Plan for the Presentation

• Brief Introduction to NAIAD
• Addressing the Key questions posed:
  • Q1. How can we operationalize the insurance value of ecosystems to reduce flood and drought risks under climate change?
  • Q2. What kinds of tools, financial instruments, business models are available / needed?
  • Q3. Are there examples of EbA-relevant natural assurance schemes from transboundary basins (or individual countries)?
1. The Project and the Consortium
**Project title:** NAture Insurance value: Assessment and Demonstration  

**Instrument:** Research and Innovation Action  

**EC contribution:** EUR 5,081,176.25 €  

**Start and End dates:** 01/12/16 – 30/04/20  

**Project Coordinator:** Confederacion Hidrografica del Duero  

Q1. How can we operationalize the insurance value of ecosystems to reduce flood and drought risks under climate change?
Q1. Operationalization of the insurance value of ecosystems

Step 1: Defining The Insurance Value of Ecosystems

- **Definition:** “insurance value of ecosystems, i.e. the value of the sustained capacity of ecosystems to maintain their functioning and production of benefits despite any disturbance”

- The insurance value of an ecosystem results from the system itself having the capacity to cope with external disturbances and includes
  - A) an **estimate of the risk reduction** due to the **physical presence** of an ecosystem (e.g. area of upstream land/number of downstream properties protected)
  - B) the **capacity to sustain risk reduction** (i.e. the **resilience of the system**).

(SOURCE: EC, 2015)
Q1. Operationalization of the insurance value of ecosystems

Step 2: **Conceptual** and methodological frame for the **Insurance Assurance Value of Ecosystems**

**Conceptual**
- IVE Survey (56 interviews)

The **Assurance Value of Ecosystems** - Natural Assurance Schemes

The **Insurance Value of Ecosystems** – new forms of Insurance
Q1. Operationalization of the insurance value of ecosystems

Step 3: Conceptual and **methodological frame** for the Insurance Value of Ecosystems

Methodological Frame
Q1. Operationalization of the insurance value of ecosystems

Step 4: Insurance Value of Ecosystems

• Example: working with financial institutions and insurance companies to develop innovative ways for promoting nature-based solutions for risk management

• Role of Insurance: insurance companies as key potential investors given the (insurance) value of ecosystems in relation to other investments and their function, for example, in mitigating risks to human health and real estate.
  
  • A) MODELS AND DATA: a framework where the models and data (including downscaled climate change scenarios) capturing the capacity of ecosystems to reduce risks are made compatible and harmonised with the risk assessment models and data used by the private insurance sector.
  
  • B) ECONOMIC VALUE: to develop an economic approach to understanding ecosystems as representing the stock that generates the flow of services and explore how to capture the long-term benefits of maintaining and enhancing that stock.
  
  • E) CULTURE AND SOCIAL RISK PERCEPTION: to explore the cultural dimension of the insurance value of ecosystems and people’s perceptions of risks and insurance.
  
  • C) INVESTMENT: to translate risk reduction capacity into value through calculating benefit/investment ratios in landscape management and restoration. Here, the benefits would represent the reduced risk and potential lower premiums of land and property insurance policies.
  
  • D) LAW: INCENTIVES: A new legal framework that serves to create incentives for maintaining or enhancing the insurance capacity of ecosystems should be explored.

(SOURCE: EC, 2015)
Q1. Operationalization of the insurance value of ecosystems

Step 4: Insurance Value of Ecosystems

- GENERAL FRAMEWORK FOR ECONOMIC ANALYSIS

Rely on a cost-benefit analysis that is integrated into multi-criteria analysis. No general criteria for the MCA => in the demos

Cost-Benefit typology
- Implementation / LCC Cost
- Opportunity costs
- Avoided damages (benefits)
- Co-benefits

Towards an integrated assessment framework for co-benefits
Q2. What kinds of tools, financial instruments, business models are available / needed?
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**TOOLS Eco Actuary (**E$A**) on a slide**

- Detailed phenomenological and process model, coupling elements of WaterWorld and Co$tingNature PSS
- + new Valuation interface for connection to others' valuation data
- **Spatial**, local to global (1ha, 1km or 10km spatial resolution)
- All required **data supplied globally, from EO and OSM**
- **Fast** (full analysis in 20-60 minutes)
- **Simple to use** (web-based, firefox or chrome, no GIS reqd)
- **Uncertainty** and validation tools
- Sophisticated land use and management **scenarios**
- **Interventions** for DRR through **mitigation and adaptation**
- Results **downloadable** in GIS formats
- **Training** materials
Q2. What kinds of tools, business models, financial instruments, are available / needed?

**BUSINESS MODELS**

Natural Assurance Scheme Business Canvas

<table>
<thead>
<tr>
<th>SUPPLY</th>
<th>1.FLOW OF ES SERVICES</th>
<th>DEMAND</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Service</td>
<td>Secondary Services</td>
<td>1. A. PROBLEM TO BE ADDRESSED</td>
</tr>
<tr>
<td>Reduction of impacts from droughts</td>
<td>Improvement of wetlands and aquatic ecosystems, increased biodiversity, attraction of rural tourism, maintenance of work in agriculture, fixation of rural population</td>
<td>Impacts of drought</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1.B VALUE PROPOSITION</th>
<th>4. CUSTOMER SEGMENTS</th>
<th>4C. Extended Beneficiaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Managed aquifer recharge (MAR). Increase of water table and groundwater storage providing more water to increase resilience against droughts for stakeholders. Avoided cost: annual rent of a farmer – value of crop loss.</td>
<td>Farmers, CHD</td>
<td>Insurance sector</td>
</tr>
<tr>
<td>Farmers</td>
<td>Citizens from local municipalities</td>
<td>Tourists</td>
</tr>
<tr>
<td>Farmers</td>
<td>Users</td>
<td>Government</td>
</tr>
<tr>
<td>Ecosystems</td>
<td>Fauna and flora</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1C. Primary Value</th>
<th>10. Secondary Value</th>
<th>4. CHANNLES</th>
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</thead>
<tbody>
<tr>
<td>Reduction of drought impacts on agricultural production and water supply</td>
<td>Improvement of aquatic ecosystems, recovery of lagoons, enhancement of bird biodiversity, maintenance of agricultural jobs, population fixation, carbon fixation</td>
<td>BOE Notifications</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>9. Key resources</th>
<th>5. Who implements</th>
<th>6. IMPACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Funds, knowledge, people and capacity, political support, information, environmental approval (EIA)</td>
<td>CHD</td>
<td>Level of Service</td>
</tr>
<tr>
<td>Additional water availability as compared to previous situation</td>
<td></td>
<td></td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>8. COST STRUCTURE</th>
<th>7. REVENUE STREAMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opportunity costs of implementing the NBS</td>
<td>Funding coming from:</td>
</tr>
<tr>
<td>This money is not invested in dams, or other infrastructure</td>
<td>- Tariffs:</td>
</tr>
<tr>
<td>- Opportunity costs:</td>
<td></td>
</tr>
<tr>
<td>450,000 + 56000 (Life project, works + labour)</td>
<td>- Taxes: tax paid to CHD by users, pre-agreed with users, ex-post</td>
</tr>
<tr>
<td>450,000 + 56000 (Life project, works + labour)</td>
<td>- Transfers: national budget, LIFE Project, ex ante.</td>
</tr>
</tbody>
</table>
Q2. What kinds of tools, business models, financial instruments, are available / needed?

**FINANCIAL INSTRUMENTS**

**Results-Based Financing (RBF)** is a tool to give money to social programs that work. In a Results-Based Financing model, a “payer” (a foundation, international donor, or government) conditions its payment to a service provider (an NGO or private company) on desired outcomes (see chart below). Thus, Results-Based Financing allows social programs to focus on achieving real impact rather than following a set of rules. (source: InstiGlo)
Q2. What kinds of tools, business models, financial instruments, are available / needed?

FINANCIAL INSTRUMENTS and FRAMEWORKS

Lopez Gunn, Mayor, Nanu et al, 2019
Q3. Are there examples of EbA-relevant natural assurance schemes from transboundary basins (or individual countries)?
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4 OUT OF 9 demos EbA-relevant natural assurance schemes are in transboundary basins.
Replicate DEMO (scale-local)
Pedro Zorrilla Stadium, Valladolid (Spain)
DEMOS scale- transboundary?

Lower Danube (Romania)

Not all interventions can be modelled: sometimes measurement or spatial analogue is better.

- **NAIAD** has worked with the FreeStation.org technologies to develop internet of things (IoT) river level and NBS storage monitoring device and connect these to the Eco:Actuary.

- This can measure the **real-time contribution of NBS** to flood mitigation to directly **measure** of their efficacy.

- It can also measure river height in real time as a flood alert tool (connecting to Eco:Actuary, SMS and Twitter feeds) and model-training data.

Tools: Use of FreeStations and EcoActuary

This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 730497.
DEMO scale- transboundary? Medina del Campo Aquifer (Spain)
Nature Based strategy = stacking aggregated benefits of Managed Aquifer Recharge; Soil Conservation, Crop Change, Reforestation, flood plain restoration, etc. (transition of system)

https://youtu.be/IHMXg722ZJ0
CONCLUSIONS
1. Role of the Assurance Value of Ecosystems and the Insurance Value of Ecosystems
2. Development of tools and methods (value)
3. Viable business models and Finance
4. Proof of concept examples/Evidence (walk the Talk)
Dr Elena López-Gunn
NAIAD Scientific Coordinator,
Director ICATALIST, Spain
Email: elopezgunn@icatalist.eu