

Hydrological impacts of climate change and implications on women's roles

A case of the Zambezi River Basin

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Introduction

- ▶ **The global climate is changing, albeit uncertainty**
 - ▶ Already temperatures in Africa have increased by $>0.5^{\circ}\text{C}$ during the last century
- ▶ **Climate change will amplify the impacts of natural climate variability**
- ▶ **Most impacts will be felt through water resources**
 - ▶ Accelerated hydrological cycle
 - ▶ Increased frequency of flood and drought events
 - ▶ Increased water scarcity
 - ▶ Threats to food security and agriculture
- ▶ **Social, economic and environmental livelihoods will be altered**
 - ▶ Most vulnerable will be worst affected



**Water supply and food
ranked as two of the
highest human needs but
also with the highest
potential impact for
livelihoods**

World Economic Forum (2013)



Women – Yoke of hard labour

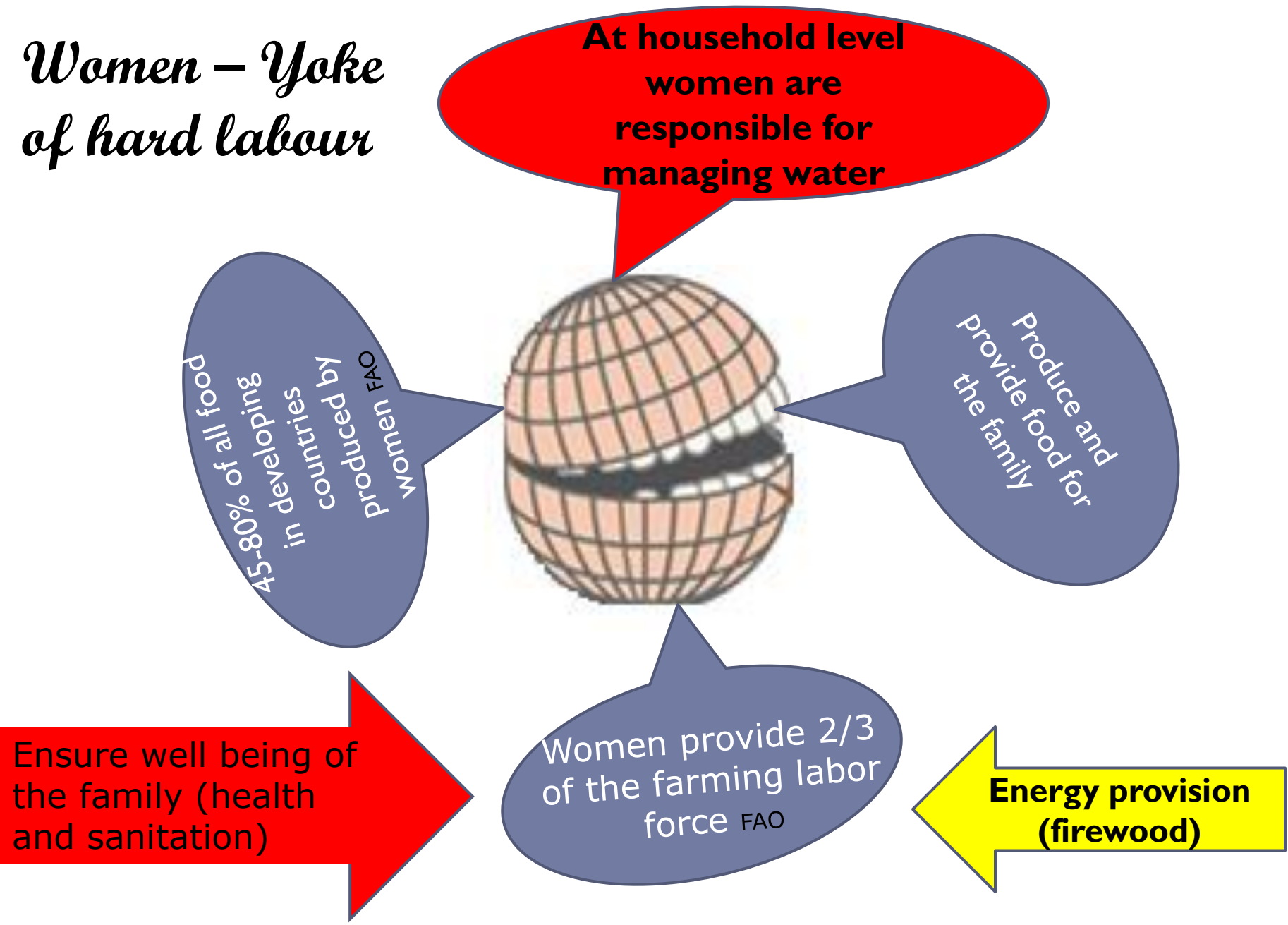





Photo by K. Chimatiro-NEPAD



♥ A water affair ♥



The SADC Regional Water Policy also stipulates that women play a pivotal role in the provision, management and safeguarding of water.



Women in the face of climate change

- ▶ Climate change will have far reaching impacts on the roles that women play
- ▶ Increased burden in an attempt to harness the resources necessary for life.
 - ▶ Women walk long distances to fetch water
 - ▶ Work under extremely hot conditions
- ▶ High health risk exposure
 - ▶ sanitation, health, hygiene, and safety are compromised



Women are more vulnerable to climate change as they bear unequal responsibility for household food security, carry a disproportionate burden for harvesting water and fuel for everyday survival, and rely on threatened natural resources for their livelihoods (UN Women Watch, 2009)

Cultural norms????
Policy issue????

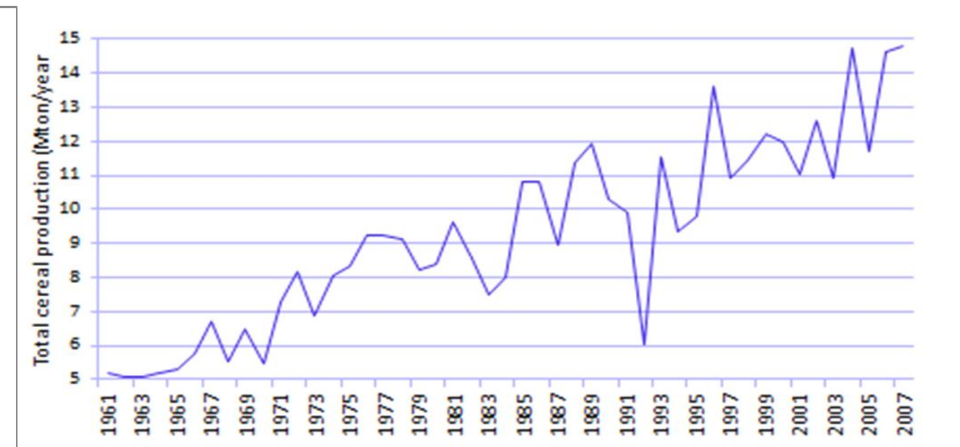
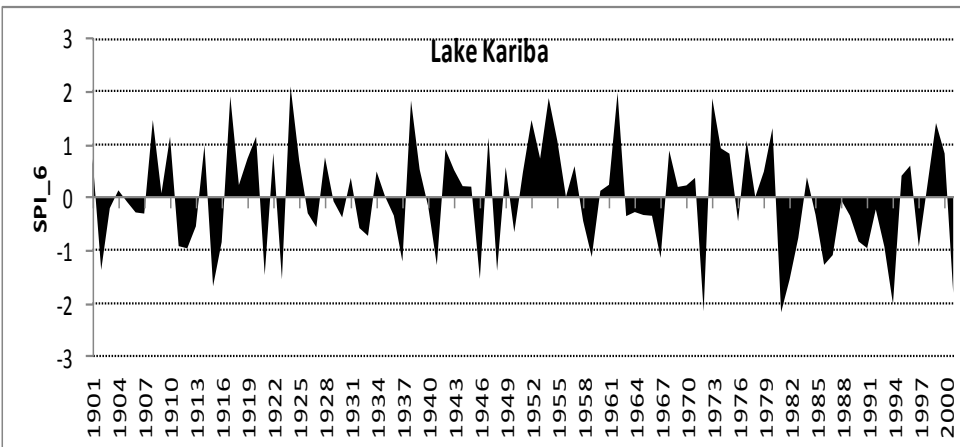
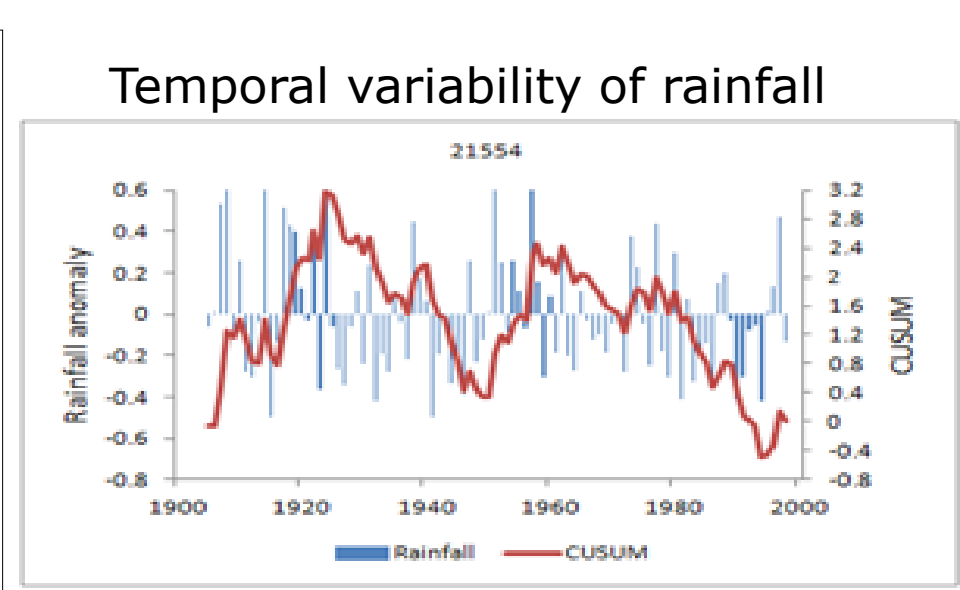
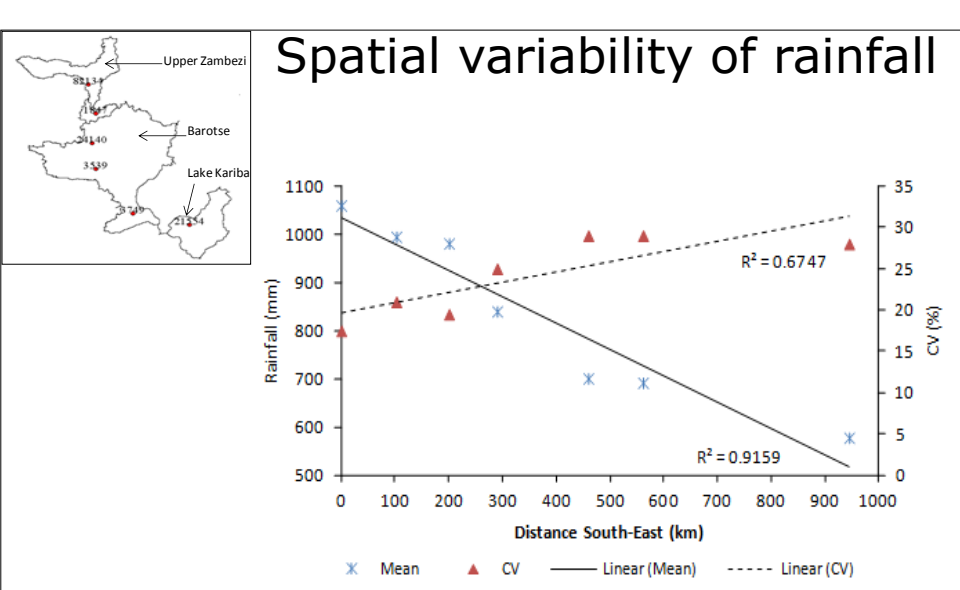


ZAMBEZI RIVER BASIN

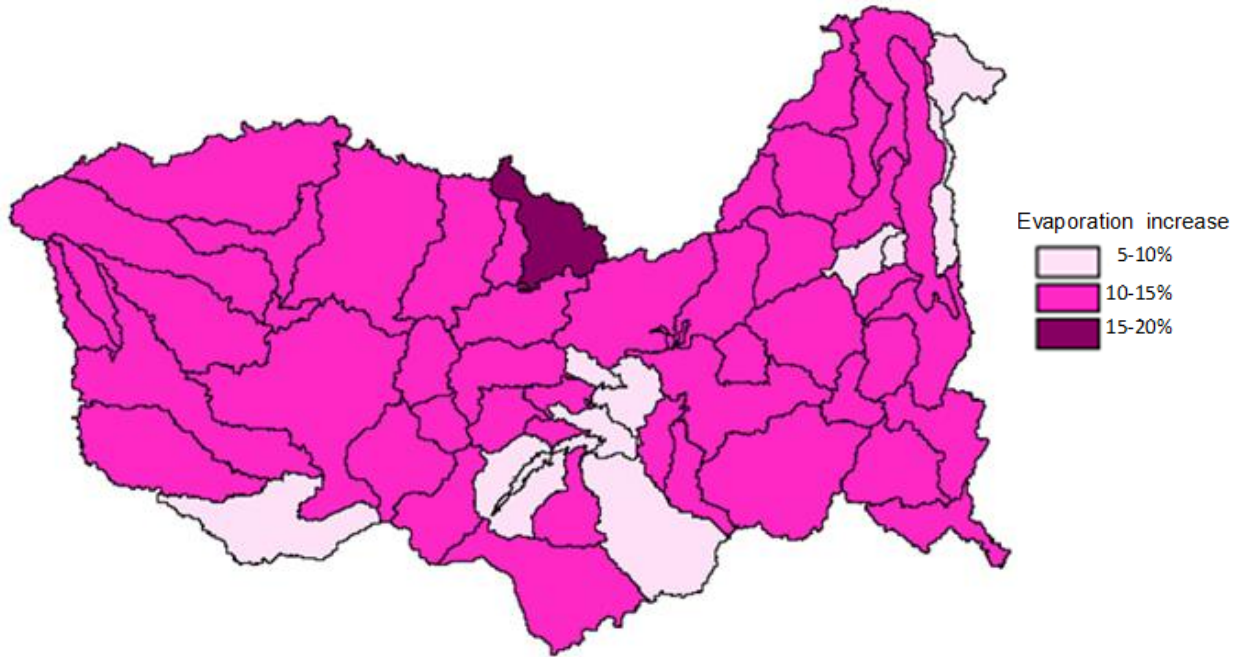


- Most livelihoods rely on rainfed agriculture
- High natural climatic variability \longrightarrow floods and droughts a recurrent feature
 - availability of water and food insecure

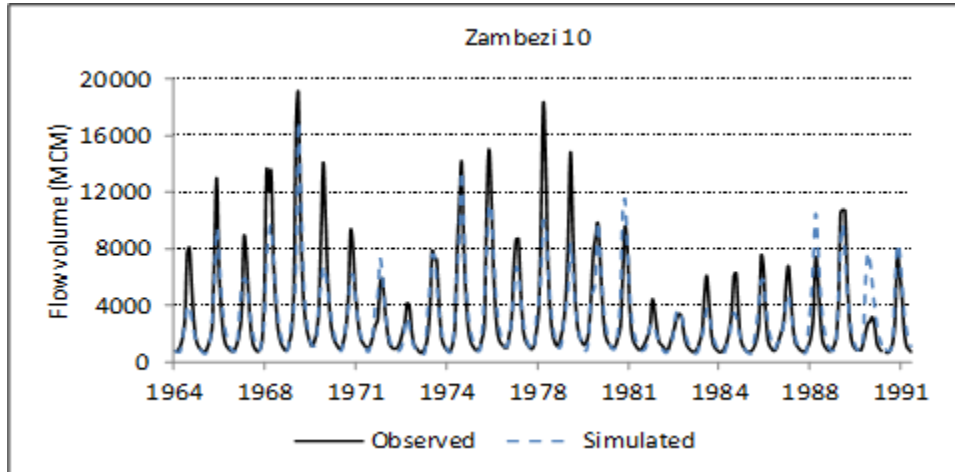
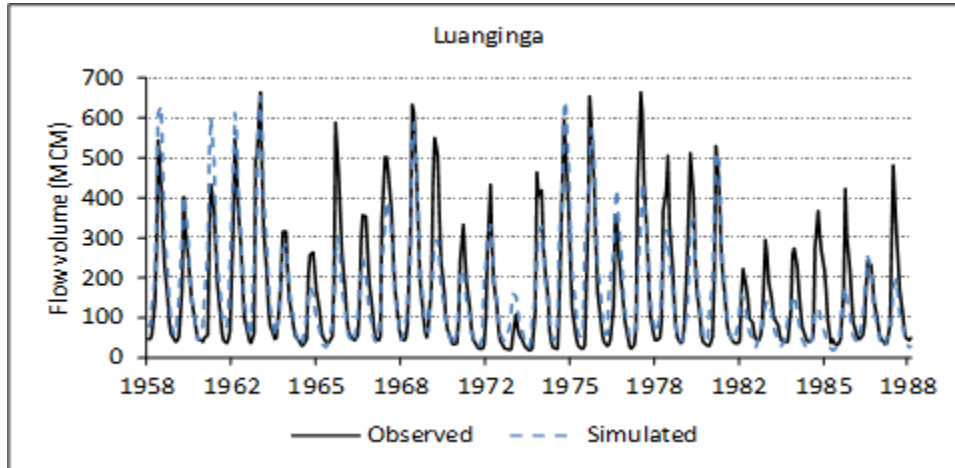




Climate change in the Zambezi



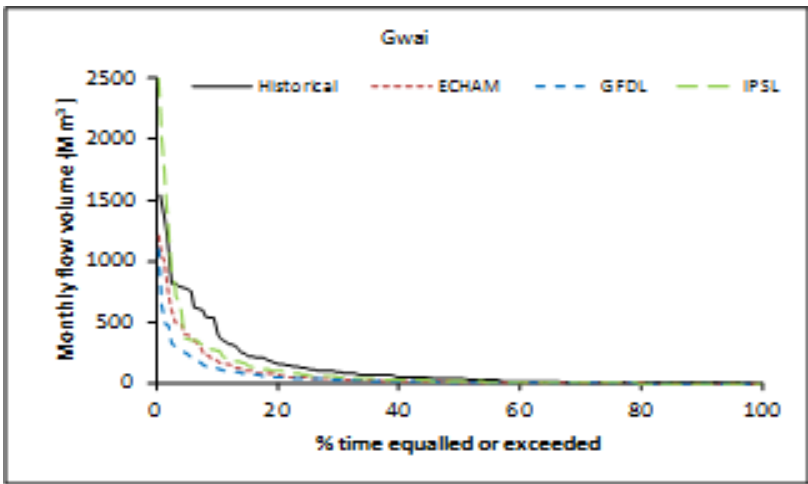
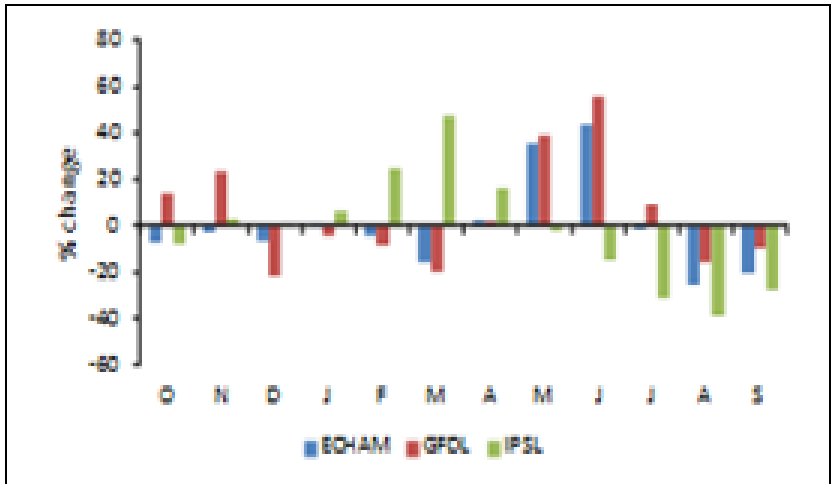
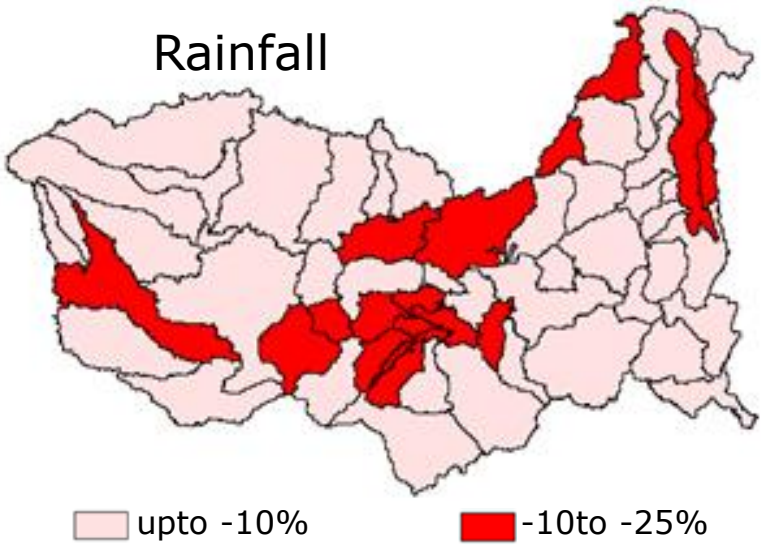
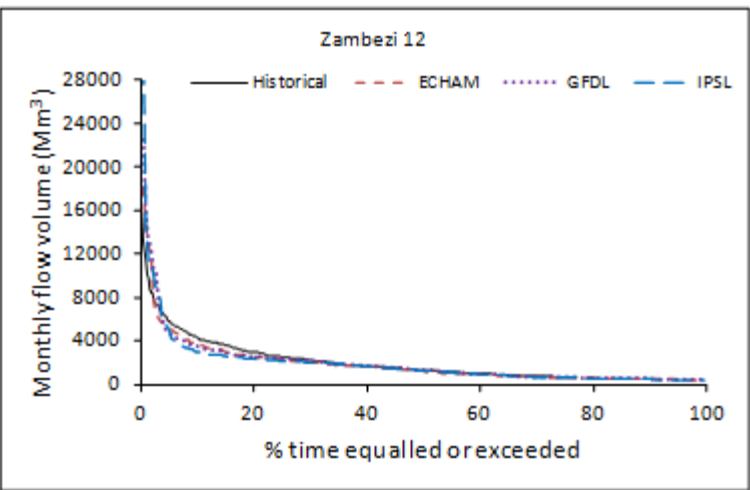
Hydrological Modelling-calibration



- ▶ Pitman rainfall-runoff model
- ▶ Results suggest model is capable of reproducing the hydrological response characteristics of the various sub-basins of the Zambezi.
 - ▶ However, any modelling process is linked to uncertainties from various sources.



Hydrological impact of climate change 2020-2065



Average drop in streamflow 5-15%



Climate change and climate variability

► Signal to noise ratio in predicted streamflows

ECHAM												
Sub-basin	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Kabompo	0.17	0.13	0.25	0.51	0.54	0.53	0.66	0.68	0.30	0.36	0.72	0.39
Zambezi 12	0.46	0.18	0.33	0.06	0.50	0.02	0.05	0.01	0.14	0.50	0.43	0.33
Lusungwa	0.86	0.73	2.44	1.58	0.74	0.53	0.70	0.88	0.82	0.92	1.67	1.99
Buroto	2.31	2.68	1.52	0.40	0.56	0.38	0.68	0.83	1.16	1.45	1.49	1.67
Zambezi 8	1.50	1.96	2.34	1.13	0.63	0.55	0.56	0.66	0.79	0.98	1.23	1.40
Gwai	0.29	0.06	0.22	0.18	0.15	0.02	0.31	0.39	0.73	0.62	0.15	0.18
Lufwanyama	0.00	0.25	0.13	0.22	0.35	0.15	0.50	0.71	0.26	0.55	1.04	0.74
Kafue 4	0.20	0.09	0.07	0.01	0.13	0.33	0.05	0.68	0.67	0.03	0.70	0.63
Luwishi	0.28	0.04	0.32	0.30	0.27	0.13	0.40	0.45	0.16	0.33	0.72	0.68
Lusungwa	2.44	0.91	0.17	0.09	0.56	0.47	0.93	2.05	1.60	0.04	1.20	2.15
Mazowe	0.45	0.17	0.04	0.54	1.05	1.12	1.09	1.24	0.29	0.96	2.50	1.76
Namitete	1.16	0.10	0.63	0.75	0.25	0.63	0.51	0.11	0.94	2.06	1.11	1.03

GFDL												
Sub-basin	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Kabompo	0.20	0.69	0.15	0.41	0.71	0.62	0.75	0.85	0.40	0.30	0.65	0.19
Zambezi 12	0.75	0.26	0.26	0.16	0.65	0.04	0.20	0.09	0.27	0.59	0.50	0.39
Lusungwa	0.79	0.58	2.48	1.62	0.51	0.41	0.56	0.74	0.69	0.88	1.76	2.32
Buroto	2.49	2.04	1.44	0.32	0.08	0.18	0.76	0.91	1.20	1.48	1.57	1.78
Zambezi 8	1.58	2.13	2.57	0.34	0.50	0.17	0.39	0.68	0.86	1.04	1.28	1.46
Gwai	0.07	0.07	0.45	0.31	0.51	0.11	0.40	0.77	0.84	0.40	0.31	0.21
Lufwanyama	0.81	1.07	0.01	0.29	0.31	0.10	0.65	1.10	0.71	0.08	0.58	0.26
Kafue 4	0.43	0.66	0.31	0.10	0.28	0.45	0.04	0.89	1.00	0.22	0.49	0.31
Luwishi	0.22	0.63	0.05	0.24	0.26	0.03	0.35	0.80	0.61	0.11	0.29	0.27
Lusungwa	2.74	0.67	0.17	0.14	0.06	0.09	0.75	2.28	1.75	0.10	1.31	2.43
Mazowe	0.91	0.14	0.11	0.37	0.35	0.55	0.86	1.34	0.67	0.69	2.34	1.21
Namitete	1.90	0.00	0.31	0.74	0.10	0.06	0.10	0.42	0.86	1.85	1.34	0.73

- Variability persists
- Anthropogenic change also detected

CONCLUSION

It is anticipated that variability will persist into the future and exacerbated by climate change

Increased pressure on water resources will continue to impact negatively on the livelihoods of the basin population and on women's roles



WAY FORWARD

Women should be involved at all levels of decision making in water and natural resources management

- ▶ By virtue of their responsibilities, women are well positioned to contribute to climate change adaptation strategies



Thank you

