Recharge, retention and re-use

3R

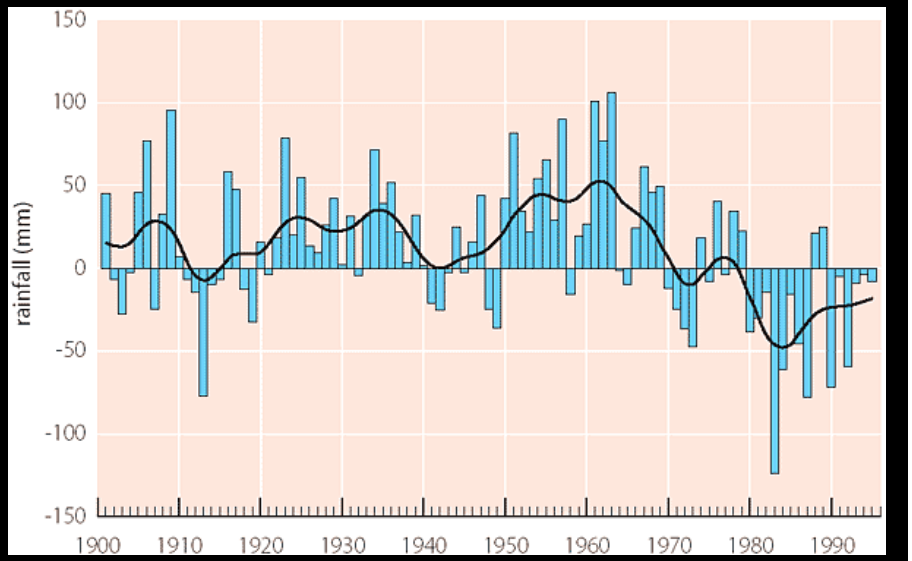
Peter Letitre (IGRAC))

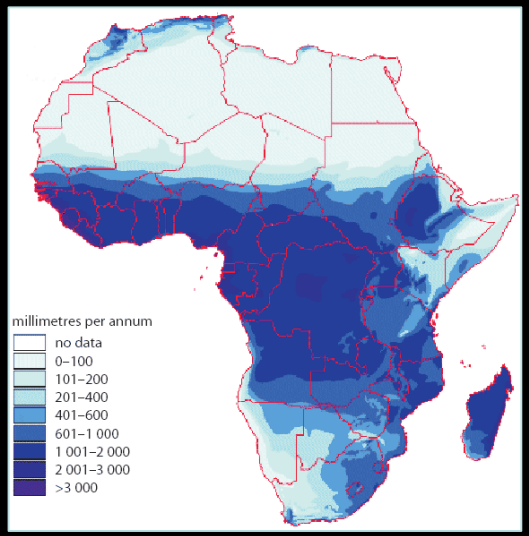
CLIMATE CHANGE:

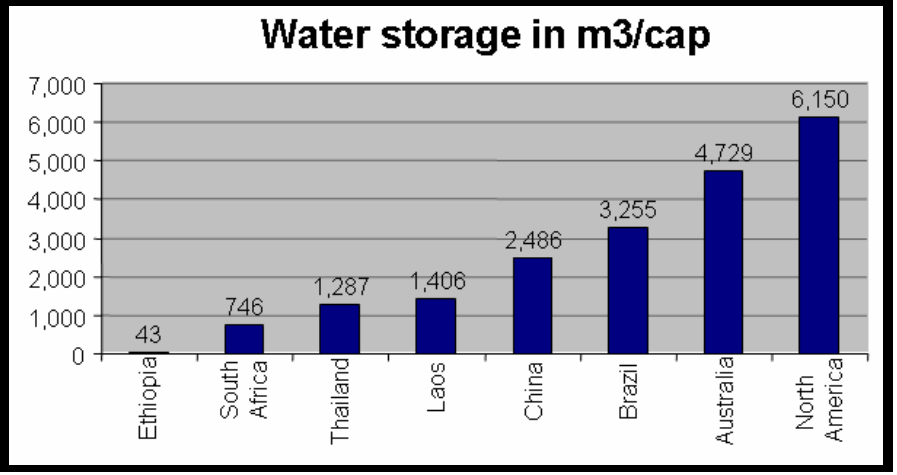
THE HIGHS AND LOWS INCREASE
AND THE ALL IMPORTANT
RAINY SEASONS
ARE BECOMING MORE ERRATIC

Development Context

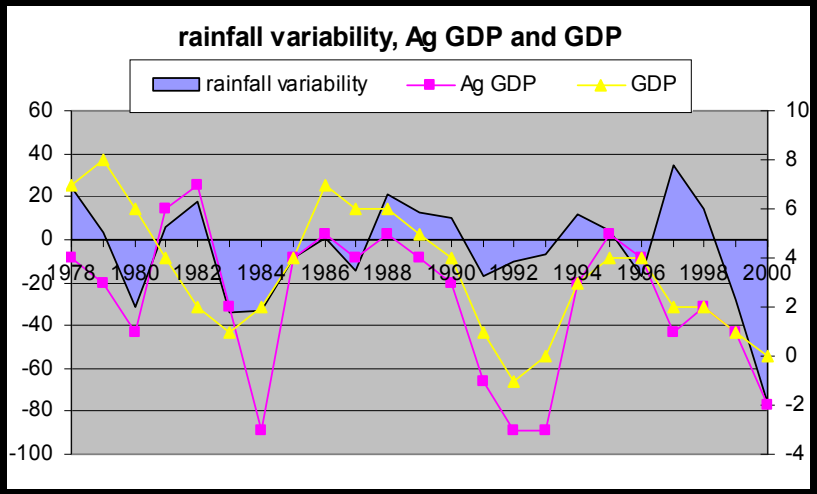
- Substantial development needs
- Rich endowement with substantial water resources
- Hydrologic Variability is high
- Water Storage Infrastructure underdeveloped
- Foundation for supporting growth and service delivery

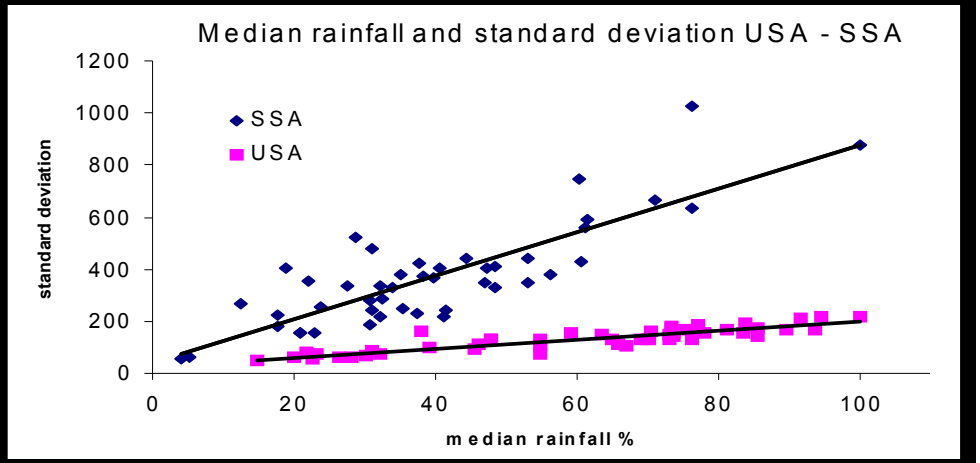






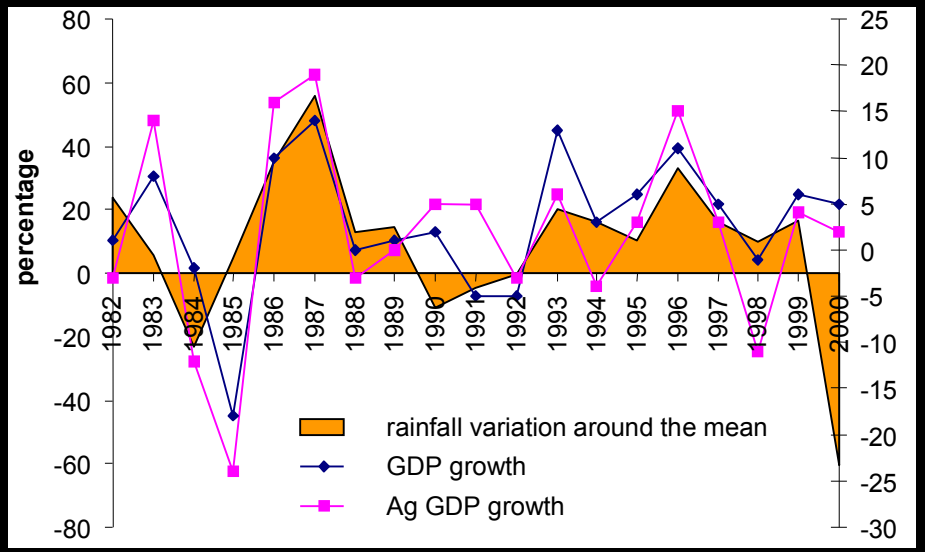
Water and Economic Growth





Ethiopia - 2003-2015 growth projections:

- 38% decline in avg. GDP growth
- 25% increase in poverty

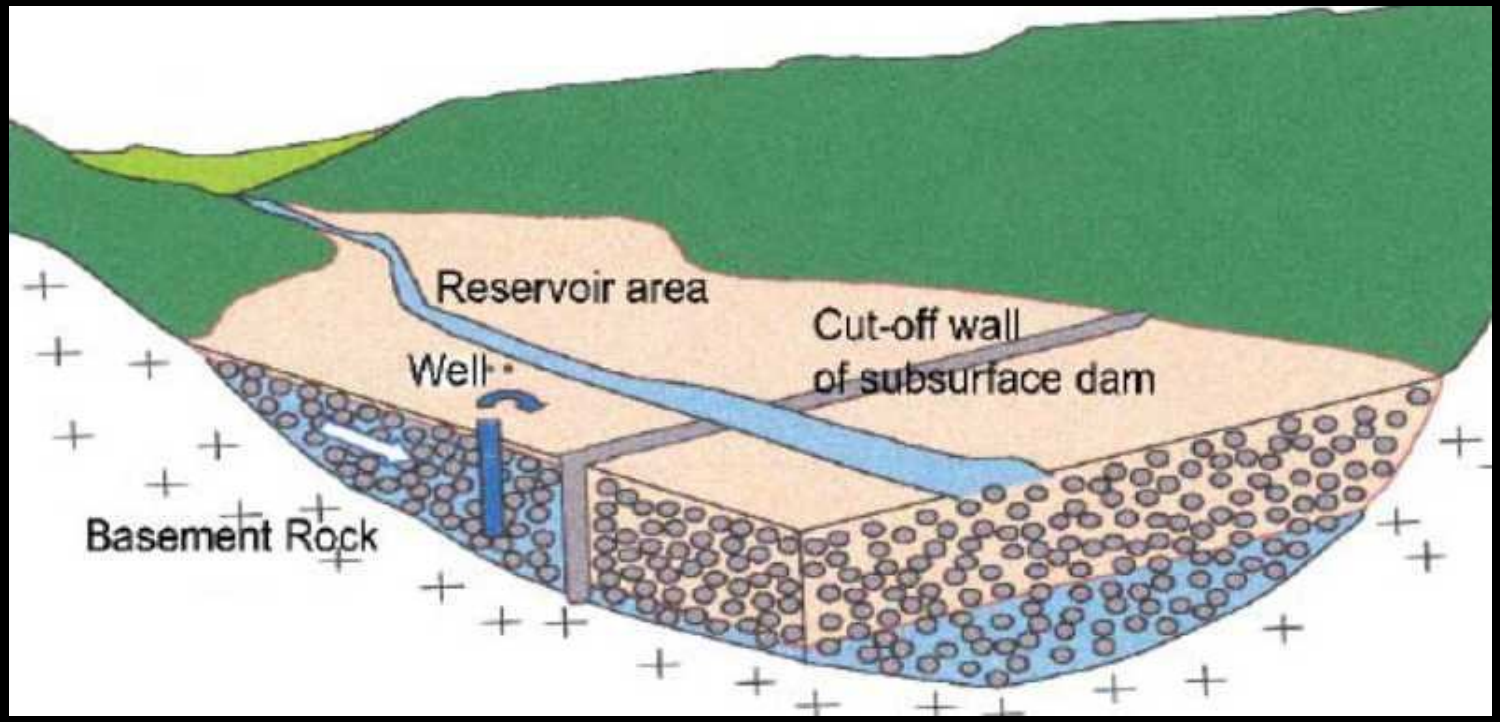


TO ADAPT to climate change
Need to manage the water buffer

GROUNDWATER STORAGE AND LOCAL SURFACE STORAGE

BOTH FOR WATER AND FOOD SECURITY

3R = RECHARGE, RETENTION AND REUSE

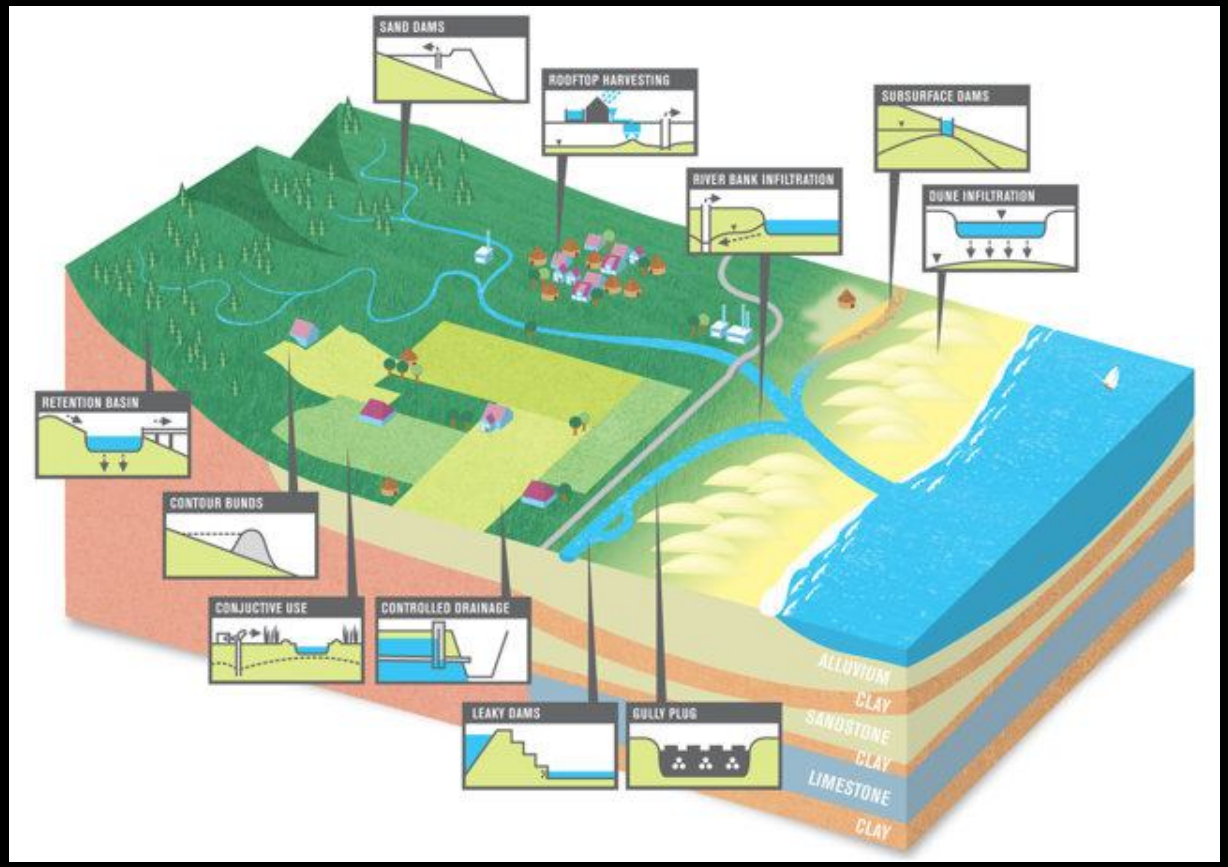


3 r - Techniques

- **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

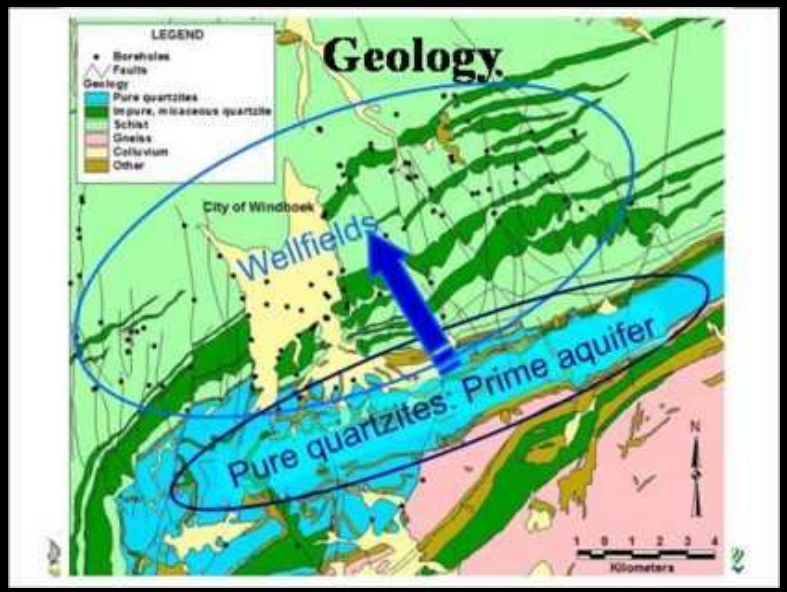
MANAGE THE RECHARGE
BY LEAKY DIVERSION STRUCTURES
AND TAIL END SUPPLIES

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



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

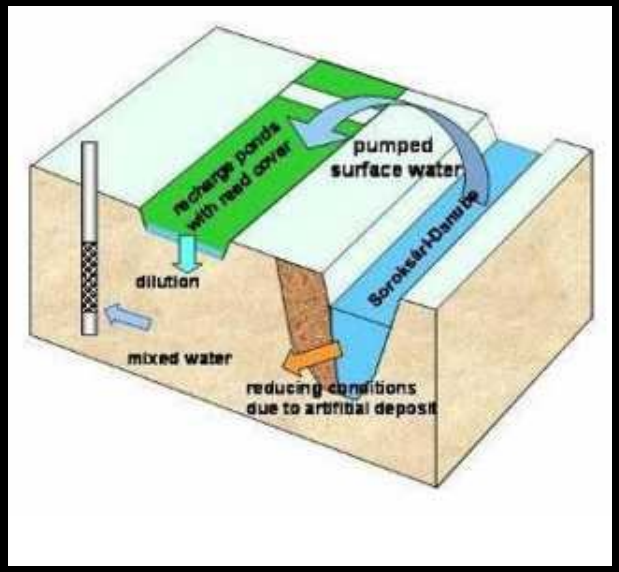
IRISH BRIDGES TO RETAIN SUBSURFACE FLOW AND INCREASE GROUNDWATER LEVELS,

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

Acacia Water
Solutions in Groundwater

igrac

RAIN
Rainwater Harvesting
Implementation Network

META
META Research

iah
aih

BGR
Bundesanstalt für
Geowissenschaften
und Rohstoffe