21 March
International Day of Forests

Forest and water links

From service to benefit sharing

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UNECE & FAO, Palais des Nations, Geneva

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Increasing international momentum

- 2015 - COP 21, Paris > **Mitigation vs Adaptation**
- 2015 - Encyclical letter - Laudato si' - On Care For Our Common Home
- 2007 - Warsaw Resolution 2 on Forests and Water > **water as part of SFM**
- 2002 - Shiga Declaration on Forests and Water > **holistic approach to SFM**
- 1996 – Helsinki, Water Convention, UNECE (40 + EU) > Transboundary Watercourses

Problems

Some consequences of increasing population and resource consumption

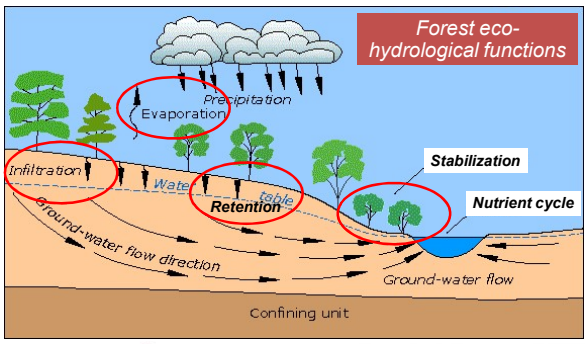
- **Water scarcity:** 2/3 of global population will be affected by 2025 (Vorosmarty et al., 2000)
- **Groundwater depletion:** consumption is 3.5 times the recharging capacity (Gleeson, 2012)
- **Water Pollution:** 38% of water bodies in EU (EC, 2012)
- **Increase of flooding:** climate change will double river flood probability (Dankers and Feyen, 2008)

Example of costs

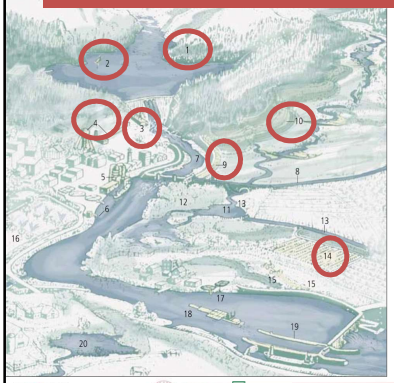
- **Drought in 2003 cost the EU economy €8.7 billion** (Economic and Science Policy, European Parliament, Brussels, 2008)
- Water shortages will cost **taxpayers** an estimated $1.6 billion per year in California. (World Economic Forum. 2011)
- Murray River commercial fisheries experienced large losses in certain species such as flounder, which **declined in economic value by 91%**. (Strengthening Irrigation Communities, Synthesis Report Stage 1: here Are W We At Now?)

www.conservationgateway.org

How can forests help?



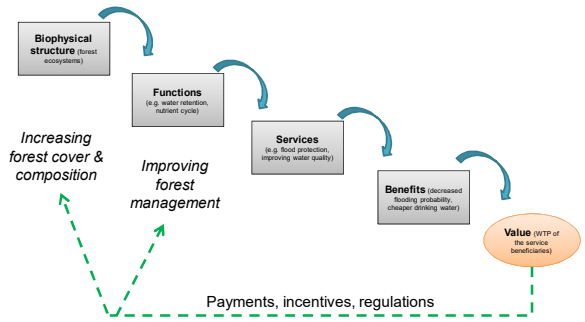
Water-related services (some examples)



1. **Forest sedimentation control**
2. **Recreation, swimming, fishing, camping and water storage**
3. **Hydroelectric station**
4. **Municipal water supply**
5. City and industrial waste treatment plant
6. Pump to equalizing reservoir for irrigation
7. Diversion dam and lake
8. High-level irrigation canal
9. **Flood control**
10. **Erosion control:** stream drams, contour terracing and wetland restoration
11. Regulating basin for irrigation
12. Wildlife refugee
13. Low level irrigation canal
14. **Agriculture irrigation**
15. Contour ploughing
16. Sprinkler irrigation
17. Community Water Treatment Plan
18. Navigation: barge, trains, locks
19. Re-regulating reservoir with locks
20. Farm pond with pisciculture

Source: Smith *et al.*, 2006

Correct terminology: CASCADE model



Source: modified by Haines-Young and Potschin, 2010

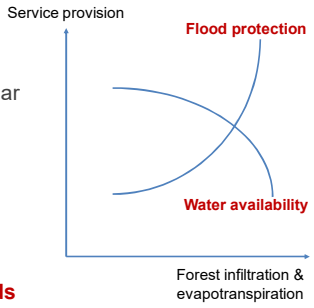
Hydrological services

- The benefits to people produced by terrestrial ecosystem effects on freshwater
- Four broad categories:
  - water-associated supporting services (supporting).
  - improvement of extractive or in-stream water supply (provisioning).
  - water damage mitigation (regulating).
  - water related cultural services (cultural).
- **Defined by attributes** of quantity, quality, location, and timing of flow.

Source: Brauman et al., 2007

Trade offs between hydrological ES

- Different eco-hydrologic processes may have competing effects on the same attribute of a particular service
- Ex. Exotic monoculture plantations lead to groundwater depletion in Chile, South Africa, etc.
- **Forest water related services are human needs and site specific**



Source: Brauman et al., 2007

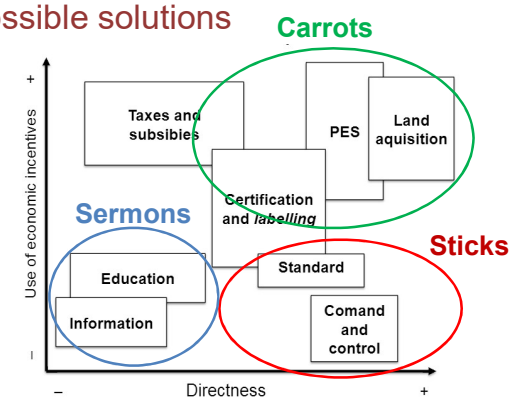
SFM maximize trade-offs

- A way to maximize multiple forest water services and regulate trade-offs
- Human needs and climate change faster than forest cycles > **adaptive SFM**
- Moving towards the concept of "**Forest as green infrastructure**" to provide specific services with desired attributes
- Need to increase **dialogue between water and forest related institutions** (Local water works/utilities, are still mostly based on grey infrastructure approaches)

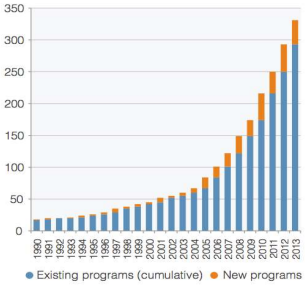
Critical operational aspects

- Water services are not always a deterministic condition of a good SFM > **uncertainty and risks?**
- Measurement/monitoring of hydrological services
- Economic evaluation approaches
- **Mechanisms for economic compensation to service providers**
- Stakeholder participation, cultural values..

Possible solutions



Growing interest in market based mechanisms for hydrological services

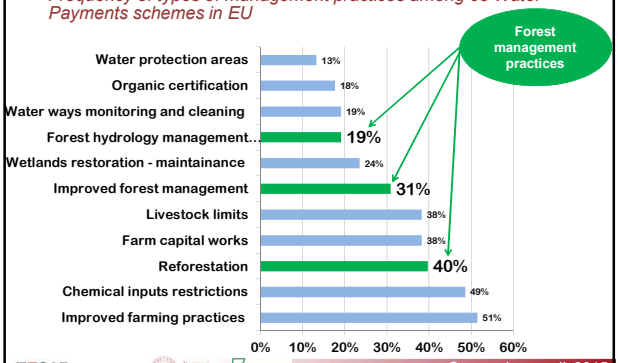


- **> 450 programmes in 2014**

www.ecosystemarketplace.org

Payments for?

Frequency of types of management practices among 68 Water Payments schemes in EU

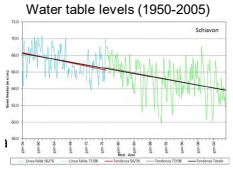


Source: Leonardi, 2015.

Example: Forest Infiltration Areas (1/2)

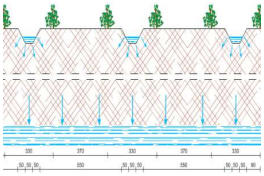
- Veneto Region, lowland area, 5M inhabitants
- Increasing agriculture and industry water abstraction
- Increased climate change effects on water table levels
- New regional project doubling groundwater abstraction from the site

Water table levels (1950-2005)



Example: Forest Infiltration Areas (2/2)

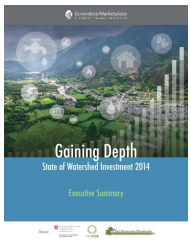
- 8 sites covering 15 ha (need to reach 100 ha to compensate groundwater abstraction)
- Water works collaborated with Regional Forest Service to find out solutions
- Mixed compensation mechanism, using CAP, public & private funds
- Current scale up of the project but **monitoring is uncertain under climate change**



ECOSTAR Alliance surveys & reports

Co-funded by the Erasmus+ Programme of the European Union

- **ECOSTAR** - European Research and Enterprise Alliance on Marketing and Economics of Ecosystems and Biodiversity
- University of Padova (Italy) + 8 partners (Romania, UK, Spain & USA)
- Global and EU reports on Payments for Watershed Services



www.ecostar-alliance.com

Conclusions

- Water related co-benefits are site and human specific > **need for local research, monitoring and evaluation**
- Traditional top-down regulations (sticks) need to be backed-up by market incentives (carrots)
- Payment schemes may help **local partnership for forest-water win-win solutions**, involving both type of institutions.
- **Accepting a degree of uncertainty** on water service provision (holistic SFM is not deterministic)
- **Strong need to spread best practices**

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Conclusions

'We share the housework. I make the mess and she clears it up'

www.dailymail.co.uk

Sharing benefits, duties and risks!

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Thank you!

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