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The U.S. Government's Global Hunger & Food Security Initiative

Water Management for Agriculture

**Workshop on the Strategic Alignment in Climate, Agriculture, and the Environment
Malawi • October 24-28, 2016**

Raymond Von Culin



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SESSION OBJECTIVES

1. Examine water resource conditions and trends in Malawi.
2. Review effects of climate change on water.
3. Evaluate water management practices.
 - Water sources, types of irrigation used, technologies and approaches.
4. Explore watershed development and Integrated Water Resources Management (IWRM) approaches.
5. Discuss key issues and considerations.



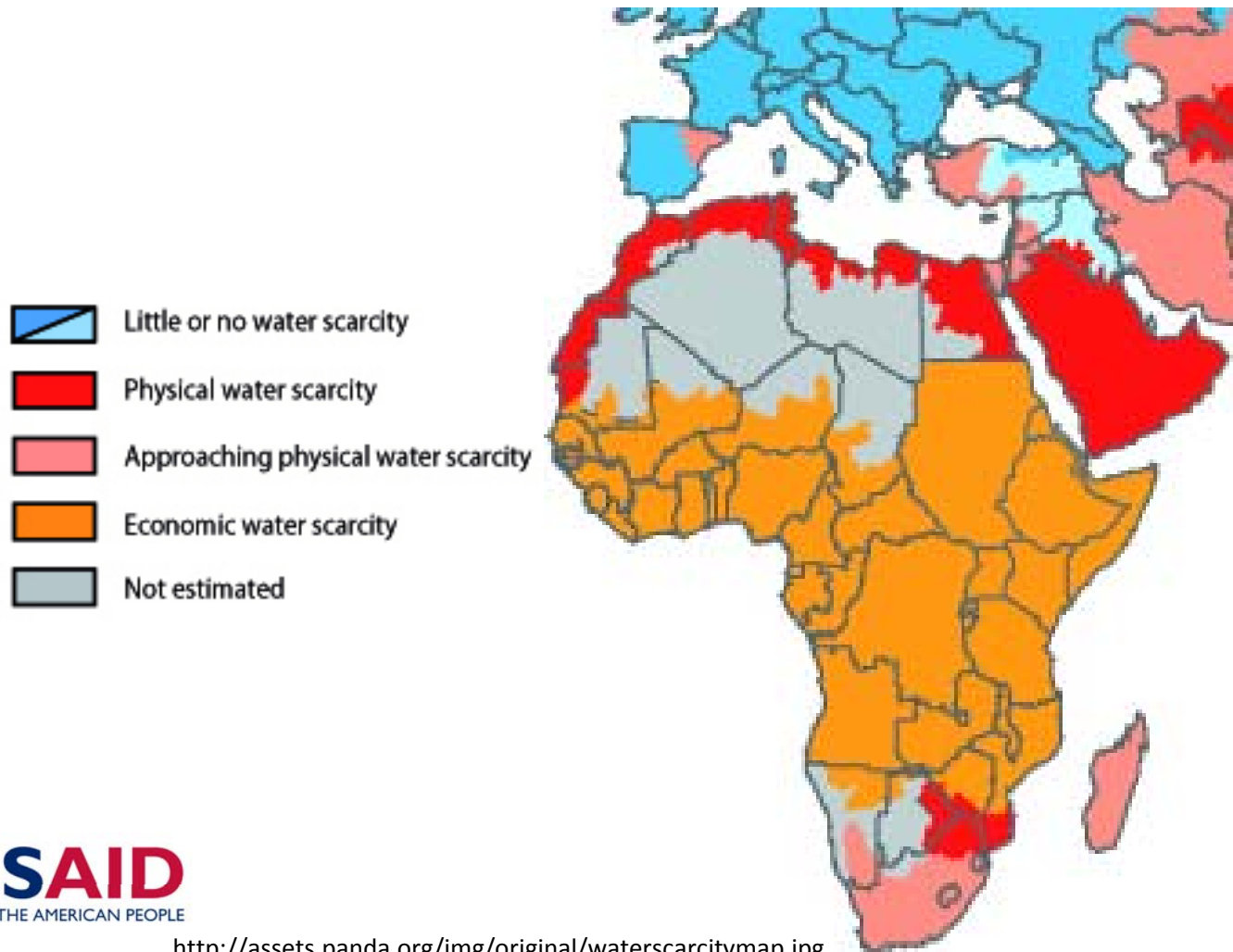
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WATER SCARCITY AND ACCESS



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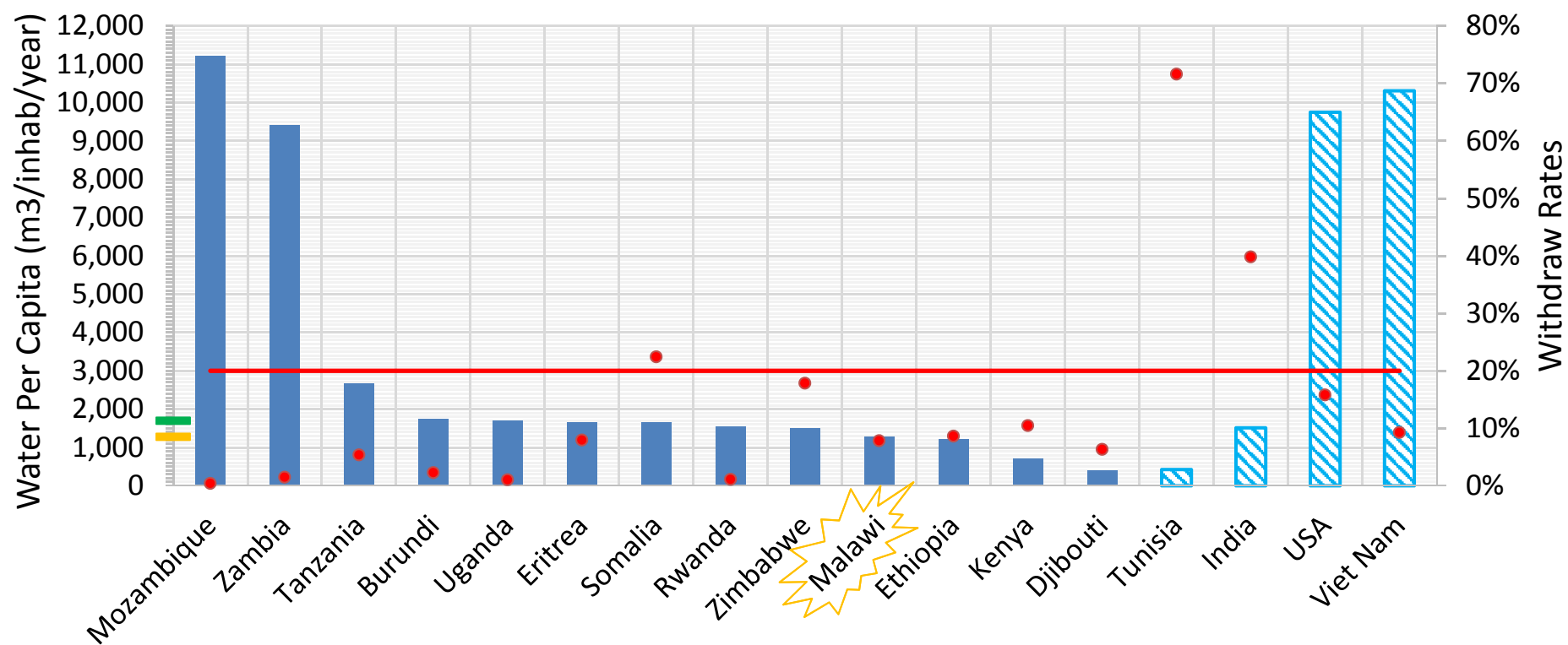
<http://assets.panda.org/img/original/waterscarcitymap.jpg>



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WATER RESOURCES AND WITHDRAWALS



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■ Total renewable water resources per capita
● Percentage of total withdrawn
— Level of potential water stress

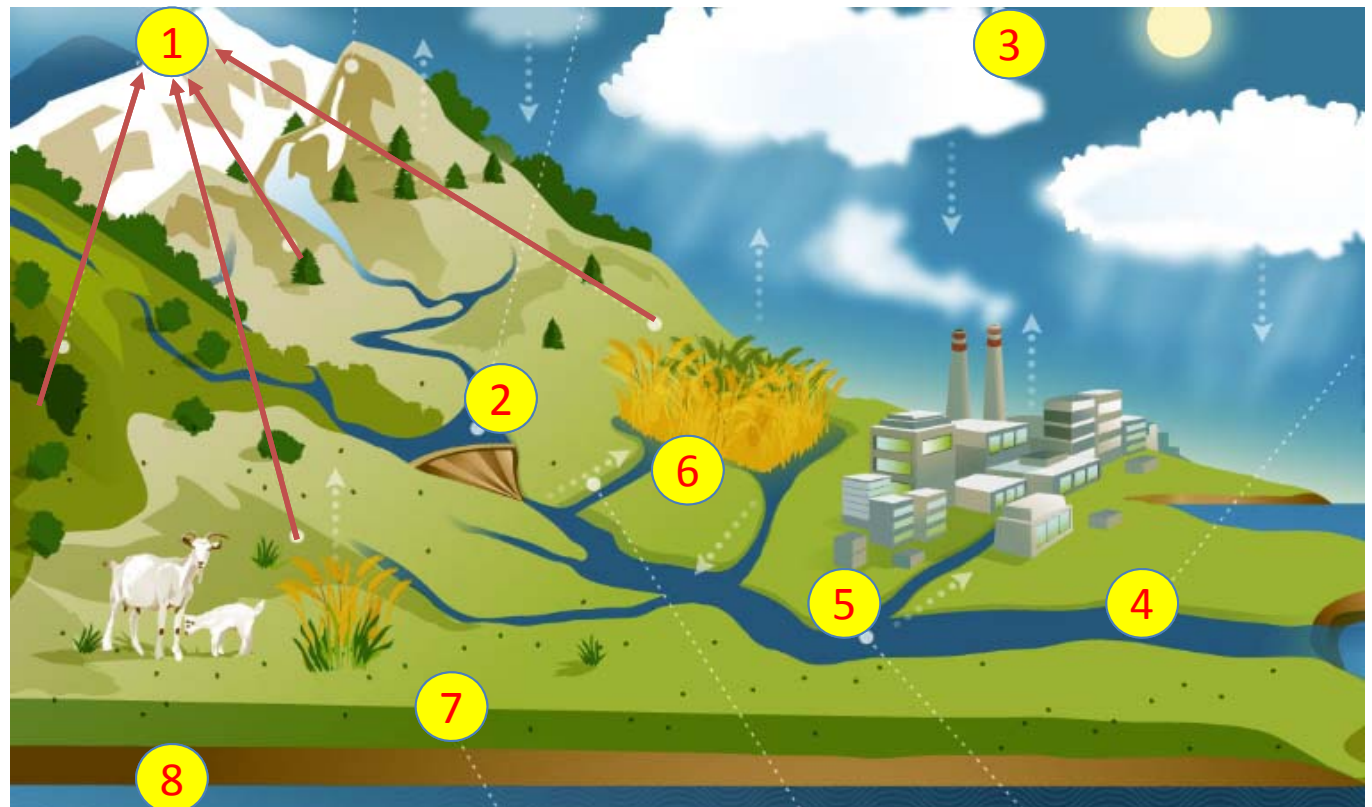


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EFFECTS OF CLIMATE CHANGE ON WATER

- 1) Evapotranspiration
- 2) Evaporation
- 3) Precipitation variability
- 4) Frequency of floods
- 5) Low flow
- 6) Demand for irrigation
- 7) Moisture deficit
- 8) Pressure on ground water

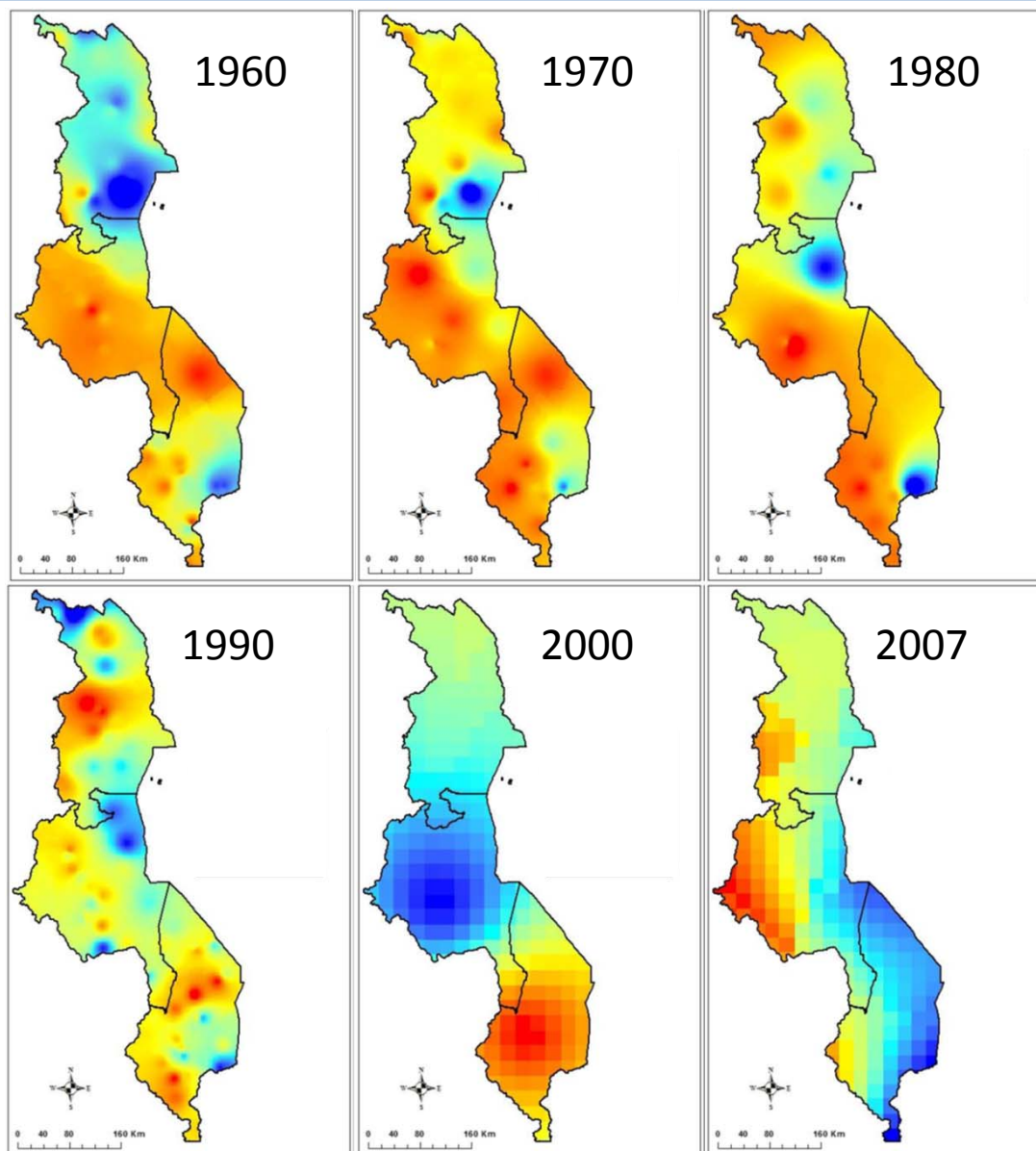
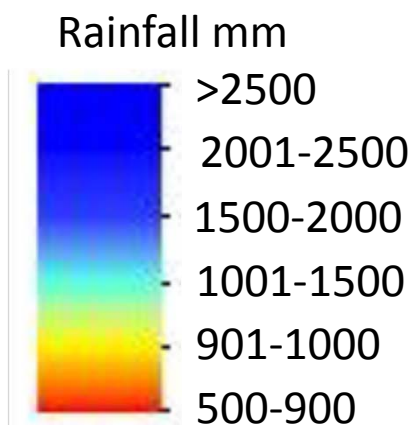


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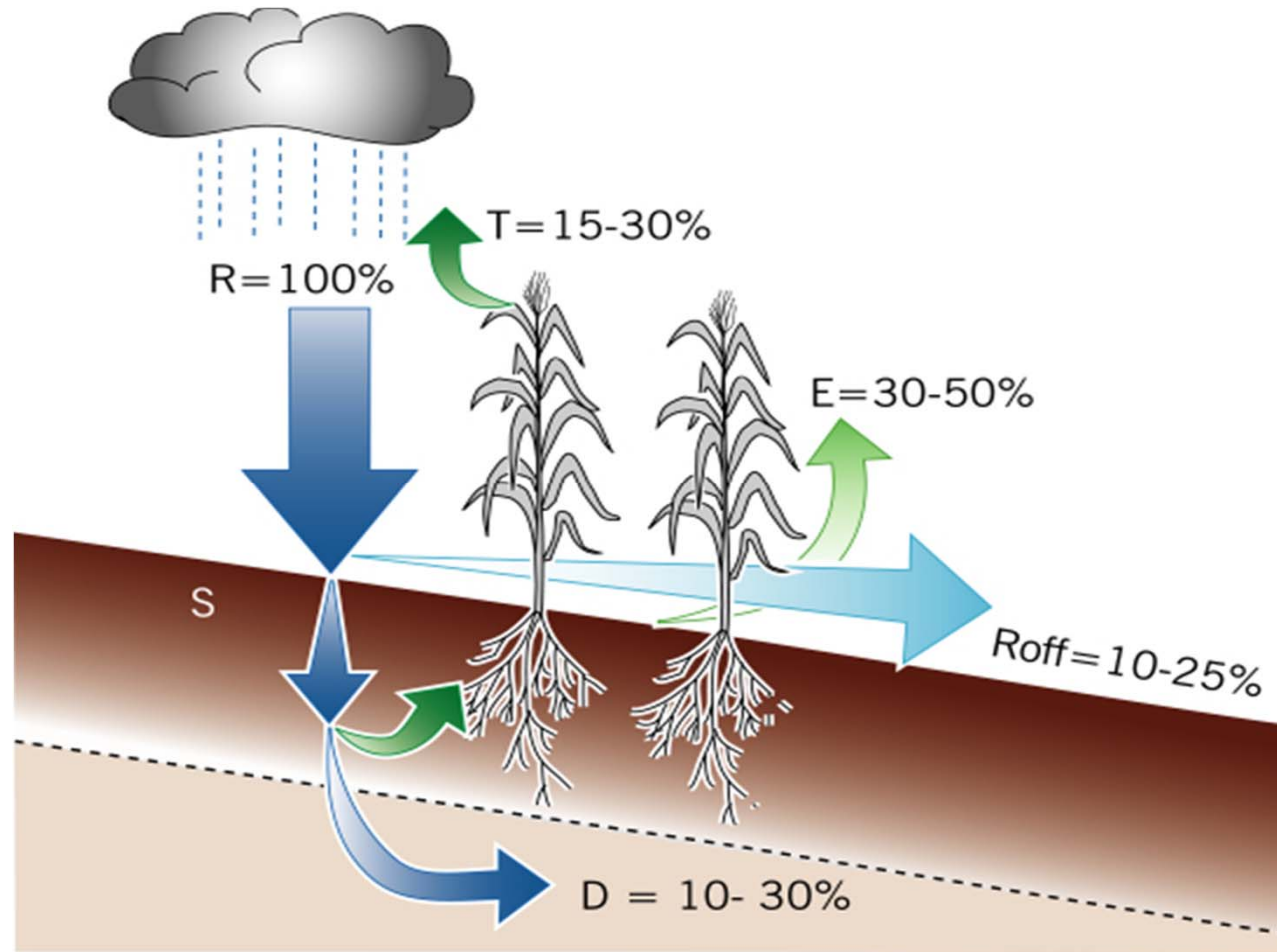
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RAINFALL PARTITIONING IN FARMING SYSTEMS



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MDG Center East and Southern Africa



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SOIL AND WATER CONSERVATION



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<http://www.fao.org/docrep/006/y4690e/y4690e09.htm>
http://cgiarweb.s3.amazonaws.com/wp-content/uploads/2011/12/CPWF_Zai_web.jpg



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IRRIGATION (HARVESTING AND DRAINAGE)



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<https://waterjournalistsafrika.com/tag/malawi/>

<https://villageimpactmalawi.com/energy/>

<https://www.concern.net/news-blog/irrigation-farming-reducing-hunger-malawi>

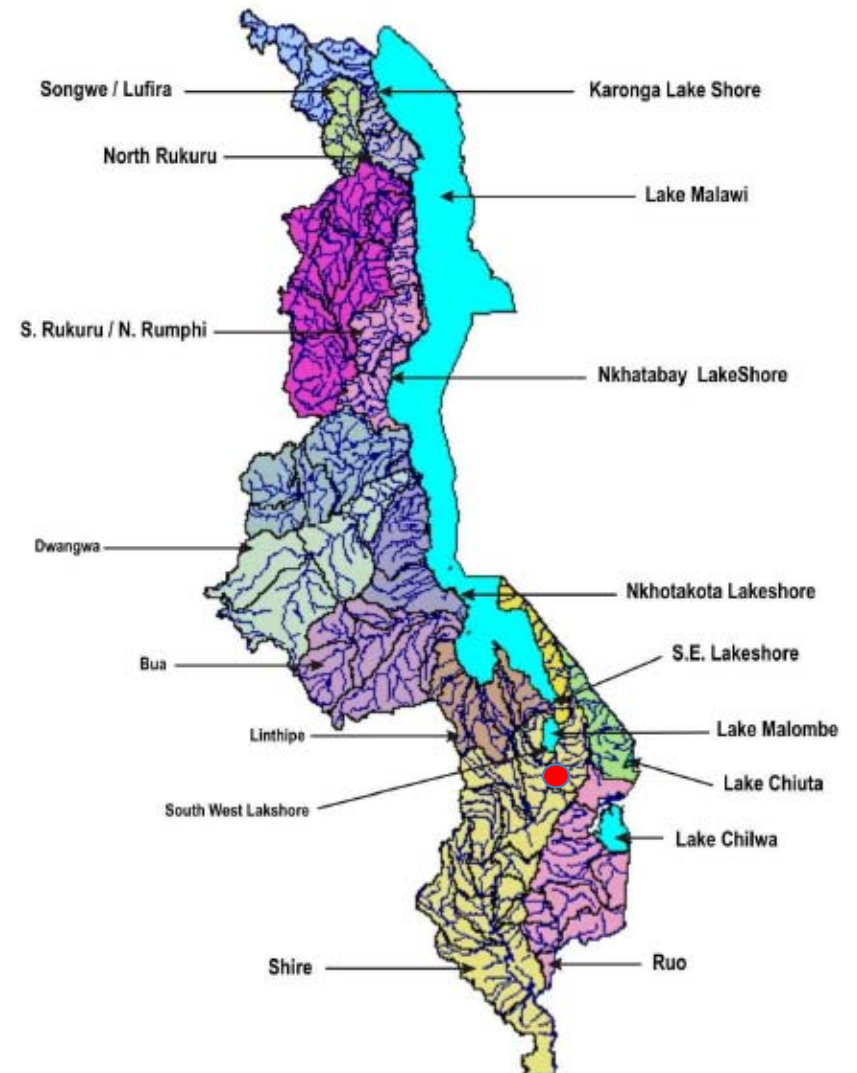


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WATERSHED DEVELOPMENT APPROACH

- Watershed development is a **concept** and **not an activity or program**
- Broad objectives:
 - Reduce run off
 - Reduce soil erosion
 - Increase soil moisture
 - Make water streams perennial
 - Increase ground water level
 - Enhance productivity of land
 - Enhance overall sustainability of ecosystem



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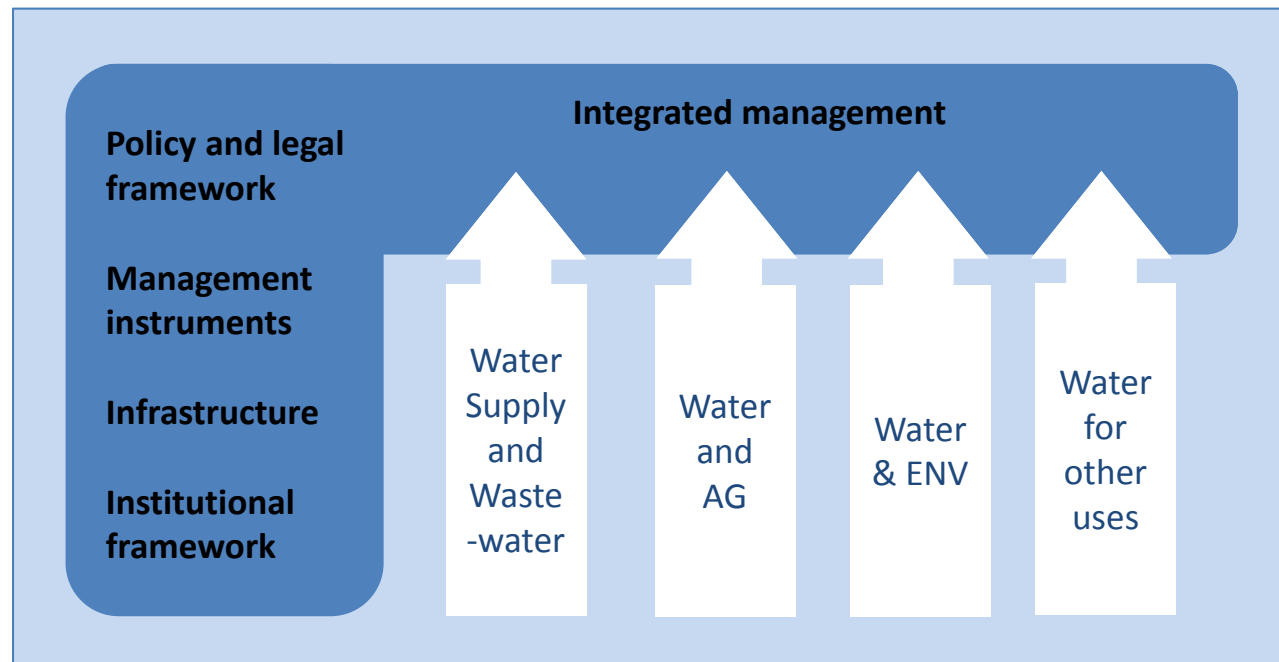
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INTEGRATED WATER RESOURCES MANAGEMENT (IWRM)

- IWRM is a process for the sustainable development, allocation and monitoring of water resource use.
- All uses of water resources are considered together.
- Water allocations and management decisions consider the effects of each use on the others.

- Malawi's
Integrated Water
Resources
Management
and Water
Efficiency
(IWRM/WE) Plan
2008-2012



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KEY ISSUES AND CONSIDERATIONS

- Placement and targeting
- Technology choice
- Community participation and management
- “The whole package”
- Technical knowledge and skills
- Project management and time frame
- Monitoring, evaluation and learning
- Sustainability



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SOURCES

- **Slide 3**
 - International Water Management Institute. (2007). Trends in water and agricultural development. In D. Molden, K. Frenken, R. Barker, & C. de Fraiture, *Water for Food, Water for Life* (pp. 57-89). Washington: Earthscan.
- **Slide 4 and 5**
 - FAO. 2016. AQUASTAT Main Database - Food and Agriculture Organization of the United Nations (FAO)
- **Slide 6**
 - Food and Agriculture Organization of the United Nations (fao.org), Effects of climate change on water cycle.
- **Slide 7**
 - L Nhamo and FAO Climate Database 1950-2007MoDPC 2011
- **Slide 11**
 - IWRM/WE Plan 2008-2012, Malawi Watersheds.
- **Slide 12**
 - Global Water Partnership, Integrated Water Resources Management.
- **Slide 13**
 - IFAD, *Challenges and opportunities for agricultural water management in West and Central Africa: lessons from IFAD experience*, 2012.



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