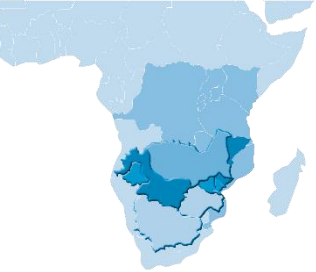

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Climate Resilient Development Pathways in the Okavango

Stockholm World Water Week

26 August 2018

Laszlo Pinter on behalf of Eben Chonguica: Executive Secretary, OKACOM

Climate projections courtesy CCRM

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The trade in virtual water

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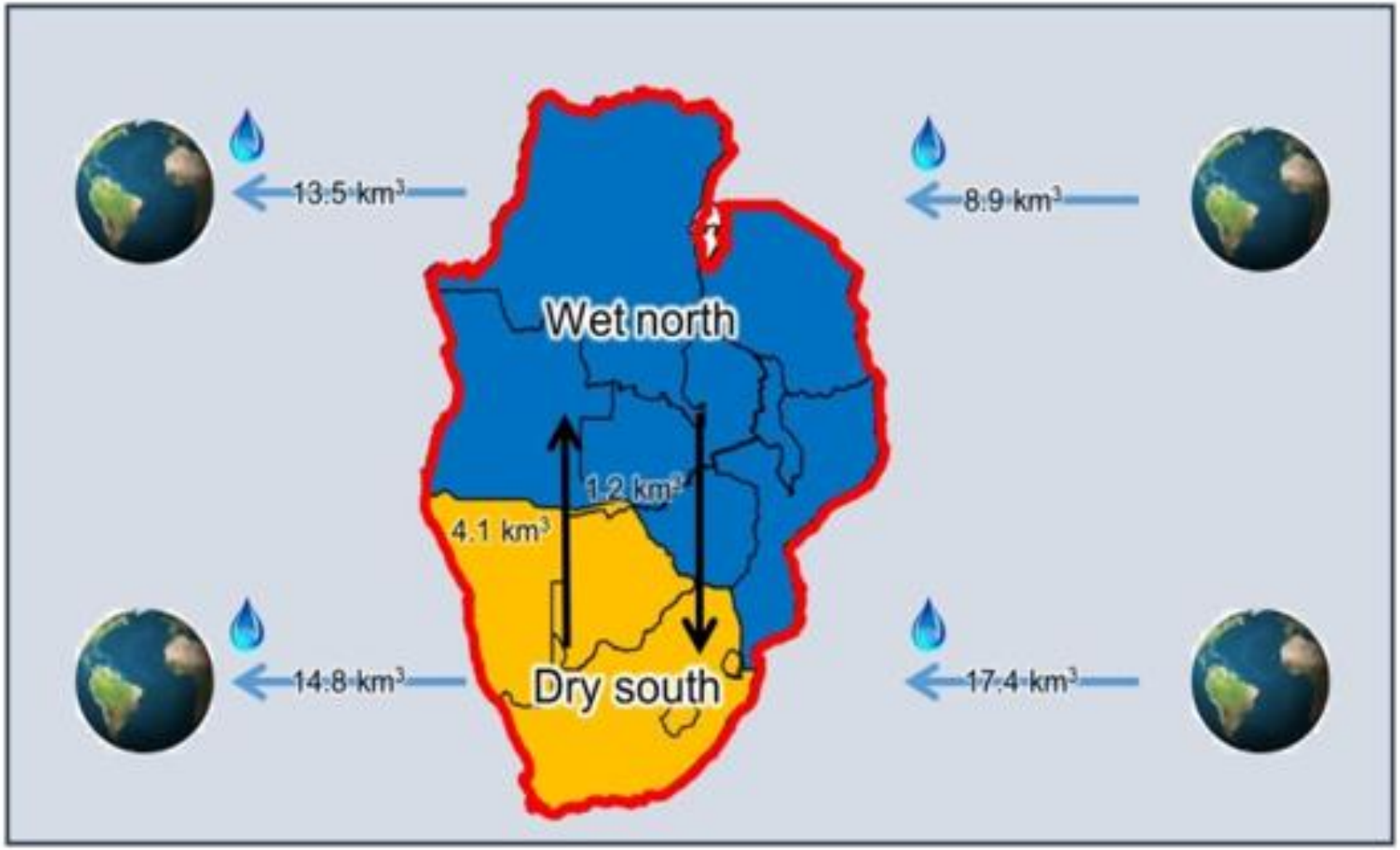

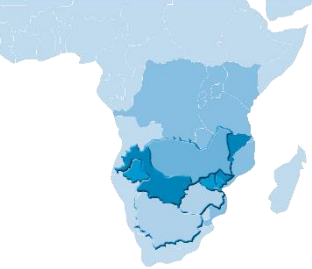

CRIDF Background

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Southern Africa has the following challenges:

- Infrastructure need - gap in water and sanitation estimated to be $15Bn[1] per annum
- infrastructure provision between the north of the area and the south (north lacks infrastructure; south needs to optimise available infrastructure)
- Significant variation in precipitation between the north of the region and the south
- Reconciling the tensions between different demands/needs for water resources

There is a need for strategic planning to

- Deliver more infrastructure particularly in river basins in the north
- Increase efficient water use in the south
- Reduce poverty
- Integrate climate resilience in development options

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Okavango River Basin

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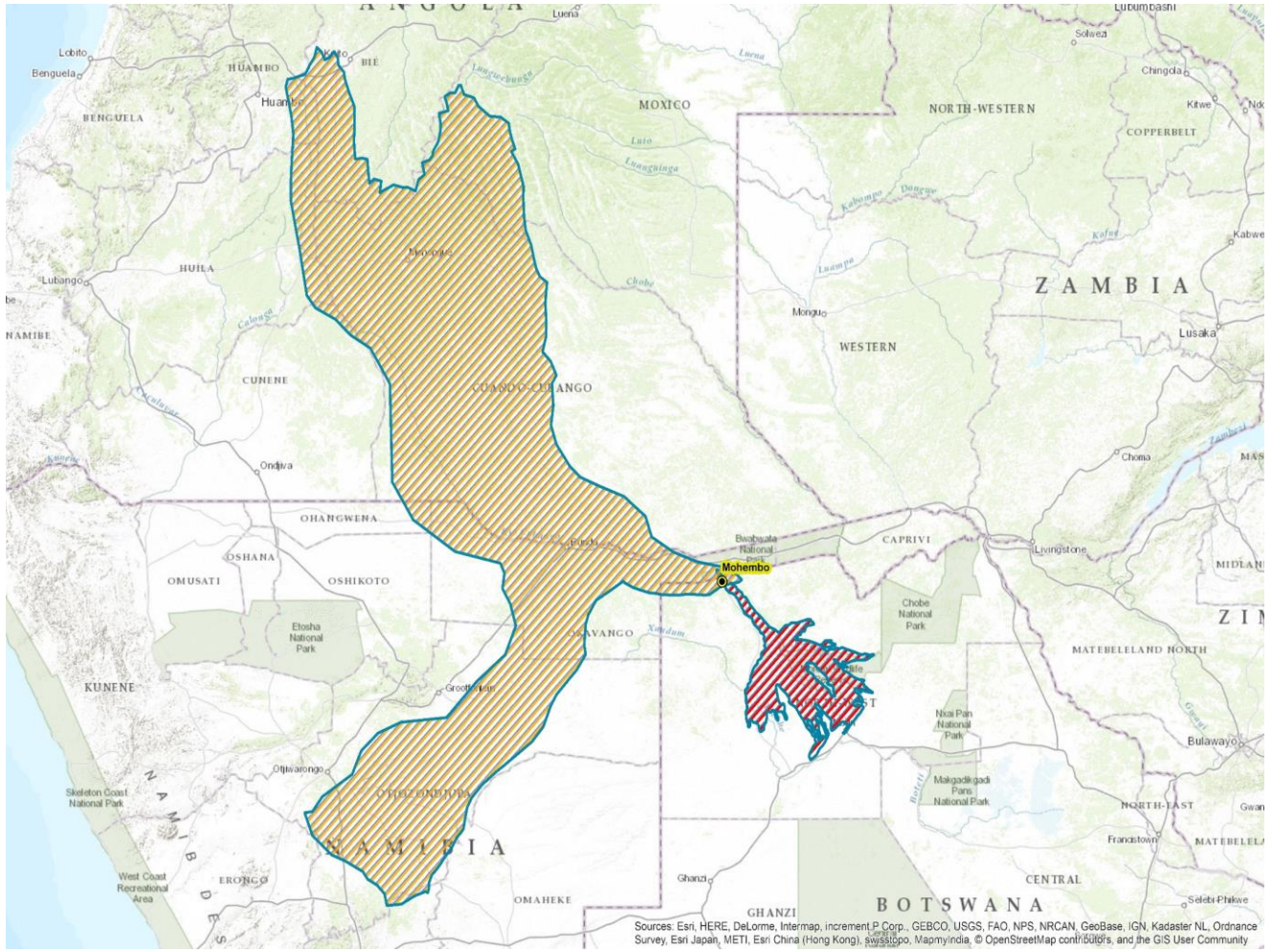
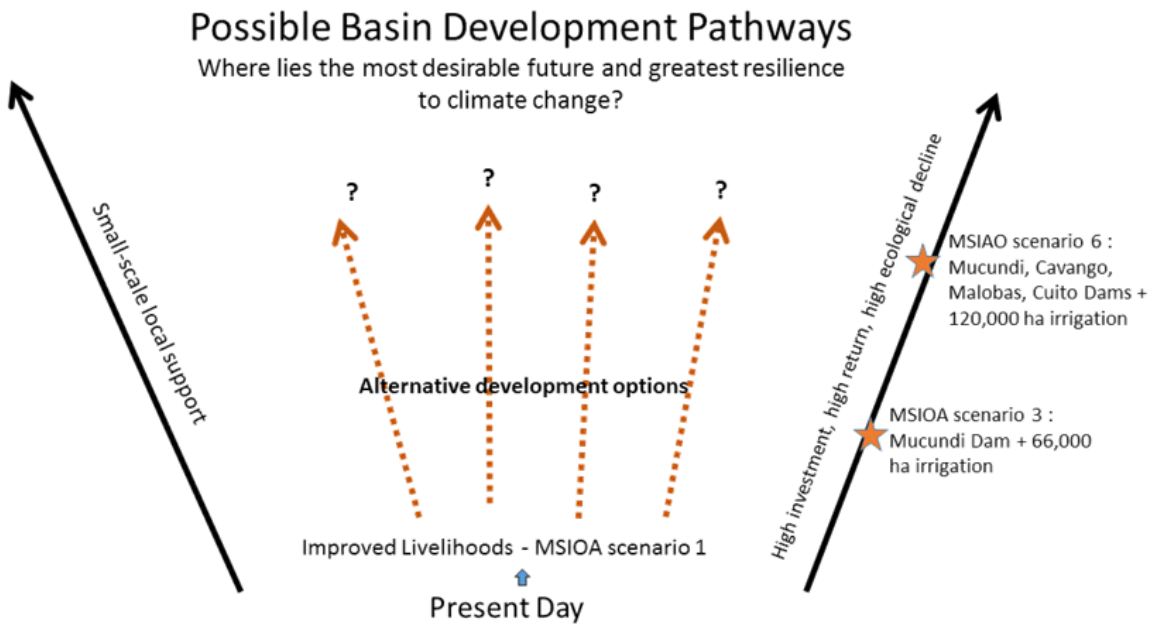
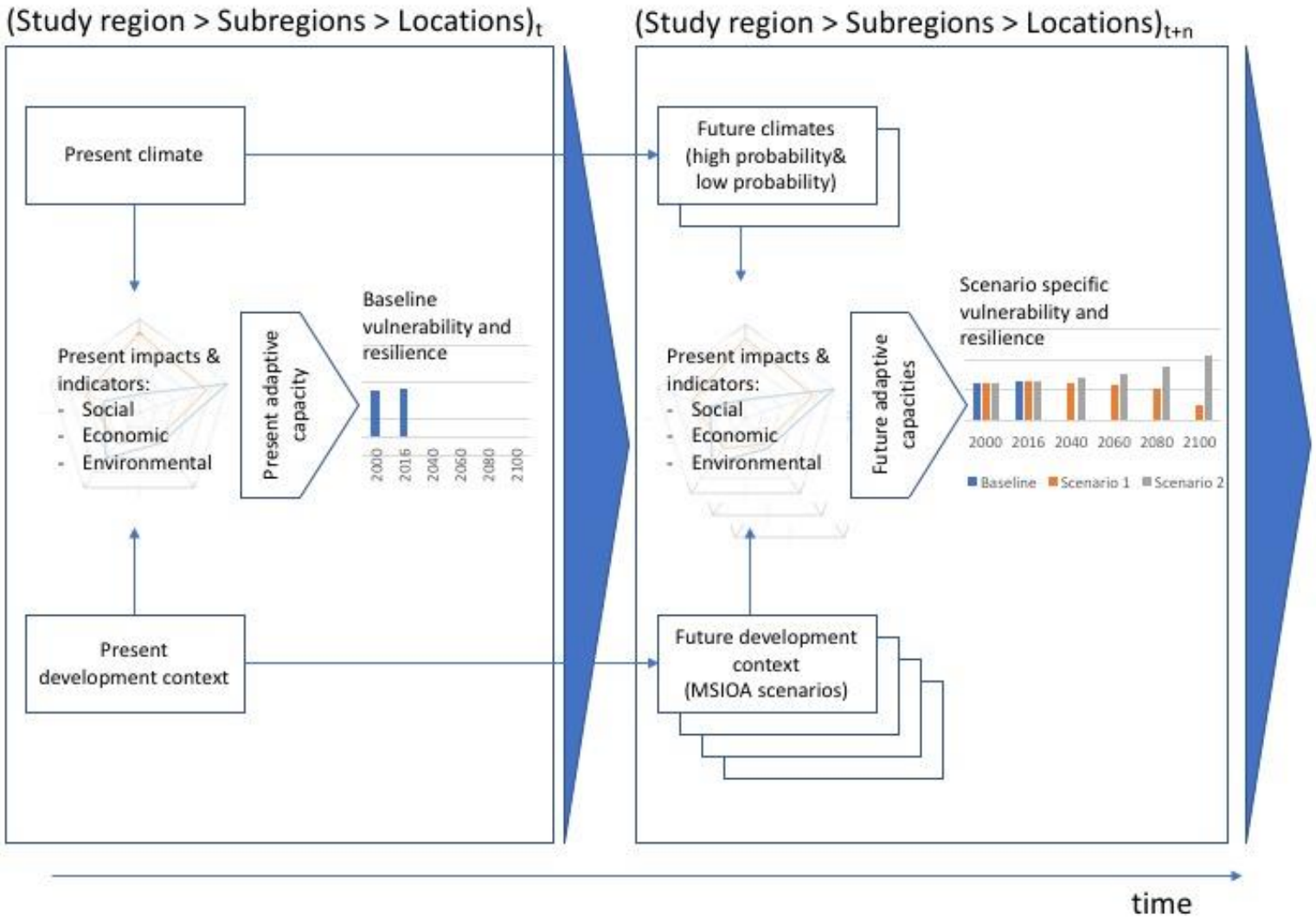


Vulnerability in the basin

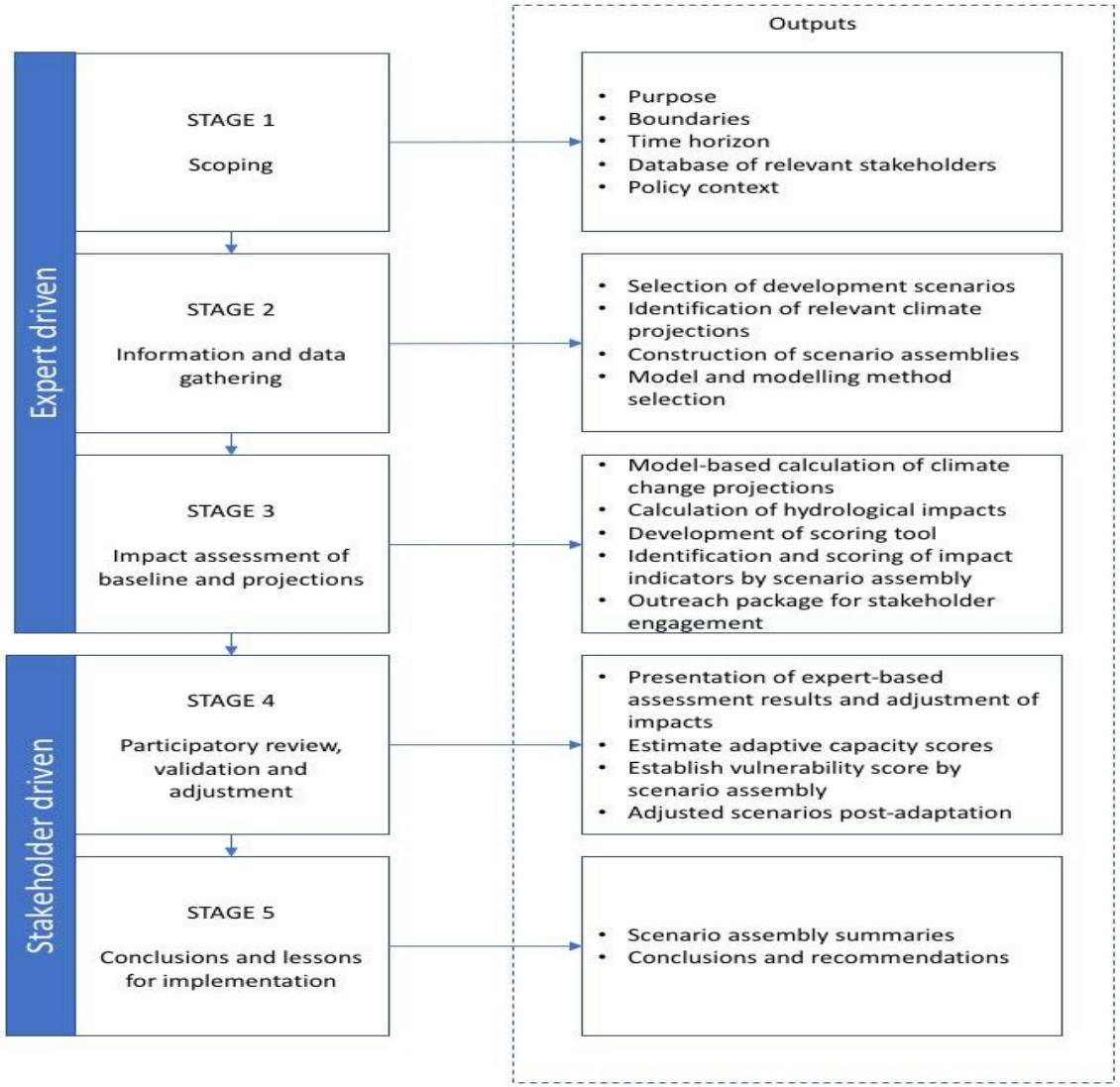


- High dependence on rainfed agriculture
- Low household incomes
- Limited access to clean water
- Limited access to social services
- Loss of forested lands
- Insufficient government capacity
- High dependency on transboundary cooperation

CRDP Approach

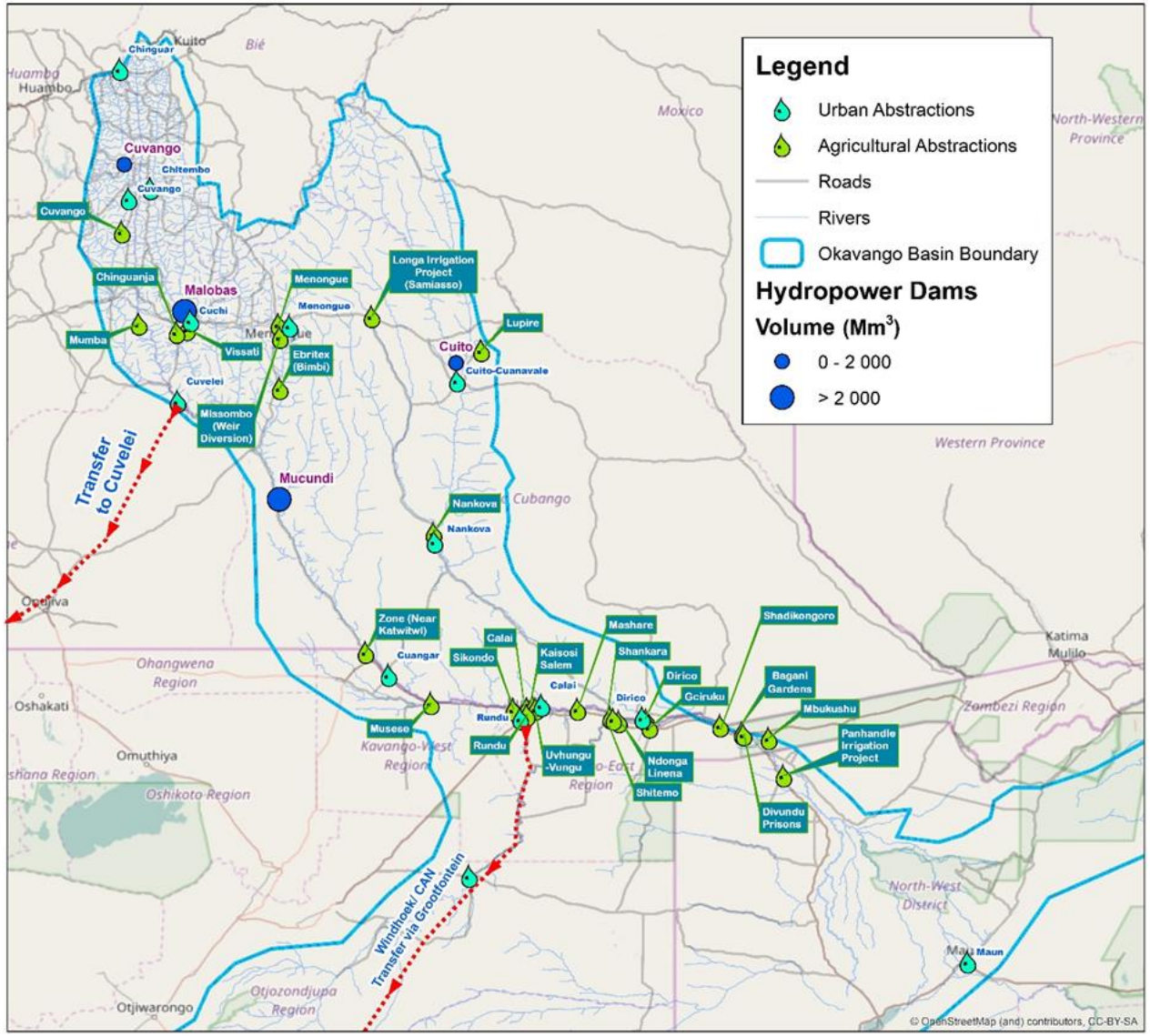


CRDP Process



MSIOA Options

Scenarios	Hydropower Dams
LS1	-
LS3	Mucundi
LS6	Malobas, Cavango, Cuito, Mucundi
LS9	Malobas, Cavango, Cuito, Mucundi



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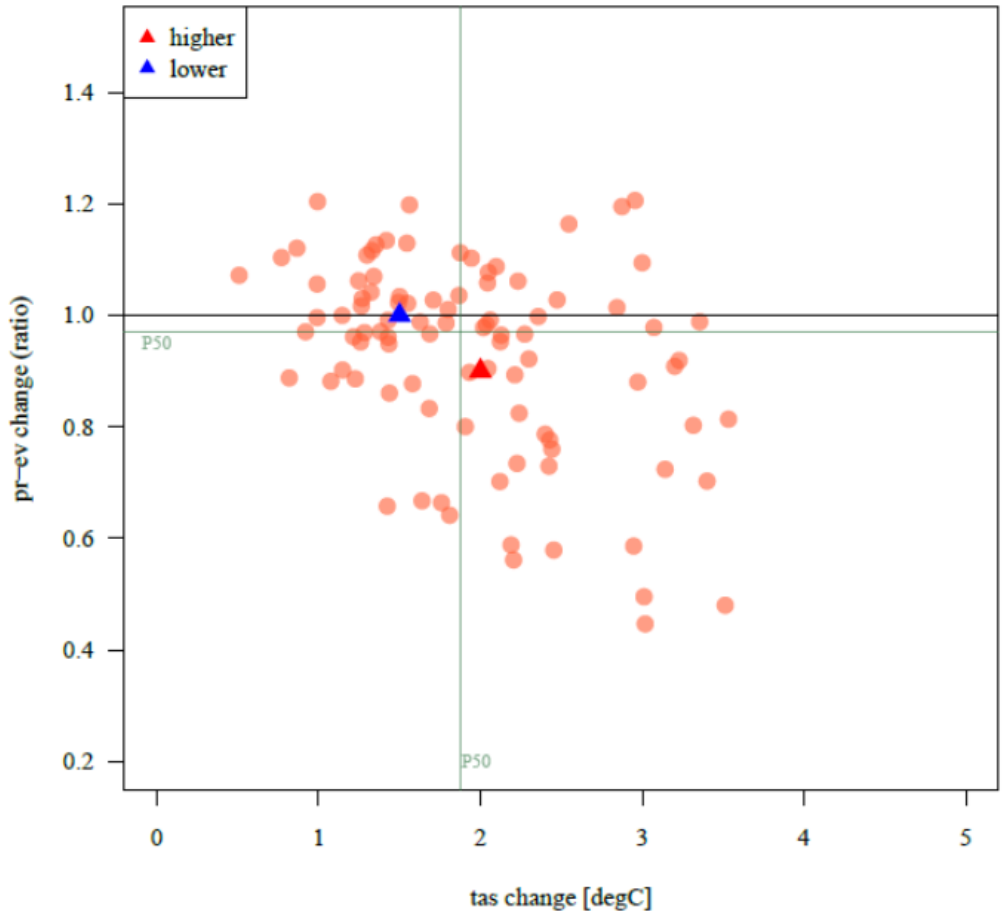
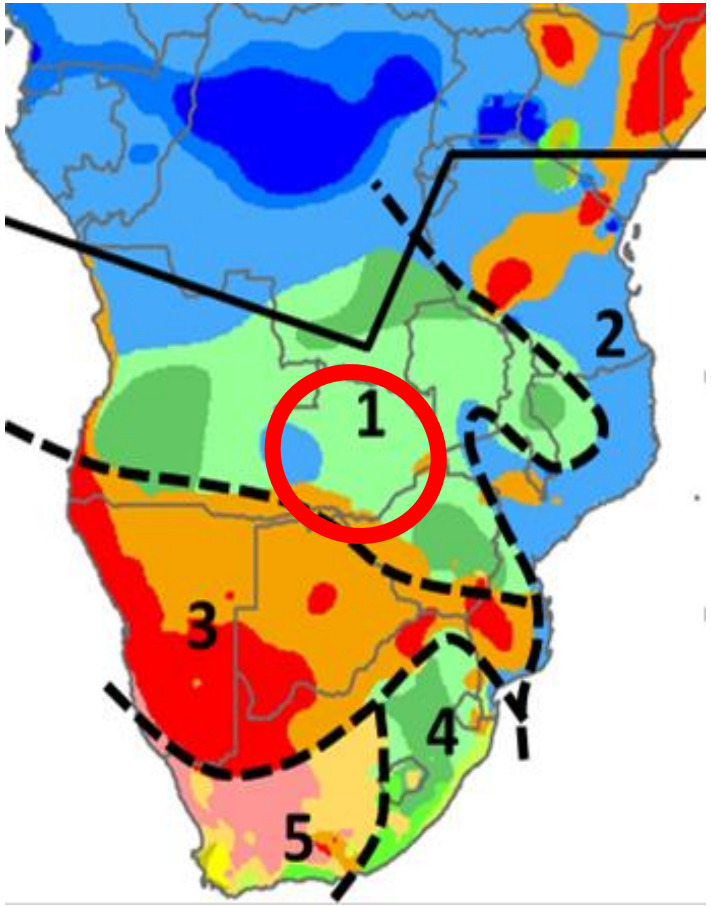
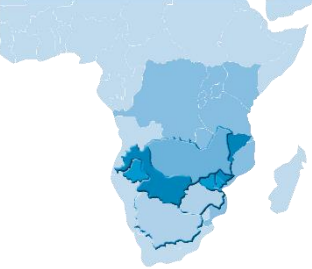
Climate Scenarios (SOMs)







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Climate Scenarios (SOMs)

Temperature

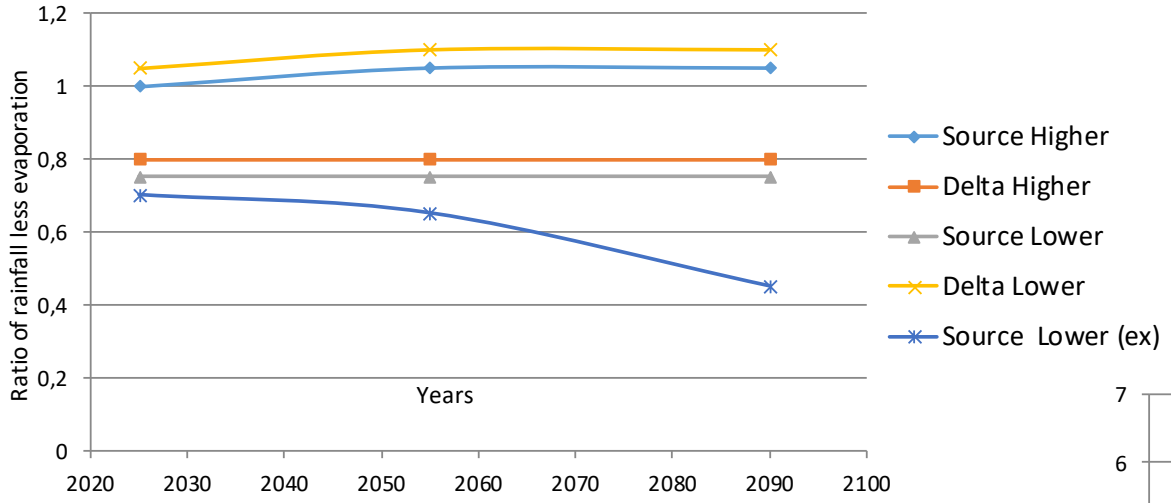
Sectionz	Likelihood	2025	2055	2090
Upper Basin	Higher	0.75ºC	**1.50ºC**	2.00ºC
Lower Basin	Higher	1.00ºC	2.00ºC	2.25ºC
Upper Basin	Lower	1.25ºC	**2.00ºC**	2.50ºC
Lower Basin	Lower	1.00ºC	1.50ºC	2.00ºC

Rainfall - Evaporation

Section	Likelihood	2025	2055	2090
Upper Basin	Higher	1.00	1.05	1.05
Lower Basin	Higher	**0.80**	**0.80**	0.80
Upper Basin	Lower	**0.75**	**0.75**	0.75
Lower Basin	Lower	1.05	1.10	1.10

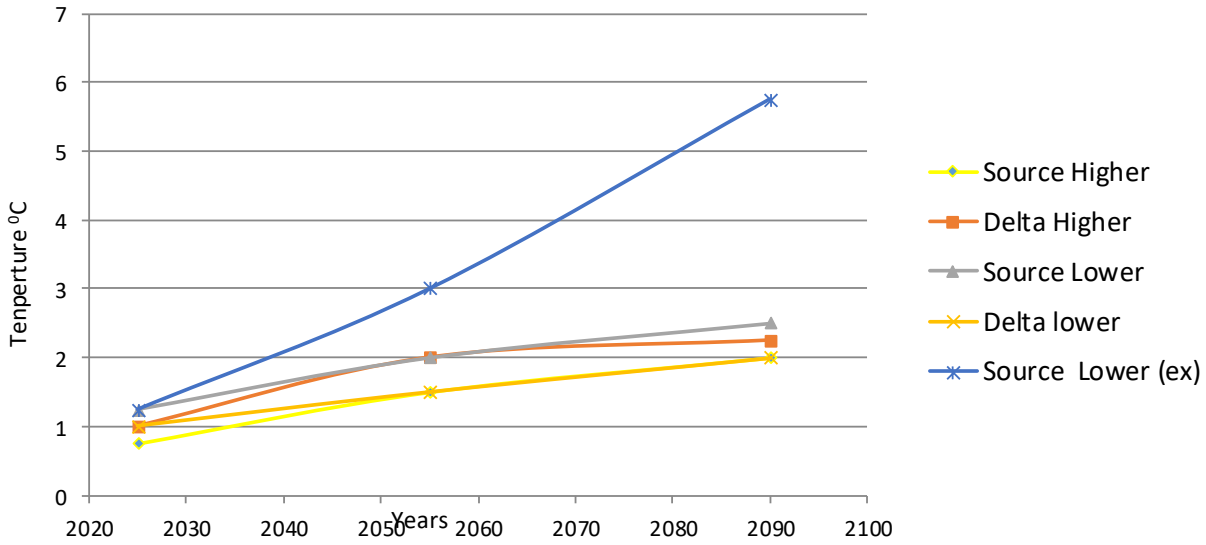
Climate Scenarios (SOMs)

Change in Rainfall less Evaporation in the Okavango



60% reduction in water availability

Change in Temperature in the Okavango



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Workshop

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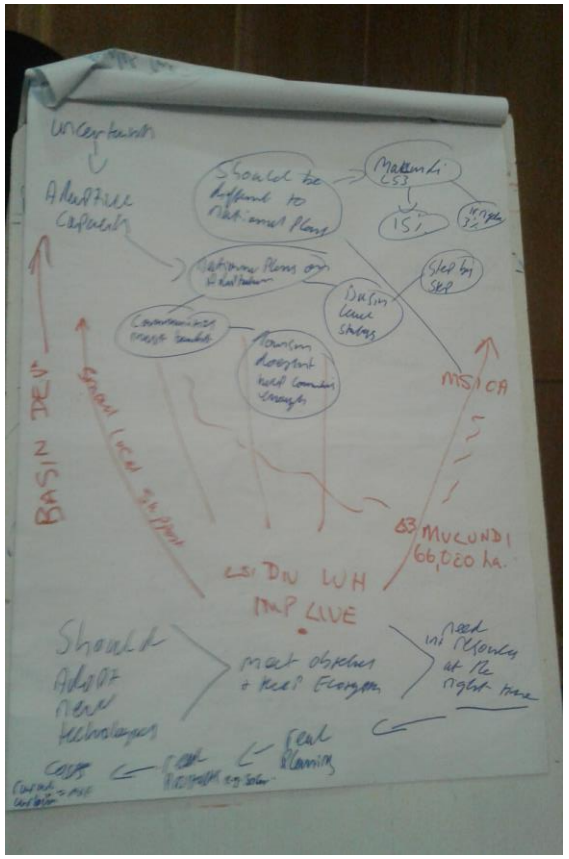

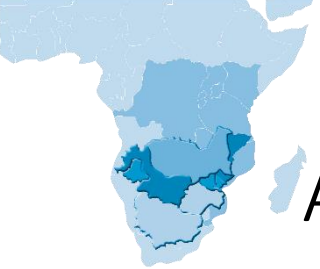

CRIDF Assessment Results

Indicator	LS1 MSIOA score	LS1 CC High Prob	LS1 CC Low Prob
Change in real GDP	1	1	0
Welfare gain/loss	1	1	0
Change in government revenue	0	0	-2
Change in trade balance	0	0	1
Change in unskilled labour	0	0	-1
Aggregate score	0.4	0.4	-0.4

Indicator	LS3 MSIOA score	LS3 CC High Prob	LS3 CC Low Prob
Change in real GDP	1	1	1
Welfare gain/loss	1	1	1
Change in government revenue	-1	-1	-2
Change in trade balance	1	1	1
Change in unskilled labour	0	0	-1
Aggregate score	0.4	0.4	0

Indicator	LS6 MSIOA score	LS6 CC High Prob	LS6 CC Low Prob
Change in real GDP	2	2	1
Welfare gain/loss	2	2	1
Change in government revenue	2	2	-2
Change in trade balance	2	2	1
Change in unskilled labour	2	2	-1
Aggregate score	2	2	0

Indicator	LS9 MSIOA score	LS9 CC High Prob	LS9 CC Low Prob
Change in real GDP	1	1	1
Welfare gain/loss	1	1	1
Change in government revenue	0	0	-2
Change in trade balance	1	1	1
Change in unskilled labour	0	0	-1
Aggregate score	0.6	0.6	0

MSIOA SCENARIO	CLIMATE SCENARIO	THEME	TIME PERIOD		
			Baseline	2016-2035	2046-2065
LS1	No climate change	*Social*	0	0.66666667	
LS1	High probability	*Social*	0	0.66666667	
LS1	Low probability	*Social*	0	-0.3333333	
LS3	No climate change	*Social*	0	0.33333333	
LS3	High probability	*Social*	0	0.33333333	
LS3	Low probability	*Social*	0	-1.3333333	
LS6	No climate change	*Social*	0	-1.3333333	
LS6	High probability	*Social*	0	-1.3333333	
LS6	Low probability	*Social*	0	-2	
LS9	No climate change	*Social*	0	-1.6666667	
LS9	High probability	*Social*	0	-1.6666667	
LS9	Low probability	*Social*	0	-2	

MSIOA scenario: LS3

Climate: No climate change

Environmental impacts

Indicator name & unit of measure	Type of number	Baseline indicator values and scores	Projected indicator values	
			2016-2035	2046-2065
Extent of savana - km2	Indicator value	56	69	69
	Indicator score	0	-1	-1
Percent of river length dry	Indicator value	14	21	21
	Indicator score	0	-1	-1
Average impact scores / time period		0	-1	-1

MSIOA scenario: LS3

Climate: High probability

Environmental impacts

Indicator name & unit of measure	Type of number	Baseline indicator values and scores	Projected indicator values	
			2016-2035	2046-2065
Extent of savana - km2	Indicator value	56	56	35
	Indicator score	0	0	1
Percent of river length dry	Indicator value	14	14	12
	Indicator score	0	0	1
Average impact scores / time period		0	0	1

MSIOA scenario: LS3

Climate: Low probability

Environmental impacts

Indicator name & unit of measure	Type of number	Baseline indicator values and scores	Projected indicator values	
			2016-2035	2046-2065
Extent of savana - km2	Indicator value	56	30	30
	Indicator score	0	-2	-2
Percent of river length dry	Indicator value	14	6	6
	Indicator score	0	-2	-2
Average impact scores / time period		0	-2	-2

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AGGREGATE IMPACTS BY THEME

Scoring key

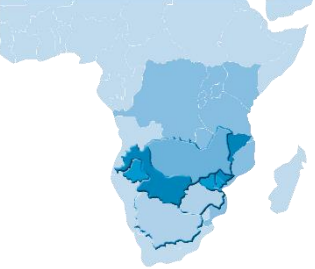
Score	Impact	Color scheme
2	positive	
1	weak positive	
0	neutral	
-1	weak negative	
-2	negative	

Average of indicator scores is calculated using equal weight.

MSIOA SCENARIO	CLIMATE SCENARIO	THEME	TIME PERIOD		
			Baseline	2016-2035	2046-2065
LS1	No climate change	*Social*	0	0.66666667	0
LS1	High probability	*Social*	0	0.66666667	0
LS1	Low probability	*Social*	0	-0.3333333	0
LS3	No climate change	*Social*	0	0.33333333	0
LS3	High probability	*Social*	0	0.33333333	0
LS3	Low probability	*Social*	0	-1.3333333	0
LS6	No climate change	*Social*	0	-1.3333333	0
LS6	High probability	*Social*	0	-1.3333333	0
LS6	Low probability	*Social*	0	-2	0
LS9	No climate change	*Social*	0	-1.6666667	0
LS9	High probability	*Social*	0	-1.6666667	0
LS9	Low probability	*Social*	0	-2	0
LS1	No climate change	*Economic*	0	0.4	0
LS1	High probability	*Economic*	0	0.4	0
LS1	Low probability	*Economic*	0	-0.4	0
LS3	No climate change	*Economic*	0	0.8	0
LS3	High probability	*Economic*	0	0.4	0
LS3	Low probability	*Economic*	0	0	0
LS6	No climate change	*Economic*	0	2	0
LS6	High probability	*Economic*	0	2	0
LS6	Low probability	*Economic*	0	0	0
LS9	No climate change	*Economic*	0	0	0
LS9	High probability	*Economic*	0	0.8	0
LS9	Low probability	*Economic*	0	0	0
LS1	No climate change	*Environmental*	0	0	0
LS1	High probability	*Environmental*	0	0	1
LS1	Low probability	*Environmental*	0	-2	-2
LS3	No climate change	*Environmental*	0	-1	-1
LS3	High probability	*Environmental*	0	0	1
LS3	Low probability	*Environmental*	0	-2	-2
LS6	No climate change	*Environmental*	0	-2	-2
LS6	High probability	*Environmental*	0	-1	-1
LS6	Low probability	*Environmental*	0	-2	-2
LS9	No climate change	*Environmental*	0	-2	-2
LS9	High probability	*Environmental*	0	-1	-1
LS9	Low probability	*Environmental*	0	-2	-2
LS1	**No climate change**	***Combined***	**0**	**0.35555556**	**0**
LS1	**High probability**	***Combined***	**0**	**0.35555556**	**0**
LS1	**Low probability**	***Combined***	**0**	**-0.1111111**	**0**
LS3	**No climate change**	***Combined***	**0**	**0.04444444**	**0**
LS3	**High probability**	***Combined***	**0**	**0.24444444**	**0**
LS3	**Low probability**	***Combined***	**0**	**-1.1111111**	**0**
LS6	**No climate change**	***Combined***	**0**	**-0.4444444**	**0**
LS6	**High probability**	***Combined***	**0**	**-0.4444444**	**0**
LS6	**Low probability**	***Combined***	**0**	**-1.3333333**	**0**
LS9	**No climate change**	***Combined***	**0**	**-1.2222222**	**0**
LS9	**High probability**	***Combined***	**0**	**-1.0222222**	**0**
LS9	**Low probability**	***Combined***	**0**	**-1.3333333**	**0**

Key findings

- Important to create a vulnerability base line
- Climate change will impact on the basin and options to improve resilience must be explored now
- The do nothing option is not an option - The best performing MSIOA programmatic option is the livelihoods option (LS1)
- Some water storage infrastructure in the upper basin may improve Delta resilience if there is a dramatic decrease in water availability
- Sequence development options to manage uncertainty
- Explore the potential role of natural capital and ecosystem services in the upper basin to improve resilience
- Building climate risk proactively into strategic plans helps reduce exposure to large financial liabilities, but can also can attract financing from donors and investors interested in climate finance
- CRDP stimulated discussion on cooperation and integration around interests in the basin; who benefits and in what way, and how that might change



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World Café table discussion topics

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- Is the use of climate scenarios a useful and replicable way of helping decision makers manage climate uncertainty within strategic planning and project preparation?
- Is the CRDP process a sensible process? Does it allow sufficient participation and does it require about the right level of resources?
- How important is good scientific evidence of climate impacts in improving decision making on infrastructure?
- Is the 2 day format, with a world café and breakout sessions to score impacts, appropriate?
- How do you ensure your process of reporting final CRDP findings doesn't result in a report left on a shelf? How do you enhance its ability to have an appropriate influence on decision making?