How forecasts can trigger humanitarian action

Andrew Kruczkiewicz

2016 HEPEX Workshop
Quebec City
8 June, 2016

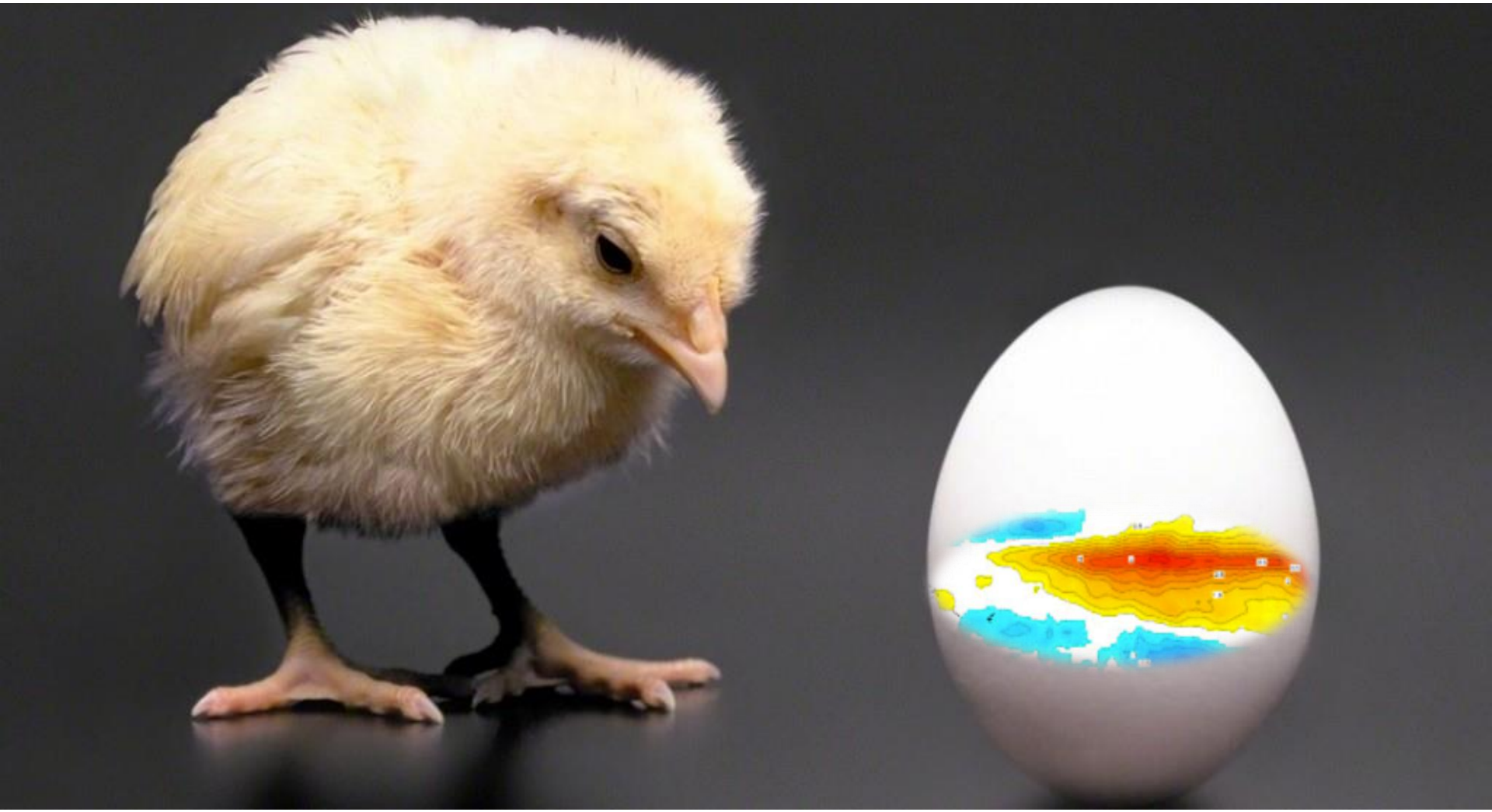
International Research Institute
for Climate and Society
EARTH INSTITUTE | COLUMBIA UNIVERSITY

RED CROSS/RED CRESCENT
CLIMATE CENTRE

International Federation
of Red Cross and Red Crescent Societies

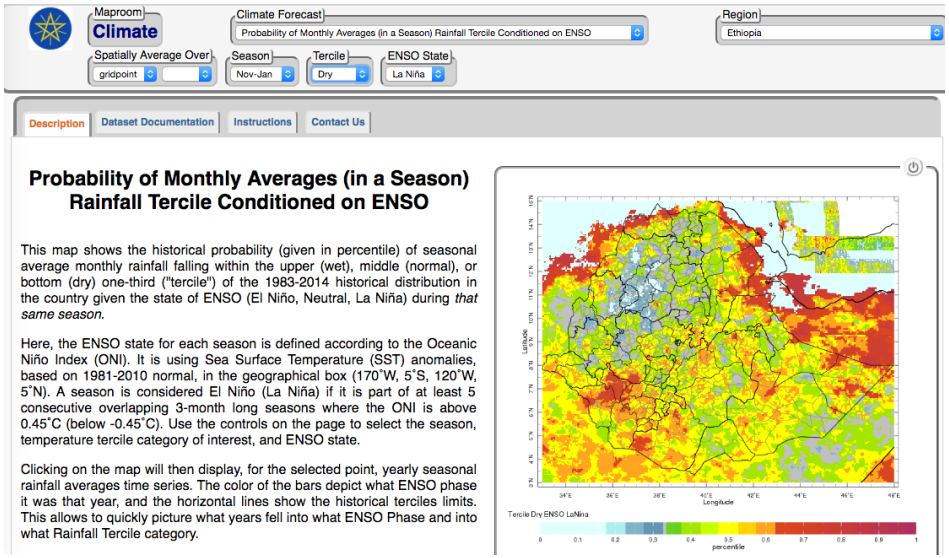
The Netherlands Red Cross

Part 1: What comes first?



Games for a new climate: Namibia. Villagers in Katima Mulilo, on the Zambezi River, play Ready! The region has suffered severe annual floods in recent years. (Photo: Colleen Macklin/Parsons the New School)

Researchers/
MET



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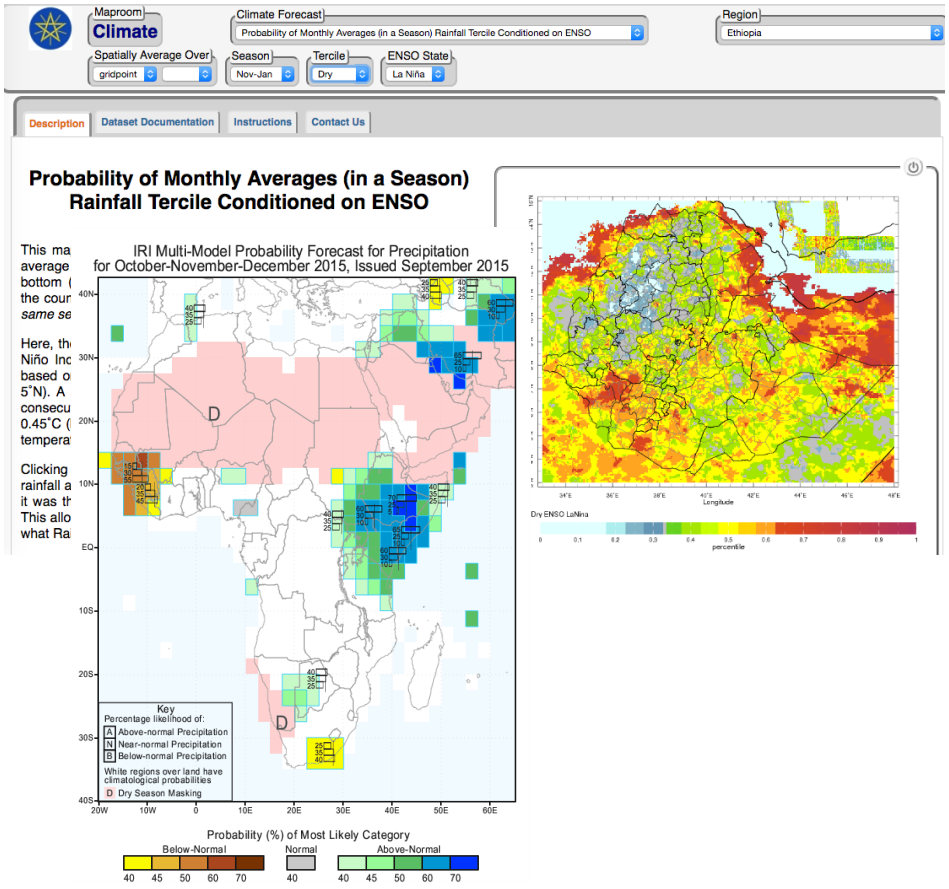

JAMHURI YA MUUNGANO WA TANZANIA
WIZARA YA UJENZI, UCHUKUZI NA MAWASILIANO
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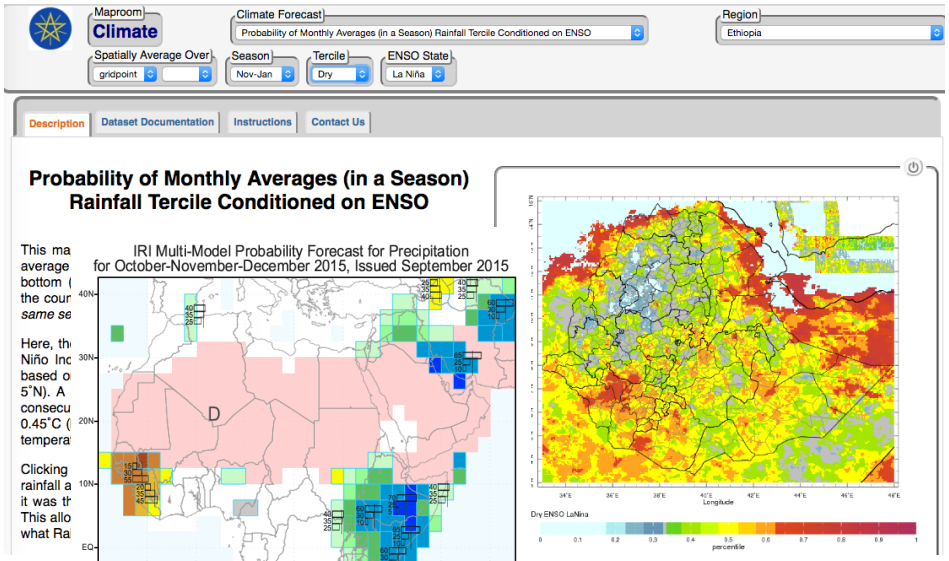
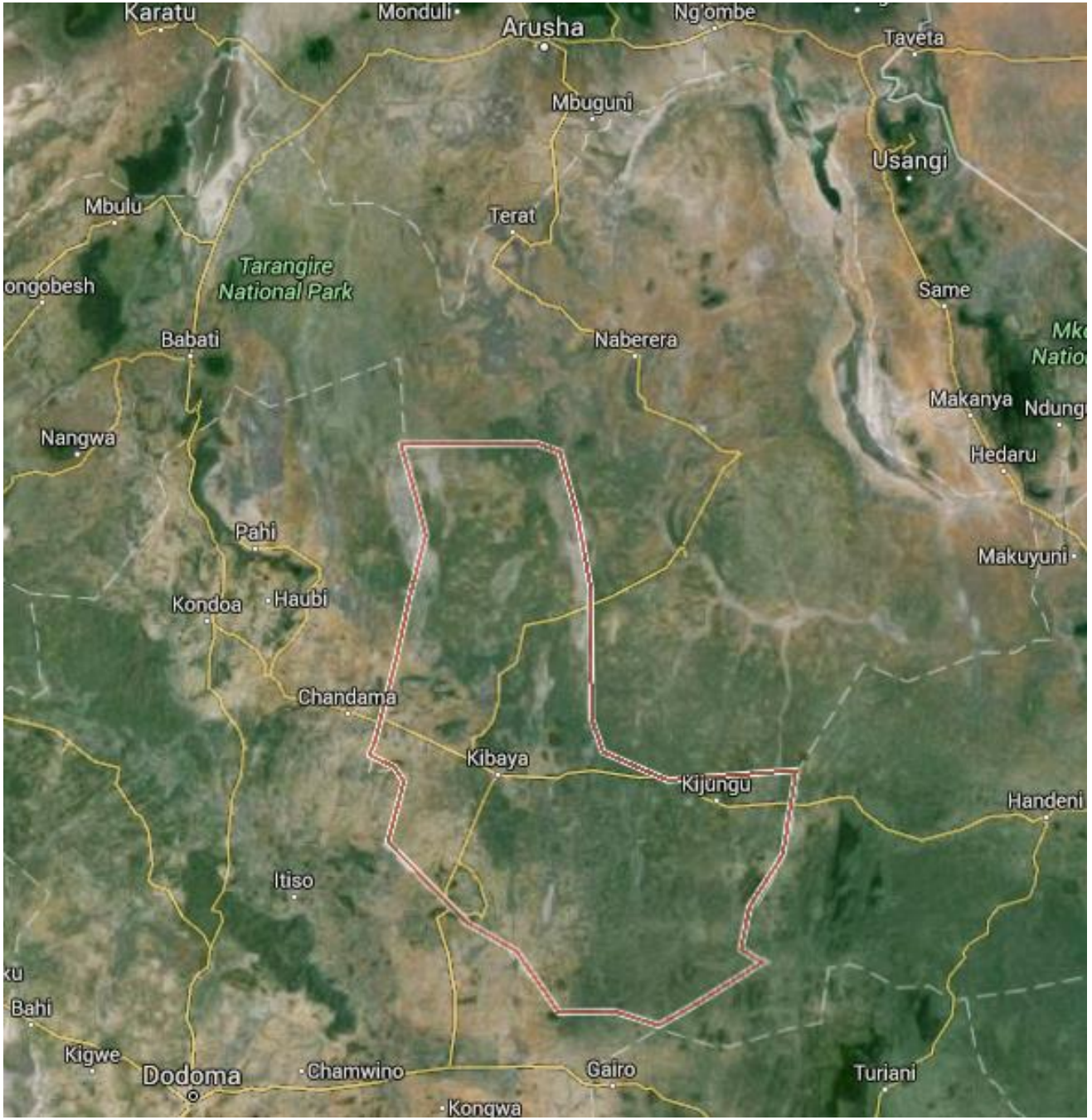


Regional Gov't/Red Cross

Tuesday	7th Jun 2016	Min 22°C Max 32°C
Wednesday	8th Jun 2016	Min 22°C Max 29°C
Thursday	9th Jun 2016	Min 21°C Max 30°C
Friday	10th Jun 2016	Min 19°C Max 32°C
Saturday	11th Jun 2016	Min 21°C Max 30°C


Karatu
Monduli
Arusha
Ng'ombe
Taveta
Mbuguni
Usangi
Mbulu
Terat
Tarangire
National Park
ongobesh
Same
Babati
Naberera
Makanya
Ndung
Nangwa
Hedaru
Pahi
Makuyuni
Kondoa
Haubi
Chandama
Kibaya
Kijungu
Handeni
Itiso
Bahi
Kigwe
Dodoma
Chamwino
Gairo
Turiani
Kongwa

Researchers to (with) MET

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S.L.P. 3056
DAR ES SALAAM

06 Juni, 2016

Taarifa kwa Umma: Upepo mkali na mawimbi makubwa vinatarajiwa katika maeneo ya ukanda wa Pwani.

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Dureja la Taarifa:	Tahadhari
Kuanzia:	07 Juni, 2016
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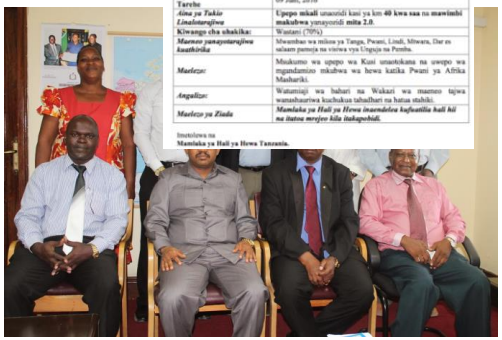
Maelezo ya Ziada	*Mamlaka ya Hali ya Hewa inaendelea kufuatilia hali hii na itatoa mrejeo kila itakapobidi.*

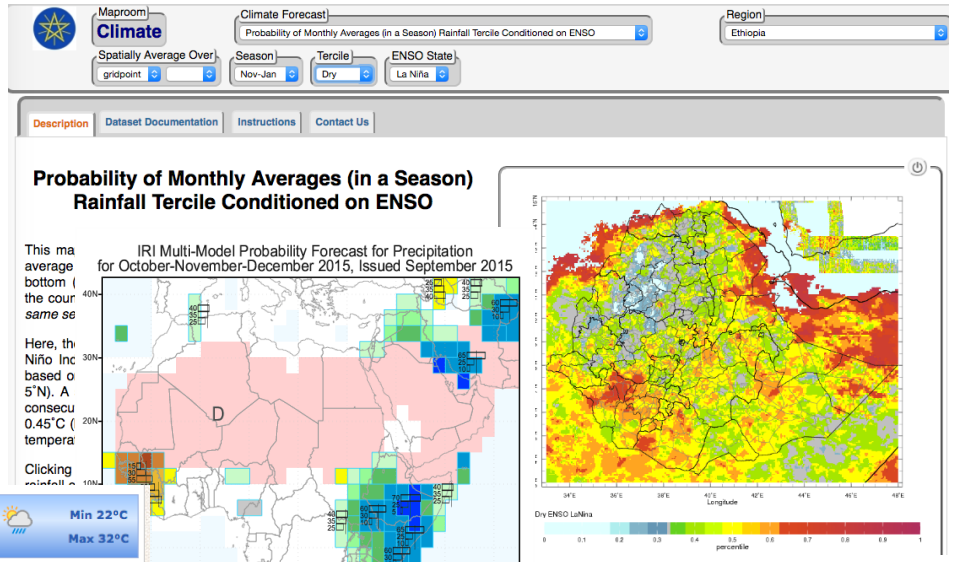
Imetolewa na
Mamlaka ya Hali ya Hewa Tanzania.

Regional Gov't/Red Cross



Local Gov't

Researchers to (with) MET



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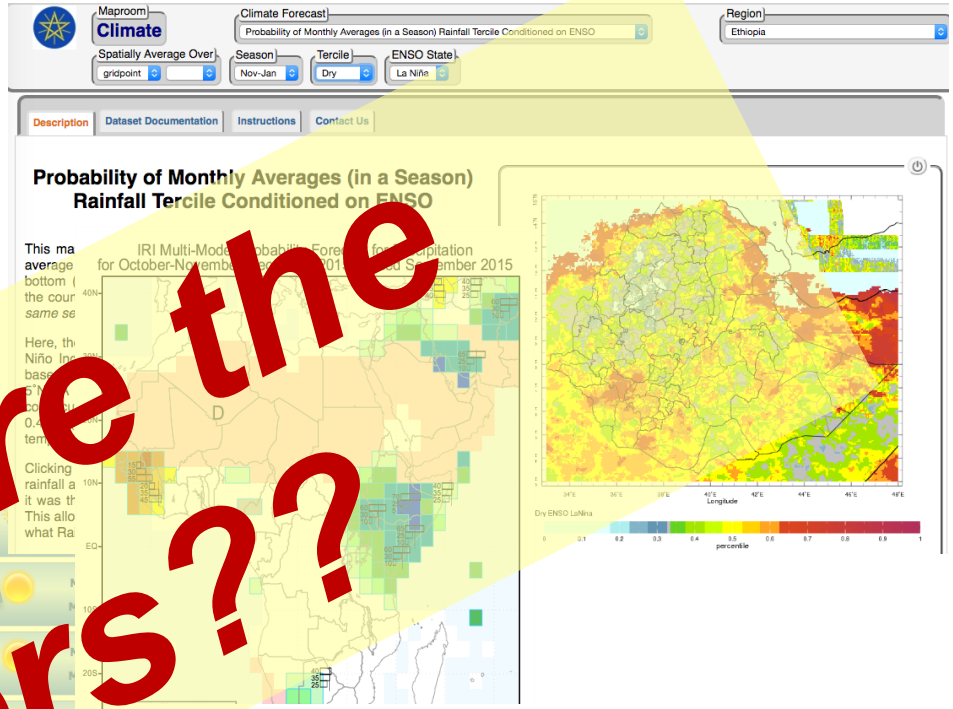
Local Gov't

Community Action

Researchers to (with) MET



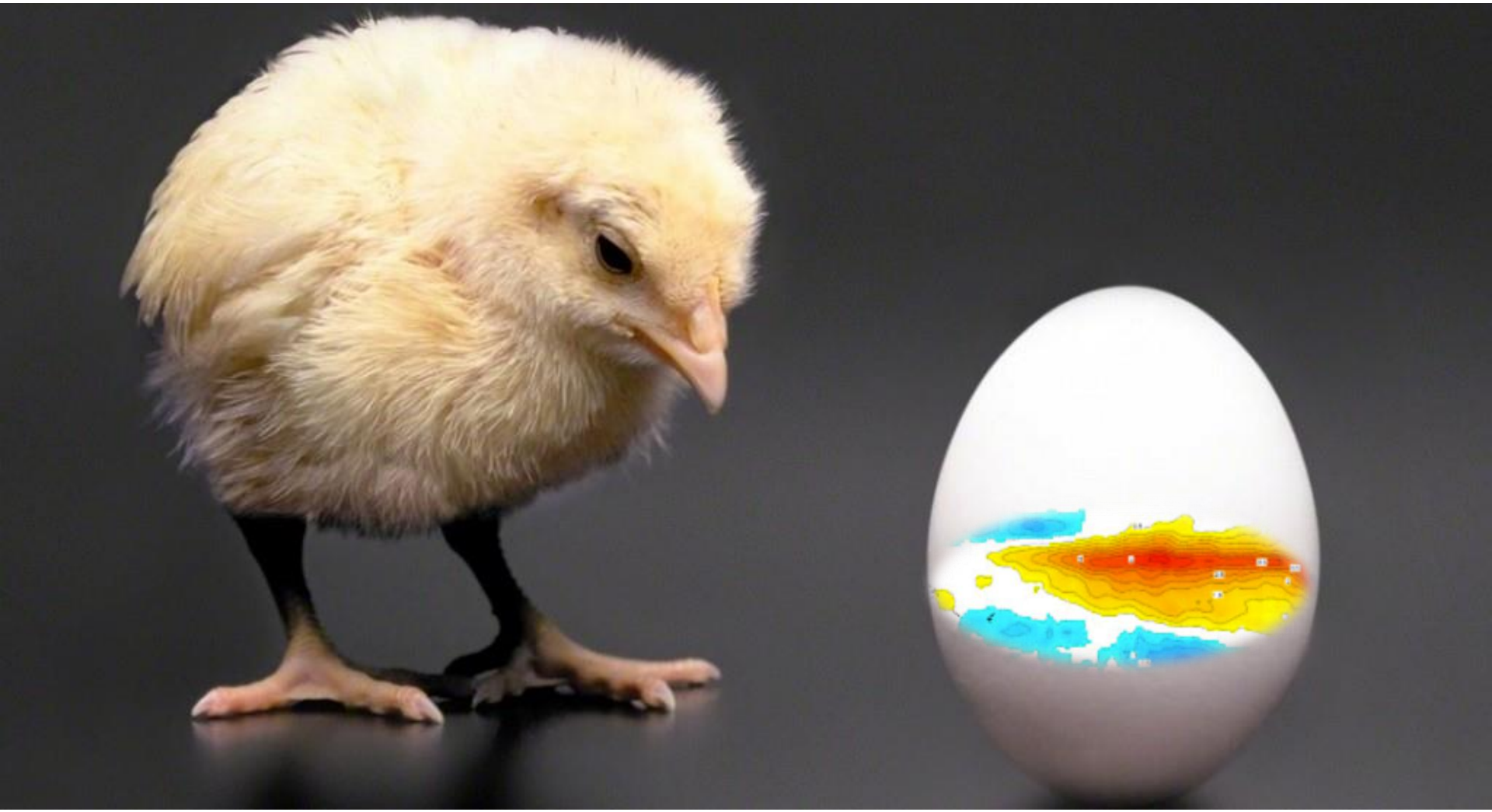
Regional Gov't/Red Cross

Who are the users??

Local Gov't

Community Action

Part 1: What comes first?



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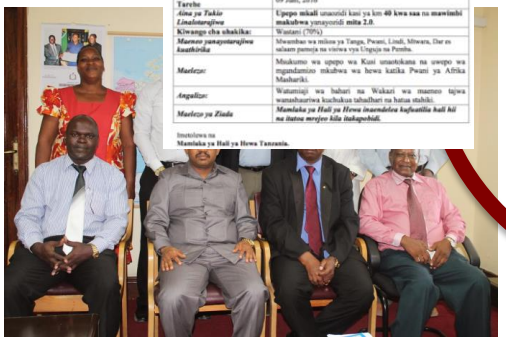
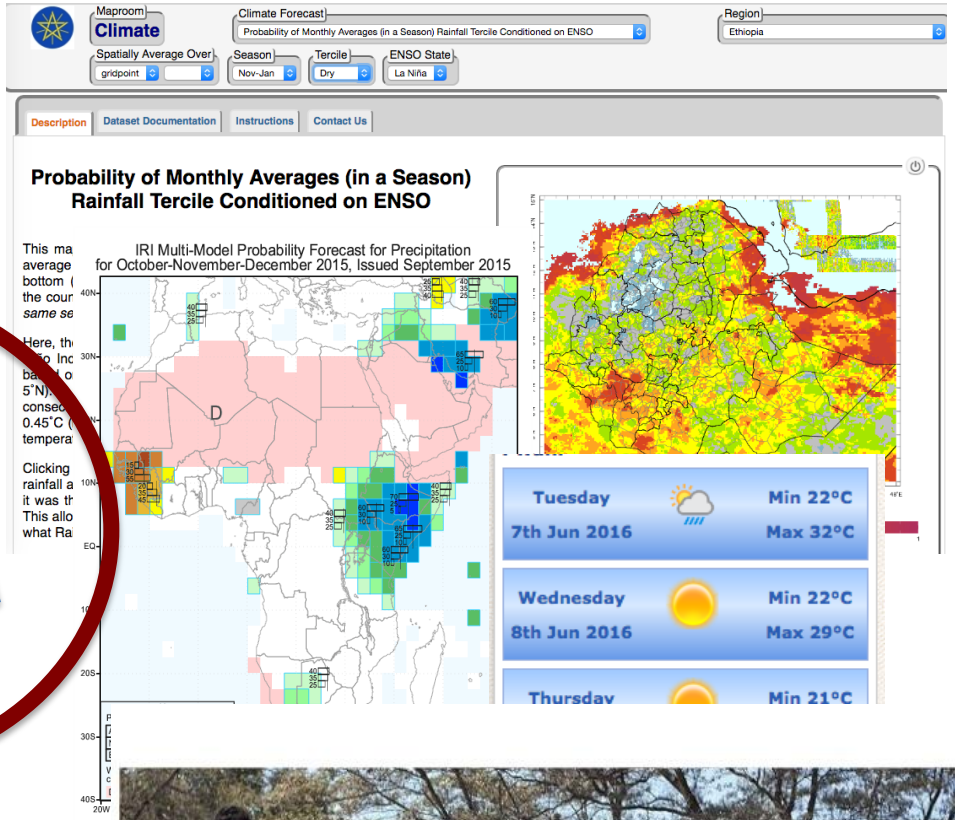
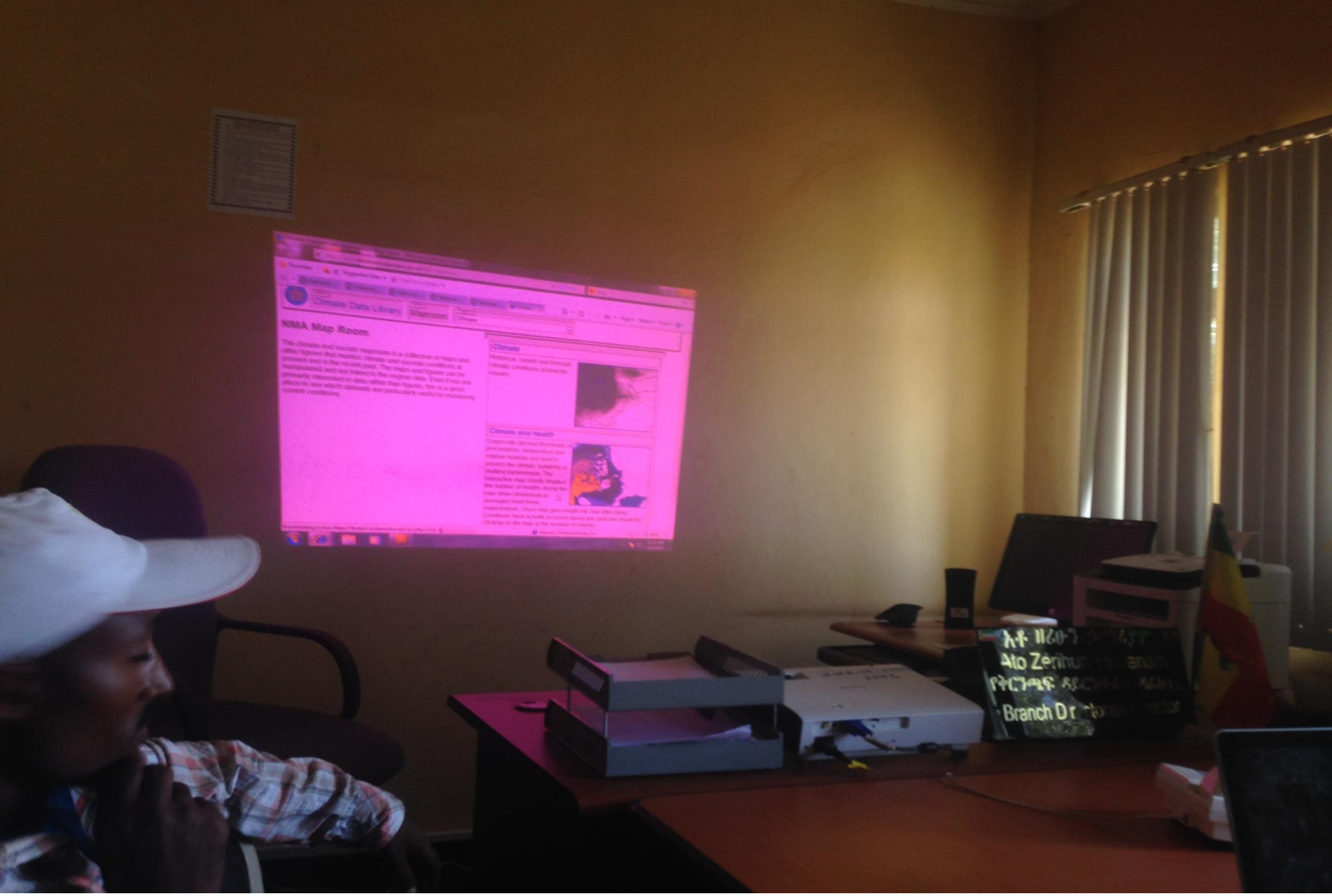




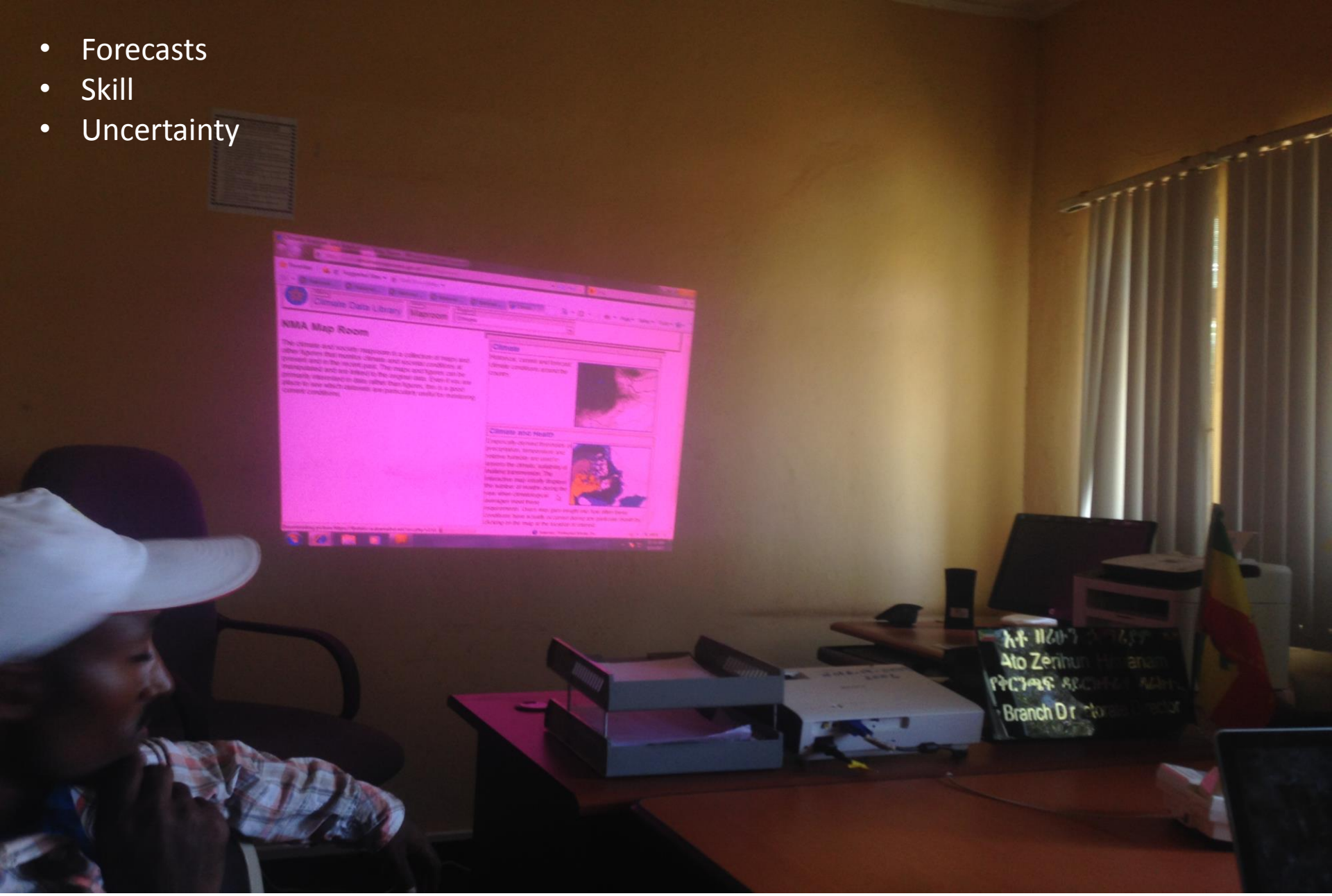
Local Gov't/Red Cross

Community Action

- Action
  - Length of time to prepare
  - How to execute the action
  - Reality in the community
  - Local culture


NMA Map Room

- Forecasts
- Skill
- Uncertainty



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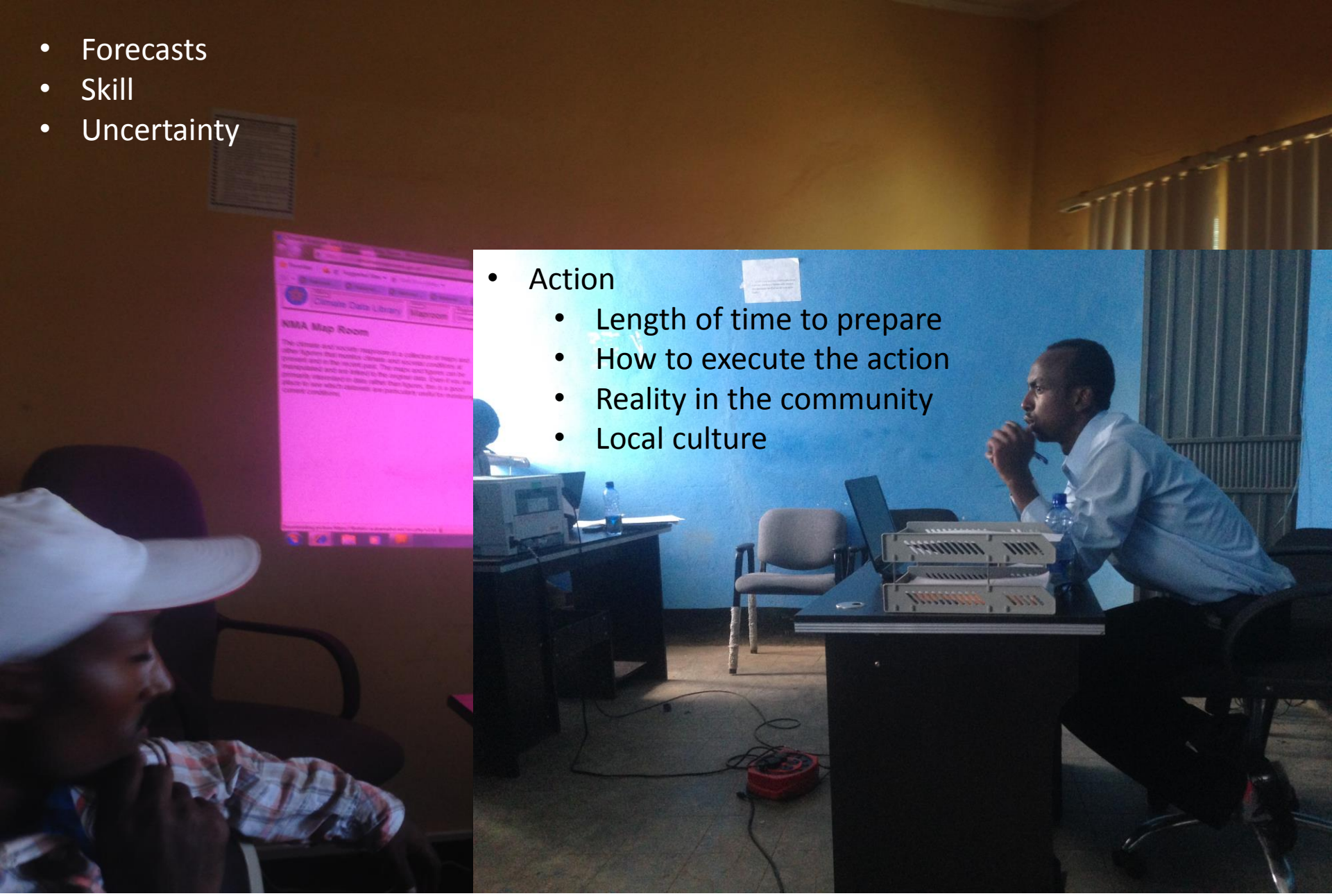

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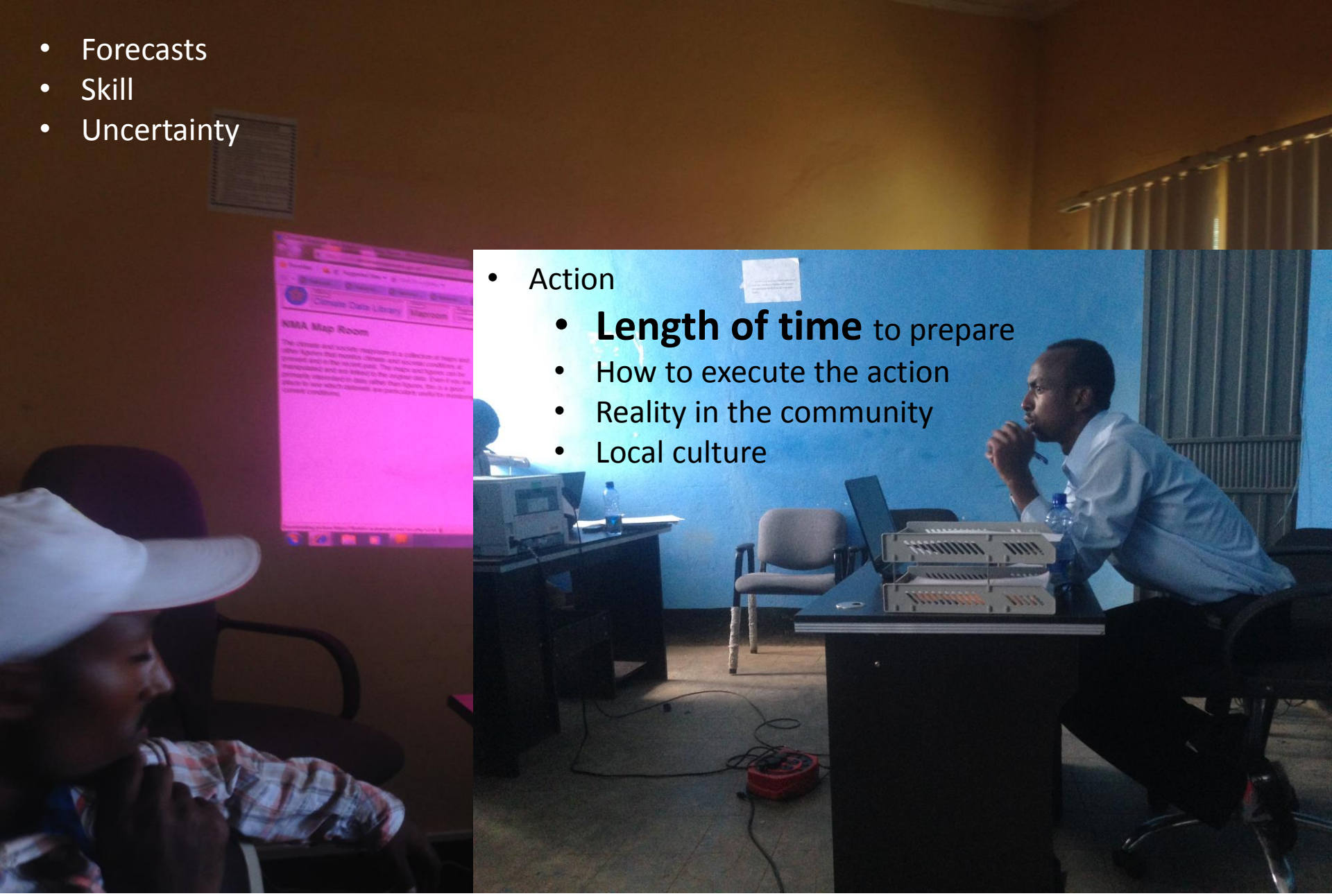

- Action
  - **Length of time** to prepare
  - How to execute the action
  - Reality in the community
  - Local culture

Warning for strong winds and large waves/Tahadhari ya upepo mkali na mawimbi makubwa 07-09/06/2016.

Jun 06

From: tma cfo

To: cmsangi@yahoo.com, Ewald bonifasi, fanosbert@yahoo.com, godfridaclement@yahoo.com, kazimilistephen@yahoo.com, konyonanai@pmo.go.tz, turuka@yahoo.com, carockilembe@yahoo.com, agnes. kijazi, massytambwe@gmail.com, ndungu karemeri, DMintern Africa, Renatus Mkaruka, Andrew Kruczkiewicz, Geofrey [illegible], Joseph Kimaryo , Director Disaster Management, kibari2006@yahoo.com, [illegible], [illegible], arrighi@climatecentre.org, joycekagaruki@yahoo.com

WARNING 06-06-2016.pdf (113.8 KB) Preview | Download | Briefcase | Remove
TAHADHARI 06-06-2016.pdf (105.5 KB) Preview | Download | Briefcase | Remove
Download all attachments
Remove all attachments

Please receive the warning information on strong winds and large waves along the entire coast from 07-09/06/2016.

Tafadhali pokea taarifa ya tahadhari ya upepo mkali na mawimbi makubwa katika ukanda wote wa pwani kuanzia tarehe 07-09/06/2016.

Thank you/Ahsante

Public Weather Services Department/Kitengo cha Huduma za Hali ya Hewa kwa Umma,
Central Forecast Office/Ofisi Kuu ya Utabiri,
Tanzania Meteorological Agency/Mamlaka ya hali ya Hewa Tanzania.

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WIZARA YA UJENZI, UCHUKUZI NA MAWASILIANO
MAMLAKA YA HALI YA HEWA TANZANIA

Simu: 255 22 2460735/2460706
FAKSI: 255 22 2460735/2460700
Barua pepe: met@meteo.go.tz
Tovuti: www.meteo.go.tz

S.L.P. 3056
DAR ES SALAAM

Unapojibu tafadhali nakili:
Kumb. Na.: TMA/1622

06 Juni, 2016

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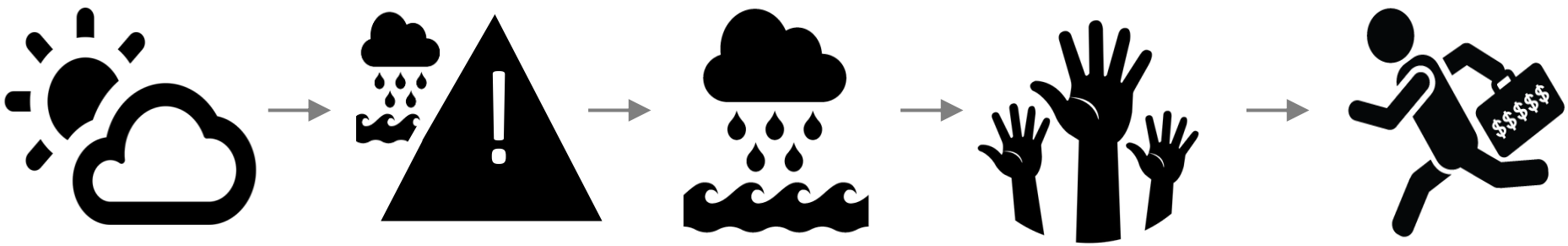
Part 2: Forecast Based Financing

Actions: Who/When/Where?

Funding

Acting in vain

The Usual Surprise



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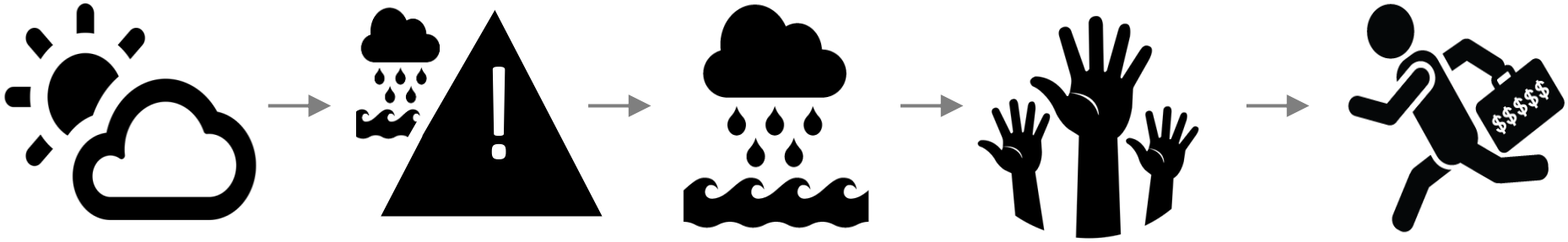
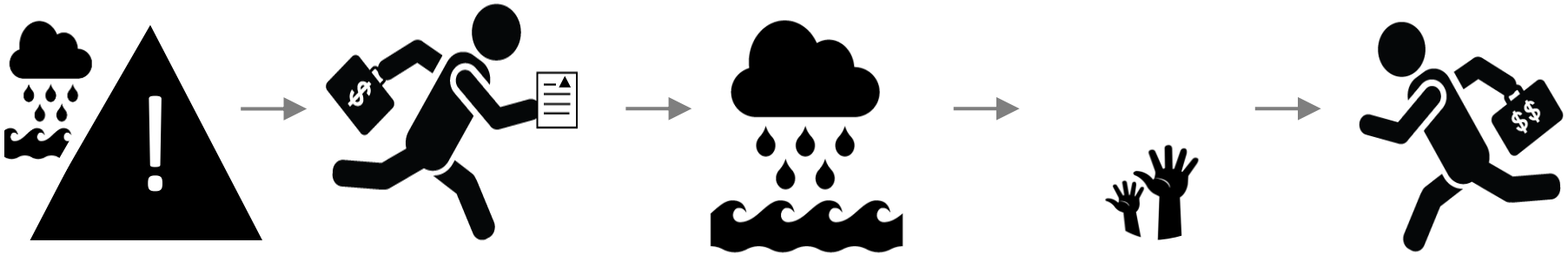


The Proposed Innovation



No early action

Response

Suffering

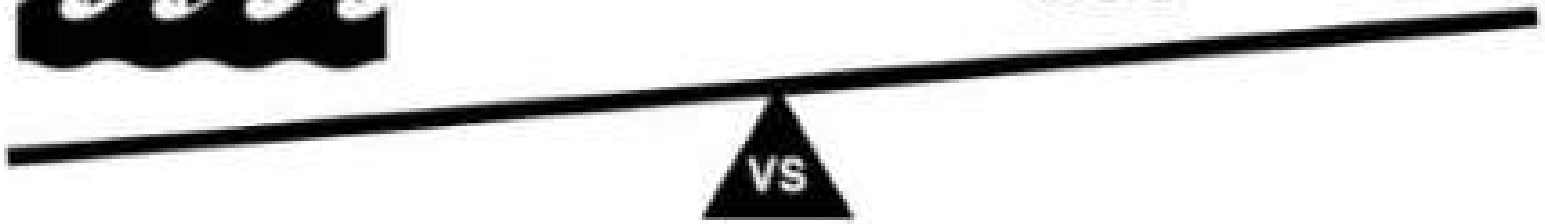
Forecast-based Financing for Preparedness Actions

Preparedness

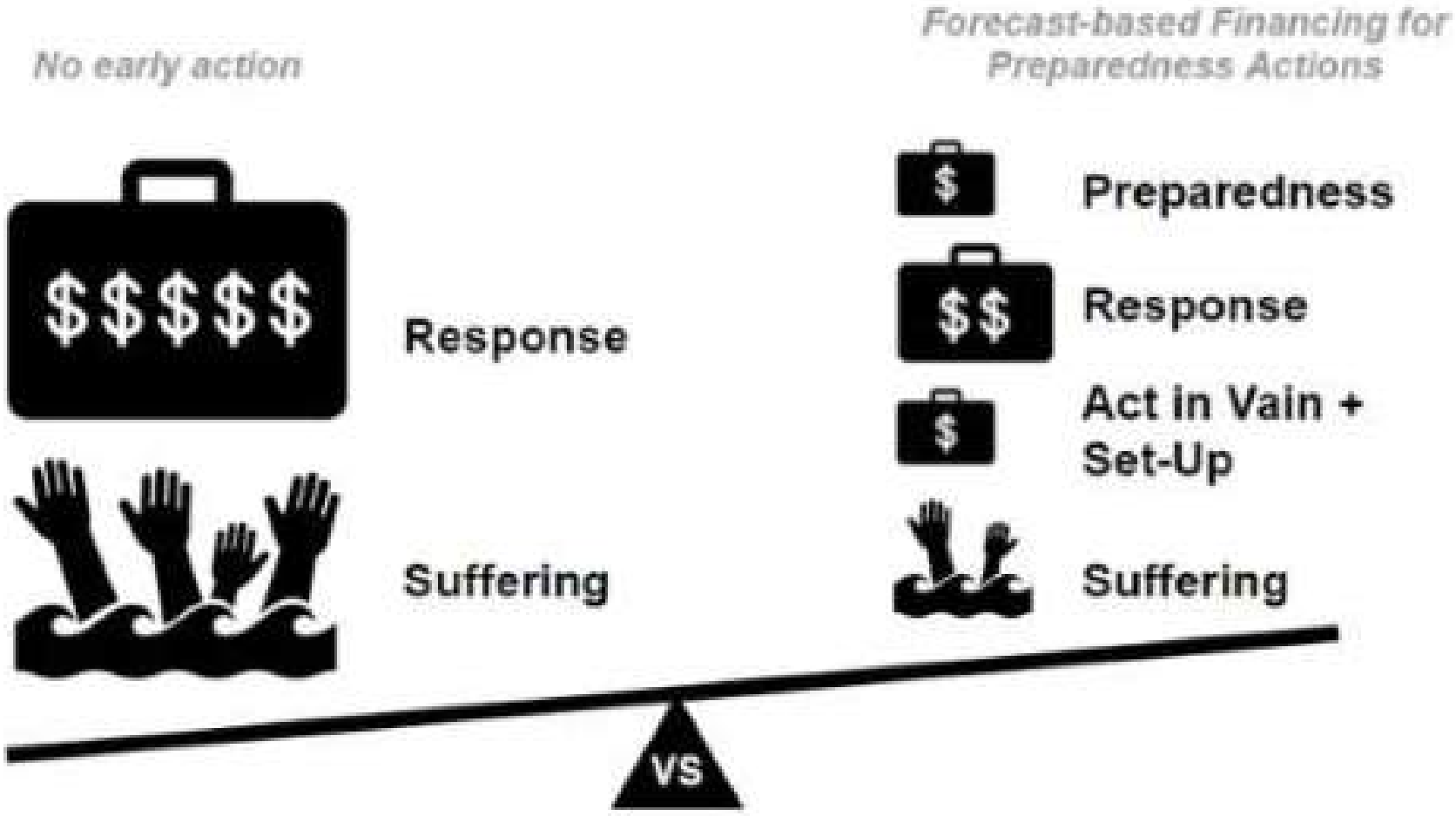
Response

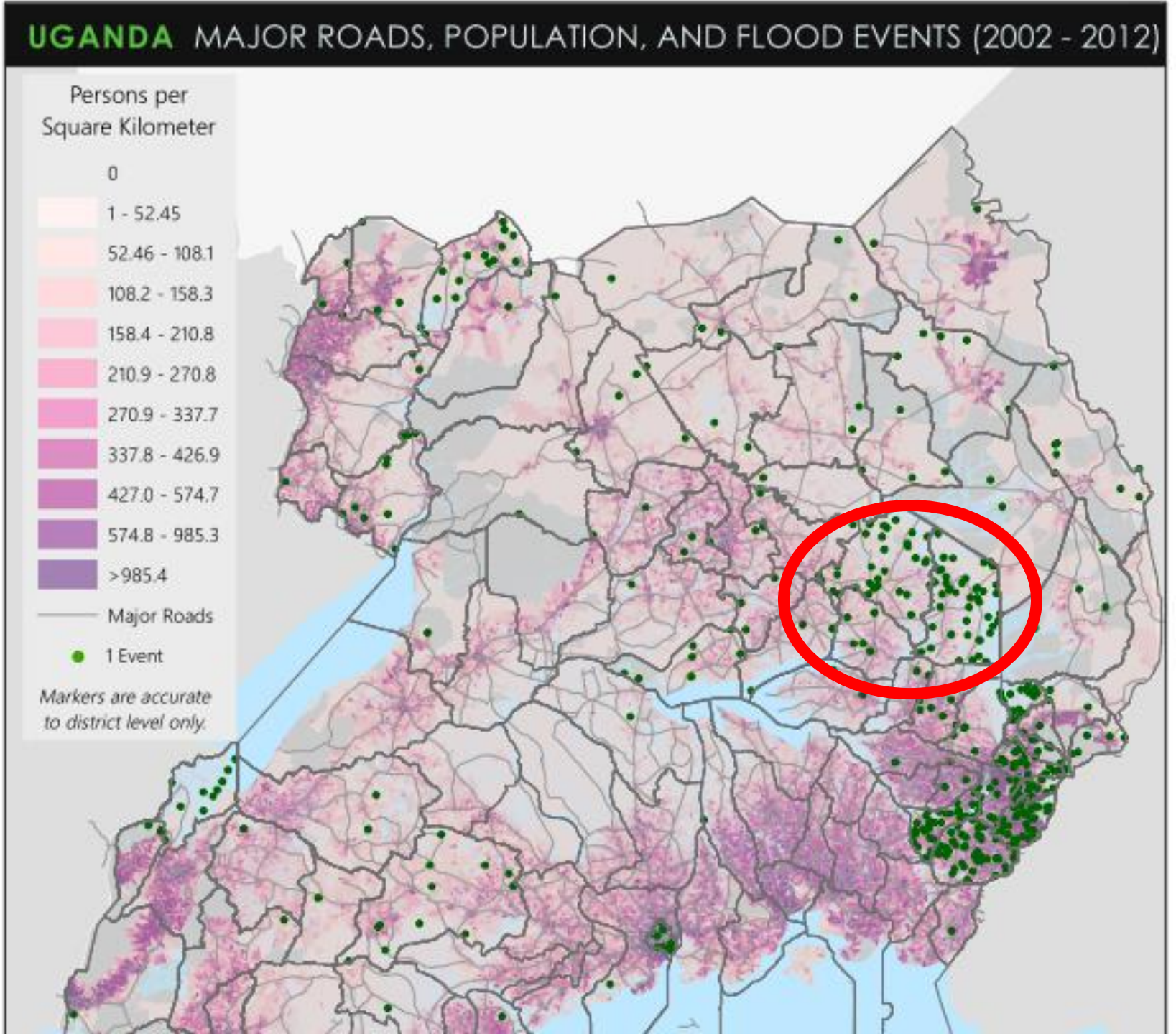
Act in Vain + Set-Up

Suffering



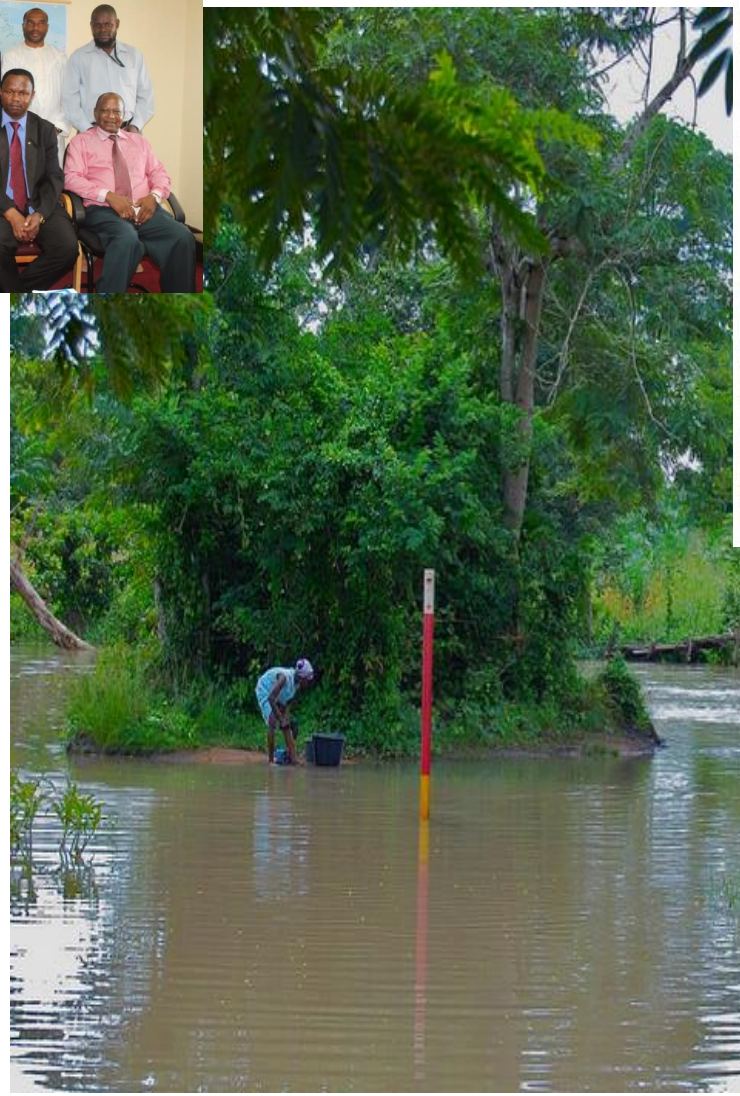
Thresholds, Funding and Action



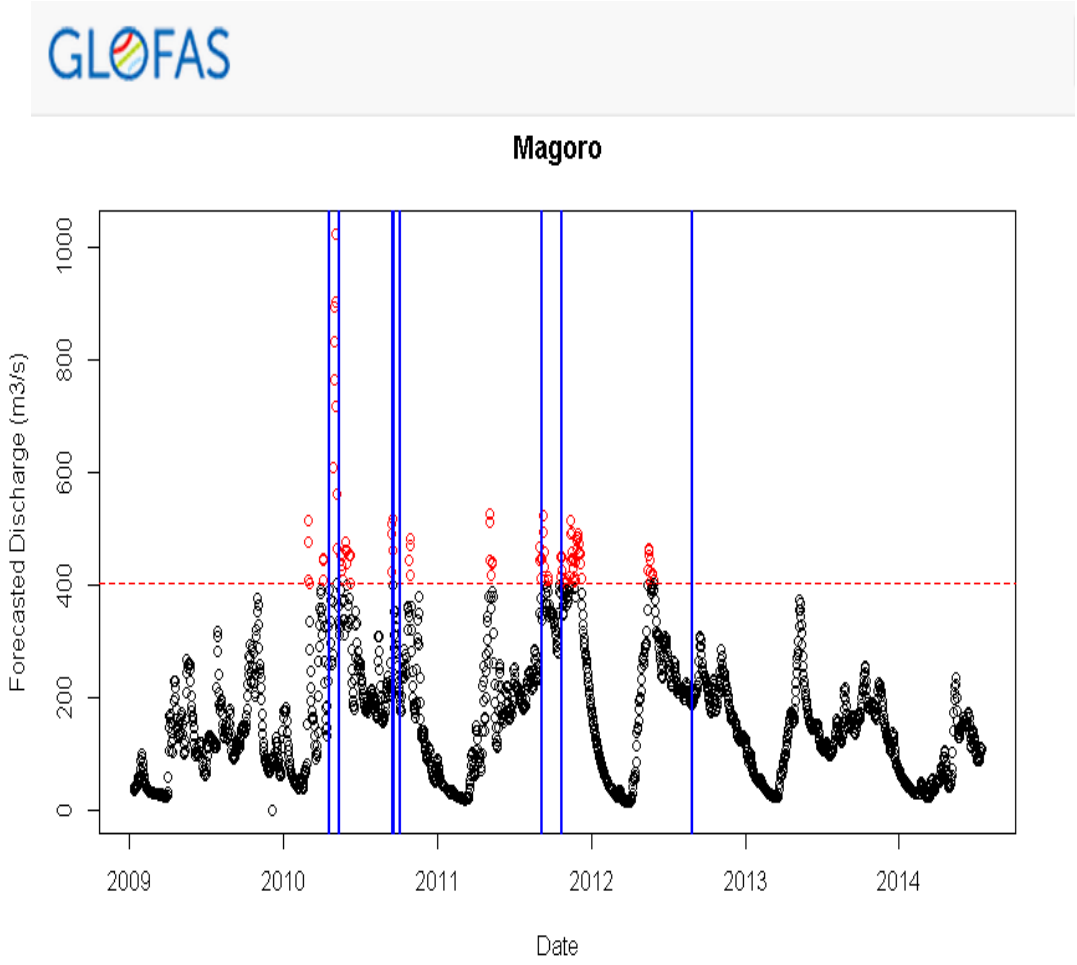

UGANDA MAJOR ROADS, POPULATION, AND FLOOD EVENTS (2002 - 2012)
Persons per Square Kilometer
0
1 - 52.45
52.46 - 108.1
108.2 - 158.3
158.4 - 210.8
210.9 - 270.8
270.9 - 337.7
337.8 - 426.9
427.0 - 574.7
574.8 - 985.3
>985.4
Major Roads
1 Event
Markers are accurate to district level only.

Risk Knowledge: What is a disaster?

Risk Knowledge: What is a disaster?



Risk Knowledge: What is a disaster?



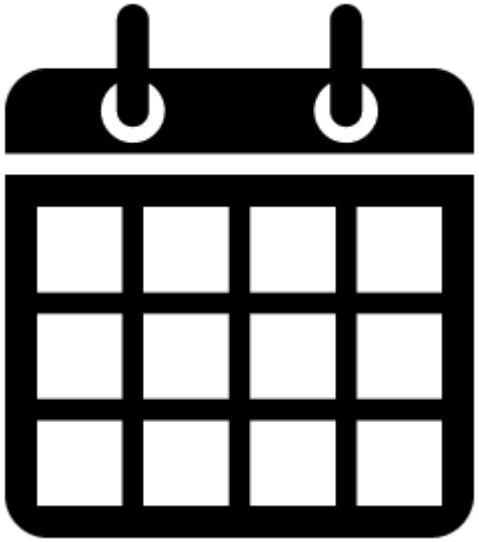
95th Percentile of historical daily discharge

Action Option: Preposition Stocks

Action Option: Preposition Stocks

Step 1: Acquire and stock Non food Items (NFI)

- NFI kits (large)
- NFI kits (small)
- Mosquito nets
- Gum boots
- Rain suits
- Hygiene booklets
- Water purification tablets



Warning Response: Other actions to take?

Action	Time required to complete the action (lead time)	
Water storage and purification: distribute jerry cans, soap, and a 30-day supply of chlorine tablets to vulnerable households	4 days	
Water drainage and water source rehabilitation: clear drainage, rehabilitate broken boreholes	4 days	
Food Storage: Move vulnerable items into storage facilities on high ground	7 days	

Action Option: Strengthening houses

How long will it take to strengthen Houses?

3 Months

Hygiene Kits

Warning Response: Act in vain?

Warning Response: Act in vain?

50%

Possible Outcomes

	Does the extreme event materialize?	
	DISASTER	NO DISASTER
ACTION	**"Worthy Action"** *Faster response post-flood, reduced disease burden*	**"Act in Vain"** *Extra transport costs, reputational costs, perception*
INACTION	**"Fail to Act"** *Disaster*	**"Worthy Inaction"** *Regular day*

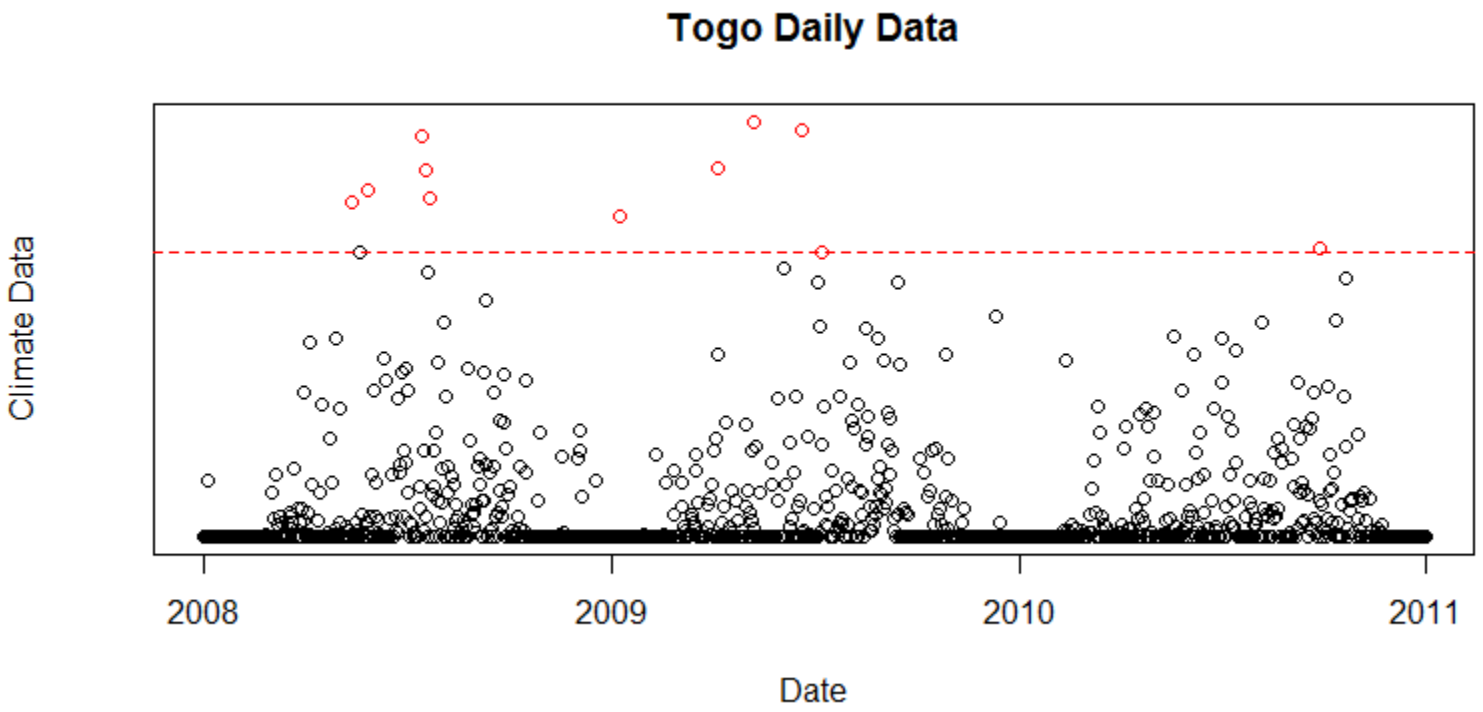
Part 3: Challenges

- Thresholds. When to act in the area of interest? Seasonality? Nodes of variability? Trend?
- Developing SOPs (Standard Operating Procedures). Reaching consensus.
- Inciting action at the community level.
- Perfect forecast = perfect action?

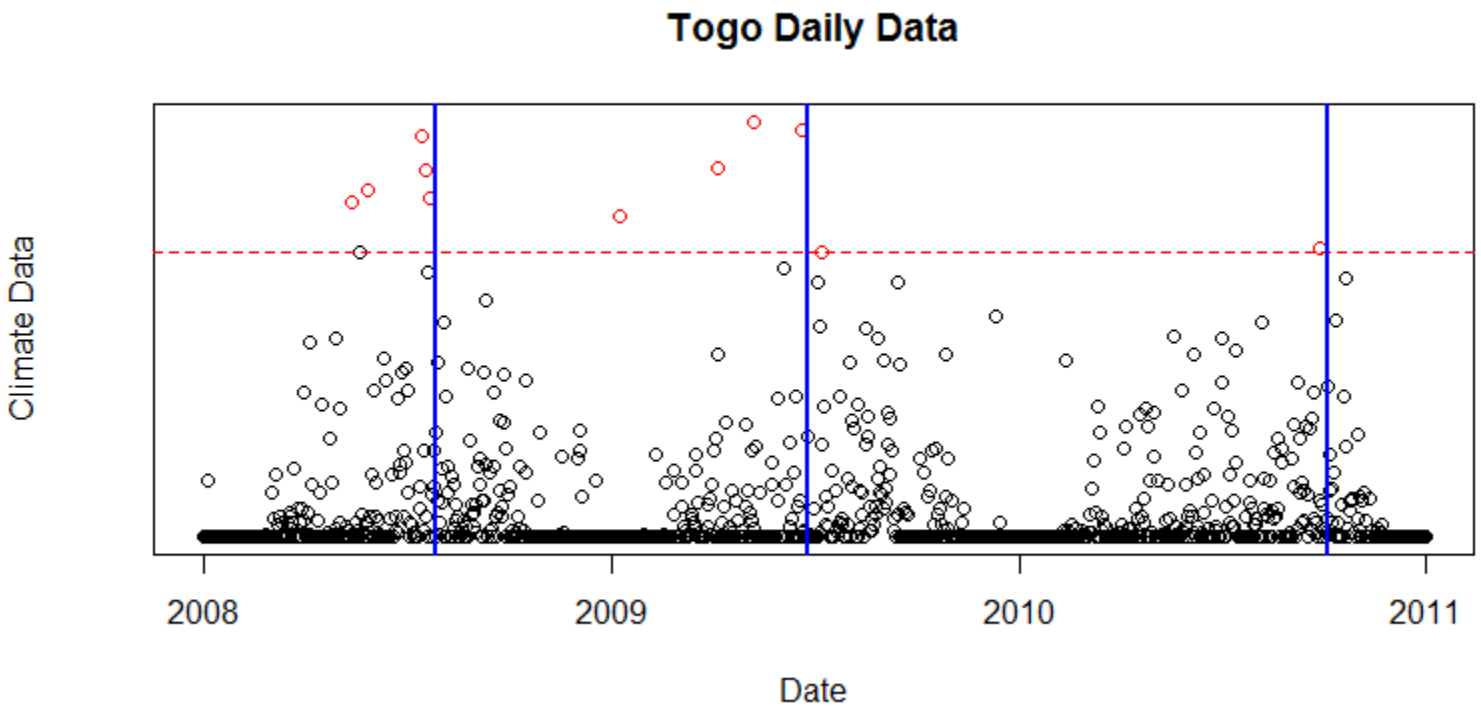
https://vimeo.com/152150976

Challenges

Act if forecast >= *threshold 1*



Floods!



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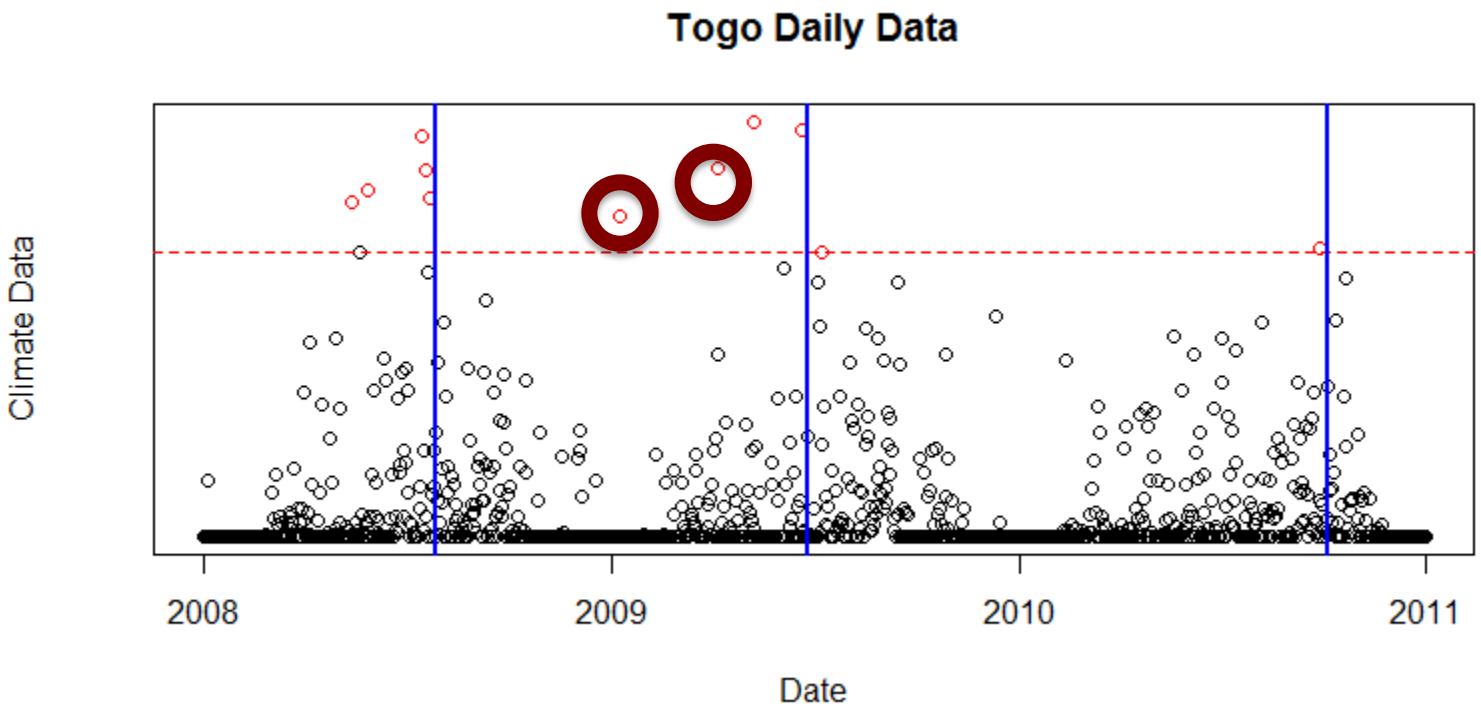

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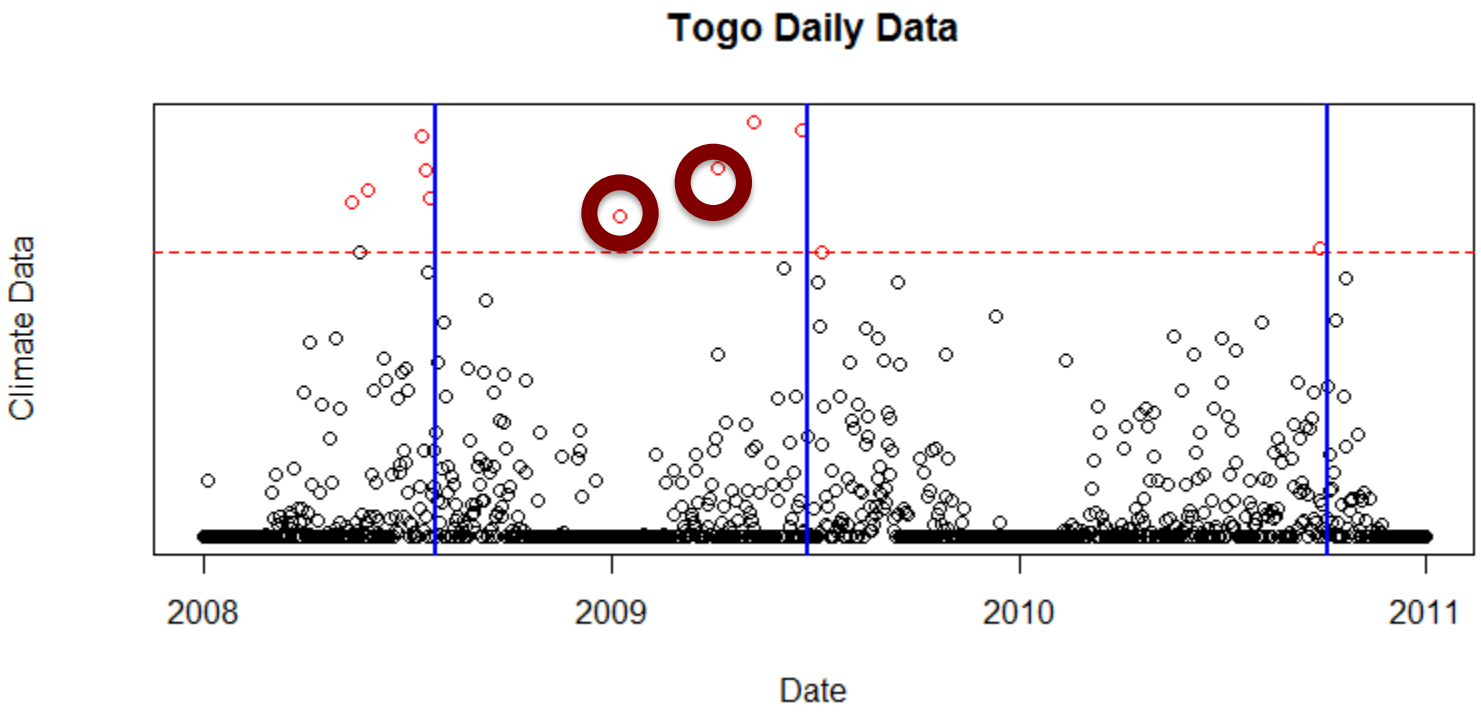
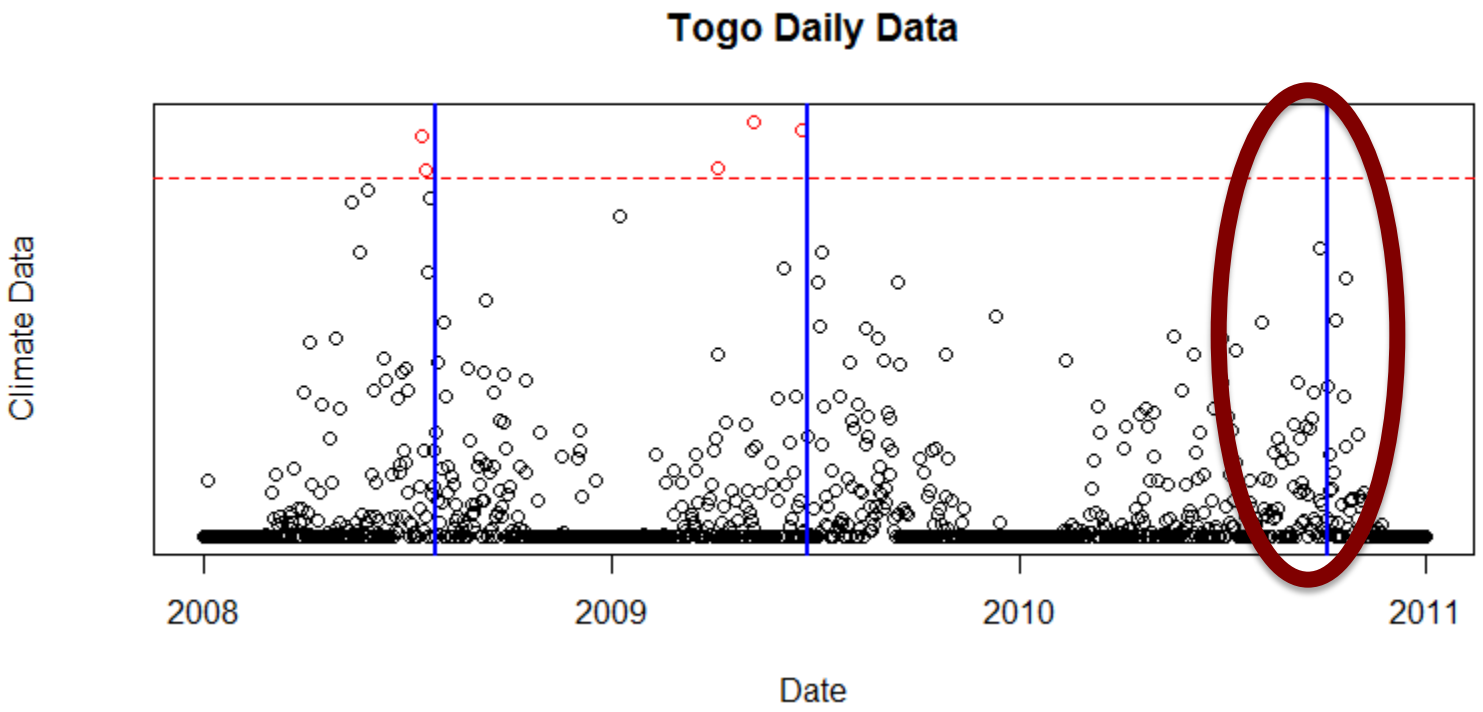


2 False Alarms in 1 year!

Alternative *threshold 2*



Missed 1!

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International Federation
of Red Cross and Red Crescent Societies

The Netherlands Red Cross

African Union
a United and Strong Africa

ISDR
International Strategy for Disaster Reduction
Africa

THE ROCKEFELLER FOUNDATION

unicef

WORLD RESOURCES INSTITUTE

Stanford University

American Red Cross

Climate & Development
Knowledge Network

THANK YOU!!!