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
- Aquatic Productivity
- Water Quality Costs
  - Sedimentation
  - Salinisation
  - Contamination

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 you 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 — New York City
  - User fees — Quito, Ecuador
  - Taxes
- Trading — New South Wales, Aus.
  - Credits — Lake Yajoa, Honduras
  - Mitigation — Costa Rica
  - Easements
- Voluntary payments — Valle Cauca, Colombia; Perrier-Vittel, France

New York City
January 1997

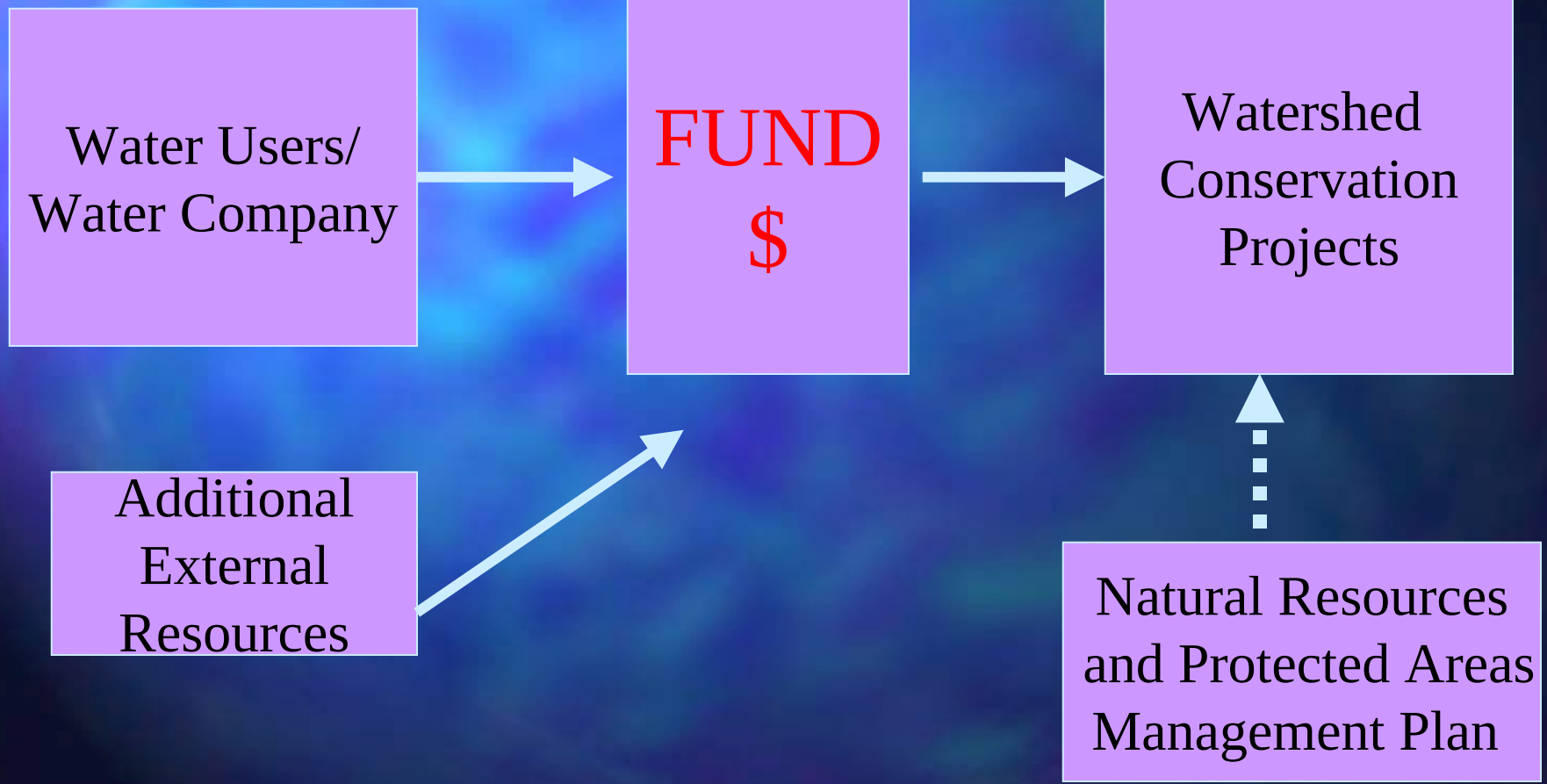
- To avoid the construction of a wastewater treatment plant required by the U.S.EPA at a cost of $4 billion, NYC invested $660 million:
  - Buy lands and create environmental - $300 M
  - Rehabilitate septic systems and flood control measures - $249 M
  - Economic development in the Catskills - $60 M
  - 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
  - Communicty development

FONAG - Quito, Ecuador



New South Wales, Australia

- Threat
  - Increased Salinisation
- Causes
  - Land clearing
  - Decreased transpiration
  - Rising water table
- Activities
  - Irrigation Farmers - purchase transpiration credits
  - Forest service - Reforestation project
- 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 hector 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

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