



**NILE BASIN INITIATIVE**  
INITIATIVE DU BASSIN DU NIL



**Manage climatic extreme events, risk and uncertainty**

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# Outline of the presentation

- The periodicity of the occurrence of river floods and flash floods has increased in recent years in Sudan.
- Variability/Change in Rainfall in term of distribution, start and cessation at agriculture zone in Sudan.
- Rising in temperature trend
- key actionable (solution)

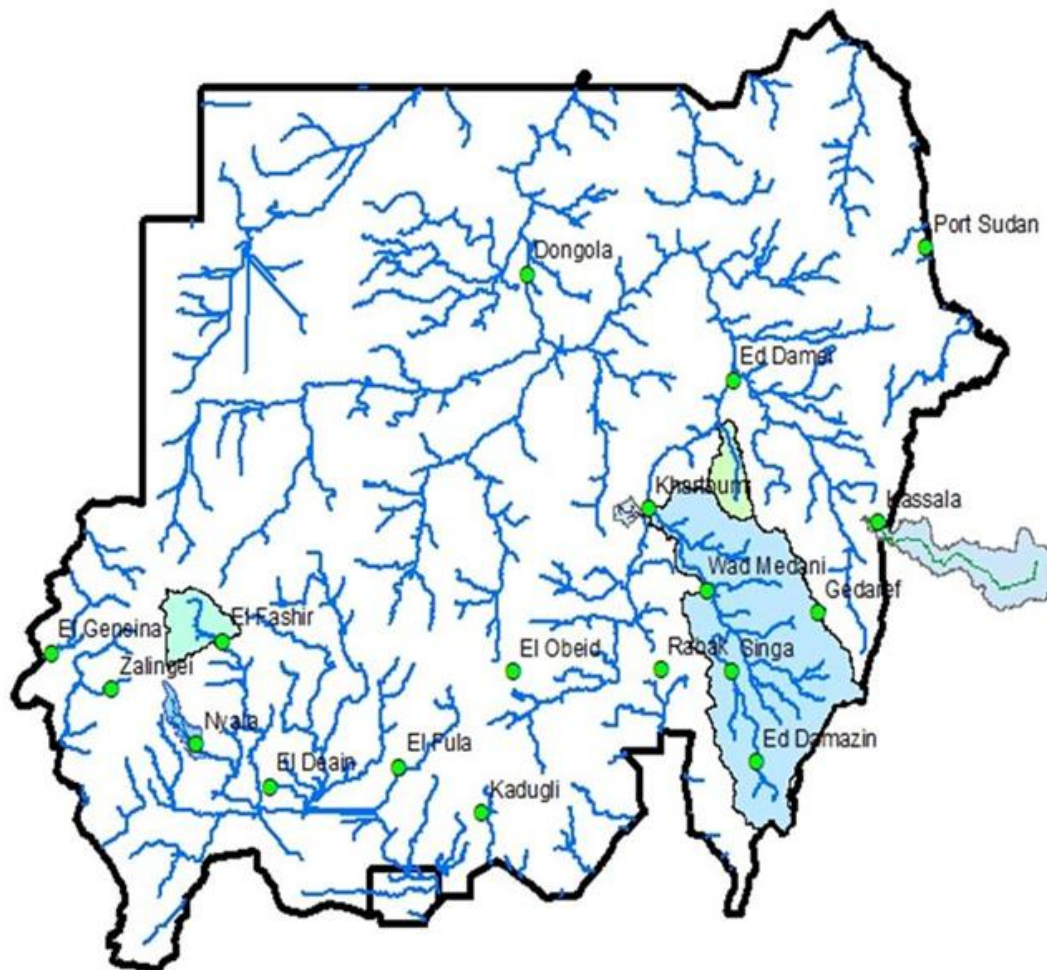
# The periodicity of the occurrence of river floods and flash floods has increased in recent years in Sudan

N	Year	Riverine	Year	Flash	Most affected cities
1	1988	√	1988	√	Khartoum, Damazin and Madani
2	1998	√	2000	√	Khartoum, Singa, Kassala
3	2006	√	2006	√	Madani, Singa, Damazin
4	2011	√	2013	√	Khartoum, Singa and Kassala
5	2012	√	2012	√	Sinnar, Singa and El girba
6	2016	√	2018	√	Khartoum, Sinnar, Singa and Kassala
7	2019	√	2019	√	Khartoum, Sinnar, Singa and Kassala
8	2020	√	2020	√	Khartoum, Sinnar, Singa and Shandi



# Flash flood-prone areas

## Shaded areas of more frequency in flash flood



No.	Flood-prone area (Flash flood) Effected Cities and Town
1	Valleys ( <i>Wadian</i> ) Deltas surrounding capital Khartoum somtimes combined with Blue Nile and white Nile.
2	Valleys ( <i>Wadian</i> ) passing through Nyala (western Sudan, Darfur)
3	Valleys ( <i>Wadian</i> ) passing through El Fashir (western Sudan, Darfur)
4	Valleys ( <i>Wadian</i> ) joint river Nile at Shendi (North Sudan, Nile state)
5	River gash passing through Kassala (eastern Sudan, Kassala state)

# Photos of Past Floods events in Khartoum



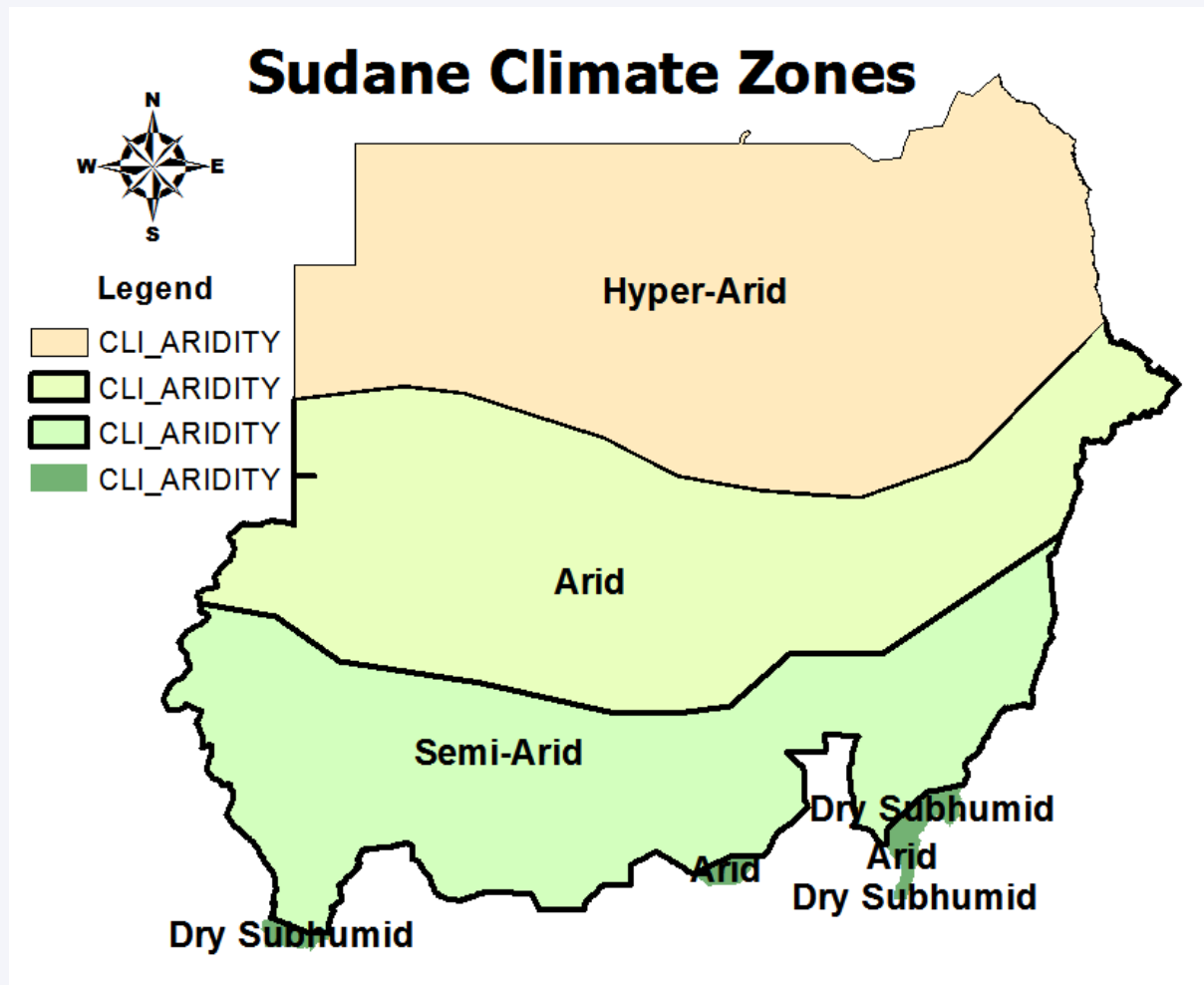
رئيس اللجنة الشعبية: لم  
نقصر في شيء، والمحلية رفضت  
تسليمنا عربيات المشفط والتراب



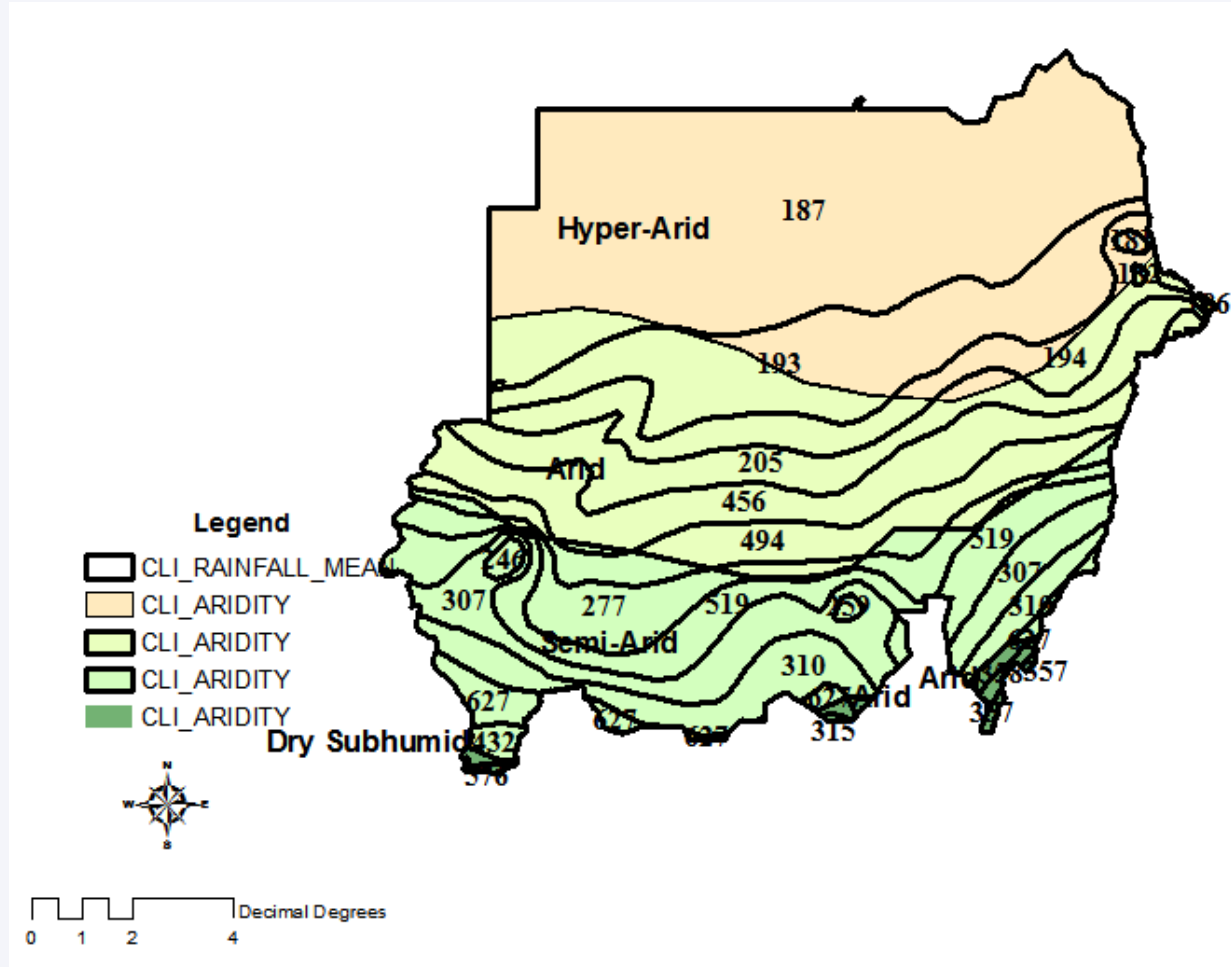
مواطن: الضرر يفوق الوصف،  
ونطالب بحل المحليات واللجان  
الشعبية لفشلها في إدارة الأزمة



# Variability/Change in Rainfall in term of intensity distribution, start and cessation at agriculture zone

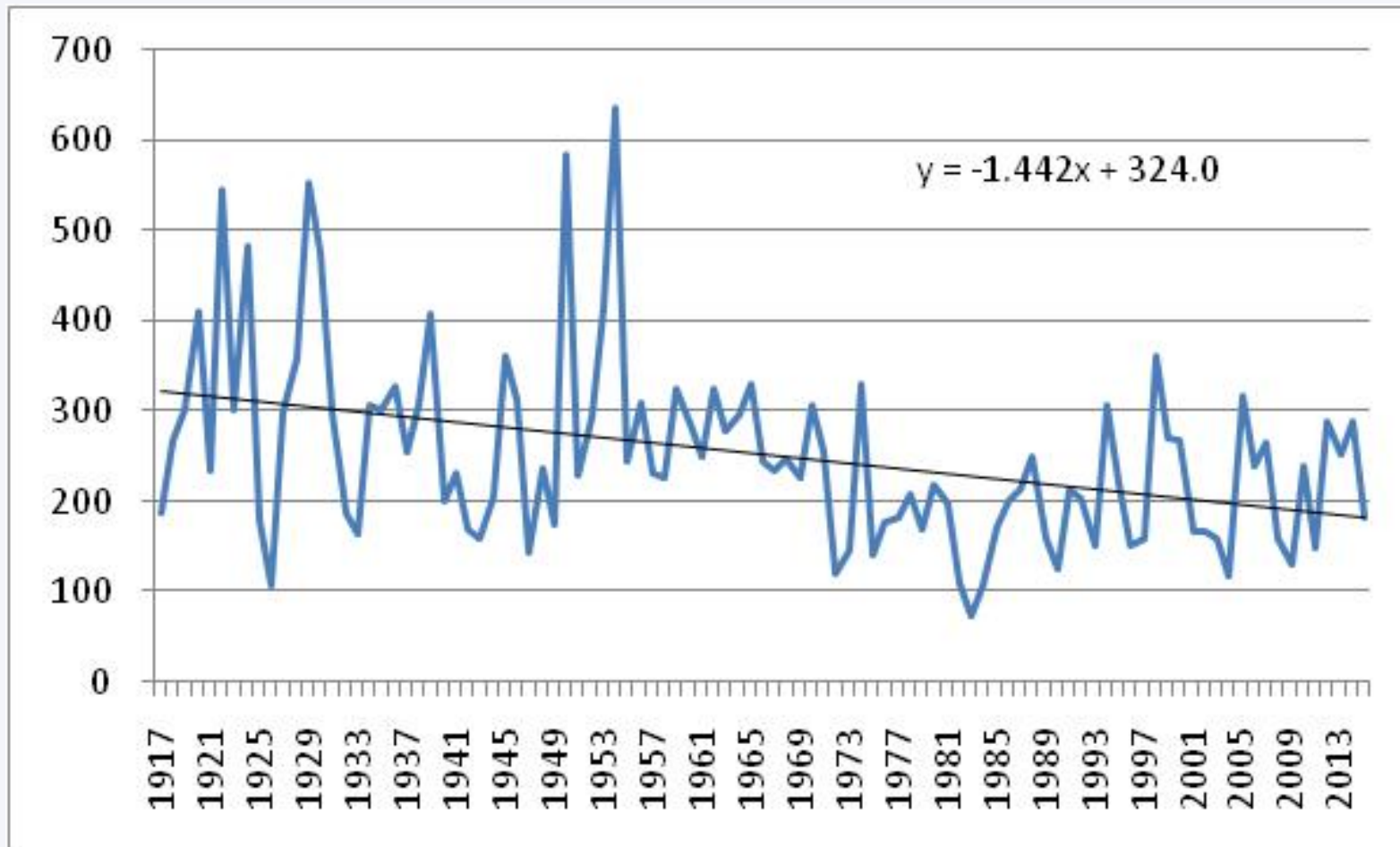


# Shift of rainfall isohyets towards south



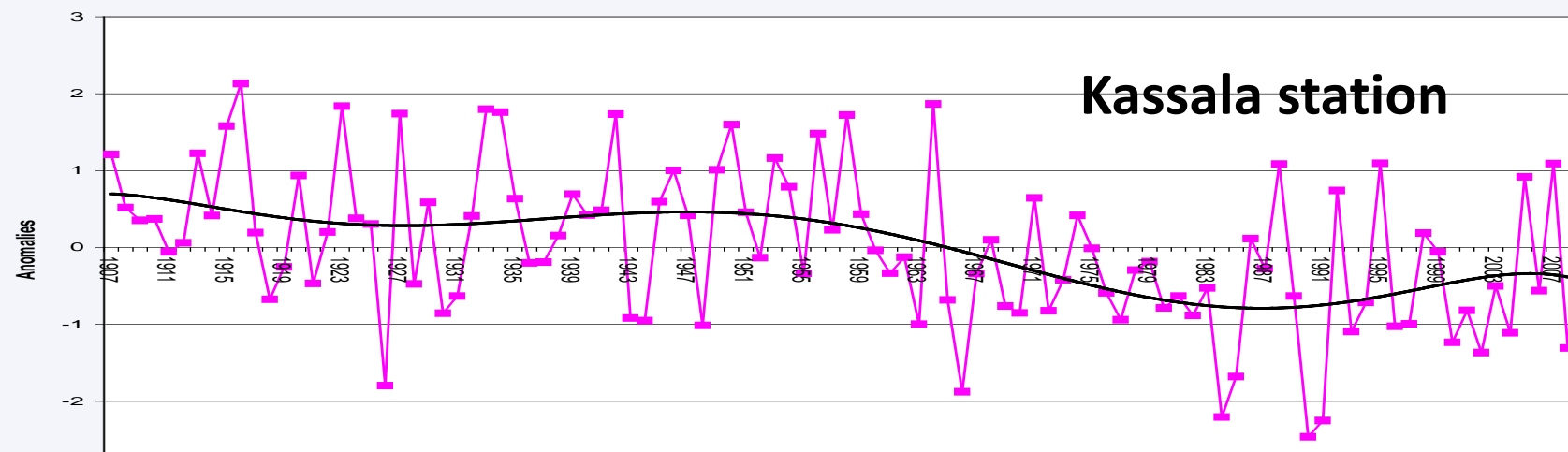
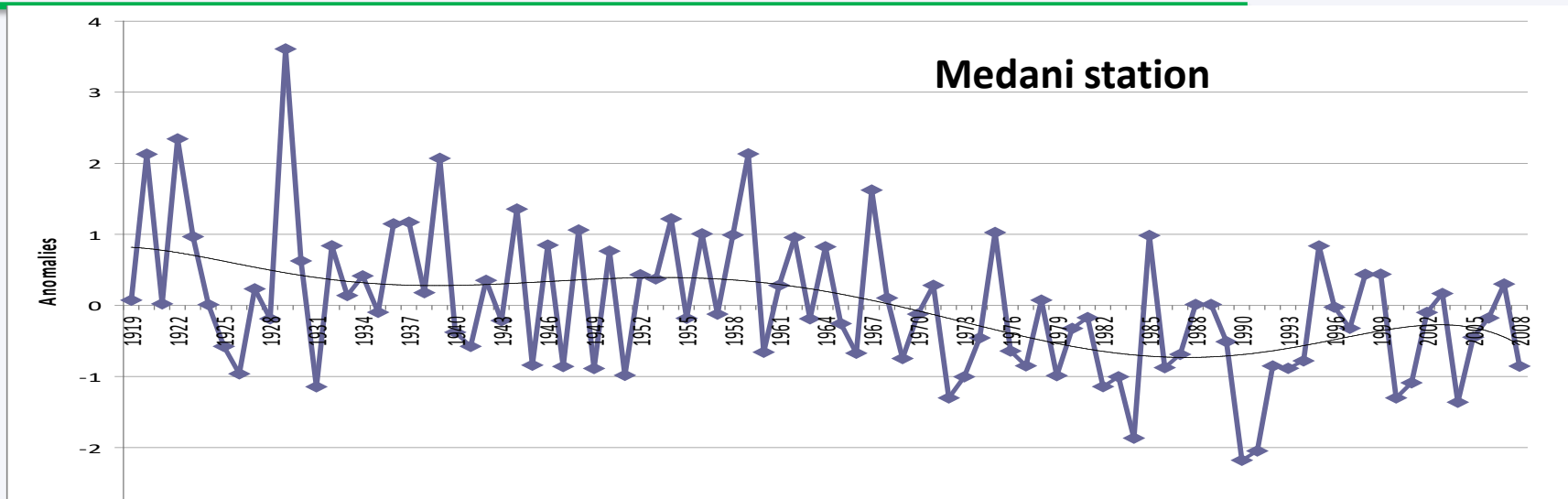


# Annual rainfall over El Fasher (1917-2015)



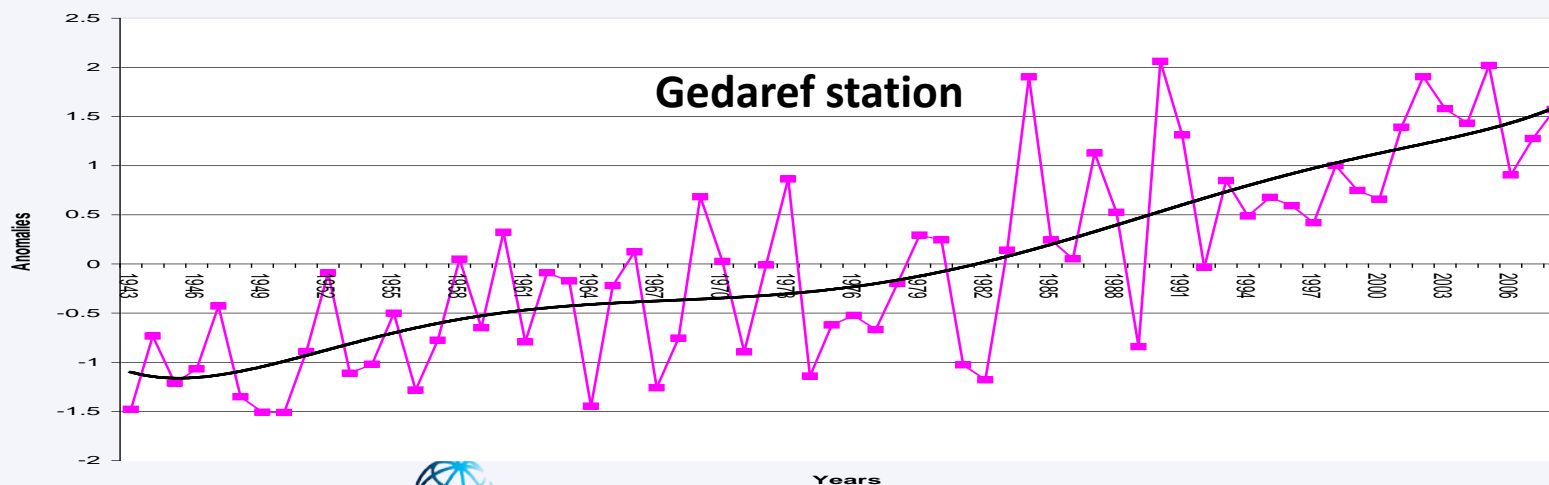
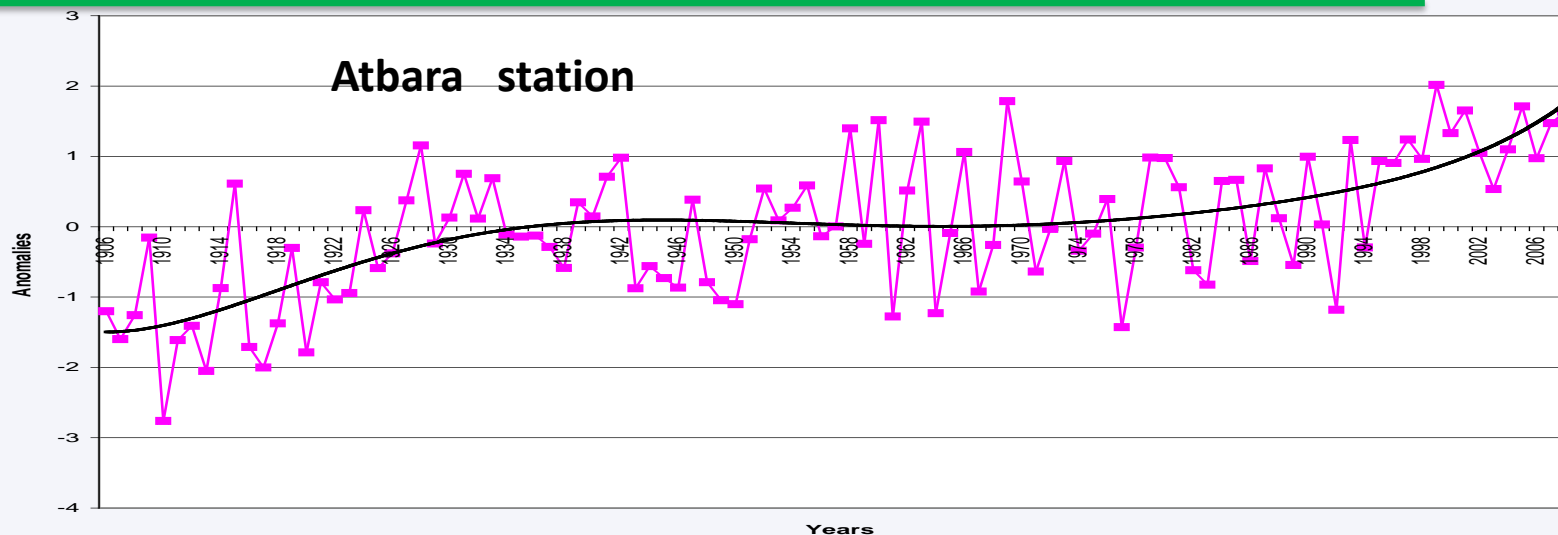


# Rain fall trends and deflection to the long term mean at two stations (1907-2007)



# Rising in temperature trend

## Temperature trend in semi-arid, Sudan (1906-2006)



# Climate change impact the sectors of agriculture, forestry and water resources as followings:



Agriculture sectors: Drought is threatening the existing cultivation of rain fed, mechanized farming and rain fed lands which directly affect Pastoral and farms groups in the semi – arid areas, that lead not only reduction in productions but also conflicts between farms and Pastoral.

# Climate change impact the sectors of agriculture, forestry and water resources as followings: *cont.*



Decrease in crop production is predicted to decline substantially for both millet and sorghum. The area of rain fed land as well as the important Arabic Gum belt would likely also decrease, with attendant impacts on both local incomes and food security would drop.



# Climate change impact the sectors of agriculture, forestry and water resources as followings: *cont.*



Humid-agro climatic zones: will shift southwards, rendering areas of the north increasingly unsuitable for agriculture and lead to increase sand storms which burring Nile course in northern part of Sudan substantially increase evaporation and infiltration of

# Key actionable (recommendation)

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- Establishment of regional hydro-meteorological and meteorological monitoring network, in flood and drought vulnerable areas in order to enhance efficient early warning systems at communities, institutional and regional levels especially in flood and droughts prone areas.

## Key actionable (recommendation) *cont.*

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- Encouraging Water Harvesting targeted agricultural and land management practices, and Storing excess water during heavy rains in dams ( Hafir), provide inter basin water transfers to areas with water deficit in order to regulate river flows down stream and to mitigate against floods.

# Key actionable (solution) *cont.*

- Investment in information infrastructure at both institutional and regional level and cooperative management of shared watercourses can optimize regional win-win benefits, mitigate flood and drought disasters, and minimize tensions between riparian states. It can also help maintain shared ecosystems and improve water and agriculture productivity.





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**THANK YOU!**