



Limpopo Basin Data Sharing and Early Warning Flood Forecast System (EWFFS)

Stakeholders in Mozambique Workshop
1st March 2017



Agenda

Introductions	08:00
Update on CRIDF Programme and CRIDF2	08:15
Recap on the project Progress to Date Project Implementation Plan (PIP) Economic Analysis of the EWFFS	08:45
presentation on how the EWFFS works	09:15
TEA BREAK	10:00
Agreement how to make the system operational (agricultural companies with government organisations)	10:15
Dates for training	11:15
Any other business	11:30



Update on CRIDF

- 💧 **Climate Resilience Infrastructure Development Facility;**
- 💧 **DFID's water infrastructure support programme in Southern Africa, taking lead from SADC's vision commenced in May 2013. Programme finishes in March 2017. CRIDF2 due to commence from April 2017**
- 💧 **Delivering water related infrastructure in SADC Countries, building climate resilience for the poorer communities, needs to be sustainable**
- 💧 **Peaceful and climate resilient management of shared water resources in SADC for the benefit of the lower income communities : projects within the major river basins**
- 💧 **Approach is commencing with pilot projects expanding to a transboundary approach.**

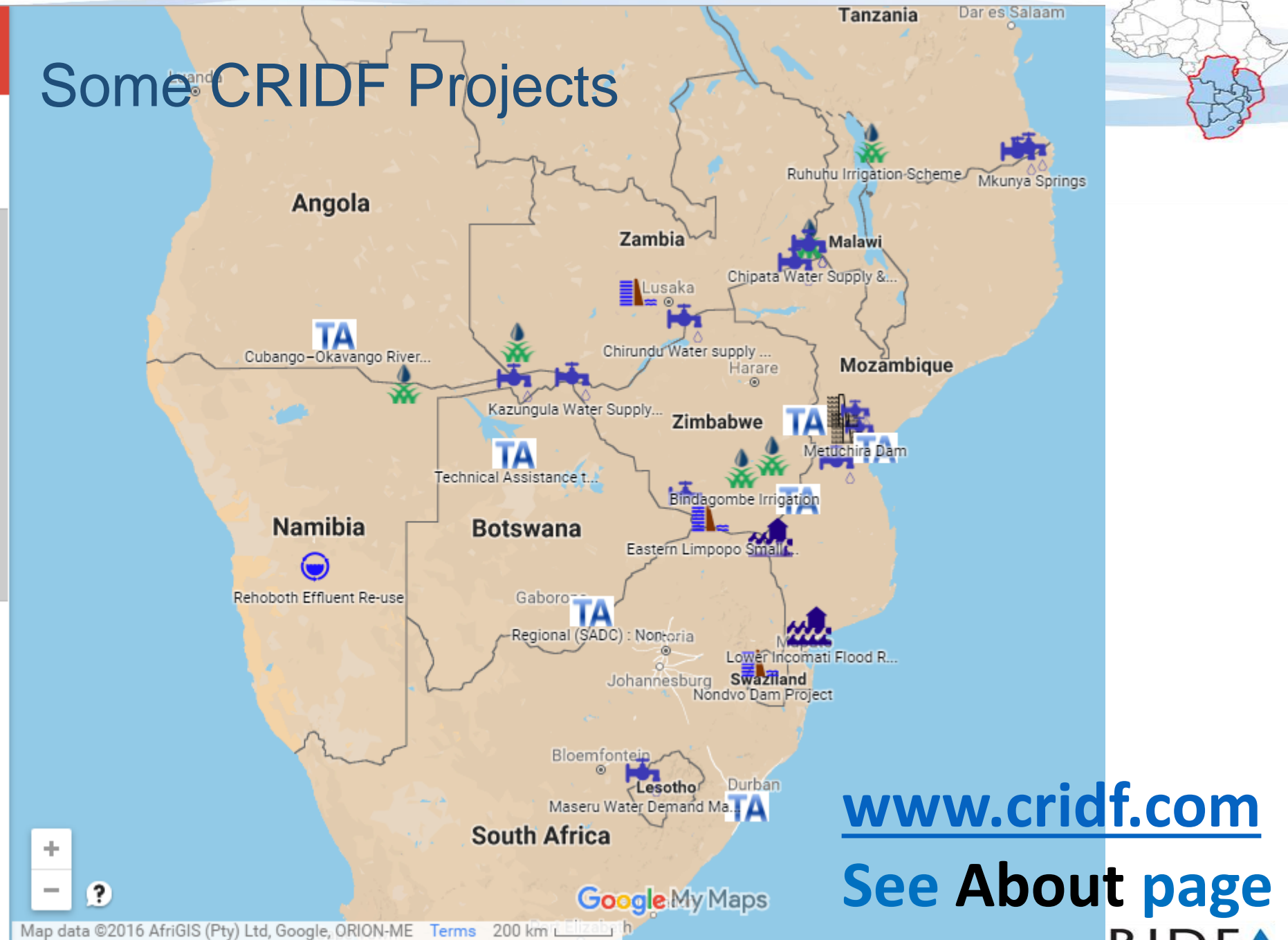


CRIDF projects



- Bindagombe Irrigation
- Kufundada Irrigation
- Chibabava WASH and Flood protection
- Kazungula Water Supply & Sanitation
- Chirundu Water supply & sanitation
- Chipata Water Supply & Sanitation
- Mashili Small Dam
- Metuchira Dam
- Gorongosa dam
- Ruhuhu Irrigation Scheme
- Ntalale Water and Sanitation Rehabilitati...
- Eastern Limpopo Small Dams
- Maseru Water Demand Management
- Rehoboth Effluent Re-use
- Limpopo Flood Monitoring (Botswana, M...
- Mayana Community Climate Vulnerabilit...
- CCAP Sioma/Malombe Irrigation
- CCAP Chikowa Irrigation
- Makonde Water Supply Scheme

Some CRIDF Projects



www.cridf.com

See About page

CRIDF



Project Objective

Establish a system to transmit **near real-time data** from critical flood flow monitoring points in the upper Limpopo and its tributaries in each LIMCOM Member State to a **central server**, and to establish a flood routing model to determine the **likely extent and timing of floods** at critical points downstream, especially in Mozambique.



Project Phases

- **Phase I:** Determine flow gauges, transmit flow data from rainfall runoff data / water level gauging stations in all four countries, predict likely extent and timing of downstream flooding
- **Phase II:** Secure financing for improved flow gauging stations, water infrastructure implementation (civil works rehabilitation of weirs)
- **Phase III:** Heightened awareness system, increase warning times for flooding to more than one / two weeks

The project is currently at the end of Phase I

Description of the Project Area : Site Selection & Model



Limpopo Basin 402,000 km²

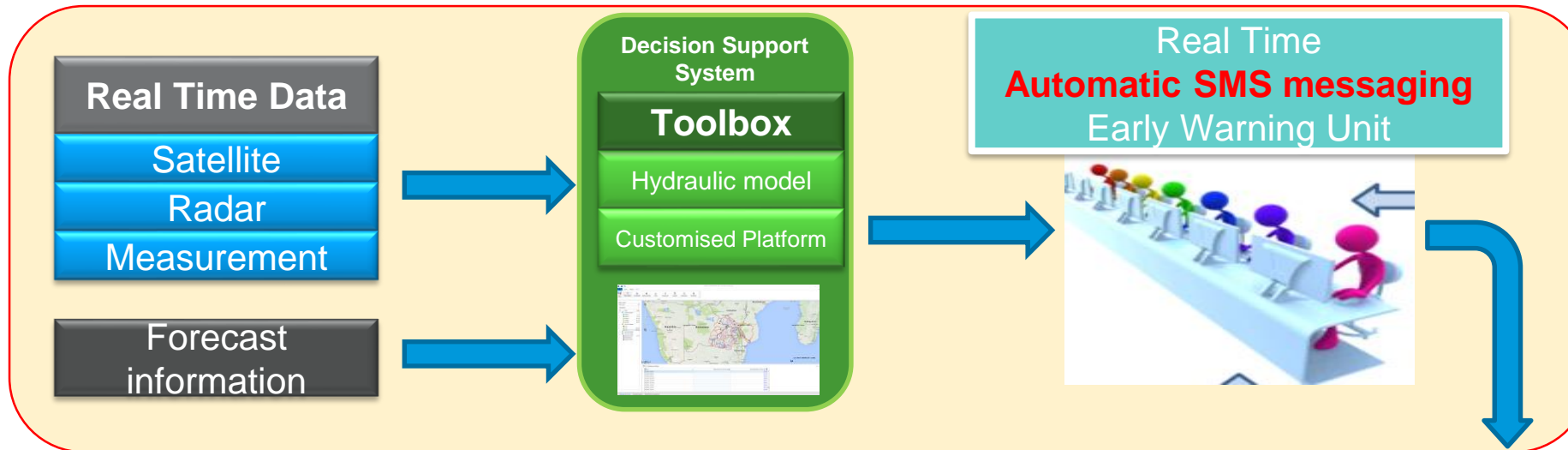
Branch Name	Length (kms)
Limpopo	1509
Shashe	65
Bubi	148
Mwenzi	325
Luvuvhu	118
Oliphants 1	220
Oliphants 2	85
Total	2470

Pilot project
Mike Customise: EWFFS model
One node every 10 kms
River cross sections from 90m
resolution DEM
Model built
Flooding thresholds to be decided

Success Phase 1A : Early Warning Flood Forecasting System (EWFFS)



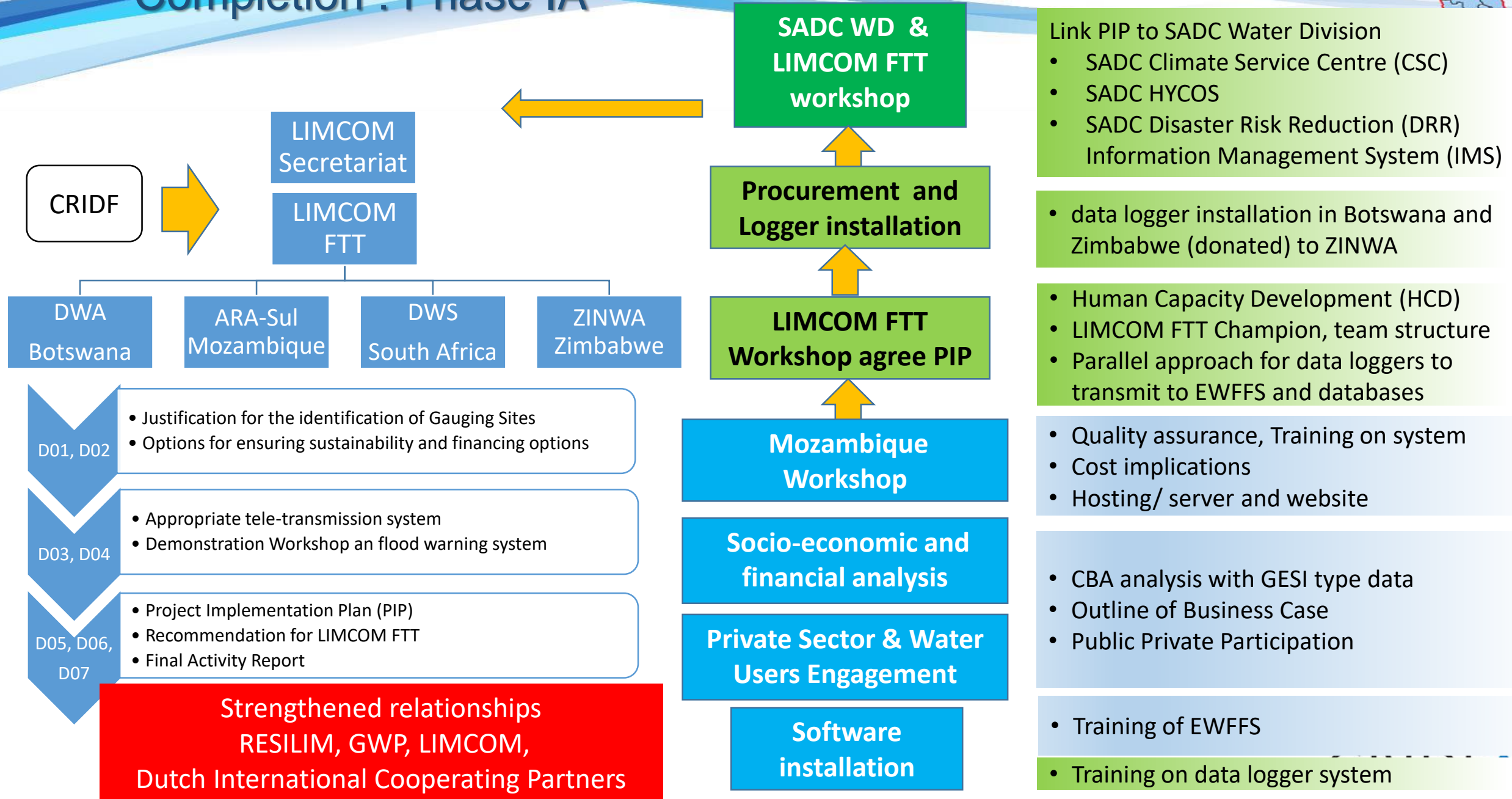
- 💧 The aim is when a water level threshold is reached in the EWFFS, text messages/ whatsapp message can be sent to key stakeholders
- 💧 Real time water level data loggers available in South Africa and Mozambique to use on the project
- 💧 EWFFS is ready for use operationally



**Potentially
maximum 10 days
for flood warning**

Completion : Phase IA

Foundation for CRIDF 2



Phase 1A : Project Implementation Plan (PIP)



💧 LIMCOM Flood Task Team (FTT) requested a PIP during the CRIDF EWFFS Demonstration workshop

The PIP is a concise 11 page document circulated to the LIMCOM FTT and contains the following:

- Explanation of how the system works
- Summary of the system sustainability :
 - robust and inexpensive. O & M costs low, no additional resources needed
- Implementation Issues and Implications
 - Technical and compatibility (water level data loggers linked to existing databases, data releases)
 - Institutional and human resources (Champion from FTT, Member States departments)
 - Role of the SADC sector
 - Gauging Station Quality Assurance
 - EWFFS installation and training
 - Procurement, ownership and asset management
 - Cost summary Initial costs and estimated O & M costs



Phase 1B: Engagement with Agricultural Companies

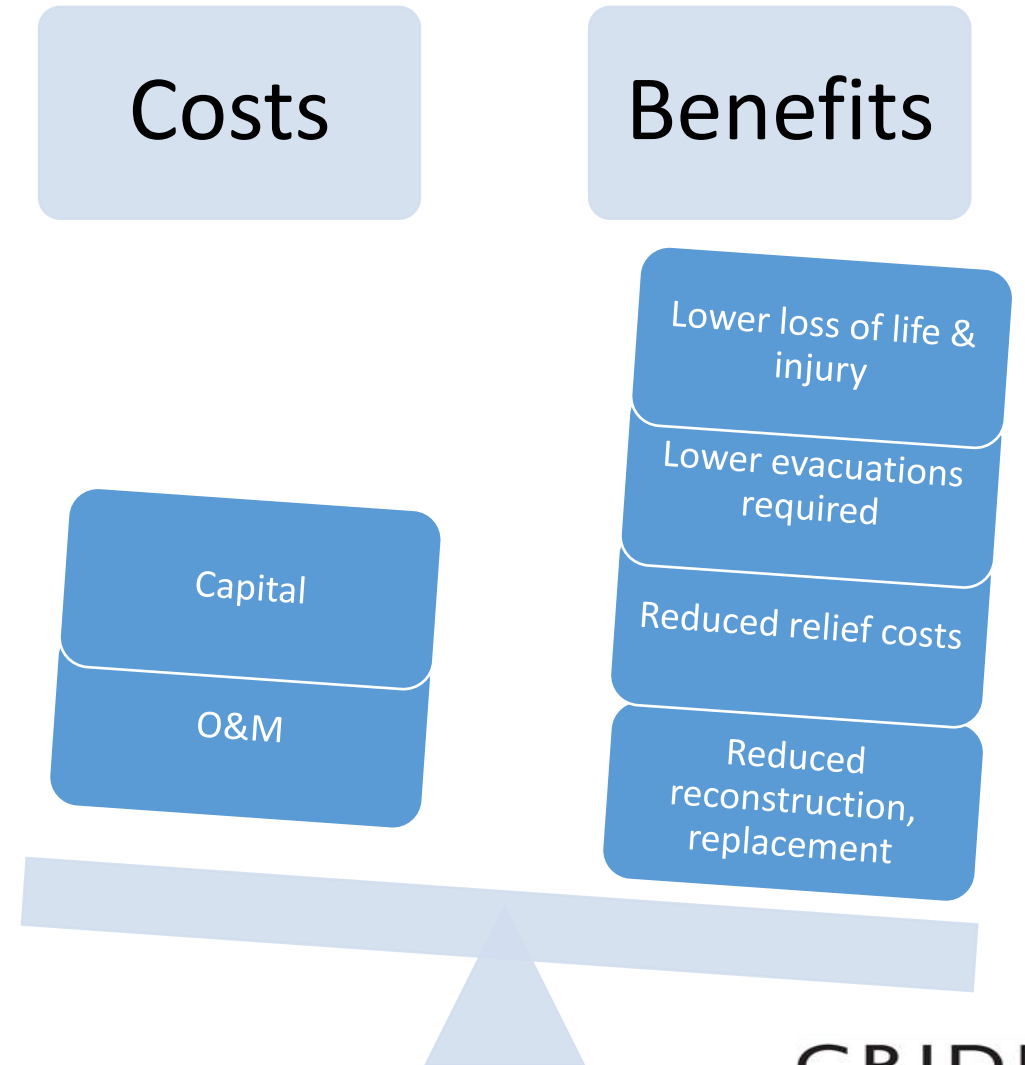
- 💧 Cesar Mulana (CM) : Director of Operations, Hidráulica de Chókwè (HICEP)
- 💧 Armando Ussivane (AU) : Chairman of the Board of Directors, Regadio do Baixo Limpopo (RBL)
- 💧 Sami Saran (Chief Operating Office) : African Food Company (AFC) :
- 💧 Gary Thirkettle Agri –Sul : General Manager



Benefits & Costs of the Project

Investment Case for the Private Sector

- Companies exposed to flood risk and damage – large costs from flood damage
- EWFFS can provide lead time to respond, therefore reducing loss of life, injury, damage to moveable property
- Impact on insurance premiums?





Technical Options & Flood Scenarios

Technical Options

Baseline
Do nothing

Option 1
Pilot project with
technology transfer
& O&M

Option 2
Option 1 + model
upgrade

Flood Scenarios

Mild Flood

Flood occurrence = 1:10 years

- Directly impacted population that are located within the area of inundation in 2040
- **182,938 people**
- Located in **60 villages**

Moderate Flood

Flood occurrence = 1:25 years

- Directly impacted population that are located within the area of inundation in 2040
- **519,137 people**
- Located in **75 villages**

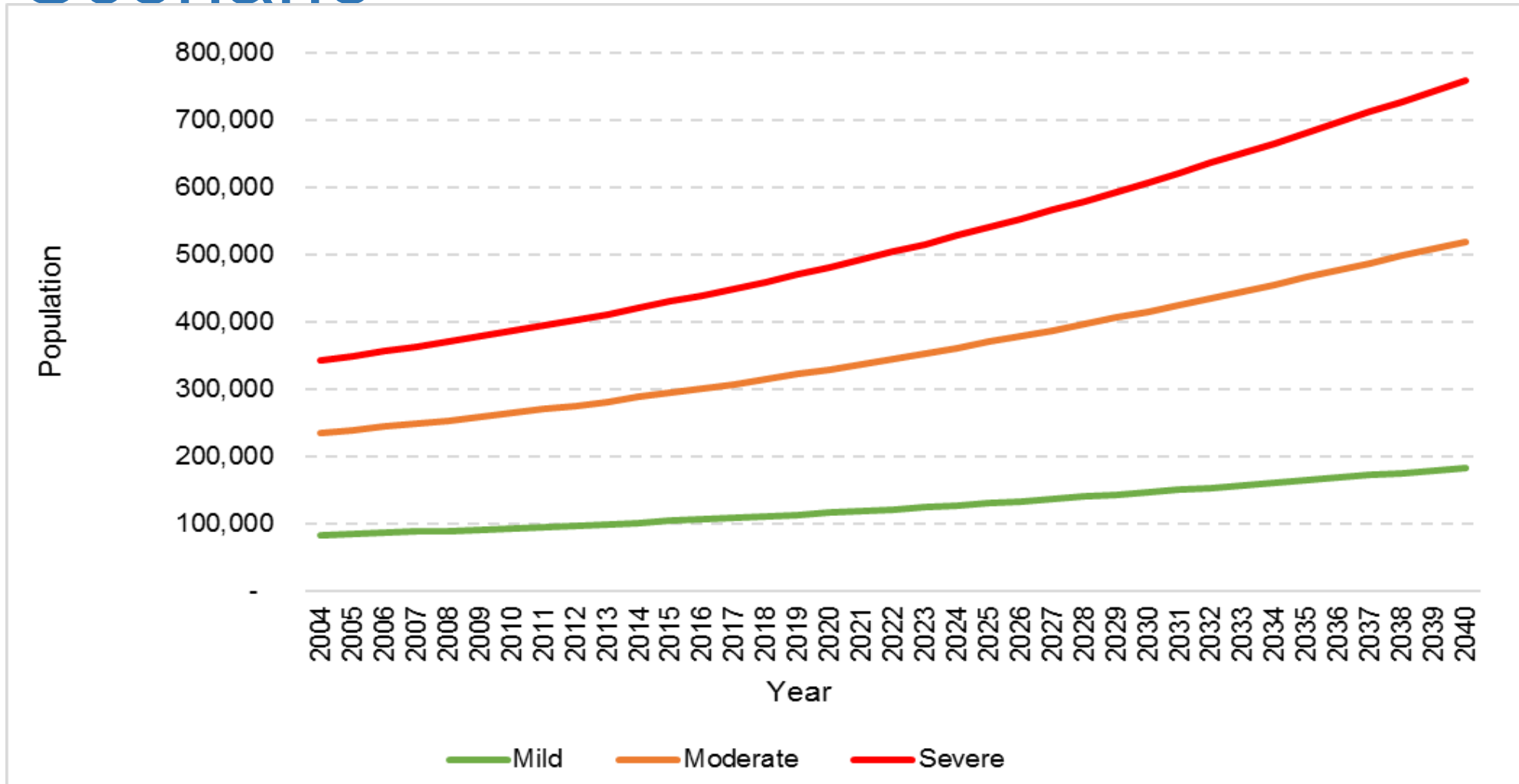
Severe Flood

Flood occurrence = 1:100 years

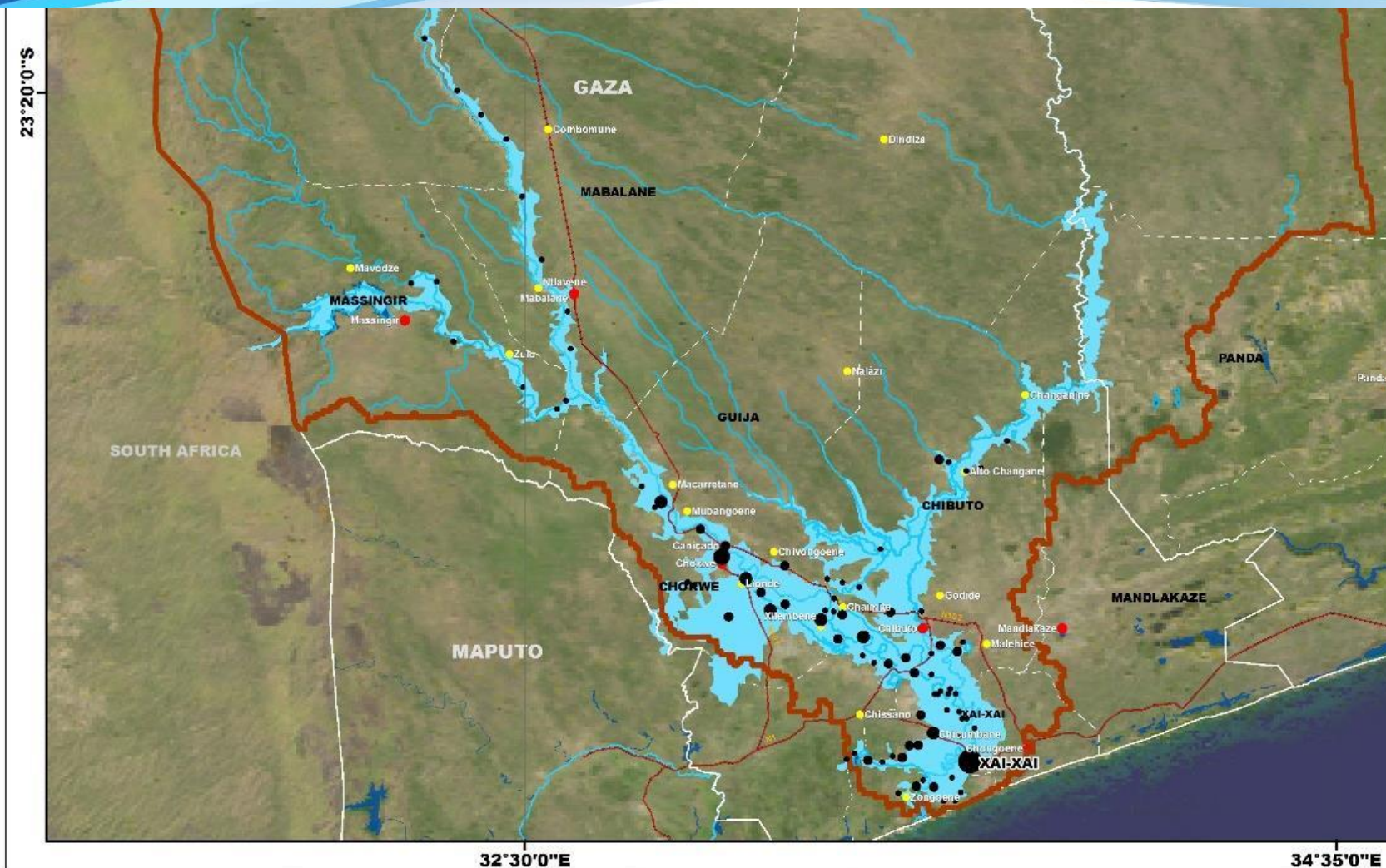
- Directly impacted population that are located within the area of inundation in 2040
- **758,744 people**
- Located in **100 villages**



Forecasts Direct Beneficiaries by Flood Scenario



Phase 1B : Cost Benefit Analysis Results



- 1 in 100 year flood event
- Mozambique Flood Risk Analysis Project (SMEC 2004)
- GIS analysis added for population affected by flooding

Legend

- Provincial Capital
- District headquarter
- Admin. Post Headquarter
- Province Boundary
- District Boundary
- Existing Roads
- Rivers
- Severe Flood
- Lake & Ponds
- Limpopo Basin in Mozambique

Affected Villages Population

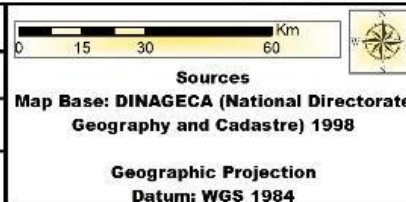
- 0 - 2.194
- 2.195 - 5.276
- 5.277 - 14.265
- 14.266 - 49.730
- 49.731 - 99.442

Version : 1.0

Prepared by :

Approved by :

Data : 06.12.2016



Client:
FTT/LIMCOM

Company:
CRIDF

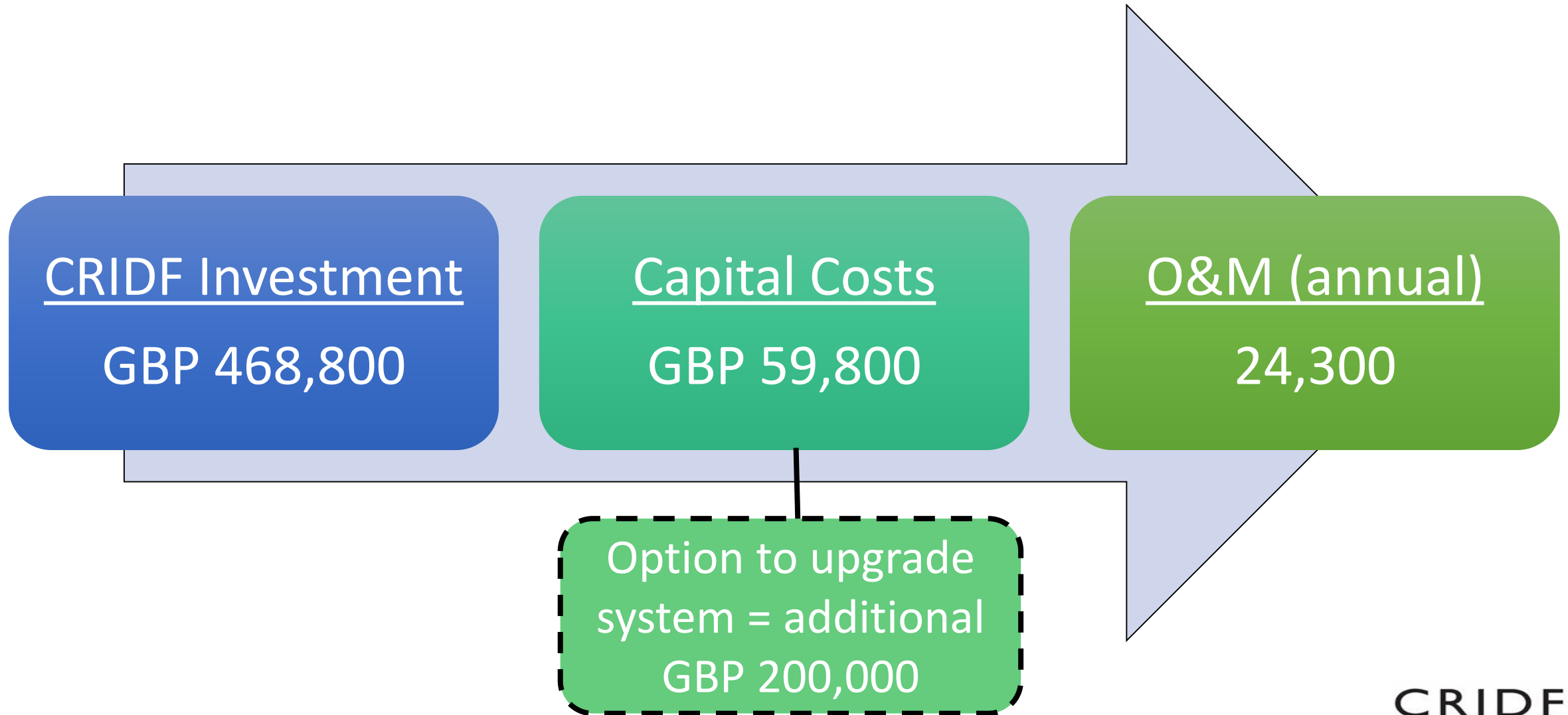
Title:
Severe Flood (1:100 years)

Project:
CRIDF-FP13-006-Limpopo Data Sharing and Early Warning Flood Forecasting System

CRIDF



Project Costs





Project Benefits

Summary of Costs Avoided Due to the EWFFS for Flood Scenarios, 2017 - 2020

Costs Avoided Due to EWFFS	Flood Scenario		
	Mild	Moderate	Severe
Relief Costs	£ 104,659	£ 261,648	£ 392,472
Direct Costs	£ 220,543	£ 551,359	£ 827,038
Indirect Costs	£ 346,926	£ 867,315	£ 1,300,972
Reconstruction Costs	£ 172,696	£ 431,739	£ 647,609
Total	£ 844,824	£ 2,112,061	£ 3,168,091



Cost Benefit Analysis Results

Technical Options	Indicators	Discount Rates	Flood Scenario		
			Mild	Moderate	Severe
Baseline	NPV	3,5%	-£ 61 791	-£ 81 980	-£ 98 804
		10,0%	-£ 33 032	-£ 43 836	-£ 52 838
Option 1	NPV	3,5%	£ 243 160	£ 1 244 678	£ 2 079 275
		10,0%	£ 106 665	£ 642 565	£ 1 089 149
	BCR	3,5%	1,57	3,93	5,90
		10,0%	1,43	3,56	5,35
	IRR	both	33%	144%	237%
Option 2	NPV	3,5%	£ 49 924	£ 1 051 441	£ 1 886 039
		10,0%	-£ 75 153	£ 460 747	£ 907 331
	BCR	3,5%	1,08	2,70	4,05
		10,0%	0,83	2,07	3,10
	IRR	both	5%	33%	55%



Thank You