve its GIS capacity was more modest than the EFA input, but was equally well directed and technically appropriate. Following an assessment of the job requirements and functional capabilities of technical staff and managers, a tailor-made in-service training programme was developed by a Geography professor from the University of Dar es Salaam, in conjunction with a GIS technician from the Ministry of Water and Irrigation. This resulted in a basic GIS course for 14 staff that was followed up with intensive training for four individuals considered best placed to use GIS in their work. The advanced course included two weeks of field work and covered the handling of spatial data from maps, satellite imagery and GPS units, to produce customised maps and conduct basic spatial analyses. After the training, WADA donated two hand-held GPS units to WRBWO.

The Basin Office previously had sophisticated GIS hardware in the Morogoro office which few knew how to operate, and the WADA-support equipped them with the necessary skills to operate PC-based GIS software (mainly ArcMap 3.2) and to scan topographic base maps, conduct on-screen digitising and produce simple customised maps for different applications (such as maps of sub-basin boundaries or the locations of towns, gauging stations and water quality monitoring sites). The staff still face some technical bottlenecks for which they would benefit from further external assistance, and this is an area where WADA II should be able to assist (see below).

Lastly, WADA’s inputs in both the EFA and GIS support led to the establishment of good working relations with WRBWO and its individual staff. iWASH/WADA II should be able to build constructively upon this firm foundation.
2.3.2 EMS support to private sector

WADA’s work with industries located in the Wami and Pangani basins was a new and well-received contribution to improving catchment management. In contrast with the enforcement approach to over-use or pollution of water resources - a necessary function of regulatory agencies such as the National Environment Management Council - WADA was able to offer collaborative assistance to the private sector by providing no-cost technical advice on ways to (e.g.) reduce water consumption, treat waste and limit discharge into surface water bodies.

Environmental assessments were conducted at two sugar estates (Mtibwa Sugar Estate in Mvomero and Tanganyika Planting Company in Moshi) and at one sisal estate (Kigombe Sisal Estate near Tanga). Recommendations were made on wastewater treatment and management, rationalisation of irrigation systems, pesticide storage, the containment of oil and the acquisition of instruments to test wastewater quality. Sound technical inputs were provided to the three targeted companies by program partner THESA and later by ENVICON\(^7\). Individual reports and a synthesised EMS document were produced and distributed to each company and to other program partners. One of the local Coca-Cola bottling partners (Bonite in Moshi) was also assessed, but its systems already met ISO standards for environmental management and water treatment.

Mtibwa was the most receptive partner and agreed to the formation of an environmental task group of high ranking staff, headed by its Assistant General Manager. Further to THESA’s visits, the company also modified its settling ponds to allow better through-flow of factory wastewater and built a new dam on its boundary to create a 31 ha reservoir to capture the wastewater coming out of the ponds, before it would otherwise have returned to the Wami River. This not only led to cleaner water exiting the property with a lower sediment load, but also provided a conveniently-located source of irrigation water for the company itself which has now reduced internal pumping costs. Mtibwa pays a relatively modest Tshs 2.6 million p.a. for the right to abstract 1.5 m\(^3\)/s from the Diwale River (a tributary of the Wami) so its water is relatively cheap. But the costs of pumping to distribute this water internally to its 5,600 ha of cane fields are nevertheless rather high, and if surplus irrigation water or factory wastewater can be collected and re-used, then the company can save money and improve its image at the same time. In this instance the environmental advice of the WADA consultants also made commercial sense for the company.

In other cases there has been limited adoption of the proposals made in the EMS reports. For example, a major overhaul was proposed of the Mtibwa wastewater ponds to incorporate an aeration system, but only minor flow modification was carried out; proposals to separate oil from waste water at source within the factory complex were not adopted; and a dedicated environmental officer was not recruited as THESA had proposed. At Kigombe and the Tanganyika Planting Company, none of the EMS proposals were taken up and Kigombe continues to discharge untreated waste from sisal decortication\(^8\) into the Indian Ocean.

This raises a concern that while the recommendations of the WADA-contracted experts may have been technically sound, they were not necessarily commercially realistic. No cost-benefit analyses were carried out for any of the proposals that were made. There remains a particular

\(^7\) ENVICON is a company formed by former THESA staff led by Dr Karoli Njau.

\(^8\) The process of stripping and cleaning the sisal.
need to re-visit Mtibwa and reach closure on the various proposals, balancing the commercial imperatives of the company with the technical merits of the suggestions that were developed.

2.3.3 School sanitation

WADA’s contributions to school latrine construction suffered from inconsistency in both design and implementation, a limitation that is discussed in 2.4.6 below. But as a basic response to the total inadequacy of sanitation in most of the beneficiary schools, it was a well targeted and much needed intervention. Two of the beneficiary institutions (at Madizini and Dumila) had no sanitation facilities whatsoever pre-2007, and it was reported by TCMP that enrolment of girls increased as a direct result of the new WADA-funded latrines.

WADA also made efforts to innovate in the area of school-based hygiene by introducing at least four different kinds of hand-washing technology during its three year lifetime: refillable concrete water tanks, rainwater-fed polypropylene tanks with taps\(^9\), the foot-operated “tippy tap” and water-saving push taps. This was a key area of program innovation.

It is nevertheless unfortunate that none of the hand-washing systems were still in use at the time of the review: the concrete tanks were empty and/or missing their taps, the polypropylene tanks had either been stolen or were being kept under lock and key in one of the school rooms, and the tippy-taps and push taps were broken or absent. This suggests that there is a need for more systemic change in school sanitation regimes if behaviour change is to be induced, complementing the installation of new equipment as part of a wider behaviour change effort. There are implications here for the approach of WADA II (see chapter 3).

The work on school latrines by WADA I contributed to the recognition of iWASH (by association) as a credible implementing agency in the school sanitation arena. This has added legitimacy to the current iWASH engagement with a UNICEF-led process to develop National SWASH\(^10\) Guidelines. This important initiative is the first attempt to produce formal guidelines for school sanitation (including governance, hardware designs, hygiene promotion guidance and training materials) for adoption by the four concerned Ministries\(^11\). The first draft of the SWASH guidelines was produced in July 2010 and is being piloted in several districts by various NGOs and development partners, before finalisation scheduled for June 2011.

2.3.4 Community exchanges

Two “Salt and Sugar” tours were organised by WADA/TCMP in 2009, each lasting three days and comprising visits by five Wami river mouth communities to the Mvomero area and vice versa. Downstream visit sites included the estuary and prawn fishing areas (by boat), Saadani salt works, riverbank communities and the Chalinze pumping station, while upstream the visits covered Mtibwa Sugar Estate, Mtibwa teak plantations, irrigated rice paddy in Mvomero, a waterfall on the River Livue and the Basin Office in Morogoro.

\(^9\) 100 or 200 litre Simtanks, described in program literature as “portable hand-washing stations”.
\(^10\) SWASH: School Water supply, Sanitation and Hygiene.
\(^11\) The Ministries of Health & Social Welfare, Education & Vocational Training, Water and Irrigation, and the Prime Minister’s Office – Regional Administration and Local Government.
These exchanges were mutually instructive and there was good recall among those who participated, not only of the places visited and the activities witnessed, but also of the implications for their own use of riverine resources. This was particularly so for the upstream farmers engaged in large-scale rice and sugar cane irrigation. The impacts of such exchanges are naturally difficult to quantify, but they were clearly well received and added to the communities’ understanding of intra-basin dependency.

2.4 WADA I challenges and program shortfalls

The following section on program shortfalls is the lengthiest part of the review and this may prompt concern that the process focused unduly on the weaker aspects of WADA rather than its success stories. Pre-empting such a concern, it is important to note that the review was expected to highlight lessons from which improvements can be made for WADA II, and only by thoroughly addressing areas of weakness (alongside areas of strength) can this be achieved. It is also worth noting that several of the issues have already been highlighted and addressed in the design of iWASH.

2.4.1 Short-term financing

Only one year of program funding was initially assured under WADA and extensions were approved in a staged and rather uncertain manner according to the availability of additional finance through USAID’s Tanzania mission. This made long-term planning by TCMP difficult and there was naturally a preference for one-off interventions such as training courses and basic infrastructure investments, rather than systemic, process-based interventions that would require long-term engagement. It is very difficult to bring about meaningful and sustainable changes through a short-term set of interventions, particularly changes in behaviour.

2.4.2 Thin spread of interventions

Under the management of TCMP in Dar es Salaam, WADA project sites were highly dispersed, from the Wami river mouth westwards to the Nguru Mountains, northwards as far as Moshi and Tanga in the Pangani Basin, and also including parts of Zanzibar. This created a high supervisory burden and constrained the depth to which the program could engage with any of the partner communities. The short funding and planning horizon intensified this problem. Although an effort was made through the exchange visits to link communities together, each intervention location remained essentially independent of the others.

The majority of program work was out-sourced to sub-contractors and not implemented by TCMP staff themselves. For example, community assessments were carried out by RECODA, PHAST courses by certified national trainers, EMS by a private consultancy firm and GIS training by a contracted specialist. This added further to the limited depth of engagement between the management tier of the program and its village-level beneficiaries.

2.4.3 Lack of wat-san link in tree planting

WADA’s tree planting component lacked any plausible link to its core water and sanitation objectives. The aim of this activity was ostensibly to protect river banks and catchments, but this was a rather conceptual link and both the scale and viability of the initiative were in question –
the scale because the fewer than 40,000 seedlings planted could cover no more than 10 ha of land\textsuperscript{12} and the viability because the motivation for those involved was not well thought through in terms of land ownership, management responsibilities, rights to harvest, potential markets and returns from tree products, and the rights to retain incomes from their sale.

Seedlings were initially transported from outside and distributed to beneficiaries, and later seeds and materials were provided by TCMP to produce seedlings within school-based tree nurseries. Planting out took place in both schools and communities, and at Pangani prison (to establish fuel woodlots to reduce mangrove cutting for fuel). The species provided included fast-growing ornamentals (e.g. \textit{Terminalia} spp.), fuel-producing species (such as \textit{Senna siamea}), fruit trees (\textit{Citrus} spp.) commercial pole-wood varieties (e.g. teak, \textit{Tectona grandis}) and slower-growing timber trees (e.g. \textit{Cedrela odorata} and \textit{Khaya nyasica}).

Tree planting was a self-contained activity under direct TCMP management that relied fully on external funding, with no meaningful contributions required of beneficiaries. Once the funding ended in 2008, the school-based tree nurseries closed and the continued survival of the seedlings then depended on the degree to which individual teachers took an interest in sustaining them. As might be expected, average survival rates are now higher within school compounds that they are in stand-alone woodlots (due to water stress), but the overall average is still no better than 50%. Most of the targeted schools lacked permanent water sources and in those that did have water sources, there was no budget set aside for water purchase to sustain trees (water costs TShs 800 per 1,000 l at Mander and Kikaro schools on the Chalinze piped scheme).

Rural forestry is a specialist field and there are decades of learning from African development programs about the incentives environment required to encourage the raising, planting and tending of trees. It is not an activity well suited to being appended onto other programs and must be considered in its wider socio-economic context.

2.4.4 Training component not needs driven

WADA target communities were not apparently prioritised on the basis of their sanitation or hygiene needs, given that a number of fast-growing towns in each river basin were excluded (e.g. Turiani) while some very small communities at relatively low risk from water-borne disease were included (e.g. Saadani). No settlement in the Wami-Ruvu basin has perfect water and sanitation coverage and all would clearly benefit to some extent from improvements, but for cost-effectiveness the program could have worked in a more prolonged and engaged manner in those communities where the risks to human wellbeing and the integrity of water resources (e.g. from rapid population growth) were identified as being most significant. This was not a limitation observed in the school-based work, however, and all the schools were well chosen and without exception in dire need of better sanitation facilities.

Having selected the first nine program communities, WADA commissioned a needs assessment before confirming its activities (see RECODA, 2007). However this did not result in any variations in the training packages that were subsequently introduced. A standard program of PHAST training was rolled out in all locations, together with training in forming or strengthening village water committees (VWCs) using a standard 5-day format that made no significant

\textsuperscript{12} Assuming 1.5 m spacing.
allowance for the nuances of the local situation. Thus the trainings provided in Miono, a busy and fast-growing market centre with a diverse ethnic composition and a piped and metered water supply system, were essentially the same as those provided in Saadani, a small ocean-front settlement on the edge of a conservation area where water is scooped from the bed of sand river. Clearly they face very different technical and institutional challenges, the former more likely to need assistance addressing sanitation, water-borne disease, water system maintenance, meter reading and reconciliation of water distributed against revenue collected, and the latter more likely to benefit from advice on water treatment and handling, and the risks and responses to saline intrusion. But in all locations the training focussed mainly on the protection of water points, hygiene measures in the handling of water, and the protection of catchments.

The training component also failed to recognise the policy shift in Tanzania from the management of water supplies by VWCs under the direct control of village governments towards Community-Owned Water Supply Organisation (COWSOs), a change that was introduced in the National Water Policy (2002) and subsequently enshrined in law under The Water Supply and Sanitation Act (Republic of Tanzania, 2009; see text box). WADA was effectively training and empowering village governments to manage water, while the law was simultaneously repositioning the control of water supplies to non-government entities.

The Water and Sanitation Act (2009) provides for the creation of Community-Owned Water Supply Organisations (COWSOs) to own, manage, operate and maintain public water supplies and to collect and manage fees from water consumers. COWSOs encompass various institutional options including NGO, company, cooperative society, Water Trust or Water Consumer Association. They are independent of village councils although their creation must be approved by the district council or urban authority, and they remain answerable to the local government authority in terms of performance and financial management. COWSOs are expected to secure a Water Use Permit from the relevant Basin Water Board in order to use water from any surface or underground source before August 2011.

The Water Resources Management Act (2009) resulted in a change to the meaning of Water User Association, which is now an entity established by the users of water resources to manage, distribute and conserve water from a source used jointly by its members, or to acquire and operate any permit granted under the provisions of the Act, or to resolve water use conflicts, or to collect water user fees on behalf of the Basin Water Board, or to represent the special interests and values arising from water used for a public purpose (such as in an environmental or conservation area) or for the purpose of managing a Groundwater Controlled Area. The formation of a Water User Association must be approved by the relevant Basin Water Board.

2.4.5 Approach to hygiene promotion out-dated

The community needs assessment recorded high rates of latrine ownership and hand-washing in the first nine communities, where 86% of respondents claimed to have a latrine and 87% claimed to practice hand-washing before eating (RECODA, 2007). The issue does not seem to be that local people lacked knowledge of sound hygienic practices (as they clearly wished to claim high rates of good practice, even if these were over-stated). Rather the question was how to bring about lasting behaviour change.

WADA adopted PHAST as the preferred methodology for promoting hygiene-related behaviour change. PHAST training courses were conducted by national PHAST trainers and were typically attended by 20-30 Ward Executive Officers, Village Executive Officers, Village Chairpersons,
Sub-village chairpersons, primary school teachers, village health committee members and religious leaders. The aims of these courses were:

- to create a team of PHAST facilitators at village level to support the community in improving their knowledge and skills on disease control and prevention;
- to facilitate sustainable planning, monitoring and follow-up of water, sanitation and hygiene-related activities in their area; and
- to enable community members themselves to evaluate water, sanitation and hygiene activities and behaviour changes.

Each village was expected to develop a Plan of Action after the PHAST course, to bring about changes in sanitation facilities and personal hygiene habits.

The review found the recall of PHAST content to be reasonable. Most participants could remember two or three of the key messages, typically the need to construct a household latrine, drying racks and a rubbish pit, to treat or protect drinking water, and to avoid sharing hand-washing water before eating. However, it was apparent that little had subsequently been done with this knowledge. None of the village committee members interviewed were able to produce the village health plan and in most cases admitted that it did not exist. Leadership changes were typically blamed for the loss of these documents, but if the plans were truly village-based then they would have been immune to changes in personalities. Sub-village leaders were expected to convey the health messages to school teachers in their locations, who were in turn expected to transmit these messages to pupils. This does not appear to have taken place, perhaps because neither the leaders nor the teachers had any personal incentive to introduce the measures proposed by PHAST.

It is now widely accepted that PHAST is effective at conveying key health messages but is less effective in invoking improved hygiene behaviour change (see, for example, an evaluation of PHAST in Tanzania led by Bibby, 2007). Despite rigorous and often repeated attempts to demonstrate causal links between PHAST and sustainable behaviour change, the evidence is inconclusive (see text box).

### Summary of PHAST evaluation (Bibby, 2007)

PHAST has not been the participatory community development process that was envisaged, but a donor-driven methodology with a top-heavy Training of Trainers structure. The process is facilitator-dependent and this results in considerable variation in methods, with reports that some facilitators use non-participatory lecture techniques because of shortage of time. The community action plan, a key PHAST output is rarely, if ever, retained or implemented. PHAST also sells the idea of better sanitation and hygiene behaviour in a rather negative way, centred on the idea that poor practices will lead to disease and the risk of death. There are more effective ways to encourage uptake of new ideas that build on positive aspiration and known behaviour change drivers.

Institutionally speaking, PHAST is usually run on a contract basis and is not mainstreamed within the day to day working of government at any level. In addition, being heavily allowance-dependent with no easily measurable results, it is generally perceived to be expensive and as a result there is no real local ownership of the approach. At an estimated cost of $3 per capita, it is concluded that PHAST is a relatively costly way of conveying a limited number of key sanitation and hygiene messages to a limited number of people with limited impact.

A high profile and well-funded sanitation and hygiene program such as WADA should have recognised and responded to the significant concerns that have developed in relation to PHAST over the last few years, and considered more progressive, contemporary approaches. This,
together with lack of understanding of the policy environment, were symptoms of the lack of real engagement in the sector - not surprising given that the key players were not wat-san sector specialists. An “add-on” approach to implementing a wat-san program was not effective, as the next section outlines further.

2.4.6 Insufficient technical capacity

WADA implemented a package of sanitation and hygiene-related interventions that were essentially appended to a natural resources management program. The primary concern of the TCMP is effective coastal governance. TCMP’s staff lacked wat-san expertise and were therefore not ideally qualified to design and supervise WADA activities.

This had a number of significant outcomes as far as WADA was concerned:

- **Limited analysis and redirection**: There is little evidence that the program analysed its experiences and redirected its interventions on the basis of lessons that were being learned. Most activities were pre-determined and replicated from site to site over the three year funding period. The PHAST and VWC training of 2009, for example, was a straightforward repeat of the first round of training in 2007, despite the fact that none of the first training sessions had led to any sustained impact (such as the preparation of Village Health Plans and appropriate follow-through).

- **Little innovation**: Beyond the efforts to experiment with school-based hand-washing systems, there is little evidence that WADA sought to experiment or innovate, in spite of the pressing need for new and more effective approaches to promoting better sanitation and hygiene in Tanzania. The program could, for example, have considered ways to move beyond PHAST towards more up to date approaches for engendering behaviour change such as Community-Led Total Sanitation (CLTS) and Social Marketing; or could have opened up a debate about alternative latrine pits capable of accommodating cheaper and more mobile emptying devices (hence better suited to inaccessible schools than traditional exhauster lorries); or could have considered smaller and cheaper latrine designs suitable for children that would have allowed the limited funds to go further; or could have considered matching hardware maintenance requirements (especially with regard to pit emptying) with schools’ financial capacities and their termly funding cycles.

- **Faulty infrastructure design.** The design of school latrines and rainwater harvesting systems was often technically unsound. For example:

  - the vent pipes on the 2008/09 (THESA-built) latrines were fitted on the inside rather than the outside of the buildings, which means they cannot function as “ventilated improved pit” (VIP) latrines because there is insufficient solar heating of the pipe to induce convective air flow;
  - the eaves on most of the latrines are too short (<60 cm) to cover the doors when they are open (90 cm), so when the doors are left ajar they are exposed to rainwater and will rot prematurely;

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the hand-washing soak-aways added in 2008/09 were over-engineered and unnecessary, with excessive piping, large concrete chambers and heavy lids that cannot be lifted off;

- the netted air vents retrofitted above the latrine doors were also unnecessary, given the ventilation entering the structures from other sources;

- efforts to incorporate access for disabled pupils were amateurish and the resulting stalls could not be used by most disabled children as they are too narrow, the seats too high, handrails too widely spaced and wheelchair access not possible (as the ramps terminate at the door rather than alongside the drop hole); and

- rainwater harvesting systems were not appropriately matched to roof areas, rainfall and site-specific needs: some have excessive guttering for the installed tank capacity (e.g. at Madizini, a 5,000 litre tank is fed by 336 sq.m. of roof area, meaning that the tank will fill with just 15 mm of rain); others are excessively complex for local management (e.g. Dumila, with a 15,000 l separator tank, 60,000 l storage tank, 9,000 l overflow tank, two 5,000 l overhead tanks and four distribution points, but none of it functioning due to theft of an electric pump).

A series of photos in Annex F illustrate the variety of design problems that were observed.

- **Poor construction quality.** The infrastructure problems went beyond the designs of the latrines to the quality of the building work itself. This became apparent post-2007, once World Vision’s involvement ended. Additional photos in Annex F illustrate a variety of sub-standard practices on the part of WADA’s 2008/09 sub-contractors, including:

  - failure to construct and compact foundations (leading to subsidence of floors and cracking of walls);
  - lack of treatment of exposed timber;
  - absence of doors and locks; and
  - installation of soak-away pipes above ground instead of buried.

Low standards of construction can be attributed in part to funding limitations (around $10,000 per latrine unit), but the lack of experienced supervisory capacity within TCMP also meant that artisans were poorly supervised and clearly took advantage. TCMP is currently attempting to make good four latrines where beneficiary schools have refused to take ownership\(^\text{14}\) until they are in usable condition (in Saadani, Matipwili and Mvomero/Mwembeni, plus one in Zanzibar; at Mvomero the floor repair was itself sub-standard and had collapsed once again by the time the review visited).

The results of adding a wat-san component to a program not otherwise focused on this sector were clearly quite limiting. There are lessons from which USAID and TCCC can learn when considering future funding modalities for activities of this nature.

\[^{14}\text{The concept of “handing over” is indicative of the way the communities perceived the assistance, not as a partnership but as a donation.}\]
2.4.7 Little sustainability in community-level work

The engagement of WADA with the WRWBO has created a valuable platform for further capacity-building and technical support under iWASH. Likewise the work with private companies in developing EMS is potentially scalable and replicable (and indeed ENVICON went on to work in an advisory capacity with the Karibu Textile Mill in the Ruvu Basin independently of WADA). However, the program’s work at village level leaves behind few sustainable benefits.

For example, three of the school latrines on the mainland have not yet been accepted by the beneficiary institutions, as outlined above. The latrines constructed by THESA or the one built directly by TCMP (Mvomero) are deteriorating rapidly and are likely to become unusable in a matter of three or four years. A well constructed latrine, designed to facilitate regular emptying, should last as long as a well constructed house or classroom provided it is properly maintained.

There was little apparent thought given to maintenance of the latrines, including how children, teachers the community at large might be incentivised to carry out regular cleaning and repairs, and whether (and how) school teachers and administrators could be held responsible for this.

There are no residual impacts from the PHAST training. In most places the village health plan was either not produced or has since been lost. Even in the few locations where a plan was drawn up as a result of the training (e.g. in Mvomero), there has been no significant effort to implement its provisions. And while several village governments can confirm how many of their residents have a latrine and how many do not, citing this as an outcome of the PHAST support, this was information already being collected in most cases as part of health sector monitoring and is not an outcome that can be definitively attributed to WADA’s inputs.

Equally few impacts and sustained benefits are evident from the VWC training. Certainly the review did not find evidence to support the statement in the first phase close-out report that “after the training provided through WADA, the capacities of the village committees were enhanced”.

The three rainwater harvesting systems built under the program in the Wami Basin have all suffered from rapid breakdown: the tank at Dumila Juu is only one year old but already lacks a connector pipe and taps and does not function; the guttering at Madizini has broken on one side of the building so the system is 50% usable; and the pump theft at Dumila has rendered that system inoperable.

The low survival rate of trees planted on the program has already been noted (optimistically averaging 50%), and the intended purpose and beneficiaries were not well thought through.

2.4.8 PR disproportionate

WADA I was a very well publicised program. The first close-out report records 26 positive articles and features in the Tanzanian media and there were several press tours and visits by high profile individuals from TCCC during the first 18 months. Launch events and handovers were conducted with great flair and usually involved senior figures from GoT (Regional and District Commissioners), the US Embassy (including the Ambassador) and TCCC’s local bottlers and its offices in Kenya, South Africa and the USA. This generated a heavy workload for the TCMP staff delegated to manage the various events, which were often out of proportion with
the scale and impact of the work actually being done on the ground. While it is acknowledged that TCCC provided separate funding and in-kind contributions from its bottling partners for most of the launches, handover events and media promotions, the managerial burden on TCMP staff was still significant.

The exaggerated expectations created by high profile events at village level led to hopes being falsely raised and would inevitably have been followed by community disappointment. The TCMP Director also reported that the high profile donor presence created the impression that resources were unlimited and this led to an unwillingness on the part of local residents to contribute their time or resources to WADA-supported activities.

It is reported by the former program coordinator that the media and PR effort was driven largely by TCCC. The USAID mission in Dar es Salaam stated that it was sometimes unaware of particular events or was not invited to send delegates. Yet TCCC provided no funding after the first year and it was USAID that contributed 72% of the total budget between 2007 and 2009. A unified and coordinated approach to program publicity, giving acknowledgement to all program partners in proportionate measure, would have been more appropriate.

TCCC apparently considered WADA I a great success, perhaps in part because of the significant publicity that it generated. An evaluation commissioned by The Coca-Cola Africa Foundation (see Khulisa Management Services, 2009) found the majority of the WADA activities in Tanzania to be of a high standard, with a total of nine social impacts reported to be large in extent, medium to high in intensity, and medium to long in duration. The evaluators concluded that WADA had created “a culture of toilet use” and had precipitated a “decrease in pregnancy rates” and improvement in “overall student performance”. They also cited a “decrease in conditions, such as cholera, that are found in the community” and an “overall improvement in the communities’ health”. While follow-ups by the program’s own staff suggested that the enrolment of girls might have increased at Madizini and Dumila Primary Schools, the review is unable to agree with the evaluators’ other bold conclusions, in the absence of any verifiable evidence that the stated changes took place, or had any linkage with WADA interventions.
3. Implications for WADA II

3.1 Specific follow-up work

There are specific areas identified by the review for which follow-up work is suggested to bring particular interventions to a close. These are as follows:

• **Repair rainwater harvesting systems:** The rainwater systems installed under WADA I have operational problems but are repairable. This should be the responsibility of TCMP rather than iWASH, possibly with further USAID support. It is suggested that rapid rehabilitation work is undertaken done at Dumila Juu (a new connector pipe and taps on the tank) and at Madizini (an additional tank and repairs to guttering). The Dumila system needs a new pump but this should not be replaced until it is clear how a repeat theft can be avoided. This will require a more in-depth discussion with the primary school management and village government, before any commitment to repair the system is confirmed. It may be more sensible simply to relocate the two overhead tanks to ground level and operate the system on a more straightforward gravity-fed basis.

• **Finalise EMS work at Mtibwa Sugar Estate:** The EMS work at Mtibwa needs to be brought to a logical conclusion as there are outstanding recommendations and it is unclear what should happen next. A final visit by the ENVICON consultant is suggested to review the recommendations that were made (both technical and institutional), determine the reasons for non-implementation where relevant, and make final suggestions for a WADA exit strategy. This should take place in December or January when the factory is closed for maintenance, and could be facilitated under iWASH.

• **Provide follow-on support to WRBWO:** The excellent foundation laid by WADA I allows WADA II to engage in several follow-on activities with the Basin Office in Morogoro. These include: commissioning a wet season EFA on the Wami River, conducting an EFA on the Ruvu and providing further GIS support of a targeted nature. The GIS support should address some specific technical issues that have arisen, such as the need to upgrade the ArcMap software (to version 9.2) and to assist staff in converting coordinates between different reference systems, sharing files between different software versions, transferring data to and from GPS units via cable connections, and so on. These are straightforward technical bottlenecks that could be easily solved on an individual basis, allowing the trained staff to fully exploit the skills that WADA I introduced.

3.2 Programmatic implications

The review findings also have some generic implications for the wider operation of iWASH / WADA II.

3.2.1 Nature of financing

WASH is a technical field with its own long history of learning in Tanzania and the wider region. It is not easily appended to a program with different core interests whose staff lack the necessary expertise and exposure to provide sound technical oversight. Funding for water and
sanitation improvement should, as far as possible, therefore be channelled through dedicated wat-san programs with appropriately qualified staff. This lesson has already been acknowledged and incorporated into iWASH, which is a specialised sector program under the management of GLOWS/FIU, working with a team of wat-san specialists and experienced partner institutions.

Within iWASH it will be important to ensure that the environmental management component is duly mainstreamed and does not itself become treated as an add-on to a program otherwise strongly focused on wat-san. iWASH staff in supervisory roles should acquire adequate skills in environmental screening and management.

The WADA I experience also highlights short-term planning horizons as an inherent limitation of the WADA funding structure, given that TCCC generally provides financing for only one year. Fortunately it has already been agreed that USAID will sustain WADA II in years two and three. It would be worth considering a similar follow-on strategy for WADA initiatives in other countries that are benefiting from joint USAID/TCCC financing.

### 3.2.2 Site selection and geographic focus

It may seem obvious that water and sanitation interventions should be needs-driven, meaning that water should be supplied where it is lacking and efforts should be made to improve sanitation and hygiene conditions where they are most deplorable. But an important implication of this logic for iWASH/WADA is that interventions to improve water access may be directed separately from sanitation and hygiene measures, according to where the respective needs are greatest. This challenges the traditional integration of water, sanitation and hygiene interventions, but as they require different timeframes, approaches and skill sets, then this separation may be justified in some locations.

WADA I experience also suggests that it would be imprudent to cover an excessively large geographical area within WADA II. From an operational base in Morogoro and with no budget for field-based staff under the WADA component, it is not realistic to expect meaningful and sustained community engagement beyond 200 km or so. This lesson justifies the tighter focus of WADA II on the Wami-Ruvu Basin, excluding the Pangani, and for its service delivery focus on selected Wards within Morogoro Rural District.

### 3.2.3 Length and depth of engagement

Improving water supply and improving sanitation and hygiene is as much about changing behaviours, perceptions and management systems as it is about providing new infrastructure. WADA I showed, for example, that the presence of tanks and taps was not sufficient to catalyse hand-washing in schools; intensive training sessions in PHAST and water supply management did not result in enduring changes in community-level sanitation practices or the management of water resources; donations of tree seedlings did not stimulate a new culture of tree growing and afforestation.

Bringing about real change takes time and commitment, to engender mutual understanding and real engagement. It would therefore benefit iWASH/WADA II to focus on a relatively confined geographical area within which effort is focussed for an extended period of time. For hygiene-related behaviour change, a two to three year engagement is probably required, ideally working through multiple channels and in adjacent communities to maximise the opportunity for
message reinforcement. iWASH will be working on this in partnership with SNV, one of the best qualified organisations in Tanzania for school-based sanitation and hygiene improvement.

3.2.4 Innovation in school sanitation

There are several learning opportunities from WADA I in relation to school latrine development:

1. **The status quo must be challenged if national targets are to be met:** Faced with resource limitations and the huge challenge of installing latrines to approved GoT standards in a large number of schools, it may be necessary to challenge current thinking on numbers and designs. Firstly, the requirement to provide one latrine per 25 boys or 20 girls may be overly ambitious, and in many cases a lesser number of a decent standard would be better than no latrines at all; there are proposals already being considered for an “interim” target of 40 girls and 40 boys per latrine (“some for more, not more for some”). Secondly, it may not be necessary to build latrines for school children to the same design specifications as those for adults; to reduce costs it is worth considering smaller stalls and lower building heights - children do not need 90 cm wide stalls and 235 cm ceilings. Related to this, there is a need to find modalities for emptying pits that do not require an exhauster lorry to visit the school, this being prohibitively expensive\(^\text{15}\) and not even practical in many cases due to access constraints. There may, for example, be ways of using smaller, sloped latrine pits with solids barriers from which liquids can be removed using hand-operated pumps or other technologies developed for urban areas. This would not only save money during construction as 5 m pits could be avoided, but could also allow for cheaper and more frequent latrine emptying on (possibly) an annual basis, which would fit better with school planning and budgeting cycles.

2. **Contractors need to be appropriately financed and closely managed:** It is not possible to build a school latrine of the current recommended design for $10,000. Around 50% more than this is needed for a standard 20-stance structure, although much less could be spent if some of the above proposals were adopted. Budgets should therefore be realistic and costings must be accurate for the design being proposed, ideally based on proper Bills of Quantities or fixed price contracts. Those sub-contracted for any building work must be closely supervised by appropriately qualified program staff, to ensure that standards are maintained and high quality materials are used.

3. **The culture of hand-washing is at least as important as the hardware:** Water and some means of dispensing it is of course essential for ensuring that children wash their hands after using latrines. But providing this facility is not sufficient to ensure that hand-washing actually takes place. Systemic changes to school culture are required that require long-term engagement at both practical and policy levels. Village governments are mandated to manage primary schools and can apply direct pressure to see sanitation improved through their health and environment committees. The fact that most pupils’ parents live locally provides an additional channel through which pressure for change can be applied, as does the Ministry of Education’s school inspection system. An interesting idea for district sanitation league tables has been developed by WaterAid.

\(^{15}\) Renting an exhauster may costs TShs 70-80,000 and there will be an additional charge of perhaps Tshs 1,000 per km. This means Tshs 150-200,000 for a typical primary school.
(one of UNICEF’s partners in the SWASH guidelines development), with schools ranked against a combination of recordable factors. In Morogoro Rural District the chosen criteria are the number of latrines, their build quality and condition, the water supply situation and the existence of hygiene education (see Geodata Consultants Ltd., 2010).

3.2.5 Moving beyond PHAST

PHAST has been the dominant tool for promoting hygiene-related behaviour change in Tanzania for over a decade, but has not been effective in bringing about such change. A successor to PHAST is required that focuses on a smaller range of behaviours, is easier and simpler to introduce, and contributes in a more integrated way to a multi-channel approach to behaviour change promotion with message reinforcement from diverse sources. There are examples of this in WaterAid Tanzania’s “mtumba” approach.

A maximum of three key behaviours should ideally be addressed by a hygiene promotion program (e.g. separation of people from excreta through adequate latrines; hand-washing with soap at critical times; and perhaps a third, locally-specific hygiene message). Cheaper, simpler and more effective ways of achieving these behaviours are required. WADA II may wish to build on the early findings of CLTS, which was introduced to Tanzania from South Asia by Plan International and has been taken up by other organisations with varying degrees of success. Another methodology worth exploring is social marketing, in which the Water and Sanitation Program (WSP) of the World Bank has been active, piloting partnerships with private soap producers in hand-washing campaigns. Hybrid approaches are required that draw on the best elements of these various methodologies.

In spite of its limitations as a relatively expensive stand-alone approach, there may also still be a place for PHAST-type tools in hygiene promotion if the approach can be made more streamlined, more cost-effective and better integrated with other government and non-governmental structures and approaches. Given that behaviour change is determined by multiple triggers, methodologies such as PHAST can still be useful as part of a more comprehensive hygiene communication strategy, as one strand in a communication approach that includes additional contact points reinforcing the same messages (e.g. mass media, home visits, religious gatherings, school-based activities, groups for women, youth or other specific interests, commercial advertising outlets and government campaigns, with regulatory enforcement by the Ministry of Health and Social Welfare). In this way, PHAST would not be delivered into a supply vacuum, but would be used alongside complementary measures to raise demand for improved sanitation and hygiene where appropriate service providers and products exist (e.g. private sector suppliers). This has sometimes been called “PHASTER”, but is an area in need of more work.

A more Specific, Measurable, Achievable, Replicable, Time-bound (“SMART”) version of PHAST is also proposed, with strict performance measures at different stages for both facilitators and participants and a streamlined set of more punchy tools which are easier and quicker to use. Nevertheless, while there is common agreement that PHAST needs to be replaced, it will not be easy to develop an alternative methodology which is simple, replicable, cheap to introduce and “champion-proof”, while still retaining real value and giving the potential to yield impacts as part of an integrated behaviour change marketing strategy. An extremely simple tool is required, but over-simplification introduces a risk that it will be ineffectual.
3.2.6 Engagement with water users and water polluters

It is not clear whether the industries targeted for EMS support by WADA were those with the greatest potential to affect water resources or were simply those with the highest profile. There is a need to conduct a more comprehensive assessment of the different industries, farming operations and settlements within the Wami and Ruvu basins that are either using surface water or discharging into surface water bodies, to determine their relative significance in order to prioritise further interventions in WADA II.

Two options then exist for the program. The first is to work with a large number of users at a relatively shallow level and the second is to work with fewer users in greater depth. WADA I opted for the second approach and produced sound technical guidelines but little ultimate change in industry practice. In WADA II it would be worth considering the first strategy, where a more generic approach to a particular sector is adopted in order to identify best practices, change mindsets and promote systemic change. For example, lessons and practices that are applicable across the sugar industry, biofuels sector, rice sector or across multiple urban water authorities.

3.2.7 PR management

The experience of WADA I suggests that the demands of PR from the program’s donors could be a significant burden on iWASH and may not always be proportionate to actual financing levels and activities on the ground. Such risks will need to be balanced against the understandable desire of TCCC and its non-profit affiliates to maximise the publicity value of their generous contributions.

From the iWASH perspective it will be important to ensure that the program retains firm control over any PR plans, that community expectations are not falsely or unfairly raised by publicity events and media releases, and that neither TCCC nor USAID generates publicity that is disproportionate to the scale of the activities on the ground or the relative contribution that each has made. There is a role here in relationship management for GETF, as the lead contractor on the iWASH and WADA contracts, working with the USAID mission in Dar es Salaam.
Annex A: Statement of work

Background
The Water and Development Alliance (previously known as Community Watersheds Partnership Program) is a public-private partnership between USAID and the Coca Cola Company. In February 2007, the Water and Development Alliance (WADA) launched a new project in Tanzania. The project aimed to support government efforts to achieve sustainable management of water and watershed resources in the Wami-Ruvu and Pangani River Basins. At the same time, it aimed to improve community access to sustainable safe water, and provide sanitation services and hygiene education to local communities.

The WADA I project was initially envisaged as a one-year project with a budget of US$500,000, but was later given a no cost extension to August 2008. USAID provided additional funds under ‘Water for the Poor’ to extend the project up to December 2009. The lead agency was University of Rhode Island’s Coastal Resource Centre (CRC), which operated through their local agency, the Tanzania Coastal Management Partnership (TCMP). The key implementing partners were World Vision Tanzania, Tanzania Health and Environment Association (Thesa), Florida International University through Global Water for Sustainability (GLOWS), and the University of Dar Es Salaam. Other local partners included the Ministry of Water and the two Basin Offices, the Vice President’s Office Department of Environment and the National Environmental Management Council, Saadani National Park, TPC Sisal Producers, as well as the Local Government Authorities and Village Water Committees.

The stated objectives of the project were:
• Develop and improve water supply and sanitation systems in selected local communities in the Wami-Ruvu and Pangani Basins.
• Promote participatory decision-making process and the local ownership and management of water supply and sanitation services of communities in the targeted basins.
• Delineate the drainage basins and characterise surface catchment in relation to longitudinal and vertical dimensions of the Wami River.
• Determine credible measure of river basin flows, as well as water quality and quantity requirements of household and private sector water users, and the flow required to maintain biodiversity and ecosystem processes.
• Mainstream the participation of both genders to optimize the use of water resources and improve sanitation and hygiene.
• Identify sources of pollution and fresh water use that have potential to affect sanitation and health related to water contact and extraction, and advocate for cleaner production practices in agro-industrial water use and reduce business operating costs.

Project activities took place in four geographic regions:
• Morogoro Region in Kilosa and Mvomero Districts, in Msowero, Dumila, Mvomero, and Madizini villages
• Pwani Region in Bagamoyo District, in Miono, Mandela, Kikaro, Saadani and Matipwili villages
• Tanga Region in Korogwe and Pangani Districts, in Hale, Pangani East and Pagani West villages
• Zanzibar in Mjini Magharibi, Bweleo and the Fumba Peninsula
Project activities included:

- An Initial Environmental Flow Assessment carried out on the Wami under dry season conditions with the Wami-Ruvu Basin Water Office;
- Studies and implementation of Environmental Management Systems at two industrial sites on the Wami River;
- Village Water Committees strengthening, and formation of committees for Environmental Hygiene and Sanitation;
- PHAST training conducted for all the selected villages in the Wami-Ruvu, with other forms of hygiene/sanitation training conducted in Pangani and Zanzibar;
- School latrines constructed in most of the selected villages, and rain water harvesting systems in four of the schools (three in Wami-Ruvu);
- A piped connection to a village water supply constructed at one school;
- Promotion of better hygiene standards for food vendors;
- Tree planting activities;
- Exchange visits for Wami upstream communities to visit downstream communities and see the river system and how upstream activities can impact.

A ‘learning review’

The new WADA funding for the iWASH Program is intended to build on the WADA I experiences. The proposed Learning Review aims to capture, analyse and document those experiences, to ensure that good practice from WADA I is incorporated in WADA II, and any mistakes or pitfalls can be avoided. It is proposed that this Review take place between 06 – 30 September 2010, at the very start of the WADA II project.

Scope of Work

The consultant will review available existing documentation, and then visit key sites within the Wami-Ruvu to physically see the infrastructure constructed, to discuss with key informants and beneficiaries, and to assess the appropriateness, effectiveness and sustainability of the different interventions of WADA I.

The following sites are proposed for visits:

- Dumila and Madizini villages in Kilosa District, which are rapidly growing centres (small towns in the making) where several different interventions were made:
  - School latrines and RWH (Dumila school had no latrines previously)
  - Hygiene/PHAST (Madizine had serious cholera problems)
  - WUA and water committees were trained

- Mvomero and Msowero villages in Kilosa District:
  - School latrines were constructed
  - PHAST was carried out
  - WUA and Water Committees were trained
  - Tree planting was promoted

- Miono, Kikaro and Saadani villages in Bagamoyo District: Miono was used as a centre for PHAST training during WADA I:
  - Miono was used as a centre for PHAST training during WADA I
➢ School latrines were constructed in all three villages, and one water scheme was constructed
➢ WUA and Water Committees were trained
➢ Tree planting was promoted
➢ Improved hygiene was promoted among food vendors

• Mtibwa Sugar plantation, which was deemed a very successful example of Environmental Management System interventions

[NB. It is not proposed to review the Wami EFA as this will be done separately with EFA experts and the local EFA Team.]

The consultant will review the following:
• What were objectives of the interventions?
• What were the planned activities?
• What methodologies/technologies were chosen? And why?
• What was actually done?
• Who implemented the activities? How effective were partnerships? How was the local Government involved in implementation, and follow up?
• What was achieved? And what if any are the subsequent outcomes or follow on activities?
• Which of the interventions have had sustained benefits or impacts? And why?
• Which have not sustained? And why?
• What were the main challenges or shortfalls – why?

The consultant’s conclusions and recommendations should identify the following:
• What can iWASH and WADA II learn from the WADA I experience?
• What are the examples of good practice, especially as regards ensuring appropriate, effective and sustainable outcomes?
• What mistakes or pitfalls should iWASH avoid?
• Are there any WADA I areas of interventions for which WADA II/iWASH should consider follow-up work?

Expected output
Report no more than 25 pages, with clear summary of findings, conclusions and recommendations.
## Annex B: Review itinerary

<table>
<thead>
<tr>
<th>Date</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sun 5&lt;sup&gt;th&lt;/sup&gt; Sep 2010</td>
<td>Fly Nairobi-Dar es Salaam and overnight.</td>
</tr>
<tr>
<td>Mon 6&lt;sup&gt;th&lt;/sup&gt; Sep</td>
<td>Meeting with former WADA Coordinator. Drive Dar es Salaam – Morogoro. Meet iWASH Director and overnight Morogoro.</td>
</tr>
<tr>
<td>Tue 7&lt;sup&gt;th&lt;/sup&gt; Sep</td>
<td>Report review. Visits to Jumila and Jumila Juu villages, Kilosa District. Overnight Morogoro.</td>
</tr>
<tr>
<td>Wed 8&lt;sup&gt;th&lt;/sup&gt; Sep</td>
<td>Visits to Miono and Kikaro villages, Bagamoyo District. Continue to Saadani and overnight.</td>
</tr>
<tr>
<td>Thu 9&lt;sup&gt;th&lt;/sup&gt; Sep</td>
<td>Visits to Saadani, Matipwili and Mandera villages, Bagamoyo District. Return to Morogoro and overnight.</td>
</tr>
<tr>
<td>Fri 10&lt;sup&gt;th&lt;/sup&gt; Sep</td>
<td>Public Holiday. Debriefing with iWASH Director. Document review. Overnight Morogoro.</td>
</tr>
<tr>
<td>Sat 11&lt;sup&gt;th&lt;/sup&gt; Sep</td>
<td>Further document review. Overnight Morogoro.</td>
</tr>
<tr>
<td>Sun 12&lt;sup&gt;th&lt;/sup&gt; Sep</td>
<td>Further document review. Drive Morogoro-Madizini and overnight.</td>
</tr>
<tr>
<td>Mon 13&lt;sup&gt;th&lt;/sup&gt; Sep</td>
<td>Visits to Mtibwa Sugar Estate and Madizini and Mvomero villages, Mvomero District. Return to Morogoro and overnight.</td>
</tr>
<tr>
<td>Tue 14&lt;sup&gt;th&lt;/sup&gt; Sep</td>
<td>Sanitation engineer to Msowero village, Kilosa District. Lead consultant analysing data in Morogoro, Overnight Morogoro.</td>
</tr>
<tr>
<td>Wed 15&lt;sup&gt;th&lt;/sup&gt; Sep</td>
<td>Visit Wami/Ruvu Basin Water Office. Drive Morogoro-Bagomoyo and visit TCMP. Continue to Dar es Salaam and overnight.</td>
</tr>
<tr>
<td>Thu 16&lt;sup&gt;th&lt;/sup&gt; Sep</td>
<td>Debriefing at USAID and meeting with ENVICON, accompanied by iWASH Director. Overnight Dar es Salaam.</td>
</tr>
<tr>
<td>Fri 17&lt;sup&gt;th&lt;/sup&gt; Sep</td>
<td>Final data collection. Fly Dar es Salaam-Nairobi.</td>
</tr>
<tr>
<td>Wed 29&lt;sup&gt;th&lt;/sup&gt; Sep</td>
<td>Submission of draft review report to FIU for comments.</td>
</tr>
<tr>
<td>Fri 15&lt;sup&gt;th&lt;/sup&gt; Oct</td>
<td>Submission of final review report.</td>
</tr>
</tbody>
</table>
Annex C: People met

iWASH Program, Morogoro
Vivienne Abbott, Director
Appa Mandari, Consultant
Raphael Lwassa, Sanitation Engineer (CARE International)

USAID Mission, Dar es Salaam
Juniper Neill, Team Leader, Natural Resource Management/Economic Growth
Gilbert Kajuna, Deputy Team Leader, Natural Resource Management/Economic Growth
Gabriel Batulaine, Senior Environmental Management Specialist
Cory Brandt, Communication Specialist
Ken LuePhang, Contracting Officer

Tanzania Coastal Management Partnership, Bagamoyo
Jeremiah Daffa, Director

Wami-Ruvu Basin Water Office, Morogoro
Praxeda Kalugendo, Basin Water Officer
Misigaro Kigadye, Head of Water Resources Planning and Research
Lukanazya Tumaini, Hydrology Technician
Deotila Mgoli, Hydrology Technician
Lucy Makunjira, Survey and Drafting Technician

ENVICON Dar es Salaam
Karoli Njau, Chief Executive Director

Bagamoyo District:
Kikaro village
Ramadhani Mange, Divisional Secretary, Miono Division
Zahaniah Yusuf, Village Chairman
Ramadhani Jumbe, VEO
Blaise Kanute, Head teacher, Kikaro Primary School
Joseph Thomas, Agriculture teacher, Kikaro Primary School
Mandera village
Claudio Shamlamba, Head teacher, Mandera Primary School
Matipwili village
Mrisho Tumaa, Village Chairman
Tabu Rajabu, Village Executive Officer
Gavile Jeti, Agriculture & Livestock Extension Officer
Muhsin Hassan, Deputy Head teacher, Matipwili Primary School
Miono village
Hashim Ramadhani, Village Chairman
Lucian Puka, Head teacher, Miono Primary School
Saadani village
Haji Sefu, Village Chairman
Kombozi Hali, Education Committee
Iddi Ibrahim, Head teacher, Saadani Primary School

Kilosa District
Dumila village
Douglas Mwigumila, Village Chairman
Frank Kessy, Acting Village Executive Officer
Twaibu Shida, Health Committee
Salum Ramadhani, Social Welfare Committee
Leah Nzali, Social Welfare Committee  
Makati Mbaruk, Chairman, Bwawani sub-village  
**Msowero village**  
Mbaya Ngajimba, Village Chairman  
Mashaka Motile, Village Executive Officer  
Richard Nchimbi, Secretary, Village Health Committee  

**Mvomero District**  
Costa Reuben, Ward Executive Officer, Mtibwa Ward  
**Madizini village**  
Rajabu Chamwile, Village Chairman  
Fatuma Shaban, Home-based HIV/AIDS carer  
**Mvomero village**  
Kasim Mtunge, Village Chairman  
Omary Kombo, Village Executive Officer  
Ann Nyagatwa, teacher, Miembeni Primary School  
**Mtibwa Sugar Estate**  
Peter van der Lucas, Factory Manager  
Balthazar Tingo, Assistant Factory Manager  
Edward Adukio, Irrigation Engineer  
Harryson Reumbiza, Safety, Health and Environment Manager  
Mike Whitbread, Agriculturalist  
Zachariah Mwakipanda, Assistant Process Manager
Annex D: Documents consulted


Coastal Resources Centre & Florida International University, 2008. *How much water do we need for nature, livelihoods and people? Assessing the environmental flow of the Wami River and its sub-basin*. WADA-funded publication of the University of Rhode Island and FIU.


Tobey, James, 2008. *A Profile of the Wami River Sub-Basin*. Coastal Resources Centre, University of Rhode Island, USA.


WADA Tanzania, 2007. Two page fact sheets in English and Kiswahili on EFA, EMS, tree planting and wat-san, as well as program overview. Produced by TCMP, Dar es Salaam.

Annex E: Map of programme beneficiary communities
Annex F: Photographs

A. Latrine design flaws

Matipwili: no vent pipes visible

Matipwili: vent pipe incomplete

Saadani – vent pipes positioned internally
Madizini: Hand-washing soak-away over-spec

Jumila: Same problem, soak-away size and covers excessive

Miono: Covers for soak-away never fitted; too heavy to put into place
Jumila Juu: vent pipes internal; valley-style roof; inadequate gable protrusion

Mwembeni (Mvomero): drop hole too small

Jumila juu: handrails for disabled children weak and widely spaced; no wheelchair access
Saadani: wheelchair ramp but no access; stall too narrow

B. Latrine construction faults

Saadani: subsidence due to lack of foundation, floor being re-done at TCMP expense
Mwembeni: Collapsed floor, missing doors

Mwembeni – no foundation under slab

Miono: Subsidence at end of pit
Matiwpili and Saadani: Cracked walls due to subsidence

Mioni and Jumila: Poorly installed vent pipes, now broken
Mwembeni: Missing ridge allows rain to enter

Matipwili: Untreated fascia board

Madizini: Mosquito netting weak, now broken
C. Problematic rainwater harvesting systems

Dumila: Missing downpipe

Dumila Juu: missing connector pipe
Dumila: Collection tank and overhead tanks

Dumila: Cage for electric pump, but pump stolen

Dumila: System connected to four distribution points, now not working
Madizini: Double guttering > 40m over-spec for tank capacity

Madizini: Gutter too long to carry weight of water and has buckled

Madizini: Gutter lacking downpipe or tank
D. Hand-washing systems

Jumila Juu: concrete box system; tap missing

Miono: Tippy-tap system, but container absent

Dumila: Tippy-tap system, water rancid
Madizini: Simtank system, but tank missing

Saadani and Mwembeni: Simtank systems, but tanks missing
Saadani: Simtank kept in school store

Jumila Juu: Simtank in place, but lacking tap

Matipwili and Jumila Juu: Hand-washing soakaways over-spec; connector pipes broken
E. School tree planting

Msowero: Good survival rate within school compound

Mandera: Good survival within compound
Miono: 40-50% survival in woodlot

Kikaro: 50-60% survival in woodlot