

Recharge, retention and re-use

3R



Peter Letitre (IGRAC))

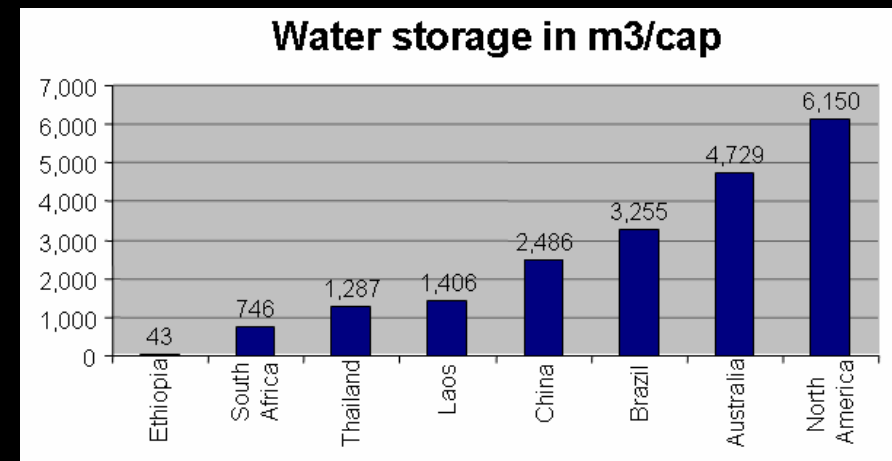
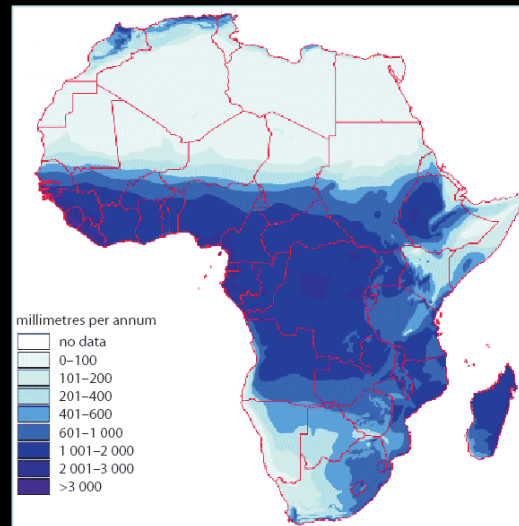
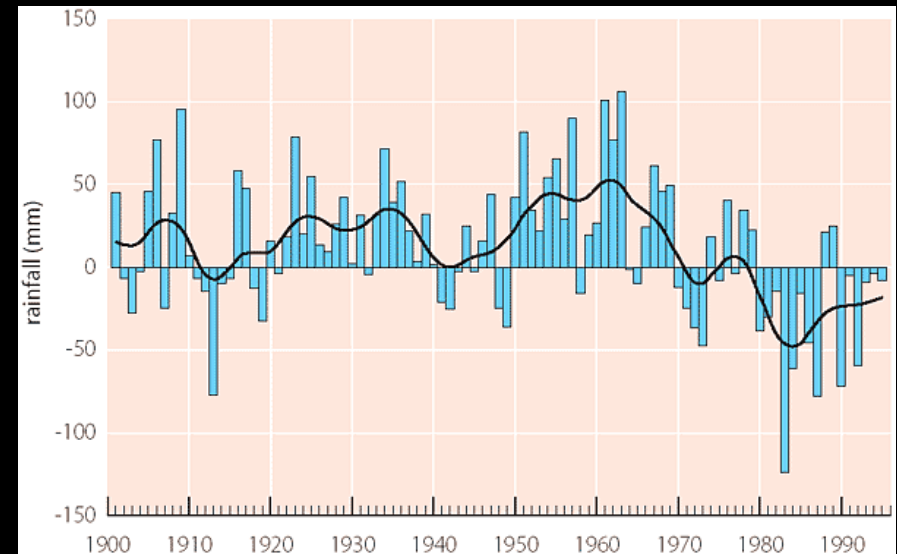
CLIMATE CHANGE:

**THE HIGHS AND LOWS INCREASE
AND THE ALL IMPORTANT
RAINY SEASONS
ARE BECOMING MORE ERRATIC**

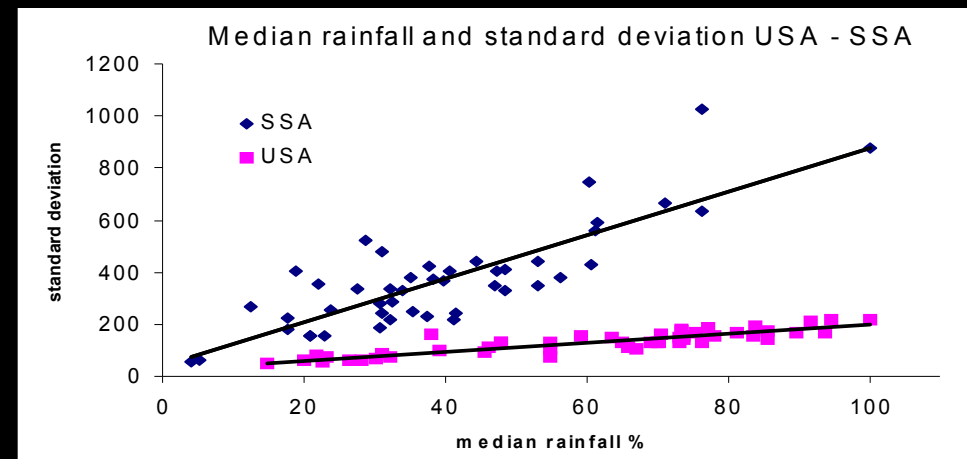
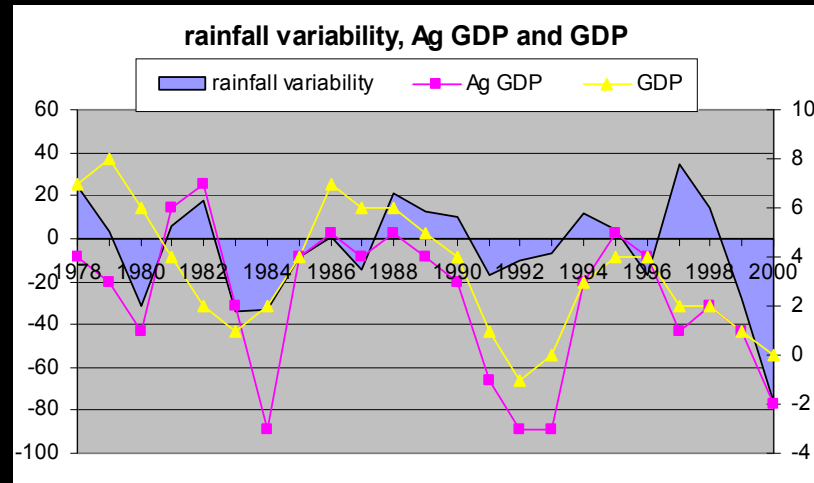


Development Context

- Substantial development needs
- Rich endowment with substantial water resources
- Hydrologic Variability is high
- Water Storage Infrastructure underdeveloped
- Foundation for supporting growth and service delivery

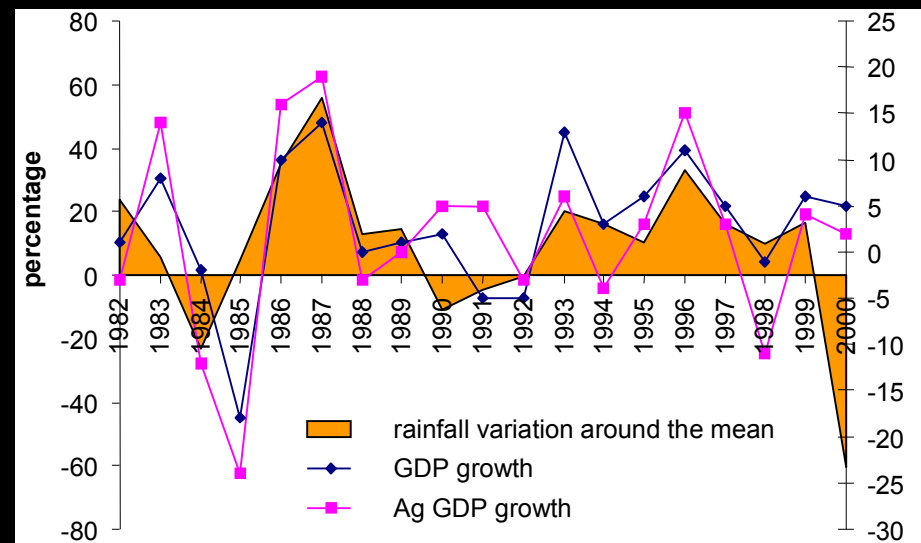


Water and Economic Growth



Ethiopia - 2003-2015 growth projections:

- 33% decline in avg. GDP growth
- 25% increase in poverty



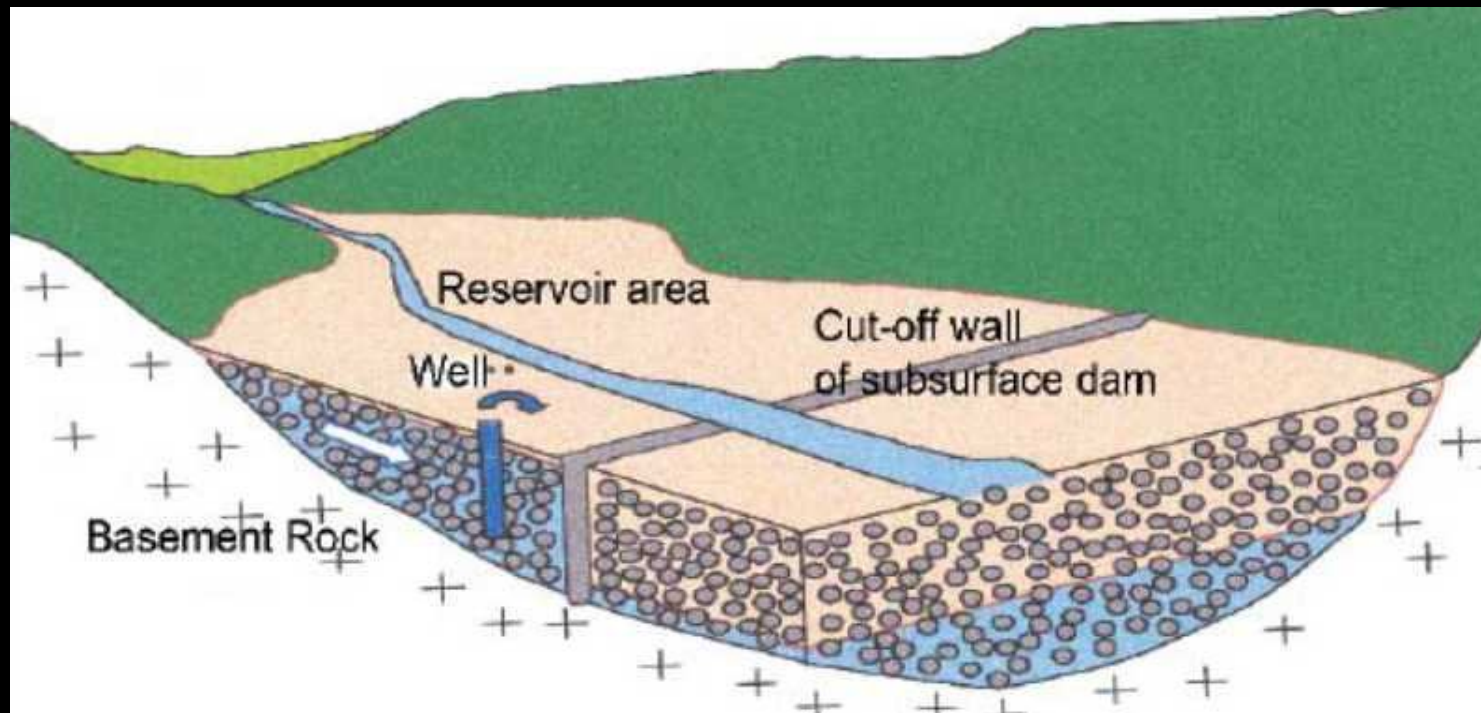
**TO ADAPT to climate change
Need to manage the water buffer**



**GROUNDWATER STORAGE
AND LOCAL SURFACE STORAGE**

BOTH FOR WATER AND FOOD SECURITY

3R = RECHARGE, RETENTION AND REUSE



3 r - Techniques

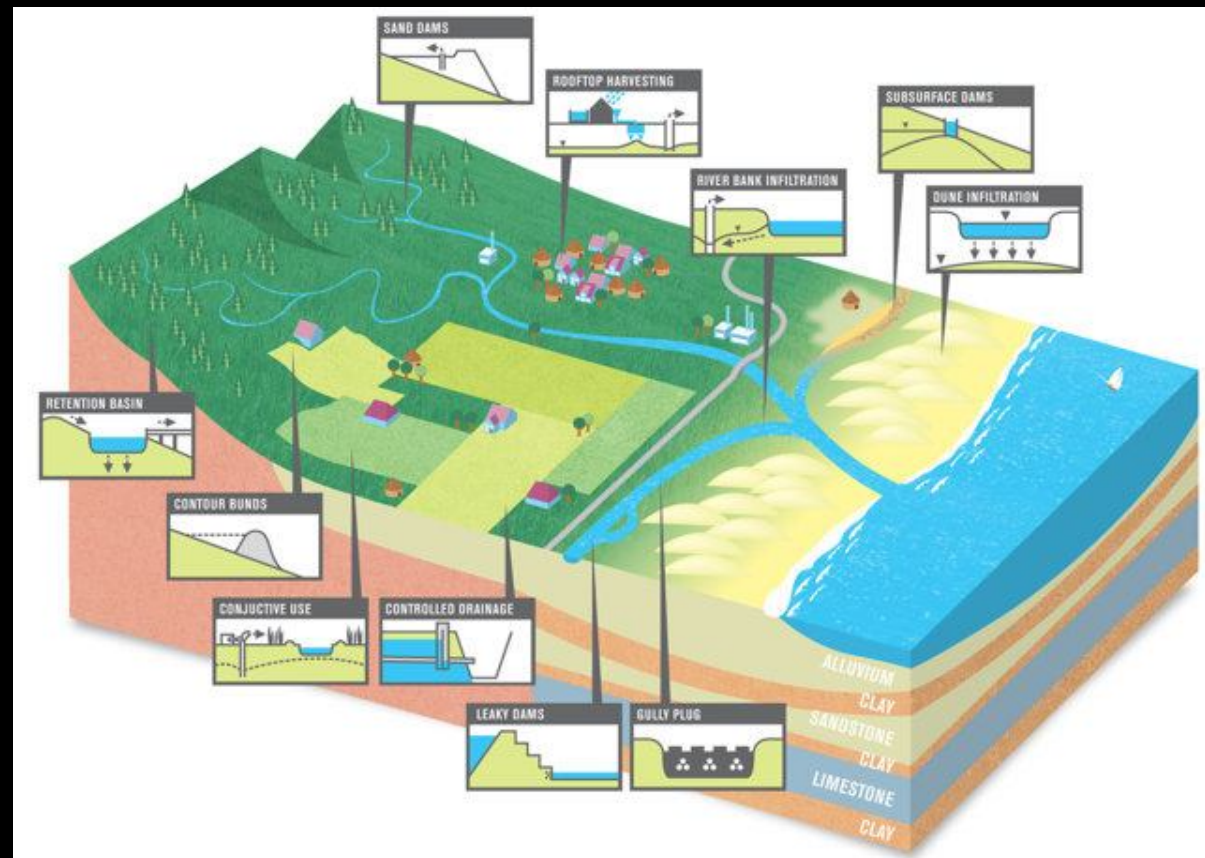
- **Recharge: managing natural and artificial recharge**
- **Retention: creating wet buffers in the basin**
- **Reuse: extending the 'chain of uses'**



3R PROCESSES

- **IDENTIFYING LOCAL NEEDS**
- **ASSESSMENT AT SCALE:**
 - 3R POTENTIAL MAPPING
 - MEDIUM TERM CLIMATE INFORMATION
- **LINK TO REGIONAL PLANNING**
- **IMPLEMENTATION AND FINANCING**





**INTRODUCE BUFFER MANAGEMENT
AT SCALE - BASIN BY BASIN
NOT PIECEMEAL/SCATTERED**

Buffer management in practice

- **Upscaling of small scale solutions and**
- **Implementing directly at subbasin scale**
- **Business case**
- **No regret measures**

Examples

SAND STORAGE DAMS, KITUI, KENYA

**CAREFULLY CREATE – IN STAGES -
A SANDY AQUIFER BEHIND THE SAND DAM**

**STORE FLOODWATER
AND INCREASE LOCAL WATER LEVELS**



**SPATE IRRIGATION FOR AGRICULTURE
AND RECHARGE, YEMEN**

**SPREAD FLOODS OVER LARGE AREAS
FOR AGRICULTURE**

**MANAGE THE RECHARGE
BY LEAKY DIVERSION STRUCTURES
AND TAIL END SUPPLIES**



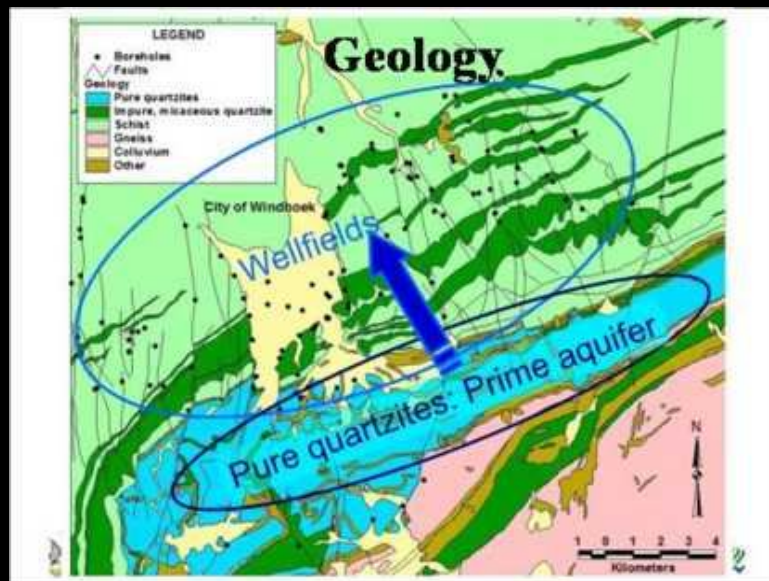
**RETAINING WATER IN VERY HUMID AREAS
(NORTH BENGAL INDIA)**

**GULLY PLUGS/ BUNDS TO RETAIN SHEET FLOW
AND ASSURE SOIL MOISTURE
INCREASE CROPPING INTENSITY
AND YIELDS OF RAINFED PADDY**



CREATING A WATER BANK (NAMIBIA)

EXCESS WATER FROM LOCAL DAMS
INJECTED IN AQUIFER
ASSURES WATER AVAILABILITY
FOR WINDHOEK CITY



LARGE DIAMETER DEEP BOREHOLE



**RAINWATER HARVESTING IN SALT EFFECTED AREAS
(SENEGAL)**

**LARGE SCALE INTRODUCTION
OF ROOF TOP WATER HARVESTING**

**LOW COST ALTERNATIVE FOR DRINKING WATER
SUPPLY IN VERY DIFFICULT AREAS**



**CONJUNCTIVE USE IN LARGE SCALE IRRIGATION SYSTEMS
(MOROCCO)**

**MOST WATER IN LARGE IRRIGATION SYSTEMS IS
FROM REUSING SEEPAGE WATER**

**NEED TO PLAN BUFFER FUNCTIONS
INTO SURFACE IRRIGATION SYSTEM**





USING ROAD INFRASTRUCTURE FOR 3R

**ROAD EMBANKMENTS RETAIN SURFACE RUNOFF/
COMPARTIMENTALIZE SHEETFLOW**

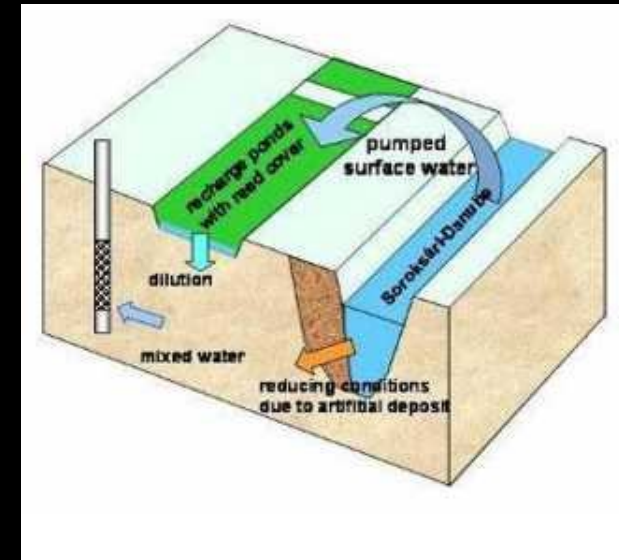
**IRISH BRIDGES TO RETAIN SUBSURFACE FLOW
AND INCREASE GROUNDWATER LEVELS,**

PERMEABLE SURFACES AND QUALITY ISSUES

3R IN ARID AND HUMID AREAS

3R FOR WATER AND FOOD SECURITY

3R FOR URBAN AND RURAL DEVELOPMENT



Key elements

- **Proven techniques +**
- **Not so well known techniques**
- **Work at scale**
- **Location-specific**
- **Start from local priorities**
- **Integrate with regional planning, land use planning etc**



VISION:

**TO GIVE PEOPLE THE CONFIDENCE AND
MEANS THAT THEY CAN PROTECT THEIR
LIVELIHOODS AND DEVELOP THEIR
ECONOMIES EVEN IN TIMES OF CLIMATE
VARIABILITY AND CHANGE**



**SOMETIMES YOU ARE
STANDING ON A SOLUTION
WITHOUT EVEN KNOWING IT**

