International Water Projects

A 29 Year Retrospective

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Principal/CTO

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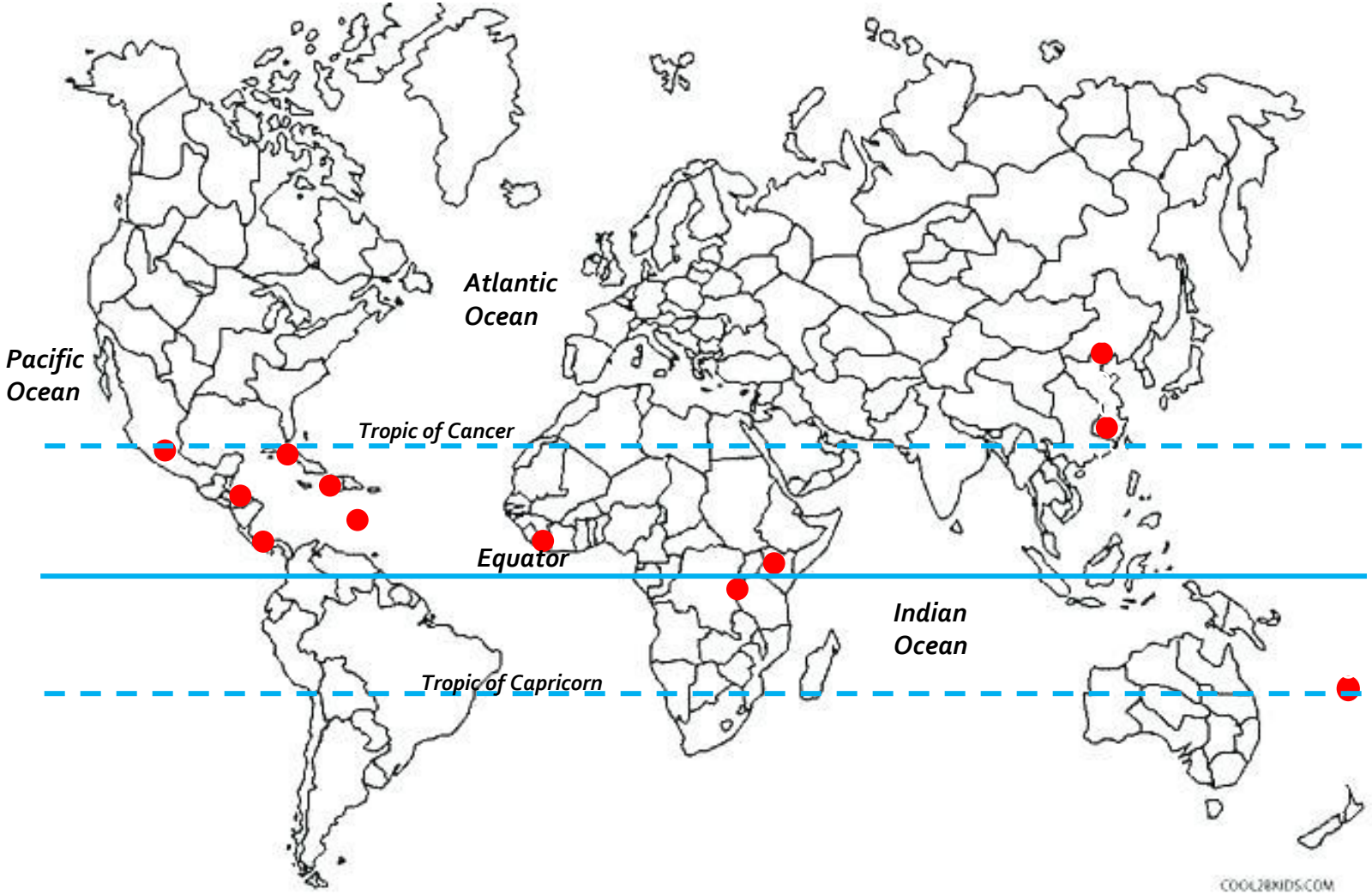
Project Locations

- Mexico (Oaxaca)
- Honduras
- Costa Rica
- Cuba
- Haiti
- Grenadines
- Fiji
- Hawaii
- Liberia
- Rwanda
- Kenya
- Eastern China
  - Ningbo
  - Hangzhou
  - Tianjin
  - Shandong



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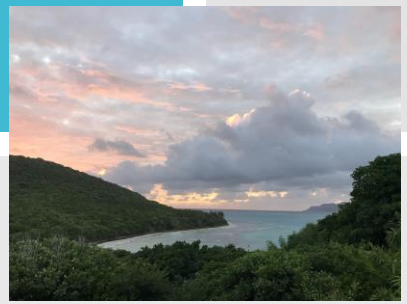
Project Types

International Development/ Education
- Honduras
- Mexico
- Cuba
- China
- Haiti
- Kenya

Health Care
- Haiti
- Liberia
- Rwanda

Ecotourism
- Fiji
- Grenadines
- Honduras
- Costa Rica

Industrialization
- Honduras
- China



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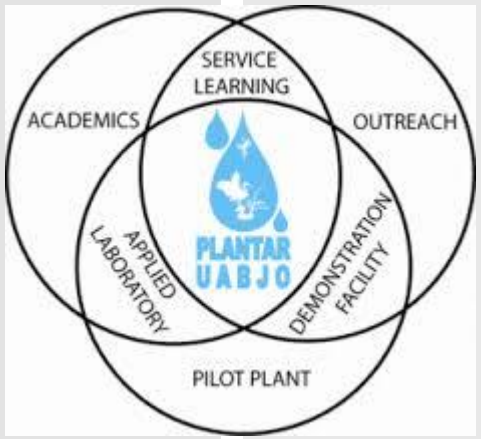
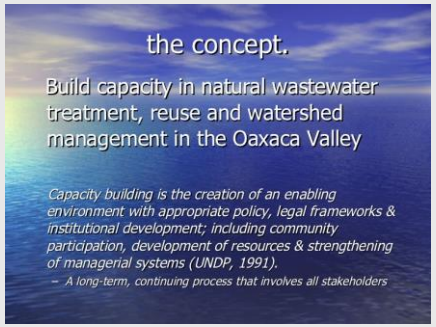
International Development/Education

Mexico (National University/HSU)

- Community Development/Environmental Management
  - Water Supply
  - Wastewater Management
  - Solid Waste Management
- 2007-2009 (3-year initiative)





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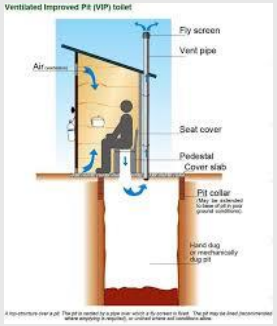
HUMBOLDT STATE UNIVERSITY

International Development/Education

Honduras (SANAA/USAID/DIMA)

- Rural Water and Sanitation
  - Gravity Water Supply
  - Dry Sanitation – Latrines
- Water Resource Management and Pollution Control
- 1990 – 1994 (4-year Initiative)



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ATICA, S. de R.L.
Asesores Técnicos en Ingeniería y Ciencias Ambientales

International Development/Education

Cuba (Colegio de Ingenieros Civiles de Cuba/HSU)

- Technical Exchange Program
- Ecological Wastewater Management Strategies
- Wetland Preservation and Restoration
- 2000

- Co-taught a workshop of wetland treatment systems
- 100 Cuban + 11 US Environmental Engineers/Scientist Attended
- Three-day tour of the Zapata Cienaga Wetland Complex
- 452,000 Hectares – Ramsar Designated Wetland
- One of the largest and best preserved wetlands in the Caribbean

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HUMBOLDT STATE UNIVERSITY

International Development/Education

China (MOC/Work Bank/Ningbo/Hangzhou)

- Rural Wastewater Management
- 2009-2011 (3 years) – Lead Technical Consultant

New Socialist Countryside Initiative

- 55% to 60% of china in rural countryside
- Large Gap between urban and rural services
  - Economic and Education – 3X less in rural area
  - Predominant elder population in rural areas
  - Doctors: 5.2 urban to 2.7 Rural
  - Infant Mortality 3x higher in rural areas
  - Water and sanitation coverage 3x lower in rurals area
- $15 billion dollar investment in 10 years to rural china
  - Education,Health Care, Water & Sanitation,Transportation
- MOC/WB – Rural Wastewater Management Demonstration Project - 200 Villages provided with rural sanitation

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Project Setting

Three Principal Geographic Areas

- Peak District (Ele. 300 to 1000 mts)
- Alluvial Valleys in Peak District (200 to 600 mts)
- Plains (Ele. 0 to 20 mts)

Two Climatic Regions

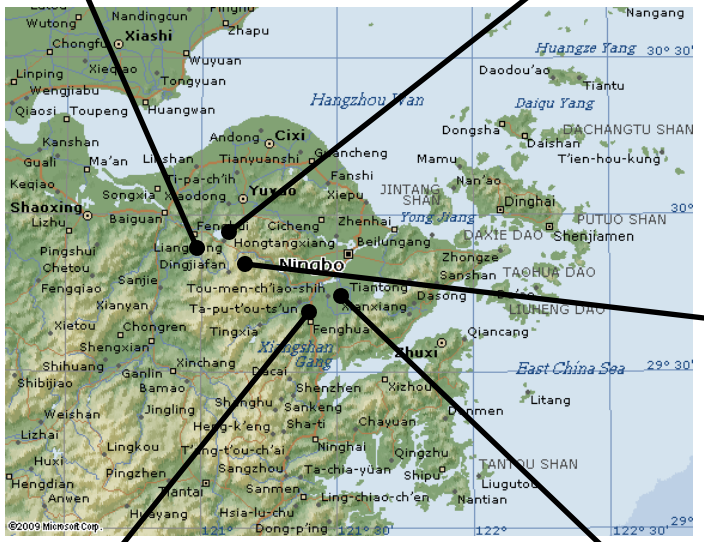
- Mountainous Climates (0 to 30 °C)
- Maritime Climate (7 to 30 °C)
- Annual Precipitation = 1480 mm

Geology

- Hard rock in peak district
- Alluvial soils in valleys and plains

Soils and Groundwater

- Shallow soils in peak district
- Deep well formed and rich soils in alluvial valleys and plains
- High groundwater in many alluvial valleys and plain areas (< 1 mt)



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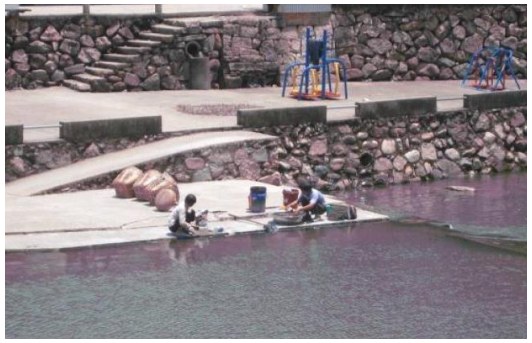
Problem Assessment

- Lack of design standards or guidelines for rural infrastructure
- Land use conflicts – Placing WWTP in floodways
- Lack of participation
- Inferior building materials
- Poorly engineered and/or constructed system
- Difficult terrain
- Direct surface water discharges and pollution
- Lack of O&M
- River used for laundry washing



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Demonstration Project

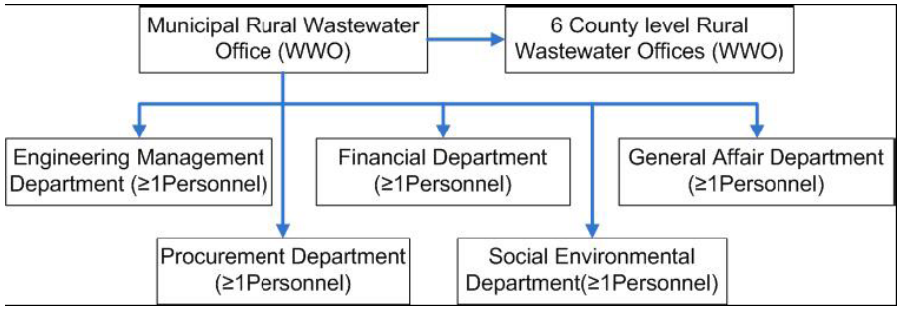
- Appropriate Technology
- Develop Technical Criteria and Guidelines
- Set up Regional Wastewater Management Program
- Analyze Alternative Financing
- Strategies to Improve Community Participation
- Alternative O&M and Administration Models
- Develop Monitoring and Evaluation Program
- Develop Ongoing Training and Education Programs

70189

Guide for Wastewater Management in Rural Villages in China

WATER PARTNERSHIP PROGRAM

December 2011



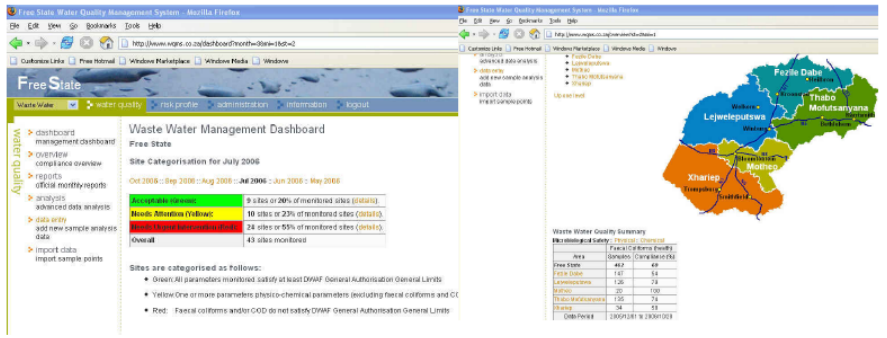


Figure 3: *Examples of eWQMS outputs including Management Dashboard screen (left) (highlighting compliance of a particular site) and Overview Screen (right) (highlighting compliance for an area*

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Health Care

Haiti (MASS Design Group/Gheskio)

- Cholera Treatment Center
- Water and Wasterwater System Design and Training
- 2015

In response to Cholera Outbreak in Haiti Gheskio and MASS Design Group Design and Constructed the First Permanent treatment center

Designed the water and wastewater systems for the new center

WWTP – Anaerobic baffled reactor + raised vegetated evaporative bed system

Assisted with installation and training of staff

COTE Top Ten Buildings of the year

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MASS

Health Care

Rwanda (MASS Design Group/Ministry of Health)

- Design and Construction Support for Two District Hospitals
- Nyarugenge (Kigali) & Munini District Hospitals
- 2014 - Ongoing

- **Provided civil and environmental engineering design**
- **Site Design (grading, drainage and retaining walls)**
- **Wet utilities (water, wastewater and stormwater)**
- **Construction Support Services**

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MASS

Health Care

Liberia (MASS Design Group/Ministry of Health)

- Liberia Health Infrasture Standards
- Developed Civil, Environmental and Water Resource Standards
- 2014 (2 year initiative)

- **Capacity building to country's healthcare infrastructure and service delivery system after the brutal 1989 to 2003 civil war**
- **National standards for health infrastructure design, planning and construction**
- **Conducted workshops and training sessions over a 2-year period**
- **Standards have served as models for Rwanda, Kenya and Sierra Leon**
- **New Redemption Hospital Caldwell is under construction**

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Ecotourism

Fiji (JMC Fiji Island Resort/Ocean Futures Society)

- Designed and built on-site wastewater recycling system
- Ecological wastewater treatment system
- 2004/05

- **5 Star Resort on Vanua Levu**
- **Design system that is integral to the setting**
- **Low-cost, energy-efficient and simple-to-operate**
- **Eliminate the release of nutrients to coral reefs**
- **Reuse treated water for wetland and irrigation**
- **Use locally available materials and labor**






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Jean-Michel Cousteau Resort FIJI

JEAN-MICHEL COUSTEAU'S OCEAN FUTURES SOCIETY
WWW.OCEANFUTURES.ORG

Ecotourism

Grenadines (Petit St. Vincent/Ocean Futures Society)

- Designed and built on-site wastewater recycling system
- Ecological wastewater treatment system
- 2018

- **Kanso Water Treatment System**
- **5 Star Resort on private island of Petit St. Vincent**
- **Design system that was easy to install**
- **Low-cost, energy-efficient and simple-to-operate**
- **Eliminate the release of nutrients to coral reefs**
- **Reuse treated water for irrigation**
- **Use locally available labor**

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Petit St.Vincent PRIVATE ISLAND

JEAN-MICHEL COUSTEAU'S OCEAN FUTURES SOCIETY
WWW.OCEANFUTURES.ORG

Industrialization

China (Asian Development Bank)

- Tianjin Lingang Industrial Zone Ecologic Wetland Park
- Tianjin, China
- 2010-2011 (2 year effort)

- **Due diligence technical assessment of 180-acre ecologic wetland park**
- **Presentation of low-pressure gravity sewer system design for 10 square mile are of new harbor project**

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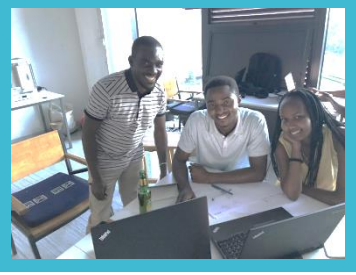
Lessons Learned








- Important to look at the past experience to build the future
- Maintain realistic expectations and composure
- Active listening is fundamental
- Remember there are many experts in the room
- I am always a guest
- Any technological intervention requires ongoing support
- Understanding the technical, financial and institutional capacity (ex. Engineering services in China is ~3% of project costs)
- Achieving multiple objectives typically leads to higher success rate (ex. Water scarcity and recycling in the Oaxaca Valley)
- Community development is hard word and requires building trust. Building trust can be a long-term endeavor (ex. Elderly women population in Chinese village mistrust of government to install sewer connections)
- Keep it simple stupid (KISS) and serviceable
- Many young professionals worldwide are under similar financial stresses regardless of their location (Tegucigalpa, Shanghai, Kigali, Monrovia, Oaxaca, Nairobi, Suva)
- Never underestimate or undervalue your experience

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