NAIAD

A Financing Framework for Water Security

Deltares

Enabling Delta Life

Cancun, June 2nd, 2017

XVI World Water Congres

Mónica A. Altamirano

Specialist in Public-Private Partnerships

Contents

- Financing water security: research questions
- The Financing Framework
- Preliminary findings:
  - Common resources: Payments for Watershed Services , Water Funds and Water Stewardship for Watershed Conservation – work under NAIAD
  - Public and club goods: Public Private Partnerships for Resilience against floods
- Q&A/ Discussion

Financing Water Security

8 juli 2017

A changing development finance landscape

- Water Security– traditionally a public task
- Financing for Development – Addis Ababa (2015)
- “From Billions to Trillions: transforming development Finance” (WB & IMF 2015) - Blended Finance approach
- New Sustainable Development Agenda (2016)
- COP21:
  - Need for PPP
  - Balanced investments in Adaptation versus mitigation
- All in all: **new financing arrangements** required
- Key question: how to structure bankable Water Projects?

Research questions

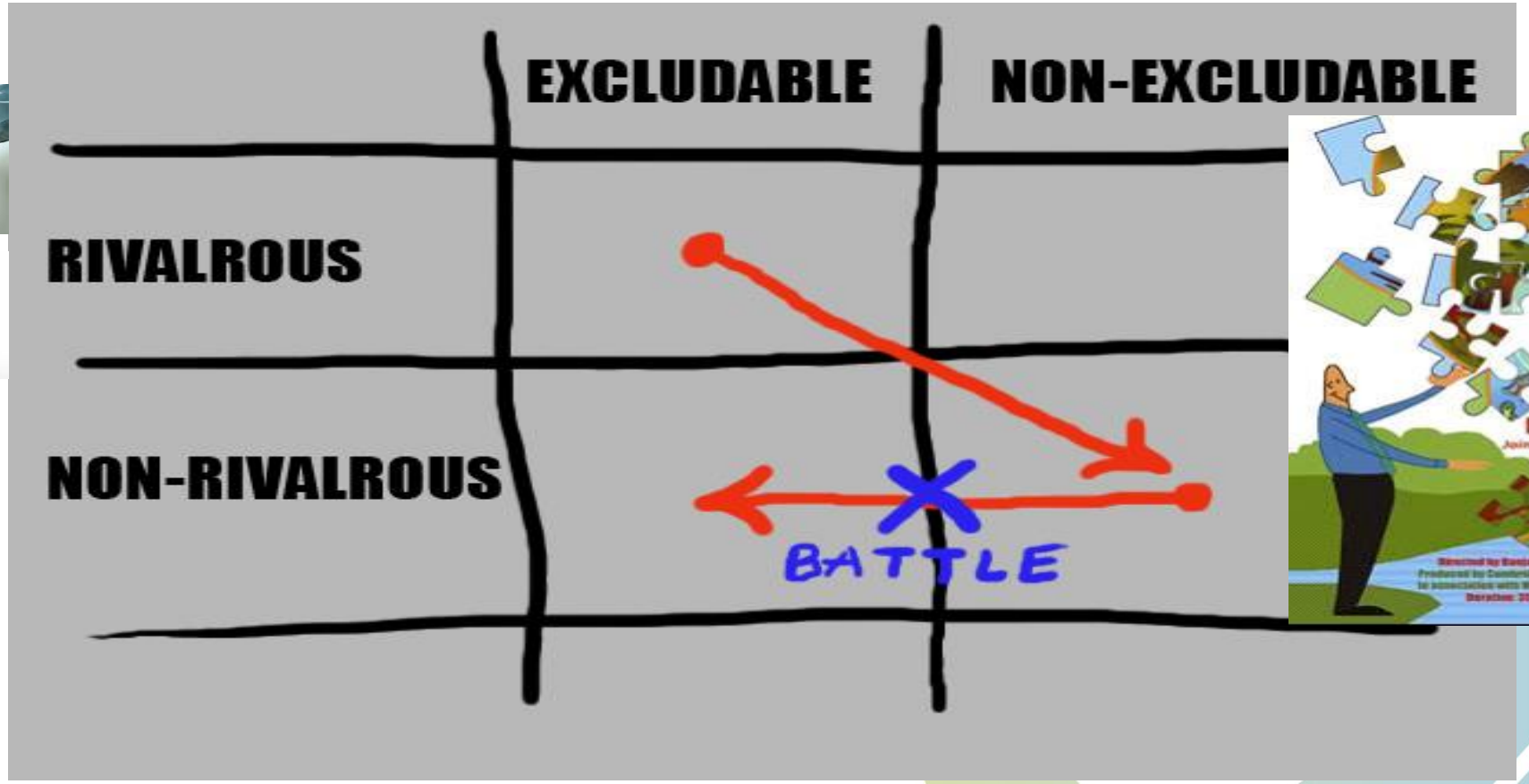
- How to align the incentives P-P-P stakeholders?
  - → work together towards implementation →
  - keep motivated use strengths →
  - ensure sustainable provision of the services introduced
  - acceptable Level of Service
- The role of the government in setting up the institutional and regulatory framework & safeguards
  - Incentivize companies to engage in “beyond the fence” actions
- How to set up and give shape to the new types of partnerships – SDG Goal 17: P4 or People’s first PPP

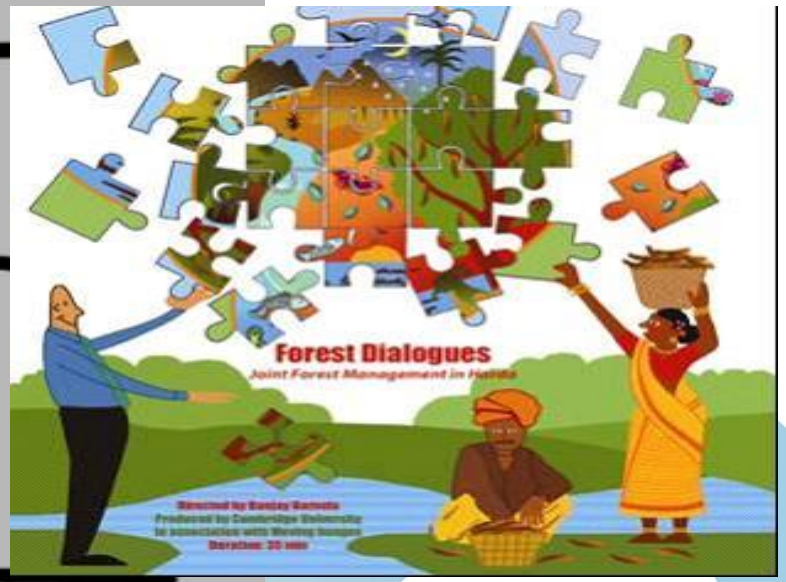
•A successful sustainable development agenda requires partnerships between governments, the private sector and civil society. These inclusive partnerships built upon principles and values, a shared vision, and shared goals that place people and the planet at the centre, are needed at the global, regional, national and local level

Reconciling two Scientific and Political Streams

- Public goods versus club goods
- PPP world (top down) versus
- PES, common pool resources (bottom-up)

P3's





CREMA

NAIAD

Research gap

- *However, a transaction cost approach suggests that none of these organizational answers should be discarded ex ante:* ***trade-offs should be analyzed in a comparative way****, with careful examination of the* ***costs of implementing and monitoring*** *these alternative modes of governance. This is a demanding research program, but hardly escapable if we want to go beyond expectations of* ***technological miracles*** *and look at innovative organizational solutions to environmental problems.*

Source*:* Claude Menard. A New Institutional Perspective on Environmental Issues. Environmental Innovation and Societal Transitions, 2011, 1 (1), pp.115-120

Financing Framework for Water Security

8 juli 2017

Financing Framework for Water Security

- The framework would serve as a guideline for local governments to “engineer” an implementation arrangement –
- choosing for a wide range of project delivery and finance options that vary from purely public governance options up to the creation of markets for private initiatives-
- taking into account
  - the transaction (e.g. type of good and project characteristic)
  - the level of service required over time and
  - the institutional setting : stakeholders, strengths of local government, private sector and community and the incentives created by formal and informal institutions
- most effective in ensuring the financial and institutional sustainability of the service being introduced by the solution or measure that is being implemented.

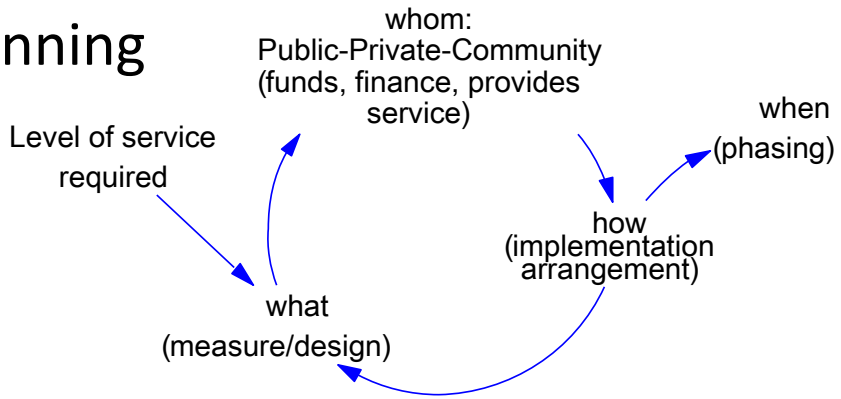
Source: A financing framework for Water Security (Altamirano & Lopez Gunn, forthcoming)

NAIAD

Financing Framework for Water Security

Framework of Analysis

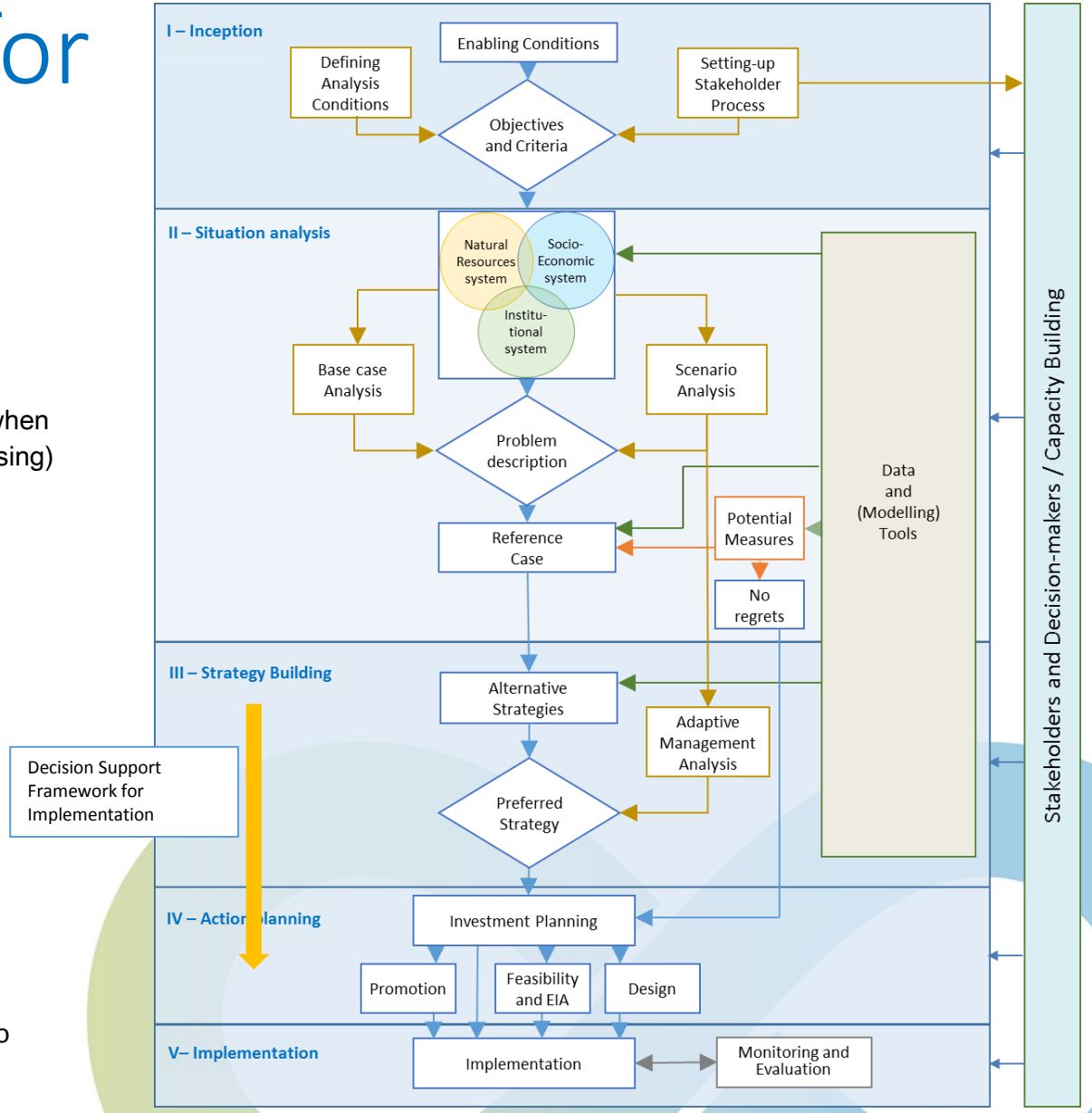
IWRM planning



"implementation" considerations that are key to take into account in design so as to ensure "sustainability" in service provision; avoid the delivery of "white elephants"

"what" and "how" are interlinked; if there are limitations to implement the initial "what" given the a) potential of public, private and communities –"whom"- to fund, finance and provide the service in a sustainable way; → (re) design of measures to ensure frugality

Another alternative to accommodate the constraints on implementation capacity is to phase those measures differently.



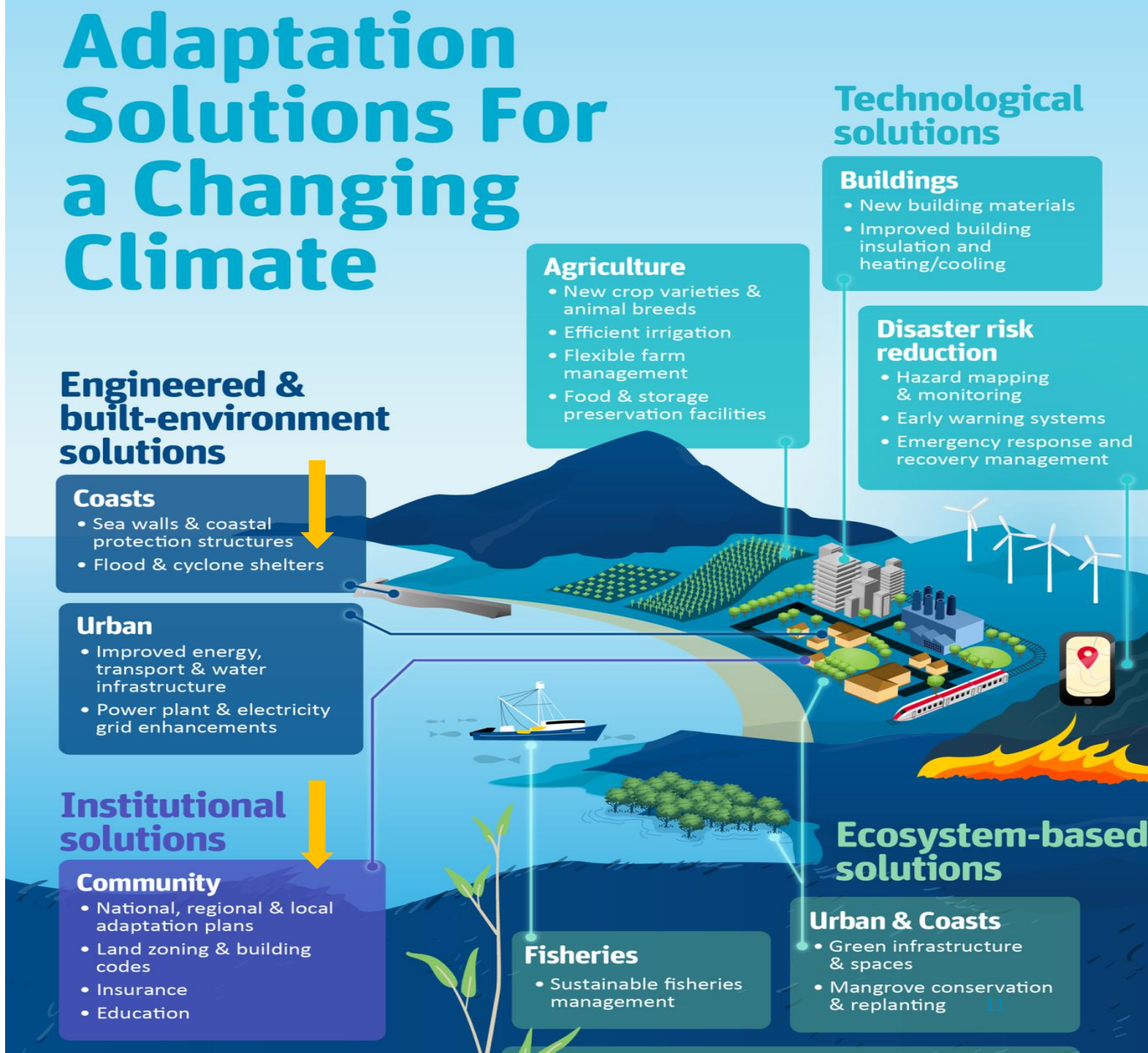
Graph : IWRM Guidelines - the steps (Source: Water Resources Systems Planning and Management: 2017 Edition; van Beek, E. and P. Loucks)

NAIAD

Typology measures

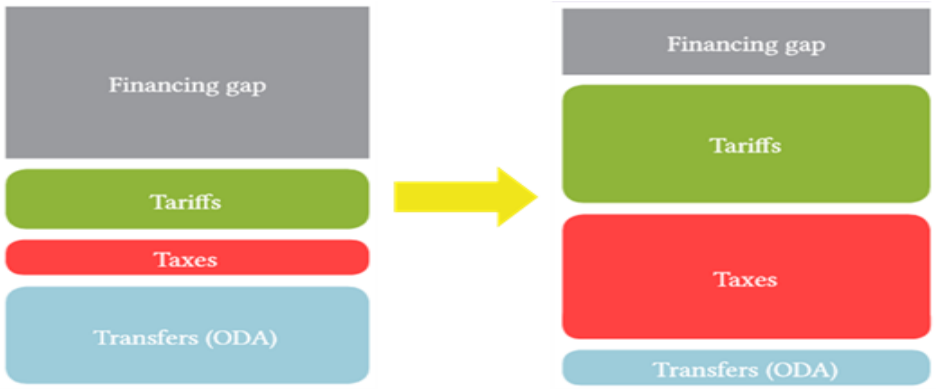
- ❑ Changing behavior
- ❑ Capital Intensive (infrastructure) projects

- ❑ successful implementation of both involves a great institutional and financing challenge



Framework building blocks:

Funding strategies



Type of good (context) = governance mode

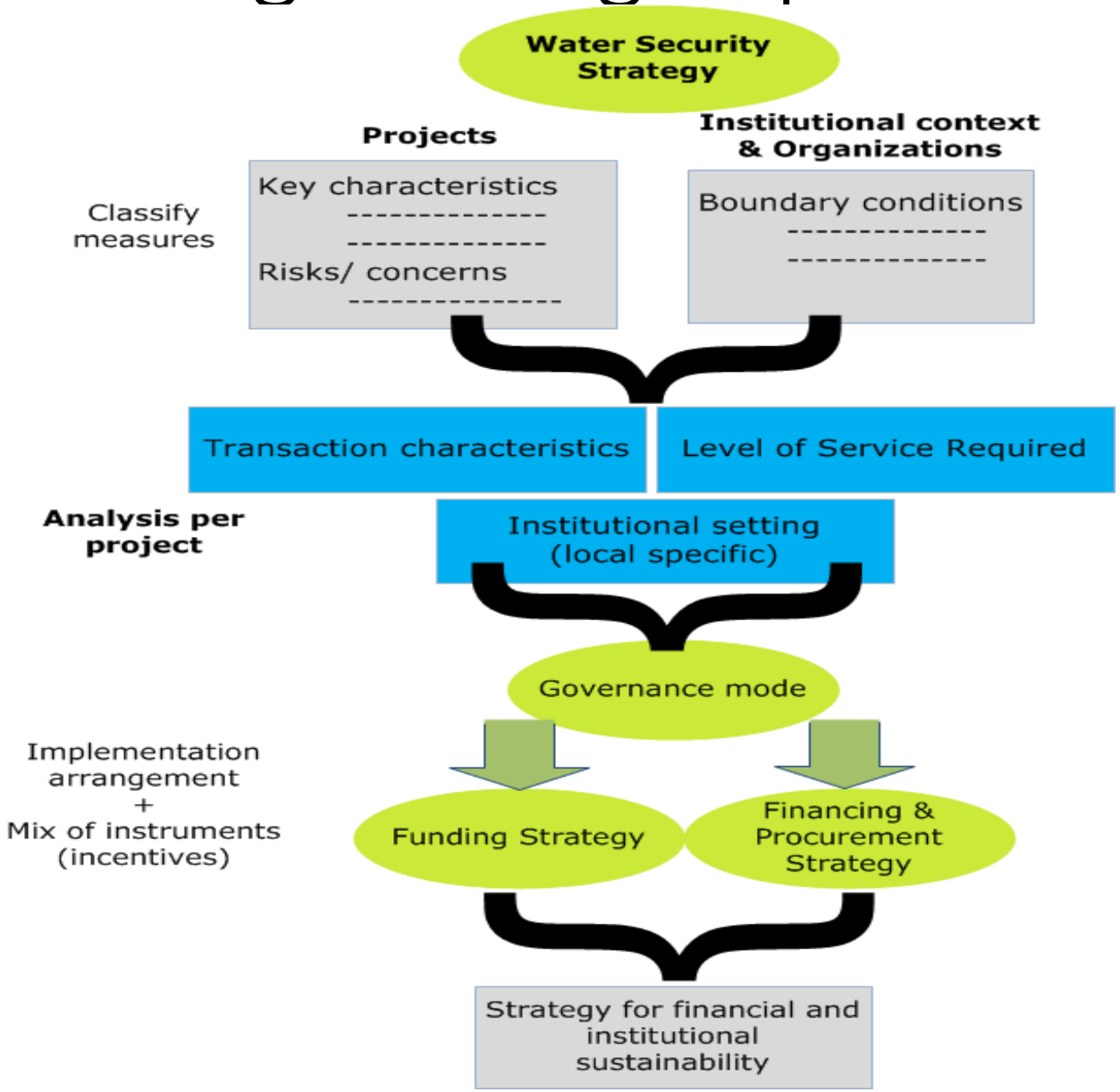
	Excludable	Non-excludable
Rival	**Private Goods** *e.g. ice cream, cheese, houses, cars*	**Common Resources** *e.g. fresh water, fish, timber, pasture*
Non-rival	**Club Goods** *e.g. cable television, cinemas, wifi, tollroads*	**Public Goods** *e.g. fresh air, knowledge, national defense*

Financing mechanisms

- IFI's loans to governments
- Tax swaps
- Institutional investors
- Bonds Financing
- Concessional loans
- Impact investing
- Capital Markets
- Loans: corporate /
- project finance (PPP's)

- Institutional Economics, Engineering Design Theory & System Analysis

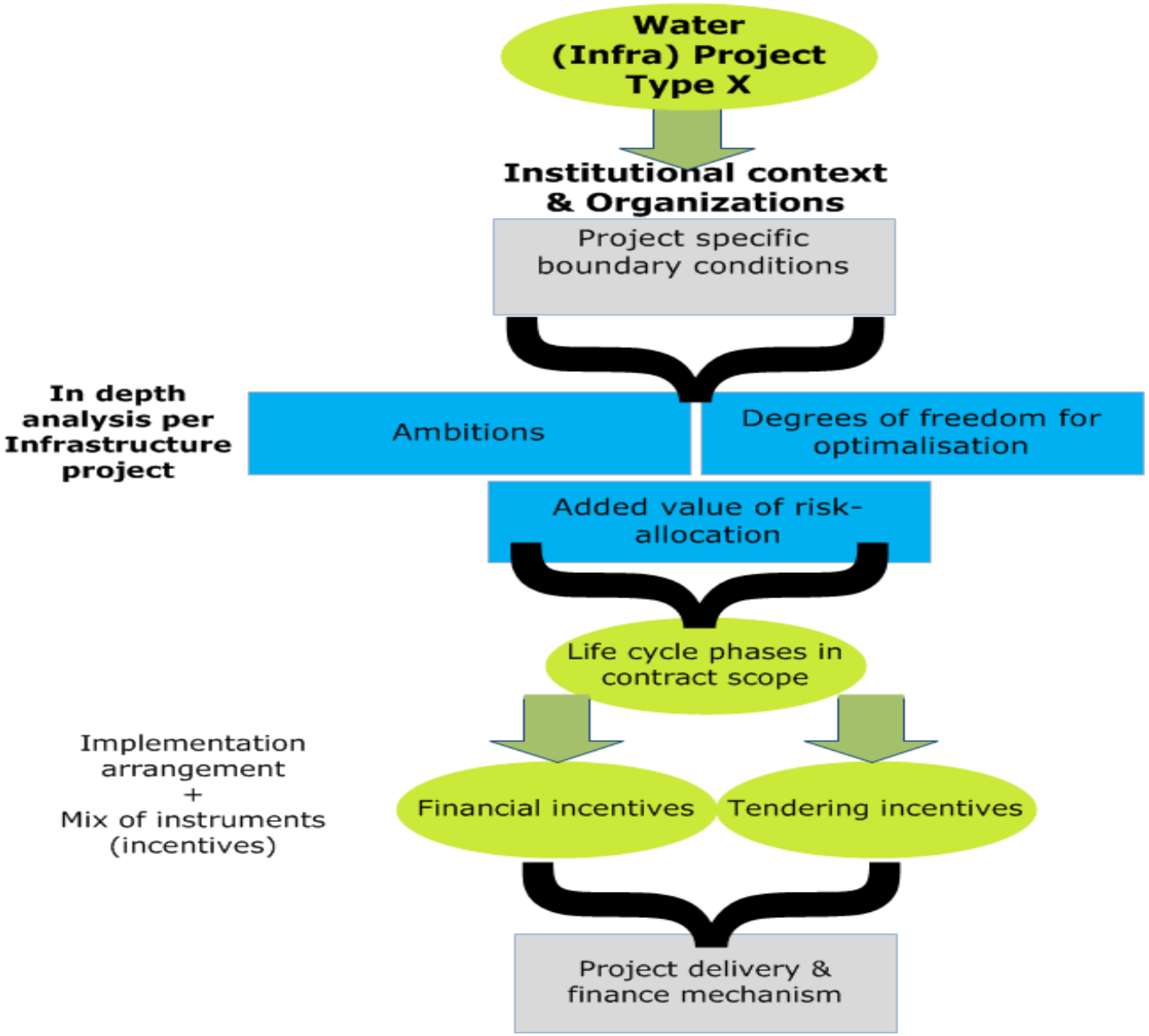
Engineering implementation arrangements



Steps:

1. Analyze the strategy : classify measures: e.g. infrastructure versus institutional strengthening
2. (National) institutional context and boundary conditions. What is possible and what is not.
3. Analysis per project:
    1. Transaction characteristics (type of good, technological characteristics, Life cycle costs, etc.)
    2. Level of service required over time
    3. Institutional setting – at the scale of the project, which incentives are created per institutional layer
4. Choice of : governance mode, funding, financing and procurement strategy – that guarantees financial and institutional sustainability of the service introduced by the measure

Structuring Water Infrastructure Projects (2)



Steps

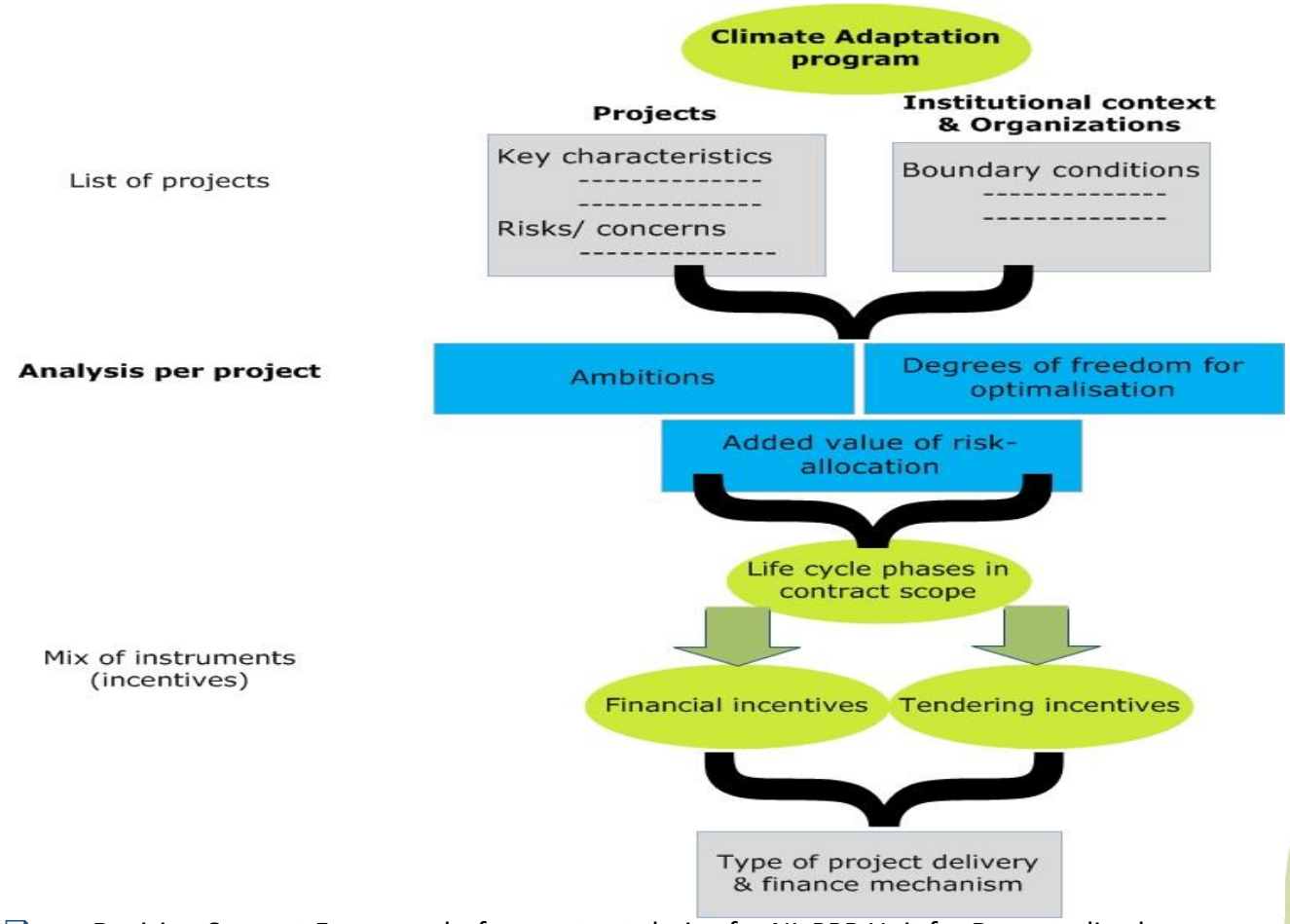
- ❑ Inventory: project characteristics , ambitions and concerns , financial characteristics, risks and constraints
- ❑ Analysis : prioritizing project goals and concerns and weigh relative risks and opportunities , identify degrees of freedom
- ❑ Trade-offs and considerations: what ambitions to integrate tasks and responsibilities in the contract; choice of instruments and determine set of incentives
- ❑ Outcome: project delivery and finance mechanism

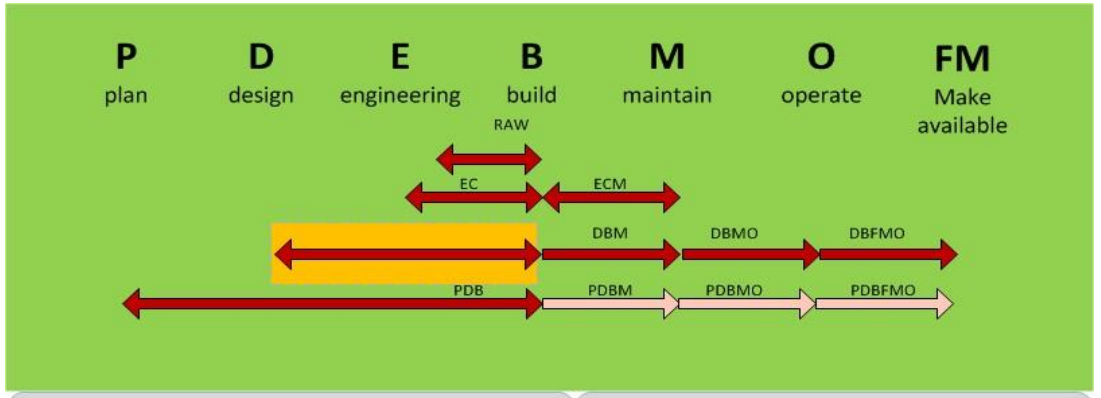
Thank you for your attention

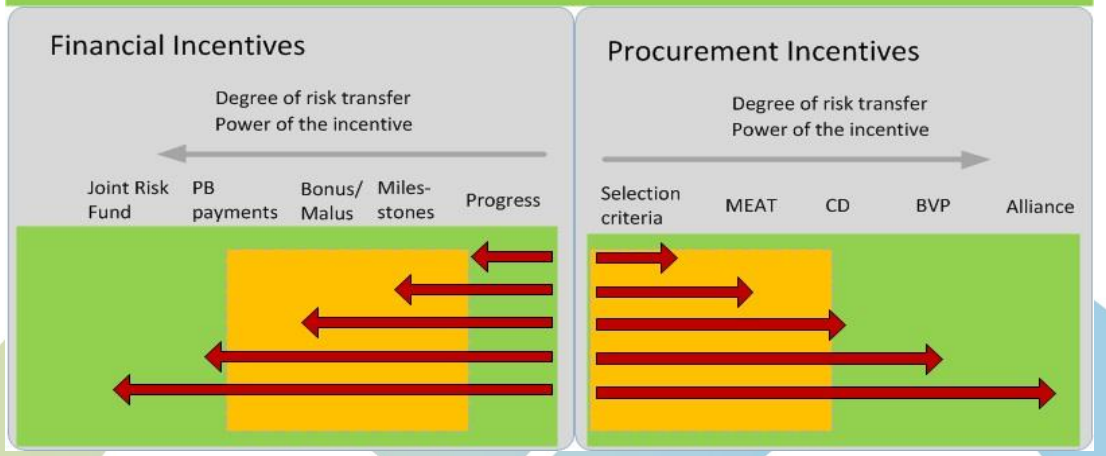
Any questions?

Mónica A. Altamirano, PhD
Specialist in Public-Private Partnerships and Climate Finance
Deltares, Department of Water Resources and Delta Management
Email: monica.altamirano@deltares.nl
Tel: +31 (0) 61 222 86 85

Previous tools developed for the Water Sector







- Decision Support Frameworks for contract choice for NL PPP Unit for Decentralized governments (PPS Support) and Union of Water Boards (UvW) , National Flood Protection Program (HWBP)

https://www.uvw.nl/publicatie/afwegingskader-hwbp/

https://www.pianoo.nl/document/12844/afvalwaterzuiveringsinstallaties-afwegingskader-ge-ntegreerde-contractvormen

Key concepts

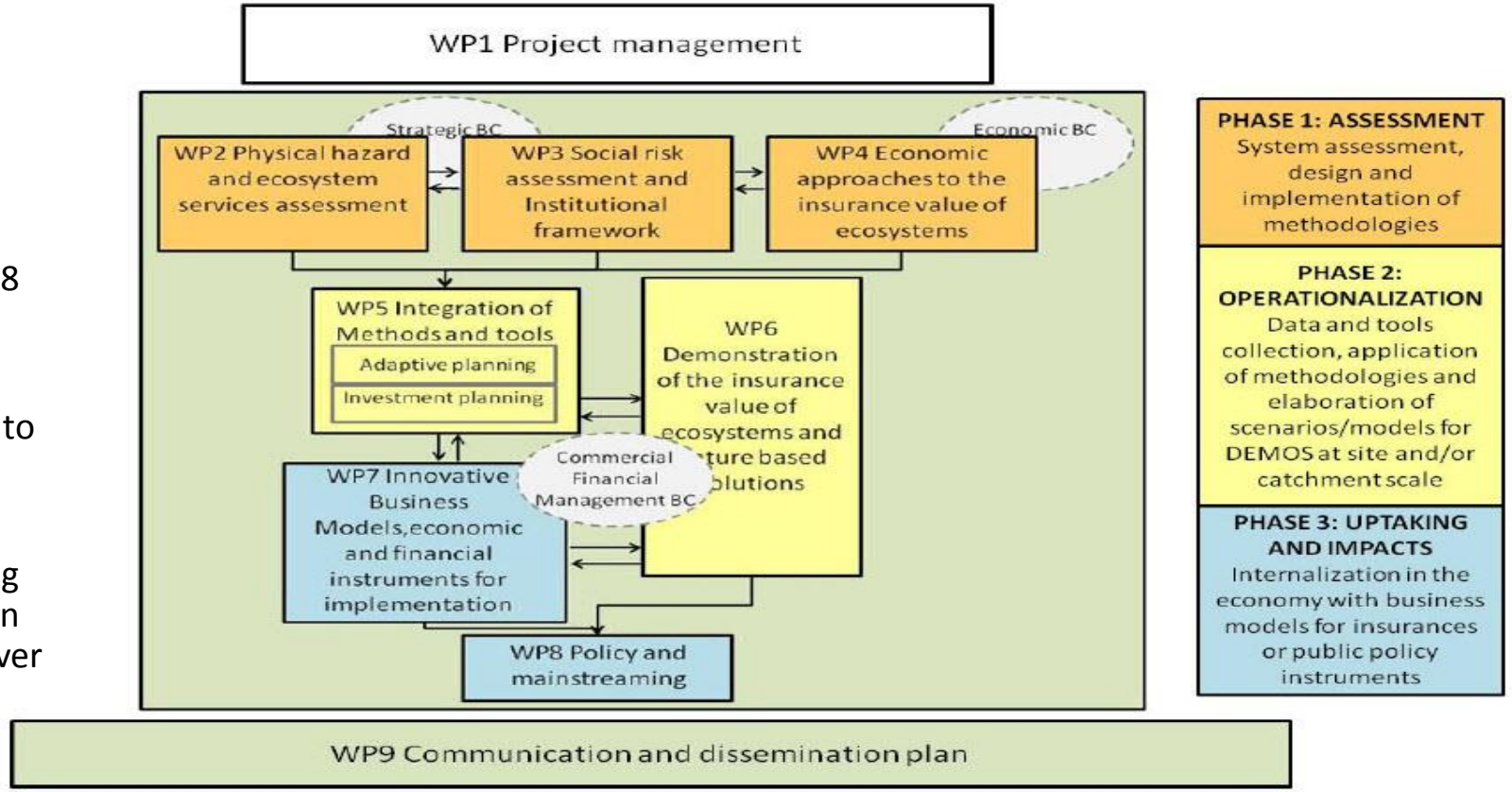
Financing watershed conservation – WATER STRESS

Alternative implementation strategies for Common Resources (goods)

NAIAD

NAIAD: NAture Insurance value: Assessment and Demonstration (H2020) 2017-2019

- Define: Insurance Value of Ecosystems (IVE)
- Operationalize "Natural Assurance Schemes" internalize IVE & buffering role of river systems against water risks
- Tested -involvement insurers and stakeholders - in 8 demonstration sites (DEMOs)
- Develop trans disciplinary tools and methods applicable and transferable across all of Europe → to go from (IWRM/ADM) planning to investment planning
- Outcome: New insurance schemes and/or long term contract between key stakeholders – align incentives, fair allocation of Benefits, Costs, R&R over time



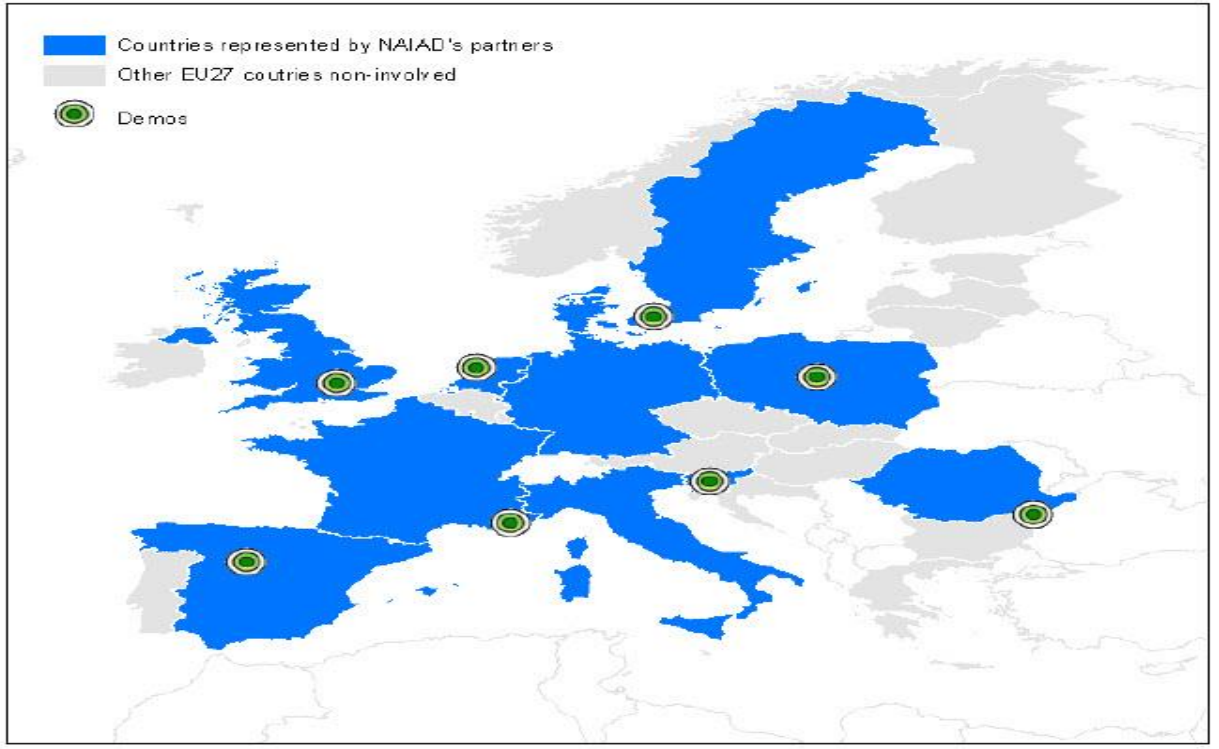
- Coordinator: El Duero River Basin Authority –implementing agency.
- Demo linked to CHD investment plans and development of LIFE Environment Integrated Project

NAIAD

NAIAD: NAture Insurance value: Assessment and Demonstration (H2020) 2017-2019

- 23 partners, 12 countries
- KCL, GEUS, BGRM, IGME, IRSTEA, UNESCO-IHE, CNR-IRSA, SIWI, DELTARES, GEO-ECOMARE , ISKRIVA.
- CCR (FrenchRe) & support Swiss-Re
- 8 demo's: variety of hazards and NBS

Country	Hazard	Ecosystem
Spain	Rural/ GW pollution, droughts, floods	Aquifer and groundwater-related wetlands
France	Rural/ Severe Drought	Aquifer/ Infiltrating Ecosystem Management
	Peri-urban/ torrential floods	Forest & aquatic ecosystems (vulnerability/ forest fires)
UK	Peri-Urban/ Storm surges, urban drainage flooding, fluvia flooding	Flood storage, enhanced infiltration and evaporation
NL	Urban/ Cloudbursts, floods	Micro urban wetlands/ water storage (biofilters)



- Approximately 5 million

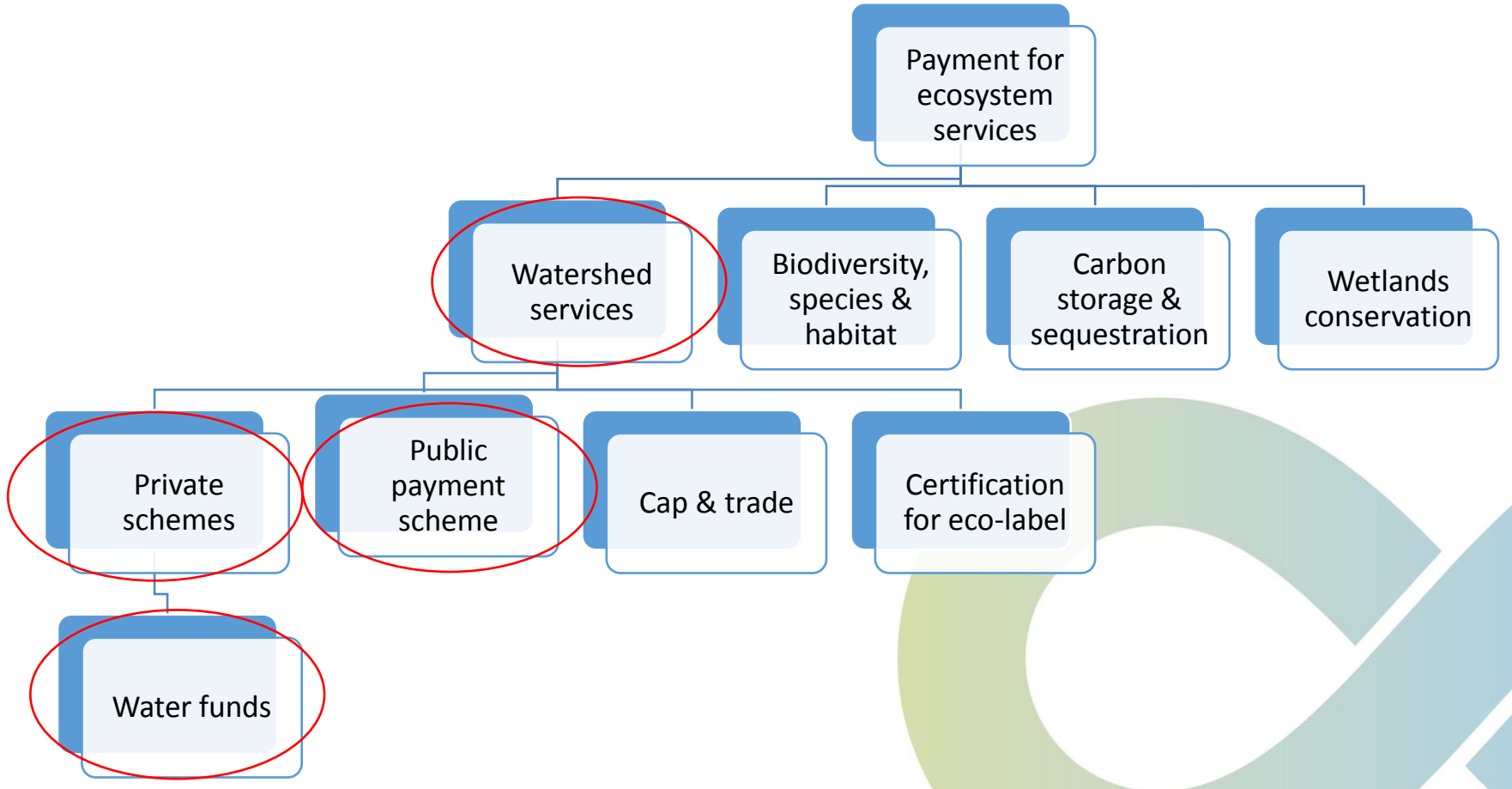
NAIAD

What drives investments in watershed conservation?

- Climate change → externalities visible
  - Frequency of El Niño events/ droughts & floods
  - Externalities visible
  - Awareness: Nature/Water – real license to operate
- Companies and citizens: willing to pay – good governance is key!
- Key ingredients: The role of the government in setting up the institutional and regulatory framework & safeguards
  - Transparency in collection
  - Use of intended goals
  - Clear scientific base to guide work of River Basin Agencies and committees
  - Rigorous hydrologic monitoring program to communicate & improve outcomes of investments
  - Models/tools to understand the vulnerabilities under CC
  - Accountability at all levels
- Financial and Institutional sustainability – 2 sides of the same coin

Financial instruments for watershed conservation

- PES and PWS
- Water Funds: private versus public payment schemes
- Water stewardship – companies engaging in Beyond The Fence actions



Pioneering examples from LAC

Pioneering examples from LAC

What drives investments in watershed conservation?

- Climate change → externalities visible
  - Frequency of El Niño events/ droughts & floods
  - Externalities visible
  - Awareness: Nature/Water – real license to operate
- Companies and citizens: willing to pay – good governance is key!
- Key ingredients: The role of the government in setting up the institutional and regulatory framework & safeguards
  - Transparency in collection
  - Use of intended goals
  - Clear scientific base to guide work of River Basin Agencies and committees
  - Rigorous hydrologic monitoring program to communicate & improve outcomes of investments
  - Models/tools to understand the vulnerabilities under CC
  - Accountability at all levels
- Financial and Institutional sustainability – 2 sides of the same coin

Water Stewardship in Rio Doce- Brazil (3)

- Helping companies/Municipalities to mitigate (future) water scarcity
  - Vulnerability assessment of Rio Doce Basin and priorization of investments (hotsposts) in gray (sanitation) and green infrastructure
  - In 2016 – 26 million BRL – 8 million USD- in PPP for water management
- Private sector investments in the Basin
  - Biomass producers – eucaliptus: downward rainfall patterns, where to locate the plants?
  - Agriculture and Forestry Integration – Scale up process
  - Mining company: 24 million USD in reforestation – ensure minimum flows –15 to 20 years
  - Fundacao Renova: BR$20 billions to recover forest, soils, springs – to guarantee economic growth and water supply – 15 year Program
  - Hydropower companies: sediment management – to lengthen the life of reservoirs
- Key:
  - Transparent and scientific based management of IBIO: maximum score as Basin Agency by ANA (National Water Agency), local and federal recognition
  - Accountability at all levels: are granted the right to serve as RB each 5 years – request by all RBC

TNC Water Funds

- TNC created 30 water funds around the world
- Water fund Quito: FONAG
  - Launched in January 2000, with USD 21,000 in public & private funding
  - Endowment of USD 12 million
  - Invest approx USD 3 million/year→ condor bioreserve & surrounding farmlands
  - Reforestation, forest protection, cover crops and change in agricultural practices
  - Since 2006 – 2% water bills Quito
- Lessons learned:
  - Attractive vehicle for pooling an deploying collective investments in watersheds…still…
  - Not yet fully implementation at watershed level
  - Greater diversity and surety of cash flows
  - So that→ frontloading investments (securitization cash flows)

Peruvian experience with Water Funds

First country in LAC to collect for watershed protection

- Important sequence
  - First a number of local pilots: TNC trust funds & local experiments collecting 1% of water tariffs (e.g. Taropoto)
  - People need to see the effect of green infra and develop trust in governance arrangement
- Public Payment scheme introduced in 2016:
  - Collect additional 1% of water bills (nationally)
  - Only for lima = 10 million Soles = USD 3 million/year
- Trends and impact of climate events and neighbours:
  - recent floods catastrophic impacts
  - – had implemented green multifunctional infrastructure

Lessons learned – FIETS sustainability

- Institutional & Financial Sustainability are two sides of the same coin – cannot be conceived in isolation:

  Good economic Governance = Trust

  - Lower Transaction Costs
  - Larger Revenue Streams
  - Lower Risk Perception

  = Better Cash flow Profiles
  = Bankable projects

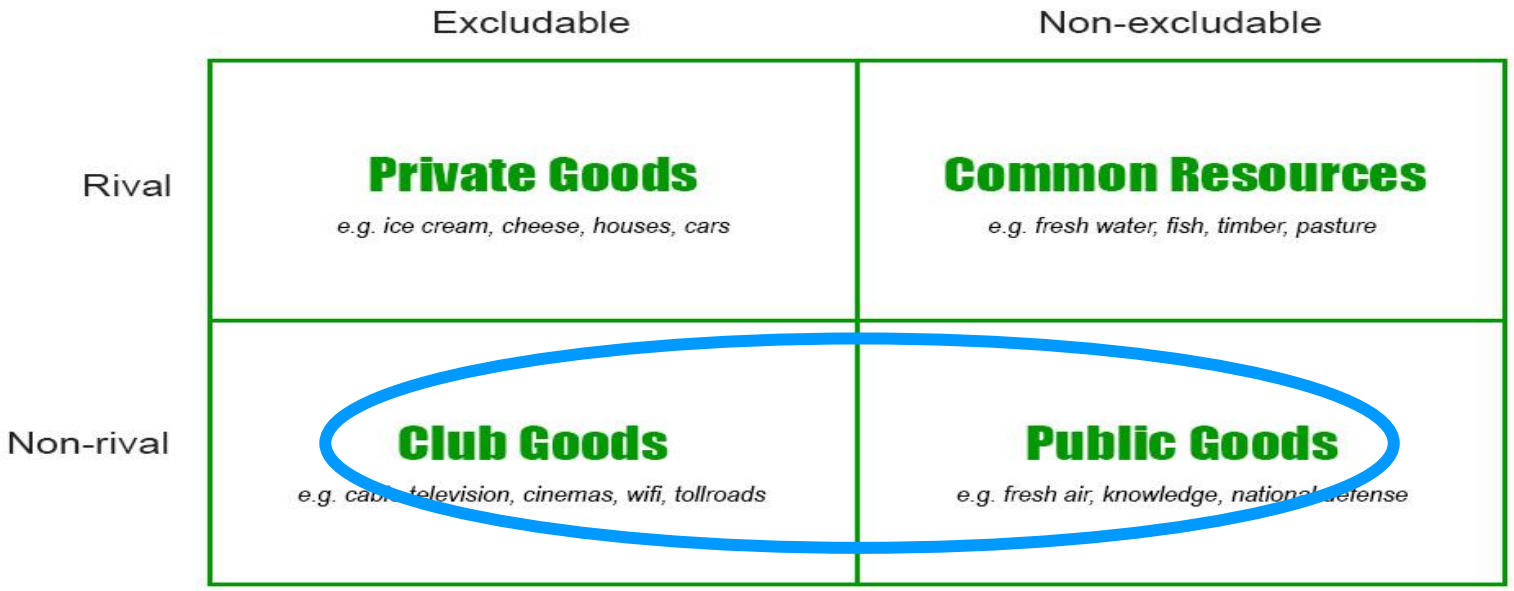
- Success factors
  - Key: alignment of incentives through fit for purpose implementation arrangements
  - Rigorous hydrologic monitoring and scientifically backed system understanding
    - of what works and what does not
    - Climate Change impacts
    - Robust investment pathways

- FinTech – exciting possibilities for implementation arrangements – impact on governance constraints
  - Reduction of transaction costs = a larger share for productive use
  - Reduction of intermediaries = less room for corruption = trust
  - Blockchain potential for Payment for Watershed services, e.g. remote monitoring of performance and access to impact investors

Special thanks to the contributions of:

- Marco Follador, Brazil
  Head of Strategic Planning, iBio, marco.follador@ibio.org.br
- Elena Lopez Gunn, Spain
  NAIAD project coordinator, Director Icatalist, elopezgunn@icatalist.eu
- Liliana Miranda Sara, Peru
  Peruvian Congress Principal Advisor

NAIAD



Financing infrastructure – flood Protection

Alternative implementation strategies for “Public” and “Club” goods

NAIAD

The challenge

- Financing gap

❑ Adaptation investments required in developing countries: USD 70 to 100 billion from 2010 -2050 (World Bank 2010)

❑ A “gap” of finance (USD 8 billion p.a.) and estimated (USD 90 to 210 billion) for mitigation and adaptation (Global Canopy Foundation, 2009).

❑ Approx. 85% percent of the capital needed must come from private finance (WB EASIN 2012)

- Structuring Bankable projects

❑ Problematic characteristics of climate adaptation projects (Gleijm & Gerdes,2012)

- Capital-intensive;
- Unique;
- Delayed & Dispersed benefits;
- Non-guaranteed and non-financial benefits;
- Limited autonomous earning power;
- High risk profile

NAIAD

Pioneering implementation and financing arrangements

	RWS Locks Programme (6 projects) (NL)	Afsluitdijk Dike (NL)	Broadland Flood Alleviation Project (BFAP) (UK)	Pevensey Bay Coastal Defence(UK)	Tweed River Entrance Sand Bypass (AU)	City of Gold Coast A-line Seawall (AU)	Toogoom Seawall (AU)	FEPI (Costa Rica)	Valle la Estrella (Costa Rica)
Publicly Funded	Taxes	Taxes	Taxes	Taxes	2 States/ taxes	Taxes		Taxes	
Publicly Financed						Partly		Partly	
Privately Financed	Project Finance	Project Finance	Project Finance	Equity	Project Finance				
Privately Funded									
Tariffs									
Co-financed								Industry Corporation	
100% Privately Funded							Pool of owners		Company
Innovative Contract / Private Service Provider	DBFM / PFI	DBFM / PFI	DBFM / PFI	DBFM / PFI	DBFM / PFI				
Traditional Contract						DBB	DBB	DBB	
	Public					**Natural Monopolies/ Club Goods**			**Private**
Year	2014-2017	2017	2001	1999	1999	2013	2014	2012	1996

Sources:

1. Financing flood protection measures in developing countries: Are private investments feasible? Experience from Pevensey Bay Coastal Defence Project in UK (TUDelft, Deltares, 2013)
2. Financing Coastal Flood Protection: an overview of emerging Public-Private Financing models
3. DRR-Team Mission Report Costa Rica March 6-13, 2016

NAIAD

Thank you for your attention

Any questions?

Mónica A. Altamirano, PhD
Specialist in Public-Private Partnerships and Climate Finance
Deltares, Department of Water Resources and Delta Management
Email: monica.altamirano@deltares.nl
Tel: +31 (0) 61 222 86 85