



## **Deliverables 1 and 2: Activity Report and Draft Scope of Work for Follow-on Activity**

**RS01-016, Scoping Support to Illovo Sugar's 'Maragra Smallholder Sugarcane Development Project', Mozambique**

**Version 2**

25<sup>th</sup> June 2014



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**Disclaimer**

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## Acronyms

CRIDF	Climate Resilient Infrastructure Development Facility
EU	European Union
Ha	hectares
SADC	Southern African Development Community
AMSP	European Union Accompanying Measures for former Sugar Protocol countries
MoU	Memorandum of Understanding
DFID	Department for International Development
TWM	Transboundary Water Management

## Introduction

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### Context: Every river...

Every river yearns for the sea, in flood doubly so. Of course one would not think so having seen the InKomati River winding its way across its floodplain in the dry season. Here the river, nearing the end of its life, wanders aimlessly shifting direction back and forth, seemingly in no rush to the sea just a few kilometres away. Like many of us in our dotage, the river has made deposits along its banks and bed, building up a wide fertile plain of clay rich soils over the millennia. Sugar estates, taking advantage of this largesse, have sprung up along both sides of the river, where clay rich soils and high water tables contribute to high cane yields with little or no irrigation demand.

However, the InKomati River on its floodplain, again like all of us in our twilight years, is prone to spread a little when overfed. The lower InKomati River, over the last few decades, has experienced a number of floods which one would expect to typically have much longer return periods, resulting in considerable economic loss for the sugar estates and hardship for the local community. This hits poor smallholder sugar cane growers, without a wider financial safety net, hardest. The Sugar Estates have responded with flood risk avoidance and minimisation measures, protecting and isolating cane producing areas through dykes and berms - channelling and diverting the river away from the cane fields. To date this has largely occurred in an uncoordinated and responsive manner, and without an overall view or understanding of the flood hydrodynamics of the floodplain system. The two large Estates, the downstream Magara Scheme managed by Illovo Sugar, and the upstream Xinavane Scheme managed by Tongaat-Hulett, have separately pursued flood protection works, potentially exacerbating the flooding problem.

Girdling and constricting the bloated river has, as one might expect, caused it to bulge and burst out in quite unexpected places... increasing flood risks in places and complicating flood response mechanisms. The most recent flood in February 2014 is said to have 'come from the wrong side', potentially a result of changing the hydrodynamics of the river. The result was that the water was dammed behind the flood protection works, increasing the losses due to the floods.

### The Opportunity: Maragra flood risk, EU smallholder scheme, overlapping CRIDF mandate

On the back of CRIDF's engagements with Illovo in Malawi, the Facility was invited by Illovo to provide a rapid expert opinion on; i) the possible increase in flood damage due to protection works on the floodplain at their estate, as well as ii) plans for flood protection works for a further 2,000ha of food and sugar crops incorporating 4,000 new out-growers.

On the basis of the request, two CRIDF staff members were mobilised and travelled to the lower InKomati to meet Illovo stakeholders and to provide an opinion on the above; and to assess the potential for further engagement of this as a CRIDF Project.

## Current situation and future plans

Illovo has established a Mozambique operation at Maragra some 60 km north of Maputo, and conducts agricultural production (sugar cane) and milling. The mill has agreements with a range of out growers (on a continuum of large commercial to small-scale family operators) to supplement their own cane production. The mill is reported to operate at 84% of capacity (2013), implying that further out grower production can be accommodated. Illovo won a grant from the EU Sugar stabilisation Fund to contribute to the expansion of small-scale out grower production.

Tongaat-Hulett has also established a Mozambique operation and conducts agricultural production (sugar cane) and milling at Xinavane north of Maputo. The estate is some distance up-river from the Maragra estate. The mill has agreements for a range of out growers (on a continuum of large commercial to small-scale family operators) to supplement their own cane production. Hulett also won a grant from the EU stabilisation Fund to expand small-scale out grower production.



**Figure 1: Google Earth image of the project area indicating the 1:100 year floodline**

CRIDF's initial engagement noted that all stakeholders are subject to seasonal floods occasionally of some magnitude, as well as water shortages in the dry season. Anecdotal evidence suggests that the magnitude and return periods for larger floods is increasing. Xinavane indicated some \$8m damage from recent flood events. The CRIDF team noted that it is likely that the flood defences already in place may alter the hydraulics of the floodplain in both upstream and downstream directions potentially affecting other stakeholders and ecological functioning. The team therefore recommended that both Xinavane and Maragra jointly investigate flood management works with the support of a flood hydraulic model of the whole floodplain area, up to the border with South Africa. This recommendation was put to both Estates, and they have agreed to, for the first time, jointly engage the problem through the catchment management forum under ARA-Sul. In this regard, Xinavane has agreed to hold off its plans to construct new flood defences until a joint decision can be reached.

## Institutional arrangements

Both estates are managed with vertically integrated elements of cane production (classified as agricultural) and sugar processing (classified as industrial). The 'core' processing throughput is guaranteed by the estate production, with supplementary supply from a range of large and small outgrowers. It is reported that the core estates are unable to negotiate further landholding or leases in order to expand their production.

**Commercial outgrowers:** a number of commercial operations have responded to demand for more cane (arising from underutilisation of milling capacity). The status of land tenure for these outgrowers is unclear, but probably relies on local-level agreements (permissions to occupy) as leases with communities in the area.

**Small-scale family outgrowers:** a significant cadre of small producers, growing cane under the supervision of the estates, also produce cane for sale to the mill. These farmers are guaranteed a market, and assisted with advisory services, inputs and centralised services (like transport etc.).

A significant expansion of small scale outgrowers is underway under EU Sugar Stabilisation Funding with co-funding from Illovo and Tongaat-Hulett. In excess of 4,500 people will be added to the small scale outgrower cadre just at Maragra, bringing a significant amount of new land under sugar (and food crop) production.

The combination of employment (several thousand full-time and part-time jobs between the two mills and major outgrowers), large scale and small scale production contributes significant economic benefit in a rural area. The multiplier is believed to be significant, with anecdotal evidence pointing to significantly accelerated local development as a result. One of the specific tasks for follow-on work will seek to analyse and document this multiplier, potentially to support other CRIDF projects along a similar vein.



Figure 2: Existing smallholder out-grower cane and vegetable production at Maragra

## The Existing Flood Management Strategy

### Individual responses in an integrated system

Currently the flood (and low-flow) strategy for the lower InKomati is fragmented and uncoordinated. Individual estates and outgrowers as well as informal subsistence farmers all assess their own exposure and risk and prepare flood defences on the basis of this analysis. It is possible that the actions of individual stakeholders over the years has had unintended consequences both on the floodplain ecosystem as well as on neighbouring farmers assets. This is particularly likely in relation to uncoordinated canalisation, building of flood defences to protect fields from flood as well as modification of wetlands (that have historically provided a buffer to absorb and lessen the impact of flood events).

All stakeholders interviewed cite evidence that the area is experiencing more frequent and more severe flooding. However there is less certainty on the cause of the increased flooding; how much can be attributed to increased water flow entering the lower InKomati and how much can be attributed to anthropogenic modifications of the flood plain hydrology.

It is clear from discussions with a range of stakeholders that the limits of this strategy are apparent to all participants, and that the case for an integrated flood management system (probably under the oversight of the mandated regulatory authority – ARA-Sul) is both obvious and accepted.



**Figure 3 InKomati river flowing close to the main Maragra flood dyke**

## Climate Futures: ‘no regrets’ investments

Irrespective of the cause of the increased flooding, any investment (in human and physical capital) that improves the ability of the stakeholders and the catchment management authorities to deal with increased uncertainty and risk is a ‘no regrets’ option. The ability of communities to adapt and manage uncertainty and risk through proactive management as well as infrastructure equips them to deal with potential climate change in the future.

Critical to this proactive approach is a shift in emphasis from ‘planning to treat increasingly serious symptoms’ – or flood avoidance infrastructure; towards ‘analysis and understanding the cause of uncertainty and risk’ – or managing risk through infrastructure, operations and financial buffers. The limits of physical flood protection works and the capital cost of these works are quickly reached, both in financial costs and in the ecology of the floodplain and associate ecosystems services. The shift in emphasis to understand and manage floods - rather than try and control them – is critical.

This is represented in the figure below.

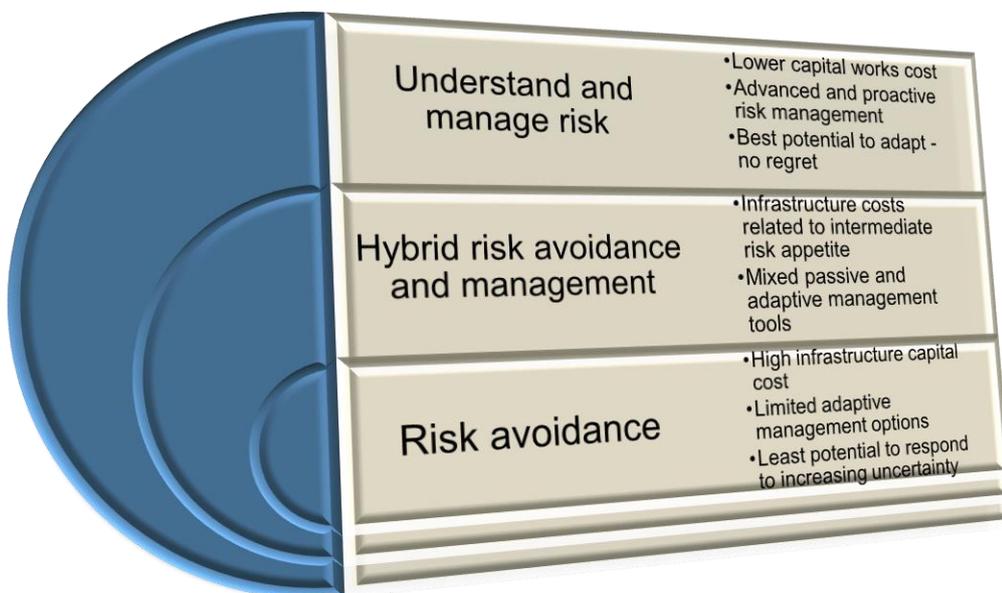


Figure 4 Risk Approach, Cost and management Implications

## Out-growers: strategically important, significantly more vulnerable

Notwithstanding the beneficial and symbiotic relationship between formal, large business interests and small-scale more informal stakeholders, a number of significant risks to small farmers is apparent. The mill owners and estate producers are SADC-wide multinational companies. Their risk, from individual events and specific causes, is therefore managed within the context of; i) underwriting through significant group resources and an active insurance portfolio, ii) a geographic and country spread of operations that isolates individual events and specific causes to only one group site. In contrast, for small producers (and indeed from large outgrowers) there is a significantly increased risk from individual events and location-specific causes. The smaller scale growers; i)

do not have access to formal risk management tools such as insurance, and ii) are specifically site-bound and therefore susceptible to geographically localised events like floods.

Cognisance of differential risk for the groups of stakeholders, especially in the context of increased climate variability and change, needs to be recognised if an integrated and innovative approach to flood management, or indeed drought management, is to be taken forward.

CRIDF engagement of the lower InKomati flood and drought challenges faced by the Sugar Estates, and particularly the small scale outgrowers (especially through the local and national water management agencies, ARA Sul and DNA) therefore has strategic benefits for the Facility. It will allow the Facility to;

- Expand its relationship to Illovo, with respect to financing some projects, its water stewardship functions across SADC, and its CSR engagement;
- Examine the potentially higher multiplier effects associated with contract farming involving the rural poor, for potential replication where other opportunities and corporates allow;
- Introduce the concepts of risk management on multiple levels to the water management authorities in Mozambique;
- Further build relationships between Mozambique and South Africa by extending flood warnings across the border; and
- Expand its portfolio of projects to include a flood and drought management and offsetting Project.

## Recommendations for follow-on Scoping Study

### Design and implement scoping activity

For all the reasons outlined above, it is recommended that CRIDF takes this potential Project beyond the advice offered under this RAS. However, recognising that further groundwork and agreement on the scope of work is needed by all stakeholders, this should be initiated with a scoping level eligibility assessment on the basis of the draft ToR as attached in Annex 2, including:

- Institutional engagement and arrangements
- Definition of Technical requirements for and viability of flood modelling
- Financial options analysis

It is recommended that the team proceed with scoping activities as soon as possible to ensure that momentum is maintained.

### Develop and distribute draft MOU

Using the draft below (Annex 1) as a starting point, distribute and initiate discussions with DNA, ARA-Sul and the two sugar estates. Finalise during the implementation of the scoping activity.

Annex 1: Draft MOU

## **Draft Memorandum of Understanding**

**regarding**

### **Support to the Development of Flood Management Procedures and Flood Protection Works for the InKomati Floodplain in Mozambique**

## PREAMBLE

### **RECOGNISING** that;

The lower InKomati River floodplain has experienced a number of severe floods over the last few decades, and the frequency and intensity of these floods appears to be increasing. These floods have devastating impacts on the rural poor in the floodplain area, and smallholder poor sugarcane farmers supplying the Sugar Mills at Maragra and Xinavane are particularly vulnerable to losses due to flooding. These floods also result in damage and losses for the Maragra and Xinavane Sugar Estates, and affect the financial and economic viability of these schemes, which in turn impacts on the local economy of the region with considerable knock on effects for the poor.

Both Maragra and Xinavane wish to expand and support their smallholder cane supplier schemes, and have secured financial support from the European Union Accompanying Measures for former Sugar Protocol countries (AMSP) in this regard. However, regular flooding is likely to compromise the long-term viability of these smallholder cane supplier schemes. The development of flood control measures has consequently been included in the EU support programme to Maragra.

Joint and conjunctive management of the flood regime and development of flood control works holds mutual benefits for both schemes. This may realise cost savings for both schemes, and can avoid conflicting flood management and control responses. Any flood control and management works must also ensure minimum flows can still mitigate saline intrusion, and must minimise further impacts on the ecological functioning of the system on which the rural poor depend.

Flood management and flood impact mitigation must include the following elements;

1. reducing the impact of the Floods on the Maragra and Xinavane schemes through developing and operating infrastructure on the floodplain;
2. flow monitoring and flood warnings; and
3. the management of existing and new storage infrastructure to reduce flood peaks;

Mozambique's National Directorate of Water and ARA Sul have ultimate responsibility for monitoring and managing the water resources of the lower InKomati Basin, including flood management, and must be involved in any flood management and flood warning project. Similarly, as the InKomati is a transboundary river, the flood management and warning efforts of the InKomati Catchment Management Agency in South Africa can be integrated with systems inside Mozambique. Importantly also, any infrastructure and non-infrastructure solutions prepared to manage flooding and regulate the river must remain fully compliant with all relevant legislation as well as policies in Mozambique.

The Climate Resilient Infrastructure Development Facility (CRIDF); supported by the Department for International Development (DFID), of the United Kingdom of Great Britain and Northern Ireland; has noted that Flood Management and Flood Control infrastructure has pro-poor benefits, builds climate resilience and can build cooperation between Mozambique and South Africa. The Facility has consequently committed to work with Maragra and Xinavane Sugar Estates to develop Flood Management Protocols and support the design of Flood

Control infrastructure for both schemes, particularly with respect to increasing both the numbers of poor small holder farmers and increasing their resilience to floods.

These efforts would be strengthened by establishing a framework for cooperation which promotes the successful, cooperative and timely design, delivery, and subsequent operation / implementation of infrastructure and non-infrastructure flood mitigation options for the lower InKomati Floodplain for the Maragra and Xinavane.

In consequence thereof, we, the representatives of the:

Climate Resilient Infrastructure Development Facility (CRIDF);

Maragra Acucar Sugar Scheme; and

Xinavane Sugar Scheme;

(the Parties)

**HEREBY** agree to the following framework for cooperation for the development of Flood Management Protocols and associated Flood Control Infrastructure.

## **Article 1: Objectives and General Commitments**

- 1.1 The objective of this Memorandum of Understanding is to establish a framework for cooperation that promotes the timely identification, design, delivery and implementation of Flood Management Protocols and Infrastructure which reduces the vulnerability of the Maragra and Xinavane Schemes, and especially the smallholder Farmers and the poor.
- 1.2 The Parties agree to cooperate fully with respect to all actions necessary to achieve the objective of this Memorandum of Understanding. Cooperation shall include, but will not be limited to:
  - i. Communicate in a timely manner on all matters relevant to the implementation of this Memorandum;
  - ii. Making staff available for meetings, site visits or workshops as required for the successful conclusion of the proposed activities and achievement of the objectives of this Memorandum;
  - iii. The provision of any available data, free of any charges or duties, in so far as these data are necessary for the completion of the proposed activities. This does not include any charges associated with the collation and dissemination of the data on the media required;
  - iv. Facilitating rights of access to the Maragra and Xinavane sites, subject to any normal restrictions on right of access to such schemes; and
  - v. Expeditious and timely response to any reasonable requests for data, participation in a Steering Committee, workshops and field visits, in so far as these are required to achieve the objectives of this Memorandum of Understanding.

## **Article 2: Scope of Activities**

- 2.1 The following Activities are included in this framework for cooperation; and will be detailed in Terms of Reference to be prepared by CRIDF:
  - i. A Scoping Assessment to define the requirements of all the stakeholders;
  - ii. The development and calibration of a Flood Model capable of delivering on the requirements of all the stakeholders;
  - iii. The development of a Flood Warning system;
  - iv. The development of Flood and drought operating rules for storage infrastructure in the Mozambique portion of the InKomati River Basin; and
  - v. The development of 'flood insurance schemes' for smallholder Farmers.
- 2.2 Activities may added or removed by any of the Parties, which will be considered by the Steering Committee established under Article 6 of this Memorandum of Understanding. New Projects would be considered on the basis of their alignment with the intention of this Memorandum of Understanding.

**Article 3: CRIDF**

3.1 The Climate Resilience Infrastructure Development Facility (CRIDF) will:

- i. In full consultation with the Steering Committee, support the development of socially, environmentally, and technically viable solutions to mitigate and minimise flood damage and losses, through the calibration of suitable flood and hydrological models;
- ii. Purchase any software necessary for the operation of these models;
- iii. Seek external support for LiDAR surveys of the floodplain area;
- iv. Cover the technical assistance costs of all studies required to successfully calibrate the models, prepare flood risk maps and design the flood control infrastructure and flood management protocols, the flood warning systems, and storage operating rules; including all consultancy and staff fees, travel and per diem costs of these staff and consultants;
- v. Provide independent engineering check services during the construction of any infrastructure if required;
- vi. Provide guidelines and proposals for flood insurance schemes for smallholder Farmers;
- vii. Support Maragra and Xinavane with the flood and flow data and information required to apply for any authorisations required under Mozambique legislation;
- viii. Support and advise DNA and ARA Sul regarding any potential reservoir storage operating rules, and flow and flood monitoring and warning systems;
- ix. Provide regular and on demand feedback on progress on any Activity as required or requested by any of the Parties;
- x. Support Maragra and Xinavane with any flood risk related information required to support their engagement with the smallholder Farmers;
- xi. Seek additional financial support for any infrastructure required for flood control or warning, but not covered by the Maragra and Xinavane Schemes or the EU grant; and
- xii. Provide any capacity building required for the successful implementation of the Flood Management Protocols.

**Article 4: Maragra Sugar Scheme**

4.1 The Maragra Sugar Scheme will:

- i. Lend full cooperation in support of achieving the objectives of this Memorandum of Understanding;
- ii. Identify staff, and any external consultants required, who will participate in the Steering Committee, and who would serve as the primary contact point for engagements related to this Memorandum;

- iii. Cover all the fees and reimbursable costs of any external consultants required and not covered by CRIDF;
- iv. Prosecute the EU supported Maragra Smallholder Sugarcane Development Project as required by their contractual obligations under that Project;
- v. Consider diverting any savings made under the EU support grant that arise as a result of CRIDF's support to increasing the number of beneficiary smallholder farmers;
- vi. Cover all travel costs, staff remuneration and per diems, reimbursable costs of their staff in the territory of Mozambique, and in the prosecution of their commitments under this Memorandum of Understanding;
- vii. Provide in a timely manner any available data and / or information required for the implementation of Activities under this Memorandum of Understanding;
- viii. Facilitate CRIDF and consultancy staff access to the Maragra Scheme, as required to take any measurements required to support the implementation of this Memorandum of Understanding;
- ix. Provide logistical support, transport and accommodation for CRIDF staff and consultants on the scheme as required for Article 4.1 (vii);
- x. Engage their smallholder farmers and other stakeholders to identify flood risk areas or zones and socially and environmentally acceptable flood regimes on the scheme; and
- xi. After due consideration of any recommendations for the Flood Management Protocols and Flood Control Infrastructure proposed by CRIDF; to procure, design, implement and operate infrastructure to minimise flood losses, in particular for the most vulnerable members of the scheme and the surrounding communities.

#### **Article 5: Xinavane Sugar Scheme**

##### **5.1 The Xinavane Sugar Scheme will:**

- i. Lend full cooperation in support of achieving the objectives of this Memorandum of Understanding;
- ii. Identify staff, and any external consultants required, who will participate in the Steering Committee, and who would serve as the primary contact point for engagements related to this Memorandum;
- iii. Cover all the fees and reimbursable costs of any external consultants required and not covered by CRIDF;
- iv. Prosecute the EU supported Xinavane Smallholder Sugarcane Development Project as required by their contractual obligations under that Project;
- v. Consider diverting any savings made that arise as a result of CRIDF's support to increasing the number of beneficiary smallholder farmers;

- vi. Cover all travel costs, staff remuneration and per diems, reimbursable costs of their staff in the territory of Mozambique, and in the prosecution of their commitments under this Memorandum of Understanding;
- vii. Provide in a timely manner any available data and / or information required for the implementation of Activities under this Memorandum of Understanding;
- viii. Facilitate CRIDF and consultancy staff access to the Xinavane Scheme, as required to take any measurements required to support the implementation of this Memorandum of Understanding;
- ix. Engage their smallholder farmers and other stakeholders to identify flood risk areas or zones and socially and environmentally acceptable flood regimes on the scheme; and
- x. After due consideration of any recommendations for the Flood Management Protocols and Flood Control Infrastructure proposed by CRIDF; to procure, design, implement and operate infrastructure to minimise flood losses, in particular for the most vulnerable.

#### **Article 6: Steering Committee**

- 6.1 The Parties agree to establish a Steering Committee for the purposes of overseeing the implementation of the projects and the implementation of this Memorandum of Understanding.
- 6.2 The Steering Committee will meet nominally on a quarterly (3 monthly) basis, or as required in Maragra, Mozambique. These meetings may be coordinated with any Project Steering Committee meetings required under the EU support.
- 6.3 Maragra will provide Secretariat Services and venues for Steering Committee meetings, which shall include:
  - i. Establishment of the meeting dates in consultation with the Parties, and attendees;
  - ii. Preparation of the invitations, draft Agenda, and Minutes of the meetings;
  - iii. The logistical arrangements and costs of the meetings including venue and catering costs, excluding any staff related direct costs;
- 6.4 The Steering Committee shall consist of staff identified by all the Parties, ARA Sul and DNA; as well as other agreed participants. Consultants required will act as input resources and observers.

#### **Article 7: Visibility**

- 7.1 The Parties agree to make all reasonable efforts to increase the visibility and promote the each of the Parties. This shall include but will not be limited to;
  - i. The inclusion of the Parties on any Project Signboards;
  - ii. Mention of participation by all the Parties in communication materials produced;
  - iii. Inclusion of the Project on their respective web sites where applicable; and
  - iv. Provision of corporate logos and to CRIDF, and agreement for their use in any promotional materials produced to promote the Project.

**Article 8: Closing Provisions**

- 8.1 This Memorandum of Understanding becomes effective on the date of the last signature of the Parties, and remains in effect for the duration of CRIDF, currently 31 March 2017.
- 8.2 This Memorandum of Understanding may be amended through a consensus decision of the Steering Committee, and after a submission by any of the Parties.
- 8.3 Notwithstanding the overarching commitments to cooperate; none of the Parties may be held liable by any action or failure to take action by any of the other Parties, nor any costs incurred as a result of such action or failure to take action.
- 8.4 Any of the Parties may terminate their participation in this Memorandum of Understanding by giving notice to the Steering Committee.

**IN WITNESS** thereof, the duly authorised representatives of the Parties have hereby signed the present Memorandum of Understanding at the place and the dates detailed below.

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For: Climate Resilient Infrastructure Development Facility  
Name:  
Date:  
Place:

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For: Maragra Sugar Scheme  
Name:  
Date:  
Place:

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For: Xinavane Sugar Scheme  
Name:  
Date:  
Place:

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## Annex 2 – Draft Follow-on ToR

### Background

The Climate Resilient Infrastructure Development Facility (CRIDF) is DFID's water infrastructure programme for southern Africa. Working to deliver sustainable small-scale infrastructure across 11 SADC countries, the demand-driven programme focuses on water services, water resource management, and water for livelihoods, fostering sustainable development of the region's water resources and addressing the water, food and energy nexus.

CRIDF prepares small-scale water infrastructure projects and facilitates access to finance for the implementation of these projects. Such interventions provide the entry point and platform for CRIDF to engage with, support and influence key SADC interventions, river basin organisations and national stakeholders. Activities are selected according to a set of CRIDF principles to ensure that investments align with strategic objectives that have been developed specifically for each SADC river basin.

As a result of CRIDF's work, poor people in countries of the SADC region will benefit from climate-resilient water infrastructure. The conditions for enhanced cooperation between stakeholders in shared river basins will be improved, and the evidence base – demonstrating the national benefits of cooperation on shared waters – will be strengthened. Through these outputs and outcomes the CRIDF programme will contribute to peaceful, climate-resilient and sustainable planning and management of shared waters in SADC, generating current and future benefits to the poor.

#### Project Background

The clay-rich soils and high water tables found along the banks of the meandering lower InKomati River have proved ideal locations for high-yielding sugar cane plantations, as little or no irrigation is required. However, over the last few decades the lower InKomati River has experienced a number of floods which one would expect to typically have much longer return periods, resulting in considerable economic loss for the sugar estates and hardship for the local community. This hits poor smallholder sugar cane growers, without a wider financial safety net, hardest.

The existing large-scale Sugar Estates have responded with flood risk avoidance and minimisation measures, protecting and isolating areas through dykes and berms - channelling and diverting the river away from the cane fields. To date this has occurred in a largely uncoordinated and responsive manner, and without an overall view or understanding of the flood hydrodynamics of the floodplain system. The two large Estates, the downstream Maragra Scheme managed by Illovo Sugar, and the upstream Xinavane Scheme managed by Tongaat-Hulett, have separately pursued flood protection works over a number of decades – which primarily involves heightening the dykes. Unfortunately, by interfering with the natural run of the river, these works may have exacerbated the risk of flooding in certain areas and negatively affected natural functioning of the wetland system and increased inundation periods. The most recent flood in February 2014 is said to have 'come from the wrong side', potentially a result of changing the hydrodynamics of the river further upstream. The result was that water was dammed behind the flood protection works, increasing the farmers' losses.

## Activity Background

Both Illovo Sugar and Tongaat-Hulett have acknowledged the need to reassess their current flood management strategies in response to recent flood events – not only for commercial purposes, but also as a vital part of their corporate social responsibility to the smallholder outgrowers involved in the Maragra and Xinavane schemes respectively.

At Illovo Sugar's request, and following CRIDF's engagements with Illovo in Malawi, the Facility recently mobilised a Rapid Advisory Service to discuss potential flood assessment support to the smallholder component of the Maragra Scheme. During this site visit (which included a mission to the Xinavane smallholder scheme) the limits of the current physical flood protection works were noted. The uncoordinated efforts of the two Scheme's separate flood defence works may have exacerbated the overall flood problem, and the flood defences were primarily reactive and based on avoiding rather than managing floods. The potential positive benefits of the floods in terms of maintaining certain ecological functioning, and bringing in nutrient rich sediments were not considered. It was agreed by all parties that a combination of flood risk mapping, flood warning systems and active/integrated risk management strategies for the whole floodplain area needed to be developed and implemented.

Moreover, while an informal flood warning system had been developed, it does not identify the potential flood before it gets into Mozambique, and does not adequately identify potential floods originating inside Mozambique. The integrated operation of Mozambique's existing and potential new storage infrastructure by DNA and ARA-Sul for both flood and drought had also not been considered as part of the flood mitigation package.

## CRIDF's Related Activity(ies)

CRIDF's initial engagement with Illovo Sugar stems from QW09-001 'Illovo Water Supply and Sanitation Project in Nchalo Town, Malawi'.

These Terms of Reference have been developed based on recent engagement with stakeholders at both Illovo Sugar's Maragra Scheme and Tongaat-Hulett's Xinavane Scheme, during RS01-012 'Scoping Support to Illovo Sugar's Maragra Smallholder Sugarcane Development Project, Mozambique'.

In addition, an MoU between the Clients, CRIDF and the relevant institutional bodies (i.e. DNA Mozambique and ARA-Sul) has been developed under RS01-012.

## Methodology

### Objectives

The primary objectives of this Activity are: i) to define the scope of work required to assess and manage the flood (and associated) vulnerability of the smallholder developments, and integrate this with the flood protection activities of the Sugar Schemes; and ii) to engage with and validate with DNA Mozambique and ARA-Sul that

this work is consistent with and complementary to activities already underway in the InKomati, and gain their support.

## Scope of Work

### 1) Institutional Engagement

The Project Lead, TWM Expert, CRIDF-DNA Liaison and Flood modeller will meet with DNA and ARA-Sul to garner their support for and involvement in CRIDF's proposed involvement. Specifically, they must:

- Outline the flood management support that CRIDF plan on providing to the smallholder developments;
- Assess DNA/ARA-Sul's knowledge of possible similar projects requiring this type of support in the InKomati, and their willingness to engage in this Project;
- Assess the need to involve/engage with TPTC and InKomati CMA in further Activities;
- Determine DNA and ARA Sul needs with respect to flood warnings and reservoir operating rules;
- Discuss the concept of developing an institutional Steering Committee for this stream of work; and
- Propose that a request be made to extend the World Bank/DFID LiDAR survey to cover the lower InKomati floodplain.

Engagements with the Maragra and Xinavane Schemes will facilitate the signing of the Memorandum of Understanding. The MoU includes their commitment to consider ploughing any savings that result from the CRIDF support into expanding their outgrower schemes, as well as direct and in kind contributions to the CRIDF Project. The operation of the Steering Committee in this respect will also be agreed.

### 2) Definition of Technical Requirements

The Project Lead, TWM Expert and Flood Modelling Expert will engage with key Maragra and Xinavane personnel to determine their specific needs with respect to flood protection works and flood management. The intention is to ensure that modelling platforms are selected that can:

- Map flood risk areas at different return flow risks (Flood Risk Mapping);
- Identify best options for flood protection infrastructure and management;
- Improve flood warning systems (and guide management of these systems);
- Manage the existing and new storage to minimise impacts (including natural storage and wetland systems); and
- Shift from flood control to risk-based flood management.

The requirements to include flood risk maps to GIS systems, and the use and maintenance of these systems and modelling platforms must also be agreed. This should include options for the purchase of the modelling software, potential training of staff and modelling system maintenance.

**3) Financial Needs Assessment**

The Infrastructure Finance Expert must assess the need for financial support mechanisms to the smallholder outgrowers, specifically with respect to integrating this into the flood risk management system. This would include recommending potential options to be explored, with a potential view to expanding the system to other outgrower schemes and drought risk.

**Activity Timetable**

The Activity is expected to start 16/06/2014 and last 3 weeks.

**Activity Deliverables**

	Deliverables	Completion week
D01	Minutes from engagement with DNA and ARA-Sul	2
D02	Report and agreement on technical support, modelling requirements, and scope of flood management initiatives required to reduce the vulnerability of smallholder developments	2
D03	Financial support needs assessment	2
D04	Draft Scope of Work and Terms of Reference for the follow-on Activity	3

## Staffing

Name	Role	Days per deliverable				
		D01	D02	D03	D04	Total
Taz Chaponda	Portfolio Lead/ Finance Expert			2		2
Bruce Mead	Project Lead	1	1	1	2	5
Jeffer Sakupwanya	CRIDF-DNA Liaison	2				2
Caroline Brown	Portfolio Manager	1	1		1	3
Gavin Quibell	TWM Expert	1	2	1	2	6
Jason Hallowes	Modelling Expert	1	5		1	7
<b>Total</b>		<b>6</b>	<b>9</b>	<b>4</b>	<b>6</b>	<b>24</b>





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