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Sida Decentralised Evaluation

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Evaluation of the Pungwe Basin Transboundary Integrated Water Resources Management and Development Programme (PP2)

Final Report

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Abbreviations and Acronyms

AfDB	African Development Bank
APR	Annual Progress Report
ARA-Centro	Regional Water Administration of Central Mozambique
CDP	Critical Development Projects
CRA	Water Supply Regulatory Council of Mozambique
DNA	National Directorate for Water in Mozambique
DNGRH	Direcção Nacional de Gestão de Recursos Hídricos, National Directorate of Water Resource Management
EQ	Evaluation Question
ET	Evaluation Team
FIPAG	Fundo de Investimento e Património do Abastecimento de Água, Water Supply Investment and Asset Fund
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit, German Development Cooperation Agency
GoM	Government of Mozambique
GoZ	Government of Zimbabwe
IDA	Institutional Development Advisor
ILAC	Institutional Learning and Change Initiative
INAM	Instituto Nacional de Meteorologia, National Meteorological Institute
INGC	Instituto Nacional de Gestão de Calamidades, National Disasters Management Institute
IUCN	International Union for the Conservation of Nature
IWLUS	Integrated Water and Land Use Strategy
IWRM	Integrated Water Resources Management
IWRM&D	Integrated Water Resources Management and Development
JWC	Joint Water Commission Concerning Water Resources of Common Interest
MEWC	Ministry of Environment, Water and Climate (Zimbabwe)
MIRENE	Ministry of Mineral Resources and Energy (Mozambique)
MITADER	Ministry of Land, Environment and Rural Development (Mozambique)
MTR	Mid-Term Review
MUPB	Management Unit of Pungwe basin (Chimoio Office)
NGO	Non-Governmental Organisation
OECD-DAC	Organisation for Economic Co-operation and Development, Development Assistance Committee
PBC	Pungwe Basin Committee
PIM	Programme Implementation Manual
PMC	Programme Management Committee
PNDRH-1	Programa Nacional para Desenvolvimento de Recursos Hídricos, National Programme for Development of Natural Resources
PP2	Pungwe basin Transboundary Integrated Water Resources Management and Development Programme

PPP	Public Private Partnership
PSC	Programme Steering Committee
PSCC	Pungwe Sub Catchment Council
PSU	Programme Support Unit
QQT	Quality, Quantity and Time
SADC	Southern African Development Community
SCC	Save Catchment Council
SDAE	Serviço Distrital de Actividades Económicas, District Service for Economic Activities
SGF	Small-scale Grant Fund
SMDDS	Small and Medium Dam Development Strategy
ToR	Terms of Reference
WMO	World Meteorological Organization
ZINWA-Save	Zimbabwe National Water Authority – Save

Preface

This Evaluation of the Pungwe basin Transboundary Integrated Water Resources Management and Development Programme (hereinafter ‘the Programme’) was commissioned to NIRAS Sweden AB by Sida and the Embassy of Sweden in Ethiopia. The evaluation has two phases: in this first phase the evaluators conducted an initial review of the Programme and create a baseline and set indicators for the final evaluation to be held in mid-2020. This first phase took place from September to December 2017 and was conducted by:

- Svend Erik Sørensen, Team Leader, Institutional Development Expert
- Troels Kolster, IWRM Expert
- Wellington Dzvairo, IWRM Expert Zimbabwe
- Tjitske Leemans, IWRM Expert Mozambique
- Klas Sandström, Evaluator and IWRM Expert

Johanna Lindgren Garcia managed the review process at NIRAS Sweden. Mats Alentun and Gonçalo Carneiro provided the quality assurance. Annika Karlsson managed the evaluation at Sida.

Executive Summary

Sweden has supported the joint management of water resources in the Pungwe River basin since 1998. Based on a strategy developed for the period 2002-2006 (PP1) a comprehensive programme (PP2) was initiated in 2007. The development objective of PP2 was as follows:

To strengthen relevant institutions, stakeholders and systems at all appropriate levels for the joint, integrated and sustainable management of water resources in the Pungwe River basin, and to stimulate and support appropriate development-oriented investments in the basin that contribute to poverty reduction and environmental sustainability.

Two water resources institutions were the focus of the support: *ARA-Centro in Mozambique* and *ZINWA-Save in Zimbabwe*. Five components were initially identified to meet the objective, and later restructured to the following four: (i) institutional development, (ii) poverty reduction, (iii) environmental protection, and (iv) regional cooperation. After several extension periods PP2 ended in April 2017.

The purpose of this review is to (i) assess results, i.e. effectiveness, (ii) judge whether the institutions supported have a proper mandate and the capacities to fulfil their missions, i.e. outcomes and sustainability, and (iii) to establish the degree to which poverty reduction and environmental protection have been achieved and the impact on local communities. The review applies the OECD-DAC evaluation criteria and the focus is on the outcome level of PP2.

The key **findings** of the review were as follows:

Relevance: The objectives set for PP2 addressed the needs of the governments of Mozambique and Zimbabwe as defined in their policies and strategies. Local authorities and beneficiaries participated in all project phases and especially the SGF was a means for PP2 to materialise into activities addressing the beneficiaries' livelihood and daily subsistence needs. It was found that the enforcement of the strategies, plans and directives that derive from the policies and strategies was insufficient, while acknowledging that not all of the PP2 activities were within the auspices of ARA-Centro and ZINWA-Save.

Effectiveness (institutional development): The institutional development component comprised a review of (i) staff development, (ii) decentralisation, (iii) stakeholder participation and (iv) information and communication systems.

Staff development: Despite efforts by PP2, low motivation of the ARA-Centro staff was experienced throughout the PP2 lifetime, resulting in recurrent underperformance. Large-scale capacity development support was provided through PP2 to ARA-Centro and ZINWA-Save by which staff capacity improved significantly. However, such capacity improvements do not seem to have had a significant effect on staff motivation and retention, which continue to be affected negatively by the working conditions and the generally low salaries for staff members. Insufficient monitoring data prevented an assessment of the value for money of the PP2 capacity development support to ARA-Centro and ZINWA-Save.

Decentralisation: The decentralization of water resources responsibilities and equipment procurement was executed successfully to the water institutions and stakeholders, including to the Chimoio sub office and the Pungwe basin Committee and sub-committees. Decentralisation in the ZINWA-Save was a reality prior to the initiation of PP2. Decentralisation process should be continued based on capacities and funding available. The decentralised efforts also facilitated the engagement of local authorities. These will, together with decentralised units, be important entities in the forthcoming support to the people of the basin now that the PP2 funding has terminated.

Stakeholder participation was a key feature of PP2 and was achieved in that the number of (sub) committees and (sub) councils expanded during PP2 and strengthened through comprehensive training and exchange visits and furnished with office and transport equipment. However, the impact of the capacity building events to facilitate participation could not be assessed, as records or reporting on the result and impact of the capacity building either was not carried out or was insufficient. Introducing a simple effect measurement system could enable an assessment of the value for money of those capacity building efforts. It is most likely that where PP2 activities were carried out in the Pungwe Basin, those contributed to mitigating water conflicts.

Information and communication systems: PP2's support to information and communication was overall successful. The networks of hydrometric and pluviometric stations, and of automatic stations for real time communication have been substantially upgraded and expanded during the Programme. In Mozambique the number of hydrometric stations is well above the targets set for PP2 and in Zimbabwe the targets were achieved. Data quality and information sharing have significantly improved following observer training, supervision of observers, geo-referencing of hydrometric stations and installation of the data management software Hydstra.

Capabilities to carry out water resource assessments were substantially improved, especially within ARA-Centro. The allocation of water permits increased, but control and the issuing of sanctions remains inadequate. Water quality monitoring improved following the procurement of water quality testing kits, training of staff and the provision of resources for fieldwork and transboundary cooperation. However, the

lack of an adequate laboratory in Mozambique to carry out more advanced water sampling constitutes a barrier towards effective water quality monitoring and protection of the environment. The quality and amount of water management information being produced by ARA-Centro improved with regards to disaster risk reduction. The environmental flow component was cancelled.

There seems to have been a main focus on improving the surface water network and not enough effort has been invested into improving the water quality and groundwater network, with possible detrimental effects on especially ARA-Centro's capacity to manage the environmental sustainability of the basin.

Effectiveness (poverty reduction): The poverty reduction component comprised a review of the (i) Pungwe basin investment facility, (ii) small and medium dam development strategy, and (iii) a small-scale IWRM&D grant fund (SGF).

The Pungwe basin Investment Fund did not materialise because ARA-Centro was not capable of managing the fund, and because there were doubts that viable large-scale commercial water infrastructure projects in the basin were unlikely to be financially feasible.

A Small and Medium Dam Strategy was produced and according to the training conducted, sufficient capacity should be available within ARA-Centro to coordinate and supervise the implementation of the strategy. Feasibilities studies for each of the dams should have been included in PP2 to enable the government of Mozambique to attract funders and investors.

The small-scale IWRM grant fund was overall successfully implemented, yet there are challenges concerning the future of the projects supported by the fund. Focused financial and technical support from PP2, the beneficiaries themselves and the local authorities (districts) – addressing poverty concerns in selected localities in both countries, ensured the success of the fund-supported interventions. While women seem to form a considerable number of the association members, their role in the decision-making bodies remains unclear. Due to armed conflict in several of the districts many irrigation schemes were abandoned for long periods of time. Even though most of the associations restarted their activities with technical support from local authorities, sustainability of the projects is a big challenge as most of the associations are not able to save money for maintenance and replacement of the equipment.

Effectiveness (environmental protection): The environmental protection component comprised a review of (i) salinity control, (ii) gold panning management, (iii) flood and drought warning, (iv) integrated water and land use development, and (v) environmental flows.

Salinity control: PP2 did not provide appropriate protection against saline water intrusion in the Lower Pungwe basin to protect irrigation and industrial activities

dependent on water supply from the river, and to ensure the availability of safe drinking water. This project was underestimated in terms of time, capacity and complexity and it started too late with inadequate input of qualified staff and insufficient attention to the aspect of irrigation. The Programme did not want to invest in the improvement of the water quality for the Sugar Estate. These considerations should have been made before the Programme started, also to not raise expectations with stakeholders. Alternatively, a PPP or similar arrangement should have been considered by decision-makers.

Gold panning management: Sustainable technologies and alternative livelihoods were promoted for small-scale mining groups, but gold panning activities increased due to the attractive gold prices on the market, resulting in increased water pollution. PP2 could have had more impact if the involved ministries would have had more formal/leading role in the process because they have more authority and legal instruments (licenses and concessions) and means (police) to intervene than ARA-Centro.

Flood and drought management: Flood management became operational during PP2 and can be considered a major achievement of the Programme via investments in capacity building of ARA staff and improvement of the HYDROMET network. Neither PP2 nor ARA-Centro have substantially addressed drought management other than via the drafting of a strategy. ARA-Centro is highly dependent on data from external stakeholders. It is important to strengthen the institutional arrangements involving other stakeholders and ensuring that they are able to provide, collect and share relevant information.

Integrated water and land use strategy: PP2 supported the development of a comprehensive, integrated water and land use strategy, but did not result in any implementing policies and regulations. The strategy was disseminated to some extent but there were no effective coordination mechanisms established for promoting and monitoring sustainable water and land use in the basin. The promotion of water and land use lies beyond ARA-Centro's mandate, competence and capacity. Other governmental institutions should have been invited to take the lead.

Environmental flows: The strategy and action plan for monitoring and preserving e-flows in Gorongosa Park and Lake Urema were developed together with an assessment of land use practices on Gorongosa Mountain. However, by 2012 the project was downsized and terminated. The environmental flow requirement study was not implemented due to its substantial implementation costs, an assessment that should have been made in the design phase.

Effectiveness (regional cooperation): The regional cooperation component has been successful in that the Joint Water Sharing Agreement for the Pungwe River between the two countries was signed in July 2016, thereby constituting the final outcome of the component. The Agreement served as an example for mutual agreements for the Save and Buzi river basins. The stage is now set for the implementation of the

Agreement, which will be supported by GIZ who will also provide support for the completion of the Save and Buzi agreements, as well as for a joint secretariat. Without the success it had been questionable if other donors would have pursued the support. The success also was facilitated by a determined effort from the national levels in the two countries.

Sustainability: For ARA-Centro to become sustainable it will need to be able to utilise its strengthened capacity developed during PP2 to collect fees more efficiently and effectively. The potential fee collection from the selling of raw water from the dams will be critical for long-term sustainability. Barriers include the continuous instability of the staff situation and the extent to which the current financial crisis in Mozambique will impact on the government budget allocation to ARA-Centro. Recently some water tariff fees have increased but they are insignificant as the increase is small and the number of clients is still relatively low. Important is also the institutions' ability to tackle the unwillingness to pay for water use and the limited development of water infrastructure in the basin.

Impact: Overall impact that can be attributed to PPS interventions has been less significant than anticipated, from the perspective of important and influential stakeholders. This is particularly significant considering the fact that PP2 was carried out over a relatively long period of 10 years. Importantly for assessing impact will be the degree in which products generated within PP2 will be used in the future, such as policies or strategies, or concrete products such as feasibility studies, by government, international donor or others.

Efficiency: The efficiency assessment of PP2 included (i) the national flow of finances, (ii) the Programme Support Unit, and (iii) performance monitoring. The distributing of programme funds through the official national financial system in Mozambique had flaws and suffered from incompatibility of systems that caused delays in the release of funds. As a non-decision-making body the PSU managed to provide the services requested by decision-making bodies of PP2 and other stakeholders. Overall performance monitoring was inadequate in that the reporting on progress did not integrate the Programme into the business plans of the two institutions. Other monitoring instruments, often relevant, provided assessments of progress but were submitted irregularly. ARA-Centro and ZINWA-Save should use simple M&E practices, including the use of simple indicators applying for example Quantity, Quality and Time (QQT).

Measured Achievements of PP2

Based on the Review a Lickert scale (1 to 5) has been prepared in which the degree of achievements has been indicated for each of the PP2 components and projects, as well as for the evaluation criteria (Tables 1 and 2, respectively).

Table 1 - Degree of achievement per Programme component (1-min to 5-max).

Component / project	Degree of achievement, 1 (poor/low) – 5 (excellent)
<i>Institutional development</i>	
1. Staff development	3,0
2. Decentralisation	4,5
3. Stakeholder participation	3,0
4. Information and communication	4,0
<i>Poverty reduction</i>	
1. Pungwe basin investment facility	1,0
2. Small-medium dam development	3,5
3. Small-scale IWRM&D fund (SGF)	4,0
<i>Environmental protection</i>	
1. Salinity control	1,0
2. Gold panning management	3,0
3. Flood and drought warning	4,0
4. Integrated water and land use	2,0
5. Environmental flows	1,0
<i>Regional cooperation</i>	5,0

While effectiveness has been then focus of the review, achievements of other evaluation criteria have also been assessed within the framework of the OECD-DAC evaluation criteria.

Table 2 - Degree of achievement per OECD-DAC criterion (1-min to 5-max)

OECD evaluation criteria	Degree of achievement, 1 (poor/low) – 5 (excellent)
Relevance	5,0
Effectiveness (average score)	2,9
Sustainability	1,5
Impact	2,0
Efficiency	2,0

An assessment of the *design of PP2* concludes that it was logically a very comprehensive programme as IWRM includes multi-sector and institutional challenges. More focus should have been on the *core business* of ARA-Centro and ZINWA-Save emphasizing their (financial) sustainability. This would have meant fewer components and projects with larger budgets, leaving out the components and projects that should have been under the auspices of other governmental institutions, e.g. the gold panning component and the integrated water and land use strategy. Furthermore, the institutions were highly dependent on data derived from other institutions for the flood and drought management. From a strict budgetary perspective it appears that a major part was spent on result areas that were the core businesses of the agencies (institutional development, stakeholder participation, bilateral cooperation, flood warning, information and communication systems, dam development strategy).

With the cancellation of multiple components or parts thereof – including the Pungwe initiative, e-flow, pre-investment fund and saline intrusion reduction – and the stretching of the institutions activities beyond their mandates, it is reasonable to conclude that the design itself invited to a diversity of activities that deviated from the institutions' core business.

Recommendations for Sida

- Sida should focus on strengthening the core business of beneficiary organisations, and not include themes that are outside their mandate or sphere of control.
- Sida should concentrate on a smaller number of activities with greater potential for impact, and combine interventions targeting the organisations' strategic mandates, capabilities and planning with investments in the implementation of concrete measures. When doing so, it is important to avoid overloading the beneficiaries' staff with additional tasks for which the organisation does not have the capacity.
- Sida should carry out a more effective monitoring and supervision of Programme implementation, using processes and tools as simple as possible for monitoring progress and measuring achievements.
- Sida should reconsider channelling funds through the national financial system of partners, given the complications and significant delays associated with such practice.

Recommendations for ARA-Centro and ZINWA-Save

- Both organisations, in particular ARA-Centro should prioritise human resource management, as staff is a key resource for success. Realistic approaches to improving employee performance is key, as well is improved internal communication.
- Both organisations should prioritise investments in equipment and focus on expanding and maintaining their monitoring networks, such as water quality and flood, and drought monitoring equipment.
- Both organisations should work together with other institutions to organise billing and fee collection, and to continuously update the client data.
- With respect to marketing and public relations both organisations should explain clients what they are doing and why clients are requested to pay for the services provided. This outreach should be done by skilled decentralised staff and stakeholder groups. Moreover the communication and information system should be improved by investing in new means of communication and tailoring products to the individual targets groups.
- The responsibility for support and monitoring of the current 33 SGF projects should be handed over to local government and/or civil society organisations. Close collaboration between all the parties involved should be continuously encouraged. This could include, for example, technical support for more effective

agricultural practices, ensuring benefits for disadvantaged groups in the project areas, and identifying funding mechanisms, such as micro-finance.

- Both organisations should reactivate and train beneficiary associations with a focus on the financial sustainability for the operation and maintenance of the projects and the increased commercialisation of the associations. The latter is an important driver in both countries, as there currently exists a local (and international) market for (contract) farming to produce fruits and vegetables.
- In both organisations any additional income should be used to expand irrigation systems and create employment for the surrounding communities. ARA-Centro and ZINWA-Save should support the associations to exploit a dynamic market. In Mozambique support could constitute a collaborative effort of ARA-Centro, through the MUPB Chimoio and the local government, through the SDEA activities. Support could also include connecting the SFG projects to relevant programmes running in parallel and supported by international donors (e.g. the World Bank) or the national governments (e.g. Maguta in Mozambique). Both organisations should coordinate and exchange information with important stakeholders with respect to possible future water scarcity, including the water utility FIPAG, the World Bank-funded agricultural projects and provincial agricultural authorities in Mozambique.

Baseline and Value Targets for the 2020 Evaluation

The baseline has been developed based on the review result and recommendations. For each component, project and evaluation criterion generic indicators have been identified and baseline established for November 2017. Target values for 2020 are proposed. This is presented in chapter 5.

1 Background

1.1 INTRODUCTION

Sweden has supported joint management of water resources in the Pungwe River basin since 1998 when the preparation of a project for developing an integrated water resources management (IWRM) strategy for Pungwe was initiated by the governments of Mozambique and Zimbabwe with Swedish assistance through Sida (PP1). At the same time as the PP1 was finalised in 2006 the preparation of a comprehensive programme (PP2) was initiated based on the result of that strategy.

The development objective of PP2 was as follows: *To strengthen relevant institutions, stakeholders and systems at all appropriate levels for the joint, integrated and sustainable management of water resources in the Pungwe River basin, and to stimulate and support appropriate development-oriented investments in the basin that contribute to poverty reduction and environmental sustainability.*

Five components were identified to meet the objective:

1. Institutional development (with a focus on the two IWRM institutions, ARA-Centro in Mozambique and ZINWA-Save in Zimbabwe)
2. Stakeholder participation
3. Information and communication systems
4. Pungwe basin investment facility
5. Critical development projects

Component 5 comprised seven critical development projects (CDP):

- Salinity control
- Gold panning management and mitigation
- Flood and drought warning and mitigation
- Sustainable environmental flows in Gorongosa National Park and Lake Urema
- Small and medium dam development strategy
- Integrated water and land use strategy
- Small scale integrated water resources management and development (IWRM&D) grant fund (SGF)

PP2 commenced in late 2007 with an intended period of five years, but due to delays in the inception phases extended to the end of 2013. This programme configuration remained intact up till the end of 2013, but was subsequently restructured during a three-year extension period from 2014 to 2016. While keeping the original development objective the components were redefined as follows:

1. Institutional development (with a focus on human resources and sustainability of the institutions)

2. Poverty reduction
3. Environmental protection
4. Regional cooperation

The restructuring also included a reshuffle of critical development projects.

The purposes of this evaluation were (i) to assess results, i.e. effectiveness, (ii) judge whether the institutions supported have a proper mandate and capacities to fulfil their missions, i.e. outcomes and sustainability, and (iii) to establish the degree to which poverty reduction and environmental protection have been achieved, and the impact on local communities.

The evaluation takes place in two phases. The first phase in which a review was carried out and baseline indicators established and their values defined for a later evaluation is presented in this report. The second phase is the actual evaluation to take place in 2020, three years after the completion of PP2. Sida's intention with this set-up has been to evaluate the sustainability and continued ownership of PP2 by the IWRM institutions in the two countries three years after the termination of the Sida support.

1.2 METHODOLOGY

1.2.1 Overall Approach

The work under phase one has been structured in three separate sub-phases: inception, data collection and reporting. The inception phase included a desk study and preliminary interviews and was presented in the Inception Report in September 2017. Contribution analysis¹ constituted the main approach in the data collection process carried out in the field in Mozambique and Zimbabwe in October and November 2017, which included interviews with all relevant stakeholders engaged in or affiliated with PP2 and further collection and review of data. Key documentation was found first and foremost in the annual progress reports (APRs), selected subject matter/specialist reports, and minutes of Programme Steering Committee (PSC) meetings.

An evaluation matrix was produced and presented in the Inception Report. The matrix contained evaluation questions (EQs) that formed the basis for the fieldwork data collection, as well as for identifying the indicators for the 2020 evaluation. We have ensured that important indicators mentioned in the evaluation matrix have been addressed. During the course of the data collection phase some indicators were shifted between the EQs as some indicators related more clearly to another EQ than the one they were placed under originally.

¹ For details on the use of contribution analysis, see Mayne, J. ILAC Brief 16, Contribution Analysis, May 2008.

The Terms of Reference (ToR) requested the evaluation to have an *outcome* focus. This means that each objective under each component or CDP has been defined as the outcome to be achieved. This is essential and is reflected in the analysis of the data collected and has guided the structure of the effectiveness chapter of the report (2.2). For each outcome we have assessed related indicators and key influencing factors that emerged as issues during the course of the evaluation mission. Each component/CDP in the effectiveness chapter has been described chronologically in an introduction followed by a review of data collected and finalised with a conclusion.

It was agreed with Sida that the review should focus strongly on the Small Scale Fund projects. The evaluation mission carried out visits to 15 SGF projects (11 in Mozambique and four in Zimbabwe) and the results from each visit are presented in Annex 4. In order to ensure systematic field data collection, the evaluation team drafted an interview guide that provided consistent and comparable information for the review. These results have been a key source of information for the review, together with the APRs and the Evaluation of the SGF from 2014.

The evaluation team has ensured that all data collected have been adequately scrutinised for their reliability and credibility through a triangulation process, where feasible. Where findings are based on anecdotal evidence only, this is stated in the text.

The report is organised in four main sections: This chapter includes a description of the background that introduces the Pungwe Programme, a presentation of the methodology and a brief description of the Pungwe River basin. This is followed in chapter 2 by a review of programme achievements that is structured in accordance with the OECD evaluation criteria. Based on the review, chapter 3 presents the lessons learned, recommendations and the baseline, including indicators suggested for the 2020 evaluation. The report contains the following annexes: terms of reference for the evaluation (A), list of people met (B), list of documents reviewed (C), list of SGPs in Mozambique (D), description of the field visits to the SGPs in Mozambique (E), list of SGPs in Zimbabwe (F), description of the field visits to the SGPs in Zimbabwe (G), maps with GPS locations in Mozambique (H) and a list of the trainings for ZINWA-Save 2012-2016 (I).

1.2.2 Limitations

In Sida's 'Conclusion on Performance' from June 2016 it is stated that "(t)he gender dimension unfortunately has been lost within the programme" (p.3). At the same time the ToR for the evaluation have requested the evaluation to collect and assess detailed and disaggregated data relative to gender and disadvantaged groups (p. 3-4). While the evaluation team dedicatedly sought for these data they were either not available or not accessible due to the inability of the two institutions to track them. It was only during the extension period of PP2 (2014-2017) that a particular focus on the number of women engaged in meetings and training, etc. was recorded. The tasks specifically assigned to women, and their responsibilities and 'true' involvement were not

recorded though. Therefore this report does not include a specific analysis of gender and vulnerable groups. Yet, where data related to gender issues and disadvantaged groups have been accessible to the team they have been included in the report.

Theory of change (ToC) is considered a critical analytic method in development work. In reviews they often contribute to the rephrasing and re-formulating of the overall pathways towards change of a programme's development objectives. In the case of PP2 we found it suitable and realistic to let the Business Plans of the two IWRM institutions, ARA-Centro and ZINWA-Save, constitute the theory of change. The main reason for this was that business plans are often thoroughly worked-through documents with missions, visions and objectives of focus areas and therefore represents well the direction of the institutions over a specific period of time, e.g. 3-5 years. While it was the intension of the evaluation team to carry out a ToC exercise in close collaboration with the institutions, it was impossible to do so within the limited time available. As such, a ToC is not discussed in the report. While it was the intention that the business plans of the two institutions were to be used as guidelines for what they intend to achieve and prioritise over the next 2-3 years and as such guiding the evaluation in the definition and values of indicators, it became clear that the plans were not finalised and/or approved business plans or were under revision. Therefore the indicators, baseline and values presented in Chapter 3.2 are based on the review of PP2, the lessons learned and recommendations, and not on the business plans.

Within the limited time available the team managed to access as many important PP2 stakeholders as possible, including the PP2 management, individual farmers to high rank policy makers as well as key water users/providers, such as FIPAG Beira and agricultural commercial enterprises. A total of 91 stakeholders have been interviewed for this evaluation (cf. Annex B).

1.3 CONTEXT

The Pungwe River stretches for 400 kilometres, flowing eastwards from Zimbabwe's Eastern Highlands, through Manica and Sofala Provinces in Mozambique, to the Indian Ocean at Beira (Figure 1). The main river and its tributaries drain a total catchment area of 31,151 square kilometres, of which approximately 5% is within Zimbabwe and 95% in Mozambique. Nonetheless, the Zimbabwean part of the basin is estimated to produce between 25 to 30% of the natural runoff. Where the river starts in the west, there is a humid mountainous climate with relatively lower temperatures and mean annual rainfall above 2000 mm. In the eastern region, especially near Beira, the climate is tropical humid with high temperatures and average monthly rainfall varying from 300 mm in February to 20 mm in September. These characteristics, among others, account for significant annual variations in the Pungwe's perennial flows, contributing to recurring periods of flooding and drought. In the absence of major dams, but also of small and medium dams especially on the Mozambican side of the basin, the negative impacts of floods and droughts are

difficult to control and mitigate. The lack of hydraulic infrastructure also limits the capacity to utilise the available water for agricultural development and other economic activities (*Pungwe II Programme Proposal, 2006*).

Figure 1: The Pungwe River basin (Source: SWECO, 2006)



PP2 was funded through Sida as a follow up to the completion of PP1 implemented between 2002 and 2006. PP1 was concerned with setting the ground for a more effective engagement of the governments of Mozambique and Zimbabwe in joint water resources management action in the shared river basin. PP2, started with the signing of the Specific Agreement between the governments of Sweden and Mozambique in October 2007. PP2 represented an endeavour by both governments, with support from Sida of SEK 117 million, to address key social, economic, environmental and institutional challenges in the Pungwe River basin.

While the Swedish government has been one of the main funders of PP2, ARA-Centro and ZINWA-Save have engaged with other partners in the Pungwe River basin during the 2007-2016 period, including the African Development Bank (AfDB) via the SADC Shared Watercourses Support Project for Buzi, Save and Ruvuma River basins. The main partners currently include the World Bank's support to the National Programme for Development of Natural Resources (PNDRH-1), Climate Resilient Infrastructure Development Facility (CRIDF) and International Union for Conservation of Nature (IUCN) via the BRIDGE programme, Dutch Water Authority Hunze en Aas, and GIZ.

1.4 OVERVIEW PP2 2007-2017

This section describes the organisational structure of PP2 including the main responsibilities of each entity. An overview of the programme development over time

is also given, describing also how each component/CDP evolved with the development of the Programme over the 2007-2017 period.

Figure 2. Institutional set-up of PP2 (Source: Extension Proposal, 2014, p.68)

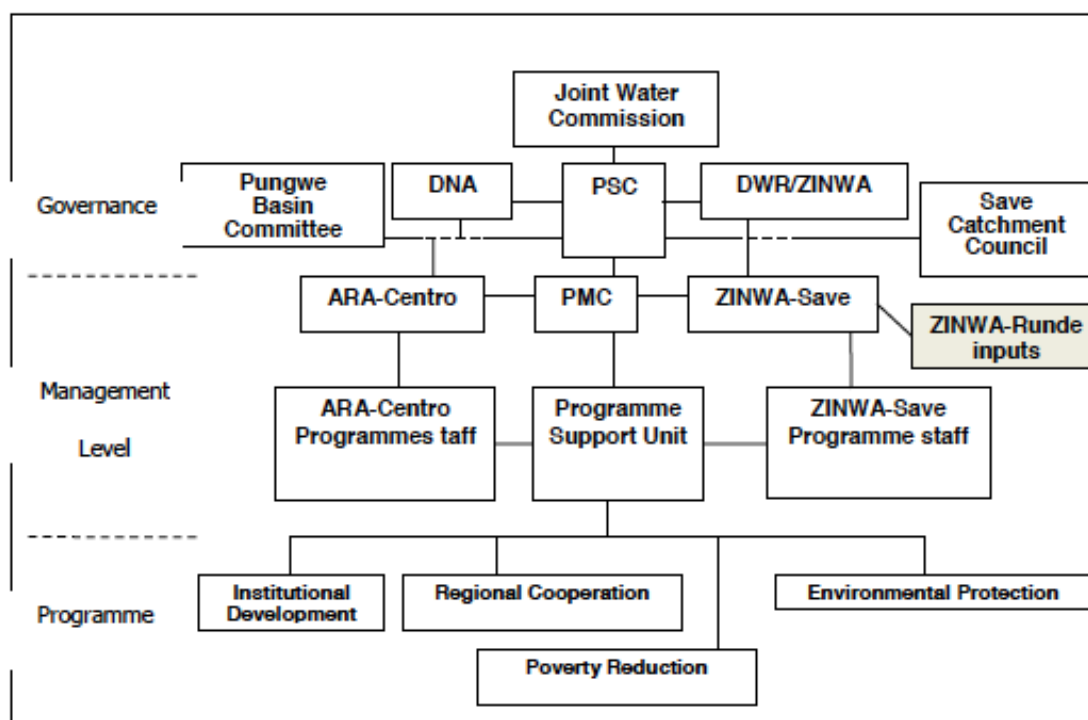


Figure 2 shows the *institutional set-up* at governance, management and component levels. The responsibilities of the key actors are listed in Table 3. At the programme level the components are presented that have been defined in the extension period.

PP2 was under the auspices of the Joint Water Commission (JWC) and consisted of the National Directorate of Water (DNA/DNGRH)² in Mozambique and Department of Water Resources (DWR) in Zimbabwe.

The Programme Steering Committee (PSC) consisted of representatives from the DNA and DWR, the ARA-Centro and ZINWA-Save, and the Pungwe basin Committee (PBC) and Save Sub-Catchment Council (PSCC). Sida was an observer in the PSC.

The Programme Support Unit (PSU) was housed at ARA-Centro in Beira and had the following staff: the Programme Manager, the Assistant Programme Manager, a Finance Officer, a Procurement Officer, and support staff (Secretary and Driver). The PSU acted as secretariat to the PSC. An Institutional Development Advisor (IDA)

² DNA has been divided in DNAAS and DNGRH, the latter being the National Directorate of Water Resources Management

was attached to PP2. While not an actual member of the PSU, for operational reasons the IDA was often considered as a PSU member. PSU staff were administered through an Administrative Consultant (Orgut/COWI). The PSU's primary task was to manage the Programme, but also to support and strengthen the river basin institutions (especially ARA-Centro) to assume and sustain their respective roles and responsibilities with regard to IWRM in the Pungwe basin (see section 2.5).

Table 3. Key PP2 institutions and their main responsibilities

Key institution	Main responsibility/ies
Joint Water Committee (JWC)	Formal authority governing PP2 consisting of the Minister of Public Works and Housing from Mozambique and the Minister of Water Resources and Infrastructure Development from Zimbabwe
National Directorate for Water in Mozambique (DNA)	Implementation and regulation of policies and strategies related to water resource management
DWR (Zimbabwe)	Provision of strategic direction and policies on water resources management and development
ZINWA (Zimbabwe)	National operation of water resources management and standardisation of strategies and activities (Zimbabwe)
Programme Steering Committee (PSC)	Providing the overall guidance and monitoring of PP2 and comprises of representatives from DNA, ZINWA, PBC and SCC
Pungwe basin Committee (PBC)	Promoting efficiency of water use and representation of user's interests on water management (Mozambique)
Save Catchment Council (SCC)	Promoting efficiency of water use and representation of user's interests on water management (Zimbabwe)
ARA-Centro	Operational water resources management at regional/basin level (Mozambique)
ZINWA-Save	Operational water resources management at regional/basin level (Zimbabwe)
Programme Management Unit (PMC)	Supervising and directing the day-to-day implementation of PP2
Programme Support Unit (PSU)	Supporting the PMC in running PP2. It consists of the Programme Manager, an Assistant Programme Manager, a Financial and a Procurement Officer

Table 4. Overview of PP2 phases and major events in Components and Projects

[illegible]

2 Review of the achievements of PP2

The Review of PP2 is organised around the OECD-DAC evaluation criteria, namely in five sections discussing relevance, effectiveness, sustainability, impact and efficiency. Each section is structured in the same way. After the presentation of the focus of the evaluation, i.e. the *outcome assessment question(s)*, an introduction describes the theme or subject matter, followed by the review and finalised with a conclusion. As for the effectiveness chapter (2.2), which constitutes the bulk of the review, each PP2 component and CPD is reviewed chronologically.

2.1 RELEVANCE

Outcome assessment questions

1. To what extent does the intervention comply with development policy and planning of the recipient country or the partner government?
2. Were needs assessment(s) performed based on recognised methodology and recommendations made for priority actions and specific target groups?

Introduction

Relevance addresses the extent to which the objectives of the intervention are consistent with beneficiaries' requirements, country needs, global priorities and partner and donor policies.

Review

The water policy of the *government of Mozambique* (GoM) was updated in 2007 with guidelines for implementation described in the National Strategy for Water Resource Management (2007). The base is IWRM with the following central themes:

- Monitoring and evaluation of water quality and quantity;
- Water use and allocation;
- International water basin management (according to SADC guidelines);
- Construction of large water dams and implementation of a small and medium dam strategy;
- Flood and drought management;
- Water for economic use (agriculture, hydro-electric, industry, fishing and tourism);
- Establishment and capacity building for the Regional Water Administrations (ARA).

As such the objectives designed for PP2 comply well with the policy and strategies of the GoM. Elements of PP2 were integrated in the Action Plan of the Mozambican

Water Sector for the Implementation of the Sustainable Development Goals 2015-2030, including increased storage capacity (dams), prevention and mitigation of extreme events, improve coverage of the monitoring network, international cooperation and institutional development.

Regarding the *local authorities*, the three district administrators covering the Pungwe basin that were interviewed stated that their main concerns are the production of food and access to safe drinking water. The SGF project addressed the issue of food production with the installation of irrigation schemes and construction of fishponds. Increased access to drinking water was formulated as one of the results of these projects, but in practice no significant contribution was made in the districts. In the Strategy for Small and Medium Dams Strategy (SSMDS) the issue of drinking water supply was addressed, but up to the present date none of the dams has been constructed. In the framework of PP2 with ARA-Centro as main partner it is logic that drinking water supply (capture and distribution) was not one of the main elements. As one of the core businesses of ARA-Centro, much effort was paid to the protection of the quality of the drinking water sources through other critical development projects, such as the gold panning and salinity projects, as well as through all activities related to the improvement of water quality monitoring.

The Zimbabwe National Water Policy was established in 2013 with support from the World Bank. Previously the sector was being guided by the Water and ZINWA acts from 1998. The policy advocates for the separation of implementation and monitoring with the establishment of two separate authorities, i.e. the Water Services Authority and the Water and Wastewater Regulatory Authority.

The policy was also premised on past events where the economic situation caused a collapse of service delivery and outbreaks of waterborne diseases. Thousands of lives were lost in 2009 countrywide due to a cholera outbreak. The policy covered issues of climate change, gender and phased implementation, and also hydropower generation at most dams while coordinating with other users.

The decision to establish the SGF was crucial for the satisfaction of the needs of the local *beneficiaries*, namely farming, fishing and mining associations. It created visible results and motivation. All beneficiaries of projects related to irrigation and fishing ponds met by the evaluation team during the field visits confirmed the importance of these projects (see section 2.2.6).

PP2 fits in all components of the *Swedish development agenda* and *Sida's* mission and vision including governance and transboundary cooperation, capacity building of the public sector and stakeholder participation, and as a key component to obtain sustainable regional water management.

Numerous people from government, civil society and the private sector were consulted during the preparation of the project proposal for PP2 to address the beneficiaries' needs. Moreover a needs assessment was carried out for the Capacity

Building Strategy, focussing on capacity and knowledge gaps at ARA-Centro, ZINWA-Save and the stakeholders.

Conclusions

The objectives set for PP2 address with the needs of the governments of Mozambique and Zimbabwe as defined in their policies and strategies. Local authorities and beneficiaries participated in all project phases and especially the SGF was a means for PP2 to materialise into activities addressing their livelihood and daily subsistence needs.

2.2 EFFECTIVENESS

2.2.1 Institutional development

2.2.1.1 Staff development and decentralisation

Outcome assessment questions

1. Has the capacity of key basin IWRM institutions to effectively, efficiently and sustainably fulfil their defined roles and responsibilities been strengthened?
2. Has the institutional capacity been sustainably enhanced, and, if so, has this allowed for effective and co-creational decision-making among stakeholders, as well as implementation of these decisions?

Introduction

The main objectives of the Institutional Development Component of PP2 were to strengthen the capacity of the two key basin IWRM institutions (ARA-Centro and ZINWA-Save) in order for them to carry out their mandate in an effective, efficient and sustainable manner, as well as ensure strong decision-making among stakeholders related to IWRM.

From these broad-based objectives the evaluation matrix identified indicators for various institutional themes and sub-sectors that related to water data, use, infrastructure, pollution, permits, demand, safety, tariffs/charges and revenue collection, as well as to more generic management and systems, such as decentralisation, business plans, staff development and retention, and solutions to conflicts related to water.

In order to provide a manageable overview specific themes and subject matter issues have been addressed under their respective components and projects. For example, conflict issues have been reviewed under the Stakeholder Participation component and pollution concerns under the Environmental Protection component. The main issues dealt with in this section include staff development and decentralisation.

Review

Staff development

Staff development and retention was a key focus of PP2. For this purpose a significant number of training events and capacity building exercises were designed and delivered to the staff of ARA-Centro and ZINWA-Save. Furthermore, during the PP2 extension, several staff members of ARA-Centro attended bachelor and master's degrees at foreign and national universities funded by Sida. These training events and long-term education programmes led to significant capacity improvements and contributed to a highly skilled labour force within the two institutions over the period of ten years. It should however be noted that ZINWA-Save did not participate in the long-term educational programme.

For the period 2007-2016 the evaluation team requested the two institutions to provide a clear overview of capacity building events because data provided in the APRs were inconsistent, with overlaps and scattered in different sections.

As for the ARA-Centro, a clear overview of the comprehensiveness and details of the capacity building support was not provided. From the data received it was observed that courses cover a great variety of themes and that the courses have concentrated on ARA-Centro staff and less on stakeholders (e.g. the committees) and beneficiaries (particularly those related to the SGF projects).

As for ZINWA-Save detailed information on training for the period 2012-2016 was provided and presented in Annex I. Similar observations as for ARA-Centro can be made and while women were overall reasonably well represented, their participation was particularly prevalent in softer areas, such as gender equality training and project and community management. Stakeholder and beneficiary representatives were much less represented in the training.

Table 5. Staff numbers and skills levels at ARA-Centro, Beira, 2007-2017 (Source: ARA-Centro, Human Resources Dept.)

Level	2007	2009	2011	2013	2015	2017
Management	7	7	10	14	11	16
Middle-level	5	6	8	10	13	8
Basic	4	5	6	7	3	2
Elementary	4	8	4	3	2	10
Total	20	23	28	34	29	36

Table 5 presents the development of staff numbers and skills level of staff of ARA-Centro every second year for the period 2007-2017. It clearly shows an increase in staff numbers combined with a general skills upgrading during the years. The 'management' level includes technically skilled personnel, including bachelor and master's level in water management, which explains the increase in 'management'

staff from 2015 to 2017 and the concurrent reduction of middle-level staff. This development was mainly due to PP2's support to the higher education programme.

A 'severe' staff turn-over has been mentioned as a problem for ARA-Centro, according to some sources. While staff have changed as a result of disciplinary measures, the overall picture does not indicate that staff turn-over was significant. After a staff crisis in 2012 that included staff not being paid salary for almost half a year, only five staff left ARA-Centro while 20 remained after negotiations. In addition to the staff at the ARA-Centro head office in Beira an ARA Management Unit of the Pungwe basin (MUPB) in Chimoio is staffed with four people and over 100 readers/observers are employed, whose main responsibility is to collect hydroclimatological data.

While the data in Table 5 underscore a positive assessment of a central part of the institutional development of ARA-Centro, it is evident that staff issues were at the forefront of barriers to establishing an effective and efficient workforce. From several sources, including the APRs and several interviewees, it was clear that some of the staff appeared to be highly demotivated and have severely underperformed for many years.

Several reasons for this situation were given by some of the ARA-Centro staff members, including low salaries – in particular compared to PP2 experts, poor management, and favouring a small group of staff profiting from capacity building and the per diem. From other sources, including the national level, poor work ethics of staff groups dominated. The development of a Staff Motivation and Retention Strategy was in itself an indication of staff motivation problems. It was not implemented to a satisfactory degree and did therefore not have the intended effect. It is an irony that ARA-Centro has the best-educated staff of the three ARAs in Mozambique, due primarily to the PP2 intervention, but performs ineffectively, according to sources at the national level.

One important aspect for stimulating motivation among staff was to pair up with experts/consultants recruited by the Programme, as well as staff from PSU that were engaged in different assignments, in office or in the field. While this had skills upgrading effects, the pairing did not result in lessening the overall underperformance of ARA-Centro.

Data provided by ZINWA-Save are presented in Table 6. There was a very steady manning throughout the PP2 period: two people at management level, four to five mid-level personnel, while at supervisory level there has been a gradual reduction in numbers from 2008 until 2017. Similarly the number of other employees gradually declined over the years from 200 to 170. From discussions with ZINWA-Save's management levels no serious staff development concerns were raised and overall performance was considered satisfactory.

Table 6. Staff numbers and skill levels at ZINWA-Save, 2007-2017

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Management	2	2	2	2	2	2	2	2	2	1
Middle Mgt	5	2	3	5	5	5	5	4	4	4
Supervisory	35	35	30	30	28	25	24	24	24	24
Other employees	201	199	198	194	180	179	175	172	171	170

Decentralisation

Decentralisation was a critical element of Sida's support to PP2. It was related in part to the delegation of tasks and responsibilities to decentralised units. These units included (i) the MUPB Chimoio office, located in the central part of the Pungwe basin and (ii) the stakeholder groups, i.e. Pungwe basin Committee in Mozambique and its sub committees, and the Pungwe Sub-Catchment Council in Zimbabwe.

In 2011 MUPB Chimoio started to function. It received computers and cars from PP2, as well as technical equipment for water quality and quantity monitoring and GPS. The MUPB Chimoio was planned to operate from Catandica (Bárue District) at the installations of Nhacangale Dam, but at the moment the main office is located in Chimoio because dam construction has not yet started. In June 2017 ARA-Centro assigned one technician to work in Catandica to represent the MUPB and to manage the clients and the sub-committee.

The main responsibilities of the MUPB today include the following:

- Tax collection including distribution of the invoices and client contact;
- Facilitating the Pungwe basin Committee (PCB);
- Monitoring of water quality;
- Monitoring of water quantity;
- Collection of climatological data by 57 hydrometric and rainwater meter readers;
- Rehabilitation and maintenance of the monitoring network;
- Provision of services to third parties: for example measurement of water quality, provision of water resource data and training.

The MUPB has experienced significant challenges following the termination of PP2. This includes the following:

- water quality and quantity monitoring which was introduced in 2014 is not carried out according to plans (quarterly), but semi-annually by local readers due to lack of resources, i.e. per diem and fuel for transportation;
- limited resources available for the MUPB to continuously support the PBC;
- the 'financial autonomy' situation is further threatened now that the office rental and fuel costs are not paid by PP2. The income provided by the clients does not cover the operational costs and there are no clear targets for revenue collection.

In addition the MUPB faces other challenges, including

- lack of willingness to pay by clients for their water usage, as well as MUPB's inability to enforce their mandate, for example through fines;
- there is no systematic structure for updating the customer base;

- the water usage is based on estimations and not measured which is partly due to the fact that water use licenses are stipulated for a period of five years and concessions for 50 years, which makes it difficult to adjust the volumes according to the real use.

Despite the discrepancies pointed out above the decentralisation process has been a successful effort carried out by PP2 partly because the support services for the decentralised units carried out by ARA-Centro were strengthened, including the delivery of equipment and means of transportation (e.g. motor bikes). This enabled them to work more effectively. In addition, the MUPB Chimoio was strengthened with the increase in staff numbers and upgrading of staff skills.

Important collaboration partners at the decentralised level are the district authorities. PP2 is consistent with the main preoccupations of the districts, namely food production and access to water. The district authorities, especially the District Services of Economic Activities (SDAE) were involved in the implementation of the SGF activities at all stages: selection of the projects, construction of the works and technical assistance to the associations. Moreover the districts were involved in the inventory of the potential small and medium dams.

Nevertheless it seems that the districts' roles after the termination of PP2 are not clearly defined and there is no regular contact between the districts and ARA-Centro. The districts do not have funds to follow up on the small grant projects, the construction of small and medium dams, or to include the visits to the farmer associations into the regular working schedules of the extension workers, who in most cases operate with few or no means.

In Zimbabwe, ZINWA-Save operations had already been decentralised when PP2 commenced, and the Pungwe Sub-Catchment Council and ZINWA-Save were already in full operation. PP2 contributed to enhancing the skills, resources and motivation for carrying out their mandates.

Conclusions

(i) While ZINWA-Save provided no reliable data, it appears that the main problems regarding capacity of staff and their performance lie with the ARA-Centro. The low motivation of the ARA-Centro staff has been experienced throughout the lifetime of PP2, despite the various efforts taken by PP2 to solve it. This situation is therefore most likely to persist and as such will severely impact the effectiveness and efficiency of ARA-Centro's future work, as well as its ability to sustain the benefits created by PP2. The overall conclusion is that while ARA-Centro's staff capacity has improved significantly, they have underperformed.

(ii) As for the decentralisation, sustained efforts are needed to maintain the strength and performance of the decentralised units, whether being the MUPB Chimoio office or the stakeholder participation groups. A particular emphasis of the MUPB Chimoio

will be to include the districts in regular communication platforms and the PBC Committee and see how tasks and responsibilities can be shared and combined.

2.2.1.2 Stakeholder participation

Outcome assessment questions

1. Has stakeholder participation in IWRM&D in the Pungwe River basin been strengthened and expanded?
2. Which socio-economic groups (incl. marginalised groups, men, women, girls, boys, etc.) have participated in the programme and how have these groups benefitted from programme results?
3. Have stakeholders practiced sensitivity toward potential emerging or existing conflicts?

Introduction

The main objectives of the stakeholder participation component of PP2 were to strengthen and expand stakeholder participation in the Programme and ensure socio-economic benefits for the target populations – objectives in full compliance with the national water policies of the governments of Mozambique and Zimbabwe. The guiding principle was to allow stakeholders to influence policy formulation, design alternative institutional arrangements, and decide on investment choices and water resources management issues affecting their communities. Furthermore, participation of stakeholders should ensure that the benefits of PP2 should become sustainable and contribute to empowering different social groups, in particular disadvantaged community groups.³ Stakeholder involvement was a high priority in the design of PP2 and according to several stakeholders steps were taken to initiate a stakeholder mapping. A stakeholder participation strategy was never developed though.

Review

In 2008 PP2 was primarily concerned with establishing and setting-up the Programme and no substantial efforts were made or resources put into the stakeholder participation component. In 2009 it was decided to pilot the establishment of two sub-basin committees, one each in Manica and Sofala Provinces of Mozambique. This decision was based on experiences from Zimbabwe and elsewhere that demonstrated that a more decentralized level of participation would be essential for sustainable IWRM.

By 2010 the PBC in Mozambique became functional. Also, the Nhadzonia Pilot Sub-basin Committee was established on the Mozambique side of the basin. A second sub-basin committee was aimed at during 2010, but was abandoned because it proved

³ The concept of empowerment and stakeholder participation are discussed in several contexts of the PP2, for example, in the MTR 2011 and in the Project Document 2006.

to be too ambitious given the limited supporting capacity of ARA-Centro at the time. By 2013 the Gorongosa Sub-basin Committee was established, and office and communication equipment procured. ARA-Centro provided technical backstopping to the sub-committees. Box 1 illustrates briefly the development, functioning and challenges of the Gorongosa basin Sub-Committee in Mozambique.

Box 1. The Gorongosa Sub-Committee (Source: Gorongosa Sub-Committee, field visit Nov 2017)

The Pungwe River basin Sub-Committee of Gorongosa started in 2014. The sub-committee has 12 members (two women) representing the various water users in the basin: farmers, fish farmers and gold panning artisans. The members also represent the associations that benefitted from the small grant funds and there are some individuals.

Since PP2 was completed in 2016 the (financial) support to the sub-committee stopped. Motivated by SDAE the members of the committee now contribute a monthly fee for operational costs. SDAE provides a place to meet and a technician to participate. The main agenda for the sub-committee is to create awareness within the communities about sustainable water use and protection of the environment and advise the local communities about crops and growing methods. Four of the sub-committee members participated twice in exchange visits to Zimbabwe. Main challenges include:

- According to its members, the sub-committee is not legalized as a part of the institutional governmental structure in Mozambique. As such tasks and obligations are not clear. In Zimbabwe the sub-committees are already legalized;
- The sub-committee does not have its own office to work and store its materials;
- Both the sub-committee and the involved associations need training on how to operate, plan and monitor their activities.

In Bárue District mention was made of the sub-committee, but they did not meet formally since the project stopped and no meeting was set up during the field visit. It is clear who the leaders of the committee are and the local ARA-Centro technician now has the objective to restart the committee.

According to the APR 2010 training workshops were carried out for committees and councils on relevant topics, including introduction to the IWRM concept and specific training (including issues related to efficient water use, rainwater harvesting), new water laws (including procedures for applying for water permits), conflict management, leadership skills and revenue collection. The APR 2010 states that these events contributed significantly to enhancing stakeholder capacity and building their confidence to deal with the water resources management challenges they faced. The capacity building events were to some extent repeated as committee and council members changed during PP2.

From 2012 the training of stakeholders expanded and included training workshops in IWRM and management of community projects for the PSCC, the PBC, the Nhazonia Pilot Sub-basin Committee and traditional leaders. During 2012 the decentralisation of ARA-Centro to the MUPB Chimoio office was further consolidated by delegating new functions, including conflict resolution, monitoring land and water use, as well as the provision of awareness raising to the Nhazonia Pilot Sub-basin Committee.

Stakeholders in both countries participated in IWRM training workshops and the most common training topics during PP2 covered the following: water resources management, conflict management, water integrity, water demand management, gender mainstreaming in IWRM and HIV/AIDS, flood and drought mitigation and management, gold panning mitigation, information management strategy, and the Pungwe Bilateral Agreement – issues all relevant to the PPS components and CDPs.

Data revealed that participation of stakeholders was enhanced as a result of the capacity building events provided by PP2. It is evident that the committees and councils have been instrumental in decision-making processes in various components, in particular in the selection and prioritization of the initial project ideas for the SGF.

While overall participation was strengthened during the course of PP2 the mid-term review (MTR) from 2011 stated that gender issues and representation of stakeholders were challenges. At committee and council level participation was representative as regards different interest groups (farmers, water users associations, companies, local authorities, etc.). At the beneficiaries' level, i.e. small farmers, community members, schools, etc. the process of participation was found to be less representative, including the limited involvement of women and disadvantaged groups. It appears from interviews that this involvement process, while being increasingly prioritised by PP2 in its latter years, did not materialize into the collection of more specific and detailed data on the socio-economic composition of the beneficiary population. The level of details mainly focused on the distribution of the sex of the participants – less on other relevant disaggregated socio-economic data such socio-economic status and degree of participation, e.g. through assigned responsibilities and the results of the performance of these responsibilities.

The MTR found that by the end of 2010 it was not clear how women and other vulnerable groups were identified and participating in the committees. It further stated that activities or actions leading to the empowerment of women in decision-making could not be traced. The MTR also found that the approach to training and capacity building was overall oriented to providing infrastructure and technical skills and less oriented to empowering the committees in terms of democratic and participatory governance and leadership.

The APR 2011 claimed – as it was also generally perceived by interviewees during the fieldwork – that awareness campaigns generally only provided a superficial familiarity with the terminology of IWRM. The ARA-Centro management stressed that in order for the awareness campaigns to have sufficient effect they were often carried out in connection with various training and on-site practical events, for example related to alternative livelihoods and the challenges faced by communities in terms of pollution due to panning, land degradation and soil erosion. In the Capacity Building Strategy from 2013 the limitations of awareness raising campaigns are acknowledged while a 'situational learning' approach was aimed at. The APR 2014 states that this approach contributed significantly to a better appreciation of water issues in the communities, as well as the role of the ARA-Centro and ZINWA-Save.

Another issue was the stakeholders' access to information. The APR 2010 states that people could not engage in discussions without adequate access to terms, concepts and policy. The various stakeholder meetings and workshops that were organized became instrumental for stakeholders' access to information. This was to be further supported by the production and dissemination of bulletins, brochures and flyers. The latter were produced in 2012 and distributed later on in the Programme.

The suspension of funds for stakeholder activities (see 2.5) negatively impacted the confidence and trust being among stakeholders that was starting to emerge. Stakeholders wanted to see tangible benefits of IWRM on the ground. Embarrassing situations occurred when promised training activities scheduled were not executed due to the suspension of funds. The cancellation of training and capacity building events for committees and catchment councils occurred frequently during PP2, but as the flow of funds improved during the latter part of the programme such cancellations occurred less often.

Other related activities of the component included exchange visits. These involved for example exchange visits between the Nhazonia Pilot Sub-basin Committee and the PSCC in 2010 and 2012. In a 2014 exchange visit by stakeholder representatives of Gorongosa Sub-basin Committee and the PSCC focus was on increased knowledge of and appreciation of upstream-downstream water resources management challenges. In 2015 nine members of the PBC and the Nhazonia and Gorongosa sub basin committees visited the Manyame and Macheke sub catchment councils in Zimbabwe to exchange experience on effective stakeholder participation, election process for stakeholder representatives, water allocation and revenue collection. Manyame and Macheke are known for being the leading sub catchment councils in terms of water resources management and revenue collection in Zimbabwe.

The PP2 management saw exchange visits between stakeholder groups as important events because they provided stakeholders with the opportunity to share experiences and information and enable them to make use of this knowledge and experience in their own context. According to the PP2 management these visits contributed to consolidating mutual trust and confidence amongst the communities of the Pungwe River basin. During the evaluation fieldwork the staff of ARA-Centro and ZINWA-Save, as well as other stakeholders interviewed confirmed the particular usefulness of exchange visits for more effective working with IWRM issues and, especially, addressing water conflicts.

Yet, while it was acknowledged that Manyame and Macheke were the leading stakeholder sub-catchment councils in terms of water resources management and revenue collection in Zimbabwe there is no reporting on how visiting committee members applied or transformed the learning into practice in their own communities on these issues. This latter aspect of the capacity building is lacking in nearly all of the reporting and constitutes a serious limitation for assessing the true outcome and impact of the capacity building support. It is important for all capacity building events

that it is possible to measure to which extend learning has taken place and that the learning has influenced IWRM knowledge and practices in their own communities. Whether learning was made use of and applied locally was not reported in the APRs or discussed in PSC meetings.

A standard presentation in the APRs of capacity building events is shown in Box 2. While it states the basic information and purpose and immediate outcome of the training, it lacks the most important aspect: how the learning inspired or was applied in their home communities, and if not what were the drivers and barriers. For example, what effect did reduced stream bank cultivation and improved access to markets in the ‘jurisdiction’ of the PSCC have on the Nhazonia Pilot Sub-basin Committee members and the likelihood of them applying parts of this learning in their own area? That is what is important in capacity building and exchange visits – not the training or exchange visits per se.

Box 2. Common reporting practice on capacity building events (Source: APR 2012)

It is recognized within PP2 that the water governance system at the Pungwe Sub-catchment is at a more advanced stage than that at the Nhazonia Pilot Sub-basin. The Nhazonia Pilot Sub-basin Committee reported after their visit to the Pungwe Sub-catchment that they had appreciated from their visit that devolving the management of water resources to basin and sub-basin units requires a protracted focus on learning and skill development. They also noted that information on which stakeholders can base decisions and management practices is not easily accessible. The Pungwe Sub-catchment Council also shared some of the challenges they face in the management of water resources and how they had been resolved. These included resolving conflicts arising from the use of water, encouraging communities to move away from stream bank cultivation and access to markets for their produce.

The Pungwe Sub-catchment Council on their part learnt from their visit to the Nhazonia Pilot Sub-basin that delays in the establishment of basin and sub-basin management units results in implementation gaps and reduces stakeholders’ confidence in their needs being addressed.

‘Where there is a water need there is a potential conflict’ – said by one engineer in the ZINWA-Save office in Mutare during the fieldwork. While this is obviously true staff at ARA-Centro and ZINWA-Save told the evaluation team that the stakeholders themselves in most cases successfully resolved cases of water related conflicts within the Pungwe River basin. However there was some inconsistency in the opinions of the various stakeholders of the degree and comprehensiveness of the conflicts. But they all agreed with the fact that no major water related conflicts arose during PP2 – while those that did emerge as potentially major conflicts were managed and mitigated satisfactorily by the two water resources institutions. Neither ARA-Centro nor ZINWA-Save have kept records of conflicts observed and it is therefore not possible to assess the nature and scale of the conflicts. Most conflicts, we were told, were described and recorded at community level, but they were neither collected nor analysed by the committees, councils, ARA-Centro or ZINWA-Save.

What was pointed out by several stakeholders, including ARA-Centro staff and some beneficiaries, was that most conflict issues were resolved by ‘*observing the problem*’ – i.e. the involved persons and/or communities exchanged visits to the problem area to be told about the concerns of the other party, e.g. upstream-downstream issues. In this manner it was possible for both parties to recognize a common problem that was to be solved within an atmosphere of mutual respect for each other’s needs.

Working/consultative groups were established early on in PP2 to facilitate a representativeness of key players in each of the CDPs. The purpose of these groups was to assist with the implementation of the activities of the projects, including drafting ToR for service providers and reviewing their products. The composition of the groups is presented in Table 7. In all of the working groups, ARA-Centro and ZINWA-Save provided technical secretariat services with support from the PSU.

While the groups seemed crucial to ensure a strong participation of important interest groups on specific IWRM concerns in the basin, it was unclear to the evaluation team to which extent these groups were actually active. When inquired about the role of these groups, the managements of both ARA-Centro and ZINWA-Save did not recognize their existence. And at higher levels in ZINWA and the NDA the impression was that these groups generally did not work (e.g. MoPW in Mozambique).

Table 7. Working Groups/Consultative Groups for the CDPs (Source: PSU)

CDP	Members of the Working/Consultative Group
Saline Intrusion	Mafambisse Sugar Company located at the mouth of the Pungwe, Beira City, Small Scale sugar farmers
Floods and Drought	Departments of Water Resources (Mozambique and Zimbabwe), ZINWA-Save, ARA-Centro, Meteorological department Mozambique (NAM), Meteorological department Zimbabwe, Department of Calamities (Sofala and Manica), Civil Protection department (Zimbabwe), Local Authorities
Environmental Protection	Department of Environment (provincial level), Department of Mining and Minerals (provincial level), Local Authorities (Sofala and Manica), Pungwe sub catchment council and Pungwe basin Committees
Water and Land Strategy	Pungwe sub catchment council, Pungwe basin Committee, Ministry of lands (provincial level), Ministry of Agriculture (provincial level)
Small Grants funds	Ministry of Agriculture, Ministry of Irrigation, Pungwe Sub catchment council, Local Authorities, NGOs
Pungwe Bilateral Agreement	During the elaboration of the Bilateral Agreement, the consultations were done at Pungwe sub catchment council/ Pungwe basin Committee

During the mission the question regarding the continuation of the stakeholders groups, especially the PBC committee and sub-committees was raised, as funds for their operations disappeared with PP2. Opinions were divided among those interviewed, but it is concluded that there is a high risk that activities will be reduced due to lack of funds and therefore that the influence of particular stakeholders be narrowed. The transboundary stakeholder forum that is planned for the upcoming GIZ/SADC support may facilitate a continuation of stakeholder participation.

Conclusions

There is no doubt that the design of PP2 included a strong effort to have a participatory approach as a conceptual prerequisite for successful implementation. The establishment of several (sub) basin committees by ARA-Centro and (sub) catchment councils by ZINWA-Save confirms this. Without knowing the true nature of the working/consultative groups for the CDPs, their establishment somehow confirms the support for stakeholder participation. Overall we consider that the outcome set for the stakeholder participation component has been achieved – seen from a mere *quantitative* perspective, namely the establishment of stakeholder groups. The (sub) committees and (sub) councils increased in number during the lifetime of PP2 and were strengthened through training and furnished with office and transport equipment. As regards the extent to which communities have benefitted from the results of PP2 support, these aspects have been addressed under the respective components and projects.

As regards the *qualitative aspect* of the stakeholder participation there is insufficient data available for the review to be conclusive. The impact of the capacity building events facilitating the participation could not be credibly assessed as records or reporting on the result and impact of the capacity building did either not taken place or were insufficient. This does not mean that the capacity building efforts did not have any results, but rather that data for verifying those results are lacking. In the end this is rather unfortunate because the whole idea with capacity building was to have a documented positive impact in real life. Given the major focus of PP2 on training and capacity development more efforts should have been made to measure the impact of the training delivered, and not only refer to and report on the trainings conducted.

As regards PP2's approach to the *resolution of water conflicts*, it appear to have been successful. Taken the point of departure that 'where there is water there is a potential conflict' the Pungwe basin has experienced very few, if any, major water conflicts during the evaluation period. Whether this was due to PP2's efforts to solve these through its support to stakeholder participation or the involvement of ARA-Centro or ZINWA-Save is not clear. There are however indications that the manner in which potential conflicts have been dealt with – bringing parties together face-to-face on the ground as well as generally through exchange visits between stakeholders – have been a success. As such it is most likely that the PP2 approach has contributed to mitigating (major) water conflicts in the Pungwe basin.

2.2.1.3 Information and communication systems

Outcome assessment question

Have appropriate, efficient, effective and sustainable technical systems and capacities for the collection, management and communication of water resources data been ensured?

Introduction

The objectives of the information and communication component are twofold. First, to strengthen technical systems and capacities in the IWRM agencies in the basin to gather and process relevant and reliable data for the sound management of water resources. This includes the acquisition of hydromet equipment, installation of software and hardware for data processing in order to generate the range of hydromet information products required for adequate decision making and management decisions regarding the development and use of water in the Pungwe basin. Second, to enhance the information exchange and communication between Mozambique and Zimbabwe and within the countries in a broad sense, related to transparency, accountability and participation of a wider range of stakeholders in IWRM.

In the PP2 Programme Proposal (2006) the component contained the objective of quantifying and monitoring the environmental flows along various reaches of the basin, but this was changed in the Extension Proposal (2014-2016) as elaborated upon below. The chapter below on environmental flows will also briefly elaborate on the CDP *Sustaining environmental flows in Gorongosa National Park and Lake Urema*.

Review

In 2008 a preliminary assessment of the hydromet network was conducted during a reconnaissance field visit. Equipment and specifications were identified for hydromet network, hydrogeological monitoring and water quality monitoring.

By 2009 in collaboration with the Meteorological Office (INAM) rainfall stations were installed and rehabilitated with a view to expand the network and create effective monitoring systems and procedures for flood forecasts and warnings. Sites were also identified for the installation and rehabilitation of real-time monitoring equipment for stream flow in collaboration with the SADC-HYCOS programme. An information management and communication strategy was also developed. The existing PP1 website was reviewed and expanded.

The upgrading and expansion of the network continued in 2010. The analysis of water quality samples of surface water started in the course of 2010 after the appropriate equipment, i.e. water quality test kits, had been procured and transport made available. An agreement was reached with the Save and Buzi programmes and a tender was launched for the BUPUSA website. In terms of database and data management Hydstra was identified as the appropriate software and was procured.

Issues around sustainability and system maintenance were at the time raised as a concern particularly in relation to the payment of the Hydstra license fees. Operation and maintenance of the network and general O&M of equipment is done partly on an ad hoc basis.

Also during 2011 upgrading and expansion of the network continued and support services were strengthened through motivational training of observers and provision of appropriate transport to enhance data collection activities. Neither the production of dissemination and information products, nor the planned implementation of awareness raising campaigns took off as planned due to delays in decisions regarding the engagement of NGOs. The development of a comprehensive information and communication strategy was also postponed to 2012. The Mid-term Review concluded that the environmental flow requirement determination did not take place due to the high cost associated with its implementation.

By 2012 regular monitoring of water flows and quality took place at both ARA-Centro and ZINWA-Save as a result of the upgrading of the hydrometric network and the provision of equipment and transport. ARA-Centro and ZINWA-Save shared seasonal forecast with stakeholders, e.g. DNA, INCG, provincial authorities and ZINWA-Save, for planning purposes. Information on river flows and dam levels were also made available to stakeholders. The development of ARA-Centro and ZINWA-Save draft Information Management Strategy was completed. GIS software and hardware to both ARA-Centro and ZINWA-Save were procured and staff was trained through various GIS courses. Network expansion continued. The development of the PP2 website was completed and launched. The analysis of water quality samples ('turnaround time for results') still presented a challenge that constrained significant impact of this intervention for ARA-Centro due to the lack of adequate water analysis laboratories in Mozambique.

The Information Management System was completed in 2013. The quantity and quality monitoring of water resources continued to improve following the upgrading and expansion of the hydrometric network. The application of GIS in the development of information products continued. Water quality equipment was procured and training was provided to ARA-Centro staff at MUPB Chimoio office as part of decentralisation and also for the ZINWA-Save main office in Mutare. Modern meter equipment for verification of abstraction and low flows was also procured for MUPB Chimoio to assist in the assessment of abstractions and in issuing water permits. Two sets of real-time data loggers were procured for SADC HYCOS stations to be installed at the Pungwe border and Gorongosa to complement the loggers installed in the SADC HYCOS project. Installation of a radar data logger real time installation was delayed due to the security situation at Gorongosa Bridge.

ARA-Centro and ZINWA-Save data collection continued to improve in 2014 with installation of data loggers. Data quality improved following observer training, supervision of observers, geo-referencing of hydrometric stations and installation of the data management software Hydstra. Water resources assessments and allocation

of water permits for water use improved following the increase in hydrometric stations and better quality control. Water quality monitoring by MUPB Chimoio office improved following the procurement of water quality testing kits and training of staff. ARA-Centro and ZINWA-Save commenced uploading information on the website after receiving hands-on training on website management. The environmental flow monitoring was not taken up substantially in the PP2 Extension proposal and the PP2 strategy was to rely on funding from other partners for this activity. By 2017 ToRs for an elaborate e-flows assessment were in the process of being developed in collaboration with the IUCN-BRIDGE Programme together with a funding proposal.

By 2015 the data exchange between Mozambique and Zimbabwe had improved following regular pre- and post-seasonal meetings. The website was upgraded to include the Buzi and Save River basins. Protocols were established with dam operators to supply hydrological data and ARA-Centro staff started migration of hydrological data to the Hydstra database. In Zimbabwe the migration of hydrological data from the in-house developed system, was suspended after complications with file formats and the absence of funds to renew the license annually. In addition the hydromet information is still being shared through social media and emails regularly, especially during the rainy seasons.

In the following sections reviews are conducted of (i) water quality, (ii) the hydromet network modernization and rationalisation, (iii) water resource database and data management, (iv) water resources demand and allocation management, (v) data and water management information products and dissemination, and (vi) monitoring and sustaining of environmental flows in the Gorongosa National Park and Lake Urema.

(i) Water quality

Deterioration of water quality is according to ARA-Centro and stakeholders the main problem in the basin, while water availability is currently not a major issue. During PP1 and at the start of PP2 water quality was identified as one of the main issues to be addressed especially in relation to water pollution (mercury and suspended sediments from artisanal gold panning). Economic developments have superseded the original concern with artisanal gold panning as 10 large companies are now conducting gold mining in the basin, aggravating pollution even further. Leachate to groundwater and rivers from uncontrolled solid waste landfills, agricultural practices along the riverbeds, lack of adequate sanitation and a gradual increase in the use of fertilisers are sources of pollution that will most likely intensify with general economic development in the basin.

On a quarterly basis samples from the strategic monitoring network are analysed using the following five parameters:

- pH
- temperature
- electrical conductivity
- dissolved oxygen
- turbidity (used for indirectly calculation of total suspended solids)

According to the Pungwe bilateral agreement ARA-Centro should be monitoring at least the additional 12 parameters on a regular basis:

- Alkalinity
- Biological Oxygen Demand
- Chemical Oxygen Demand
- Chloride
- Coliforms
- Conductivity
- Nitrate
- Nitrite
- Phosphates
- Sodium
- Sulphates
- Total Dissolved Solids

The five parameters measured can hardly be said to constitute an adequate monitoring of river water quality. Also in relation to the targets set in the bilateral agreement the current system is deficient when considering the pollution sources in the basin, i.e. gold mining and farming. ARA-Centro does not have a laboratory for water sample analysis and parameters such as heavy metals (mercury and lead), faecal coliform, phosphorus and nitrate are parameters that are not measured regularly to identify possible source contamination from the above mentioned pollution risk factors. Samples are sent to a laboratory in Harare on an ad hoc basis.

In 2013, with the support from PP2, water samples were analysed for mercury pollution from gold panning and only in one location were the levels above the maximum recommended values.⁴ Due to the financial constraints of ARA-Centro, the low number and frequency of samples collected and parameters measured means that no definite conclusion or solid trends can be made by ARA-Centro in terms of pollution caused by the different sources.

The information exchange with ZINWA-Save has been limited to a few sampling points close to the border, although general water quality issues were discussed at the PMC meetings during the implementation of PP2.

ARA-Centro faces challenge in terms of monitoring effluents from the mining industry and municipalities in general. It is also a problem that illegal discharge of effluents takes place in the basin. In 2018 a new decree will be enforced that regulates illegal effluent discharges and allows ARA-Centro to collect pollution fees for such discharges, which will need to be quantified by ARA-Centro.

⁴ Nhamukwarara, a tributary of Pungwe River flowing from Zimbabwe where there are very high gold panning activities at the border between Zimbabwe and Mozambique.

There are insufficient water quality data available for the review to conclude on the effect of PP2 in reducing water pollution originating from gold panning activities. A clear strategy to combat water pollution has been developed, adopted and implemented during PP2 and population growth and economic development will likely lead to increased water pollution. It was a serious weakness of PP2 that it did not managed to build the capacity of ARA-Centro to effectively monitor water quality and provide information on trends in water quality with regard to pollution from key sectors such as agriculture and gold mining/panning. Moreover, the establishment of a laboratory to measure important water quality parameters should have been considered due to the importance of ensuring water quality in the basin.

(ii) The hydromet network modernization and rationalisation

According to the assessment made in the ARA-Centro Business plan (2012), the Pungwe hydromet network was considered adequate as per World Meteorological Organization (WMO) in terms of the number of hydrometric stations. At the time there were 19 stations compared to the recommended 17. However, with its 26 stations the rainfall network was well below the WMO recommendation of 61. There were no operational evaporation and sediment transport stations in 2012. Water quality was monitored in 14 hydrometric stations and no groundwater monitoring network had been established, due to its high costs.

By 2015 the network in Pungwe had improved to 41 rain gauges, still 32 % below the WMO recommendation and 27 hydrometric stations. In addition eight evaporation stations had been sourced (cf. Table 8). The networks for Save and Buzi were well below the WMO recommendation for the rainfall network, but the Buzi hydrometric network complied with recommendation while Save was 60% below.

The network also contains automatic stations for real time monitoring composed of OTT Thalimedes Data Logger, Ecolog 500 and Radar in 3 locations.

The improvement of the rainfall network is paramount for improving the flood warning system, but it requires coordination with INAM, which is supposed to take the lead on this.

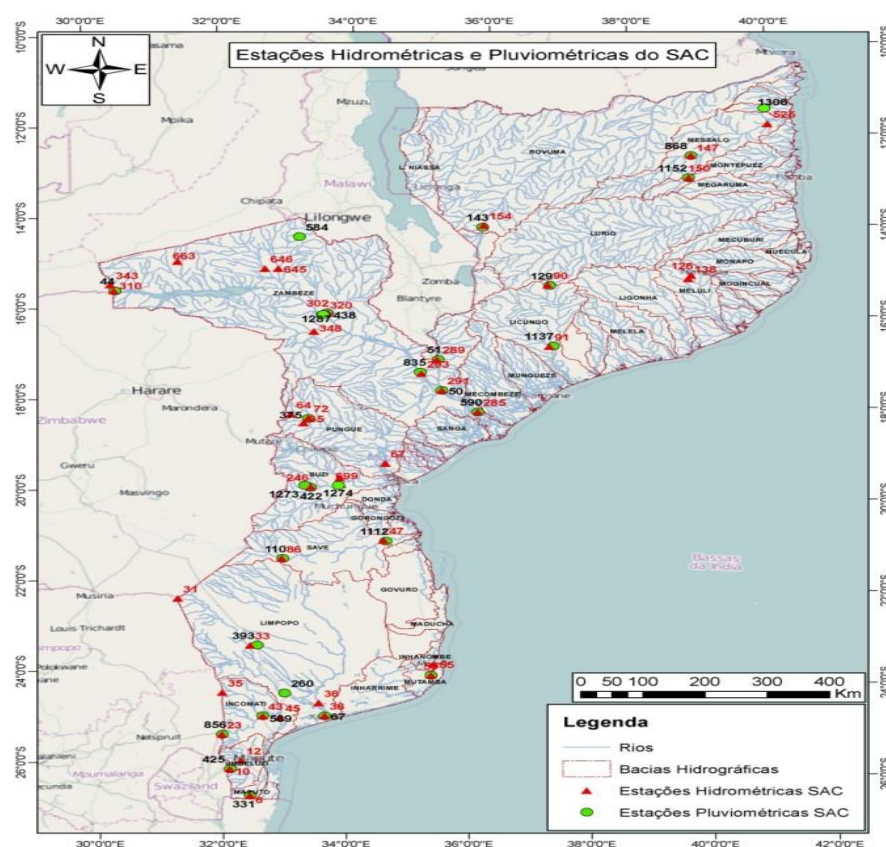
Table 8. ARA-Centro Hydro-meteorological network update (Source: ARA-Centro Business Plan 2017, preparation document, p.12)

River basins	2014			2015		
	Rain Gauges	Hydrological Stations	Evaporation Stations	Rain gauges	Hydrological Stations	Evaporation Stations
Pungwe	39	27	8	41	27	8
Buzi	27	20	0	29	22	0
Save	5	4	0	6	4	0
Savane	3	0	0	3	0	0
Gorongosa	3	01	0	5	0	0
TOTAL	77	51	8	84	53	8
TOTAL	136			145		

88 observers collect and exchange data from stations with ARA-Centro in Beira. During the dry and rainy seasons data are collected three and five times a day, respectively. The observations are handed in to ARA-Centro by the observers coinciding with their payment on a quarterly basis during PP2, but after the finalization of PP2 the frequency has been reduced to bi-annually.

Data from the stations that composes the Flood Warning System network is collected by observers and transmitted via phone on a daily basis to ARA-Centro during the rainy season (cf. Figure 3).

Figure 3. Hydromet stations in the National Flood Warning System network (Source: Consultec and Solomon 2014)



Nine groundwater-monitoring boreholes had been established by 2017. ARA-Centro has created an Excel database with borehole data from DPOPHs that contains data from 2008-2010. In order to provide a more accurate picture of the groundwater situation, there is a need to feed the database with more recent information.

Individual station historic data files have not been prepared by ARA-Centro for any of the above mentioned station categories.

Periodic sampling of water quality and sediments was initiated in 2013 and is collected from 13 stations in the Pungwe, Buzi and Save river basins of which seven

are considered particular strategic locations (cf. Figure 4). Water quality sampling is also carried out during staff's field visits using water-sampling kits provided by PP2.

Figure 4. ARA-Centro Strategic water quality monitoring locations (Source: DNGRH - National Water Quality Report 2016, p. 6-7)

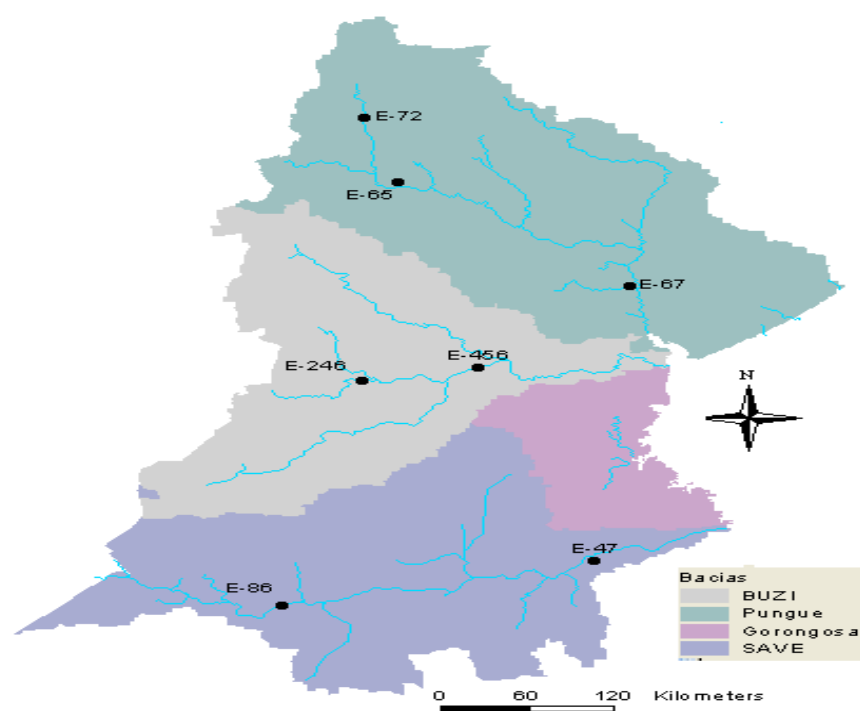


Table 9. Water quality sampling carried out during field visits (Source: ARA-Centro Annual Reports 2007-15)

Year	Samples			Field Visits	Total Samples
	Pungwe	Buzi	Save		
2016					0
2015	24	30		3	54
2014	25	18			43
2013					0
2012	11	4		2	15
2011					0
2010	11	4		2	15
2009					0
2008	6	4		3	10

Since 2013 where periodic water quality sampling was introduced the number of samples collected during field visits has been tripled (Table 9). The adequacy and effectiveness of the water quality parameters measured and trends in water quality are reviewed in the section on environmental protection.

In terms of regional coordination of monitoring, two teams of water quality experts and hydrologists, from ZINWA-Save and ARA-Centro carried out water quality monitoring on both sides in the three transboundary river basins, namely Pungwe, Save and Buzi during February (seven sites) and June (five sites) in 2016. Rapid water quality tests were carried out on site.

Currently ARA-Centro's monitoring system does not fully conform with WMO standards. Meteorological data is lacking in terms of availability and accuracy. There is no meteorological station in the Zimbabwean part of the Pungwe River basin, which is critical as this part of the basin receives the largest amount of rainfall. The small number of available stations and insufficient spatial coverage lead to data not being accurate enough for robust hydrological modelling. The quantity of data from discharge measurement stations was an issue improved substantially with the PP2 investments in the hydromet network. However, the quality and availability of both meteorological and discharge data are inadequate for enabling more detailed hydrological assessments in the future.

In ZINWA-Save only two near real-time stations were constructed in the Pungwe basin, leading to a total number to four. The station density was already above the recommended WMO standards before the additional stations. However these stations were necessary to ensure that major tributaries to the Pungwe River were also gauged. Before 2014 the two stations in the Pungwe catchment were on the main stream of Pungwe River, whereas the Honde River - one of the major tributaries - remained ungauged. PP2 created a balance in the stream flow measurements in the Pungwe basin. No new stations were added in Save and Buzi catchments. However six stations were upgraded from manual autographic chart recorders to data loggers.

However the real time capability of the stations installed by PP2 in Pungwe, Save and Buzi is still compromised. The stations are programmed to send readings every fourth hour due to battery capacity limitations. Although data is recorded on the logger every fifth minute, some of the peaks that may happen in between the four-hour period may be missed – especially if there is a need to relay the flood downstream. In addition at least two of the stations must be equipped with rainfall gauges to complete hydromet measurements and analysis

No meteorological stations were added to the basin during PP2. Other projects such as SADC HYCOS and the AfDB were supposed to add rainfall gauges in the Save and Buzi catchments. ZINWA has a policy of equipping all its dams with evaporation pans and rain gauges. However due to various challenges such as lack of maintenance, no data have been captured on the ZINWA database since 2000. Meteorological data collection is under Zimbabwe Meteorological Services, which is separate from ZINWA.

(iii) Water resource database and data management

The Hydstra hydromet database software was installed in 2010 at both DNA (DNGRH) and ZINWA head offices through the SADC HYCOS project. Training

was provided to ARA-Centro and ZINWA-Save staff in 2010 and 2012 but the software was only used for approximately one year as DNGRH did not allocate funds to renew the license. By the end of PP2 the software was not in use. By 2017 ARA Zambeze is the only river basin organization in Mozambique using Hydstra. DNGRH is in the process of raising funds from partners to cover licensing costs. ARA-Centro uses Excel to store and manage hydromet data. During the working period of Hydstra ARA-Centro continued in parallel to populate its Excel database. Thus, the license issue did not affect the procedures for data storage already in place. All data input to the database is backed up to a server.

The data management system can therefore not be said to have been upgraded in line with the nationally adopted database and management platforms e.g. Hydstra. However, the current system is working and ARA-Centro is able to acquire and process data. ZINWA is not using Hydstra due to complications in importing files. It still uses its proprietary WRS software for stream flow data processing and a Microsoft Access-based database. The data file formats, especially the way the stations are rated, are completely different. The situation has not improved even after engaging Kisters, the developers of Hydstra.

Groundwater monitoring in Zimbabwe is not fully developed. It is still concentrated in the western parts of the country and major cities where there is more groundwater abstraction due to the limited surface water sources. Groundwater exploitation in catchments such as Pungwe where there is abundant surface water (highest runoff in Zimbabwe) is very limited.

Water quality stations are still far below the WMO standards. Monitoring has been concentrated at the water supply stations where all water production is monitored. The frequency of monitoring is very low. The last comprehensive monitoring was done in October 2016. There is no consistency in monitoring due to the absence of funds for the team to do fieldwork. The catchment will need to improve if a complete analysis is to be achieved.

(iv) Water resources demand and allocation management

According to the 2012 Business plan ARA-Centro was not adequately fulfilling its mandate with regards to the functions of establishing an inventory of water resources and determining, modelling and creating scenarios for future water demand and the water balance at basin and regional level. The monographs produced under PP1 were initial stepping stones towards estimating future water demand and deciding on water allocations. The Save basin is extensively developed in Zimbabwe, while in the Buzi and the Pungwe river basins the level of development is comparatively much lower.

In view of meeting the demand and ensuring future water security, in 2014 ARA-Centro carried out a hydrological analysis and modelling of the Pungwe River basin with support from PP2 and the Netherlands' "Partners for Water" initiative. This

assessment was based on the Soil and Water Assessment Tool (SWAT),⁵ and was then used to develop a Water Evaluation and Planning System (WEAP) model to improve water allocation planning. Capacity in ARA-Centro has therefore been improved in terms of converting data into knowledge, which can be used for future decisions on water resource allocation.

SWAT was developed to capture all physical processes at the highest level of detail to understand processes in the basin, while WEAP focuses on water demand, supply and shortages for the current situation, as well as under possible development scenarios. The Buzi and Save basins have subsequently been modelled in WEAP, and water availability in the Pungwe, Buzi and Save basins has been assessed using the PITMAN model. Therefore, ARA-Centro's knowledge on the current hydrological state of the Pungwe River basin has been improved and it has knowledge of data and tools that are available to undertake a hydrological assessment study.

The support also provided ARA-Centro with a roadmap that can be followed to undertake hydrological assessment studies for other river basins within Mozambique. ARA-Centro has therefore knowledge of current demand, unmet demand and outflow from the Pungwe basin. According to the WEAP model run there seem to be water security for the major water users and investors and unmet demand is currently not a major issue, unless an extreme drought occurs. Major stakeholders such as the FIPAG water utility of Beira and Dondo and ARA-Centro staff also confirmed this result. Presently the major issue according to stakeholders is one of water quality and not quantity, as indicated earlier.

By 2011 ARA-Centro had registered and issued water permits to 32 water users and the annual demand in the three basins was estimated at 176 million cubic meters, of which 77% was in the Pungwe basin. No data was given for 2017.

The water demand and allocation by ARA-Centro has increased since the start of PP2, particularly with the increase in irrigation under World Bank funded projects in Sofala, as well as Manica Provinces and gas mining activities around Buzi in Sofala Province.

The current water demand figures used by ARA-Centro are listed below and are from the draft agreement document between Mozambique and Zimbabwe on the co-operation on the development, management and sustainable utilization the water resources in the Save/Buzi water course and the updated sector study on surface water resources for Pungwe basin from 2013.

- Save: 167,48 million cubic meters
- Buzi: 383,7 million cubic meters
- Pungwe: 193 million cubic meters

⁵ SWAT (<http://swat.tamu.edu/software/swat-model/>) is a river basin model developed originally by the USDA Agricultural Research Service (ARS) and Texas A&M University and is currently one of the world's leading spatially distributed hydrological models

According to FIPAG, which is currently surveying the population of Beira and Dondo to estimate future drinking water demand, the demand for Beira will double within the next 20 years due to population growth.

The Beira Agricultural Growth Corridor (BAGC) project that aims to develop 190,000 ha of irrigated agriculture in the long term will be a major risk factor in terms of water security and meeting the demands in the future. WEAP model runs of just 25,000 ha already generates scenarios of severe shortages and negative impact on people and economy and an outflow of the Pungwe river into the Indian ocean below the critical 10 m³ s⁻¹ which will increase the salinity problem

More critically, there has not been any discussion between ARA-Centro and the BAGC project concerning the issue of water security in light of the expected agricultural development.

ARA-Centro is still to develop a comprehensive strategy to deal with the above-mentioned expected substantial increase in future demand. Currently the planning is based on a forecasted annual increase of water users in the range 10-20 users, but with no specification of the type of users or estimate of individual demand.

Structural measure to deal with future water demands is discussed in the chapter on small and medium dam development strategy. ARA-Centro have not considered how to promote more efficient irrigation methods or other water conservation and reduction techniques in collaboration with stakeholder, such as the provincial and district departments for economic activities to minimize water use. At the level of urban water supply FIPAG has embarked on a non-revenue water project with technical support from the Dutch water utility fund Vitens Evides, to reduce physical losses in the distribution system and thereby minimise required bulk water abstraction.

The water demand and allocation is met by granting licenses, water rights and concessions. Little progress has been made in reporting of the actual water demand due to deficiencies and challenges in installing meters. According to the regulation on water licensing, automatic meters should be installed when a concession is granted. However, by 2017 only one concession was awarded within the jurisdiction of ARA-Centro.

Water users declare their expected consumption on the license application form in terms of for example hours irrigated per day and quantity. However, according to ARA-Centro quantities are often declared lower than real abstraction and practices such as irrigating more than the stated are common. With the support of PP2, ARA-Centro carries out routine checks on major users such as the Mamfambisse Sugar Estate, but control of small and medium users is not carried out.

ARA Cento express that there are a substantial amount of unregistered water users both in terms of users of surface and groundwater. The challenge for ARA-Centro is

that agricultural authorities that handle land use titles (DUAT) at rural level do not always transfer the register of newly issued DUATs to ARA-Centro for the purpose of increasing the amount of registered water users. The assessment of illegal or unregistered water use versus the water uses with licenses, water rights and consents is still to be done.

The Pungwe Sub-catchment Council has been very active in monitoring surface water commitments. There has been an increase of 380% since 2012 in the volume of water now registered in the catchment, which has translated into increased revenues for the Council. Most of the increase was attributed to a surge in the development of mini hydropower plants due to the substantial perennial flows in the basin.

(v) Data and water management information products and dissemination

Hydrological products are disseminated through multiple channels. The main products are various bulletins and their transmission is via fax, email, web page, press releases and phone calls. WhatsApp is also an increasingly important channel for transmitting forecasts and warnings not only within the countries, but also between ARA-Centro and ZINWA-Save.

The following bulletins are issued by ARA-Centro:

- Hydrological bulletin (daily from October to March)
- Dry season bulletin (training received in 2017 on how to produce these and the product will be distributed during the 2018 dry season)
- Water flow bulletin (issued when flows are low)
- Dam bulletin (weekly from 2018, DNGRH has elaborated a standard format to be used, which will be adapted to the DAMs in the ARA-Centro basins)
- Water quality bulletin (issued when samples are taken)

The ARA-Centro/ZINWA-Save project website BUPUSA.org was a useful communication channel, but after the end of the PP2 financing in 2017 the website has not been maintained and the license has not been paid, rendering the website not operational.

The Pungwe basin committee members also disseminate information themselves.

During the flood period, the level of activity is substantially increased, with warnings about potential flood situations and active interaction with INAM and INGC. ARA-Centro issues daily bulletins about the progress of the more critical situations.

Within ARA-Centro and ZINWA-Save there are no qualified information technology specialists to maintain information management systems or databases.

The PP2 project has assisted in improving the amount and quality of water management information available to managers and other stakeholders. The use of social media has enabled the dissemination of information to a larger group of stakeholders.

(vi) Monitoring of environmental flow and sustaining environmental flows in Gorongosa National Park and Lake Urema

The planned environmental flow requirement study was downsized and subsequently terminated. The 2011 MTR noted that the intended design did not take into consideration institutional and legal limitations, which would have jeopardized the monitoring. It should also be noted that at the time of the MTR in 2011 the hydrological information available to ARA-Centro based on its hydromet network was not adequate to produce sound recommendations on environmental flows, which could also justify, apart from the significant costs involved, the decisions at the time to downsize the activity.

The team was informed that an IUCN/GEF project that will include an environmental flow component is currently in an advanced stage of planning. However, the previous down-sizing and termination constituted a risk and limitation to the Programme, given that environmental flows is a key aspect of the bilateral agreement between Mozambique and Zimbabwe. The programme has therefore tried to identify other interested partners to support the study. This has not yet materialized in a study, but in 2015 IUCN has provided training to 14 staff members from Mozambique and Zimbabwe on how to incorporate environmental flows in the bilateral agreement. IUCN has also agreed to provide resources for a pilot project in the Pungwe basin for the estimation of the environmental flows. A desktop methodology has been used to estimate environmental flows, based on the hydrology of the Pungwe River, during PP1, which can be used until a detailed study is done.

A strategy and action plan for monitoring and preserving environmental flows in the Gorongosa National Park and Lake Urema was developed together with an assessment of land use practices on Gorongosa Mountain. However, by 2012 the critical project was downsized and concluded. Although all expectations in terms of actual implementation of improved land use practices and alternative livelihood options for farmers that were created at the beginning of PP2 have not been met, the Programme has allowed for a better communication and understanding between ARA-Centro and Gorongosa National Park. The armed conflict also made the area insecure to work in from 2013 and until 2017 and thereby making the implementation of activities not viable.

Conclusions

The network of hydrometric and pluviometric stations, and of automatic stations for real-time communication have been substantially upgraded and expanded during PP2. In Mozambique the number of hydrometric stations is well above the targets set for PP2, and in Zimbabwe the targets have also been achieved. The detailed assessment in terms of categories of stations in the network reveals that the number of hydrological stations is adequate, while efforts still need to be made to improve the coverage of rain gauges and evaporation pans. However, it should also be noted that the installation of rain gauges in Mozambique falls under the responsibility of the Meteorological Institute (INAM), but the institution is still weak, and the ARAs have

had to compensate for some of INAM's shortcomings in that regard, in order to be able to produce reliable information on water resources. A similar situation was observed in Zimbabwe, as the mandate is under the auspices of a different institution.

Data quality has significantly improved following observer training, supervision of observers, geo-referencing of hydrometric stations and installation of the data management software Hydstra. However, the sustainability of the interventions has been jeopardized by the lack of financial resources to pay for the Hydstra license, such that Hydstra is currently not in operation.

The capabilities to carry out water resource assessments have been substantially improved, especially within ARA-Centro. The coordination and exchange of information with important stakeholders, such as the water utility FIPAG, the World Bank-funded agricultural projects and provincial agricultural authorities in Mozambique is yet to be effectively dealt with with respect to possible future water scarcity.

The allocation of water permits have increased, but permit control and the issuing of sanctions is still an issue which needs to be addressed and improved upon.

Water quality monitoring has improved following the procurement of water quality testing kits, training of staff, and the provisions of resources for fieldwork and transboundary cooperation. However, the lack of an adequate laboratory in Mozambique to carry out more advanced water sampling, e.g. for heavy metals and pesticides, constitutes a barrier towards effective water quality monitoring and protection of the environment.

The quality and quantity of water management information produced by ARA-Centro has improved and is available to managers and stakeholders as required, especially with regards to disaster risk reduction. A communication strategy has been elaborated but does not seem to have been properly institutionalised. The information products and communication channels can be further improved to suit different target groups.

While the environmental flow requirement study was down-sized and terminated because support was provided by IUCN, the reduction of the environmental flow component and subsequent cancellation of the determination study and monitoring was a limitation in the Programme, considering the importance of environmental flows to the joint agreement between the two countries. An IUCN/GEF project with an environmental flow component is in an advanced stage of preparation.

ARA-Centro and ZINWA-Save have not managed to do their own monitoring after the end of PP2, which is now compromising data collection and rendering the equipment acquired useless.

2.2.2 Poverty reduction

2.2.2.1 Pungwe Basin Investment Facility

Introduction

The Pungwe Basin Investment Facility consisted of two structures, a Pre-Investment Fund and the Pungwe Basin Initiative, and was designed as a mechanism for mobilizing resources for investments in the basin addressing pro-poor development. The Pre-Investment Fund facility would support (pre-)feasibility studies for substantial and bankable investment projects, while the Pungwe Basin Initiative would mobilize investment funds for large-scale infrastructure developments within the basin, based on the (pre-)feasibility studies,

Review

Following a tender procedure, in accordance with Sida's Guidelines for Procurement, a service provider (Pegasys Ltd, SA) was appointed in August 2009 to provide a concept note and a business case for the establishment of the Pungwe Basin Pre-Investment Fund. The business case was completed in October 2009 and contained the following key features:

- The fund would be established with an account within ARA-Centro, to be managed by PSU on behalf of the Director of ARA-Centro;
- An advisory board would be established with government and stakeholder representation to guide the selection of projects for the pre-investment phase;
- ARA-Centro management would procure, appoint and manage consultants for the feasibility studies, with support from the PSU;
- The fund would adopt the financial management systems and procurement procedures outlined in the Programme Implementation Manual (PIM);
- The fund strategy should be viewed broadly to include projects financed by other institutions, leading to a comprehensive portfolio of projects by the Pungwe Basin Initiative.

Activities related to the operation of the Pre-Investment Fund included:

- Ensuring clear and written guidelines for accessing the fund, transparent criteria and procedures for disbursement of funds and the implementation, management and monitoring of the studies to be financed by the fund;
- Establishing of a strategy for advertising the fund;
- Assessing the needs for training and capacity building in fund management and monitoring and design a capacity building programme;
- Providing guidelines/criteria for the identification and prioritization of potential projects for possible financing by the fund.

By 2010 further adjustments were planned regarding the governance structure of the fund and the process for the nomination of advisory board members was underway. A separate fund account was established, but challenges remained in the transferring of Sida funds to the fund through the government “*e-sistafe*” financial system. The APR

2011 states that the component would continue, but no progress was reported. In the APR 2012 there is no mention of the Fund at all. As such, from the written documentation, it has been difficult for the review to assess the reasons behind the sudden disappearance of the Pre-Investment Fund and therefore also the Pungwe Basin Initiative. The team was unable to access the minutes of the PSC meeting that could have clarified the issue.

From interviews with Sida staff and the management of ARA-Centro it appears that the capacity of the ARA-Centro to manage and have the overall responsibility of the fund was considered insufficient. According to the same sources this was a determining factor in PP2 refraining from establishing the fund. At the same time there were doubts at Sida that viable large-scale commercial water infrastructure projects would be feasible in the basin.

Conclusion

The facts that the component failed and the outcome were not achieved leads to the conclusion that it could have been beneficial to assess the capacity of the ARA-Centro to manage the funds before these were launched in PP2.

Based on the findings and the knowledge and insights gained from the progress and activity levels of other components and CDPs in the period 2010-2012, it is likely that Sida's assessment was correct. A new management at ARA-Centro was appointed in 2012, following a staff crisis in 2011 and most of 2012. Staff motivation levels were generally very low. Moreover, this coincided with a period of increased procurement of equipment, capacity building activities of ARA-Centro staff and support to stakeholders and beneficiaries at decentralised levels. These factors together had left the ARA-Centro in a vulnerable situation and unable to handle an additional task of such complexity and importance as setting up and managing an investment fund.

There is insufficient data available to assess the viability of large-scale commercial water infrastructure projects in the basin.

2.2.2.2 Small and Medium Dam Development Strategy

Outcome assessment question

Have small and medium-sized dams for future development in the Pungwe basin been identified, assessed and prioritized?

Introduction

The development and rehabilitation of multi-purpose small and medium-sized dams in the Pungwe basin was important for several reasons. They (i) provided reliable irrigation water for expanding small- and large-scale commercial agriculture; (ii) guarded against droughts and strengthened food security amongst subsistence farmers; (iii) ensured adequate water supply to small towns where existing supplies

have reached or are close to their limits; (iv) facilitated the supply of hydroelectric power to small towns and growth points; and (v) developed storage capacity and regularizing water use in the basin.

While acknowledging the need for small and medium dam development in the Pungwe basin, PP2 did not include direct investment in the construction of substantial hydraulic infrastructure. The Pungwe Basin Pre-investment Fund aimed at mobilizing resources for such investments (see 2.3.1) and the SGF could provide resources for investments in concrete development activities at smaller scales. PP2 aimed to consolidate, and where possible enhance, existing knowledge on the potential and priorities of small and medium dams in the basin. It also aimed to design a clear strategy for small and medium dam development together with relevant stakeholders, including outlining a strategy for resource mobilization that would facilitate future investigations and funding for actual dam construction.

Review

The Small to Medium Dam Development Strategy (SMDDS) was completed in early 2010. The strategy was based on field investigations of over 20 potential dam sites, considering both technical and socio-economic criteria, and led to the prioritisation of 12 sites. The strategy also identified potential funding sources, key roles and responsibilities for implementation and capacity development needs for ARA-Centro. The strategy gave a practical input for planning and source funding.

The Strategy was disseminated to key government institutions, local authorities and potential financiers from 2011 onwards. According to information given by the district administrators, the SMDDS was well received by the district councils and they used it in district development planning, although there was no budget available for the actual construction of the dams. DNGRH used the document when approaching donors and investors for financing, and included the construction of dams in the five-year government development plan, as well as in the 2015-2030 Action Plan of the Water Sector to Implement the Sustainable Development Goals.

The World Bank and GIZ used the information in the strategy for selecting the sites they intended to develop for the benefit of local communities. No concrete actions were taken by GIZ. The World Bank financed the elaboration of feasibility studies and detailed design for the Gorongosa and Metuchira dams as part of the processes for elaborating the National Programme for the Development of Natural Resources (PNDRH-1). The PNDRH-1 itself does not include the construction of any dams though.

Since the start of PP2 the focus has been on the realization of three dams, the Nhacangara, Gorongosa and Metuchira dams

From the APR in 2008 the construction of the *Nhacangara dam* was mentioned as one of the major developments in the Pungwe basin. According to APR 2015,

negotiations for the funding of the design and construction of Nhacangara dam were in an advanced stage with potential donors, after the Italian government had withdrawn its commitment to finance dam construction, as it did not consider it economically sustainable.

The construction of Gorongosa dam commenced in 2014, fully financed by the government of Mozambique, and was to be completed in 2016. As of November 2017 the dam was almost complete, but because of lack of funding the work has stopped.

According to the APR 2015, the Metuchira dam had secured funding from the government of Mozambique to commence construction in 2016. As of November 2017 the detailed design and feasibility study were ready, but there was still no progress because of lack of funding. Tenders for the design and construction of Metuchira dam through a public-private partnership had already been advertised and it was hoped that work would commence early 2018.

Since 2012 the APRs stated that the government of Mozambique had crafted a number of policies which promote the development of water infrastructure in order to improve the livelihoods of the poor, as well as boost agricultural activities (e.g. the green revolution). These policies were to create an enabling environment for donors to participate in dam construction. Follow-up is now required in terms of feasibility studies to be carried out for the nine other prioritized dam sites in order to prepare bankable projects and the base for PPPs on small and medium dam construction. PP2 did not contribute towards the elaboration of those studies.

The immediate impact of the construction of Gorongosa dam has been an increase in employment in the area during construction. Once the dam will become operational the revenue base for ARA-Centro will increase through the sale of raw water. As such, the financial situation for ARA-Centro looks bright in the years ahead, as their revenue base is set to increase (APR 2016).

Apart from funding, the technical capacity of ARA-Centro was mentioned several times as a risk factor for the implementation of the SMDDS. During the elaboration of the study, two ARA-Centro staff were seconded to the service provider (SSI) and SSI also arranged for a series of short workshops to train eight ARA-Centro staff in small and medium dam development and strategic planning. Also, ARA-Centro staff received training in the design, operation and maintenance of dams.

Conclusion

The outcome that was defined for the small and medium-sized dams development has been met with the elaboration of the Small and Medium Dam Strategy. The biggest challenge was to find finance for the implementation of the strategy; until date not one dam has been completed. It was a missed opportunity that no feasibility studies were conducted within PP2, because that is the first step to attract donors and investors.

According to the training conducted, sufficient capacity should be available within ARA-Centro to coordinate and supervise the implementation of the SMDDS.

2.2.2.3 Small-scale IWRM and Development Grant Fund (SGF)

Outcome assessment question

Have local IWRM&D initiatives been supported, that have a strong poverty and broad cross-cutting focus and that will simultaneously deepen local participatory IWRM processes?

Introduction

These small-scale investments were initiated in order to support and encourage local, community-based IWRM&D initiatives. They were intended to link local communities more closely to the IWRM processes, provide practical experience in IWRM and most importantly bring immediate and tangible results to the stakeholders. The support should demonstrate the practical application and benefits of IWRM and contribute to poverty reduction, gender equity, improved health and environmental sustainability.

This CDP became a flagship for PP2 during the course of implementation, as it targeted IWRM from the perspectives of poverty reduction and food security. Most of the projects identified dealt with water supply to irrigation schemes and agricultural activities, including seeds selection, pest control, soil conservation and improvement, agriculture techniques, crop storage, markets, among others.

Review

It was acknowledged already in PP1 that IWRM occurs at the local catchment and community levels and therefore the SGF support was initiated as one of the CDPs of PP2. However, it was only after the completion of the inception period at the end of 2009 that steps were taken to initiate SGF support activities. It took until 2012 to establish the fund governance structure for those activities.

By 2012 the fund had still not been set-up, but important preparatory arrangements had been initiated, including: (i) the development of a guide for fund operations, (ii) holding of stakeholder meetings for identifying and prioritising initial project ideas (two in Mozambique and one in Zimbabwe), (iii) raising the awareness of government departments to create an enabling environment for project implementation, and (iv) site visits and preliminary screening of project ideas conducted by technical teams of ARA-Centro and ZINWA-Save supported by the irrigation departments of both countries.

10 projects in Mozambique and five in Zimbabwe were selected for implementation, and technical assistance was procured for detailed design and budget verifications. By 2013 a total of 20 projects had been identified, of which 18 had reached the level of

detailed design with drafts of bills of quantities for constructions (12 in Mozambique and six in Zimbabwe).

By 2014 the APR claimed that PP2 had moved from simply promoting IWRM, to developing it, with a major focus on poverty alleviation, particularly as a result of the increasing focus on the SGF. Grant calls had received large responses, indicating a strong willingness by communities to engage in activities that could assist them reduce poverty. Similar responses were observed in the Buzi and Save basins.

By the end of PP2 (2017) a total of 10 small grant projects had been initiated and/or implemented in Zimbabwe and 23 in Mozambique.

In Zimbabwe a total of USD 328,600 were spent on small-scale projects mainly targeting water supply for domestic use or irrigation purposes. The evaluation team visited four small grant projects observing that overall beneficiaries had a more steady income than before, some being able to expand the projects using surplus from sales of increased crops yields. Moreover, the beneficiaries entered into better contractual arrangements for their crops and brought their products directly to the markets avoiding middlemen. Most projects also included a fair provision of the communities' own contribution (often in-kind), their efforts to ensure proper operation and maintenance, as well as re-investment when possible. For example, in the Chidzinzwa irrigation scheme, each plot holder paid 1USD/month to a maintenance fund. Poverty reduction has been evident from these projects and in addition to the features already mentioned, the beneficiaries highlighted that the projects enabled them to pay for other social services, including their children's school fees, and water levies and rates.

An important aspect that community members mentioned was their increased knowledge of irrigation and agricultural techniques as a consequence of the practices applied and the training that was carried out, in some cases by PP2. In total 292 households and two schools benefitted from the SGF in Zimbabwe.

In Mozambique a total of USD 533,585 was spent on small-scale projects mainly targeting water for irrigation purposes, but also establishing fishponds and constructing small dams, covering three districts (Gorongosa, Barue and Nhamatanda). The evaluation team visited 11 of the 23 projects. Many of the beneficiary associations were established and projects initiated in 2014 and 2015 (some in 2013 and some in 2016), but due to armed conflicts in the districts in 2015/16 several projects were discontinued (associations fell apart, equipment vandalized, etc.) only to be 'restarted' in the beginning of 2017. There was no input of PP2 funding – the associations restarted by themselves, setting up their organisation, preparing the land, repairing the equipment and using the irrigation equipment after the two-year interruption.

Despite the significance and negative impact of the armed conflict on the SGF projects, the observations from the field visits are that the results are generally

positive. The irrigation projects in particular had a positive effect on the livelihood of association members, as they managed to improve their houses, pay school fees for their children, increase the variety of their diet and improve means of transport. For example in the Tsiquir irrigation scheme in the Gorongosa District, three crop-cycles have been under irrigation since 2016 and the result has been an increase in the maize production from 1.5 ton/ha to 2.5 ton/ha. A greater variety of crops has been planted, which has enabled a diversification of the nutrition for community families. Income has increased and many of the association members are now contracting workers to work on their land, on either an annual or seasonal basis. Similar improvements are experienced in other of the schemes visited by the review team. In total 512 households and one school benefitted from the SGF in Mozambique.

The APR 2015 reports the following *progress and achievements of the SGF projects* (no such data is present in the 2016 APR):

- Income generation has been significant: “Most beneficiaries lived on less than USD 30 per month. The income on average for all projects has increased to a minimum of USD 90 per month”.
- Irrigation infrastructure installed covered a total area of 241 ha irrigated land in Mozambique and 116 ha in Zimbabwe.
- There is now more diversification of crops with crops being grown throughout the year, as opposed to during rainfall seasons only.
- Crop yields have more than doubled due to increased production efficiency following stakeholders applying the skills and knowledge gained from water resources management, agribusiness, and project management in the day-to-day farming, as well as due to water resources being available throughout the year
- There is a gradual shifting away from unsustainable farming practises e.g. shifting cultivation and stream bank cultivation following empowerment of farmers through the provision of equipment. No data is presented to justify these claims though.
- Increased participation by beneficiaries in water resources management, namely in decisions on water allocation within their irrigation schemes as demonstrated by conflict resolutions in the project areas.

While the above statements from the APR 2015 appear impressive it is worth noting the following:

- There are no data that documents a threefold increase in average income for all projects. Data found from the team’s field visits (see Annex 4) and from the SGF Evaluation report did not enable us to validate those claims.
- There is no documentation for the more than doubling of yields due to greater production efficiency, yet from the field data we have indications that an increase has obviously taken place in several projects.
- While there is no doubt that a shift away from unsustainable farming practices is taking place no data indicate the comprehensiveness of this shift.
- Finally, as mentioned elsewhere, data on the number and comprehensiveness of resolved water-related conflicts are scant and there is not sufficient evidence of

the correlation between ‘effective (beneficiary) participation in decision-making’ and ‘conflict resolutions’.

The results of a SWOT analysis of 11 SGF projects in Mozambique is presented in Table 10, overleaf.

From an *institutional aspect* ZINWA-Save has experience from managing irrigation schemes and has support mechanisms in place for farmers to prosper. They have been rendering support to irrigation schemes as part of their mandate. Our fieldwork findings indicated that local government support in Mozambique was largely present and extension support was provided through the SDEA.

As regards the *social aspects* of the SGF projects only limited information could be gathered on the participation of women in the SGF projects. Women membership of the associations is equal to that of men. In some cases women held the position of association chairperson and were often instrumental in the in-kind contribution to the projects. Their exact role in the decision-making processes in the associations was not clear. At one point a female stakeholder mentioned that for women in Manica District it was particularly difficult to have a say due to the influence of the apostolic church.⁶ The SGF Evaluation report states that the involvement of or attention paid to disadvantaged groups (including the physically and mentally handicapped) was not addressed by the SGF projects. In a monitoring report from 2015 it was stated that the most influential people took over a project at the expense of less dynamic stakeholders, and that community members with little income were discarded as they could not pay association membership fees.

While this was verified by our fieldwork, some cases were observed of support being provided to disadvantaged groups in schools and in adjacent communities in the form of food supply or tree planting.

⁶ e.g. <http://christianleadershipcenter.org/apostolic.pdf> p. 256, that instructs a woman to be silent and 1 Timothy 2:9-15 which prohibits a woman from teaching or having authority.

Table 10: SWOT analysis of 11 SGF projects in three districts in Mozambique.

STRENGTHS: • Design of the irrigation systems is simple and easy to understand for the users. • First crop cycles under irrigation show increased production and increased quality of crops. • Associations start to diversify their products and try new crops. • SDAE is very involved and gives technical assistance to the associations via technical experts and extension workers. • Some of the associations cooperate during the preparation of the land by hiring a tractor, purchase of seeds, fertilizers and pesticides. In most cases there is one plot dedicated to the association as a whole, income is used for joined expenditures. The rest of the land is divided amongst the members to produce their own products. • Association members and their families increased living standards by improving their houses and transport. • Association members and their families are eating more diversified products like potatoes and veggies.
WEAKNESSES: • Formal training for the associations on operation and maintenance did not take place. Explanation in the field during the installation of equipment was in some cases done by Zimbabwean experts that did not speak the local language. • Although an MoU has been signed for each of the projects and some of the tasks are specified it does not state very clear who is responsible for technical assistance to the associations and maintenance of the system. • The associations have no clear plan for maintenance, repair and expansion. They solve issues at the spot. Due to the remote location and lack of trust, most associations do not have a bank account which makes it difficult to keep larger amounts. • Women are underrepresented in the associations. • The pump for the gold miners was too small to provide enough water but helped a bit.
OPPORTUNITIES: • Demand for agricultural products in all regions is high, and it is easy to sell the products. The buyer comes to fetch the products with own transport. • Associations started to produce under contract (eg. cabbage for the Gorongosa National Park and bean seeds for seed company). • Due to the flexible design of the systems (both irrigation and fish ponds) it is easy to expand the systems in the future with own means. • Associations and members of the associations are contracting workers to work the land, fixed as well as seasonal. This contributes to employment.
THREATS: • Continuous armed conflict restricted access to the area. Up until today one of the villages can't be reached because of insecurity. • Vandalisation of the equipment

Conclusion

The findings of the SGF indicate that the outcome has been achieved as a result of financial and technical support from PP2, the beneficiaries themselves and the local authorities – addressing poverty concerns in selected localities in both countries. As

regard the social and crosscutting aspect of the SGF the achievements fall somewhat behind in that concern for the environment. While women seem to form a considerable number of the association members their role in the decision-making bodies remains unclear.

Several challenges are facing both ARA-Centro and ZINWA-Save in the future as regards the SGF. First and foremost funding appears to be insufficient to ensure the expansion of the number of projects following the closure of PP2. So far a clear system for effectively monitoring of the current 33 projects has not been established for developing further the irrigation schemes put in place by PP2 – including more pro-active support to strengthening the technical component for more effective agricultural practices and also the social aspect of ensuring benefits for disadvantaged groups in the project areas.

2.2.3 Environmental protection

2.2.3.1 Salinity control

Outcome assessment question

Has appropriate protection against saline water intrusion in the Lower Pungwe basin been provided to protect irrigation and industrial activities dependent on water supply from the river, and to ensure the availability of safe drinking water?
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Introduction

Due to the topography in the lower Pungwe River basin there is seasonal intrusion of sea water during periods of low river flow, accentuated during high tides in the Indian Ocean. The intrusion of saline water, which at times can reach up to 100 km upstream of Beira, affects both the water supply to Beira and Dondo and the irrigation of sugarcane at the Mafambisse Sugar Estate. Until 2009, the Beira water supply company FIPAG abstracted its water from a canal supplying water to the Mafambisse Sugar Estate, but FIPAG has since moved its intake further upstream. This largely reduced the threat of saline water affecting the potable water supply to the greater Beira area. Moving the intake for the Mafambisse Sugar Estate, however, may be too expensive, and other solutions need to be considered.

Protecting the lower part of the Pungwe River basin from saline intrusion is important from several aspects. The Mafambisse Sugar Estate is an important economic enterprise with approximately 2,800 employees. If the supply of water of sufficient quality cannot be assured throughout the irrigation periods there will be serious disturbances to production and employment, as was the case in 2005 and earlier. Protection against sea water intrusion would also increase the feasibility of expanding the operations of the Estate, as well as of other run-of-the river abstractions for irrigation.

Review

The project for salinity control started only in 2010 with the tender for the pre-feasibility study. At the same time it was concluded that the construction of a possible salinity control structure would go well beyond the timeframe of PP2 (APR 2010).

After delays in the procurement, contracting and payment processes, the inception report for the pre-feasibility study was completed in 2011 (APR 2011). The study included an assessment of the possible impacts of the identified salinity control options and its preliminary costing. From the report it was evident that for the near future salinity would not pose problems to the water supply for the city of Beira since the new intake was moved further upstream. However with the expected increase in water demand saline intrusion problems would pose more problems in the future. In the case of the Mafambisse Sugar Estate, salinity intrusion remained a problem particularly during low flows and drought. A number of options were suggested as possible solutions. The proposed options needed to be studied in more detail in a feasibility study.

Taking into account the economic value of the Mafambisse Sugar Estate, the MTR recommended extend the feasibility study with one year, to include a more profound study on the impact of the salt intrusion on agricultural and sugar cane production, as these aspects had been underexplores in the pre-feasibility study. The MTR also concluded that insufficient qualified staff was allocated to supervise the pre-feasibility study. This recommendation was not taken into account and following a reprioritization of PP2 activities and funds in 2011 it was decided to no longer carry out the feasibility study and the construction of a salinity control infrastructure.

Reasons mentioned in the Programme Completion Report 2017 for not advancing with the construction of the salinity control infrastructure were: (i) putting up a barrier would affect the aquatic ecology of the lower part of the Pungwe River; (ii) the works could not be completed within the timeframe of PP2 and (iii) implementing agencies had no capacity to supervise such a big project.

It was expected that the major stakeholder (Mafambisse Sugar Estate) impacted by saline intrusions would take over the pre-feasibility study and try to set up an adapted solution. According to information from the ARA-Centro focal point, the Mafambisse Sugar Estate did not advance with any of the recommendations up to this date.

In 2012 dissemination of the pre-feasibility study took place which gave the stakeholders a better understanding of the challenges and possible options for reducing the impact of saline intrusion, as well as the impact of those solutions (APR 2012).

Conclusions

PP2 did not provide appropriate protection against saline water intrusion in the lower Pungwe basin to protect irrigation and industrial activities dependent on water supply from the river, and to ensure the availability of safe drinking water.

In general the implementation of this project component has been underestimated in terms of time, capacity and complexity. The project component started too late with inadequate input of qualified staff and insufficient attention to the aspect of irrigation. The project could have been a demonstration of the type of services that ARA-Centro can provide to its stakeholders. In addition, it seems clear that the technical solution that was considered (inflatable dam) would have required a very expensive future set-up for maintenance and management, which has serious sustainability implications.

2.2.3.2 Gold panning management and mitigation

Outcome assessment question

Have negative effects on health, livelihoods and the environment of uncontrolled gold panning in the Pungwe basin been minimized?

Introduction

The rapid and uncontrolled growth of uncontrolled gold panning in the Pungwe River basin is a key area of concern for the respective national and provincial governments of both Mozambique and Zimbabwe as it causes numerous problems. The Programme Document from 2006 stated the following:

- Suspended sediments make the water unsuitable for drinking, washing and irrigation, bury the aquatic fauna, prevent photosynthesis and have effects on the fish population.
- Miners use mercury and other chemicals in the gold mining process that may cause risks for human and animals. Also other heavy metals, e.g. lead and cadmium, are bound to the suspended sediments since they exist naturally in the soils.
- Damage to riverbeds and banks causing siltation of rivers and dams which in turn causes deterioration of water quality, choking up of water pumps and irrigation systems, reduction of wetlands and grazing areas for animals, destruction of aquatic habitats, and an overall reduction in biodiversity.
- The uncontrolled chopping down of trees close to rivers causing deforestation, which contributes further to erosion and siltation.
- Social problems also arise such as land-use conflicts between migrant gold panners and local resident communities, the use of child labour, poor health and sanitation conditions, the migration of men in particular for long periods thus placing mining in competition for labour with food production, and alcoholism and prostitution with increased risks of the spread of HIV/AIDS.

On the other hand, it is important to recognize that if undertaken in a controlled and responsible way, alluvial gold panning (as well as other small- and larger-scale

mining) can make an important contribution to economic and social development. This has been recognized both by the Zimbabwean and Mozambican authorities.

PP2 aimed to address the challenges with a comprehensive and well-coordinated approach that took account of the many intersecting issues, be these environmental, technical, institutional, economic, social and political.

Review

Water quality has not improved since the start of PP2, rather it has worsened due to increased mining activity. Specific monitoring of water quality parameters related to pollution from gold panning is implemented but focuses only on turbidity, as the measurement of heavy metals is not possible to carry out in Mozambique, and having samples analysed abroad would be excessively costly. FIPAG and ARA-Centro coincidentally do measurements of heavy metals, but information is not shared. ARA-Centro (and DNGRH) increased the dissemination of water quality reports to inform policy makers and stakeholders generating discussions on all levels.

The Trans-boundary Gold Panning Management and Mitigation Strategy for the Pungwe River basin was concluded in 2012. It was a very extensive document with a great deal of information about the areas affected by the gold panning and a clear strategy. The initiative of PP2 to develop and disseminate this strategy contributed to increased awareness about the impact of gold panning on water resources amongst the key governmental institutions via the joint consultative working group and amongst other stakeholders via awareness campaigns. However, regulation and monitoring of mining activities are the responsibilities of the national government and implemented through the Ministry of Land Use and Environment (MITADER), the Ministry of Mineral Resources (MRN) and the provincial directorates. As such it could have had more impact if these ministries had been more involved in the process because they possess the legal instruments and enforcement means to intervene.

Following the recommendations in that strategy, alternative technologies were promoted through four demonstration projects and the gold mining associations were trained on operation and maintenance. During the team's field visits it was observed that all equipment of one of the projects was vandalized and in one case the installed pump was not well designed (too small) but working. In general the major challenges for the introduction of new technologies were the acceptance of the new technology by the gold panners and the poor organization (leadership, finance and integrity) of the associations.

Through the SGF two projects were funded for alternative livelihood opportunities involving fishponds and irrigation schemes. Mainly the wives of the gold panners were involved in the projects and it was seen as an additional income rather than a substitute, because gold panning is far more lucrative. Moreover gold panners were highly mobile and tend to follow the 'gold rush' moving from one site to another

making it difficult to settle and farm. These projects were not included in the field visits, and their effects could therefore not be assessed.

The Pilot Basin Mining Centre was not established. In the MTR (2012) it was mentioned that this was out of the scope of ARA-Centro and no further reference was made to this activity in any of the reports.

Gold panning management and mitigation is an on-going process where much work was done over the last years by ARA-Centro, MITADER and MNR to organize and regulate the mining activities. It is difficult to say to what extent PP2 has contributed to that work because decisions took place outside the framework of PP2. Nevertheless gold panning is on the increase due to higher remuneration as compared to other economic activities in the region. This is being fuelled further by high unemployment and lucrative prices on the gold market.

During interviews it was stated by ARA-Centro and by interviewees at the provincial and national levels that it was very challenging to include and convince the bigger mining companies to change procedures. They do not show up at meetings or send representatives and are not very sensitive towards (local) authorities. The issue is nevertheless on the agenda of the government of Mozambique. According to DNGRH, the President of the Republic ordered the provincial directorates in Manica Province to be more strict and rigorous with interventions during his visit in November 2017.

Conclusions

The development of the gold mining strategy through PP2 increased awareness about the impact on water resources on governmental level and with local stakeholders. Sustainable technologies and alternative livelihoods were promoted for small scale mining groups. Moreover several interventions were done in the past years by various authorities to control and regulate gold mining that were not directly related to PP2. Nevertheless gold panning activities increased due to the attractive gold prices on the market with increased water pollution as a result. Although they are continuously addressed, the big mining companies are not sensitive to any authority and difficult to convince to change their way of working.

Developments regarding the regulation and monitoring of mining companies and gold panning associations are actually led by the national government and implemented through the ministries of land use and environment and mineral resources. This also has been recognized in the MTR and stated in the annual progress reports. PP2 could have had more impact if the involved ministries would have had more formal/leading role in the process because they have more authority and legal instruments (licenses and concessions) and means (police force) to intervene than ARA-Centro.

2.2.3.3 Flood and drought warning and mitigation

Outcome assessment questions

1. Have relevant mechanisms and capacities for effective drought preparedness, flood warning and flood mitigation been improved?
2. Has this improvement reduced the number of people, property, economic activities and ecological systems affected negatively from floods and droughts?

Introduction

At the time of the 2011 MTR the component had not been initiated, with the exception of the drafting of a Flood Management Strategy & Drought Contingency Plan, and the MTR cited that insufficient funds were the main reason for that fact. In the extension proposal from 2013 the component was mainly placed under the institutional component, while annual joint monitoring of floods was placed under the regional cooperation component. The objective of the component was to develop and implement information systems for monitoring and modelling floods and droughts, build capacity of ARA-Centro to disseminate and cooperate with the many institutions involved in disaster preparedness and mitigation in Mozambique, and issue timely warnings to communities.

Review

By 2013 the Pungwe Basin Flood and Drought Warning and Mitigation Strategy was drafted and an improved flood monitoring network was developed in both Mozambique and Zimbabwe as described under the Information and Communication Component (2.2.3). Capacity was strengthened at ARA-Centro and ZINWA-Save for the installation, operation and maintenance of hydrometric equipment, while more accurate flow measurements were made possible by the procurement of acoustic doppler current profilers. One staff member of ARA-Centro received training in flood risk mapping (as part of his MSc research project).

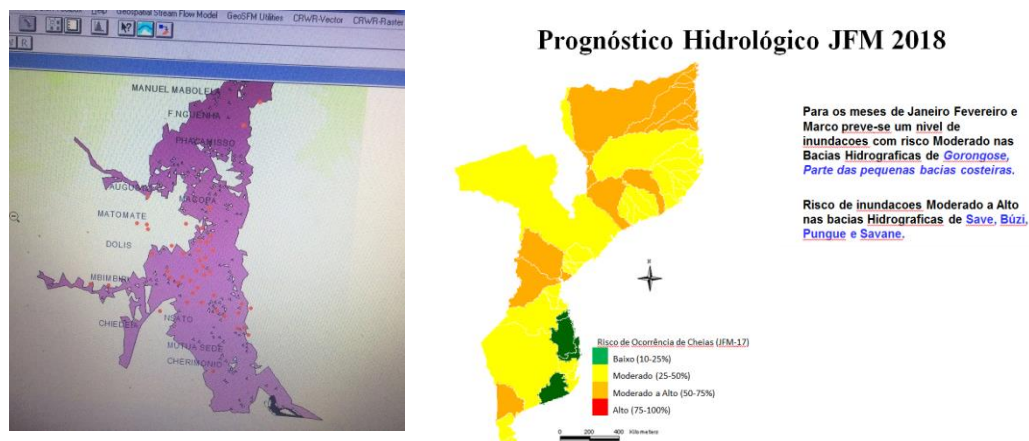
By 2014 flood forecasting at ARA-Centro and ZINWA-Save had improved following the installation of real time data loggers and the training of staff in flood forecasting. Coordination and exchange of information among key departments involved in flood management improved partly due to the bi-annual pre- and post-seasonal meetings held between the two countries. Internally in Mozambique post-flood season evaluations are also organised involving main stakeholders such as MITADER and INGC.

ARA-Centro staff organised frequent radio programmes to raise awareness on seasonal forecast and to alert the public and private institutions, as well as the communities on the likelihood of flooding.

A simple GIS-based flood forecasting model using the DNGRH open source Geospatial Stream Flow Model (GeoSFM) was developed for the Pungwe basin. The main input into the model is rainfall forecasts. The main output is flow magnitude for the given rainfall estimates. The model was calibrated and run. Five staff members of

ARA-Centro received training and are capable of using GeoSFM. DNGRH is currently considering what model to promote in the future. ARA Zambeze is using Mike 11, which has a high license fee. The choice of model is important for sustainability, as demonstrated by the Hydstra database also promoted by DNGRH, which is currently non-operational.

Figure 5: Screen dump from GeoSFM model at ARA-Centro, Beira and Flood Risk Map for 2018



By 2016 flood risk maps were produced with GIS and daily hydrological bulletins circulated to key flood management institutions during the rainy season (Figure 5).

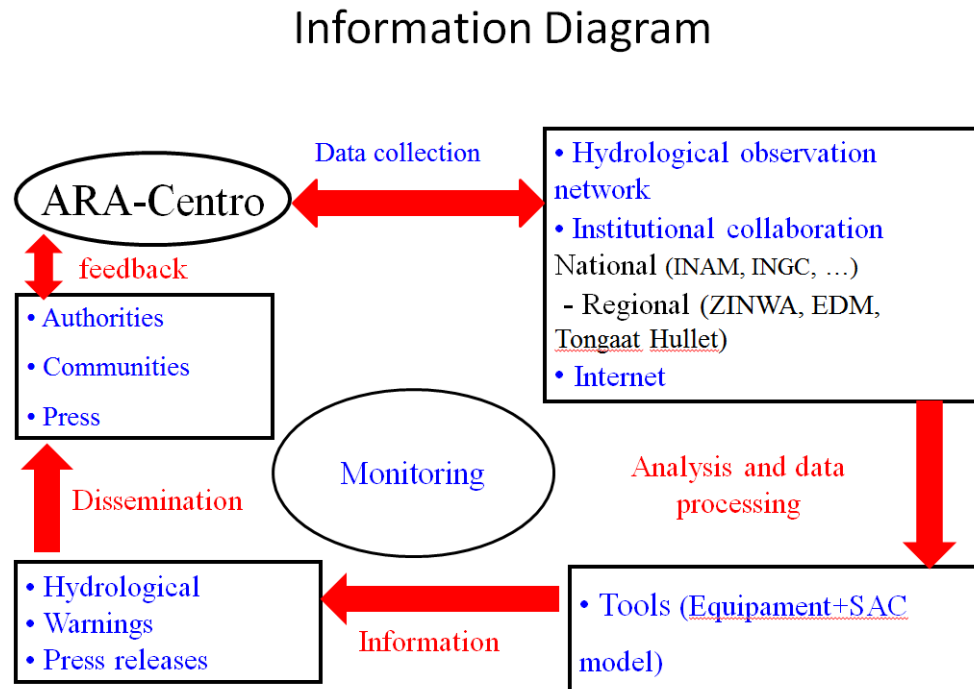
ARA-Centro with the support from the Dutch Waterboard plans to organize a dedicated modelling room at their head office in Beira. ARA-Centro also has plans to develop similar flood and drought warning and mitigation strategies for Buzi and Save as has been developed for Pungwe. During flood situations a dedicated working group is established in ARA-Centro and works in close partnership with the DNGRH Flood and Drought unit.

The dissemination system seems to be working well. ARA-Centro sends out press releases (four press releases were sent out in 2017) when predefined alert levels are reached providing recommendations for the affected district governments. Information is also transmitted to relevant provincial governments when the basins reach alert levels, for provincial governments to disseminate to district level and if relevant translate it to local languages. In order to swiftly reach stakeholders at district level and in Zimbabwe, a photo is taken of the first page of the hydrological bulletin and social media (WhatsApp) is used to disseminate warnings including flooding maps. The use of WhatsApp has substantially improved the speed and coverage with which warnings can be disseminated. INGC is also briefed using WhatsApp and evacuation decisions are made by INGC based on the information received from ARA-Centro.

The BUPUSA website was also used for this purpose, but is not operational after the failure of ARA-Centro to pay the website fee after the conclusion of PP2. Also,

ARA-Centro's dissemination system aimed at individual targets groups were inadequate.

Figure 6: Diagram of the dissemination process and information flux (Source: ARA-Centro Contin-gency Plan 2017-18, power point presentation)



Droughts had not been an issue during the PP2 implementation period in the Pungwe basin and ARA-Centro has not issued any warnings. However, there are no major reservoirs in the basin that could serve as structural mitigation measure for a possible future drought situation. ARA-Centro is currently not carrying out drought management planning and monitoring, but based on the 2017 drought situation affecting the southern part of Mozambique and especially the water supply to Maputo city, ARA-Centro is planning to initiate this.

INGC is the coordinating institution for the Disaster Risk Committee at provincial level, which is chaired by the provincial governor. It has the responsibility for compiling statistics on the effects of floods after each rainy season in the province. DNGRH then compiles the information received from all provinces into one national report. Since the start of PP2 there has only been one major flooding event occurring in 2012/13 in Pungwe and Buzi basins. ARA-Centro is advocating with other governmental institutions for the inclusion of comprehensive datasets in the report covering these areas:

- Roads (ANE)
- Agriculture (Provincial Department for Agriculture)
- Lost lives and personnel damage (INGC)
- Infrastructure (Provincial Department for Public Works)
- Health infrastructure (Provincial Department for Health)
- School infrastructure (Provincial Department for Education)

Part of the PP2 proposal (2006) was to implement structural flood mitigation measures in the form of multi safety platforms. This was not included in the extension proposal and it falls under the responsibility of INGC, with support from ARA-Centro in terms of defining suitable locations. ARA-Centro also provides advice on a project to identify suitable evacuation routes together with INGC.

ARA-Centro has not quantified the reduction of people vulnerable to floods and/or droughts as a consequence of the activities of PP2. Also, no efforts have been made to quantify the effect of increased awareness due to improved means and speed of dissemination of information and issuing of warnings.

Conclusion

Overall the component outcome has been achieved. Flood management is largely operational, which can be considered a major achievement of the Programme via investments in capacity building of ARA staff and improvement of the hydromet network. As a result of the Programme transboundary cooperation and communication on flood management has improved, and so has the capacity of ARA-Centro to interact with the main stakeholders. Warnings are issued in a timely fashion and by the use of adequate means of communication reaching the target groups.

PP2 or ARA-Centro have not substantially addressed drought management other than via the drafting of the strategy. ARA-Centro is aware of this and has plans to address drought management specifically.

The effects of flood and droughts and of improved management are not fully captured by ARA-Centro, which is mainly due to the lack of adequate data collection by other sector institutions. ARA-Centro is advocating for improved data collection by all stakeholders in order to improve evaluation and learning from flood and drought events, and to assess the adequacy of management approaches and mitigation strategies.

2.2.3.4 Integrated water and land use development strategy

Outcome assessment question

Have integrated water resource management and appropriate land use practices to support economically and environmentally sustainable development in the Pungwe basin been effectively promoted?

Introduction

Agriculture is critical both for Zimbabwe and Mozambique. The growth of large- and small-scale agriculture in the Pungwe basin is anticipated to be a primary area of future investment and development. Although water balance analysis from PP1

indicated that water in the basin is sufficient for present and expanded levels of irrigation, in a longer-term perspective unregulated use would constrain water supply.

Therefore in PP2 the development of an integrated and strategic approach to water resources use, irrigation development and land use in the basin was planned, linking the various agricultural sector initiatives and actors with the key IWRM and environmental agencies. In addition, the intention was to optimize both economic and environmentally sustainable uses of water for agriculture and related developments.

The significance of both water rights and land tenure is critical not only for effective and sustainable resource use and management, but also for poverty and inequality reduction. In most government and donor policy and institutional frameworks, water and land rights issues are dealt with separately and yet their relationship to one another is crucial.

Review

The Integrated Water and Land Use Strategy (IWLUS) was completed in 2010, key institutions responsible for Water and Land Use issues in the basin from both Zimbabwe and Mozambique were consulted and their views were taken into consideration during the formulation of that strategy.

For the effective coordination of the IWLUS the establishment of a Pungwe Development Agency was suggested. It has been obvious though that the establishment of such an agency would go beyond the competence and capacity of ARA-Centro, since other governmental actors such as agriculture, land use and environment, would need to be involved as was suggested in the 2011 MTR.

According to the APR 2012, some training of staff of ARA-Centro and ZINWA-Save and stakeholders through secondment and hands-on approach was provided, contributing to increased capacity in ARA-Centro and ZINWA-Save to update and implement the strategy. Some of the concepts of IWLUS have been applied in the development of the SGF projects (APR 2013).

In practice it seems that, despite the extensive fieldwork, interesting discussions and the comprehensive strategy report, the IWLUS was not used or implemented. During interviews with ARA-Centro and representatives from the districts and province the strategy was referred to as ‘another report for the shelf’. A main problem was, as mentioned, that key institutions were not involved in the development of the strategy, including the Provincial Department of Land Use and Environment (DPTADER) and the Provincial Department of Mineral Resources (DPRM).

Conclusion

In PP2 a comprehensive, integrated water and land use strategy (for each side of the basin) has been elaborated involving most of the stakeholders. The IWLUS was to

some extent disseminated but there were no effective coordination mechanisms established for promoting and monitoring sustainable water and land use in the basin.

The coordination and monitoring of water and land use development is extremely complicated because of the large number of sector institutions involved at all levels. Technically the IWLUS might be well prepared but the elaboration, dissemination and implementation process have not included more formal political/institutional steps to get the right solution and guaranteed support for a coordination mechanism. The promotion of water and land use goes well beyond ARA-Centro's mandate as well as its competence and capacity. Other governmental institutions would have had to be invited to take the lead.

2.2.3.5 Environmental flows strategy

Outcome assessment question

Has a strategy and have practical actions been develop for monitoring and preservation of environmental flows into the Gorongosa National Park and Lake Urema?

Introduction

With Gorongosa National Park and Lake Urema being a critical resource for wildlife, nature and tourist development in the Pungwe basin with national as well as local economic significance, the need of carefully managing water flows into and out of the park and the lake is evident. At present there is no specific quantification of the environmental flows through the Gorongosa National Park and into the floodplain to ensure ecosystem viability and sustainability.

Review and conclusions

The strategy and action plan for monitoring and preserving environmental flows in Gorongosa Park and Lake Urema was developed together with an assessment of land use practices on Gorongosa Mountain. However, by 2012 the project was downsized and terminated.

The *environmental flow requirement study* was not implemented due to insufficiency of funds under PP2 to finance the study which represented a substantial cost. The MTR also noted that the intended design did not take into consideration institutional and legal limitations, which would have jeopardized the monitoring. It should also be noted at the time of the 2011 MTR the hydrological information available to ARA-Centro based on its hydromet network was not adequate to produce sound recommendations on environmental flows, which could justify the decisions at the time to terminate the project.

Since the environmental flows constituted a key aspect of the bilateral agreement between Mozambique and Zimbabwe the termination of the project has narrowed the

achievement of PP2. Therefore the Programme tried to identify other interested partners to support the study. This has to date not materialized in a study but IUCN provided training in 2015 to 14 staff members from Mozambique and Zimbabwe on how to incorporate environmental flows in the bilateral agreement. IUCN also agreed to provide resources for a pilot project in the Pungwe basin for the estimation of environmental flows.

While the project allowed for improved communication and understanding between ARA-Centro and Gorongosa National Park the armed conflict made the area insecure to work in between 2013 and 2017

2.2.4 Regional cooperation

Outcome assessment question

Has the collaboration between the two countries and different stakeholders been sustainably developed, and has it been effective in fulfilling the overall objective of the programme?

Introduction

The focus of the regional cooperation has been on the process of establishing and entering into an agreement between the two countries. Specific IWRM elements in the agreement (e.g. water monitoring and environmental concerns) are dealt with under other headings in this report.

Review

In 2004 the governments of Mozambique and Zimbabwe established a Joint Water Commission (JWC) for the joint management of water resources in the shared basins. Following negotiations in 2012 comprising numerous revisions to previous drafts of the agreement, the two ministers responsible for water resources management signed the Pungwe Water Sharing Agreement on 11 July 2016 in Chimoio, Mozambique. The overall purpose of the Agreement was to secure peace, promote economic growth, and perform effective IWRM practices, including the tackling of pollution for the benefit of the basin's population.

An important aspect of the agreement has been to ensure effective sharing of knowledge between the two main institutions, ARA-Centro and ZINWA-Save. The two countries have become more open to sharing information and this has contributed to reducing the impact of extreme events. A legal instrument within the bilateral agreement has now been put in place to ensure that countries comply. Sharing data is a key component of management of shared river basins.

The process towards signing the agreement was long, as negotiations took place at top political levels, involving approvals of different versions of the agreement by the Council of Ministers in Mozambique and the Cabinet Committee on Legislation by

the Government of Zimbabwe. With the signing of the agreement the co-operation between the two countries in the management of water resources has been significantly enhanced.

A small coordination unit with a secretariat is planned and it will be tasked with the responsibility of advising the JWC on monitoring compliance, planning, and development of infrastructure in order to optimise the benefits while promoting mutually interdependent institutional frameworks. In line with IWRM principles, stakeholders in the basin are expected to play a significant role in regional cooperation. This includes a common oversight committee for the implementation of the agreement and the establishment of transboundary stakeholder forums. These forums will provide platforms for exchange of ideas and managing conflicts.

The idea is that the secretariat would gradually grow into a fully-fledged organisation as the demand for the services grows. A technical and financial proposal for support was submitted to Sida for consideration in early 2017 but was rejected as PP2 was drawing to an end. It appears that the German GIZ via the SADC Water Division is willing to take up – over a period of two years – support to partly establish the secretariat, as well as further the development of the BUPUSA project.

Conclusion

The regional cooperation component has been successful in that the Joint Water Sharing Agreement signed by the two countries in July 2016 was the final outcome of the component. With the agreement in place and the steps taken by the GIZ to support the institutional set up for the implementation of the agreement the achievements of PP2 can be sustained and developed further. This will be the basis upon which the valued indicators will be defined. At the national level there was much praise for the efforts made by PP2 in making this agreement a reality. The overall conclusion is that the regional cooperation component could probably be considered the most successful outcome of PP2.

2.3 SUSTAINABILITY

Outcome assessment questions

1. Will the benefits produced by the programme be maintained after the cessation of the programme? Are exit strategies developed?
2. Has local ownership been built through participation and supported by partner government entities?

Introduction

The assessment of sustainability encompasses not only the financial sustainability of ARA-Centro, but equally institutional and environmental sustainability. The latter two aspects are discussed in section 2.2, as is the issue of ownership of Programme

processes and results by stakeholder and beneficiary groups. In this section we assess the financial sustainability and government support to the ARA-Centro, and provide a summary of the assessment of institutional and environmental sustainability.

Review

As can be seen from Table 11 the main budget lines of the ARA-Centro are: (i) staff costs (mainly salaries), (ii) investments in new infrastructure and equipment, including replacement of equipment, and (iii) water fees collected from its clients. In addition to these PP2 provided additional funding for training and capacity building and equipment and transportation supply. The annual contribution of PP2 amounted to MZN 20-25 million over the period 2012-2016.

Table 11. Budget and Actual for ARA-Centro 2012-2017 (in million MZN; Source: ARA-Centro, Nov 2017)

	2012		2013		2014		2015		2016		2017	
	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual
Salaries	10.7	10.7	6.5	6.5	12.1	12.1	8.8	8.8	7.8	7.3	8.8	5.9
Investments	13.8	13.8	2.5	2.5	1.0	1.0	9.5	9.5	12.3	4.2	13.1	0
Fees	5.2	5.2	6.1	6.1	3.6	3.3	6.7	6.0	6.6	6.2	5.0	4.1
PP2	26.0	26.0	25.6	25.6	27.9	21.2	25.0	20.5	43.7	29.2	14.5	0
Total	55.6	55.6	40.7	40.7	44.4	37.6	45.8	44.8	71.4	46.9	41.5	10.0

The following observations can be made:

Salaries: They have fluctuated significantly since 2012, from approx. MZN 6.5 million in 2013, MZN 12 million in 2014 to MZN 8.8 MZN in 2015. These fluctuations do not correspond to the number of staff employed. In 2013 a total of 34 staff were employed, of which 24 were at the management and mid-levels. In 2015 the total number of staff was 31, of which 24 were at the management and mid-levels. This discrepancy in salary-staff ratio suggests a flawed salary scheme, but no explanations was provided. It appears that the salary restructuring scheme initiated in 2015 has not been satisfactorily solved and may relate to the demotivation of staff of ARA-Centro, yet this was not clear. A Staff Retention Strategy was developed but was not implemented.

In Zimbabwe the Board of ZINWA-Save has clear guidelines for staff schemes and as such is not subject to any arbitrariness, as could be the case of ARA-Centro.

Investment: The investment budget allocated from government sources has also differed significantly over the years. However, what ARA-Centro has requested for investments has mostly been granted it, including for purchasing new and for replacing old equipment. Due in part to the financial crisis affecting Mozambique, this has not been the case in 2016 and 2017 though.

Fee collection: The fee budget has partly been based on ARA-Centro's capacity to collect fees. This indicates that ARA-Centro would be able to increase this component of the budget if it managed to improve its fee collection practices.

However, despite significant capacity and equipment support provided to ARA-Centro, the overall fee collection amount *has not improved since 2012*, despite the increase in the number of clients from 35 in 2012 to 50 in 2017. FIPAG and the Sugar Estate are the two largest fee-paying clients.

The 2016 APR presents the revenue collected by ARA-Centro from its water users from 2009 to 2016 (Table 12). There are significant discrepancies between the data collected by the team during field mission (cf. Table 11) and the data in the 2016 APR. This suggests that ARA-Centro has faced, and continues to face challenges in the financial management and reporting of its operations and revenue collection, which in turn may be related to issues of inadequate systems and staffing.

Table 12. Revenue collected by ARA-Centro from the users from 2009 to 2016 (Source: APR 2016, p.50)

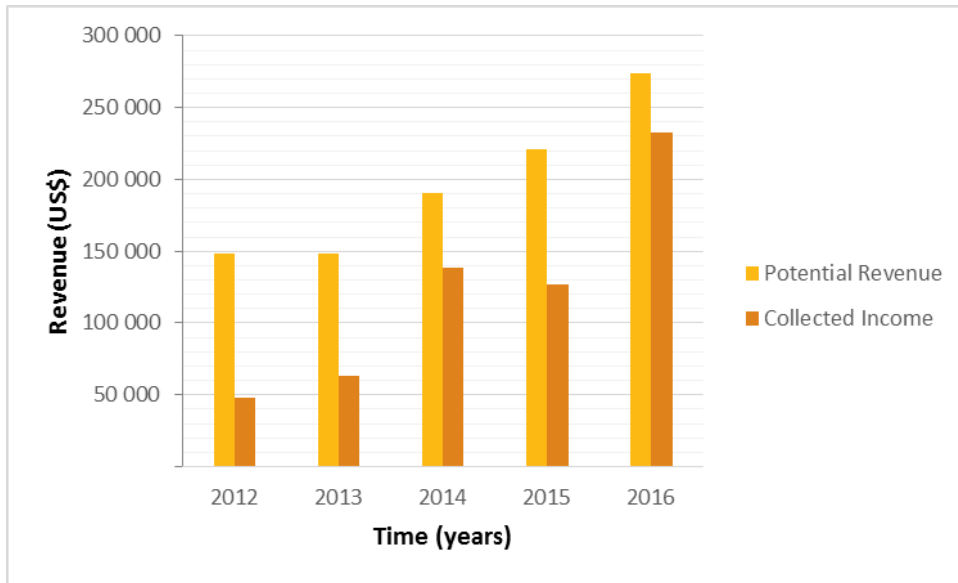
YEAR	No. of USERS	REVENUE (MZN)
2009	15	2,130,406
2010	20	3,138,651
2011	25	3,965,729
2012	35	6,926,899
2013	38	4,976,551
2014	38	4,886,362
2015	38	6,644,229
2016	50	4,776,420

The APRs mention three main reasons for the low revenue collection by ARA-Centro, namely:

- Unwillingness to pay for water use, in part due to low water quality
- Low and unsustainable water tariffs fees
- Little development of water infrastructure in the basin

Contrary to ARA-Centro, ZINWA-Save has increased its revenue significantly. In 2016 the sub catchment collected USD 232,276, which was an increase of 380% relative to 2012 (Figure 7). However, there are still illegal abstractions in the Pungwe sub-catchment and ZINWA-Save has now procured an all-terrain vehicle (yet to be delivered as of November 2017) to access all permit holders in the sub-catchment. It has secured a place to construct its permanent offices.

Figure 7. Pungwe Sub catchment Council Revenue Progression



While PP2 did not prepare a clear *exit strategy*, the closure of the Programme was a recurrent dialogue issue in the last two years of implementation. Numerous ideas and requests were tabled, discussed and integrated into the agreed minutes, agreement extensions, etc. An investor conference was planned for the final stage of the Programme (in early 2017) for private and other interested parties to invest through for example public-private partnerships and building on the benefits from PP2. However, the conference was cancelled as it was considered unrealistic for Sida to organise a useful event within the limited time available. Instead, Sida commissioned a monitoring consultant that had followed PP2 implementation to assist the parties in the preparation of a concept note to attract financing from different sources.

Several water infrastructure projects are in the near completion stage, including several dam constructions (e.g. Nhacangara Dam and Gorongosa Dam). They will enable an increase in water supply and consequently increase the potential revenue for ARA-Centro from selling raw water, which could be positive for its financial sustainability.

A clear strategy to combat water pollution has not been developed, adopted and implemented, which could compromise the long-term sustainability of the environmental component of PP2. The Programme has contributed to putting in place sufficient capacity to implement such a strategy, but ARA-Centro and ZINWA-Save need to have an adequately sized budget for monitoring, especially with regard to water quality. Otherwise data collection will be compromised and the equipment acquired will be rendered useless.

The reduction of the environmental flow component and subsequent cancellation of the determination study and subsequent monitoring was a limitation to PP2. The environmental sustainability of the lower part of the basin due to over exploration

will be at risk in the long-term if environmental flows are not quantified and subsequently monitored, regulated and considered in water allocation decisions.

For ARA-Centro to become institutionally sustainable it will require a significant change in terms of staff motivation, so that mandated tasks and responsibilities are adhered to. Distrust between staff and management also needs to be reduced. Overall, mechanisms that can facilitate improved working conditions are crucial for a sustained performance of ARA-Centro. Attention to staff performance and satisfaction, and equipment maintenance at the decentralised level is particularly important given the delegation of critical functions to that level, notably the collection of fees and contacts with clients.. Only with a strong ARA-Centro will it be possible to strengthen local ownership by stakeholder groups in the committees and sub-councils, as well as by the beneficiaries.

As discussed in section 2.2.2.3 the SGF projects face some challenges regarding their sustainability. The main challenge is that the associations do not have a clear plan for maintenance, repair and expansion. At the same time, issues are solved at the spot and the associations are restarting by themselves after the difficult period of insecurity in the region. Remoteness and lack of trust have prevented associations to access bank services, which has constrained financial management and sustainability.

Conclusion

From the above it may be concluded that if ARA-Centro were able to utilise the strengthened capacity developed during PP2 to collect fees more efficiently and effectively, it would probably be able to mobilise the necessary resources for carrying out its mandate and improve water resources management. Of particular importance for sustainability will be the ability to collect fees from the sale of raw water from the dams under constructions. In Zimbabwe, the capacity developed has already helped the sub catchment in terms of revenue collection.

Barriers to sustainability for ARA-Centro include the continuous instability of the staff situation and the extent to which the current financial crisis in Mozambique will impact on the overall budget allocation to ARA-Centro from the national government. For example, ARA-Centro may not be able to retain the fee it collects, as has been the practice so far, but instead be required to transfer it to the central government.

2.4 IMPACT

Introduction

According to Sida's Evaluation Manual (2007, p. 32-36) the word impact has several meanings and is applied as such in Sida evaluation contexts, i.e. addressing the totality of effects brought about by an intervention or more narrowly to the effects in the longer term on societies, communities or systems. For the purpose of this review

impact was defined as the positive changes in the structures of the Mozambique and Zimbabwe governments and other stakeholders of PP2, which the Programme has contributed to, i.e. a user-oriented approach. While some components were not implemented causing lack of results the evaluation approach regarding impact has been to focus on what was actually implemented during the PP2 duration. In that regard the team did not identify noteworthy negative impacts apart from the implementation delay at the initial stages of the programme.

Review

The result from assessment of the PP2 components suggests that the following positive impacts were generated:

- (i) Elements of PP2 were integrated into the Action Plan of the Mozambican Water Sector for the Implementation of the Sustainable Development Goals 2015-2030, such as increased storage capacity, prevention and mitigation of extreme events, improve coverage of the monitoring network, international cooperation and institutional development.
- (ii) The involvement of the District Services of Economic Activities (SDAE) in the implementation of the SGF activities in Mozambique was an important contributing factor in the districts adopting the approaches and policies initiated by PP2 at the local level. Local authorities were important partners at the decentralised level for achieving the policy objectives related to increased food production and access to water.
- (iii) The increase in income and improved living conditions for many members of the associations engaged in the SGF activities suggest a positive financial and social spin-off effect that could have an impact in terms of poverty reduction. However, the data available (see Annex 4) do not yet allow full confirmation of such an impact.
- (iv) While not entirely documented, all stakeholders of PP2 consulted for this review recognised that the approach of the Programme to solving potential water conflicts by ‘walking the problem’ of ensuring face-to-face meetings, often through the exchange visits, was effective – and that this recognition is guiding ‘conflict’ aspects at local levels in the future.
- (v) International donors have made use of the PP2 products, including the World Bank using the feasibility studies.

Conclusion

Positive impacts were observed that can be related to the results of PP2 interventions, including effects from the application of policies at both local and national levels. Although not fully documented, one may also conclude that PP2 SGF activities have

had an effect in terms of poverty reduction and mitigation of water-related conflicts. Moreover, some of the PP2 products have been used by international donors in their programmes and projects in the region, which might have other spin-off effects in the future.

While acknowledging that some positive impacts are observable, other positive impacts could have been expected considering the size and duration of the PP2 support, notably the fact that PP2 was carried out over a period of 10 years. For example one could have justifiably expected improvements in fee collection structures and monitoring systems, which did not materialise. As such it is concluded that the overall impact fell somewhat short of what could have been expected.

2.5 EFFICIENCY

Introduction

For the purpose of this review the efficiency criterion focuses to how the PP2 inputs have been used for achieving the Programme objectives. In line with the ToR, the assessment comprised: (i) the national flow of finance, (ii) the performance of the Programme Support Unit (PSU) and (iii) the performance monitoring of the Programme.

Review

(i) National flow of finances

The channelling of Sida funds through the national financial system of the government of Mozambique did not generally cause serious implementation delays of PP2 activities. However, in particular situations funds were delayed and obstructed implementation of training events and the delivery of equipment.

According to the Director of ARA-Centro funds from Sida were transferred to the Treasury (Ministry of Finance) via the Central Bank of Mozambique, and subsequently disbursed via the provincial financial system to ARA-Centro.

An issue that emerged as regards the timely distribution of funds included the formal confirmation by Treasury of funds available for PP2 activities at the end of a calendar year (Jan-Dec) and presented in January the following year. Delays in the communication concerning the availability of funds between the Central Bank and Treasury caused delays in the release of funds for Programme activities. This problem was frequent at the beginning of the Programme, but was later solved with the intervention of Sida.

Another issue that caused delay in fund distribution to PP2 activities included the discrepancy of the financial systems set-up between PP2 and the government structure, particularly with respect to different budget lines and the lack of alignment

between the two systems. For example, the official systems operated with ‘small goods’ and ‘large goods’ which was not the case for the Programme. This caused lengthy discussions between PP2 and the provincial finance department. This resulted in delays in Programme implementation, as an alignment was mandatory for funds to be released. The alignment process was time consuming, involving complicated approval procedures at provincial (and national) levels. Starting in 2014, meetings were held at the end of each year between ARA-Centro, the Finance Department in the province and Treasury to ensure that funds were released on time.

In late 2010 Sida suspended the disbursement of funds to PP2 through the national funding system due to irregularities exposed in ARA-Centro in a system-based audit. This particular incident added to the delays and uncertainties in the implementation of Programme activities.

(ii) Performance of PSU

The PSU was located in the same offices as ARA-Centro, and although its primary task was to facilitate programme implementation and coordination, part of its terms of reference referred to supporting and strengthening the relevant basin institutions (especially ARA-Centro) to assume and sustain their respective roles and responsibilities with regard to IWRM.

In order to stimulate ownership and sustainability during programme implementation it was expected that both partner institutions (i.e. ARA-Centro and ZINWA-Save) would play a more prominent role. The PSU, in line with the Programme Document, would act as a resource framework, yet the PSU became a crucial actor in the actual implementation of PP2, more so given the low motivation levels of ARA-Centro staff, which impacted on ARA-Centro’s capacity to implement the Programme. A similar situation was not experienced at ZINWA-Save.

The PSU was praised for its work by all stakeholders, from ARA-Centro and ZINWA-Save to the national, provincial and district levels, for having delivered relevant services to PP2. Considering the scale and not least the complexity of PP2, the review team agrees with that appraisal. The impressive efforts by the PSU are documented in the APRs and the minutes from the PSC meetings, and involved tasks related to massive capacity building support, recruitment of service providers and consultants, procurement of equipment to the decentralised levels, financial management support, and its occasional pairing with ARA-Centro staff for capacity building purposes. This is confirmed by an assessment done by the Project Service Provider (ORGUT).

(iii) Performance monitoring

Performance monitoring has to do with how the PMC/PSU managed the measurement of progress of PP2 intervention. For that purpose the Programme made use of several instruments, including the PP2 log frame, the ARA-Centro business plan preparation document, a mid-term review and various monitoring reports, such as Sida’s Conclusion on Performance.

The log frame changed on several occasions during the course of PP2, amending outputs and indicators when justified by the PSC. A restructuring of the Programme and the log frame became evident with the initiation of the extension period in 2014. The measurement of Programme performance was weaker in terms of qualitative elements and indicators, and was more focused on the quantitative progression. A case in matter is the capacity building efforts (see section 2.2.2).

The reporting on PP2 performance progress in the APRs appeared muddled when progress was measured for both the log frame and for the ARA-Centro business plan preparation document. This provided ‘double’ information and at the same time the APRs had a chapter on ‘major highlights’. The fact that the PSU was a ‘mixed’ structure, operating as a detached unit from the general IWRM structures of ARA-Centro may have caused this type of reporting practice.

Despite improvements in log frame reporting over the years, the monitoring reports and Conclusion on Performance were not regularly submitted and varied in quality.

Furthermore, there is no doubt that the performance monitoring has not been facilitated by the budgeting and work plan procedures carried out by ARA-Centro at the national level, which have faced recurrent challenges. In a recent document commenting the PP2 budget and work plan for 2016 the following is stated:

- The links between the evaluation and work plan tables on the one hand and the budget on the other have not been made in a clear way to budget lines and items, incl. to financing from government and other sources. Neither does the budget contain information about contribution from government and other sources, for e.g. operation and maintenance.
- It was suggested during the annual review to prepare one budget version by cost type and one by activity/output. The one now proposed is a mixture of both.
- It was agreed during the annual review that a procurement plan would be submitted along with the budget proposal. This has not been included.
- It was also discussed and agreed that the work plan and the budget would be submitted along with narrative text. This has not been included.
- Some of the budget component contain lines for unforeseen costs, some not. The percentages also vary. The basis for calculation needs to be explained, as well as the procedure for accessing the budget for unforeseen costs.

Conclusion

(i) When distributing Programme funds through the official national financial system of another country flaws in and incompatibility of systems are to be expected and will cause delay in the release of funds. These problems were significant in the first years of the Programme and they influenced the activity level of PP2, such that the resulting delay eventually became one of the justifications for extending the Programme.

(ii) From the review of the individual components and CDPs it appears that the PSU as a non-decision-making body designed to provide the services requested by decision-making bodies, such as the PSC. As such it was able to organise itself in a manner that guaranteed compliance with the services requested. From this perspective the PSU has carried out its tasks in a sufficiently efficient manner.

(iii) Overall performance monitoring appeared superficial and its qualitative dimension was generally lacking. Integration of PP2 into the business plans of the two institutions should have been a key element in the management of the monitoring work. Moreover, other monitoring instruments, often relevant, provided assessments of progress but were submitted irregularly. Generally, administrative procedures related to performance monitoring, e.g. budget and work plan, appeared not to have facilitated the monitoring process.

3 Conclusions on achievements and lessons learned

This section summarises the assessment of the achievements of PP2 against the planned targets and objectives. For each of the PP2 components and projects, and OECD-DAC criterion a five-point Lickert scale has been used to quantify and compare the degrees of achievement. The resulting grades are given in Tables 13 and 14.

A narrative explanation of the grade awarded and of the main lessons learned for each component, project and OECD-DAC criterion is provided below Table 14. The scoring combines an assessment of the degree of achievement, and an assessment of the quantity and quality of the evidence supporting that assessment. Taking these two criteria together, a higher score was awarded when there was ample and robust evidence of targets and objectives having been fulfilled, whereas a lower score was given to the Programme elements that have not achieved its targets and objectives, and for which evidence of achievements is scant, mostly subjective and not possible to validate by external means.

Table 13. Degree of achievement per component/project, PP2

<i>Component / project</i>	<i>Degree of achievement, from 1 (low) to 5 (high)</i>
<i>Institutional development</i>	
1. Staff development	3,0
2. Decentralisation	4,5
3. Stakeholder participation	3,0
4. Information and communication	4,0
<i>Poverty reduction</i>	
1. Pungwe basin investment facility	1,0
2. Small-medium dam development	3,5
3. Small-scale IWRM&D fund (SGF)	4,0
<i>Environmental protection</i>	
1. Salinity control	1,0
2. Gold panning management	3,0
3. Flood and drought warning	4,0
4. Integrated water and land use	2,0
5. Environmental flows	1,0
<i>Regional cooperation</i>	5,0

Table 14. Degree of achievement per OECD-DAC evaluation criteria, PP2

<i>OECD-DAC evaluation criterion</i>	<i>Degree of achievement, from 1 (low) to 5 (high)</i>
Relevance	5,0
Effectiveness (average of scores in Table 13)	2,9
Sustainability	1,5
Impact	2,0
Efficiency	2,0

Institutional Development Component: Staff development – 3,0

While the capacity of ARA-Centro and ZINWA-Save staff has improved significantly as a results of the large capacity building support, ARA-Centro staff have underperformed and PP2 did not manage to address effectively the causes behind the underperformance, despite the steps taken to address work ethics and the lack of motivation. It is most likely that other structures external to PP2 have influenced the underperformance. Insufficient assessment and documentation of the effects of the capacity building support provided by PP2 was a significant shortcoming in the management of PP2. It would have been necessary to devise a simple results measurement system for ARA-Centro to ensure that the training represented good value for money.

Institutional Development Component: Decentralisation – 4,5

The decentralisation process was effective for implementing the water resources management policy at the lowest possible level. The training of staff combined with the procurement of necessary equipment ensured that the decentralised units (including MUPB Chimoio and the stakeholder groups) became operational. The decentralisation efforts also facilitated the engagement of local authorities. Together with the decentralised unit, local authorities will play an important role in the forthcoming support to the people of the basin now that PP2 funding has terminated.

Institutional Development Component: Stakeholder participation – 3,0

The design of PP2 focused strongly on stakeholder participation as a key prerequisite for successful implementation. Despite the creation of many stakeholder groups, efforts and focus were insufficient for mobilising and supporting vulnerable groups and women. As was the case with the staff development in ARA-Centro and ZINWA-Save, the lack of assessing and documenting the impacts of the capacity building support provided to those stakeholder groups was an important limitation to understanding the broader effects within this component. ARA-Centro and ZINWA-Save supported a ‘face-to-face’ approach to resolving water resources conflicts in the basin, something that was regarded by most stakeholders as very useful and successful.

Institutional Development Component: Information and communication – 3,5

There seems to have been a main focus on improving the surface water network which is justifiable given the importance of surface water resources. However, not enough effort has been invested into improving the water quality network, with possible detrimental effects particularly on ARA-Centro’s capacity to manage the environmental sustainability of the basins. It may be argued that despite the low production of the Pungwe basin aquifers, more attention could have been paid to improving the groundwater monitoring network

Poverty Reduction Component: Pungwe Basin Investment Facility – 1,0

Since ARA-Centro was to be the responsible body for the management of the Investment Facility, the decision not to proceed with the setting-up and implementation of the fund appeared correct. At the time ARA-Centro presented a number of important weaknesses and the likelihood of it not being able to manage the fund satisfactorily was high. Moreover, there was no clarity about the viability of large-scale commercial water infrastructure projects. Even with the complete outsourcing of the management of the Facility, ARA-Centro would still have been required to perform important monitoring functions and quality assessments, for which it lacked capacity. PP2 subsequently prioritised the small-scale grant fund activities to 'compensate' for the cancellation of this pro-poor facility.

Poverty Reduction Component: Small-medium dam development – 3,5

For the elaboration of the SMDD Strategy a very practical approach was chosen, which facilitated the inclusion of the strategy in the district and national planning process. Options for funding were defined, but it is still necessary to conduct a feasibility study for each of the dams in order to attract funding for dam construction. The realisation of such studies could have been included in PP2 to facilitate for the government of Mozambique to attract funders and investors.

Poverty Reduction Component: Small-scale IWRM&D grant fund (SGF) – 4,0

While women were *specifically* addressed in the fund design (article 7 in standard MoUs for the SGF beneficiaries) only few benefits were observed and the women's role in the decision-making bodies remained unclear. Notwithstanding those facts, the support to the construction of irrigation schemes facilitated a pro-poor approach that led to tangible results, such as increased income and agricultural production, which in turn strengthened women's capacity to pay for social services (e.g. school fees). The success of the support benefitted from the districts' engagement in extension services to farmers, as well as by a dynamic market with good prices for agriculture products. Support to irrigation projects with immediate benefits for the farmers comprised a relatively small part of PP2. The armed conflict affected Programme implementation and limited the success of some of the projects.

Environmental Protection component: Salinity control – 1,0

The cost of the salinity control construction was underestimated in the PP2 budget. The movement of the intake for drinking water was already foreseen in the project proposal for PP2 (2006). The programme did not want to invest in the improvement of the water quality for the Sugar Estate. These considerations should have been made before the programme started, also to not raise expectations with stakeholders that could not be met afterwards. Alternatively a public-private partnership or similar scheme could have been considered.

Environmental Protection component: Gold panning management – 3,0

The gold panning strategy helped raise awareness amongst stakeholders about the environmental and social impact of gold panning. It could probably have had a greater impact if the ministries with the primary responsibility for this activity (mineral resources and/or environment) had led this project, as they could have taken more rigorous control and enforcement measures. The demonstration projects showed very practically how things worked and proved that production can increase if the activity is well operated and maintained. However, to change the gold panners either to use other technologies or to take up alternative income generating activities was a big challenge. PP2/PCU did what they could to show alternatives, but the incentives to maintain existing practices, and the magnitude of the problem proved too overwhelming for PP2 to counter.

Environmental Protection component: Flood and drought warning – 4,0 The Programme has been successful in building the necessary mechanisms and capacity for flood warning and mitigation at ARA-Centro. It is however important to strengthen the institutional arrangements, involve other stakeholders and ensure that they are also able to provide, collect and share relevant information, other than just focusing on building the capacity of the river basin organisation itself.
Environmental Protection component: Integrated water and land use development – 2,0 The IWLUS Strategy was technically sound, but did not result in the implementation of any policies or regulations. The governance structure in Mozambique could have been considered right at the start of the Programme, in order to get more support for the content of the strategy and proposed coordination mechanism. The promotion of water and land use goes well beyond ARA-Centro's mandate, competence and capacity. Other governmental institutions could have been invited to take the lead, given the cross-sectoral nature of the strategy.
Environmental Protection component: Environmental flows – 1,0 The environmental flow requirement study was downsized and terminated because support was provided by IUCN, at the same time as PP2 funds for this study were insufficient. The project appraisal for the environmental flows should have elaborated on budget institutional and legal limitations. This would have enabled for a more informed decision to be made during the design phase of the study in terms of the viability, cost and financing from other partners.
Regional cooperation – 5,0 With the successful signing of in the Joint Water Sharing Agreement in July 2016 a significant basis was established for the continuous strengthening of regional cooperation between the two countries – including the mobilisation of future GIZ support to the implementation of the Agreement and the BUPUSA project. Without the signing of the agreement it is questionable if other donor would have provided support. The success of this component also was facilitated by the efforts of the Mozambican and Zimbabwean governments.
Relevance – 5,0 It is important to have adequate and well-defined policies in place for IWRM. This is the case in both countries. Building upon the experiences and results of PP1, as well as on consultations with many stakeholders during the preparation phase, PP2 was designed in accordance with Mozambican and international policies and beneficiaries' needs. As is frequently the case, difficulties and delays arose in the implementation and enforcement of the strategies, plans and directives related to those policies.
Sustainability – 1,5 The potential fee collection from the selling of raw water from the future dams will be the key to ensuring the sustainability of ARA-Centro. Increases in fees or tariffs will be too small to have a significant impact on sustainability. The continuous instability of the staff situation at ARA-Centro and the extent to which the current financial crisis in Mozambique will impact on the overall budget allocation to ARA-Centro from the government are both factors that endanger sustainability. For example, ARA-Centro may not, as has been previous practice, be able to retain the fees it collects, and instead be requested to transfer (parts of) them to the central state administration.

Impact – 2,0

Overall impact has been less than expected, in particular when considering the fact that PP2 was carried out over a period of 10 years. An important aspect for assessing Programme impact will be the degree to which the products of PP2 will be put to use in the future. This includes policies and strategies, or concrete products such as feasibility studies and how those are used by government, international donor or others organisations.

Efficiency – 2,0

Flaws in and incompatibility of systems are to be expected and cause delay in the release of funds when national financial system are used for funding a programme of the scale of PP2. Programmes need to be integrated into the business plans of implementing institutions – and performance monitoring and reporting be based on business plans. Current monitoring procedures appear inefficient and not sufficiently systematic. ARA-Centro and ZINWA-Save could have used simplified M&E practices.

The ToR also requested the evaluation team to assess the *overall design* of PP2. From the results of the review we conclude the following:

PP2 Design

PP2 was designed as a very comprehensive programme, which is justified by the fact of IWRM including multi-sector and institutional challenges. More focus could have been placed on the core business of ARA-Centro and ZINWA-Save, emphasizing their (financial) sustainability. This would have meant fewer components and projects, each with a larger budget, leaving out the components and projects that fell under the mandate of other government organisations and focusing on institutional development (including customer service, revenue collection, water quality and quantity monitoring and control, information services and capacity building) and regional cooperation.

ARA-Centro was not the designated authority to lead the process for several of the components and projects, namely those for poverty reduction and several projects in the environmental protection component. With the current set-up it would have been an option to include other ministries as formal project partners, something that probably not have made implementation smoother. The project organisation appeared overall functional at all levels and all relevant stakeholders were involved at various degrees.

4 Recommendations

4.1.1 Recommendations for Sida

Capacity building in both the Zimbabwean and the Mozambican settings is extremely difficult for a donor, and this was particularly the case during the PP2 implementation period, when both countries underwent severe political and financial crises. Such settings reinforce the importance of defining the Programme boundaries very clearly and defining a set of realistic outcomes. In the case of PP2 the Programme has been defined very broad and expectations were very large. Against this background, the review team recommends the following:

- Sida should focus on strengthening the core business of beneficiary organisations, and not include themes that are outside their mandate or sphere of control.
- Sida should concentrate on a smaller number of activities with greater potential for impact, and combine interventions targeting the organisations' strategic mandates, capabilities and planning with investments in the implementation of concrete measures. When doing so, it is important to avoid overloading the beneficiaries' staff with additional tasks for which the organisation does not have the capacity.
- Sida should carry out a more effective monitoring and supervision of Programme implementation, using processes and tools as simple as possible for monitoring progress and measuring achievements.
- Sida should reconsider channelling funds through the national financial system of partners, given the complications and significant delays associated with such practice.

4.1.2 Recommendations for ZINWA-Save and ARA-Centro

In the current situation both ARA-Centro and ZINWA-Save depend on their own resources for carrying out their mandates, as neither donors nor the respective national governments are able or willing to provide support. While it is not impossible that this situation might change in the coming years, for the time being those two organisations should be run as a business, with a focus on public relations/marketing and efficiency, increasing income and reducing costs. Based on the findings of this review, it is recommended that:

- Both organisations, in particular ARA-Centro should prioritise human resource management, as staff is a key resource for success. Realistic approaches to improving employee performance is key, as well as improved internal communication.

- Both organisations should prioritise investments in equipment and focus on expanding and maintaining their monitoring networks, such as water quality and flood, and drought monitoring equipment.
- Both organisations should work together with other institutions to organise billing and fee collection, and to continuously update the client data.
- With respect to marketing and public relations both organisations should explain clients what they are doing and why clients are requested to pay for the services provided. This outreach should be done by skilled decentralised staff and stakeholder groups. Moreover the communication and information system should be improved by investing in new means of communication and tailoring products to the individual targets groups.
- The responsibility for support and monitoring of the current 33 SGF projects should be handed over to local government and/or civil society organisations. Close collaboration between all the parties involved should be continuously encouraged. This could include, for example, technical support for more effective agricultural practices, ensuring benefits for disadvantaged groups in the project areas, and identifying funding mechanisms, such as micro-finance.
- The responsibility for support and monitoring of the current 33 SGF projects should be handed over to local government and/or civil society organisations, while retaining the close collaboration between all the parties involved. This could include, for example, technical support for more effective agricultural practices, ensuring benefits for disadvantaged groups in the project areas, and identifying funding mechanisms, such as micro-finance
- Both organisations should reactivate and train beneficiary associations with a focus on the financial sustainability for the operation and maintenance of the projects and the increased commercialisation of the associations. The latter is an important driver in both countries, as there currently exists a local (and international) market for (contract) farming to produce fruits and vegetables.
- In both organisations any additional income should be used to expand irrigation systems and create employment for the surrounding communities. ARA-Centro and ZINWA-Save should support the associations to exploit a dynamic market. In Mozambique support could constitute a collaborative effort of ARA-Centro, through the MUPB Chimoio and the local government, through the SDEA activities. Support could also include connecting the SFG projects to relevant programmes running in parallel and supported by international donors (e.g. the World Bank) or the national governments (e.g. Maguta in Mozambique). Both organisations should coordinate and exchange information with important stakeholders with respect to possible future water scarcity, including the water utility FIPAG, the World Bank-funded agricultural projects and provincial agricultural authorities in Mozambique.

5 Baseline and values for 2020

The baseline has been developed based on the review result and recommendations. For each component, project and evaluation criterion generic indicators have been identified and baseline established for November 2017. Target values for 2020 are proposed.

Institutional Development Component: Staff development		
Indicator	Baseline value	Value 2020
Staff development plans, including the Capacity Development Strategy, Retention Strategy and HRD/M plans have been developed.	Existing strategies and plans are 'idle', not implemented or revised (ARA-Centro) Capacity Building Strategy for ZINWA-Save	Strategic staff development plans and strategies are fully updated and implemented as per available funding
Skills level of staff employed with the ARA-Centro and ZINWA-Save compared to similar ARAs/ZINWAs.	Current staff skills level and institutional functions as per November 2017	Maintenance of skills level and institutional functioning that enable for the achievement of institutional mandates Full staff compliment with positions at decentralised level filled with capacitated staff
Performance of ARA-Centro relative to its mandate.	ARA-Centro performs in a generally ineffective manner relative to its mandate.	ARA-Centro has improved its performance relative to its mandate.

Institutional Development Component: Decentralisation		
Indicator	Baseline value	Value 2020
Decentralisation of transboundary IWRM for government and other stakeholders (Chimoio, PCB, PSCC and sub-committees and councils)	Decentralized units established and functional in the Pungwe basin	Decentralised units operational as functional entities.
Collaboration on IWRM at local level (Chimoio, districts, and PCBs/PSCCs and committees/councils)	Collaboration on IWRM between decentralised units established and functional	Collaboration continued and strengthened between decentralised units on IWRM activities

Institutional Development Component: Stakeholder participation		
Indicator	Baseline value	Value 2020
Stakeholder participation in capacity building activities and exchange visits	Participation structures established and activities executed Inadequate or non-existing performance management of stakeholder participation	Participation structures and activities continued and strengthened Performance management structure established and effectively applied in Pungwe Sub-catchment Councils.
Extent of collection of data on water-related conflicts in the basin	Data on conflict resolution are not collected, registered or analysed by ARA-Centro or ZINWA-Save	Data on conflict resolution are collected, registered and analysed by ARA-Centro and ZINWA-Save facilitating improved mediation skills among decision-makers & stakeholders

Institutional Development Component: Information and communication		
Indicator	Baseline value	Value 2020
Degree to which the surface water, water quality and groundwater monitoring network fulfils WMO standards	Surface water network fulfils WMO standards, with the exception of the number of evaporation pans. Water quality and groundwater networks do not fulfil WMO standards	The surface water, water quality and groundwater monitoring network fulfil WMO standards and is maintained
Availability of water management information to managers and other stakeholders	Communication strategy developed, but not institutionalised	Communication strategy updated and institutionalised
Data management system in line with the nationally-adopted database and management platforms	Hydstra database (or other format recommended by the national line ministry) not operational	Hydstra database (or other format recommended by the national line ministry) operational
Environmental flow requirements for different reaches	Environmental flows not quantified	Environmental flows fully quantified
Guidelines for monitoring of environmental flows	Guidelines not developed	Guidelines established and used

Poverty Reduction Component: Small- and medium dam development		
Indicator	Baseline value	Value 2020
Feasibility studies elaborated for small/medium dams	0	4
Funding for x small and y medium dams secured	x=0; y=0	x>0; y≥0
x small and y medium dams constructed	x=0; y=0	x>0; y≥0

Poverty Reduction Component: Small-scale IWRM and development Fund (SGF)		
Indicator	Baseline value	Value 2020
Gender and vulnerable groups in IWRM in Pungwe basin	Gender and vulnerable issues and concerns in IWRM in the Pungwe basin inadequately addressed	Gender and vulnerable issues in IWRM in the Pungwe basin adequately addressed
Clarity of Roles and responsibilities regarding to ownership, technical assistance and operation of the SGF	For all SGF projects an MoU has been signed that clearly states the responsibility of the District Authorities and Associations.	The district authorities continue to support the local associations with technical assistance and all possible means and take measures if associations do not function well.
Degree to which all involved institutions comply with the roles and responsibilities regarding to ownership, technical assistance and operation of the SGF	Both the districts and the associations comply with the SGF MoU	Both the districts and the associations continue to comply with the SGF MoU

Environmental Protection Component: Salinity control		
Indicator	Baseline value	Value 2020
Pre-feasibility studies	1	1
Feasibility studies	0 (project cancelled)	0
Salinity control construction	0 (project cancelled)	0
Initiatives established with private sector for salinity control	0	1

Environmental Protection Component: Gold panning management		
Indicator	Baseline value	Value 2020
Monitoring of water quality parameters related to pollution from gold panning implemented	No specific monitoring points for the demonstration projects in place, only ad hoc monitoring	Monitoring impact at four demonstration projects
Strategy and action plan	1 completed	Strategy and action plan updated and implemented
Alternative technologies implemented	Four demonstration projects implemented	Four demonstration projects functioning with a spin off at another four places where alternative technologies are implemented
Funding of alternative opportunities	Two projects funded by SGF	New projects creating alternative opportunities for gold miners

Environmental Protection Component: Flood and drought warning		
Indicator	Baseline value	Value 2020
Drought contingency plan developed and implemented	Plan not developed	Plan developed and implemented
Reliable hydrological and flood forecasting models	Reliable model is operational	Reliable model is operational and used extensively
Transboundary communication implemented	Bi-annual pre- and post-seasonal meetings held between the two countries	Bi-annual pre- and post-seasonal meetings held between the two countries and protocol on exchange of data and information established
Dissemination procedures for communication products developed	Procedures for communication strategies not developed or institutionalised	Procedures for communication products and strategy prepared in close collaboration with INGC and other relevant institutions, and institutionalised
Quantification of the number of people vulnerable to floods or droughts	Number of vulnerable people in Zimbabwe quantified	Number of vulnerable people fully quantified in the entire basin

Environmental Protection Component: Integrated water and land use development		
Indicator	Baseline value	Value 2020
Comprehensive water and land use plan	One Integrated Water and Land Use Strategy in place	Integrated Water and Land Use Strategy updated and implemented
Coordination mechanism for integrated water and land use development	No coordination mechanism in place	Coordination mechanism in place and operational

Regional Cooperation Component: Regional Cooperation		
Indicator	Baseline value	Value 2020
Establishment of joint water sharing agreements as part of IWRM policies of the two countries	Joint Water Sharing Agreement signed July 2016 – implementation of Agreement initiated Establishment of a Secretariat initiated for the Pungwe, Buzi and Save basins	Progress in the implementation of the Agreement (including actions based on PP2 products) A Secretariat for the Pungwe, Buzi and Save basins fully established and operational

Relevance		
Indicator	Baseline value	Value 2020
IWRM policies and strategies	Policies and strategies for IWRM in the basin exist	Policies and strategies continue to facilitate positive IWRM development

Sustainability		
Indicator	Baseline value	Value 2020
Fee collection at ARA-Centro and ZINWA-Save	Fee collection system has not improved the revenue for ARA-Centro over the last 10 years despite increased number of clients. Average 8 years (2009-2016) 4.680.000 MZN⁷ Fee collection has improved 380% for ZINWA-Save from 2012 to 2016.	Fee collection level increased by at least three (3) per cent by November 2020 for the three-year period 2018-2020, compared to the average for the period 2009-2016, i.e. 4.820.000 MZN Fee collection improved by 25% by November 2020.
Retention of the fees collected by ARA-Centro	Fees collected are retained by ARA-Centro and included in its budget	Continued retention of the fees collected by ARA-Centro and inclusion in its budget
Functional SGF projects	Inadequate structures for maintenance, repair and expansions of SGF projects	Management and funding structures for the maintenance, repair and expansion of the SGF projects established and functional

Impact		
Indicator	Baseline value	Value 2020
Use of PP2 products by other initiatives or organisations	PP2 products integrated into the following processes: • Action Plan of the Mozambican Water Sector for the Implementation of the Sustainable Development Goals 2015-2030 • World Bank-financed feasibility studies in support of PNDRH-1 • Feasibility studies for the Tsatse, Pavua and Metuchira dams, and construction of the Gorongosa dam. • National Policy for the Development of Water Resources Management of Mozambique.	<i>NB: No specific target defined. The review in 2020 should collect evidence of the use of PP2 products in other policy and planning processes as an indicator of uptake and potential impact on broader policy decisions and practices.</i>

⁷ APR 2016 p. 50

Annex A – Terms of Reference

Terms of Reference for the evaluation of the Pungwe Basin Transboundary Integrated Water Resources Management and Development Programme (PP2)

Date: 2016-09-28

Case number:

1. Background

Sweden has supported joint management of water resources in the Pungwe River Basin since 1998, when the preparation of a project for developing an integrated water resources management strategy for Pungwe was initiated by the governments of Mozambique and Zimbabwe with Swedish assistance (PP1). The strategy was based on a monograph report on current physical, environmental, institutional and socioeconomic conditions in the basin, and on sector studies that provided the basis for different development scenarios. In addition to enhancing cooperation between the basin agencies in the two countries – ARA-Centro in Mozambique and ZINWA Save in Zimbabwe - the strategy project also covered institutional capacity development activities related to hydrological monitoring and modelling, office infrastructure, and increased stakeholder engagement and awareness.

At the same time as the strategy was being finalised in 2006, the preparation of a more comprehensive programme (PP2) that would follow and build on PP1 was initiated. The following development objective and components of PP2 were defined:

Development objective

To strengthen relevant institutions, stakeholders and systems at all appropriate levels for the joint, integrated and sustainable management of water resources in the Pungwe River Basin, and to stimulate and support appropriate development-oriented investments in the basin that contribute to poverty reduction and environmental sustainability.

Components

1. Institutional Development
2. Stakeholder Participation
3. Information and Communication Systems
4. Pungwe Basin Investment Facility
5. Critical Development Projects

PP2 was thus intended to have a focus both on institutional strengthening and support to development-oriented investments.

In order to enhance ownership and provide for more sustainable capacity building in the basin agencies, the management set-up for PP2 was made different from that of PP1. While PP1 was

largely implemented by an international consultant firm, it was decided to use an approach with a more active involvement by the basin agencies for PP2. A Project Support Unit (PSU) under the supervision of a management committee set up by ARA-Centro and ZINWA Save was put in place, with capacity to provide administrative, financial, procurement and technical support to the programme. The PSU would thus fall between a traditional external programme management unit and a situation in which programme management would be fully integrated with the existing institutions.

Implementation of PP2 started in late 2007 with an intended implementation period of 5 years. During an extension phase of three years 2014 – 2016, the programme has kept the same development objective but with the following re-defined components:

1. Institutional development with a focus on human resources and sustainability of institutions
2. Poverty reduction
3. Protection of the environment
4. Regional Cooperation

The programme is coming to a close by end of 2016, with some programme closure activities extending to end of March 2017.

Due to the original design of the evaluation there are some special procedures that need to be followed due to the length of the Sida's framework agreement for evaluation that reaches until 2017-08-31. As the final evaluation will take place in 2020 the intention is to conduct the procurement in the two following steps:

- The first step of establishing a baseline in accordance with the methodology proposed by the Consultant will be undertaken no later than December 2016.
- The second step, to be realized in 2020, can only be guaranteed if the renewed framework agreement has the same setup with one winning provider. The second phase of the evaluation will be conducted with the then current price range, enabling adjustments of the prices listed in the original call-off. It is within Sida's framework agreement for evaluation stipulated the possibility of extending the contracted party twice. The first extension period will be extended until 2018-08-31 and a second extension could enable an extension until 2020-08-31.

2. Evaluation Purpose

The purpose of this evaluation is to evaluate the results of the Swedish support to joint water resources management in the Pungwe River (PP2) basin as described above, with a focus on outcomes and impact. The evaluation will take place in two phases, starting with an inception phase to establish indicators and end-of-programme values for these indicators. The reason for this is that the actual evaluation will take place two years after the end of Swedish support. This is intended to make it possible to evaluate the sustainability and continued ownership of the programme and its

results against both the pre-programme baseline and the intermediary baseline to be established at the closure of the programme.

The purpose is also to see whether the institutions active in PP2 have the proper mandate and capacity to fulfil their mission. Another purpose is to establish to what degree poverty reduction and environmental protection has been achieved and sustained, and the impact this has had on local communities.

3. Evaluation Questions

In line with the development objective of the programme, the two overarching evaluation questions that will guide the evaluation are as follows:

1. To what extent has the programme contributed to a more sustainable management and development of the water resources and to enhanced collaboration between the two countries?
2. To what extent has the programme had an effect on poverty reduction and environmental sustainability?

The evaluation will be based on OECD-DAC principles, criteria, procedures and terminology for development evaluation. The evaluative findings in the evaluation report will thus be structured under the following criteria:

- | | | |
|----|------------------------|---|
| 1. | <u>Relevance:</u> | Has the programme conformed to the needs and priorities of stakeholders and target groups? |
| 2. | <u>Efficiency:</u> | Can the costs for the programme be justified by its results? |
| 3. | <u>Effectiveness:</u> | Has the programme achieved its objectives? |
| 4. | <u>Impact:</u> | What are the long-term effects of the programme, positive and negative, intended and unintended? |
| 5. | <u>Sustainability:</u> | Has there been a continuation or longevity of activities and results of the programme after its completion? |

The overall evaluation questions as well as the main evaluation criteria will be broken down into sub-questions by the Consultant during the inception phase, and interview guides for specific groups of interviewees will be prepared.

The following specific questions have been identified as particularly important:

- Has the Swedish support contributed to sustained poverty reduction in the Pungwe basin and what is the impact of this poverty reduction?
- Which socio-economic groups have participated in the programme and how have the different groups benefitted from programme results?
- To what extent have marginalised groups participated and how have they benefitted from programme results?
- Have women, men, girls and boys participated equally in the programme and have they benefitted equally from programme results?

- Has the Swedish support contributed to improved water quality (or reduced the deterioration of water quality) and, if so, how has this impacted the local communities and who has benefitted?
- Has the institutional capacity been sustainably enhanced and, if so, has this allowed for effective and co-creational decision making among stakeholders, as well as implementation of these decisions?
- Has the collaboration between the two countries and among different stakeholders, been sustainably developed, and has it been effective in fulfilling the overall objective of the programme?
- Has there been any replication of methods, ambitions and/or scope in other basins as a result of the programme?

Crosscutting issues central to Swedish development cooperation, including poverty alleviation, gender equality and resilience to environmental and climate change, as well as conflict sensitivity shall be considered throughout the evaluation.

Based on the evaluation findings, the Consultant will identify lessons learned and deliver recommendations to the stakeholders of the evaluation on what they see as constructive ways forward to enhance and strengthen their capacity and the sustainability of programme results. Specific recommendations to Swedish authorities in terms of project design and management shall be clearly stated.

4. Scope

The evaluation shall cover the entire original scope of PP2, including all institutions, stakeholders and partners that the programme has engaged with. The scope shall also cover the *modus operandi* with the channelling of funds through national financial systems in Mozambique, as well as the functions of the PSU.

5. Approach and Method

A key aim of the evaluation is to evaluate the **effects** of the Swedish support and the actual evaluation will therefore take place two years after the end of the programme activity period. It is, however, deemed important that the evaluation process start already before the closure of the programme. The first phase of the evaluation, the inception phase, will be conducted with a two-fold aim:

- 1) Submit a proposal to the Swedish Embassy in Addis Ababa for discussion where the scope, detailed methodology and suggested indicators are presented.
- 2) Establish the baseline values of the agreed indicators.

After two years, the evaluation team shall revisit the programme area and acquire updated values of the indicators, measured in the same manner. This will form the basis for the evaluation.

6. Stakeholder Involvement

The stakeholders in the Pungwe basin are many in number and with different interests. It is therefore of great importance that the evaluators reach out to the different stakeholders on different administrative levels to ensure a nuanced evaluation. This will also foster in-depth knowledge of the programme and its accomplishments as well as detractions.

Draft evaluation findings shall be presented to the stakeholders engaged in PP2. The final evaluation report shall also be distributed to them.

7. Evaluation Quality

The evaluation shall conform with OECD/DAC's *Quality Standards for Development Evaluation*, which provide a guide to good practice and identify key pillars needed for quality evaluations in terms of both process and end product. The evaluators shall use the OECD/DAC *Glossary of Key Terms in Evaluation*. The evaluators shall in their bid specify how quality assurance will be managed by them throughout the evaluation, including how they will handle any issues related to the time gap between the inception report and the final evaluation phase.

8. Time Schedule, Reporting and Communication

The inception phase shall have started by January 2017 and fieldwork shall be concluded by April 2017. The inception report shall be delivered to the Swedish Embassy in Addis Ababa no later than February 2017. The report will then be reviewed by the Embassy and the basin agencies, which, if deemed necessary, will engage in dialogue with the Consultant who may have to revise their proposal of indicators in order to fully capture the width and depth of the programme.

The actual evaluation will start in January 2020 and is expected to be concluded by May 2020. In order to provide an opportunity for comments and to avoid any errors of fact or misunderstandings, a preliminary version of the draft final report shall be submitted to the Embassy in Addis Ababa and the concerned stakeholders before 31 April 2020. The Consultant will then allow two weeks for comments and corrections of errors, after which the final version of the draft report will be prepared and submitted.

The final report shall be submitted to the Embassy in Addis Ababa no later than two weeks after the Embassy and the concerned stakeholder authorities, agencies and organisations have submitted their comments to the final draft report. In addition, a video or telephone conference will be arranged with the Embassy where the results will be discussed.

The final report shall be maximum 30 pages, excluding appendices and annexes. In addition, it shall contain an executive summary of maximum 5 pages. The report shall be written in English and submitted to the Embassy in Addis Ababa via e-mail. Both the draft and final versions of the report shall have been professionally proofread and edited before being sent to the Embassy.

The Consultant shall be responsible for organising meetings and interviews with relevant stakeholders. The Embassy in Addis Ababa and the PSU can assist the Consultant with contact details to key interviewees at the start of the inception phase. The Consultant shall be responsible for all travel arrangements, such as booking of tickets and hotels.

The implementing institutions , Sida HQ and the Embassy in Addis Ababa will provide the necessary background documentation.

The final version of the evaluation report shall also be communicated to the Africa Department at Sida Headquarters, and to the respective Heads of Development Cooperation at the Swedish Embassies in both Harare and Maputo.

9. Resources

The Consultant must in the offer state the amount of resources and time they need to carry out the tasks stated in these Terms of Reference. This shall cover the following:

- Amount of work days
- Fee levels of consultants
- Reimbursable costs

The costs shall be broken down between reimbursable costs and fees together with a cost ceiling for the two kinds of costs. It should also from the offer be clear what amount of time the Consultant deem necessary to spend on location in the two countries. All travel arrangements shall be the responsibility of the Consultant.

The budget ceiling for the evaluation is 1 100 000 SEK (one million one hundred thousand) in total.

10. Evaluation Team

The team of consultants shall have:

- Excellent knowledge and documented experience from the field of natural resource management, including integrated water resources management and joint river basin management.
- Good knowledge and documented experience of working with sustainable development and poverty reduction.
- Good knowledge of and documented experience of conducting evaluations, reviews and impact assessments.
- Good methodological, analytical and communication skills.
- Experience from the Southern Africa region and its frameworks for regional integration and cooperation, in particular in the area of Transboundary Water Management.
- Good command of the English and Portuguese languages.
- Knowledge and experience of working with poverty alleviation, rights and gender issues.

The team members must be independent, have no commitment with the institutions evaluated and have no stake in the outcome of the evaluation.

Annex B – List of people met

Name	Institution	Function	Place
Programme / National /Provincial level			
Mr Agostinho T.F. Vilanculos	National Directorate Water Resources Management	Hydrologist	Maputo
Mr Jose Alvaro Malanco	National Directorate Water Resources Management	Geographer	Maputo
Mr. Messias Macie	National Directorate Water Resources Management	Director	Maputo
Mr Mario Souto	Salomon Lds	Socio-economist	Maputo
Mr. Toine Ramakar	Vitens Evides	Country Director	Maputo
Mr. Manuel Americo Fobra	Provincial Department of Public Works and Water Resources Sofala	Director	Beira
Mrs. Carmen Sing Sang	FIPAG-Beira	Technician	Beira
Mr. Castigo Cossa	FIPAG-Beira	Director	Beira
Mr. Delson	FIPAG-Beira	Chief Technical Department	Beira
Mr. Gil Carvalho	Provincial Department of Energy and Mineral Resources Sofala	Director	Beira
Mrs. Hermelina Xavier	Provincial Department of Land Use and Environment Sofala	Director	Beira
Mrs. Cacilda Machava	ARA-Centro	Director	Beira
Mr. Antonio Melembe	ARA-Centro	Water Resources Manager	Beira
Mr. Castro Junior	ARA-Centro	Chief Technical Department	Beira
Mrs. Celina Machavane	ARA-Centro	Chief Admin & Finance Dep.	Beira
Mrs. Emilia Paulino	ARA-Centro	Head legal department	Beira
Mr. Agnelo Jorge	ARA-Centro	Chief Save basin	Beira
Mr. Angelo Pereira	ARA-Centro	Chief Buzi basin	Beira
Mrs. Fatima Zacarias	ARA-Centro (UGBP)	Bookkeeper	Chimoio
Mr. Delton Luis Nhaia	ARA-Centro (UGBP)	Water Resources Coordinator	Chimoio
Mrs. Olinda Genisse Matola	ARA-Centro (UGBP)	Water Resources Coordinator	Chimoio
Mr. Daniel Luis Nhatumbo	ARA-Centro (UGBP)	Chief Technical Sector	Chimoio
Mr. Omar Calitos	ARA-Centro-Nort	General Director	Maputo
Mr TinayeShe Matazu	Water Resources Planning and Mgt., Ministry of Environment, Water and Climate	Director	Harare
Mr Zvikomborero Manyangadze	Water Resources Planning and Mgt., Ministry of Environment, Water and Climate	Chief Hydrologist	Harare
Mr. Jeffer K. Sakupwanya	ZINWA	CEO / Former PP2 IDA	Harare
Mr Charles Dini	ZINWA	Planning Manager	Harare

Name	Institution	Function	Place
Ms. T. Muyambo	ZINWA-Save	Catchment manager	Mutare
Mr. M. Munyai	ZINWA-Save	Hydrologist	Mutare
Mr. Nyamangondo	ZINWA-Save	River Inspector	Mutare
Mr. M. Muhamba	ZINWA-Save	Revenue Officer	Mutare
Mr. T.M. Mutize	ZINWA-Save	A/Technical Engineer	Mutare
Mr. M. Chinjonjo	ZINWA-Save	Quality Assurance technician	Mutare
Mr. T. Jekeni	ZINWA-Save	HR Officer	Mutare
Mr V.S. Mazambani	ZINWA-Save	Consultant	Mutare
Mr Elisha Madamombe	Programme Support Unit	Programme Manager	Beira
Local level / field visits Mozambique			
Mr. Boavida Manuel	District Administration of Nhamatanda	District Administrator	Nhamatanda
Mr. Caetano Benedicto	District Service of Economic Activities	Director	Nhamatanda
Mr. Domingos Meneses	District Service of Economic Activities	Supervisor	Nhamatanda
Mrs. Anatercia	District Service of Economic Activities	Extension worker	Nhamatanda
Mr. Tomas Longisana	District Service of Economic Activities	Extension worker	Nhamatanda
Mr. Americo Luis Tivano	Association 'Tamba Waguta'	Chairman	Nhamatanda
Mr. Jimusse Lorenzo Chico	Association 'Metuchira Agrícola'	Chairman	Nhamatanda
Mr. Aroz don Luis	Association 'Metuchira Agropecuaria'	Vice Chairman	Nhamatanda
Mr. Director	EPC Metuchira Empresa	Director	Nhamatanda
Mr. Manuel João	Association 'Piamanguana'	Chairman	Nhamatanda
Mr. Manuel Jamaca	District Administration of Gorongosa	District Administrator	Gorongosa
Mr. Inacio Tatu	District Service of Economic Activities Gorongosa	Director	Gorongosa
Mr. Tito Vasco	Pungwe River basin Sub-Committee Gorongosa	Secretary	Gorongosa
Mr. Giro Antonio Jorge	District Service of Economic Activities Gorongosa	Supervisor	Gorongosa
Mr. Paulino Vasco José	District Service of Economic Activities Gorongosa	Technician Mineral Resources	Gorongosa
Mr. Eugenio Matusse	District Service of Economic Activities Gorongosa	Technician Pisciculture	Gorongosa
Mr. Pedro Tirana Parafino	Association 'Mataca Ndifuna Wedu'	Chairman	Gorongosa
Mr. Sebastião Pita	Association 'Piscicultura Nhaoroi'	Chairman	Gorongosa
Mr. Reis Camucamu	Association 'Agropecuaria Nhambire'	Chairman	Gorongosa
Mr. Carlitos Njinga	District Administration Bárue	Permanent Secretary	Bárue
Mr. Lucas Joséfa Reis	District Service of Economic Activities Bárue	Director	Bárue
Mr. Cristovão Elias	District Service of Economic Activities Bárue	Technician Production and Planning	Bárue
Mr. Edmo Landene	Association 'Nhambulo Campo Verde'	Chairman	Bárue
Mrs. Francisca Celestina Roja	District Service of Economic Activities Bárue	Extension worker	Bárue

Name	Institution	Function	Place
Mrs. Anita Nelson	Association 'Nhamazurara 2'	Chairman	Báruè
Mr. Luis Nhamugodzo	Association 'Nhampepo'	Chairman	Báruè
Local level / field visits Zimbabwe			
Mr N. Mudehwe	Pungwe Subcatchment Committee	PSCC Chairperson	Mutasa
Miss P Gorodo	Pungwe Subcatchment Committee	Secretary/Administrator	Mutasa
Mr L. Mandiringana	Pungwe Subcatchment Committee	River Inspector	Mutasa
Mr Manguruve	Chidzinzwa Irrigation scheme	Chairperson	Mutasa
Mrs T. Tapa	Chidzinzwa Irrigation scheme	Secretary	Mutasa
Mr W. Chipoyi	Chidzinzwa Irrigation scheme	Committee member	Mutasa
Mrs R. Chaukura	Chidzinzwa Irrigation scheme	Beneficiary	Mutasa
Mrs M Tarahwa	Chidzinzwa Irrigation scheme	Beneficiary	Mutasa
Mr C Mufuka	Chidzinzwa Irrigation scheme	Beneficiary	Mutasa
Mr T. Mufuka	Chidzinzwa Irrigation scheme	Beneficiary	Mutasa
Mrs. Mutsamba	Butsi Irrigation Scheme	Secretary	Mutasa
Mr Mboto	Butsi Irrigation Scheme	Primary School head and beneficiary	Mutasa
Mr C. Mapaya	Gatsi Primary School	Headmaster	Mutasa
Mrs Maboreke	Gatsi Primary School	Deputy Headmaster and Former PSCC Chairperson	Mutasa
Mrs K. Mapenda	Gatsi Primary School	Teacher in Charge	Mutasa
Mr Mapenda	Gatsi Primary School	Project Manager	Mutasa
Mrs E Nyaboko	Gatsi Primary School	SDC Chairperson	Mutasa
W. Quedani	Kushinga Irrigation Scheme	Chairperson	Mutasa
T. Makupo	Kushinga Irrigation Scheme	Scheme beneficiary	Mutasa
Sida			
Annika Karlsson	Sida, Environment and Climate Change	Adviser	Stockholm
Camilla Bengtsson	Embassy of Sweden, Addis Ababa	Councillor, Head of Section	Addis Ababa
Maria Vink	SIWI (formerly Sida)	Adviser, Former Programme Officer, PP2	Stockholm
Sverker Jutvik	Sida	Former Programme Officer, PP2	Stockholm
Christina Sandberg	Embassy of Sweden, Addis Ababa	Controller	Addis Ababa
Torbjorn Ockerman	Task Manager	ORGUT	Maputo
Åke Nilsson	Geoscope AB	Sida Monitoring Consultant (2015-16)	Stockholm
Other stakeholders(*)			
Amanda Hammar	University of Copenhagen	Professor, Researcher	Copenhagen
Grant Taylor	Industrialist, Tobacco Estate	CEO	Manica
Ivo van Haren	WeConsult	Water specialist	Maputo

(*) Other stakeholders were approached but were either too busy, on travel or did not respond - these included: Global Water Partnership, Dutch Embassy, IUCN Pretoria, CRIDF Pretoria and City Mutare water supply. Some key stakeholders were contacted but not followed-up upon. These included: Mr Gilbert Mawere, Engineer, ZINWA, Mr Sergio Siteo, National Directorate Water Resources Management and Mr. Osborne Shela, Consultant

Annex C – Documents Reviewed

ARA-Centro (2016-17): Memoranda of Understanding for Small Grant Fund Projects / ARA-Centro and District Governments / 2016-2017

ARA-Centro (2010): Strategy for Small and medium dam development in the Pungwe river basin / SSI and SEED / January 2010

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ARA-Centro / ZINWA-Save (2016a): Reports – Pungwe, Buzi and Save Rivers Water Quality Monitoring February and June 2016 / ARA-Centro and ZINWA-Save

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PP2 (2008): Annual Progress Report (APR) Pungwe basin Transboundary Integrated Water Resources Management and Development Programme (PP2) / Government of Mozambique (GoM), Ministry Of Housing And Public Works (MoPW), 2008

PP2 (2009): Annual Progress Report, Pungwe basin Transboundary Integrated Water Resources Management and Development Programme (PP2) / GoM, MoPW, 2009

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PP2 (2010b) Integrated Water and Land Use Strategy for the Pungwe River basin / SEED / November 2010

PP2 (2010): Establishment of the Pungwe basin Baseline, 2010

PP2 (2011a): Annual Progress Report, Pungwe basin Transboundary Integrated Water Resources Management and Development Programme (PP2) / GoM, MoPW, 2011

PP2 (2011b) Mid-term review PP2 / Salomon Lda / March 2011

PP2 (2011c): Transboundary Gold Panning Management and Mitigation Strategy for the Pungwe River basin / ENVIRONSURE SERVICES (PVT). LTD. / November 2011

PP2 (2012): Annual Progress Report, Pungwe basin Transboundary Integrated Water Resources Management and Development Programme (PP2) / GoM, MoPW, 2012

PP2 (2013): Annual Progress Report, Pungwe basin Transboundary Integrated Water Resources Management and Development Programme (PP2) / GoM, MoPW, 2013

PP2 (2014a): Annual Progress Report, Pungwe basin Transboundary Integrated Water Resources Management and Development Programme (PP2) / GoM, MoPW, 2014

PP2 (2014b): Extension Proposal Document / Government of Mozambique, Government of Zimbabwe / July 2014

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UNESCO IHE (2014): Strategic choices for River basin Planning at ARA-Centro, September 2014

Annex D – List of SGF projects in Mozambique

<i>Nr</i>	<i>Association</i>	<i>Village</i>	<i>Description</i>	<i>Year</i>	<i>Status during visit</i>
NHAMATANDA DISTRICT					
1	Association Tamba Wa Guta	Chirassicua	Irrigation (2,5 ha)	2014	Operational
2	Association Agrícola Metuchira Pita	Metuchira Pita	Irrigation (5 ha)	2015	Operational
3	Association Agropecuária Metuchira Pita	Metuchira Pita	Irrigation (5 ha)	2015	Operational
4	Association Macaraure	Tica	Irrigation (12 ha)	2014	Operational (SDAE)
5	Association Piamanguana	Tica	Irrigation (40 ha)	2014	Operational
6	Primary School Metuchira Empresa	Metuchira Sede	Irrigation (5 ha)	2016	Operational (SDAE)
7	Association Chinadzero	Metuchira Maguimba	Irrigation (30 ha)	2016	Operational (SDAE)
GORONGOSA DISTRICT					
1	Association Agropecuaria Nhambire	Tsiquir	Irrigation (4 ha)	2015	Operational
2	Association Mataka Ndifuma Edu	Mataka (Nhataca)	Irrigation (5 ha)	2015	Functioning partially (pump did not start)
3	Association Pisculturas Nhaoroi	Nhaoroi (Nhataca)	Fish ponds	2013	Functioning partially (2 out of 5 fish ponds in use, others need maintenance)
4	Association Tendene Pabozi	Tazaronde	Irrigation	2013	No information
5	Association Wari Menzara Nhampepo	Nhamapaza (Moera Canda)	Irrigation (11.5 ha)	2015	No information
6	Association Chibantana	Moera Canda	Irrigation (11.4 ha)	2015	Not functioning (material burned 2016) (SDAE)
7	Association Nhauranga	Nhauranga	Irrigation	2015	Not functioning (material on site, needs to be installed) (SDAE)
8	Association Mineradores Artisenais	Tsiquir	Gold panning	2015	Not functioning (material vandalized 1/2017)
BÁRUÊ DISTRICT					

1	Association Nhamazurara 1	Nhazonia	Irrigation, gravity	2015	Functioning, drip irrigation for 1 member
2	Association Nhamazurara 2	Nhazonia	Distribution of litchi trees and irrigation on gravity (8 ha)	2012 + 2015	Functioning, drip irrigation for 1 member
3	Association Nhambulo	Catandica Sede	Irrigation, gravity (7 ha)	2015	Functioning
4	Association Nhampepo	Nhampaze/N fudze	Small dam(s) for drinking water, cattle and fish farming	2014-2015	Functioning partially, dam is very dry, fencing vandalized, dirty drinking water, no fish but people are washing cloths and fetching water, animals are drinking
5	Association Pisciculturas de Malomwe	Catandica Sede	Fish ponds	2016	Not visited information varies from fully operational to not operational
6	Association Irigiação Serra Shoa	Serra Shoa	Irrigation, seed potato production	2015	Functioning (SDAE)
7	Association Mineração Nhazonia	Shoala	Gold panning equipment	2015	Functioning (SDAE)

Annex E – Field visits to SGF projects in Mozambique

Project Name	Irrigation Tamba Wa Guta
Name of Association	Association Tamba Wa Guta
Project Description	2,5 ha irrigation of mainly maize, tomatoes, onion and peppers
Village(s)	Chirassicua
District/Province	Nhamatanda/Sofala
GPS Coordinates	X: 624382 Y: 7860023 Z: 47
Key Persons Met	Chairman of association: Mr. Americo Luis Tivano 1 Association member
The Project	
What was done by PP2?	The PP2 consultant designed the project, materials were purchased and a pump was installed with the capacity of 100 l/min including the pipes for irrigation of 2,5 ha
When was the project completed?	2014
How has the system been used since that time? Any challenges?	The system has been used until 2016, then the chairman died and everybody was very demotivated and all money was spent on the funeral. Since a couple of months the association is reactivated with support of SDAE and is now starting to prepare the land for this crop cycle.
What changes have occurred since completion?	With the irrigation the production increased significantly, for maize from 1 ton/ha to 3 ton/ha.
How many people benefit from the project?	At the moment there are 10 active members of which 6 women but they are seeking for new members. The association also donates food to surrounding community, approximately 50 vulnerable families.
What was the own contribution of the association?	The association helped with excavation of the trenches for the irrigation tubes.
How is O&M and reinvestment funding guaranteed?	The produce is 50% for consumption and 50% for sales which should generate income for operations and maintenance. At the moment there is no money to do anything, not even to hire a tractor. They hope this will be resolved when coming crops are sold.
How is the gender aspect taken care of?	60% of the members are female
What is the impact on livelihood?	Difficult to say because the last 1,5 years there was no production and a lot of the association members are new.
Relevance to IWRM	Increased access to water for irrigation increased income for the association members.
Were people trained by PP2?	During installation they were explained about the working of the pump. Other trainings received via FAO
How is technical support organized?	The director, technicians and extension workers of SDAE assist and support the association.

Project Name	Irrigation Metuchira Pita
Name of Association	Association Agropecuária Metuchira Pita Association Agrícola Metuchira Pita
Project Description	Irrigation system with 1 pump for two (2) associations with each 5 ha of land. Association members connect their flexible hose with hydrant to the main pipeline to irrigate their plot.
Village(s)	Metuchira Pita
District/Province	Nhamatanda/Sofala
GPS Coordinates	X: 638412 Y: 7873628 Z: 33
Key Persons Met	Chairman Association 'Metuchira Agrícola': Sr. Jimusse Lorenzo Chico Vice Chairman Association 'Metuchira Agropecuaria': Sr. Aroz don Luis 4 association members.
The Project	
What was done by PP2?	PP2 installed a pump, a main irrigation pipe with taps and distributed flexible hoses with hydrants to association members.
When was the project completed?	2016
How has the system been used since that time? Any challenges?	The irrigation system has been in use in 2016. In January 2017 the whole land (10 ha) inundated from the river and all crops were lost. This normally happens once in 5 years. Both associations are restarting now in November 2017. Some of the members already restarted earlier.
What changes have occurred since completion?	The associations now manage to produce during the whole year.
How many people benefit from the project?	'Metuchira Agropecuaria' has 10 active members of which 3 are female. 'Metuchira Agrícola' has also 10 active members using the irrigation system of which 4 are female.
What was the own contribution of the association?	The association helped with excavation of the trenches for the irrigation pipes.
How is O&M and reinvestment funding guaranteed?	No major maintenance has been done until date. There is a maintenance fund which can be used but it is not clear how this exactly should work.
How is the gender aspect taken care of?	'Metuchira Agropecuaria' has 30% active female members. 'Metuchira Agrícola' has 40% active female members.
What is the impact on livelihood?	The association members had more income in 2016 that has been used to improve the houses and pay school fees.
Relevance to IWRM	Increased access to water for irrigation increased income for the association members.
Were people trained by PP2?	During the installation of the pump and irrigation system explanation took place about the functioning of the pump and system.
How is technical support organized?	The technician and extension workers of SDAE assist the associations on a regular base on agricultural issues. Additionally the associations receive technical support from ADPP.

Project Name	Irrigation Piamanguana
Name of Association	Association Piamanguana
Project Description	Expansion of existing irrigation system with 1.000 meter pipes and 10 hydrants. Now a total of 40 hectares is in use and under irrigation.
Village(s)	Tica
District/Province	Nhamatanda/Sofala
GPS Coordinates	X: 653677 Y: 7855073 Z: 4
Key Persons Met	Chairman of Association: Mr. Manuel João 2 members of the Association
The Project	
What was done by PP2?	PP2 expanded the existing irrigation by donation of 1.000 meter of pipes and 10 hydrants. The pumps already existed.
When was the project completed?	2014
How has the system been used since that time? Any challenges?	The system has been in use since the installation, there were no particular challenges mentioned.
What changes have occurred since completion?	The production area increased and there is now a common plot for the association of which the income from sales is used for O&M. The whole area has been legalized. The production volume increased and the association members are hiring workers to cultivate the land.
How many people benefit from the project?	There are 22 association members actively cultivating the land.
What was the own contribution of the association?	The association contributed towards excavation of the trenches for the irrigation pipes.
How is O&M and reinvestment funding guaranteed?	The income of the sales of the common plot is used for O&M.
How is the gender aspect taken care of?	Unknown
What is the impact on livelihood?	As the association benefited from various projects and funding (for example FDD/FDA/Finagro and BAD) it is difficult to say what exactly the impact of PP2 was. In general can be said that income increased for more members.
Relevance to IWRM	Increased access to water for irrigation increased income for the association members.
Were people trained by PP2?	The chairman of the association participated in various meetings and trainings in Gorongosa and Chimoio.
How is technical support organized?	The technician of SDAE and extension worker give technical assistance.

Project Name	Irrigation Primary School Metuchira Empresa
Name of Association	NA Project is directed to the Primary School Metuchira Empresa

Project Description	Irrigation of 5 ha with a pump, main pipeline and flexible hoses with hydrants.
Village(s)	Metuchira
District/Province	Nhamatanda/Sofala
GPS Coordinates	X: 626153 Y: 7880463 Z: 58
Key Persons Met	School Director
The Project	
What was done by PP2?	PP2 installed a pump, a main irrigation pipe with taps and distributed flexible hoses with hydrants.
When was the project completed?	2016
How has the system been used since that time? Any challenges?	The irrigation system has been in use in 2016. At the moment the system is not working because the pump broke down, it is not clear what the problem is. Another challenge is that the flexible hoses are being stolen.
What changes have occurred since completion?	The school has planted cashew trees and a variety of fruit trees. The school produces maize to make porridge for the school kids. The school produced tomatoes to sell.
How many people benefit from the project?	The school has 1.329 students and 31 teachers.
What was the own contribution of the association?	Unknown
How is O&M and reinvestment funding guaranteed?	The sales of tomatoes and in future other vegetables sustain the O&M costs
How is the gender aspect taken care of?	48% of the students is female 58% of the teachers is female.
What is the impact on livelihood?	The children eat porridge at school
Relevance to IWRM	Increased access to water for irrigation will increase the income for the school and provides food for the students.
Were people trained by PP2?	During the installation of the pump and irrigation system the functioning was explained. The school director participated in an exchange visit to schools in Zimbabwe.
How is technical support organized?	Via SDAE technician and extension worker.

Project Name	Pisciculture in Nhataca
Name of Association	Associação Piscicultura Nhaoroi
Project Description	Construction of 5 fish ponds, provision of nets and various alvinos (??)
Village(s)	Nhataca/Nhaoroi
District/Province	Gorongosa/Sofala
GPS Coordinates	X: 616507 Y: 7940110 Z: 486
Key Persons Met	Chairman of the Association: Mr. Sebastião Pita 7 Association Members (see picture below) Annex 2 for other participants
The Project	
What was done by PP2?	The project made 5 fishing ponds and handed over fishing nets. One (1) association member participated in an exchange visit in Manica in 2012.

When was the project completed?	2013
How has the system been used since that time? Any challenges?	Due to the armed conflict the fishing ponds could only be used since January 2017. Because of the overdue maintenance only 2 ponds could be used directly. The others need to be excavated. This is a hard job to do manually. Yield has been used for own consumption, not yet sold.
What changes have occurred since completion?	Not much changed yet, they are waiting for the first fish to be sold.
How many people benefit from the project?	The association consists of a total of 36 members of which 10 are active in the fish farming projects, 4 of them are women.
What was the own contribution of the association?	The association members helped digging the fish ponds.
How is O&M and reinvestment funding guaranteed?	The association members work 2 days per week together at the fish ponds to do maintenance. There is no fund in place yet for maintenance or reinvestments. Issues are solved on the spot. There is no bank account.
How is the gender aspect taken care of?	40% of the involved association members is female.
What is the impact on livelihood?	No significant financial changes yet because fish has not yet been sold. Association members and their families are eating the fish which should contribute to nutrition and health.
Relevance to IWRM	The project contributed to IWRM by providing better access to water for the fish farmers and as such increasing their income. Environmental impact of fish farming????
Were people trained by PP2?	1 member participated in an exchange visit to Manica
How is technical support organized?	TA by technician and extension worker SDAE. SDAE also donated the small fish to restart the project.



Pictures: Fishing pond with a dam in the stream (left) and Fishing pond fed by a spring, association members on the wall (right)



Project Name	Irrigation Mataca Ndifuna Edu
Name of Association	Associação Mataca Ndifuma Edu
Project Description	5 ha irrigation, production of maize, vegetables and beans (seeds)

Village(s)	Nhataca
District/Province	Gorongosa/Sofala
GPS Coordinates	X: 616795 Y: 7945564 Z: 430
Key Persons Met	Chairman of the Association: Sr. Pedro Tirana Parafino 7 Association Members (see picture below) Annex 2 for other participants
The Project	
What was done by PP2?	PP2 made a design and purchased all necessary equipment and material. A pump was installed, irrigation pipes were dug in with 8 taps were flexible pipes can be connected with 8 sprinklers.
When was the project completed?	2015
How has the system been used since that time? Any challenges?	The system has not been used because of security issues, the pump was not working during the visit and needs to be maintained/repared. They were preparing the land to start producing with irrigation this year.
What changes have occurred since completion?	Not yet in use. No changes yet.
How many people benefit from the project?	The association has 17 active members at the moment of which 10 are female and 7 are male.
What was the own contribution of the association?	The association helped digging the trenches for the irrigation pipes.
How is O&M and reinvestment funding guaranteed?	The members have to pay a monthly contribution and 10% of the sales of the communal plot is saved for
How is the gender aspect taken care of?	59% of the association members is female
What is the impact on livelihood?	Not yet measurable
Relevance to IWRM	Increased access to water for irrigation will increase income for the involved families.
Were people trained by PP2?	The training was cancelled because of the conflict in the area. The technician who came to install the equipment explained a little bit but was difficult to understand because of language problems.
How is technical support organized?	The technician of SDAE is assisting the association to restart their activities and repair the pump.

Pictures: The association members with SDAE technician, sprinkler and discussion about the not working pump.





Project Name	Irrigation project Tsiquir
Name of Association	Associação Agro-Pecuária Nhambira
Project Description	Irrigation of 4 hectares with various crops (maize, vegetables, beans, sweet potatoes). Water is taken with a pump and distributed via 1 main canal and 5 secondary canals. There are 7 hydrants with flexible tubes.
Village(s)	Tsiquir
District/Province	Gorongosa/Sofala
GPS Coordinates	X: 620856 Y: 7935184 Z:342
Key Persons Met	Chairman of the Association: Sr. Reis Camucamu 9 Association Members (see picture below) Annex 2 for other participants
The Project	
What was done by PP2?	PP2 designed the project, bought all equipment and materials and installed everything.
When was the project completed?	2014
How has the system been used since that time? Any challenges?	The system has been in use, main challenge was the security in the area during the last years, since 2016 they produced three (3) crop-cycles under irrigation.
What changes have occurred since completion?	Production of maize increased from 1,5 ton/ha to 2,5 ton/ha and a greater variation of crops has been planted.
How many people benefit from the project?	The association has 15 active members of which 6 female and 9 male. They benefit from the project together with their families.
What was the own contribution of the association?	The association members helped digging the tranches and canals.
How is O&M and reinvestment funding guaranteed?	The association has a common fund that is used for operations of the association, such as hiring a tractor, purchase of fuel for the pump, purchase of seeds/fertilizer/pesticides and can also be used for maintenance.
How is the gender aspect taken care of?	40% of the association members is female.

What is the impact on livelihood?	The association members feel that a lot changed because of this project. They have more yield and more income. They managed to improve their houses, send their kids to school and some of the members even bought a motorbike. Apart from this project the association also operates 3 maize mills and has fish ponds.
Relevance to IWRM	The improved access to water increased the income for the members of this association.
Were people trained by PP2?	No only explanation during the installation of the equipment.
How is technical support organized?	The technician of SDAE-Gorongosa and the extension worker are advising and accompanying the activities of the association.

Pictures: Presentation association, demonstration pump and irrigation system, association members



Project Name	Irrigation project Nhambulo
Name of Association	Association Nhambulo Campo Verde

Project Description	7 hectares of irrigation on gravity
Village(s)	Catandica Sede
District/Province	Báruè
GPS Coordinates	X: 516723 Y: 8005860 Z: 661
Key Persons Met	Chairman association: Sr. Edmo Landene 5 Association members (see picture below) Other participants in annex 2
The Project	
What was done by PP2?	PP2 implemented an irrigation system on gravity with the intake in a river coming from the nearby Sera Shoa mountains. With 20 taps and individual hoses with hydrants.
When was the project completed?	In 2015
How has the system been used since that time? Any challenges?	The system has been functional since the start and is working very well. Each individual uses the hoses for their private plot and there is a common plot for experimenting and sales of products in order to be able to sue operational costs of association. There were some pipes left over from the project. The association managed to buy extra taps and connecting kits to expand the area under irrigation. The challenge is to include more neighbouring farmers as they complain to have less access to water in their canals because a lot of water is used by the association members. The tools to do reparations and maintenance were not given by the project, the association is purchasing those.
What changes have occurred since completion?	Diversification of crops to vegetables, fruit trees and banana. Increase of production, for example before 1 ton/ha maize and now 2 ton/ha maize.
How many people benefit from the project?	25 association members and their families, 5 male, 20 female
What was the own contribution of the association?	The association members helped digging the trenches for the distribution pipes.
How is O&M and reinvestment funding guaranteed?	Theoretically with the money earned from the common plot.
How is the gender aspect taken care of?	80% of the association members is women
What is the impact on livelihood?	With the increased income the livelihood of the association members improved, kids all go to school, they eat well and nutritious and did improvements on their house. Many of the association members are now contracting people to work on the land, either fixed or seasonal
Relevance to IWRM	Before the project, the farmers used manually dug canals for irrigation. Access to water improved for the association members in the project area, however, the surrounding farmers complain to have less water available.
Were people trained by PP2?	4 association members were trained on installation and repair of the pipes and taps and they manage to maintain everything on their own during 2 days

How is technical support organized?

The extension worker is assisting the association with plague control, use of fertilizers, planting methods etc. SDAE sells subsidized seeds.



Pictures: Meeting with association members, irrigation of pineapple, association members in the maize fields.



Project Name	Irrigation project Nhamuzarara 2
Name of Association	Association Nhamuzarara 2
Project Description	1 st phase: distribution of litchi trees to association members (each member got 104 or 208 trees) 2 nd phase: 8 hectares of irrigation on gravity: 4 hectares with drip irrigation for litchi trees, 4 hectares with taps and hoses with hydrants
Village(s)	Nhazonia/Catandica
District/Province	Báruè
GPS Coordinates	X: 515681 Y: 8014845 Z: 628
Key Persons Met	Chairman association: Sra. Anita Nelson 8 Association members (see picture below) Other participants in annex 2
The Project	
What was done by PP2?	PP2 distributed litchi trees to the association members. Either 104 trees for ½ hectare or 208 for 1 ha. In the 2 nd phase they implemented an irrigation system on gravity with the intake in a river coming from the nearby Sera Shoa mountains. With 4 hectares of drip irrigation for litchi trees and 25 taps and individual hoses with hydrants.
When was the project completed?	The trees were distributed in 2012 and the irrigation in 2015
How has the system been used since that time? Any challenges?	When the trees were distributed in 2012, the association worked with irrigation canals. This was not sufficient and some of the trees dried out. Then the irrigation system was installed and that worked well. However during the conflict period a lot of people left, selling their hoses and hydrants. During that period some of the litchi trees burned because the grounds were not cleaned. In 2017 the association is restarting. There are people who want to join the association, using the installed taps but all the hoses and hydrants that were given to the former members are gone. The big complaint is that the drip irrigation was only installed for the chairman of the association. The other association members can use the taps and hoses but not all land is covered. This provokes inequality and dissatisfaction among the members. The challenge is to connect more neighbouring land as both association members and neighbouring farmers complain to have less access to water in their canals because a lot of water is used by the irrigation system. The tools to do reparations and maintenance were not given by the project, the association does not have a plan to purchase.
What changes have occurred since completion?	Production is possible during the whole year. Diversification of crops to vegetables, potatoes and other veggies. Increased production per hectare.
How many people benefit from the project?	15 association members and their families, 7 male, 8 female
What was the own contribution of the association?	The association members helped digging the trenches for the distribution pipes.

How is O&M and reinvestment funding guaranteed?	There is no plan or money for maintenance. Mainly because the biggest maintenance has to be done at the drip irrigation and nobody wants to contribute because this is owned by the chairman of the association. There are no tools to do maintenance either.
How is the gender aspect taken care of?	53% of the association members is women
What is the impact on livelihood?	With the increased income the livelihood of the association members improved, kids all go to school, they eat well and nutritious and did improvements on their house. Many of the association members are now contracting people to work on the land, either fixed or seasonal
Relevance to IWRM	Before the project, the farmers used manually dug canals for irrigation. Access to water improved for the association members in the project area, however, the surrounding farmers complain to have less water available.
Were people trained by PP2?	4 association members were trained on installation and repair of the pipes and taps. Unfortunately only 1 of them is still active in the association and has to do all on his own.
How is technical support organized?	The extension worker is assisting the association.

Pictures: Meeting with association members, association members, drip irrigation litchi tree, individual plots.





Project Name	Nfundze Dam
Name of Association	Association Nhampepo
Project Description	Excavation of three (3) dams for communal drinking water (with fence), cattle drinking water and fish farming fed by a underground spring
Village(s)	Macosse/Nhazonia
District/Province	Báruè
GPS Coordinates	X: 528121 Y: 8041551 Z: 708
Key Persons Met	Chairman association: Sr. Luis Nhamagodzo Vice chairman association: Sr. Emilio Dechane Ziro Community leader Macosse: Sr. Tuaibo Daniel Jr. Other participants in annex 2
The Project	
What was done by PP2?	Three dams were excavated of which one was fenced to use for communal drinking water, one was provided with fish to use as a fish pond and one was for cattle drinking water.
When was the project completed?	In 2014 the dams were completed, the fence done in 2015
How has the system been used since that time? Any challenges?	The dams dried up in 2016 and 2017 because there was no rain and the spring dried up. Nobody came to fetch water also because of the armed conflict and the fence was vandalized which gives cattle opportunity to enter. At the moment there is a little bit water but very dirty. The dam for the cattle is not very deep because the machines could not enter the rocks. Despite the planting of some vegetation done by the association, the dams are vulnerable for erosion and a lot of sand entered and fills up the dams. The fish was introduced in the start of 2015 but all dried up and nobody took care because of the armed conflict.
What changes have occurred since completion?	There is water available for the community although it is very dirty the people fetch it and (say) they boil it before use and use chlorine to clean.

How many people benefit from the project?	The association has 30 active members working also on agriculture. There are no figures about the amount of community members.
What was the own contribution of the association?	The association helped with planting vegetation around the dams in order to minimize erosion.
How is O&M and reinvestment funding guaranteed?	There is no funding. A lot of maintenance work is needed, removing the sand from the dams and repairing the fence, There are no plans with ARA-Centro or the District to help with this. There is also no vision for the future on how to sustain the drinking water dams for the community and cattle, obviously the fish production wont sustain all. The community does not pay for fetching the drinking water.
How is the gender aspect taken care of?	Unknown
What is the impact on livelihood?	This is difficult to say, the people are happy because they have water to use for washing, cleaning and drinking but the water is very dirty which might provoke health risks.
Relevance to IWRM	Increased access to water.
Were people trained by PP2?	During the digging of the dams
How is technical support organized?	Not really organized, SDAE did not come to see the project since 2 years.

Pictures: Fetching drinking water from dam, dam constructed as fishing pond, association members.



Annex F - List of SGF projects in Zimbabwe

The small grants component supported 10 projects in the Pungwe sub catchment. Initially 50 proposals were received. The highlighted ones were the projects visited by the evaluation team.

Project	Cost (USD)	Start Date	Scope of Works	Beneficiaries
Rujeko Community Water Scheme	52,500	Jan 2014	A 25ha Communal Irrigation scheme construction project which is gravity fed.	49 Households
St Columbas Primary School Water Scheme	22,000	Jan 2014	Banana irrigation project infrastructural rehabilitation and extension	Primary school
Chidzinzwa Community Water Project	46,200	Jan 2014	A 27ha Communal Irrigation scheme construction project with gravity fed 5km long 250mm diameter delivery main.	53 Households
Nyamandwe Community Water Scheme	47,500	May 2015	A 15ha Communal Irrigation scheme construction project with a gravity fed 2km long delivery main and 100m ³ brick reservoir.	29 Households
Butsi Community Water Project	47,500	June 2014	A 28ha Communal Irrigation scheme construction project, with gravity fed 4km long delivery main and a 250m³ brick reservoir.	55 households
Buwu Community Water Scheme	14,800	Mar 2015	A 25.1 communal irrigation scheme construction project, with 2.4km gravity line to field edge	48 households
Gatsi Primary School Water Scheme	17,700	Sep 2015	Weir construction, 2.950km main line infield works for 2ha banana, water reticulation system	960 pupils school
Kushinga Community Water Project	22,500	Jan 2016	Weir & 250m³ Tank construction, 2.5km mainline & infield works, 13ha plot land	26 households
Nyamakowero Community Water Scheme	22,000	Nov 2016	Weir & 350m ³ Tank construction, 5km mainline & infield works	15 households
Takazvida Community Water Scheme	35,900	Apr 2016	Infield works for 17 homesteads (0.5ha plots) and 2.6ha totalling 11.1ha, 3.5km mainline	17 households

Annex G - Field visits to SGF projects in Zimbabwe

ITEM	Data collected / source / description
Project Name	Chidzinzwa Irrigation Scheme
Date Visited	8 November 2017
Cost	USD46,200
Project Description (MoU)	53 farmers with 0.5Hactere plots under irrigation Concept developed in 1990. Opened an account for own contributions but was wiped out by inflation. Government through Maguta then constructed the 7.5km pipeline from the weir
Village(s)	Nyakurimwa, Chidzinzwa, Rukweza
District/Province	Mutasa (Ward 19), Manicaland
GPS coordinates	
River	Mukondwe
Key persons met	Mr Manguruve – Chairperson, E. Dodzo (Vice Chairperson), Mrs Tapu (Secretary), W. Chipoyi (Committee Member), Mrs R. Chaukura (Farmer), Mrs Tarahwa (Farmer), C. Mufukwa (Farmer), T. Mufukwa (Farmer)
The Project	
Project selection (how?)	Members developed a proposal after a government, Maguta programme had financed the intake weir
What was done?	Infield pipe network laying, sprinklers and hosepipes procurement Started irrigation in November 2013 They can now plant at least two crops a year Grow beans (twice a year), carrots, butternut, maize and vegetables
What changes have occurred since the completion	The 53 families no longer vulnerable to droughts. The 26-hectare area was grazing lands before the grants from PP2. Yields have increased. The farmers now have better negotiation skills for better contracts for their crops and deal directly with markets
Issues to be covered:	
Own contribution	Labour provision for trench digging. They had a 7.5km pipeline constructed by the government through the Maguta programme
O&M and funding	During installations, 6 farmers on the job trained during n on the maintenance of the scheme
Re-investment	Bought additional clamps for off takes Every plot holder pays USD1/month towards he maintenance fund which is currently kept in a mobile wallet account. If required maintenance exceed account balance, they ask each member to contribute more for that item. They carry out annual soil sampling to determine nutrient requirements
Gender / disadvantaged groups	27 female/26 male farmer. A couple of the female farmers are widows
Livelihood	Can now easily manage to pay fees for children Some managed to build their own houses, some bought cars from proceeds from the 0,5hectre plots

Relevance to the IWRM	Understanding of water management at grassroots level Efficient allocation and Utilisation of water resources through sprinkler irrigation Understand roles of stakeholders in IWRM and pay levies and rates
Management of the project. Mgr. duties, responsibilities	Fully fledged management committee of 7 members (4men, 3woman) Yearly elections which are monitored by Arex
Training (project & financial management, O&M)	PP2 project management training workshop SNV – Business management PP2- Equipment maintenance training
Technical support / extension	Arex (Ministry of Agriculture) – Regular good farming practices
Involvement / decision-making	The committee was formed before the award of the grant. They have been deciding for their future without any interference
Additional Requirements	Need to put reservoir tank (night storage) to regulate flow
Limitations	Cannot expand irrigable land due to limited water source. Currently in talks with government for additional water supply source
Interviewer Inputs	
Setup during site visit	Good bean crop on all plots Farmers have individual contracts with Zimbabwe Super seed to produce bean seed. They produce on average 1ton/0.5-hectare plot and sell at about US\$5/kg
Comments	Well organised irrigation scheme. Farmers eager to develop more land but limited by water source. One of the PP2 success stories. Previous season had water shortages The farmers very proud of the PP2 inputs

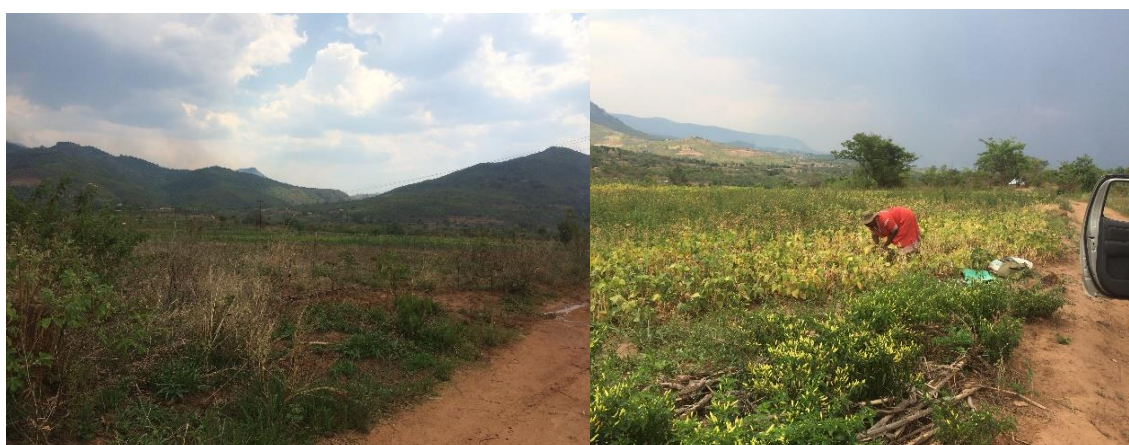
Fields and Stakeholder Meeting Chidzinzwa Irrigation Scheme



ITEM	Data collected / source / description
Project Name	Butsi Irrigation Scheme
Date Visited	8 November 2017
Cost	USD 47,500
Project Description (MoU)	55 farmers with 0.5Hactere plots under irrigation

	Concept developed in 1990. Opened an account for own contributions but was wiped out by inflation. Government through Maguta then constructed the 7.5km pipeline
Village(s)	Mutsamba, Nyabadza
District/Province	Mutasa, Manicaland
GPS coordinates	
River	
Key persons met	Mr Mboto (Headmaster, St Peters Jombo Primary school benefited through irrigation and water supply at school) Mrs Mutsamba – Committee Secretary
The Project	
Project selection (how?)	Had a village concept which had been failing to attract funds for years
What was done?	100m ³ Water Tank, delivery mains Infield pipe network laying, sprinklers and hosepipes procurement
What changes have occurred <i>since</i> the completion	The 55 families no longer vulnerable to droughts. Reduction in crime rates No more food aid Yields have increased Now with better negotiation skills for better contracts for their crops and deal directly with markets
Issues to be covered:	
Own contribution	Bricks, trenching and food for the military who build tank Some villages donated land for the project
O&M and funding	5 farmers on the job trained during installation on the maintenance of the scheme
Re-investment	9 farmers bought additional sprinklers No major repairs yet. Contribute to maintenance on adhoc basis
Gender / disadvantaged groups	24 out of 55 belong to woman Jombe primary and secondary school benefit from their irrigated plots and practical lessons
Livelihood	Can easily manage to pay fees for children Some managed to build their own houses, some bought home gadgets Main crops beans (twice a year), maize and Tabasco chillies) Benefits to schools, both primary and secondary
Relevance to the IWRM	Understanding of water management at grassroots level Efficient allocation and Utilisation of water resources through sprinkler irrigation Paying for water use through levies
Management of the project. Mgr. duties, responsibilities	Management committee of 7 members (4men, 3women). Roles not clear between Committee chairperson and Project Manager Yearly elections which are monitored by Arex
Training (project & fiscal management, O&M)	PP2 project management training workshop Practical Action – Irrigation committee development PP2- maintenance training
Technical support / extension	Arex but not regularly
Involvement / decision-making	The committee decided
Additional Requirements	Extension of scheme
Limitations	Non

Interviewer Inputs	
Setup during site visit	Half of the scheme did not have any planted crop. The other half was under chillies and bean seed which they sell to Zimbabwe Super Seed
Comments	There seem to be some friction among the farmers. Half of the irrigable land which had no crop showed indications of not have been ploughed for over a season. There is need for PSCC and Arex to support this scheme especially on the proper setting up of the management committee and roles. Some of the farmers met were not willing to be interviewed referring questions to the Secretary who also happens to be the Project Manager's wife



Butsi Irrigation Scheme

ITEM	Data collected / source / description
Project Name	Gatsi Primary School
Date Visited	8 November 2017
Cost	USD 7,700
Project Description (MoU)	Weir construction, 3km main line infield works for 2ha banana, water reticulation system to supply water to Gatsi Primary school
Village(s)	School
District/Province	Mutasa, Manicaland
GPS coordinates	
River	Mutarazi
Key persons met	Mr C. Mapaya (Headmaster), Mrs Maboreke (Deputy Headmaster), Mrs K. Mapenda (Teacher in Charge), Mr Mapenda (Project Manager), Mrs E Nyaboko (SDC Chairperson)
The Project	
Project selection (how?)	Did a project proposal which was accepted by PP2
What was done?	Weir construction, and 3km pipeline from Mutarazi river and infield reticulation for 2ha
What changes have occurred <i>since</i> the completion	Water security for the 888 pupils and 30teachers Irrigated vegetable and banana plantation Good water supply for the school and the environs Gross on average US\$100/month
Issues to be covered:	
Own contribution	Used parents who could not afford school fees as labour for trenching
O&M and funding	Groundsman and Project manager trained by PP2

Re-investment	Use funds from project for repairs Development of extra hectare to be irrigated Bought 10 goats and 8 chickens which they are rearing
Gender / disadvantaged groups	452 out of 888 pupils are girls with a sizeable number coming from marginalised communities 19 out of 30 teachers are women
Livelihood	Pay school fees for two marginalised pupils from irrigation proceeds Farm produce used as relish in the pupils feeding scheme Have extended reticulation to the clinic and put up stand pipes for the church and the locals
Relevance to the IWRM	Understanding of water management at grassroots level- teaching pupils on IWRM issues Efficient Utilisation of ow water reservoirs through sprinkler irrigation Practicals of agriculture for children
Management of the project. Mgr. duties, responsibilities	SDC is the management committee, Permanent project manager for the project
Training (project & financial management, O&M)	PP2 project management training workshop ZFU also incentivising them through coemptions
Technical support / extension	Arex
Involvement / decision-making	The committee decides
Additional Requirements	Extension of irrigable land
Limitations	Market still adhoc. Need to establish a good and continuous market for their produce.
Interviewer Inputs	
Setup during site visit	Flourishing banana, maize and vegetable crops. Well organised scheme
Comments	Well managed project. The teachers are very enthusiastic about the project. School environs green showing water abundance. It is a sustainable project as it is being managed by knowledgeable leaders



Gatsi Primary School

ITEM	Data collected / source / description
Project Name	Kushinga Irrigation Scheme
Date Visited	8 November 2017
Cost	USD 22,500
Project Description (MoU)	26 farmers (15women,11men) with 0.5Hactere plots under irrigation Gravity mains from weir replacement with standard material, construction of tank, provision of sprinklers to irrigate mainly banana, potatoes. Beans, plantations and vegetables
Village(s)	Tegwe, Muparutsa
District/Province	Mutasa, Manicaland
GPS coordinates	
River	Murara
Key persons met	W. Quedani (Chairperson), T. Makupo (Scheme beneficiary)
The Project	
Project selection (how?)	Commenced 5 years back when members started contributing USD20/month and constructed weir and used inferior material to supply water to their field
What was done?	Replaced Gravity mains from weir replacement with standard material, construction of tank, provision of sprinklers
What changes have occurred <i>since</i> the completion	The 26 families no longer vulnerable to droughts. Reduction in crime No more food aid Yields have increased
Issues to be covered:	
Own contribution	Trenching and excavations for pipework and tank
O&M and funding	Using funds from 10 of the farmers who had not finished off their contributions which started 5years ago
Re-investment	Replacement of gravity pie form tank to fields,
Gender / disadvantaged groups	15 out of the 26 plots belong to woman and women also part of the leadership
Livelihood	Some managed to build their own houses, some bought home gargets Main crops beans (twice a year), and planting all year around
Relevance to the IWRM	Understanding of water management at grassroots level Efficient allocation and utilisation of water through sprinkler irrigation Paying for water use through levies
Management of the project. Mgr. duties, responsibilities	Management committee of 5 members (2men, 3women) and a Production Manager Yearly elections
Training (project & fiscal management, O&M)	Production Manager knowledgeable on plumbing issues but not trained
Technical support / extension	Not any
Involvement / decision-making	The committee decided
Additional Requirements	Roof for the tank so that the water can be portable Replacement of pipe form tank to fields

Limitations	Need to secure markets. Getting ripped off by middle men. Deliver mains from tank limited
Interviewer Inputs	
Setup during site visit	Flourishing banana plantation. This was one of the last scheme visited and as such when the interviewer arrived some of the members had gone back to their fields/home
Comments	Good scheme. They need some training on system maintenance since they didn't get any from PP2. The reservoir need to be roofed urgently so that water is portable. Some already using it, putting them at risk diseases

Flourishing Banana plantation

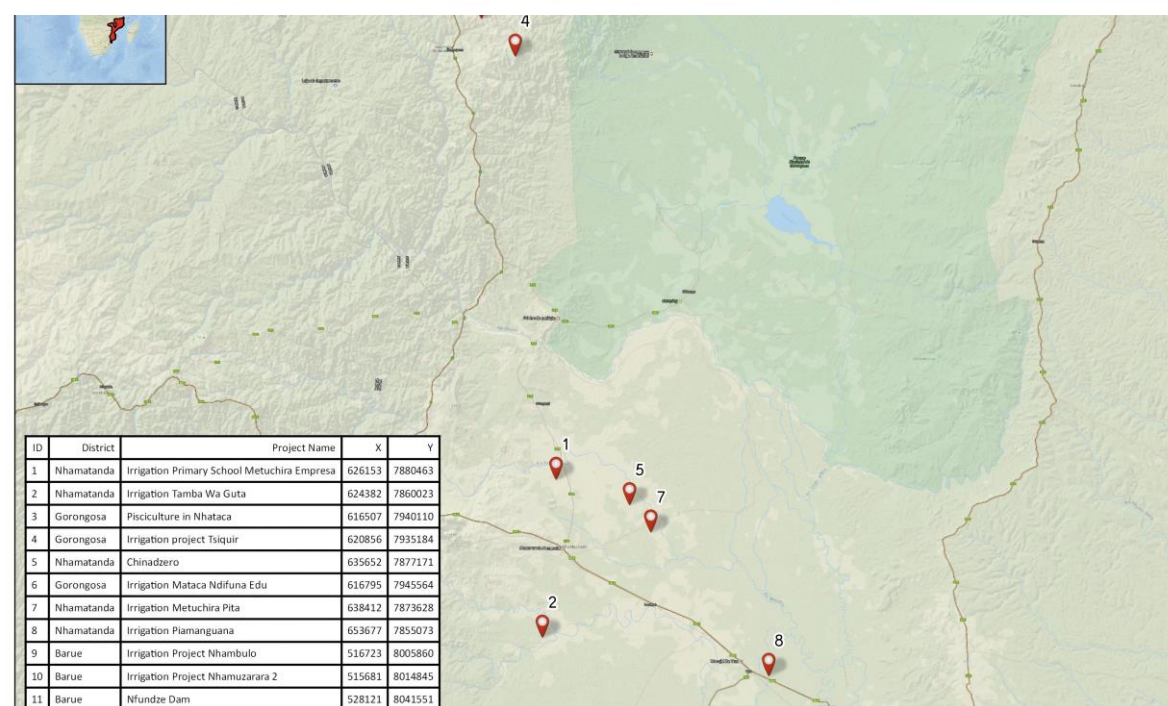
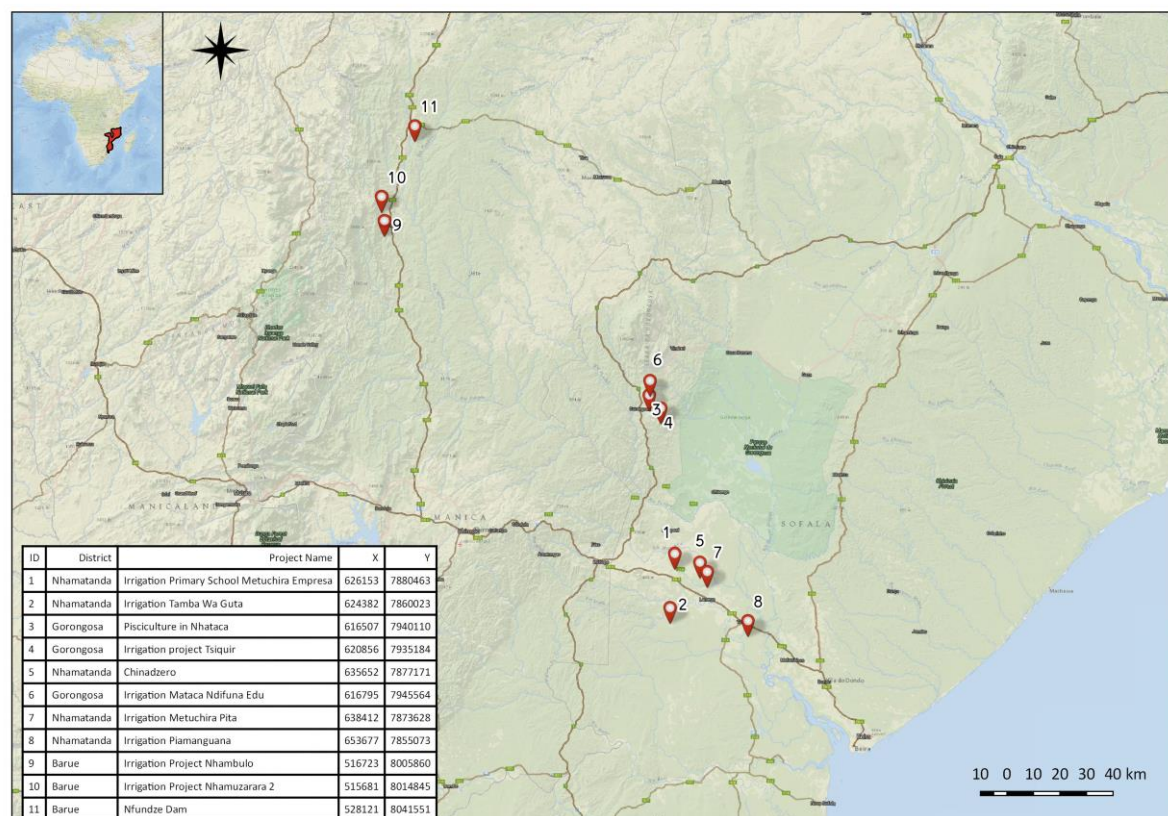


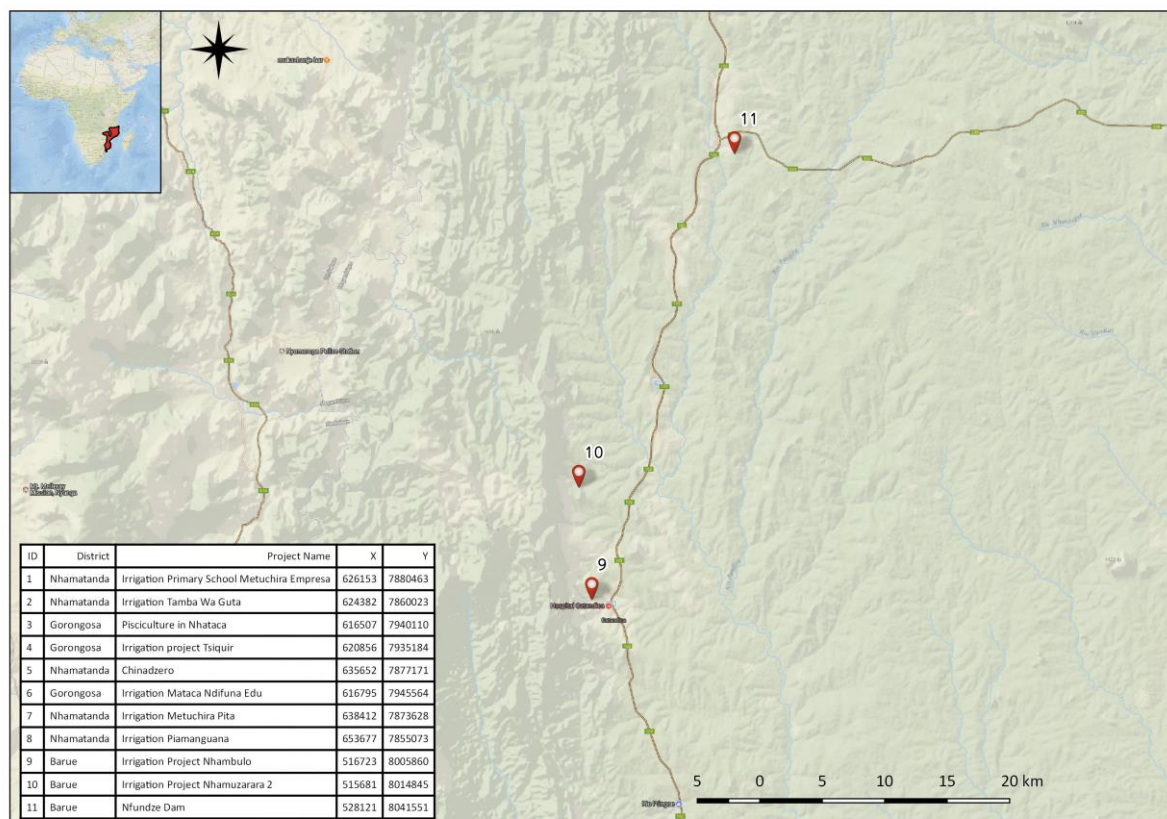
Reservoir that needs a roof



Kushinga Irrigation Scheme

Annex H – GPS locations in Mozambique





Annex I – Training for ZINWA-Save, 2012-2016

TRAINING

2012

Course Training	Venue	Duration	Consultant	Small Grants Funds	Participants Zinwa	Stakeholders	Females	Total
IWRM	Village Inn-Nyanga	27-28 Feb 2014	Zinwa	10		7	5	17
Water Governance and integrity	Village Inn-Nyanga	June	Ministry Officials & Zinwa	10		12	8	22
Water Allocation and Pricing	Village Inn-Nyanga	June	Ministry Officials & Zinwa	10		12	8	22
Project Planning and Mgt	Catchment Office-Mutare	May	Mr. Mandewo(Africa University)		14		1	14
Small & Medium dams designing and maintenance	Gorongosa				3			3
Budgets Preparation and implementation	Village Inn-Nyanga	24 th Sept 2012	Ministry & Zinwa Officials			22	10	22
Risk Management	Village Inn-Nyanga	19-21 June	Continued Professional Development (Cpd)		7		1	7
Credit & Sales Mgt	Village Inn-Nyanga	19-21 June	Continued Professional Development		15		2	15
Leadership Skills and Building high performance teams	Village Inn-Nyanga	19-21 June	Continued Professional Development (Cpd)		6		1	6
Time, Priority and stress Mgt	Village Inn-Nyanga	July	Continued Professional Development (Cpd)		6		1	6
Motivation	Village Inn-Nyanga	July	Continued Professional Development(Cpd)		16		1	16
Marketing	Village Inn-Nyanga	12-14 Sept 2012 17-19 Oct 2012	Continued Professional Development (Cpd)		16 15		4 2	12 15

2013

Course Training	Venue	Duration	Consultant	Small Grants Funds	Participants Zinwa	Stakeholders	Females	Total
Monitoring & Evaluation training	Musangan o Lodges-Mutare	8-10 Nov	Punda Milia Strategy		11		2	11
	Village Inn Nyanga	8-9 June	Punda Milia Strategy		8		1	8
Integrated Results based Management	Musangan o Lodges-Mutare	8-10 Nov	Punda Milia Strategy		11		2	11
	Village Inn-Nyanga	1-2 June 2013	Punda Milia Strategy		10		1	10
Converting inquiries into sales training	Catchment Offices-Mutare	15-16 June, 22-23 June	Continued Professional Development (Cpd)		50		2	50
Scorecard performance management system	Musangan o Lodges-Mutare	8-10 Nov	Punda Milia Strategy		11		2	11
	Village Inn-Nyanga	12-14 July 2013	Punda Milia Strategy		8		1	8
HIV/AIDS & Counselling	Nyanga	August				17	8	17

2014

Course Training	Venue	Duration	Consultant	Small Grants Funds	Participants Zinwa	Stakeholders	Females	Total
Public Relations & Customer Care	Musangano Lodge	June	Africa University		20		5	20
Team Building & Motivation	Musangano Lodges	June	Africa University		12		2	12
Conflict Mgt & Negotiating Skills	Musangano Lodges	June	Africa University		12		2	12
Project Planning & Mgt	Nyanga	Sept	Mr. Mandewo	10		8	7	18
Agribusiness & Marketing	Nyanga	Sept	Mr. Mandewo	10		8	7	18
Water Resources & Hydrological Modelling (Pitman and WEAP models)	Garusso, Mozambique	12-16 May 2014	Eduardo Mondlane University		4			4
Geographic Information Systems & Remote Sensing Applications on Inventorying and	Catchment Office-Mutare	June	Mr. Jairos Yona (Allied Systems)		14		2	14

Estimation of Water Use.								
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2015

Course/Training	Venue	Duration	Consultant	Small Grants Funds	Participants Zinwa	Stakeholders	Females	Total
Community Based Project Cycle Mgt	Village inn Nyanga	15-17 July 2015	International Union for Conservation Of Nature			25	10	25
Local Environment & Water Resources Planning	Village Inn Nyanga	15-17 July 2015	International Union for Conservation Of Nature			25	10	25
Trans boundary Environment Flows Assessment	Cape Town, SA	30 Nov - 03 Dec	Universities of Botswana & Western Cape		8		1	8
Flood Forecasting and Management	Gondola, Mozambique	20-24 Oct 2015	Eduardo Mondlane University		4		1	4

2016

Course/trainin g	Venue	Duratio n	Consultant	Small grants funds	Partici pants ZINW A	Stakeh olders	Women	Total
Gender Mainstreaming on IWRM PROJECTS	Nyanga	March	Ms. Tsinakwadi		5	13	8	18
Study Tours for Senior Officials from DNA, MEWC to the Buzi & Save River basins	Save and Buzi basin	May	Member countries		11		2	11
Identification of Primary Hydrometric Network Sites	Save and Buzi basin	May-June	Gontsi Consultancy		4		0	4
On job Training on Operation of Irrigation Schemes	Takazvida Irrigation Scheme	June	Zinwa & Dept Of Irrigations Engineers	17 households representatives				17 households
On job Training on Operation of Irrigation Scheme	Nyamako vero SGF irrigation Scheme	July-Oct	Zinwa & Dept Of Irrigations Engineers	15 households representatives				15 households
Customer Care Negotiating Skills Team Building		June-Sept	Mr. Mandewo (Africa University)		24		6	24
Data Logger Software configuration training	Buzi & Save basin	July	Gontsi Consultancy		8		0	8
Environmental Flows training	Manica (Mozambique)	July	IUCN and PP2		4		0	4

Flood forecasting modelling		13-14 Oct			8		0	8
Dam Safety, Operation and Maintenance	Musangan o Lodges-Mutare	Nov	Zinwa Engineers		25		1	24
Gender Mainstreaming workshop on IWRM projects	Catchment Office-Mutare	Nov	Ms Tsinakwadi		10	12	6	22
Project Mgt Workshop	Nyanga	Nov	Mr. Mandewo (Africa University)			12	6	18



Evaluation of the Pungwe Basin Transboundary Integrated Water Resources Management and Development Programme (PP2)

This is the report of the first phase of the evaluation of the Pungwe Basin Transboundary Integrated Water Resources Management and Development Programme. The evaluation was commissioned by Sida and the Embassy of Sweden in Addis Ababa to NIRAS Sweden AB, and was carried out between September 2017 and May 2018. The Programme was initiated in 2007, following the engagement of Sweden in the joint management of the Basin dating back to 1998, and was completed in April 2017. This first phase of the evaluation took stock of progress shortly after completion of the Programme, and developed a baseline for the second phase of the evaluation that will be carried out in 2020.

The evaluation found that the Programme has been generally effective, especially in terms of strengthening the capacity of water management organisations in Mozambique and Zimbabwe. Improvements in the institutional setup have proved more difficult to achieve, though. The Programme was highly relevant and contributed to regional cooperation, but its efficiency could be improved. There are concerns about the future sustainability of Programme results given fragilities in staffing and financial resources, especially in Mozambique.

The recommendations emphasize the need to focus of the Programme on a smaller number of activities targeting the core business of the basin management organisations; and on measures for strengthening the financial and technical sustainability of Programme results.