



**Water and**  
*Environment Centre*

# **Integrated Watershed Management**

***An Introduction***





# WATERSHED?

- Watershed → catchments area; basin

*“A delineated area with a well-defined topographic boundary and water outlet”*

- Hydrological unit
- Hydrological process
  - (infiltration, runoff, seepage flow, evapotranspiration)
- Wadi or a river drained to a reservoir (a well defined point)
- One stream or a complex of stream networks
- Range in size 1,0 km<sup>2</sup> ----1000,000km<sup>2</sup>





- Soil erosion processes
  - (detachment, transport, deposition)
- Soil and water pollution
- Soil degradation due to socioeconomic and political factors
- A complex of soil, landforms, vegetation and land uses

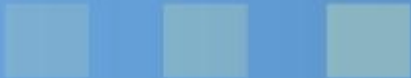
*“Both hydrological and ecological processes govern the quality of soil and water resources”*





## Why Watershed Management

- Main reasons of the decline in agricultural productivity
  - Water scarcity and poor quality
  - Political and social factors
  - Lack of appropriate technology





- Principal reasons for Watershed management
  - Decrease in per capita arable land
  - Natural resources degradation
  - Desertification
  - Tropical deforestation





# Watershed components

## 1- Water resources

**Hydrological modeling- Surface Water and  
baseflow**

**Resources Assessment**

**Extreme values**

**Groundwater (natural water recharge)**

## 2- Soil and land cover

## 3- Land Use



## **4- Water abstraction and harvesting**

- Diversion dams and wadi abstraction
- Artificial recharge
- Other methods of water harvesting
  - traditional
  - modern





## **5- Water use**

- Irrigation

Spate

Alternative types of irrigation (modernized)

- Domestic water use







## **6- water allocation**

- water rights
- Upstream- downstream conflicts
- conjunctive use
- land ownership
- Water user associations





## **7- Flood protection**

- Village protection
- Agricultural land protection
- Infrastructure protection
- Wadi training





## **8- Wadi management constraints**

- sedimentation
- urbanisation
- newly developed structures (versus traditional)
- water quality considerations
- water and poverty





**9- Socioeconomic of the watershed**

**10- Institutional aspects**

**11- Agricultural rule in the watershed management**





- Reference to Case studies  
Examples : Successful versus unsuccessful sustainable watershed management
- Exercises and practical (possibly to be includes in the case studies)

