

Brace Visitors from Barbados:

Discussion on IWRM; constraints & opportunities

Define IWRM: Mgmt. of social, political, economic and physical attributes of a watershed.

Key is WS : sustainability >> ability to balance inputs and outputs in a effort to maintain natural system. Is it ever really possible. Even within a WS irrigation causes concentration/redistribution of elements.

7 Barriers/Constraints:

- 1 **Scarcity:** timing and distribution
- 2 **Access:** 1.4 B lack clean water, 2.9 B appropriate sanitation disposal  
80% illnesses in developing countries >> water related
- 3 **Quality:** urbanization and intensive agr >>> few waters not polluted (even GW).
- 4 **Cooperation:** lack of i) skilled labour, ii) data, iii) dollars
- 5 **Awareness:** well off less aware, politicians on a 4 yr horizon
- 6 **International funding:** envir issues are long term and less evident; business  
And investments are on much shorter horizon
- 7 **Fragmentation:** competing objectives of various players

1,2 & 3: Engineering issues (easy to do, just a matter of policies and money)

4, 5, 6, & 7: Socio-economic issues: There exist logical solutions. It is only a question of our mindset.

**In summary:** The barriers and constraints to sustainable IWRM is not a technical issues but a socio-economic one. Education and awareness will drive the other factors for attainment of sustainable IWRM.

## **The Case for Barbados:**

### **Conditions in Barbados:**

- Ranked as 12<sup>th</sup> driest country on a per-person basis in the world.
- Karst
- No rivers or lakes: water source is GW plus 10% from desal of brackish water
- Water source is via well pumping and chlorination of often nearshore freshwater lense.
- 10% of island has access to wastewater treatment. Even this is only primary or secondary treatment dumped one kilometer offshore. All other waste disposal is via suckwells, some use septic systems.
- Gulley dumping is common.
- Soil erosion (sugarcane to vegetables), runoff via gulleys and nearshore flushing.
- Major pollution loads of N, P, sediment.
- Little knowledge of pesticides, agr chemicals or other industrial chemical use and disposal.
- Major die-off of nearshore coral.
- BWA consumption study: 23% farming, 22% domestic, 7.6% industrial, 2.3 % hotels and ships, 1.1% golf: Total of 56%, What of other 43%. Also what of BADMC water demand plus other unofficial wells and water use.
- BWA pumps at equivalent to 1:15 year dry-year rate. Does not account for BADMC plus other wells etc.
- Water Quality: Nitrate levels average 7 mg/l, TDS ave 427 mg/l

### **The 7 Barriers/Constraints in Barbados:**

- 1 Scarcity:** do more to capture runoff (gulley dams) and treat and return wastewater to GW. Manage demand more than supply. Roof harvesting a good example of good law and poor implementation
- 2 Access:** excellent historical success, but poor O & M. Poor distribution to northern pars of island.
- 3 Quality:** island needs control of imported chemicals and training in use. No industry or hotel should be allowed dumping without tertiary treatment. All current and future government water treatment should be tertiary.
- 4 Cooperation:** need to centralize water management within one controlling body
- 5 Awareness:** much continued effort at all levels of society required.
- 6 International funding:** funding in general needs to be addressed in terms of an indexed water pricing policy for both potable and waste treatment
- 7 Fragmentation:** A centralized BWA with indexed funding and teeth without political influence is required. This body should have independent control over all development which impacts water quantity/quality.