Forest Ecosystem Services for Capturing Values for Urban and Rural Communities Jan Cassin, Water Initiative Director **Forest Trends** Swedish Water House Seminar May 4, 2015

Outline

- 1. Brief introduction to Forest Trends
- Global water crisis & natural infrastructure (forests)
- Forests for watershed services: state of practice and examples
- Major challenges in capturing the value of forests for water



Forest Trends: *Catalyzing markets and policies to drive investments in the natural infrastructure of the planet*

New & Transparent Information

Reports, News, Measurement, Accounting

Dialogues & Partnerships

Multi-stakeholder Convenings & Capacity Building

Ecosystem Marketplace

Forest Trade & Finance

Public Private Co-Finance

Marine Ecosystem Services

Water Initiative

Communities & Markets

Biodiversity/Business & Biodiversity Offsets Program



Practical & Scalable Applications

Tools, Transactions, Key Geographies, Policies

INVESTING IN WATERSHED SERVICES

Scaling up investments in the natural infrastructure of healthy watersheds, ensuring sufficient clean water for people and nature.



- **Projects**, models for best practice
- Building knowledge and capacity
- Community of practice engaging key leaders in the water sector



A global water crisis

The story is becoming all too familiar.....

- Lack of access to water & sanitation
- Growing scarcity & conflict
- Nexus: water-food-energy
- Climate change
 - Droughts in California & Brazil
 - Devastating storms & flooding – NYC, Philippines
- Loss of aquatic ecosystems & their services



Forests and Water:

- capture moisture (interception),
- regulate runoff and infiltration (throughfall, stemflow, ET, soil structure),
- stabilize sediments/reduce erosion,
- retain nutrients,
- affect yields (annual, seasonal) & aquifer recharge rates



Seattle's Cedar River Municipal Watershed – est. 1889



Forests & Water Treatment Costs

% Forest Cover (selected US watersheds)	Treatment Cost per 3,785 m ³	Increase Compared to 60% Forest Cover
60	\$37	-
50	\$46	24%
40	\$58	57%
30	\$73	97%
20	\$93	151%
10	\$115	211%

Source: Postel 2005

Benefits to Cities from Watershed Protection

Selected US Cities	Avoided Costs
New York City	\$1.5 billion on watershed protection for 10 years; avoided \$6 billion capital costs, \$300 million annual operating costs
Boston, MA	\$180 million total (incl. flood damages)
Seattle, WA	\$150-\$200 million
Portland, OR	\$920,000 spent each year to protect watershed, avoided \$200 million capital cost
Portland, ME	\$729,000 spent annually to protection watershed, avoided \$25 million capital & \$729,000 operating costs
Syracuse, NY	\$10 million watershed plan avoiding \$45-\$60 million capital costs
Auburn, ME	\$45 million to acquire watershed land, avoided \$30 million capital & \$750,000 annual operating costs

Source: Postel 2005





Gaining Depth: State of Watershed Investments 2014 (Forest Trends)

Bolivia – Reciprocal Watershed Agreements

- Small watersheds
- Small, close knit communities
- Local knowledge of forests & water
- Communities negotiate agreements
- Water user tariffs pay for bee boxes, fencing
- Communal management, trust, relationships





Natural infrastructure for Lima's water

- Why should Lima invest in natural infrastructure?
- How do water utilities decide what to invest in?
- How can water regulators justify natural infrastructure investments?





Lima, the second-largest desert city in the world, experiences a dry season deficit of over 40 million m³ of water each year.







Average Water Supply and Demand, Rimac River Basin. Source: Peru Ministry of Agriculture (2010)

Cost and performance (baseflow augmentation) of green options......green options can address the deficit



...At costs that are competitive with those of gray infrastructure



Sources: Forest Trends analysis Gray infrastructure costs: Nippon Koei (2011).

Lima – Decision Frameworks for IWS

Evidence-based, economic rationale for green infrastructure

- 121 million USD for green infrastructure projects approved
- Funded by 5% of water tariff
- Aquafondo, Lima water fund portfolio of projects submitted for approval
- Greater water security for Lima residents at lower cost
- Livelihoods for farmers and communities in the upper watershed

San Martin, Peru – Capturing the Multiple Values of Forests

- Deforestation driven by migrants – coffee smallholders
- High rates poverty
- Sediment impacts hydroelectric facility
- Damaging floods
- Impacts to drinking water



Traditional IWS

Electro Oriente pays upstream farmers to manage sediment:

- Forest protection
- Reforestation
- Planting buffers

NOT sufficient to address forest loss & threats to water





What benefits, who benefits, & how important are the benefits?

Beneficiaries	SUB - CATEGORÍA	FUNCIONES Y SERVICIOS DE LOS ECOSISTEMAS						AS
		FUNCIÓN DE REGULACIÓN						
		Air Quality	Climate Regulation	Flow Regulation	Flood Mitigation	Soil Health	Nutrient Management	Poll
	Junta Usuarios (Regantes)							
	Arroceros Cafetaleros							
Agricultores	Cacaoteros							
U	Ganaderos							
	Acuicultores							
	Palmicultores							
	Comercio de Productos del							
	Bosque					_		
	Orquidearios							
	Empresas Embotelladoras de							
Comercial	Agua							
Industrial	Chocolaterías							
	Plantas de Procesamiento de							
	Cacao Empresas Constructoras							
Comunidad	Poblaciones Urbanas							
Comunicaci	Poblaciones Orbanas							
	Comunidadas Nativas							
	Emprosas Prostadoras do Aqua					_		
	Empresas de Transporte							
Transporte	Pluvial							
	Empresas de Transporte							
	Terrestre							

Multiple Benefits: Transition to Climate Smart Coffee, San Martin Peru



Ranking of ES value by LULC with ha under each LULC before and after transition

Corporate buyer – Water tariff Water Benefit Certificate Water fund Water footprint Sustainable Beef (agriculture, beverage, **Sustainable Soy** mining, energy) Sustainable Cotton Reduced erosion & Biodiversity sedimentation Clean water for downstream **Reduced GHG** emissions (avoided users deforestation, soil Reduced flooding carbon) **Imp**act downstream investors Soil Health Aquifer recharge **Sustainable Sustainable Coffee** Green Cacao Bond Infrastructure Corporate buyer – Investment National / voluntary carbon regional \$\$; Strategies offset REDD+ Corporate – Cost curves: sustainable supply cost/benefit) Green infrastructure chain investment priorities

Communicating the Multiple Values of Forests for Water



Ecologists: capture moisture (interception), regulate runoff and infiltration (throughflow, ET, soil structure), stabilize sediments/reduce erosion, nutrient uptake, affect yields (annual, seasonal), aquifer recharge rates

 Hydroelectric company cares about magnitude and reliability of flows, and absence of sediment

 Consumers care about access, absence of pathogens and toxins, lack of odor, clarity, taste

 Farmers care about – predictable supply during growing season, absence of salts, toxins, & excessive sediments, flood damage

Challenges –

- Measuring outcomes
- Linking management to specific outcomes
- Scaling from site to watershed
- Communicating the value of forests for water
- Landscape planning
- Linking to WASH



What can Swedish forestry contribute?

Thank you! jcassin@forest-trends.org