Implementation of the AWS Standard at Olam International's Aviv Coffee Plantation in the Ruvuma Basin, Tanzania

Technical report: Costs, benefits and emerging recommendations

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ALLIANCE FOR WATER STEWARDSHIP

WATER WITNESS INTERNATIONAL

Contents

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Executive summary

This report documents the lessons generated by the first implementation of the Alliance for Water Stewardship Standard in East Africa. Olam International adopted the AWS standard at their Aviv Coffee Plantation in the Upper Ruvuma Basin in Southern Tanzania with support from AWS accredited advisors, Water Witness International. Additional support to document and share lessons has been provided by the International Water Stewardship Programme managed by GIZ on behalf of the UK and German governments - for whom the implementation is of strategic interest. The objectives of the exercise were to:

- Advance and formalise Olam's approach to water stewardship using the AWS ISEAL-compliant standard, to better manage water risk and support collective action for water security.
- Establish the costs of applying the AWS Standard and appraise the benefits for business, government and community stakeholders, and to explore the business case for the AWS standard in Africa.

Between March and September 2015 a stepwise methodology supported alignment of the site's operations with the requirements of the standard and documented the process. The site is due to be audited against the standard in November 2015 by an independent AWS accredited certification body. This summary introduces the context of implementation, the outcomes and benefits generated, costs and challenges incurred and sets out conclusions and recommendations.

A challenging water security context

Like many investors in Africa, Olam faces a complex mix of water challenges which pose risks to operations and financial viability, and to the company's social and legal licence to operate, if not identified and addressed. At their Aviv plantation these include:

a. A naturally dynamic physical environment of regular flood and drought events, the frequency and severity of which are likely to increase as a result of climate change.
b. Competition and conflict over water resources in the sub-basin where rapid demographic change within relatively poor communities alongside new economic investment is increasing degradation and demand.
c. Weak governance and low levels of investment in water. Despite reformed water law and institutional frameworks, government authorities lack the resources and reach to effectively manage water resources. Very few users possess water use permits and the ability of the Basin Water Board to control and coordinate water use so that everyone gets a fair share is limited.

Within this context Olam plans to irrigate close to 2000 ha of coffee via abstraction from the Upper Ruvuma, to employ some 1250 people and contract 1100 out-growers. The increasing prevalence of dry spells in a sub-basin where competition, conflict and degradation are increasing, and where governance capability to manage these issues is limited exposes all water users in the basin to serious risks. Olam had already begun to act on these risks to safe guard their own operations and ensure that they were not impacting on other stakeholders. This new and pioneering work to implement the AWS standard seeks to support and strengthen that effort, and advance the water stewardship agenda for greater water security in the region.

Positive change driven by the Alliance for Water Stewardship standard

Olam was already performing well as a water steward ahead of the AWS standard implementation. However, implementing the standard has bolstered those efforts. Examples of significant change driven by the standard include:

Improved water quality management and pollution control

Pollution risks posed by and affecting the site have been systematically identified and acted on. Comprehensive pollution prevention and control planning has led to improved fuel storage facilities, management processes, and investment in risk-based water quality monitoring. Perhaps the most significant

change has been in erosion control which posed serious risk of infrastructure damage and resource loss on site, and catchment degradation downstream. A focused approach to erosion control has been developed, funded and implemented with erosion risks mapped and a range of control measures put in place including check dams and planting of vetiver grass. Effectiveness will be tracked and management adapted accordingly. To address pollution risks in the basin Olam have initiated communications with the municipal sewerage provider to demand that sewage pollution threatening the site be controlled.

Sustainable water balance and equitable use

The most significant risk facing Olam's Aviv site and other water users in the basin is water scarcity during periods of low flow and resulting shortage in supplies, environmental impacts and conflict between users. AWS implementation has strengthened Olam's ability to demonstrate compliance with its water use permit and protect environmental flow needs so that its own activities don't impact on others. It has also driven a review of the site's permit and the likely surrender of water back to the basin, once actual operational needs have been better established during 2015. This will contribute to equitable and sustainable resource use among basin stakeholders in the future.

Further, the Aviv site is now monitoring its water use intensity so that it can set and track water efficiency targets. Proactive conflict mitigation measures to prevent future disputes with downstream users has also been initiated.

Water supply, sanitation and hygiene provision

AWS standard implementation confirmed a previously identified requirement to improve water, sanitation and hygiene (WASH) facilities for staff across the site. Due to construction and contractor issues, these were previously inadequate in terms of location, provision per head and distance to travel and this posed reputational, regulatory and operational water risks. Olam's approach to water and sanitation provision has been strengthened at site, and globally as a result of working through the AWS standard. Internal policies, guidelines and standards now make reference to World Health Organisation guidelines on adequate levels of WASH provision and with new funding mobilised to ensure alignment with these.

Improved governance and positive influence beyond the fence line

Olam are co-investing in establishment of the Upper Ruvuma Water User Association. Once successfully established this body will lead new efforts to address priority shared risks, including low flows, inadequate WASH infrastructure, unregistered water use by small irrigation schemes and catchment degradation including through artisanal mining activities. It will also support water allocation which is coordinated and in line with sustainable yield, and plan responses to extreme events such as drought.

As well as investing in new skills and capacity at site level, Olam are also working with out-growers and local communities to improve water management and WASH provision. The process of alignment with the AWS Standard has demanded greater levels of transparency and disclosure by the site which in turn facilitates stronger and more trusting stakeholder relationships. Drawing on this credibility, the company is now supporting national level advocacy for improved water resource management in Tanzania through the Uhakika wa Maji Initiative.

The benefits of AWS standard implementation

The outcomes and benefits of the AWS standard are summarised in Table 1 (overleaf), benefits at site level in Table 2 and for basin governance and stakeholders more widely in Tables 3.

Costs and challenges of AWS implementation

Assigning financial benefits to AWS standard implementation is a challenge because many benefits seen concern avoided harm, or concern intangibles such as reputation and credibility. Where material savings are

possible, for example through greater efficiency and productivity, methodologies are being developed to track future financial savings enabled by the standard.

Table 1. Summary outcomes and benefits of AWS standard implementation at Olam's Aviv Coffee Plantation

Outcome areas	Summary outcomes of AWS Standard implementation	Benefits		
		Community and basin stakeholders	Site and company	Water governance institutions
Good water governance	• Support for basin governance • Investment in establishing Upper Ruvuma Water User Association • Investment in improved WASH for workers • Constructive national level advocacy • Proactive approach to conflict resolution • Greater transparency and disclosure	✓	✓	✓
Sustainable water balance	• Establishing a site water balance and targeting more efficient and productive use • Review of water use permit to support sustainable resource use	✓	✓	✓
Good water quality status	• Comprehensive pollution prevention planning & control • Investment in water quality monitoring and analysis • Improved erosion control • Addressing priority water quality risks in the basin	✓	✓	✓
Healthy important water related areas	• Demonstrating compliance and protection of environmental flow needs • Improved management of the Ruvuma River corridor	✓	✓	✓

Table 2. Benefits of AWS standard implementation at site and company level

Benefits of AWS Standard implementation for Olam International
Long term security of business operations and reputation through reduced water risk and demonstrable commitment to responsible use
Reduced likelihood of regulatory action, fines, compensation and remediation costs because of new systems to assure compliance
New water use data and efficiency tracking and likely long-term cost saving, efficiencies and higher productivity
Enhanced staff and team capacity to systematically and adaptively manage water risks, and to replicate new skills and approaches in other areas
Efficient targeting of new investment towards management of priority water risks
Ability to scale and transfer best practice from leader site implementation across global value chains in order to reduce vulnerability to water risk
Securing of new business and investment, and safeguarding existing business through demonstrable credibility as a responsible water steward

Table 3. Benefits of AWS standard implementation for basin stakeholders and governance

Benefits of AWS Standard implementation for basin governance and water security of local stakeholders
Direct contribution to improved water security for 14,286 people through action on WASH and better water management in local communities and out-grower farms.
New investment and action to improve sub-basin management which potentially contributes to improved water security for sub-basin population of 295,180
Reduced risk of pollution and inequitable water use through private sector alignment and compliance with national water policy and law
Targeted support and investment for the formation of a Upper Ruvuma Water User Association and basin Integrated Water Resource Management and Development plan
Advocacy for improved water resource management in Tanzania

Tracking the costs of implementation has been more straightforward and suggests that standard implementation is a cost-effective investment. In summary the costs amounted to several weeks of Social and Environmental Manager and Officer staff time, consultant support for implementation and investment in modelling and analysis of around €40 000, together with a further €140 000 in essential infrastructure improvements, and €30 000 onward investment annually. Cost estimates should be handled with caution as they will vary depending on context, prior investment in stewardship and scale of operation. What can be seen is that for an operation the scale of Olam, AWS implementation represents excellent value for money given the role of stewardship in protecting the viability of a multi-million Euro investment. It is also seen that investment around the standard has a multiplier effect and is likely to lever significant investment in stewardship by donors, government and other private sector actors.

A further aim of the exercise has been to identify challenges facing AWS implementation to inform improvements to the AWS system and regional guidance. The more significant challenges include:

- A lack of data or limited availability of data in catchments like the Ruvuma which can impose higher costs. Relatedly an absence of facilities and infrastructure imposes additional expense, for example, Olam have had to fly samples to the nearest laboratories for pesticide analysis.
- Variable stakeholder capacity and willingness to engage, with some, including government staff demanding payment for simply attending meetings.
- High certification costs due to the limited availability of accredited certification bodies in the region.
- Addressing the 'sustainability gap'. The current AWS standard leans heavily on an assumption that regulatory compliance will result in sustainable outcomes on water. However, in governance challenged basins there is potential for a disconnect, or 'sustainability gap' to emerge between what is desirable from a sustainability perspective, and action driven by legal compliance. For example, where water has been allocated historically based on poor data or colonial era priorities, compliance can be meaningless, or worse, can drive inequitable use and resource depletion. The same issue can be seen where companies comply with wastewater standards which are too lax to protect downstream use, and where waste and wastewater is legally passed to a third party such as a wastewater treatment works which fails to provide adequate treatment. A robust duty of care requirement would be a simple addition to the standard to address this oversight.

Conclusions and recommendations

The guided implementation of the AWS standard at Olam International's Aviv Coffee Plantation in Tanzania shows the standard to be a cost-effective mechanism for improved water security with multiple benefits for the site and other stakeholders. In particular through guiding responses and investment based on contextual risks, and establishing capacity and systems to track and modify those responses where necessary, the standard drives long term resilience to water and climate risks. This is particularly important in basins such as the Ruvuma and across Africa more widely, where despite recent reforms and investment in water management institutions, government led action on water risks may take some years to become effective.

For the site, new ways of managing and monitoring resource use, of ensuring compliance with legislation and international best practice, and of avoiding conflict with other resource users will generate costs savings. Perhaps more importantly it helps to secure the companies legal and social licence to operate, and through documenting and showcasing efforts, secures business growth and new investment. The exercise has also provided the company with the methodology, knowledge and capacity to re-apply the standard and scale it across other sites of operation internationally.

For local communities the standard ensures that a large commercial enterprise which shares their water resource does so in an equitable and sustainable manner, irrespective of the limited efficacy of government regulation. By driving proactive engagement to improve water and environmental management within the communities where workers live, and among its out-grower communities it is anticipated that implementing the standard will deliver direct benefit to almost 15 000 people.

For other stakeholders and the wider population in the basin, AWS standard implementation is contributing to strengthening of and new investment in sub-basin governance. Critically, the standard and its supporting guidance (namely, the CEO Water Mandates Integrity Guidelines) aims to prevent this investment from undermining the independence and legitimacy of the WUA. The WUAs work will address the main shared risks facing the basin in line with public policy, strategy, and has potential to benefit approximately 300 000 people within the Upper Ruvuma sub-Basin.

For water resource management in Tanzania more widely the implementation of the standard makes two important contributions. Firstly it mobilises powerful private sector actors to support better water resource management at local, catchment and national levels. The involvement of Olam in a multi-stakeholder national advocacy initiative (Uhakika wa Maji) as a result of the exercise is likely to pay important dividends for improved sector performance in the long term. Secondly, it establishes a model for private sector stewardship which is entirely aligned with public policy and which is scalable within Tanzania.

For the Alliance for Water Stewardship the exercise has demonstrated the value of the standard in a difficult basin, the cost effectiveness and viability of the business model, and flagged where improvements are required to the standard content and system. Further, Olam's implementation of the standard - the first in East Africa - has generated invaluable training material and case study evidence which will be used to build the AWS and advance the goal of equitable and sustainable water stewardship globally. Based on the exercise, the emerging recommendations include:

1. **Use Olam's implementation as a spring board for AWS roll out in Africa**.

The Olam, WWI and AWS team are already involved in outreach, using the experience to support training and communications. The opportunity to promote the standard to peer companies in Tanzania and beyond, and to support the development of regional expertise and certification capacity should be pursued.

2. Promote implementation and verification against the standard across vulnerable supply chains

Strategic focus on sites and suppliers in areas which are vulnerable to water risks because of physical, social or institutional contexts, and which draws on lessons, skills and capacity generated at 'leader sites' is likely to be a highly cost effective response to corporate water risk. Verification through an audit by an AWS accredited certification body gives confidence to stakeholders and guarantees due diligence on water.

3. **Build the regional AWS membership base to maximise relevance and impact in Africa**

Given the specific governance and contextual challenges facing water management in Africa alongside the need for private sector investment, the AWS standard system poses an immediate and important opportunity. African stakeholders should be proactive in guiding and shaping this effort through development of regional guidance, and to ensure maximum relevance and impact.

4. Stronger government engagement to integrate potential benefits

The AWS standard system has multiple benefits for government and statutory water managers. By recognising and referencing the AWS standard in policy, guidance, licencing regimes and risk based regulation and enforcement, government can both strengthen uptake and maximise the systems contribution to smarter and efficient regulation. Particular effort should be focused on helping government agencies to understand and harness the AWS standard within their institutional toolbox for water security.

1. Introduction and objectives

This report documents the impacts, insights and recommendations generated through the first implementation of the Alliance for Water Stewardship (AWS) International Water Stewardship Standard in Africa. The standard was launched in 2014 to guide and recognise responsible water stewards and their actions at the site and catchment scale. Implementation by Olam at their Aviv Tanzania Ltd Coffee Plantation was supported by Water Witness International up to the certification stage between March and August 2015. The site certification audit is due to take place in November 2015. The process, challenges and outcomes were documented to generate learning to:

1. Assist Olam the Ministry of Water of Tanzania and other stakeholders to manage water risks and support collective action on water security.
2. Establish the costs, benefits and value of applying the AWS Standard for business, government and stakeholders, and the requirements and implications for scaling up implementation.
3. Evaluate the contribution of the AWS Standard to improved water resource management for sustainable and pro-poor growth, and generate lessons about how its contribution can be enhanced.
4. Explore the utility of the Guide for Managing Integrity in Water Stewardship Initiatives published by the CEO Water Mandate.

The exercise was jointly funded by Olam International and the International Water Stewardship Programme managed by German Technical Co-operation (GIZ) with finance from the UK and German governments.

This report introduces the methodology applied and the case study context, before introducing the results in Section 4, which sets out the key changes which have been driven by standard implementation. Section 5 discusses the implications of the standard including costs, benefits and challenges for implementers, and more widely for the AWS, catchment managers, water security and sustainable development. Section 7 reflects on the CEO Water Mandate Integrity Guide. Finally in Section 8 the report concludes with recommendations for the advancement of water stewardship for shared water security which have emerged as a result of the exercise.

In addition to this Technical Report, the following outputs have been generated:

- **AWS training and materials:** case study material and guidance to supplement the AWS's training and consulting work streams, together with recommendations on standard refinement, impact indicators and knowledge management.
- **Summary factsheet: The business case for AWS standard implementation in Africa,** a public facing summary documenting outcomes and benefits.

2. Methodology

The study team comprised Water Witness International staff[1] and colleagues from the Tanzanian NGO Shahidi wa Maji, working in close association with Olam's Environmental and Social Manager, site Health, Safety and Environment Officer, and the Tanzanian Ministry of Water's Ruvuma sub-basin Office. An informal Project Advisory Group of senior sector stakeholders in Tanzania, GIZ advisors and Alliance for Water Stewardship staff was established to guide the work, and to review and communicate its findings.

The methodology took the AWS International Water Stewardship Standard (see Box 1) and implemented it at a coffee farm in the Upper Ruvuma Basin in Tanzania, and explored the following research questions.

1. What is the context within which the site uses water and what are the main water risks, challenges and opportunities at basin and site level?
2. What results does AWS Standard implementation deliver in terms of actions and improvements at site and catchment level to respond to these risks, opportunities and challenges?
3. What are the implications for implementers in terms of inputs? (i.e. costs and benefits, opportunities and challenges, and associated capacity and guidance needs)
4. What are the outcomes and impacts of standard implementation for other users in the basin, in particular vulnerable communities, and for governance institutions?
5. Given the water security challenges facing the basin and African contexts more broadly, how can the standard and the AWS 'system' be developed to deliver maximum benefit?

In addition to exploring these questions about stewardship and the AWS Standard, the study team took the opportunity to evaluate the newly produced CEO Water Mandate Guidelines for Managing Integrity in Water Stewardship Initiatives based on experiences in the Upper Ruvuma Basin (see Box 2).

Box 1. The Alliance for Water Stewardship and the International Water Stewardship Standard.

The AWS International Water Stewardship Standard (AWS Standard) is an international, ISEAL-compliant, standard that defines a set of water stewardship criteria and indicators for how water should be stewarded at a site and catchment level in a way that is environmentally, socially, and economically beneficial. The Standard provides water stewards with a six-step continual improvement framework that enables sites to commit to, understand, plan, implement, evaluate and communicate water stewardship actions.

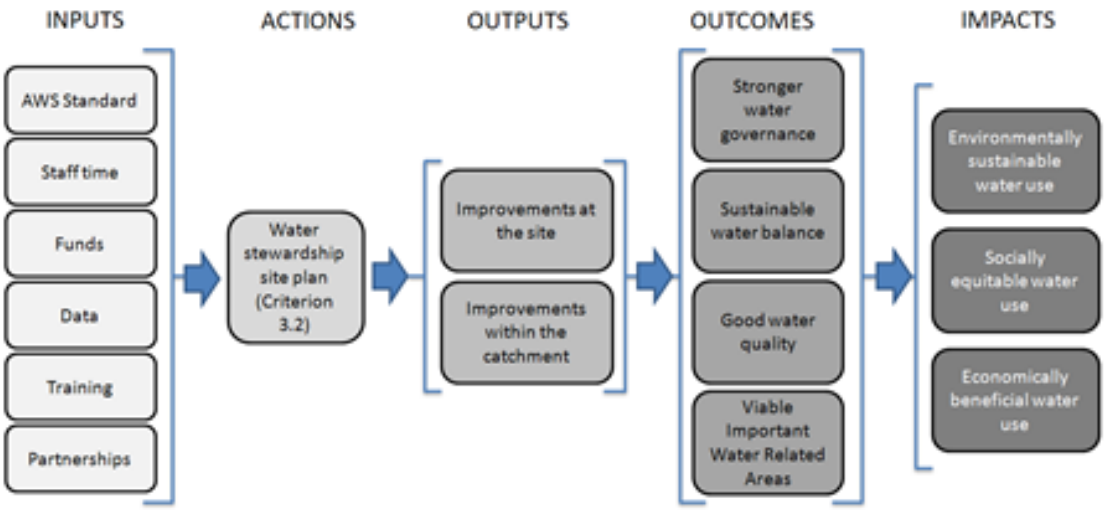
Implementing the AWS Standard helps sites to:

- mitigate their water risks,
- address their shared water challenges in the catchment, and
- ensure that responsible water stewardship actions are in place to minimize negative impacts and maximize positive impacts for everyone.

The Standard provides a consistent global framework for sites to undertake responsible water stewardship in a manner that is transparent and stakeholder-inclusive. Specifically, the Standard is designed to achieve four water stewardship outcomes: (1) good water governance, (2) sustainable water balance, (3) good water quality status and (4) healthy status of Important Water-Related Areas. The site is expected to contribute to these outcomes via a combination of on-site management and engaging others in collective action.

[1] In the interests of transparency, a potential conflict of interest should be noted given that Water Witness International is a founding board member of the Alliance for Water Stewardship.

Figure 1 below sets out the AWS Standard Theory of Change.



The AWS Standard can be implemented by any site, in any sector, in any catchment around the world. Furthermore, the Standard can be harnessed by others interested in mitigating corporate risks, such as water-related supply chain risks for investors, as well as public sector agencies as a framework to evaluate water stewardship practices.

The AWS Standard is supported by a verification system which will enable verification of practices, the use of claims and AWS verified logos. The verification system will recognize the different levels of performance outlined in the AWS Standard and will offer independent verification of performance developed by members in a robust and credible manner.

The AWS Standard is managed by the members of the Alliance for Water Stewardship and informed by a technical advisory group.

Figure 2. The AWS Standard steps for continuous improvement.

For more information see: http://www.allianceforwaterstewardship.org/

Box 2. Guidelines for Managing Integrity in Water Stewardship Initiatives.

As basin-level problems increasingly affect all segments of society, **water stewardship initiatives** (WSIs) hold exciting potential as an approach to tackling shared **water challenges**. These WSIs leverage the expertise of businesses working collectively with public institutions, civil society organizations, and other water users at the basin level. As with any new approach, WSIs provide opportunities but can also pose some design and implementation challenges, particularly around ensuring integrity. For example, involving the private sector in the management of a public resource like water must be approached with care to avoid real or perceived problems of "capture": where undue influence on decision making, skewing of public policy priorities, or privileged access to water resources results through private sector involvement.

With funding support from Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), the project co-leads, the UN Global Compact CEO Water Mandate (Mandate) and the Water Integrity Network (WIN) — in collaboration with Partnerships in Practice, Ltd., Pegasys Strategy and Development, Ltd., and Water Witness International — have developed good practice guidelines for WSI integrity management.

As well as making WSIs more impactful, sustainable, and cost-effective, ensuring high levels of integrity will reduce reputational risks that could be barriers to multi-**stakeholder** cooperation. The guidelines seek to build on the lessons learned from the pioneers of WSIs around the world. Through a practical lens, and focusing on the needs of practitioners, the ultimate aim of these guidelines is to support existing and future WSIs in creating tangible benefits for society by ensuring high levels of integrity and transparency.

The guidelines include a practical framework and quality management processes together with a suite of practical supporting tools geared toward ensuring high levels of integrity and transparency in WSIs. Guiding questions and tools are provided around a set of seven guiding principles:

Principle 1: Seek to align with, support, and strengthen public policy that advances sustainable water management; be careful not to undermine public institutions or water **governance.**

Principle 2: Ensure appropriate and balanced representation of interests throughout the course of the WSI.

Principle 3: Be clear and transparent about the roles and responsibilities of WSI participants, and ensure that their capabilities are adequate (or are sufficiently developed) to fulfill them.

Principle 4: Be clear and transparent about the water challenge(s) being addressed by the WSI, as well as the agreed scope and intended benefits.

Principle 5: Be clear and transparent about how the WSI is to be governed.

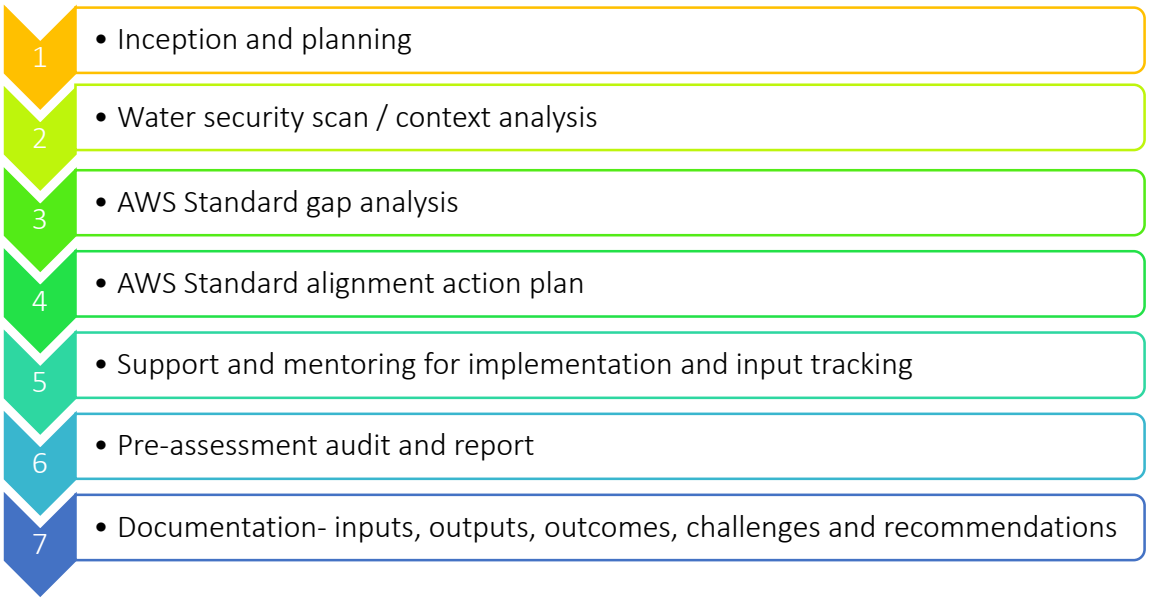
Principle 6: Track outcomes against the stated objectives of the WSI**.**

Principle 7: Foster an ethos of trust, and establish expectations for behavior of WSI participants.

For further information see: http://ceowatermandate.org/blog/resource/guide-to-managing-integrity-in-water-stewardship-initiatives/

The process adopted for implementation is illustrated in Figure 3, and a brief summary of each step in the process is provided below:

Figure 3: Water Witness International's AWS implementation support methodology



1. Inception and planning

An inception phase of planning with project partners establishes aims, objectives, roles and responsibilities, timelines, resource implications and opportunities for added value. In addition to site and company inputs, a wider group of stakeholders are consulted and (in this case) an 'informal' project reference group[2] was established to oversee and validate the work, and to support through knowledge inputs, critical review and communication. In particular, this phase builds links with government and civil society to aid their understanding of the process and the potential strategic value of the AWS standard. A site visit and local stakeholder consultation took place to ensure that the work responded to local perspectives, needs and concerns.

2. Water security scan and context analysis

The water security scan is a desk-based literature review to collate and analyse existing data about the context of standard implementation. It identifies water risks and opportunities at the basin, sub-basin and site level and identifies key stakeholders. The scan acts as a scoping exercise prior to the first site visit and is summarized in a brief report which can be drawn on to ensure that the standard is driving engagement on relevant issues with relevant stakeholders through appropriate channels. The water security scan for the Upper Ruvuma basin is provided in Appendix 2.

3. AWS Standard gap analysis

Through a visit and inspection of the site and catchment, WWI staff conducted a gap analysis to assess current performance relative to the criteria of the AWS Standard. This identifies priority areas and needs for compliance and provides the basis of the alignment action plan, which sets out the measures that must be taken in order to attain alignment with the Standard. An example of a gap analysis conducted for Olam International is provided in Appendix 3.

[2] In normal circumstances this group would be formalised, but advisors in GIZ suggested that this could interfere with the development of the Upper Ruvuma Water User Association and introduce stakeholder fatigue. Membership of the informal group is provided in Appendix 1

4. AWS Standard alignment action plan

Based on the gap analysis an action plan is formulated through discussions with site managers to develop specific recommendations and guidance for how the site can close the gaps and attain alignment with the Standard. The plan is integrated with the AWS Standard – with actions explicitly linked to specific criteria and the Standard guidance. An example of an AWS Standard action plan for Olam International is provided in Appendix 4. The plan is shared with site staff and resource, capacity, knowledge and process shortfalls are identified. Additional joint management responses are agreed to address these.

5. Support and mentoring for implementation and input tracking

To support delivery of the alignment action plan, WWI provides ongoing guidance and support to site staff and management. This support may take the form of communication through calls and emails, or it may involve WWI generating materials to assist with implementation. An example of materials generated to support implementation is provided in Appendix 5. During this phase, the study team are provided with timesheets and learning diaries to record inputs of time, money and effort, flagging achievements and challenges for later reflection and documentation.

6. Pre-assessment audit and report

Following implementation of the action plan, a pre-assessment audit is conducted. This consists of document review, personal interviews, stakeholder consultation and site inspections. As well as familiarising the site team with the audit process, the purpose is to evaluate performance against the standard to flag remaining challenges and actions. The pre-assessment is intended to indicate whether a site is likely to be found to be in compliance with the criteria of the AWS Standard if an assessment of present operations were conducted. The findings of the pre-assessment are documented in summary of performance with further recommendations for attaining alignment. An example of a pre-assessment audit and report for Olam is provided in Appendix 6.

7. Documentation of process inputs, outputs and outcomes, achievements, challenges and recommendations

The AWS Standard action plan includes fields for responsible staff members to input information regarding the time and resources that were involved. This information is used along with personal interviews and additional data gathered from the site to generate a report which evaluates the value, costs and benefits, and the capacity and resources required for implementation of the AWS Standard. The degree to which the standard contributes to improved water security for all and particular challenges and opportunities for leveraging added value and sustainable impact are considered. To support continual learning and improvement this learning is documented and recommendations derived to support scaling of the Standard and improved design and performance of the AWS system. This Technical Report represents that documentation and learning.

Study techniques and approach

Methodological reliability is ensured by drawing on a flexible toolbox of research techniques to triangulate evidence across sources, including:

- ⇒ *Document analysis and literature review*
- ⇒ *Key informant interviews*
- ⇒ *Field observation, transect walks and site inspection*
- ⇒ *Hydrometric survey & water quality sampling and analysis (potential)*
- ⇒ *Stakeholder meetings, participatory exercises and focus groups*

Each technique and relevant guidance is described in the AWS piloting methodology. Standard WWI policy and guidance was also applied to ensure the highest standards of health and safety and ethical conduct within the work and the approach to confidentiality and disclosure issues was agreed with partners at the outset.

3. Understanding the context – water security scan of the Upper Ruvuma and the Olam International Aviv Coffee Plantation.

This section draws on existing literature and data to provide an overview of the physical, socio- economic and institutional contexts and water security challenges of the Upper Ruvuma Sub-Basin. It also introduces the Aviv Coffee Plantation and the Olam International operation seeking certification, to support contextual understanding. It should be noted that the work to implement the AWS standard builds on work already undertaken by Olam to satisfy the requirements of the Environmental & Social Management Plan (ESMP) which their investor FMO had made a conditionality of the project financing. The ESMP is based on IFC Performance Standards. FMO made a Capacity Development Agreement available to Olam to cover a proportion of the costs incurred in this work. Other drivers for Olam include:

- To further advance and more importantly formalise their approach and that of our stakeholders to water stewardship using an international ISEAL-compliant standard (i.e. AWS)
- To demonstrate action based leadership through on the ground road-testing of AWS in a business situation. Olam serve a 2-year rotation as a steering committee member of the CEO Water Mandate.
- To further enhance Olam's social and environmental licence to operate with its stakeholders in the Upper Ruvuma catchment
- To build the business case for water stewardship action.

3.1 Site details: Olam International Aviv Coffee Plantation

The Olam International Aviv Coffee Plantation occupies a 2000 ha site near Songea in South West Tanzania which is made up both greenfield land and land held under title as farmland since 1987, although it was only purchased by Olam from Southern Farm in 2011. Arabica coffee is being established on 1085 ha of land and the plantation aims to achieve steady annual production of 2500 Mt of exportable washed green beans (Environmental Resources Management, 2013a).

The site is located in the Upper Ruvuma catchment, 42 km west of the town of Songea. The Ruvuma River forms the northwest boundary of the site, which flows south from the site and gradually turns east. The farm was originally intended to comprise of three irrigated areas: Division A of 470 ha, Division B of 700 ha, and Division C of 730 ha, although Division C will no longer be developed (see Figure 4a).

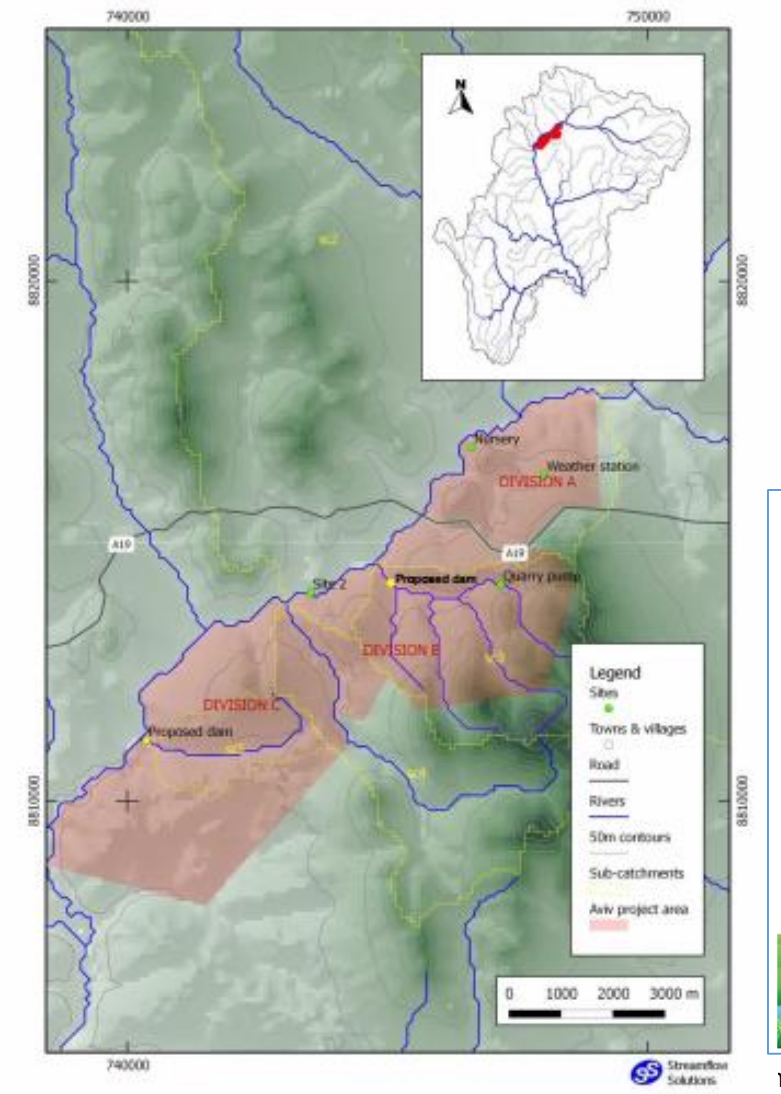
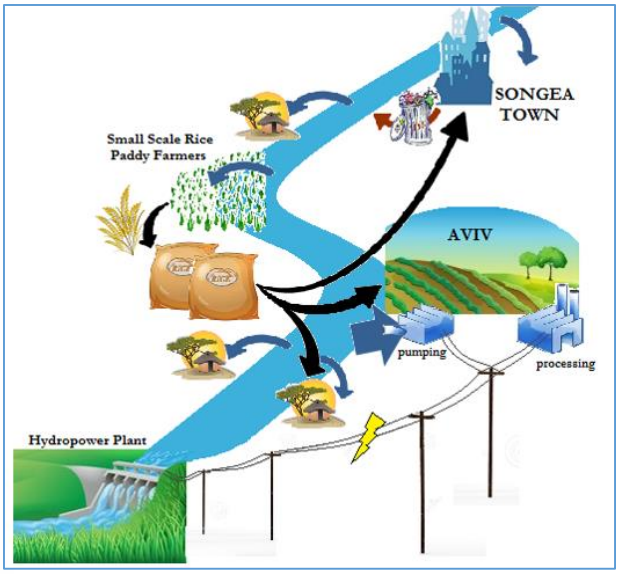


Figure 4a (left): Location of Olam's Aviv Coffee Plantation project area on the Southern bank of the Ruvuma. Inset: Upper Ruvuma catchment, with red area showing Aviv project area. Note that only Division A and B are being developed (Environmental Resources Management, 2013b).

Figure 4b (below): Diagram of location of Olam's Aviv Coffee Plantation in relation to other water users (Dufour, 2014)



ıarised in Table 1.

Table 1: Site data for Olam's Aviv Coffee Plantation

Characteristic	Details
Water Use Permit for irrigation	60,000 m3/day (RSCBWB/WUP 235/12)
Water Use Permit for Dam Abstraction at Lipokela	1,500,000,000 L/Day (RSCBWB/WUP 529/13)
Environmental Impact Assessment Certificate	EC/EIS/582
Direct water source	Ruvuma River
Title Deed	1999.11ha
Originally planned hectares irrigated (Division A, B, C)	1900 ha
Actual irrigated hectarage (Division A, B)	1085ha
Water requirements of planned irrigated area (Divisions A, B)	6.40 Mm^3/a
Domestic water requirements at Aviv Farm	2,315 m^3/month
Processing water requirement at Aviv Farm (4 month processing: Jun-Sept)	3,000 m^3/month
Water discharges	Yes (treated wastewater from coffee processing and domestic use)
Name and type of water body receiving discharges	Ruvuma River
Site staff and employees	Permanent staff 50 Casual workers 350 – 1200 seasonally Workers based in villages of Litisha, Lusonga, Lipokela, Liganga, Mbolongo
Outgrowers	1,131 (Lipokela, Lusonga, Liganga, Mbolongo, Matomondo, Nakahegwa, Litisha)

As part of the Olam Aviv Coffee Plantation's Environmental and Social Management Plan (ESMP) a detailed Water Monitoring Plan was established based on recommendations given in an Integrated Water Resources Management Plan developed by Environmental Resources Management (2013). It included the requirements for an environmental flow provision for protection of downstream needs during the dry season. Monitoring requirements prior to AWS implementation are summarised in Table 2, and were established as the basis for water use and impact assessment of Olam's operations on water in the Ruvuma River Basin.

Table 2: Summary of Water Monitoring Plan Indicators for Olam's Aviv Coffee Plantation

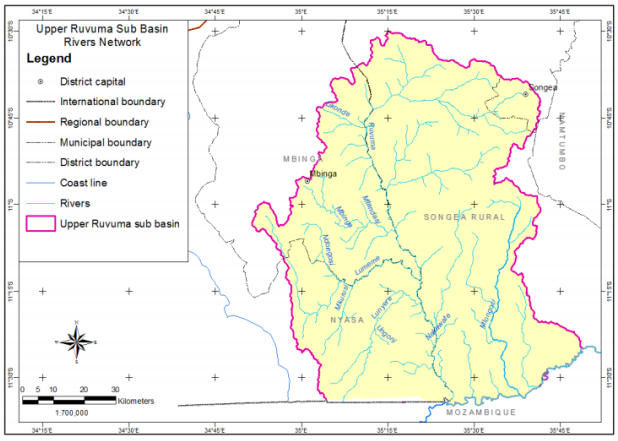
Indicator	Sub-indicator	Description	Frequency	Person in Charge
Water Level	Barologger & Leveloggers	Download of data from automatic sensor in Ruvuma River measuring water pressure – correlation between water level and flow	Monthly *(start of month)*	Field Irrigation Officer & HSSE Officer
	Manual Measurement	Manual measure of the water level – compensated between fixed local datum and water level	Monthly *(start of month)*	Field Irrigation Officer
	River Water Level	Permanent check of the river water level at the gauge stations installed few meters upstream main pumping stations to ensure level remains higher than level threshold	Permanent *(from June to November)*	Field Irrigation Officer
Water Flow	Manual Measurement	Manual measurement of the water flow of the Ruvuma River	Monthly *(start of month)*	Ruvuma Sub-Basin Officer
Water Rainfalls	Gauge Reading	Gauge reading and record of daily rainfalls on the farm	Daily *(start of day)*	Field Irrigation Officer
Water Quality	River Pollution from farm activities	Water analysis of Ruvuma River upstream and downstream the farm	Annually *(after 1st rains)*	Farm Manager
	Quality of Released Water Effluents	Water analysis of water effluent just before release into the environment	Monthly *(during processing)*	Factory Manager
	Quality supplied to workers	Water analysis of quality of the water provided to workers during working hours	Quarterly *(at internal audit)*	HSSE Officer
Potable Water	Quantity supplied per employee per day	Daily record of the amount of water distributed each day treatment plant installed on the farm and correlated to the number of workers present on the farm the same day.	Daily *(in the morning)*	HSSE Officer
Water Consumption	Abstraction from the river	Data collection of water pumped daily for farm activities (processing, irrigation..	Daily *(start of day)*	Farm Manager
	Water use for processing	Data collection of volume of water used during processing operations from new water and re-used effluents	Monthly *(end of month)*	Factory Manager
Water Management	Upper Ruvuma Committee	Provision of transparency in front of stakeholders and combination of actions between directly involved actors towards more sustainable management of the Ruvuma River	3 x year	Environmental & Social Manager + Field Irrigation Officer + HSSE Officer + Field Officer

3.2 Physical context

Olam's Aviv Coffee Plantation is located In the Upper Ruvuma Sub-Basin, which is in the extreme west of the Ruvuma River and Southern Coast Basin (RSCB), in Southern Tanzania (see Figure 6a). The total catchment area of the Ruvuma River Basin is approximately 155,000 km^2, of which 52,000 km^2 (34%) is located in Tanzania, 100,000 km^2 (65%) in Mozambique, and the remaining 2,500 km^2 (<2%) in Malawi (SWECO, 2012).

The total area of the Upper Ruvuma sub-basin is 8,238 km^2 (Figure 5). Songea and Mbinga are the main towns in the sub-basin, which also contains the Liparamba game reserve. The Upper Ruvuma Sub-Basin has an estimated annual runoff of 2,672 million m^3/year[3], which represents 25% of the annual average flow of the middle-upper main-stem of the Ruvuma, 14% of the lower Ruvuma and 7% of flow at the coast.

Figure 5: Upper Ruvuma Sub-Basin Map



Natural mean annual runoff (MAR) in the Upper Ruvuma catchment is 325 Mm^3. Groundwater potential in the basin is generally low and cannot be widely utilized for economic activities (SWECO 2012).

The wet season spans November/December to April with the Upper Ruvuma receiving on average between 1000 and 1800 mm of rainfall per year (see Figure 6c and d). There is a historical slight drying trend over the past 50 years, although climate change modelling suggests warmer and wetter conditions, with 0.5 – 3% increase in annual rainfall by 2030s. This is likely to be seen through more rain during wet season and decreased rainfall in dry season, with higher intensity rainfall and a potentially greater frequency and intensity of drought and flood events (MoW, 2014).

Ecological status

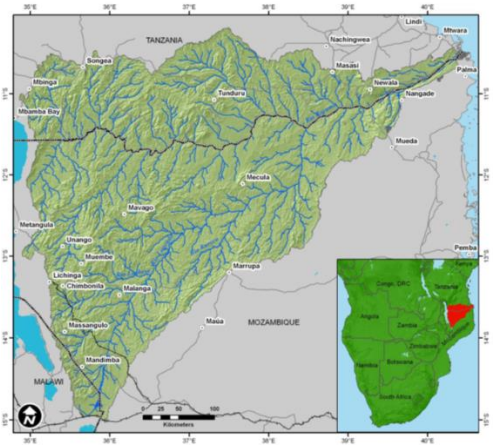
The Ruvuma Basin is exceptionally rich in terms of aquatic and terrestrial biodiversity and is home to 20 forest reserves, as well as multiple wildlife conservation areas, including the Niassa Game Reserve that covers approximately 28% of the basin area. The basin is host to a variety of aquatic species, including several endemic species. 30% of the nearly 100 fish species in the Basin are endemic to the region (SWECO, 2012).

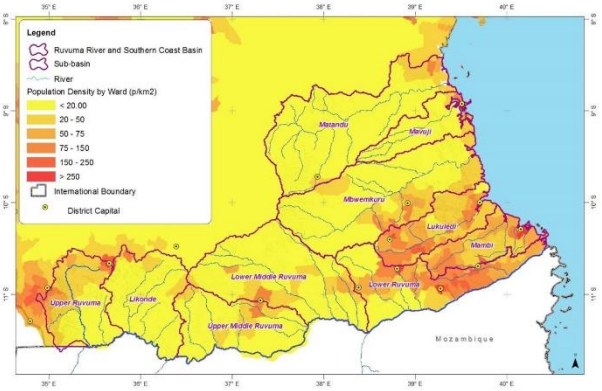
The Olam site is located in the Upper Ruvuma sub-catchment which is relatively highly populated in relation to other sub-catchments in the Ruvuma. Consequently, as a result of higher levels of human activity the Upper Ruvuma faces greater pressure on land and water resources with resource degradation are increasing. An environmental flow assessment (MoW 2014) puts the riverine habitat at the foot of the Upper Ruvuma sub-basin at: C - Moderately modified from the Reference Condition. This signifies that loss and change of natural

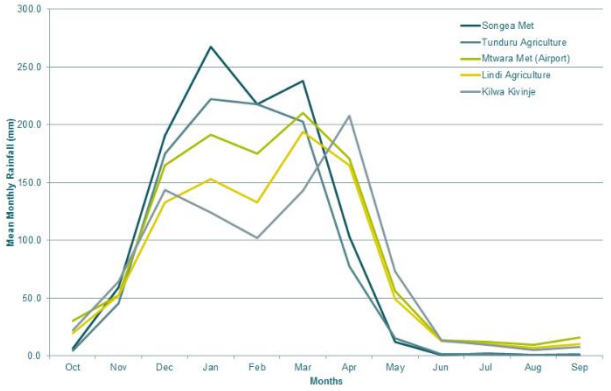
[3] United Republic of Tanzania Ministry of Water. 2014. *Integrated Water Resources Management and Development Plan – Upper Ruvuma Sub-Basin.* Dar es Salaam.

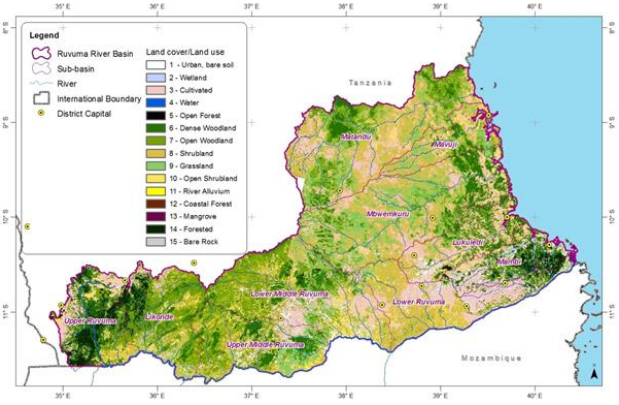
habitat and biota has occurred, but the basic ecosystem functions are still predominantly unchanged. At sampling sites upstream, the Ruvuma at Kitae was B/C and at Chipole Sisters A/B status.

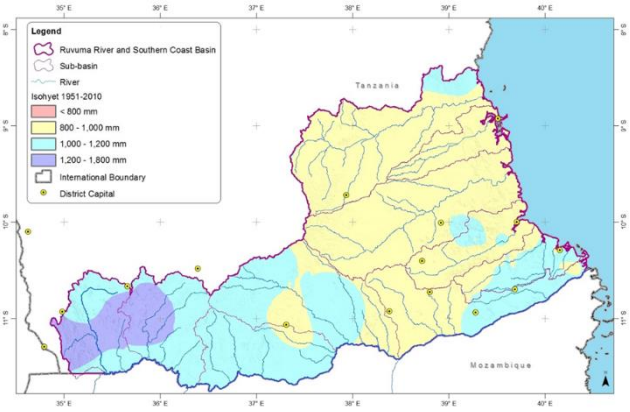
Figures 6a - h. Selected datasets for the Ruvuma Basin (clockwise from top left, from MoW 2014). a. Ruvuma Basin Map; b. Sub-basins of the Tanzanian Ruvuma; c. average monthly rainfall; d. mean annual rainfall ; e. historical rainfall record; f. Reservoirs and infrastructure; g. land cover and use; h. population distribution.

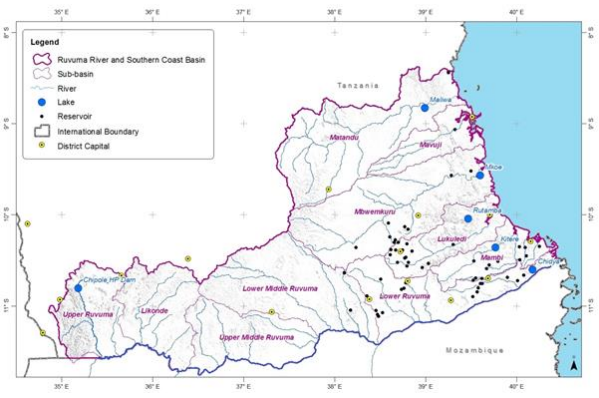


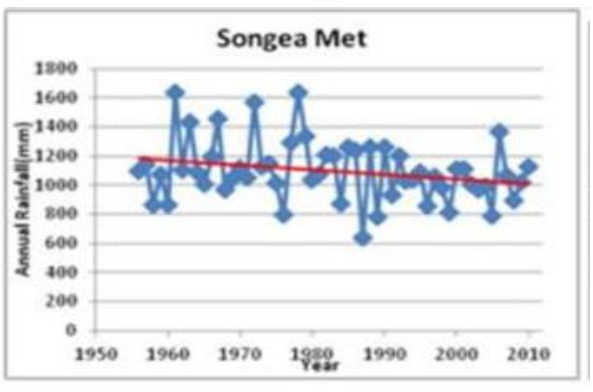












3.3 Socio-economic context and water demand

The population of the Ruvuma Basin is largely rural and dependent on the water resource for their livelihoods. About 80% of the economically active population of the Ruvuma Region are employed in the agricultural sector and 20% are employed in mining, agro-processing and the service sectors. GDP per head is relatively high for Tanzania, at 630 USD per annum, making it the 3rd wealthiest region in the country.

The Upper Ruvuma Sub-Basin covers parts of the Songea Urban and Songea Rural, and Nyassa and Mbinga districts. There is a population of 295,180 living within the sub-basin (MoW, 2014). Songea Municipality, some of which falls outside the sub-basin has a population of 203 000 (URT 2012).

Agriculture is the primary economic activity in the Upper Ruvuma Sub-Basin. Agriculture employs 70% of the population and contributes 75% of the GDP in Songea Municipal Council. The main food and cash crops are maize, cassava, banana, paddy, sesame, sorghum, millet, legume, beans, potatoes, tobacco, coffee and groundnuts, with maize and rice contributing most to the GDP. Other economic activities in the region include trade, small business and livestock keeping.

Population density in the upper basin is between 22 and 200 per km2 with a regional growth rate of 2.1% (see Figure 6h). Life expectancy is 57 years in Ruvuma region and the literacy rate is 77% (MoW 2014). With regard to housing conditions, only 15% have mud walls and most are built of brick/cement, a much lower proportion than in other regions in Tanzania.

Water Supply and Sanitation

The proportion of the population with access to safe water is estimated at 67% in Ruvuma region (59% rural, 90% urban). Groundwater is the predominant source of drinking water. Under the Water Sector Development Programme, the proportion of the rural population with access to safe water supply is targeted to increase to 90% by 2025, with full coverage in urban areas. The potential for improving sanitation provision is evident in both urban and rural areas within the Basin where over 95% of households rely on traditional pit latrines or have no sanitary facilities.

Domestic water demand is expected to double from 3.1Mm^3/year to 6.6 Mm^3/year by 2035 in the Upper Ruvuma. Demand from Songea in particular will drive at least a doubling of total urban water demand for industrial, commercial and institutional use.

Industrial use

Water demand for industrial activity is expected to double by 2035 though there are currently few large scale users in the Basin, beyond artisanal and commercial mining activity. The industrial sector has been constrained by poor infrastructure, unreliable power and water supply, low demand in the regional market, and a lack of credit facilities (SWECO 2012).

The Basin has reserves of coal, gold and uranium as well as gemstones. Impacts of extraction are significant with particularly severe impacts in the sub-basin at Lumeme.

Irrigated agriculture and livestock

The agricultural sector within the Ruvuma consists primarily of small-scale and community-based production in Tanzania, and a handful of private farms. Within the Upper Ruvuma sub-basin there are 25 irrigation schemes. 14 are 'traditional', 3 'modern', with 8 being modernised or under construction.

An area of 18,320 ha is being promoted as the potential for irrigated agriculture in the Upper Ruvuma basin, and with only 1,372 ha currently under irrigation, and only 753 ha operational. Achieving this potential

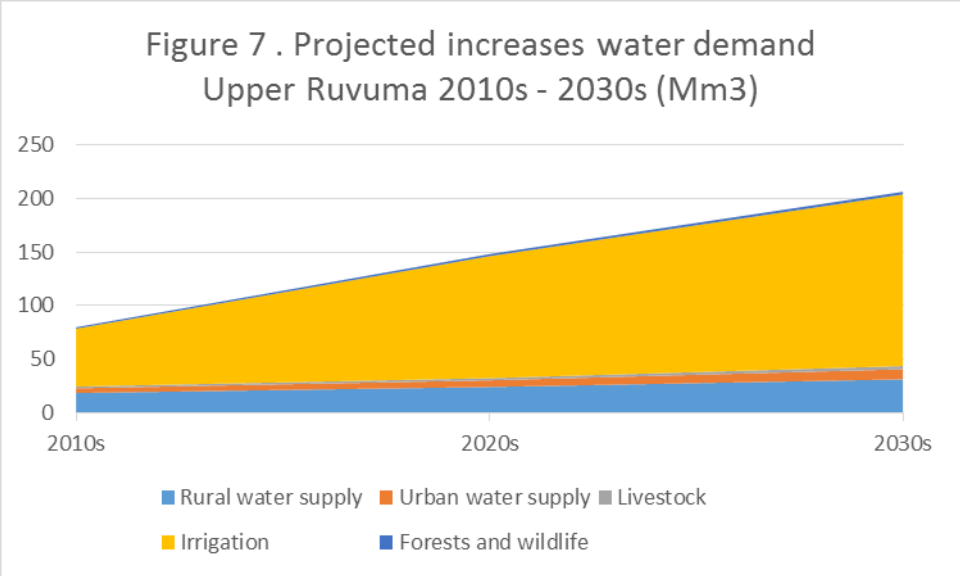
represents a 24-fold increase in irrigation water demand in the sub-basin in the next 20 years. Plans are underway to scale to 4,177 ha by 2020 and by an additional 10,890 by 2030.

There are approximately ½ million livestock in the sub-basin, though this sees large fluctuations due to movements and migrations. Water demand for livestock is likely to almost triple by 2035 (MoW, 2014).

Hydropower and storage infrastructure

There is very little water storage infrastructure in the Ruvuma basin, and the sub-catchment is largely undeveloped, beyond the Chipole Sisters hydropower plant (see Figure 6 f). Hydropower is likely to become a major commercial use of water in the Basin with a number of small-medium sized hydropower plants planned, underway, or identified as having potential (GIZ 2009, MoW 2014). Lupilo (5.9 Mm3), Nakatuta falls (19.3 Mm3 – under construction), Lumeme (3.3Mm3) and 'HP1' (3776 Mm3) are tabled by the MoW (2014).

Figure 7 below summarises the sectoral changes in water demand between present day and 2030s (MoW 2014).



Analysis by MoW for the Upper Ruvuma sub-Basin suggests that total demand will be 44% of the total water available in 2030. Environmental flow requirement is calculated at 42%. Shortages and/or environmental impact are therefore likely to become severe during the dry season and drought years. In light of this there is an urgent need to implement an institutional framework for improved basin management so that demand can be controlled in light of development priorities (particularly during drought) and negative impacts mitigated or avoided.

3.4 Institutional context

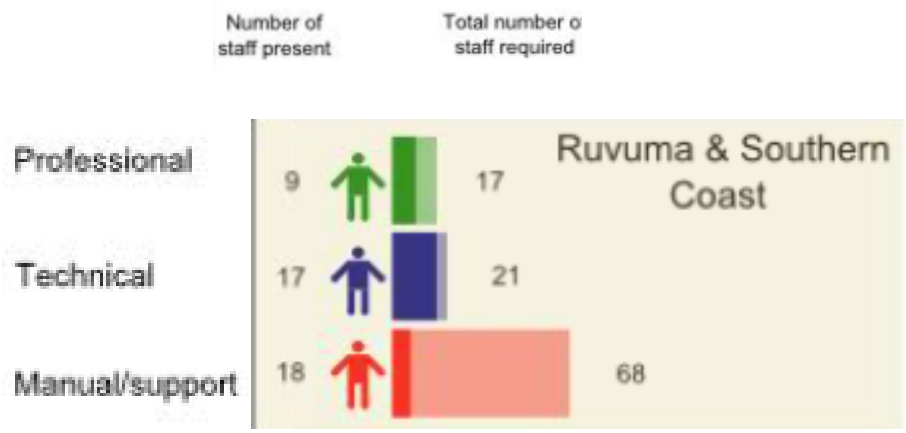
The National Water Policy and the Water Resource Management Act No. 11 of 2009 provides the institutional and legal framework for the management and development of water resources in Tanzania. The Act mandates the Minister responsible for water resource management, and establishes Basin Water Boards for each of Tanzania's nine basins, which are responsible for sustainable management and development of water resources. The RSCB Basin Water Board is the responsible authority in the Upper Ruvuma Sub-Basin, which is supported by a sub-Basin Office based in Songea. Among other duties, the Basin Water Office has the power to issue and monitor compliance of water user permits and discharge permits. The Basin Board is made up in order to represent the interests of stakeholders from the basin.

Table 3. Stakeholders in the Upper Ruvuma basin (From MoW 2014).

District water supply engineers from Songea Rural DC, Mbinga DC and Nyasa DC
Songea Urban Water Supply and Sewerage Authority (SOUWASA)
Water user associations of water supply points (semi-urban and rural areas)
The Wildlife Department of the MNRT,
Hunting operators at Liparamba game reserve and Magwamira (West) open area
District forest officials, Village Forest Committees of the forest reserves such as Liparamba game reserve and Matogoro east and west reserves
Songea Mining Office,
Largescale and artisanal miners
Zonal irrigation office, Songea
District Agricultural Officers of Songea Rural DC, Mbinga DC, Nyasa DC and Songea MC
Irrigator Organisations of the irrigation schemes listed in Annexure 1 (once formed)
Pesticide and fertiliser sellers
Private large scale irrigators such as Olam in Songea DC
Industries such as tea factory at Songea
Hydropower generators such as St. Agnes at Chipole, Prisons Department of GoT at Kitai and Peramiho Missions.

The Ruvuma and Southern Basin Office and the Upper Ruvuma sub-office suffer from limited staff and financial resources and investment which severely limit their ability to perform statutory duties. Figure 8 below illustrates the number of professional staff, technicians and manual staff needed by the basin against the number actually available and is based on data presented at the Basin Office AGM in 2014. It shows the significant shortfall particularly at the professional/senior level, with half the required number of staff in place.

Figure 8. Actual vs required personnel working for the Ruvuma and Southern Coast Basin Water Office (MoW, 2014).



The recently launched performance assessment framework (PAF) benchmarks and tracks Basin Water Office performance based on facilitated self-assessment against three composite criteria of internal process,

stakeholder relations and effectiveness of core functions. Table 4 illustrates the first assessment of these criteria for the Ruvuma with percentage scores of performance confirming limited functionality.

Table 4. Ruvuma BWO performance rating 2015 (MoW 2015).

Performance Criteria	Ruvuma BWO Score
Part A: Internal Procedures: Part 1: Human resources management, infrastructure, technical equipment and organizational procedures,	55.21 %
Part B: Relations with Stakeholders: Functioning of the board, relations with other government institutions, community involvement, customer services and communication with stakeholders,	40.15 %
Part C: Effectiveness of Core Functions: Monitoring and data analysis, water abstraction and discharge permits, monitoring network for water quality and pollution control and implementation of climate-sensitive IWRMD-plans.	46.88 %
Overall	46.65 %

A further indication of institutional performance concerns the level of coordination of water use afforded by Water use permitting. Table 5 lists the number of existing water use permits in the sub-basin (MoW 2014). However, it is also reported that an estimated 64% of water use in the basin is not permitted or is 'unregistered'.

Table 5. Water permit holders Upper Ruvuma

Public Supply	51
Hydro Power	7
Industrial	1
Irrigation	44
Livestock	3
Commercial	16
Institutions	6
Fishing	0
Waste water permit	0
Total	**128**

3.5 Summary of challenges and opportunities facing the Upper Ruvuma Basin

The major problems facing the Upper Ruvuma basin have been analysed through the Integrated Water Resource Management and Development planning process (MoW 2014) and summarised as follows:

a. Insufficient water supply and sanitation both rural and urban and inequity in urban – rural provision
b. Catchment degradation due to poor land management, soil loss and deforestation and pollution
c. Low levels of awareness (in particular around sanitation and solid waste management)
d. Conflict between pastoralists and farmers

e. Pollution from artisanal mining
f. Limited legal implementation and enforcement and low accountability
g. Shortage of manpower and skills
h. Low coordination between sectors and stakeholders.
i. Managing water resources in dry season and dry years to avoid conflict
j. Sustainable new development of water resources for new industries

Opportunities for addressing these challenges have been mapped in the sub-basin management plan across the five following themes and sub-objectives:

1. Water for domestic purposes
    - Achieving water supply and sanitation coverage for urban areas
    - Achieving water supply and sanitation coverage for rural areas
    - Effective operation of supply infrastructure
    - Sustainable asset management and
    - Research and development
2. Water for development
    - Irrigation schemes developed sustainably
    - Achieve sustainable participatory irrigation management
    - Livestock watering infrastructure and aquaculture
    - Hydropower development
    - Water storage
    - Effective and sustainable operation and asset management
3. Water for environment
    - Prepare and implement watershed management plans to reduce erosion
    - Protect forests against illegal logging
    - Water for wildlife
    - Maintain adequate environmental flow
    - Reduce pollution
    - Adapt to climate change
    - Determine the environmental reserve
4. Participation
    - Increased awareness and communication
    - Create forum for participation in WRM for stakeholders
    - Vulnerable people and women should participate
5. Capacity building
    - Effective advice and coordination
    - Accountable planning mechanisms
    - Optimal monitoring network

Further details, strategies and indicators can be found in the sub-basin IWRMDP (MoW 2014).

In summary, like many basins in East Africa, the Upper Ruvuma faces a complex mixture of challenges and opportunities. Priorities amongst these are the need for improved WASH provision and maintenance; water resource development which is sustainable and coordinated; improved land and resource management to control degradation and pollution. In particular there is a need to plan, manage, monitor and coordinate increasing demands on water use in order to avoid problems during dry periods. Underpinning and contingent to this is the need to rapidly increase the levels of participation, capacity and accountability around water resource management. Analysing the context in this way is useful in order to later reflect on the performance of the standard in addressing the priorities which emerge.

4. Implementation results: What change has the AWS standard driven at site and basin level?

In this section we set out the results of AWS implementation in terms of firstly the changes it has driven at site and catchment level. The full results of implementation are documented within the site water stewardship plan and supporting literature. Rather than replicate the full details here we instead draw on the findings of the water security scan, gap analysis and pre-assessment, and subsequent stakeholder interviews to summarise the most significant changes brought about by AWS implementation.

4.1. Water quality status

As part of the pre-existing Environmental and Social Management and Action Plans at Olam's Aviv coffee plantation water quality risks were handled reasonably well. For example a water monitoring plan set out regular water testing, and strict controls on pesticide use and storage were in place (see Plate 1a.). However, working through the AWS standard ensured that both the water quality risks which the site's operations pose for other water users, and the water quality risks posed to the plantation because of upstream activity were systematically assessed. This has led to improved systems to target action to reduce these risks and regular monitoring to ensure that action is effective. The primary risks and changes made to minimise these are described below.

Comprehensive pollution control and response planning

The primary water quality risks posed by the site are pollution from agricultural chemicals, fertilizers and pesticides, and excessive soil erosion. Assessment and mapping of pollution risks at the site has informed detailed plans to mitigate pollution risks, and development of an incident response plan. For example, the site team identified improvements in pesticide handling, solid waste management (Plate 1b), and in the storage of fuel. Plates 1c and 1d show the need for improved bunding of fuel storage tanks so that any accidental leaks and spillage will be contained within a bund wall compliant with international best practice specifications. The site stewardship plan also ensures that adequate infrastructure and systems are in place to handle increased site effluent production, once the site begins processing of coffee beans in future (See Plate 1e).

Improved erosion control and reduced sediment load

The topography, land use and layout of the site contribute to the risk of soil erosion and sedimentation of the Ruvuma River (see Plates 1f and g). Soil erosion can have severe impacts for downstream water users through degraded ecosystems, reduction of channel capacity and heightened flood risk, and sedimentation of reservoirs. Catchment degradation, soil loss and excessive sedimentation are flagged as one of the major problems facing the Upper Ruvuma (MoW 2014). Gulley erosion also has potential to create agronomic problems on site for Olam through loss of soil structure and nutrients, and causes costly damage to infrastructure such as roads.

Implementation of the standard has helped site management to develop, fund and implement a new, more focused approach to erosion control across the site. Areas at risk from erosion have been mapped and a range of mitigation and control measures put in place including check dams (see 1h) and planting of vetiver grass. The effectiveness of these measures will be tracked and management will be adapted accordingly.

Investment in water quality monitoring and analysis

Following a review of water quality risks and management, site management recognised a need to improve the monitoring programme, in particular for pesticides. This led to a revised water quality monitoring regime,

including a risk-based protocol for the timing and frequency of sampling, and on site and off site analysis for pesticides, which includes the transportation of samples to accredited laboratories.

Addressing municipal sewage pollution and priority water quality risks in the basin

Olam's Aviv site operations face risks from the effluent and pollution created by upstream users. Most notable among these is pollution from untreated human sewage from Songea Municipality. Stakeholders and on-site staff identified a particular risk emanating from damaged sewerage pipework in Songea town leaking sewage to the Ruvuma, and other problems associated with infrastructure management by the Songea Urban Water and Sewerage Authority (SOUWASA).

Implementing the standard has led Olam to initiate communications and advocacy with SOUWASA and the Basin Water Office regarding the status of sewerage infrastructure serving Songea town, and demanded action to control municipal sewage pollution.

Through engaging and providing support to the Upper Ruvuma stakeholders and investment in the formation of the Water User Association (WUA), the Aviv site will indirectly contribute to addressing a wider set of water quality risks in the basin. For example, issues mapped by stakeholders on which action will be taken through forthcoming WUA plans include water quality impacts of mining and deforestation.

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Plates 1a-h. Water Quality: (clockwise from top left) a. secure chemical storage; b. solid waste/plastics collection station; c. damaged bund wall to fuel store; d. Unbunded fuel tank; e. effluent soakaway; f. Gulley erosion alongside site access roads; g. eroded spoil associated with dam construction; h. Check dams installed as erosion control.

4.2. Water quantity, flow and sustainable water balance

The most significant water-related risk facing Olam's Aviv site and other water users in the basin is water scarcity during periods of low flow and resulting shortage in supplies, environmental impacts and conflict between users. During periods of prolonged drought, low flows have affected Aviv's ability to access water, and have led to complaints and contested use between stakeholders. . Increasing demand, expansion of irrigated agriculture and water related development in the sub-basin have potential to exacerbate these issues in the future.

Olam's Aviv site has a water use permit controlling its water abstraction issued by the Ministry of Water, against which it is fully compliant. The company has also invested significant time and resources to understand the flow regime in the river, the needs of the environment and other users and has developed and implemented an environmental flow protection regime. This is based on monitoring of water levels in the Ruvuma via a series of loggers and the scaling back of abstraction from the river during dry periods to protect downstream users. The site has also invested in a new storage reservoir to store water off-line during wet periods and secure water availability during dry periods. This investment builds resilience to climate variability at the site and reduces the risks of upstream/downstream conflict.

There is a particular risk to Aviv operations through the unregulated and informal use of water upstream in the catchment where large numbers of small-scale rice farmers do not have water use permits. Coordinating use within sustainable limits is therefore a challenge for the Basin Water Office. There is an urgent need to recognise in law and formally allocate the water needs of small farmers who operate in the basin. Compounding this problem are the current limitations in the water use permitting process which needs to better reflect seasonal water availability and constraints in the basin. Equitable use and sustainable balance in the future will require a system of permitting and control which reaches all users and accurately reflects water needs, and which enables scaling back to protect priorities in periods of drought. The main actions which AWS standard implementation has driven to address these risks are set out below.

Strengthening and demonstrating compliance and protection of environmental flow needs

Olam's Aviv site has commendably invested in an environmental flow assessment to ensure that its activities do not impact negatively on downstream users. They recruited the consultants ERM to establish a sustainable abstraction regime which would demonstrate compliance with the water use permit and optimise use at the site whilst protecting a 'hands off' or pass forwards flow in the river which would sustain downstream uses and functions. The regime is supported by river loggers which report real time levels, calibrated by spot gauging's taken by the sub-basin Officer of the BWB (see Plates 2a, b and c).

The standard has driven several actions to strengthen this system. Firstly, although the site can calculate the volume of water abstracted through pumping records, the water flowmeter at pump A was not working (Plate 2f). This means that it is difficult for the site, or the Basin Office responsible for monitoring compliance to immediately check that the site was taking water at a rate which complied with the water use permit or environmental flow protocol. AWS implementation has flagged this as a risk and driven investment to repair this flowmeter which has strategic importance for site management and compliance monitoring.

Secondly, the protocol for monitoring and responding to changes in flow is to be improved. For example, the distance between the water level loggers and the gauging point for calibration is several hundred metres and so the efficacy of the rating equation (which reliably converts river height to flow) is questionable. Alongside this, the system which is used to decide and demonstrate scaled back use during dry periods needs to be more clearly set out to give confidence to stakeholders and provide greater transparency.

Thirdly, although Tanzanian law provides for prioritisation of water use and variation of allocations to protect these during low flows, there are no explicit provisions within Water Users Permits issued by the MoW to

ensure that this happens. In effect, Olam's Aviv operations are seeking to protect downstream water users through a self-imposed and self-regulated control mechanism. In order to give this system legitimacy and build trust between water users where use is contested, the Aviv site will request a revised Water Use Permit which enshrines their commitment to protecting environmental flow in a legally binding format. As the first such permit in Tanzania this action also has potential to establish new and more robust allocation practice – and better, more meaningful use permits - in the Ruvuma basin and more widely.

Review of water use permit to support sustainable resource use

As a 'permitted' water user in the basin, Olam's Aviv plantation has a monitoring system in place for measuring its water use, and operates well within the conditions of its water user permit. However, the conditions of the permit were established based on an estimated 2,000 hectares of land under production, while the Aviv has currently only secured and developed approximately 1,100 hectares of suitable land.

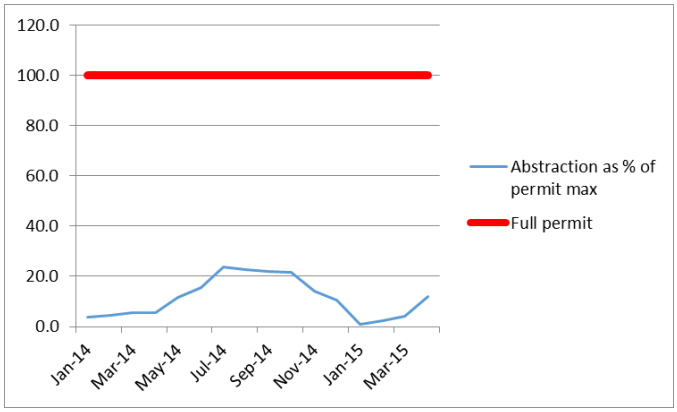
Effectively, this means that the site has a permit to abstract more water than it currently needs. Aviv's actual water abstraction compared to the limitations of its permit for the period of January 2014 to March 2015 is displayed in Figure 8 below. The water needs at the site are likely to increase as the coffee plants mature and so the permit should reflect maximum needs during dry periods. However, Aviv's current cultivation area is less than that anticipated at the time of the permit application and this has contributed to the lower than expected abstraction. From a technical and legal point of view, the permit is in contravention with Section 102 of the Water Resource Management Act 2009, which requires water use permit applications to be based on accurate and representative information. Complicating the issue further is the fact that Olam are currently trying to identify and purchase additional suitable land to take the plantation size up to that originally planned. However this may or may not be in the same sub-catchment, and water needs at this future holding ought to be covered by a separate permit to represent the different context.

The existing situation poses risks to basin water users as 'permitted' water is bound up in non-beneficial and currently unused allocation to Olam. If new applications for abstraction permits were received by the Basin Water Board it is possible that the current over-allocation to Olam could deny other legitimate water users from obtaining a water use permit. This is important because the basin is approaching closure and water access is increasingly contested, particularly in dry periods. For these reason the existing situation also poses reputational and regulatory risks for Olam with potential claims of 'water hoarding'.

From a commercial and practical perspective Olam may be reluctant to surrender already permitted water until future plans for expanding the plantation area are resolved and future water needs across the operation confirmed. This is particularly the case since water users have experienced long delays in permit determinations by the Basin Water Board.

To address these issues and better align site operations with stewardship goals, the most appropriate solution is for the site to calculate maximum water needs relating to current area of cultivation and to surrender the remaining permitted amount back to the basin. Future water needs for any extension of the plantation area should be obtained under a separate permit application. These steps will contribute to equitable and sustainable resource allocation among stakeholders in the future.

Figure 8: Aviv's water abstraction compared to allowable limits of water use permit



Establishing a site water balance and targeting more efficient and productive use

The implementation of the AWS Standard has supported Olam to institute a system which tracks how much water is used per volume output from different zones within the farm (Plate 2e). This in turn has allowed the site to track its efficiency of water use and to set targets for improved productivity over time. Although it is too early to quantify the benefits of this, in the long term this may reduce water pumping costs and have a cost saving for the site. By driving down water use per unit output driving up efficiency has the potential to reduce pressure on the catchments water resources.

Support for basin governance, coordinated resource use and climate resilience

Ultimately, managing the use of water resources in the Upper Ruvuma in a sustainable and coordinated manner depends on participation by stakeholders in a shared governance regime. The purpose of this engagement will be to share information on needs and concerns and to plan and deliver water allocation which is coordinated and in line with sustainable yield, and plan responses to extreme events such as drought. Without such a system which includes enforcement and compliance monitoring the entire basin and Olam face water risk in the future, particularly as new use ramps up demand.

In response to this, Olam's Aviv plantation has invested in the Upper Ruvuma Catchment Basin Steering Committee (URCBSC) as a vehicle to discuss common actions to support a better management of the shared resource, and deliver the Upper Ruvuma basin plan. Through alignment with the standard and with support from the WWI team, this engagement with stakeholders has been modified slightly to ensure that it aligns with the MoW model for Water User Associations, and that Olam cannot be perceived to have too much influence. The group is therefore being strengthened with new membership and is in the process of formalisation ahead of delivering its workplan. Upon formalisation one of its main areas of work will be in assisting unpermitted users to formalise their water needs.

A proactive approach to conflict resolution

The perceived impact of Olam's Aviv plantation on water quantity and downstream flow in the sub-basin has contributed to conflict with the Benedictine Sisters of St Agnes Priory, at Chipole. The convent operates a hydropower generation facility on the Ruvuma which they say has been negatively impacted in terms of reduced capacity and production, by abstraction upstream. Although the claims have been thoroughly investigated and found to be unlikely, the Chipole Sister's ongoing public claims that the site is 'taking their water' poses a reputational and regulatory water risk to Olam. Since the establishment of the site, Olam has been involved in an ongoing dialogue with the Chipole Sister's regarding the impacts of their water use.

Through working with the standard, Olam's Aviv site staff recognised the importance of resolving conflicts and competing claims around water and developed a new response based on enlisting a neutral third party to undertake a formal consultation/conflict resolution process with the Chipole Sister's to resolve the ongoing dispute. This is to supplement the establishment of a conflict resolution process and mutual data sharing arrangements through involvement in the fledgling Upper Ruvuma Committee.

Effective dispute resolution is a top priority for Olam, as uncoordinated abstraction in the Upper Ruvuma is likely to lead to further conflict between water users along the Ruvuma River and its tributaries, especially during times of low flow and drought.

Plates 2a –f. Water quantity and flow: (clockwise from top left). a. Pump and pump house division A; b Water level loggers installed in the Ruvuma; c. Abstraction point B; d. abstraction point on Ruvuma River; e. irrigation delivery to field via drip lines; f. faulty flow meter.

4.3. Water supply and sanitation, and important water related areas

Maintenance of adequate water supply, sanitation and hygiene (WASH) facilities for site workers is an important legal as well as ethical requirement, and is likely to improve staff productivity and lower rates of absence through ill health. The AWS implementation has driven important changes to WASH provision and the management of important water related areas at the site and each of these is set out below.

Significant investment in improved WASH provision and worker wellbeing

AWS standard implementation confirmed a previously identified requirement to improve water, sanitation and hygiene (WASH) facilities for staff across the site. Due to contractor and construction delays, previously these were inadequate in terms of location, provision per head and distance to travel and this posed considerable reputational, regulatory and operational water risks. Olam's approach to water and sanitation provision has been strengthened at site and globally as a result of working through the AWS standard. Internal policies, guidelines and standards now make reference to World Health Organisation guidelines on adequate levels of WASH provision and USD$ 160 000 has been mobilised at site level to invest in ensuring alignment with these. The infrastructure available ahead of this investment and construction underway is shown in Plates 3 b-e. In addition to addressing this risk through construction of additional toilets and handwashing stations across the site, a system has been established to ensure the delivery of adequate amounts of safe drinking water to workers. This is supported by the mapping of the locations of toilets, hand washing stations and drinking water access points across the site and the ongoing monitoring of these.

The standard has strengthened and supported Olam's approach to adequate WASH provision within their global operations, and the guidance developed at Olam's Aviv site because of AWS implementation is being rolled out internationally to ensure that the WASH facilities are compliant with international best practice.

Improved management of the Ruvuma River corridor

Although the site had previously mapped out the 'set back' distances of all its activities from the water course in line with national legislation, the process of AWS Standard implementation has driven a more robust monitoring regime to ensure that these important water related areas in the floodplain are managed appropriately. There is now a regular inspection regime in place and through this, illegal dumping of topsoil was identified within a floodplain area (Plate 3a). The site has taken this up with responsible contractors and a remediation plan is being implemented to dispose of soil (spoil from the new reservoir) in a more appropriate manner.

Plates 3a – f. Important water related areas and WASH (clockwise from top left): a. Degraded floodplain; b and c: pre-existing sanitary facilities; d: site staff; e and f: New WASH facilities under construction

4.4. Governance and engagement beyond the fence line

In addition to the actions described above, alignment with the AWS Standard has driven targeted action to address water risks beyond the fence line of operations. These changes are primarily through investment in improved basin governance and engagement with stakeholders, suppliers and outgrowers and are described below.

Co-investment in establishing the Upper Ruvuma Water User Association

As already set out in section 4.2, in response to the multiple shared water risks they face with other basin stakeholders, they have invested in establishing the Upper Ruvuma Water User Association. Their relationship to the stakeholder group has evolved from one of lead protagonist to co-secretariat to reduce the risk or perceived risk of bias towards Aviv. The group has also started to follow the nationally established protocols and models for WUA establishment to enhance its legitimacy and impact, and has for example mapped priority issues to be addressed in their forthcoming action plan (see Plate 4a). As a result of AWS standard implementation the WUA is more independent, and Olam's credibility as an honest broker is enhanced. In turn this has led to new investment in the WUA and its operations from GIZ and the MoW. This will lead to new efforts and investment to address priority water risks in the basin including low flows in the Ruvuma (Plate 4c), inadequate WASH infrastructure (Plate 4d), unregistered water use by small irrigation schemes (Plates 5a-c), and catchment degradation including through artisanal mining activities (Plates 5d-g).

Leveraging influence and impact through community and out-grower engagement

In order to comply with the standard, the site is driven to address indirect water use within its catchment of operation. The response to this requirement has seen the site make two important contributions to better water security in the sub-basin. Firstly, it has engaged its out-growers of approximately 1,100 small farmers to understand their water related challenges and potential impacts and to then follow that up with relevant training on water stewardship. Secondly, they have administered a WASH survey for surrounding villages to determine the interactions between Olam's Aviv operations and household access to WASH. This latter measure will enable Olam to act and advocate for improved WASH service delivery and better health for the communities from where it draws its workers. For example, the site needs to know how many community members lack basic sanitation or water supply or hygiene awareness before it can design and deliver a response with, or through local government.

Improved capacity and coordination to manage company water risk

A major change driven initially by the Dutch development bank FMO (Olam Aviv's financing partner for the plantation) and subsequently by adoption of the AWS Standard is the enhanced capacity and investment for water stewardship, and the support provided by the range of site managers for the collective effort. For example, the Officer responsible for stewardship at Olam's Aviv site has been supported through additional budget, management back up and guidance, tools and training to deliver the difficult task of water stewardship (Plate 4b). The responsibility for stewardship has also been dispersed across site management in order to embed changes into normal working practices (See Plate 4d).

Stronger stakeholder relationships through greater transparency, disclosure and trust

The process of alignment with the AWS Standard has demanded greater levels of transparency and disclosure by the site which in turn facilitates stronger and more trusting stakeholder relationships. For example, the sites stewardship plans, policy and performance are now publicly available with the site pro-actively

communicating these to key stakeholders. The site has also established a transparent register of complaints and documented responses so that concerns or issued raised can be traced to a tangible response.

Constructive advocacy on systemic issues at a national level

Some of the major water risks which Olam's Aviv site faces are a result of systemic issues within the water resource management institutional framework at the national level, which cannot be addressed by a single company working at a catchment level. For example, issues such as a lack of investment and personnel resources available to the Basin Water Boards, their limited functional performance and limited influence on decision making regarding water resource allocation, are serious problems across Tanzania and within the Ruvuma basin. Constructive engagement to resolve these root causes of water insecurity requires careful and tenacious advocacy by a highly legitimate group, based on strong evidence. Despite their importance to future business viability, advocacy engagement by a single business like Olam would be fruitless, or could expose Olam to new risk such as accusations of capture. In recognition of this challenge, Olam is contributing to a broad-based civil society led advocacy initiative to improve government investment and performance on water resource management across Tanzania called 'Uhakika wa Maji'. Olam's support involves acting as a member of the Project Reference Group together with academia, donors, government, civil society groups and the media, where their presence brings added legitimacy and influence for the project outputs.

Plates 4 a- f. Governance and catchment issues (clockwise from top left): a. Basin stakeholder meeting to establish WUA and map basin issues; b. Site health, safety and environment officer; c. Ruvuma at Chipole Bridge; d. Water collection for domestic purposes in the Ruvuma; e. Coffee beans; d. Site meeting to discuss stewardship planning.

Plates 5 a- f. Catchment issues (clockwise from top left): a. Upstream of Olam – informal rice farming; b. rice harvest by small-scale farmers; c. rice paddy; d. degraded and deforested uplands in the Ruvuma; e. artisanal mining in Ruvuma; f: mining impacts; g. artisanal miner using mercury.

5. Costs, benefits and challenges of AWS standard implementation

In this section the costs, benefits and challenges of AWS standard implementation are set out in order to inform conclusions and make recommendations. The timeframe of the study and the non-quantifiable nature of some benefits mean that a full cost benefit analysis is neither possible nor desirable. Available figures are supplemented with qualitative assessments drawn from stakeholder testimony.

5.1. Costs of AWS standard implementation

Table 6 below sets out the main costs associated with standard implementation at the site, though note that this does not include the cost of certification.

Table 6. Estimated costs of implementation and alignment with the AWS Standard based on resource tracking and interviews

Costs to implementing site	EUR
Senior staff	8 900
Junior staff	1 246
Modelling and analysis	13 950
New investment in WASH facilities and infrastructure	139 552
Estimated onward annual investment to maintain and implement plans	26 700
Implementation consultant support	17 168
Total	EUR 207 516

Non-infrastructure implementation investment	41 260
Annual onwards investment in stewardship per year	26 700

5.2 Benefits of AWS standard implementation

Many of the benefits of implementation are long-term and emerge in terms of avoided costs and so quantification is currently a challenge. Benefits for the site and wider catchment are set out in the Table 7 below and a short narrative provided of each.

Table 7. Summary table of benefits arising for site and other stakeholders through adoption of the AWS standard

Benefits	Beneficiaries	Impact and financial estimate where appropriate
Comprehensive pollution control and response planning Investment in water quality monitoring and analysis	Site	Reduced regulatory risk: Maximum fine for pollution is 10 Million TZS and/or 2 years custody plus remediation and compensation costs Reduced risk of personal injury / lost earnings liability
Improved erosion control and reduced sediment load	Downstream users Site	Avoided damage to livelihoods and health and reduced flood risk Reduced agronomic losses and avoided costs of road repair
Addressing municipal sewage pollution and priority water quality risks in the basin	Site	Avoided costs of pre-irrigation treatment Avoided costs of worker health problems and crop damage
Strengthening and demonstrating compliance and protection of environmental flow needs	Catchment population (250,000) Site	Reduced costs arising from water quality damage to ecosystems, health and livelihoods Reduced regulatory risk: Maximum fine for non-compliance 5 million TZS and / or 2 years custody
Review of water use permit to support sustainable resource use	Downstream users Site	Avoided water shortage during dry spells Reduced regulatory risk

Benefits	Beneficiaries	Impact and financial estimate where appropriate
Establishing a site water balance and targeting more efficient and productive use	Catchment population Site	Avoided 'regulatory' water scarcity Avoided future pumping costs Avoided water shortage on site
Support for basin governance, coordinated resource use and climate resilience	Site Catchment population	Long – term: avoided water shortage and conflict
A proactive approach to conflict resolution	Site and downstream users	Avoided operational and legal costs and reputational impacts of conflict between water users
Significant investment in improved WASH provision and worker wellbeing	Site Site workers	Higher productivity and reduction in absenteeism through ill health Improved health and well-being for 1,250 workers
Improved management of the Ruvuma River corridor	Site Downstream Users	Reduced regulatory risk: Maximum fine for pollution is 10 Million TZS and/or 2 years custody plus remediation and compensation costs. Avoided ecosystem degradation, reduced flood risk, avoided costs of de-sedimentation
Co-investment in establishing the Upper Ruvuma Water User Association	Site Sub-catchment population and water users	***Subject to effective future functioning of the WUA:*** Secure operational water needs Reduced reputational risk arising from poorly regulated sub-catchment and 'unfair' patterns of water use 295,180 people in the sub-basin with improved water security (indirect beneficiaries)
Leveraging influence and impact through community and out-grower engagement	Site Site workers Outgrowers	**Subject to effective engagement:** Improved health, wellbeing and productivity of site staff and families (1250 x 6 people per family = 7500 direct beneficiaries people) Improved health, wellbeing and productivity among out-growers (1131 x 6 people per family = 6786 direct beneficiaries) Greater resilience of out-growers to climate shocks, higher productivity and continuity of local supply chain
Improved capacity and coordination to manage water risk	Site Downstream users Government / Ministry of Water	Ongoing reduction of water risk and avoided damage Security of financial opportunity for site owners and local population Contribution to policy implementation and implementation of basin plan
Stronger stakeholder relationships through greater transparency, disclosure and trust	Site Catchment stakeholders	Reputational credibility and legitimacy Avoided conflict and associated losses
Constructive advocacy on systemic issues at a national level	Site WRM institutions Tz Water users in Tanzania	Subject to efficacy of advocacy: Additional investment and political support to support WRM implementation and long term reduction of shared water risks
SUMMARY	Direct beneficiaries (workers and local communities) Indirect beneficiaries (water users in the sub-basin) Site	Direct contribution to improved water security for 11 100 people Potentially significant contribution to improved water security for sub-basin population of 295, 180 Likely cost savings through efficiencies and higher productivity Operational security of water use/security of operations and reputation

Benefits	Beneficiaries	Impact and financial estimate where appropriate
		Significantly reduced regulatory risk and avoided fines of up to TZS 25 million (€1M) and/or 6 years custody, [plus several million in compensation, remediation and personal injury claims]
	MoW – Government of Tanzania	Reduced regulatory cost Advancement of public policy on water

5.2.1 Summary benefits for Olam

This case study shows how the AWS Standard provides a systematic approach to implementing best practice in water stewardship, which will facilitate significant improvements in the company's water management systems and water security.

> *'Implementing the AWS standard has further highlighted issues on site like erosion control, environmental flow protocol and the procedures for setting up a WUA. The AWS standard will help us to make the best use of our resources, reduce productivity risks, impacts on the environment and potential regulatory and reputational problems.'*[4]

Direct benefits are likely to extend through the Olam business as lessons and approaches are shared and scaled globally. For example the revised WASH protocol will be scaled to benefit site staff globally. Work is currently ongoing to develop impact metrics to measure benefits of WASH provision, which are likely to include higher productivity and reduced reputational exposure.

> *'Olam is now in the process of scaling up its internal WASH guidelines across its own farms, plantations and processing sites, inspired by practices at our Aviv coffee plantation. This would have taken more time without the AWS standard. Previously we'd underestimated the size of issue and the investment needed to provide our workers with enough safe water and good sanitary and hygiene facilities.'*

In terms of additional benefits to the business, implementing the standard has enabled Olam to demonstrate its credentials as a leader in water stewardship.

> *'The big benefit has been to demonstrate and showcase our commitment to sustainable resource use and creating shared value to future clients which will help us secure investment, social licence to operate and market access.'*

Implementation of the Standard creates a sense of ownership, responsibility and accountability for managing the sites water risks amongst management and staff. It has been particularly useful as a source of guidance and professional development for the Health, Safety and Environment Officer, increasing his capacity and authority to improve water performance across the site, and scale that learning on risk based management into new areas.

> *'It's helped the team to initiate collection and analysis of new data - allowing us for first time to look at water use efficiency data. [Site HSE Officer] has new knowledge, and going through AWS implementation has built his capacity 100%.He's clearly reapplying the approach, for example, to better manage other hazards such as fire.'*

Implementation of the AWS standard has also been a catalyst for investment in water security at the site and catchment level.

[4] All comments in this section were made by Jeremy Dufour, Environmental and Social Manager, Olam, on 6th August 2015.

'We'll be committing another $100 000 over the next few years to further manage the water risks identified through AWS standard implementation, for example in erosion control. We have already invested an additional USD$150 000 in improved WASH facilities'.

A significant indicator of the value of the AWS standard for implementers is the commitment by Olam International to scale up its use across their global business.

'For us, long term sustainability is key and in water vulnerable areas there is no doubt that the standard helps. Based on the experience at Aviv, our ambition is that our coffee plantations established in Brazil, Zambia and Laos, along with all production sites facing water risk will be AWS verifiable.'

Based on the testimony above and data set out in Table 7, the benefits of AWS Standard implementation at site and company level include:

- Long term security of business operations and reputation
- Reduced likelihood of regulatory action and fines/compensation and remediation costs of several million Euros
- Likely long-term cost savings through efficiencies and higher productivity
- Greatly enhanced staff and team capacity to manage water risks systematically and adaptively, and to replicate newly learned skills and approaches
- Efficient targeting of new investment to manage priority water risks
- Scaling of best practice and learning in order to manage water risk through global value chains.
- Securing new business and safeguarding existing business through demonstrable credibility on water risk.

5.2.2. Summary benefits beyond the fence line, for catchment governance and water security

Implementing the standard has also catalysed investment and action at catchment level to address shared water risk:

'Because of the standard we are also co-investing and taking collective action with the Ministry of Water and GIZ to improve flow measurement, water source protection, abstraction regulation, planning and participation in basin governance.'

This investment goes beyond existing partners to attract new partners in the Upper Ruvuma Collective Action Initiative:

'New partners have demonstrated some interest to join us to invest locally in the sustainable water resource management at catchment level so AWS is acting as a catalyst for new collaboration. It may end up the release of additional funds, up to several hundreds of dollars of investment in out-growers through showcasing our work.'

To explore the value of AWS Standard implementation for stakeholders in the basin and basin management the actions taken by Olam have been related to the priority challenges facing the Upper Ruvuma Basin which were set out in section 3.5 and drawn from the catchment plan (MoW, 2014) in Table 8.

Table 8. Priority challenges in the Upper Ruvuma and contributions driven by AWS implementation

Catchment challenge	Addressed by AWS implementation?	Description of contribution
Insufficient water supply and sanitation both rural and urban and inequity in urban – rural provision	✓	Engagement with SOWASA Improved WASH provision on site Engagement on WASH with out-growers and local communities
Catchment degradation due to poor land management, soil loss and deforestation and pollution	✓	Investment to control erosion and pollution on site Engagement with out-growers and through WUA establishment
Low levels of awareness (in particular around sanitation and solid waste management)	✓	Engagement with communities, out-growers and site staff
Conflicts, including between pastoralists and farmers	✓	Investment in conflict resolution. Co-investment in WUA establishment
Pollution from artisanal mining	✓	Investment in WUA formation
Limited legal implementation and enforcement, and low accountability	✓	New disclosure, investment in WUA formation and national level advocacy
Shortage of manpower and skills	✓	Investment in capacity building and training of site staff and community members. National level advocacy for additional resources to support WRM in Tanzania
Low coordination between sectors and stakeholders.	✓	Investment in WUA formation
Managing water resources in dry season and dry years to avoid conflict	✓	Strengthened environmental flow protocol, investment in WUA plans and conflict resolution
Sustainable new development of water resources for new industries	✓	Construction of new storage facilities

In addition to making a contribution to management priorities within the Upper Ruvuma implementation of the standard by Olam is supporting the advancement of water stewardship in Tanzania and Regionally. Specifically, Olam have committed to sharing the process and lessons emerging to support training and outreach on the AWS to government and business in the region. This has already involved the use of site data in training case studies globally, and their investment can be traced to commitment to adopt the standard by others in the region. The existence of Olam's Aviv site as a 'beachhead' for wider roll out of stewardship in the region is a significant contribution to better water security.

In summary, drawing on data from Table 7, the wider benefits of Olam's AWS implementation include:

- Direct contribution to improved water security for 14 286 people (this figure is based on direct employees and out growers and their families who will directly benefit from improvements driven by AWS standard implementation).
- Potentially significant contribution to improved water security for sub-basin population of 295, 180.
- Leveraged new investment of several hundred thousand dollars and new partnerships
- Targeted support for the formation of the Water User Association

- Contributions to implementation of national water policy and the sub-basin and basin IWRM and development plans.
- Contributions to advocacy for improved administration of water resource management in Tanzania.

5.3 Challenges facing AWS implementation

Specific challenges facing AWS implementation and responsible stewardship action were documented through the process. They include:

Internal issues

- Budget planning
- Lack or limited data on site water balance due to the absence of a system for collecting and monitoring data.
- The scale of the site and the dispersion/mobility of workers make the delivery of adequate drinking water and sanitation a challenge in terms of transportation and staff time. 3 wheel vehicles have now been purchased to ensure water and food are delivered as needed across site.
- Difficulty in embedding compliance among site staff with new systems for monitoring, for example, site water balance.

External issues

- Stakeholder engagement can be a challenge, as some stakeholders are unwilling to participate due to suspicions surrounding the purpose of the project, and the end use of their input will be used. For example, some stakeholders have refused to attend meetings.
- Challenges of establishing an appropriate water quality monitoring regime. Determining the optimal period and timing of sampling is difficult, particularly because of the intense and sporadic nature of onset of the wet season when sampling is most relevant. Additionally, the absence of a local laboratory capable of testing water samples for pesticides means that samples must be transported to Arusha, which imposes a significant financial and logistical burden.
- Low levels of understanding within government bodies themselves and seeking of payments for discrete tasks: pay for collecting water samples, payments for measuring water flows, pay for coming to meetings. Such collective action initiatives become less viable where individual's economic (and questionably legal) interests remain the priority.
- Negative responses and vexatious complaints in response to greater company profile on water:

  As soon as we create more knowledge, people want to take a shot at us. It's a side effect of stimulating dialogue.
- Potentially high certification costs. Some responses to the call for accredited certification bodies lead to quotes of €15 000, up to five times the expected costs of €3000. High certification costs could be a major disincentive to further adoption of the standard, particularly where the AWS standard does not lead to any market premium.
- Lack of auditor capacity: The AWS Verification system was only recently made official, and the first conformity assessment bodies were accredited in September 2015. Understandably, given the timeframe, auditor capacity is lacking. The limited number of accredited auditors poses a challenge for AWS implementation and support for accredited sites. However, it is anticipated that gap in auditor capacity will be filled as more conformity assessment bodies meet the requirements for AWS accreditation.

Issues within the AWS standard

An important objective of the exercise was to assess how well the standard addresses water risks facing stakeholders in challenging African basins like the Ruvuma. This feedback is a vital part of developing the AWS standard in the future and will feed into the standard review process in 2016.

Overall the standard appears to be effectively identifying and driving appropriate action on priority water risks on and off site. However the following issues and opportunities for improvement are highlighted.

i. **Improved handling of action on WASH.** The Standard requires sites to provide access to safe drinking water, adequate sanitation and hygiene awareness (WASH) for workers on site, however it does not set a minimum standard for adequate WASH provision. Minimum standards for the provision of safe drinking water, adequate sanitation and hygiene (WASH) for workers on-site ought to be established for example through criteria 4.7**.** Without an explicit standard, this criteria is too vague to be meaningful. It is recommended that the next version of the IWSS include a minimum standard for adequate WASH provision which details the volume of drinking water to be provided, as well as the number of toilets and hygiene stations to be provided per worker.

   Further, on WASH, given the importance of improved WASH provision and water infrastructure investment in contexts such as the Ruvuma, it would be useful for the standard to drive a more proactive and progressive response within the communities and areas of influence. For example the standard should require a demonstration of compliance with international best practice in WASH provision on site, and investment in clarifying and improving the WASH status within its area of influence – for example within the communities where it's employees live . This is not to suggest that Companies take on the role of government and provide WASH services beyond site, but that they should take an active role to understanding, advocate and where necessary invest in adequate services. This is particularly appropriate where a company has indirectly influenced services through inward migration of workers.

ii. **Addressing the 'sustainability gap'.** The current version of the AWS standard leans heavily on an assumption that legal and regulatory compliance will result in sustainable and equitable outcomes on water (covered in Criteria 3.1 and 4.1). However, in governance challenged basins there is significant potential for a disconnect, or sustainability gap to emerge between what is desirable from a sustainability or equity perspective, and the requirements of – or action driven by - regulatory action. For example, where water has been allocated historically based on poor data or colonial era priorities, compliance against a very generous allocation can be meaningless, or worse, can drive inequitable use and resource depletion through legally legitimate use. The same issue can be seen where companies comply with wastewater standards which are too lax to protect downstream use, and where waste and wastewater is legally passed to a third party such as a wastewater treatment works which fails to provide adequate treatment. Merely complying with local legal and regulatory requirements is not always a reliable indicator of good water stewardship. The standard does not yet explicitly address the risks of this sustainability gap. A duty of care requirement would be a simple addition to address this oversight.

iii. **Thematic reorganisation of Standard criteria.** It was noted that the Standard could be reorganized to be more efficient and user-friendly. Following the steps of the Standard involves a high degree of redundancy as sites find themselves revisiting the same themes over and over again. For instance, site water balance comes up three times under the sections of 'gather and understand', 'plan' and 'implement'. It was suggested that the Standard would be much more intuitive, efficient and user-

friendly if it were organised thematically, rather than by steps. For instance, a section on 'water balance' could include all of the steps related to this theme. The implementation team have developed a water stewardship manual which goes someway to improving navigation of the standard and its requirements.

iv. **Commitment and capacity for AWS implementation:** While the AWS Standard requires sites to establish a leadership commitment on water stewardship, it was noted that such a commitment is not necessarily indicative of the budget and capacity required to undertake implementation of the standard. It is suggested that the commitment criteria of the standard be strengthened to ensure site management and staff are included in, and support of the site's water stewardship efforts and that sufficient budget is available for implementation.

v. **Site water-related costs, revenues and shared value creation:** It was noted that the guidance for indicator 2.4.6, which requires sites to calculate their water costs, revenues and shared value creation, is ambiguous and lacking. In order to make this section more user-friendly, it is suggested that the Standard provide a clear methodology for sites to calculate these figures.

vi. **Understanding indirect water use:** Criteria 2.5 of the standard requires sites to develop an improved understanding of their indirect water use, an exercise which leans heavily upon existing data from the Water Footprint Network regarding the water footprint of primary inputs and outsourced services. It was noted during implementation that data regarding the water footprint of some agricultural inputs is currently unavailable. It is suggested that AWS strengthen links with the Water Footprint Network to address this gap in data availability.

vii. **Erosion and soil loss:** It was noted during implementation that the issue of erosion and soil loss is not sufficiently addressed in the Standard. While the water quality criteria of the standard go part way to addressing erosion through sampling for turbidity under 'parameters of concern', it is suggested that the water quality criteria be strengthened, or additional criteria be developed, in order to explicitly address the issue of erosion and soil loss. While turbidity may be addressed through the 'parameters of concern' for water quality, it was observed that such sampling may not be sufficient to capture and address larger issues of erosion, which pose significant detrimental impacts for water quality downstream, as well for land use management.

6. The value and role of 'Guide for Managing Integrity in Water Stewardship Initiatives'

During the implementation process the team took the opportunity to review the value of the newly available 'Guide for Managing Integrity in Water Stewardship Initiatives'. Against the context of Olam's efforts to manage water risk in the Ruvuma and its wider partnership work with GiZ, the implications and potential challenges of the guide's principles and supporting tools were considered.

The outcomes of this review and summary findings are set out below.

Integrity principles	Relevance and value	Relevance and value within the Olam/Aviv/Ruvuma context
Principle 1: Seek to align with, support, and strengthen public policy	✔	The efforts made by Olam and GIZ prior to the AWS standard and integrity guidelines were generally aligned with public policy. However the additional emphasis on this within the guidelines and

that advances sustainable water management; be careful not to undermine public institutions or water		the supporting materials for analysis drives much closer and constructive alignment. For example, through evolution of the Basin Committee into the WUA (rather than a separate parallel entity) recognized by government and based on government guidance.
Principle 2: Ensure appropriate and balanced representation of interests throughout the course of the WSI.	✓	Although balanced representation within the catchment committee had been sought, actually achieving that balance had been difficult. The guidance and tools provided are extremely useful for identifying and mobilizing balanced representation (for example, small rice farmers and mining communities). At a higher level, the guidelines flag that the WSI comprising GiZ, MoW and Olam and embodied in a MoU, could be strengthened through inclusion of a civil society partner.
Principle 3: Be clear and transparent about the roles and responsibilities of WSI participants, and ensure that their capabilities are adequate (or are sufficiently developed) to fulfill them.	✓	This is particularly relevant for the initiative given some stakeholder concerns about undue influence on the sub-basin Committee by the company. Adopting guidance under this principle could a) more effectively reveal the nature of engagement by different stakeholders, and, b) flag the need for training and the nature of that training for stakeholders at an early stage.
Principle 4: Be clear and transparent about the water challenge(s) being addressed by the WSI, as well as the agreed scope and intended benefits.	✓	This principle and guidance supporting it is again particularly relevant to the Ruvuma case. It enabled the participatory mapping of issues and challenges in the basin for the first time, and further analysis of the root causes of these issues to enable targeted action.
Principle 5: Be clear and transparent about how the WSI is to be governed.	✓	Useful to emphasise this need and provide guidance for how this should be approached to build confidence at local level, and also with national government staff, who were initially reluctant to enter into partnership with the private sector.
Principle 6: Track outcomes against the stated objectives of the WSI**.**	✓	The AWS standard provides the framework and means for this to be delivered.
Principle 7: Foster an ethos of trust, and establish expectations for behavior of WSI participants.	✓	The guidance provided on how this can be delivered/achieved is extremely valuable to the Ruvuma work and should be adopted.

In summary, there is a great deal of value in applying the new integrity guidelines in contexts such as the Upper Ruvuma WSI to strengthen the impact and sustainability of engagement. It is also clear that the AWS standard embodies many of the principles set out in the guidelines. In order to realise the potential of this complementarity for strengthening water security through WSIs, two important findings emerge.

- Effective delivery of the multiple roles of civil society within water stewardship initiatives is crucial to improving their impact and integrity. However, civil society engagement in this area

is weak or externally led and this is linked to a lack of core capacity and pragmatic support and funding. Good civil society partners exist but they need to be better supported to fulfil their key roles.

- Relatedly, the workload involved in implementing the integrity principles and guidance is significant and adds to the staffing and funding requirements of WSIs. It needs to be recognised by all parties that stewardship is not necessarily a cheap and easy route to water security, and that 'getting it right' requires ongoing investment to build integrity and impact.

7. Insights, impact and recommendations

The guided implementation of the AWS standard at Olam International's Aviv Coffee Plantation in Tanzania shows the standard to be a cost-effective mechanism for improved water security with multiple benefits for the site and other stakeholders. In particular through guiding responses and investment based on contextual risks, and establishing systems to track and modify those responses where necessary, the standard drives long term resilience to water and climate risks. This is particularly important in basins such as the Ruvuma and across Africa more widely, where despite recent reforms and investment in water management institutions, government lead management of water risks will take some years to become effective. The positive impacts of standard implementation are likely to be significant in such contexts.

For the site, new ways of managing and monitoring resource use, of ensuring compliance with legislation and international best practice, and of avoiding conflict with other resource users will generate costs savings. Perhaps more importantly it helps to secure the companies legal and social licence to operate, and through documenting and showcasing efforts, secures business growth and new investment. The exercise has also provided the company with the methodology, knowledge and capacity to re-apply the standard and scale it across other sites of operation.

For local communities the standard ensures that a large commercial enterprise which shares their water resource does so in an equitable and sustainable manner, irrespective of the limited efficacy of government regulation. It also ensures that the company meets its obligations to provide a safe working environment through adequate WASH. By driving proactive engagement to improve WASH and better water and environmental management within the communities where workers live, and among its out-grower communities it is anticipated that implementing the standard will deliver direct benefit to almost 15 000 people.

For other stakeholders and the wider population on the basin, AWS standard implementation has led to the significant strengthening and new investment in the sub-basin governance and management. Olam has directly supported the creation of a WUA and may catalyse new investment of over several hundred thousand dollars from donors, government and other private sector sources. Critically, the standard and its supporting guidance have allowed this investment to take place without undermining the independence and legitimacy of the WUA. The WUAs work alongside investment by Olam and the Ministry of Water will seek to address the main shared risks facing the basin in line with public policy, existing plans and strategy, and has potential to benefit approximately 300 000 people within the Upper Ruvuma sub-Basin.

For water resource management in Tanzania more widely the implementation of the standard performs two important contributions. Firstly it mobilises powerful private sector actors to support better water resource management at local, catchment and national levels. The involvement of Olam in a multi-stakeholder national level advocacy initiative (Uhakika wa Maji) as a result of the exercise is likely to pay important dividends for improved sector performance in the long term. Secondly, it establishes a model for private sector stewardship which advances and is entirely aligned with public policy and which is scalable within Tanzania. Based on

Olam's implementation, one other multinational has committed to adopt the standard and many more are interested.

For the Alliance for Water Stewardship the exercise has demonstrated the value of the standard in a difficult basin, the cost effectiveness and viability of the business model, and flagged where improvements are required to the standard content and system. Further, Olam's implementation of the standard – the first in Africa – has generated invaluable training, marketing material and case study evidence which will be used to build the AWS and advance the goal of equitable and sustainable water stewardship globally.

Key recommendations are provided below:

1. **Use Olam's implementation as a spring board for AWS roll out in Africa**.

Given the multiple benefits and cost effectiveness of the AWS standard as a mechanism for driving improved water security and constructive corporate engagement the experiences of Olam in Tanzania should be used to promote uptake across the region. The Olam, WWI and AWS team are already involved in outreach and in using the experience to support training and this should be scaled accordingly. For example the opportunity to promote the standard to peer companies in Tanzania and beyond, and to support the development of regional expertise should be pursued.

2. **Implementation and verification against the standard across water vulnerable supply chains.**

The AWS standard is shown to be an effective approach through which companies to manage shared water risks. Olam and other companies which share a reliance on water should seize the opportunity provided by the standard to scale its application. A strategic focus of this effort on sites and suppliers in areas which are vulnerable to water risks, either because of the physical, social or institutional contexts, and which draws on lessons, skills and capacity generated at 'leader sites' is likely to be a highly cost effective response to increasing water risks. Implementation should be followed by verification through an audit by an AWS accredited certification body in order to give confidence to stakeholders and provide a guarantee of due diligence on water.

3. **Establish a regional AWS membership base to maximise the relevance and contribution of the AWS system in Africa**

African stakeholders should convene in order to review the evidence emerging from early application of the AWS standard in Africa and based on this, develop and promote regional guidance, and support the standard review in 2017. Given the specific governance and contextual challenges facing water management in Africa, the AWS standard system poses an immediate and important opportunity to drive responsible private sector water use and engagement. African stakeholders should be proactive in guiding and shaping this effort, and as other regional stakeholders in the Asia-Pacific, Europe and North America have done should consider a regional initiative to ensure maximum relevance and impact.

4. **Stronger government engagement to integrate potential benefits**

The AWS standard system has multiple benefits for government and statutory water managers and action should be taken to ensure that these are fully realised. For example, if a site is in full alignment with the standard and this is verified, then it is likely that less regulatory effort will be needed to ensure compliance. Similarly, if new investors adopt the AWS standard they are less likely to create negative externalities for communities, other users and the environment. By recognising and referencing the AWS standard in government policy, guidance, licencing regimes and risk based regulation and enforcement, government can both strengthen uptake and maximise the systems contribution to smarter and efficient regulation. Particular effort should be focused on helping government agencies to understand and harness the AWS standard within their policy and institutional toolbox for water security.

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