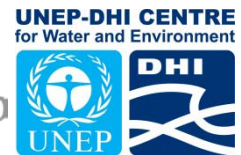


Module 6: Drought Preparedness, Emergency Management and Recovery

Drought Risk Management in Integrated Water
Resources Management
Wangai Ndirangu,
Jomo Kenyatta University, Kenya



Goal and objectives of the session

- By the end of the session, participants will be able to
 - Explain the concept of disaster preparedness and contingency planning
 - Identify measures, specifically related to water resources management to minimize drought impacts and support recovery
 - Define management measures by disaster phases
 - Identify catalyst roles for contingency planning

Hyogo Framework of Action
(HFA 5) Strengthen disaster
preparedness for effective
response at all levels

Outline presentation

1. Introduction

- Vulnerability Vs preparedness, response, recovery.
- Drought and water resources management

2. Step-wise management of drought

- Preparedness
- Response
- Recovery

3. Drought progression and management actions

- Monitoring, indicators, indices and triggers
- Risk communication
- Institution roles and coordination

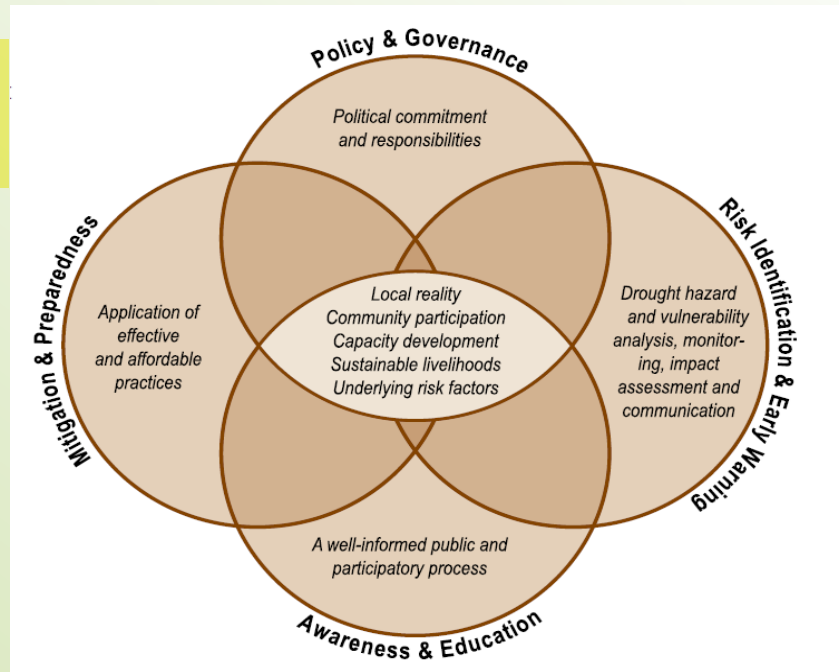
4. Post-drought disaster recovery

The 5 main elements of the UNISDR framework

1. Policy and governance

5. Strengthening preparedness

4. Reducing underlying factors of drought risk

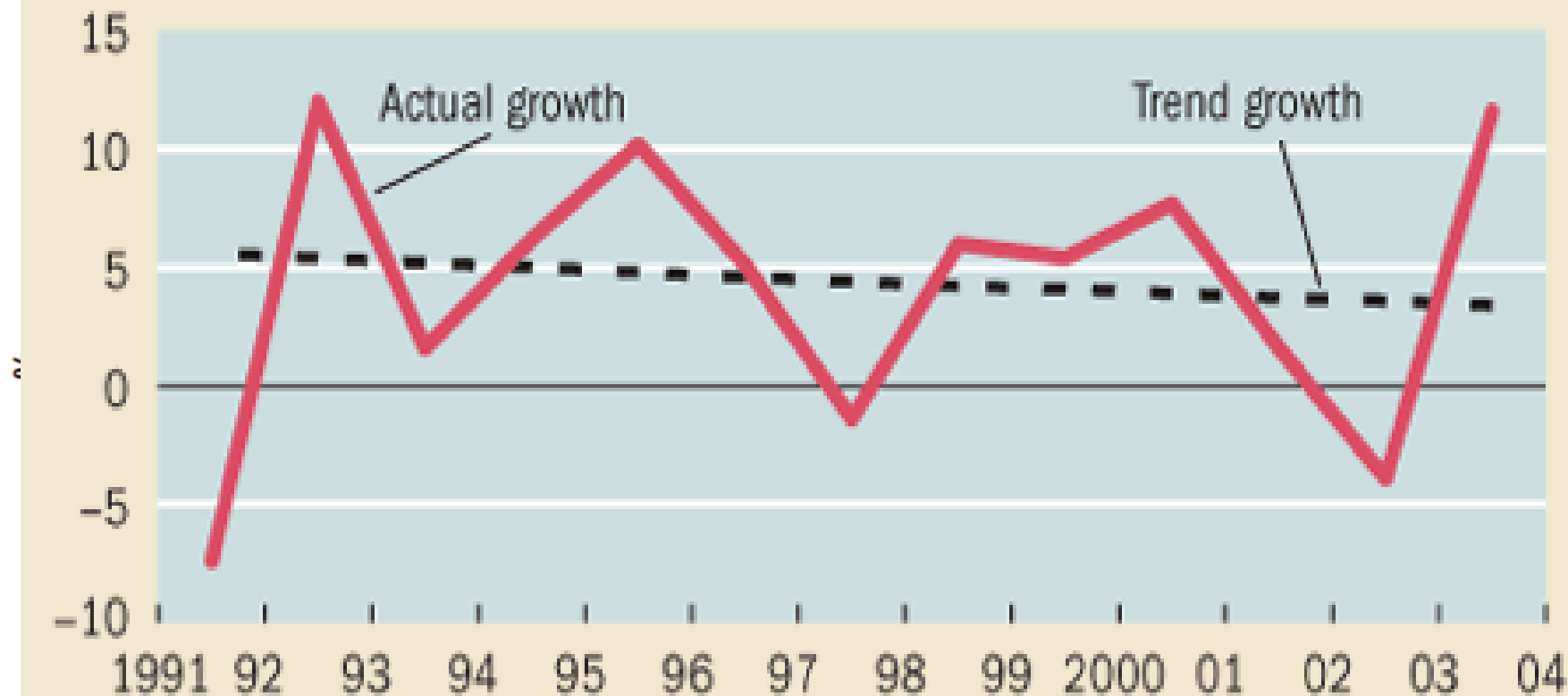


2. Drought risk identification, impact assessment, and early warning

3. Drought awareness and knowledge management

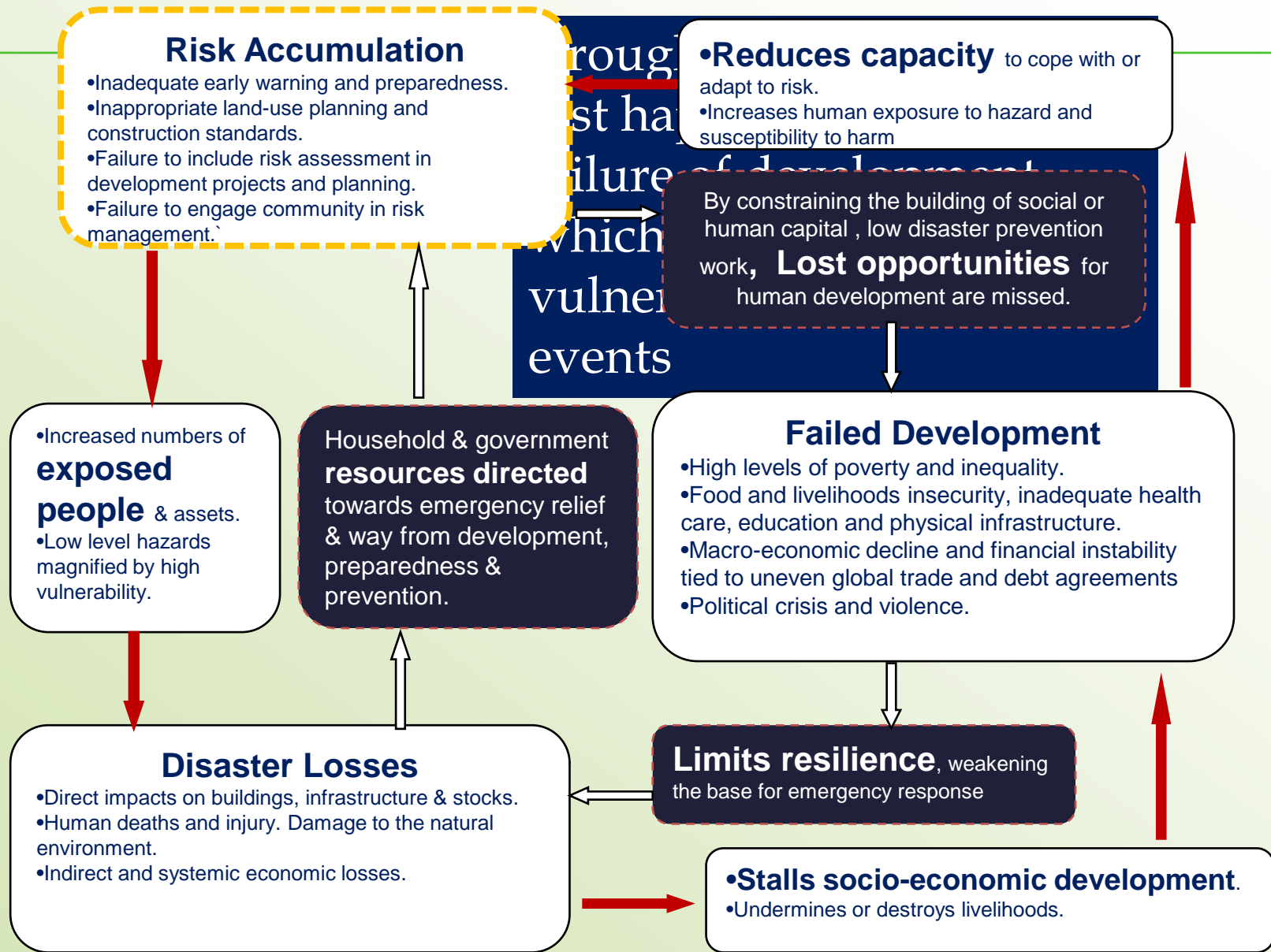
IMPACTS OF DISASTER ON CAPITAL FORMATION

Actual and trend growth in real GDP (percent)

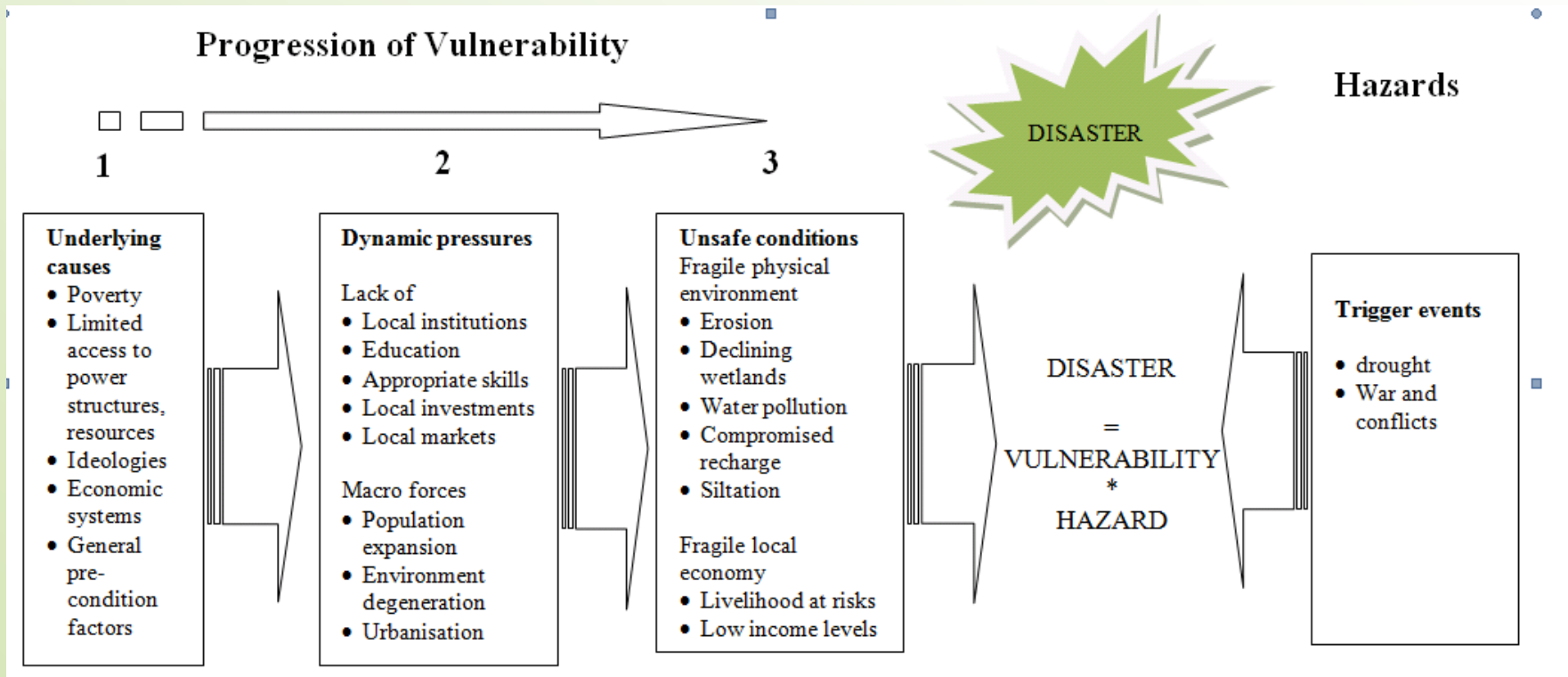


Source: Ethiopian authorities; and IMF staff calculations.

Sources: as cited, The World Bank (2000)



Progression of disaster vulnerability



Introduction



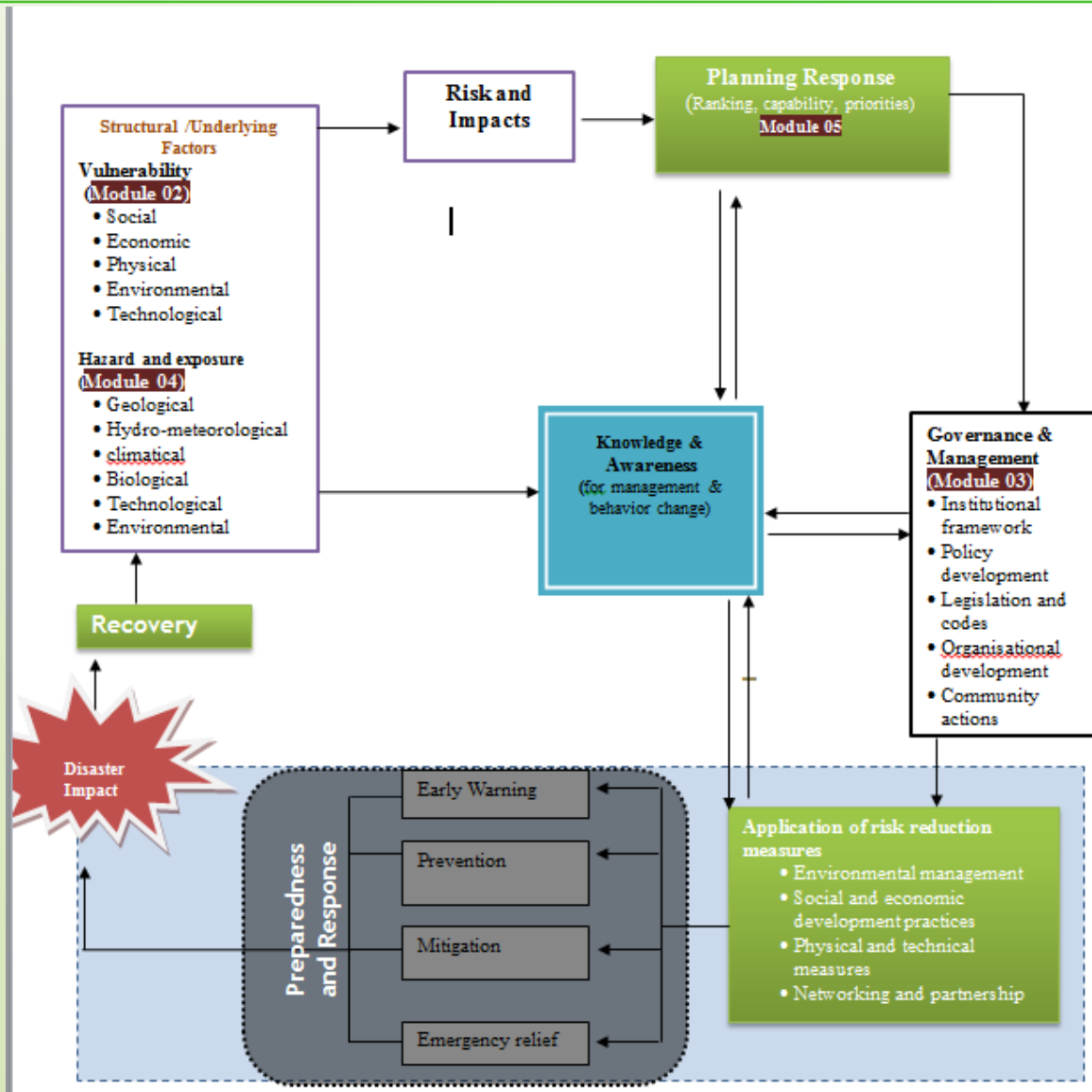
Introduction

Emergency preparedness and response activities critical protection against losses

Key to effective
Drought
preparedness

- Advance planning
- Ability to mobilize sufficient resources quickly
- Periodic exercises to identify weaknesses and problems

Preparedness & response in DRM structure



Long and Short Term Action Identification

Once most significant impacts are set and the corresponding underlying causes of vulnerability have been exposed

Emphas

First steps to implementing DRM actions is information system that answers questions like:

- Where do disasters take place?
- Why do they take place there?
- Who gets affected?
- What makes the location vulnerable to these disasters?

Long & Short Term Action Identification

Impact of Drought	Underlying Causes of Vulnerability (Basal Causes of the Why Questions)	Possible Actions	Mitigation (M), Response (R), or Accepted Risk (AR)	Feasible?	Effective for impact reduction?	Benefit / Cost ?	Equitable?	To Do?
Income loss from crop failure	Variable climate	Weather modification	M					
		Weather monitoring	M					
	No irrigation	Haul water during a drought	R					
		Provide government assistance for projects	M					
	Expensive seeds	Subsidize seed sales	M					
	Farmer preferences to plant specific seeds	Conduct workshops	M					
		Conduct research	M					
		Enhance communication	M					
	Government incentives to plant specific crops	Lobby for new incentives	M					
	No drought warning	Provide weather monitoring	M					
		Identify "triggers"	M					
	High cost of crop insurance	Government subsidies	R					
	Lack of research as to the efficiency of drought relief efforts	Identify target groups and conflicting relief program criteria and goals	M					
	Lack of drought relief program coordination	Streamline relief application and funding	M					

Drought Risk Action matrix

ASSIGNMENT OF RESPONSIBILITIES



National government is the primary duty-bearer

2 COORDINATION AMONG NATIONAL SERVICES

- Meteorological
- Hydrological
- Geological
- Marine
- Health (etc.)

3 Communication and Dissemination

warnings

feedback

4 Community Preparedness



Preparing for drought

- Monitoring - Data
- Assessment and indices - Information
- Early warning system/Alerts - Communication

Preparedness for drought

- **Prevention** measures include land use planning, agro-forestry, water-harvesting, soil erosion control and food security programs to forestall potential famine - **Raise water storage for irrigation**
- **Mitigation** assumes that people are inevitably exposed to (drought) hazard e.g. contingency cropping e.g. **drought resistant seeds/ breeds, water rationing**
- **Planning for response** - Relief facilities, Contingency fund, establish communication channels, drills
- Means to minimize impacts of drought

Preparing for drought

- Institutional/Capacity development roles measures such as
 - Drought monitoring
 - Establishing emergency relief center, formulation of emergency plans
 - Training persons and vulnerable communities to be able to undertake rescue and recovery
- Managerial and technical steps taken to minimize losses just before, during and after a disaster come within the envelope of preparedness.

Monitoring and Early Warning System

- Slow onset nature of drought
- Early warning systems with the capacity to detect the early emergence of rainfall deficiencies - normally be the best indicator of an incipient drought period
- Application of climatic indices to evaluate the status of climate and water availability (*Module 4*)

e.g. SPI - meteorological

KBDI - Soil Moisture

NVDI - crop /plant water stress

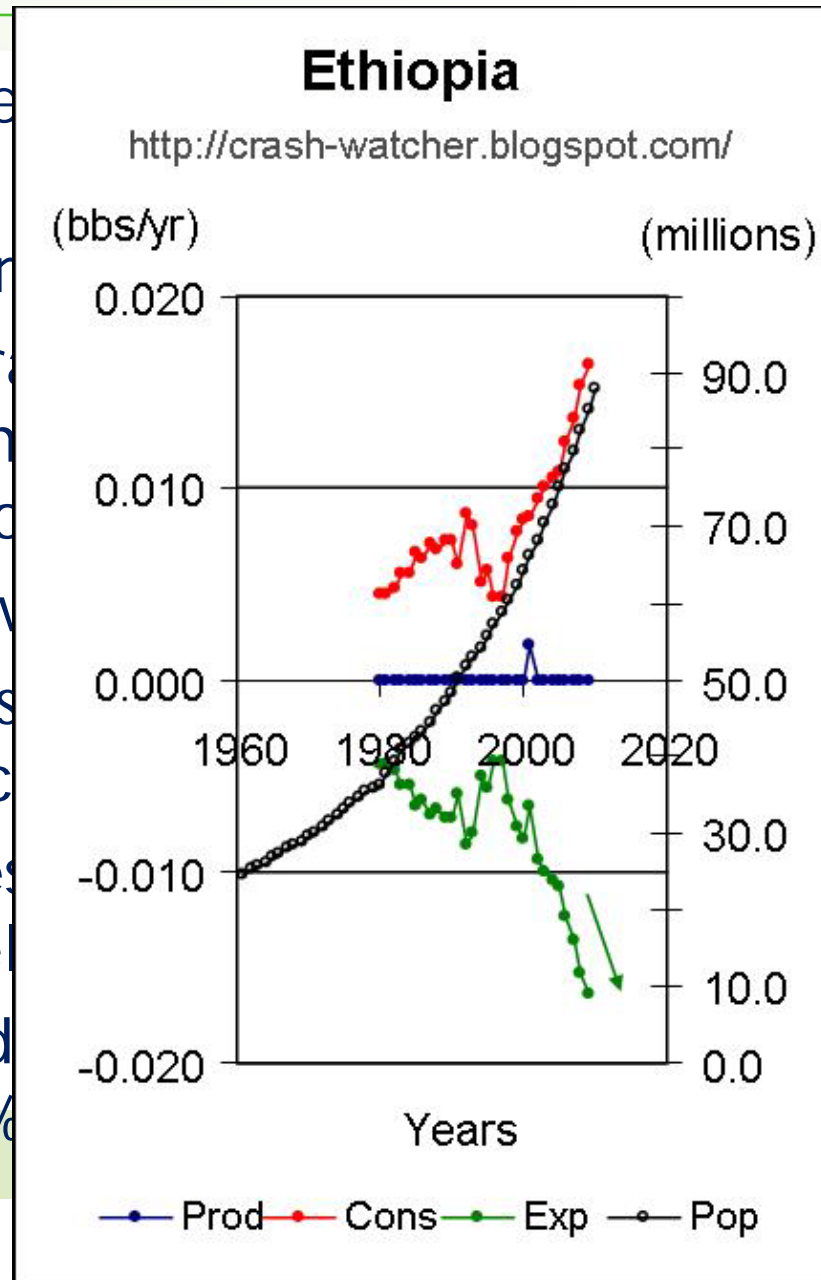
Monitoring and Early Warning System

Water Availability Assessment Values

DROUGHT SEVERITY CLASSIFICATION		RANGES		
DCP STAGE	DESCRIPTION	POSSIBLE IMPACTS	PERCENT OF RESERVOIR CONSERVATION STORAGE CAPACITY WITHIN REGION	STREAMFLOW PERCENT EXCEEDANCE WITHIN REGION
Advisory	Abnormally Dry	Going into drought: short-term dryness slowing planting and growing crops or pastures; fire risk above average. Coming out of drought: lingering water deficits; pastures or crops not fully recovered.	<70	70-79
Watch	First-Stage Drought	Damage to crops, pastures; fire risk high; streams, reservoirs, or wells low, water shortages developing or imminent, voluntary water use restrictions requested	<60	80-89
Warning	Severe Drought	Crop or pasture losses likely; fire risk very high; water shortages common; water restrictions imposed	<40	90-94
Emergency	Extreme Drought	Major crop/pasture losses; extreme fire danger; widespread water shortages or restrictions	<20	95-98
Disaster	Exceptional Drought	Exceptional and widespread crop/pasture losses; exceptional fire risk; shortages of water in reservoirs, streams, and wells, creating water emergencies	<10	0-1

Case - Ethiopia

- Till 2000, Ethiopia better
- devastating droughts
- Characterized mostly r
- 1995 -2008 series of tr
- national disaster preven
- strategy (1990) and a po
- DRM focused on proactiv
- New implementation ins
- 2008 within Min of Agric
- National level structures
- and local (*woreda*) level
- Ethiopia has maintained
- economic growth (7-10%



The response to a Drought disaster

- *Immediate*
- *Comprehensive*
- *Clear lines of command*

Drought Response

- Response measures are an important part of drought impacts mitigation but are only part of a more comprehensive management strategy

Drought Response

Drought relief

- Livestock's off-take
- Relief employment
- Food relief
- Gratuitous
- Relief th
- Cattle ca
- Financin
- Informa

What can water managers do?

Drought Response

- Drought responses - measures or actions to be implemented during various stages of drought
 - Level 1 - Advisory
 - Level 2 - Watch
 - Level 3 - Warning
 - Level 4 - Emergency
 - Level 5 - Disaster

Triggering emergency action

- Advance warning is the key to effective response
- Long-term climatologic forecasts or more immediate hurricane forecasts to identify potential danger
- Alert could be issued based on antecedent precipitation and rainfall intensity data
- Detailed forecast then issued when all data and information is available.

Case - El Salvador (1)

- Drought 1998 - 2001
- Damaged to and subsistence incomes.
- Earthquakes in early 2001
- 80% crops were lost - small & medium-sized farmers lost 38 per cent of average annual income.
- Spanish Red Cross/ Salvadorian Red Cross Society
- Objective
- increase capacity of subsistence farmers in the east of the country

Case - El Salvador (2)

Action

- Reducing the effects of 2001 drought
- Food aid in collaboration with WFP (**relief**)
- Farm Implements (tools & seeds - **recovery**)

Mitigation - Diversify, market, Environment

- Improve environmental conditions through reforestation (**fruit trees**), soil conservation
- Training in productivity
- Contant Technical support (agronomists & Agric. Engineer)
- Post-harvest management - Metal food storage silos distributed to beneficiaries

Generic Performance Indicators

Function	Water Management Objectives	Progress indicator	Unit/ definition
DROUGHT MANAGEMENT Operating floods and droughts to mitigate and minimise harm to humans, environment and economic values.	Knowledge of drought Prone areas for drought magnitudes.	Length of river analysed for flood inundation (flood frequency, hydraulic studies and topographical surveys).	Number. Kilometres analysed river.
	Functioning disaster Response System	Level of support to victims during drought	Percentage of victims supported during emergency
	Functioning drought warning system	Number of forecasts or warnings issued for low flows.	Number Sent bulletins to stakeholders per year.