

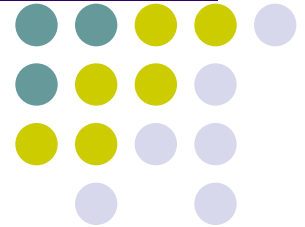


GUYANA WATER INC

Scientific Services Unit



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SCIENTIFIC SERVICES MANAGER
GWl



Outline of Presentation



- Overview of GWI
- IWRM and GWI
- Gender Issues in Water Management
- Coverage of the Population
- The Water Cycle
- A and B sand Aquifers
- Water Conservation

IWRM



- Different uses of water are interdependent
- Need to consider the different uses of water together
- Has this been practiced in Guyana?
- What are your thoughts?



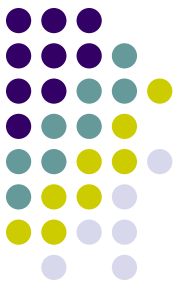
Examples of IWRM

- 2005 flooding excellent example of IWRM
- El Nino
- Flooding – coordinating uses of water
- GWI-potable water
- Guysuco – irrigation water
- EDWC – conservancy water
- Other agencies – help in co-ordination



IWRM in Operations

- GWI collaborates with various institutions
- EDWCB
- Ministry of Agriculture
- Memo of Understanding with Min of Agriculture
- Liaisons with tussah in various districts
- Community meetings
- Water user associations



IWRM weaknesses

- Informal groups
- Policy exists but needs strengthening
- Water and Sewerage act 2002 calls for Water Council – embryonic stages
- Need more co-ordinated approach in communities
- That's what St Cuthbert's aims to achieve
- Success can be replicated elsewhere

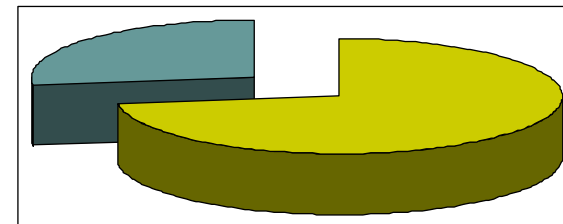
Gender Issues in Water Management



- GWI 504 employees
- 368 men
- 136 females

Corporate Management Team

- 16 members 3 females
- Board of Directors
- Female representation



GWIS LICENSING AGREEMENT



- PROVISION OF SAFE WATER
- MEET WHO STANDARDS
- RELAXED STDS FOR IRON
- WITHIN 5 YR TENURE, 90% OF POPULATION ALONG COAST MUST BE SUPPLIED WITH SAFE WATER
- 80% HINTERLAND REGION

PROVISION OF SAFE WATER



- **GWI'S COVERAGE OF THE POPULATION**

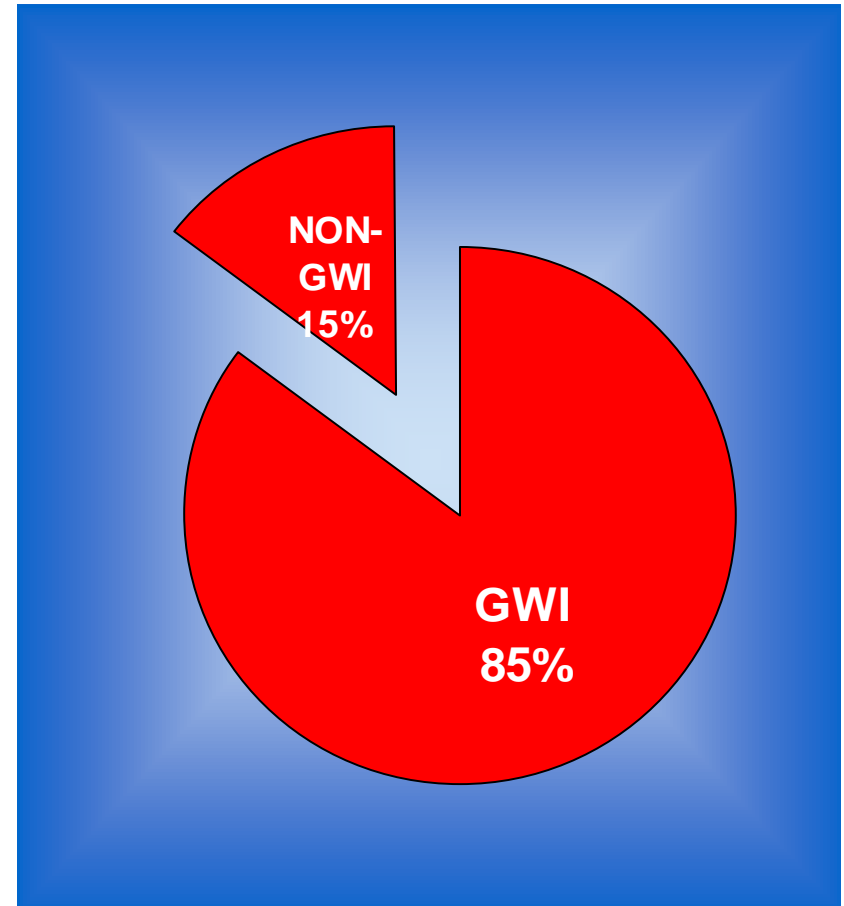




TABLE OF COVERAGE

Well Facility	Region	Population & Household Census 2002		Customers served by GWI (number of HH)	Population served by GWI (calculation done using HH Avg.)
		HH	Population		
	1	4223	23204		
Borehole	2	11253	48,411	7,461	32,082
Water Treatment Plant	3	26057	101,920	6,392	24,929
Borehole				17,394	67,837
Water Treatment Plant	4	80445	309,059	43,356	164,753
Borehole				33,723	128,147
Borehole	5	12835	52,321	12,090	49,569
Water Treatment Plant	6	31681	122,849	9,458	36,886
Borehole				22,339	87,122
Water Treatment Plant	7	3748	15,935	1,742	7,491
	8	1781	9,211		
	9	3553	19,365		
Borehole	10	10224	39,766	3,773	14,715
Booster				566	2,207
Total		185800	742,041	158,294	615,737

GWJ's coverage

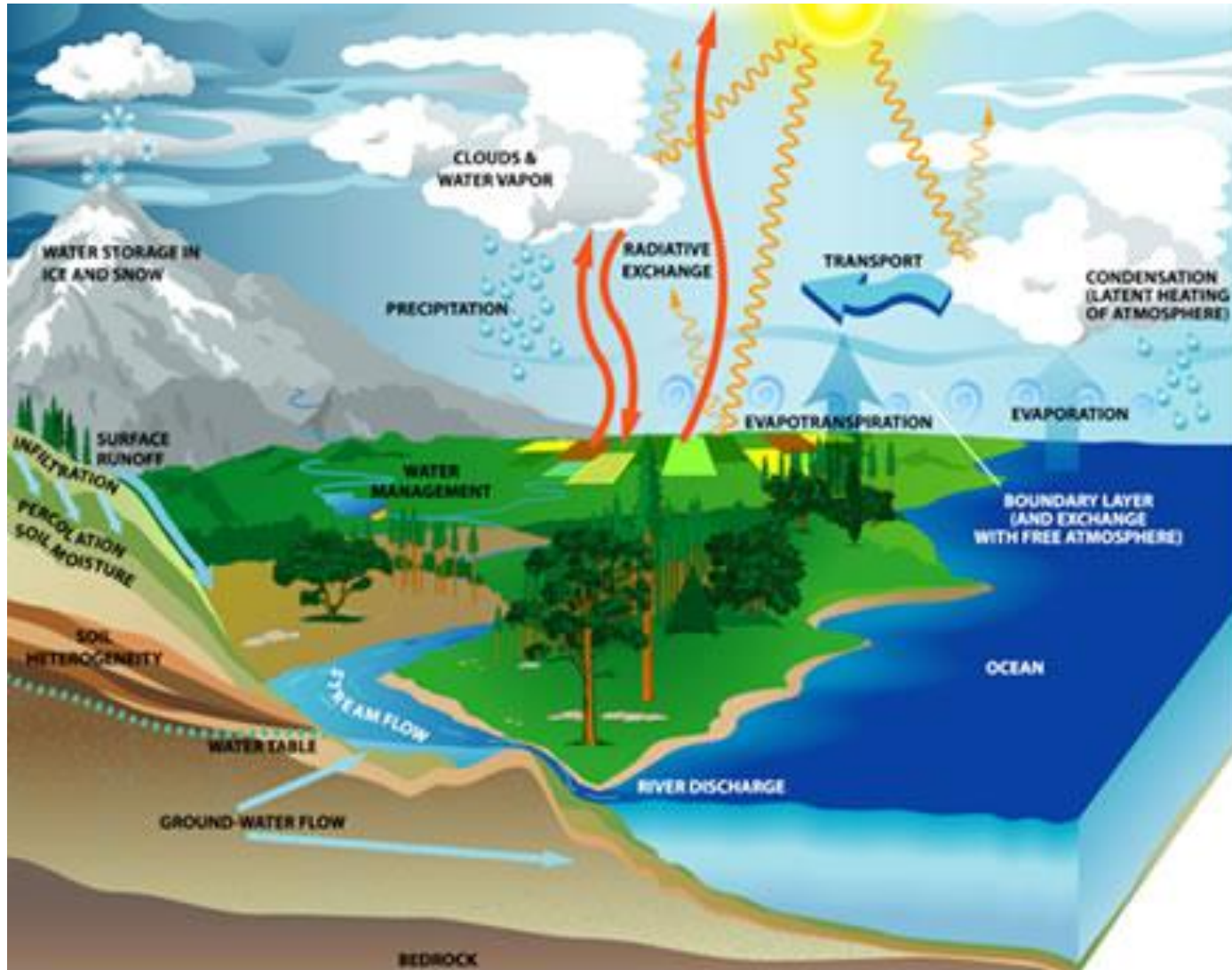


GWI WATER RESOURCES



- SURFACE WATER
 - 10% OF WATER USED
 - WITHIN GEORGETOWN 30% SURFACE WATER
 - DEMAND INCREASES SO ABSTRACTIONS TO BE INCREASED
- GROUND WATER
 - WELLS
 - MOST WELLS CONSTRUCTED IN 1970S WITH FEW IN LATE 1960S

THE WATER CYCLE

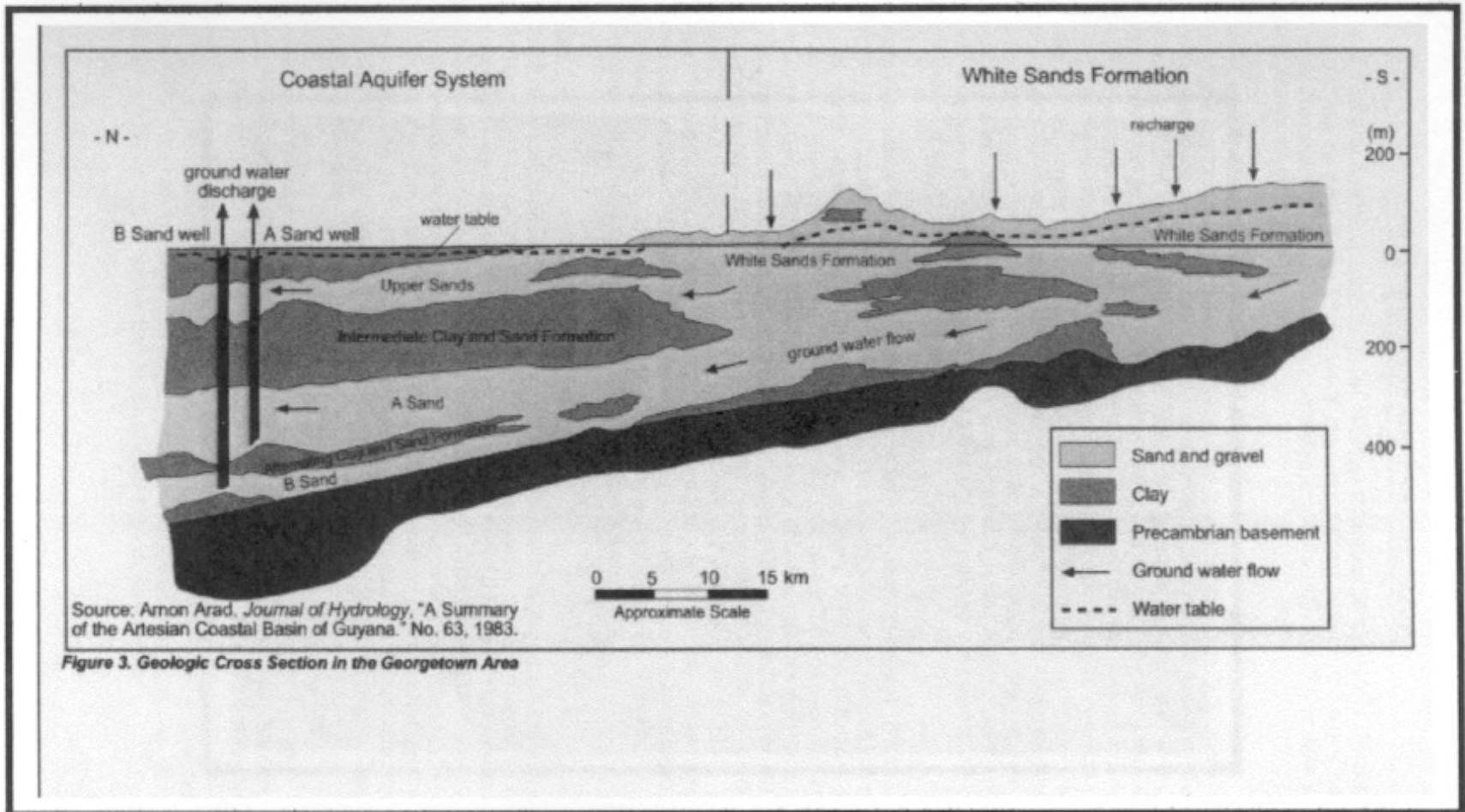
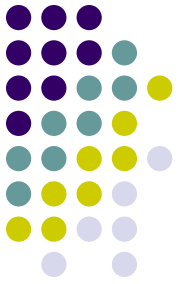




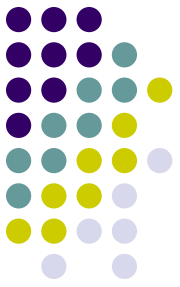
THE WATER CYCLE

- VISIT WWW.GWIGUYANA.COM
- EARTH HAS LIMITED WATER, SO WATER IS RETURNED AND REUSED
- EVAPORATION, CONDENSATION, PRECIPITAITON
- EVAPORATION –sun warms oceans, lakes etc and vapour rises to the air.
- CONDENSATION – Water vapour in air becomes cold and forms into clouds
- PRECIPITATION – lot of water condensed and air can no longer hold it, clouds burst, falls to earth by pptation, and enters rivers, lakes, and ground

THE A AND B SANDS AQUIFERS



A AND B SANDS AQUIFERS



- A Sands extends from Charity to Orealla
- 114 wells, 76.8 m (Good Hope) to 639 m (Crabwood Creek).
- Wells get deeper as we move from west to East
- B Sands aquifer penetrated by only 3 wells
- Mon Repos, Better Hope and Shelter Belt
- B sands vary from 274m at Demerara River to 460m at Corentyne

ABSTRACTIONS



Total Production from Dec 21, 2000 - Dec 31, 2004 (MI)				
Division	Sources			
	Surface Water	A Sands	B Sands	Total
	MI	MI	MI	MI
Division 1		15,499		15,499
Division 2	2,747	46,356		49,103
Division 3 - EBD		40,866		40,866
Division 3 -ECD		53,665	17,910	71,575
Division 3 - Linden	15,664	2,443		18,107
Division 3 - Georgetown	21,511	77,407	6,769	105,687
Division 4		31,340		31,340
Division 5		66,508		66,508
Total per Source	39,923	334,084	24,679	
Grand Total Abstracted				398,686

WATER RESOURCE CONSERVATION



- IS WATER INEXHAUSTIBLE?
- NO!!!!!!
- GWI'S STRATEGY
- TWOFOLD
- CONSERVE AND MONITOR
- METERING AND LEAKAGE STRATEGY





WATER CONSERVATION

- INCORPORATED WITH ENERGY MGT STRATEGY

YEAR	2004	2005	2006	2007	2008
PRODUCTION '000 ML	98	98	97	96	96
ENERGY mWh	29.78	29.74	28.80	28.40	28.40

WATER RESOURCES AND DEMAND



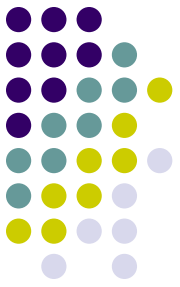
- License contains no specific reqs. With respect to water resources and demand strategy
- Concern has been expressed over the ability of the aquifers to continue to support the current level of demand.
- Legislation is required to balance the needs of the demands on surface water resources by sugar estate and farmers with the demand of public water supply

WATER RESOURCES AND DEMAND



- WHEN THE WELLS WERE FIRST DRILLED THE WATER WOULD FLOW NATURALLY (1930S) A AND B SANDS
- CURRENT DEMANDS UPON THE TWO MAIN AQUIFERS HAVE NOT BEEN TESTED
- A AND B SANDS MAY NOT BE SUSTAINABLE IN THE LONG TERM AS EVIDENCED BY FALLING STATIC WATER LEVELS
- STUDY ON SALINE INTRUSION AND SUSTAINABILITY OF AQUIFERS NEED TO BE DONE
- FUNDING NEEDED

WATER RESOURCES AND DEMAND



- Analysis of surface and groundwater abstraction data revealed that for 2004, 86.4% of water produced was sourced from boreholes, while for the period Jan to July 2005, water sourced from boreholes represented 89.7%
- This trend will continue as the 10 year development plan does not include the construction of any additional surface water treatment plants

How can we conserve water?



What is CONSERVATION?

- practices which reduce water use
- The care, preservation, protection, and wise use of water
- Using water wisely and efficiently so that it is not wasted
- The protection, development, and efficient management of water resources for beneficial purposes

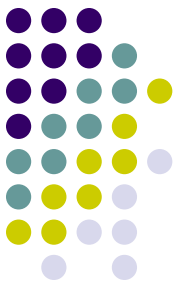


How can you save water?

- Use water sparingly when washing cars, concrete surfaces (your yard) and bathing pets



How can you save water contd.



- Encourage your mom, dad, brothers, sisters and friends to check for leaky faucets, toilets and showerheads



How can you save water contd.

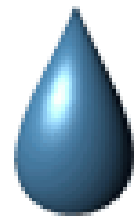


- Turn off the tap while brushing your teeth
- Turn water faucet off TIGHT
- Put water in kitchen sink to wash and rinse dishes
- Use a broom or brush to clean concrete surfaces such as your bridge, rather than buckets of water or a hose
- Flush the toilet with water used to wash clothes
- Recycle water: use fish tank water to water plants

Water Quality and Water Safety



- What do we mean by water quality?
- Does colour signify quality?
- Does the look of the water signify the safety of the water?
- How do we know it is water?
- What defines water?



GWIs strategy



- Quality Control
- Sampling programme
- Samples from boreholes – quarterly
- Samples from treatment plants – fortnightly and as situation demands it
- Weakness?

GWIs strategy



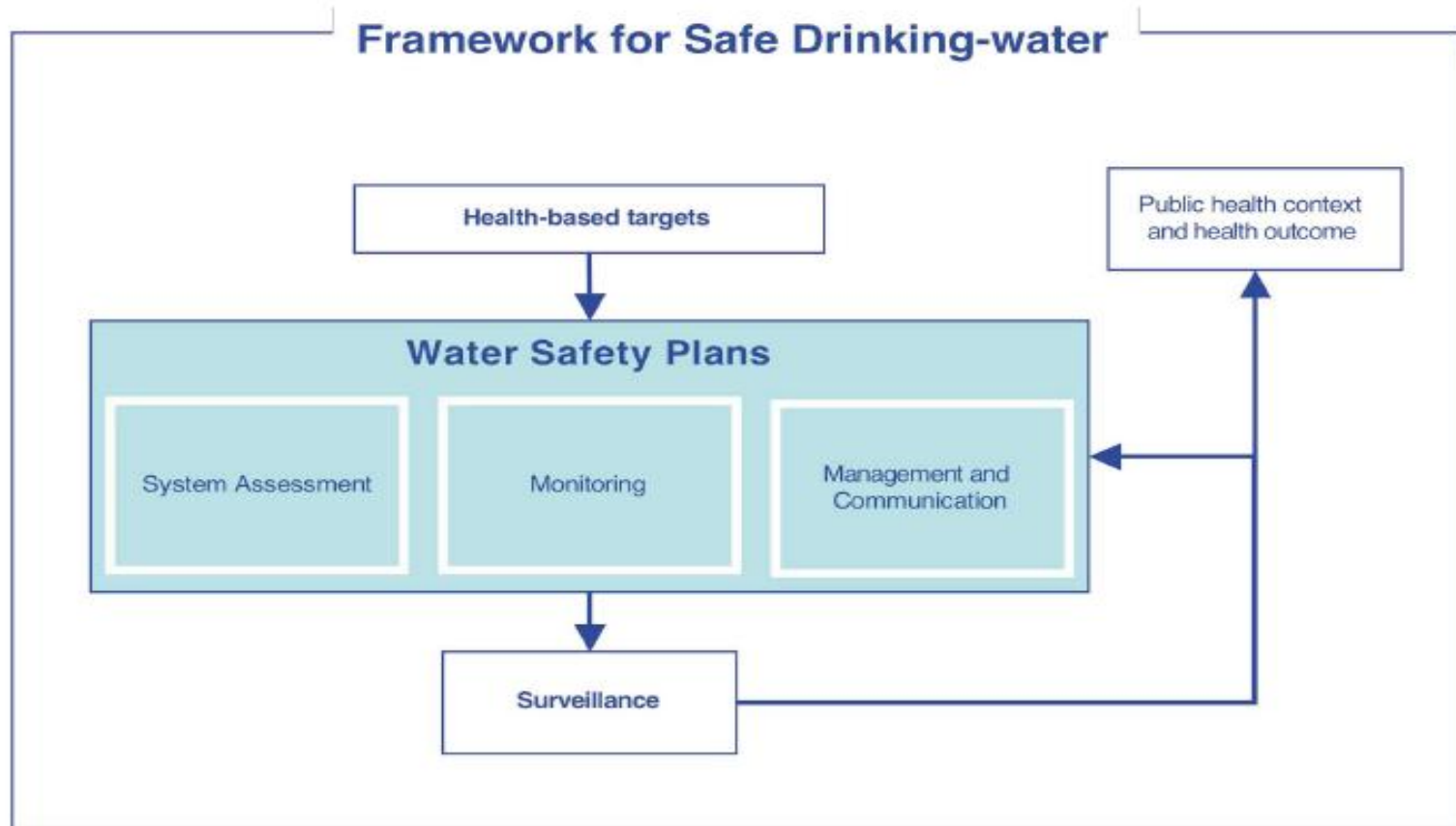
- Weakness?
- After the fact – only after contamination is discovered then action is taken
- Boil order issued
- Preventative measures taken and boil order lifted



Better Method

- Quality Control Vs Quality Assurance
- Quality Assurance
- Risk Assessment
- Water Safety Plan

Water Safety Plan Manual



Water Safety Plan



- A methodology developed by the World Health Organisation (WHO) to help drinking water suppliers improve and maintain water quality
- A comprehensive risk assessment and risk management approach that includes all steps in the water supply chain (from catchments to consumer)
- An opportunity for drinking water supplier to assess, modify and build upon existing good management practices

What are the benefits of WSP?



- Improved understanding of water supply system
- Communication and collaboration among stakeholders
- Helps water provider to effectively manage water supply
- Assists the water quality regulatory authority in its surveillance efforts

Main Objectives of a Water Safety Plan



A WSP aims to improve drinking water quality by optimizing

- Control of source water contamination
- The removal, reduction or inactivation of contaminants during treatment processes
- The prevention of re-contamination during distribution, storage and handling

Key Strategy Components



- System Assessment
- Management Plans
- Monitoring



Pilot Area Linden

- Five water treatment plans
- High leakage
- Post plant contamination
- Stakeholder involvement
- Chosen from five proposed sights



WSP - Linden

- Step 1 – assembling the team
- Step 2 – Baseline Health Assessment
- Step 3 – Water Supply System Description
- Step 4 – Preliminary Capability and Performance Assessment
- Step 5 – Risk Management
- Step 6 – Control Measure Monitoring
- Step 7 – Verification

WSP - Linden



- Step 8 – Management Procedures and Supporting Programs
- Step 9 – Auditing
- Step 10 – Documentation and Record Keeping



Future Plans

- IWRM
- WSP replication
- New Water Treatment Plants
- Consolidation rather than expansion

Household Water Treatment



- Because of limitations of funding, post source contamination
- Householder awareness – bleach, boiling, testing
- Practical – household testing kits
- Better suited for the hinterland areas where wide spread out of populace and no revenues earned from service provision

Questions

- Practical – household water testing

Thank You

