Market Based Instruments for Watershed Protection

Valuing Watersheds

Huangshan, China
May 11-12 2001

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Objectives

- Understanding the “Value” of Water provided by Forested and other Natural Areas
- Matching Financial Mechanisms to Incentives for Watershed Protection
Key Messages

- Water is an economic good
- Human activities that use water should also guarantee the protection of the source
- Usually water sources are in natural areas (that may have some protection), whose conservation should be financed for the long term
- Long term protection requires the participation of the users
Total Value

**Value of No Use**

**Value of Direct Use**
- Human consumption
- Agriculture
- Electricity generation
- Manufacturing
- Mining
- Recreation

**Value of Indirect Use**
- Flood control
- Retention of sedimentation
- Nutrient transport
- Transportation
- Flow regulation
- Fish production
- Climate stabilization
Determining Value of Watershed Services Provided by Forests

- Water Quantity Costs
  - Floods
  - Hydrographic changes
  - Precipitation and climate change

- Water Quality Costs
  - Sedimentation
  - Salinisation
  - Contamination

- Aquatic Productivity
Variables Effecting Threats and Related Costs

- Topography and slope of watershed
- Scale and size of the basin
- Geology
- Type of soils
- Total rainfall and its distribution
- Location forests and protected areas
- **Type and location of human activities**
The Human Component

Activities
- Agriculture/grazing
- Toxic/contaminated wastes
- Migration
- Uncontrolled tourism
- Development projects
- Dams/hydro-electric projects
- Deforestation

Users/ Beneficiaries
- Individual
  - Domestic Users
  - Private farmers
- Commercial
  - Farming
  - Logging
  - Fishing
- Industry
- Governmental
  - Water supply
  - Energy supply
  - Transportation
  - Health
Why do water valuation?

- To help in the **making of decision**
- To **raise awareness** of the public about the sustainable management of water
- **Promote strategies** to protect the watershed
- **Create a mechanism to finance the conservation of watershed** based on the value of their services
Valuation Process

- Choose the location
- Identify the goals of your valuation project
- Identify the key users/beneficiaries of the watershed in relation to the goals
- Identify the “audiences” (who can influence change)
- Define the information needed
- Conduct economic and hydrologic studies based on defined scope
- Develop the message(s) to persuade audiences(s)
Methodologies for Economic Calculations

- Contingent valuation
- Hedonic pricing
- Opportunity costs
- Threat avoidance costs
- Cost prevention
- Change of productivity
- Replacement of services cost
Incentive and Financial Mechanisms

- **Public payments**
  - User fees
  - Taxes
  - New York City
  - Quito, Ecuador

- **Trading**
  - Credits
  - Mitigation
  - Easements
  - New South Wales, Aus.
  - Lake Yajóa, Honduras
  - Costa Rica

- **Voluntary payments**
  - Valle Cauca, Colombia
  - Perrier-Vittel, France
To avoid the construction of a wastewater treatment plant required by the U.S.EPA at a cost of $4 billion, NYC invested $660 million:

- Buy lands and create environmental - $300 M
- Rehabilitate septic systems and flood control measures - $249 M
- Economic development in the Catskills - $60 M
- New regulations on the use of water

Saving of 83.5%!!!!!!
FONAG
Quito, Ecuador

Threats:
- deforestation
- waste water
- agriculture
- urbanization
- oil industry

Anticipated Activities:
- Land acquisition and ecological easements
- Reforestation and erosion control
- Environmental education
- Community development
FONAG - Quito, Ecuador

Water Users/Water Company → FUND $ → Watershed Conservation Projects

Additional External Resources → Natural Resources and Protected Areas Management Plan
New South Wales, Australia

 Threat
- Increased Salinisation

 Activities
- Irrigation Farmers - purchase transpiration credits
- Forest service - Reforestation project

 Causes
- Land clearing
- Decreased transpiration
- Rising water table

 Next Steps
- Government establish forest cover targets
- Users purchase transpiration units from landowners
Lago Yajoa, Honduras

Protection of Water Source

Easements by Private Landowners

Actions
• Reforestation
• Best Farming Practices
• Non-Use

Incentives
• Direct Payments
• Indirect
• Technical Assistance

User Fee in Surrounding Communities
Costa Rica

Payment for environmental services provided by forests: carbon sequestration, water production and protection of biodiversity

- **Payment per hectar per year (1997):**
  - Planting - $492
  - Forest management - $329
  - Forest protection - $49
User Association
Valle Cauca, Colombia

- Reforestation
- Erosion Control
- Land Purchases
- Protection Agreements for Riparian Areas
- Upland Economic Development

Regional Environmental Authority
Watershed Management Plan

Board of Directors
Watershed Investment

General Assembly of Users
Sugar, Rice and Soy Growers
Perrier-Vitel, France

 Goals

- Ensure high quality product
- Keep production costs low by not building filtration plants

 Threats

- Nutrient Runoff
- Pesticides

 Activities

- Reforesting infiltration zones
- Finance farmers to build modern facilities
- Finance farmers to switch to organic farming
On-Going Water Value Locations

✔ Brazil - Parana State
✔ Bolivia - Rio Bermejo; Tarija
✔ Colombia - Chingaza; Valle de Cauca
✔ Costa Rica
✔ Ecuador - Quito
✔ France
✔ Guatemala - Cerro San Gil; Pasabien
✔ Honduras - Lago Yajoa
✔ Mexico - Chiapas; Vera Cruz
✔ United States
Review of Key Messages

- **Water is an economic good**
- **Human activities that use water should also guarantee the protection of the source**
- **Water sources are usually in natural areas, whose conservation needs incentives and financing mechanisms for the long term**
- **Sustainable long term protection and conservation requires the participation of the users and beneficiaries**
Water Valuation Methodology

Conservation Plan
Activities
Financing

Audiences

Users/Beneficiaries