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Street Level Guidelines on the insurance value of ecosystems for target audiences

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INDEX

Edition information	2
1 Introduction	4
2 Street-level guidelines on insurance value of ecosystems.....	5
3 Demo guidelines on planning steps for implementation of NBS	8
3.1 Strategic planning framework: why and what is it?.....	8
3.2 Workshop protocol	8
3.3 Checklist of activities per workshop and steps in the framework of analysis	9
4 Guidelines on the use of the NAIAD Business Canvas.....	12
4.1 The NAS canvas	12
4.2 A linear flow NAS canvas process and steps for application.....	14
5 Conclusion	17
6 References.....	17

List of Figures

Figure 1: Illustration of the insurance value in different interpretations (source: Graveline et al. 2017)	6
Figure 2: Key phases in planning cycle and level of progress (green colour) in demos depending on starting point and TRL	9
Figure 3 : Strategic planning phases and link to data/models and stakeholder involvement....	11
Figure 4 : NAS Canvas.....	13
Figure 5 : Clusters in NAS canvas	14

List of Tables

Table 1 – checklist of activities per workshop	9
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2 Introduction

The aim of this document is to present the guidelines material that was developed and tested as part of the capacity building and research uptake activities in the project. The guidelines focus on the concept of insurance value of NBS and the way in which this can be integrated in environmental planning and infrastructure investment. The objective of the guidelines is to give a brief introduction that can be immediately made operational at different levels.

The present document incorporates 3 different guidelines

- On insurance value of ecosystems: In 2019 we made a guide on insurance value of ecosystems that could be readily inserted into capacity building activities and functioned as a first introduction to the concept and the methods/tools used to operationalize it.
- On strategic planning and steps to follow for NBS implementation: In the fall of 2018, we developed an internal guideline on strategic planning and steps to follow in the demos. After explaining the overall setup of the guidelines and how they would help the DEMOS to structure the activities in the workshops, we organized a number of demo specific skypes to discuss any questions/comments. We use the feedback received from the demos to identify what could be the best preparation for the 3rd and last demo workshop, as well as to provide input for WP5 and WP7 In addition, this guideline provided a format to further discuss the specific NAIAD approach in terms of: (1) Stakeholder engagement,(2) Adaptive planning, and (3) Integration approach (co-)benefits
- On the use of the NAS canvas: In preparation for the 2019 NAIAD summer course, we adapted a guide on the use of business canvas and nature assurance schemes. The adapted guide is incorporated in the MOOC

The following sections present the guidelines and refer to related NAIAD deliverables and MOOC chapters for further information.



3 Street-level guidelines on insurance value of ecosystems

Audience: General public, professionals interested in nature-based solutions and risk management. This guideline is conceptual and its content is further developed in chapter 1 of the MOOC (Van Cauwenbergh et al., 2019).

The concept of insurance value for water related risk management aims to raise awareness on the risk reduction potential that ecosystems provide against a number of hazards. It is the opposite concept of the cost of risk. As an illustration, we can state that waterproofing and developing cities in risk prone areas have been risky and this can be estimated (now ex-ante) with the concept of cost of risks. At the opposite, or having another perspective, safeguarding or restoring ecosystems with a role in water regulation (e.g. NBS) have an insurance value.

Graveline et al. (2017) adopts an economic perspective of the insurance value of NBS, which is introduced here. The first interpretation of the insurance value is based on ecological economic literature and relates to the resilience capacity of ecosystems as an insurance device. It is consistent with Pascual et al. (2010) and the assumption that a biodiverse ecosystem is more capable of buffering shocks, and in economic terms, that the biodiverse ecosystem might reduce the volatility of income (or ecosystem services production) compared to the next best alternative. This idea is represented in Figure 2 below (we add the distinction between shocks e.g. hazard and stresses e.g. global changes).

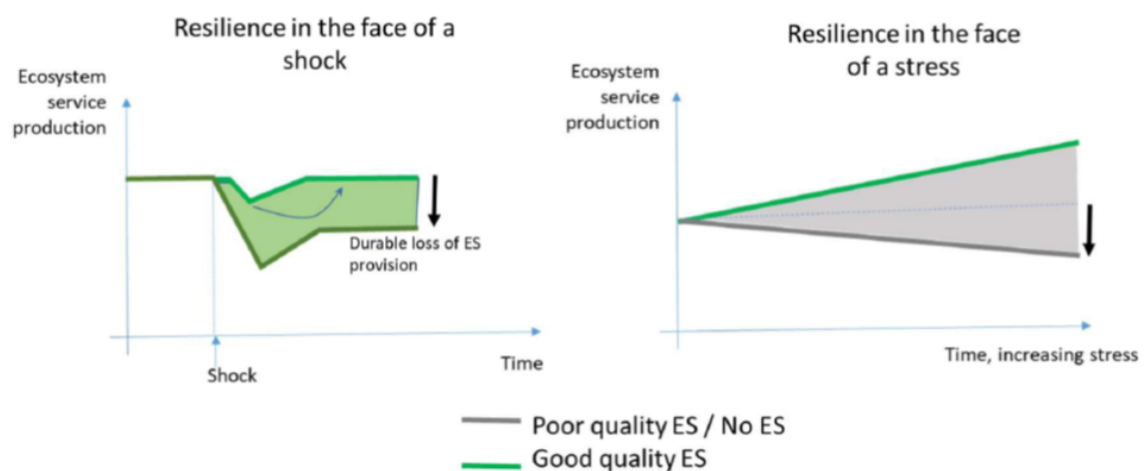


Figure 1 Quality of Ecosystem Services (ES) vs recovery and resilience (source: Graveline et al. 2017)



Graveline et al. (2017) (section 4) discusses this in relation to a financial portfolio. *“Similar to a financial portfolio, a diverse – species- ecosystem can have a regulation capacity in the face of a damage event. The stabilization effect of a diverse portfolio can be more and more valuable in the face of climate change and increasing human pressure.”* They refer for example to Augeraud-Veron et al. (2017) who considers biodiversity as an insurance device for agricultural production as it has the ability to dampen production volatility. *“It suggests that the process behind ecosystem functioning enables a guaranteed continued flow of services as long as the ecosystems stays within a given regime. This perspective triggers progressive stresses such as climate change or human pressures that induce biodiversity degradation as well as shocks. Pascual et al. (2010) argues that this insurance value plus the output value (i.e. value attached to direct ecosystem’s services and benefits) equals the Total Economic Value of the ecosystem. This is similar to a quasi option value interpretation of the insurance value of ecosystem.”* (Graveline et al., 2017)

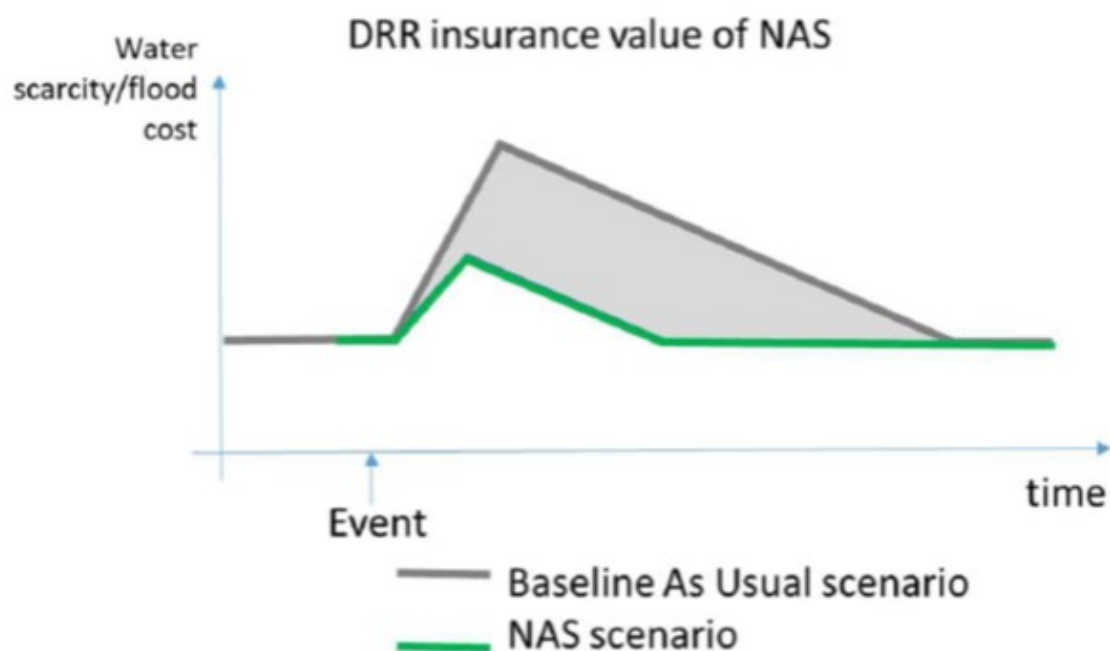


Figure 2: Insurance value stemming from the risk reduction potential of NBS/NAS (source: Graveline et al. 2017)



In the second interpretation (Figure 2), the insurance value can be conceptualized from the domain of disaster risk reduction. The grey area represents the insurance value as it is the difference in cost between the BAU scenario vs the NBS/NAS scenario. Natural hazards characterized as shocks will threaten the system under study (territory, city or basin). Any relevant risk reduction strategy has an insurance value. In disaster risk management, the insurance value of a strategy or infrastructure will be the difference in the damage with or without (reference situation), as shown in Figure 2. Here the insurance value of NBS is directly interpreted as a risk reduction potential compared to traditional strategies and baseline scenarios.

Recognizing the effect of green infrastructure, the European Commission (EC) has initiated several initiatives to promote green infrastructure in the EU, such as the [EC Green Infrastructure Strategy](#), with the clear intention to connect this strategy to its flood and drought prevention policies. In addition, Target 2 of the [EU 2020 Biodiversity Strategy](#) requires that “by 2020, ecosystems and their services are maintained and enhanced by establishing green infrastructure and restoring at least 15 percent of degraded ecosystems.”

In view of the interest and potential of NBS, "there is an urgent need to scientifically explore methodologies and conceptual frameworks for assessing the insurance value of nature and to integrate this into the disaster risk management agenda. This could be done, for example, by working with financial institutions and insurance companies to develop innovative ways for promoting nature-based solutions for risk management." - Thomas Elmqvist, Stockholm Resilience Center

For a discussion on the insurance value of ecosystems and nature based solutions by Elmqvist and others, check this [Nature of Cities global roundtable](#)



4 Demo guidelines on planning steps for implementation of NBS

Audience: NAIAD consortium and DEMOS. This guideline is

Preamble: *A year before the finalisation of the projects, demos have already implemented the Demo roadmap, stakeholder protocol and a number of actions on integration have been taken (e.g. deliverable D5.4). To inform a comparative NAIAD approach on NBS implementation, we now want to translate prior knowledge into operational guidelines for workshop protocol in the different demo sites. Since different demos have used different methods and tools, an analysis of these will allow us to identify in which stage of planning the demos are and how workshops 2 and 3 can be best prepared. As part of preparation of D5.5 and D5.7 we therefore communicate present document as guidelines for an overarching/comparative approach between different NAIAD demos.*

4.1 Strategic planning framework: why and what is it?

In order to shift the focus in Disaster Risk Management from ex-post response to ex-ante mitigation and prevention, we argue for the creation of risk adaptation plans and introduction of the ex-ante approach typical in (strategic) planning in the NAIAD demos. The link between DRR and strategic planning is explained in the video in this link: <https://drive.google.com/open?id=1stP23ydGNynDeslQgJ1wqK6lvcwrm6o>

The backbone of strategic planning is the framework of analysis; a step-wise, structured assessment to identify objectives, list problems, context and solutions and base selection of best solutions on comparison of options and rational decision making. All steps in the framework involve stakeholder participation and are supported by data and different types of methods and tools.

Figure 3 shows the planning trajectory from inception to implementation. The next section will detail how different NAIAD demos can use this framework in their workshop protocol, considering differences in context and TRL.

4.2 Workshop protocol

Whereas demos are different in terms of context, TRL (Technology Readiness Level) and the specific scientific methods and tools applied, the steps for the identification of socio-hydrological dynamics, risks and the way NBS relate to them will be the same. Figure 3 below shows the level of progress made in demos if different TRL is considered. Higher TRL demos (e.g. Rotterdam, Copenhagen, Medina) will be focusing more on implementation, whereas lower TRL demos are likely to focus more on assessment and strategy building and explore implementation with less detail.

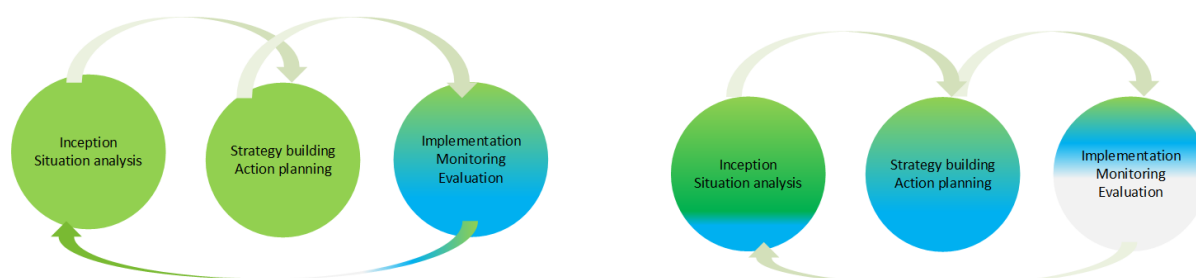


Figure 3: Key phases in planning cycle and level of progress (green colour) in demos depending on starting point and TRL

4.3 Checklist of activities per workshop and steps in the framework of analysis

Table 1 below lists the different planning steps and which kind of activities have to be done before going to the next step. Demo leaders are requested to check whether activities have been completed (either in NAIAD project or as part of previous activities and taken as input at start of NAIAD). This initial assessment will help the Integration team to work.

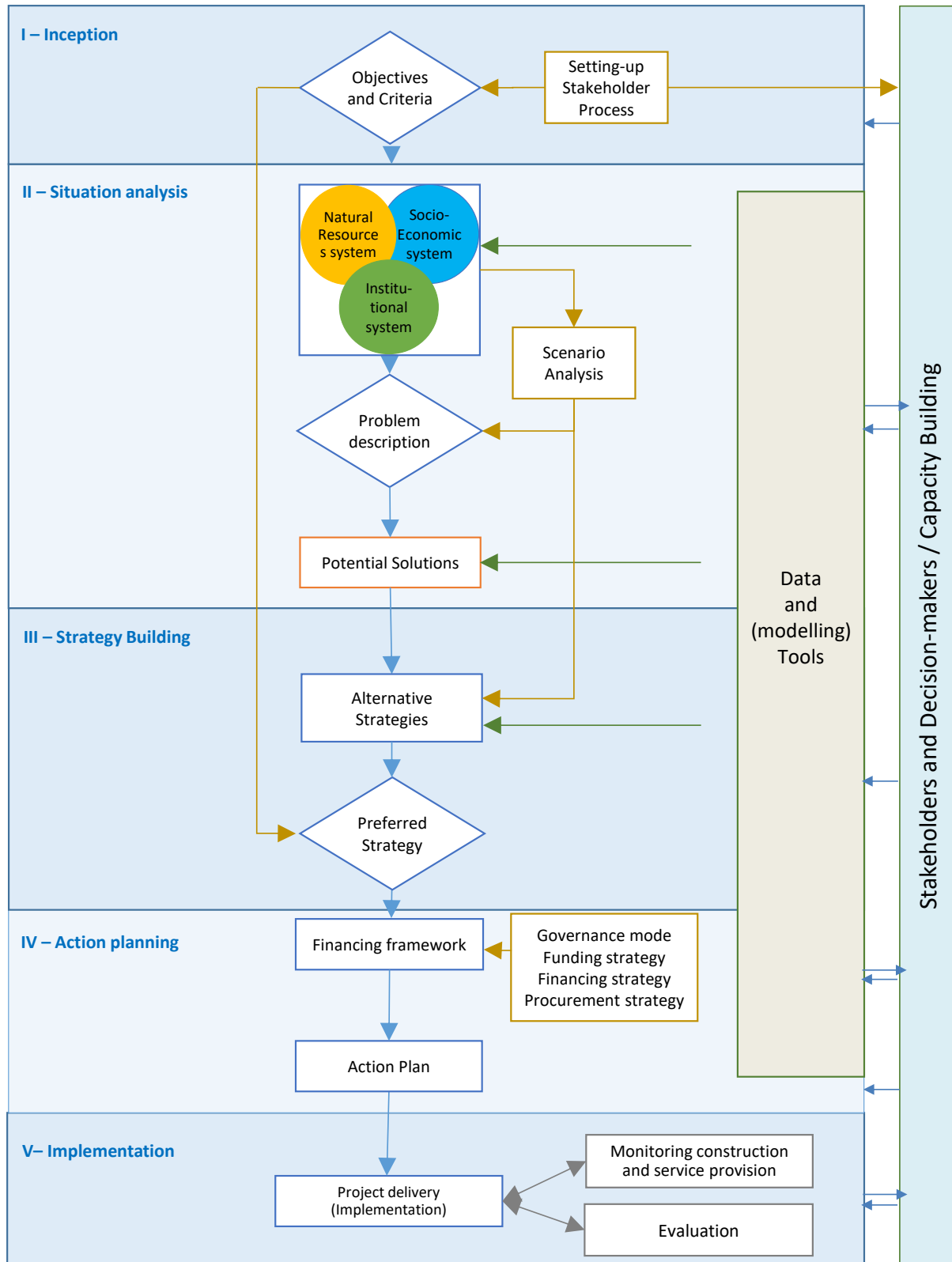
Table 1 – checklist of activities per workshop

Phases	Actions/Information to be gathered
Inception phase	
Objectives, criteria	- Based on prior assessment of risks and existing policies, what are the key objectives of NBS introduction in the hydro-social system These objectives are a combination of reducing risk/vulnerability and increasing socio-economic opportunities (i.e. benefits and co-benefits production). Given the multiple interests of different stakeholders as well as ambiguity, objectives can often be conflicting and trade-offs exist. - Identification of criteria/yardsticks that allow you to evaluate whether the objectives are reached?
Situation analysis	
Baseline assessment Situation analysis	- Description of natural, socio-economic and institutional system - Identification of problems and controversies - Stakeholder analysis (SNA), (DPSIR)
Identification of indicators, methods and tools	- Identification of quantitative and qualitative assessment needed to provide relevant information (related to policy objectives and stakeholder preferences) - Checklist of available methods/tools
Scenarios	- Storylines of possible futures (drivers of change, external to the system) - List of drivers and translation into quantitative scenarios to be modelled
Strategy building	
Formulation of solutions (measures, alternatives)	Identification of interventions/measures/alternatives in collaboration with key stakeholders



	• (Participatory) prioritization of promising measures that will be modelled
Combination of priority measures into strategies	• Separation of interventions in short/medium/long term
Assessment of strategies under different scenarios, including CB	• Quantification of indicators (including life cycle costs) • Identification of no-regret interventions (based on scenarios) • Definition of no-regret strategies
Decision making (negotiation, choice and compensation): selection of preferred strategy	• Communication of indicator results for different strategies • Use of different decision making methods (e.g. MCA, CBA, scorecard, voting, ...) • And (group) decision making aided by the assessment scores provided in previous step
Action planning	
Enabling environment, development of business plan and distribution of responsibilities	• Discussion of role and responsibilities for the implementation of the preferred strategies • Timeline of actions • Identification of funding/finance • Development of business plan • Definition of service levels, performance indicators and contract negotiation • Risks and liabilities
Implementation	
Implementation	• Construction of green-grey infrastructure and enforcing regulatory arrangements
Monitoring and evaluation	• Data collection on performance indicators • Communication of monitoring results • Check of evolution monitoring levels with initially established service levels and NBS objectives

Figure 4 : Strategic planning phases and link to data/models and stakeholder involvement





(Adapted from Loucks and Van Beek, 2017 - <https://www.springer.com/gp/book/9783319442327>)

5 Guidelines on the use of the NAIAD Business Canvas

Audience: DEMOs and later adapted for general public, professionals interested in nature-based solutions and risk management. The below guidelines are based on Mayor, 2017 and the content is further developed in chapter 4 of the MOOC (Van Cauwenbergh et al., 2019).

The aim of this section is to help DEMOs understand and apply the NAS canvas in order to describe the elements for value capture and identify potential business models to fund NBS strategies. It presents and describes the NAS canvas and the different elements composing it, while providing a structured flow process with different steps to help identify and complete the relevant information required within each component.

5.1 The NAS canvas

The NAS canvas is an adaptation of the traditional business model canvas tailored to the specificities of Nature Based Solutions and their contextual framework. The business model canvas is traditionally used to support companies and businesses to identify and structure their value proposition and the elements required to develop a strong and feasible business model. An example is the canvas by Osterwalder and Pigneur (2010); available at <https://strategyzer.com/canvas>.

The NAS canvas thus builds on the traditional model canvas, and is expanded to incorporate elements of both the so called 'PPP canvas' for ecosystem services developed by the Inclusive Business Hub¹ (see annex 1) and the economic analysis methodology developed in WP4, in order to allow capturing the extended array of co-values, actors and contextual settings inherent to NBS that will ultimately determine and condition the structure and feasibility of a NAS business model.

Business model is a description of the rationale of how an organization creates, delivers, and captures value, in economic, social, cultural or other contexts (adapted from (Osterwalder, Pigneur, & Clark, 2010). It defines the way by which an organization offers value to customers, entices customers to pay for value, and converts those payments to benefits. In the context of NAIAD, due to the often hybrid nature of services (public and private) we will consider how a different organization - be it public, private e.g. an enterprise, an NGO, or a community of citizens - can deliver value to end users. Thus, it also considers the social value (see WP4 for discussion on benefits – private and public and co-benefits). A business model reflects management's hypothesis about what end users want (link to WP3), how they want it, and how an organization can structure and plan to best meet those needs, i.e. in the case of a private enterprise get paid for doing so and make a profit. For example, we will look at social business models at the community level to reduce national funding gaps for the maintenance of structural and non-structural adaptation measures. New viable business models in which costs structure and revenue streams are considered in such a way to make the value propositions interesting to different categories of stakeholders and investors.

The NAS canvas developed for NAIAD is presented in Figure 5.



D9.4 Street Level Guidelines on the insurance value of ecosystems
for target audiences

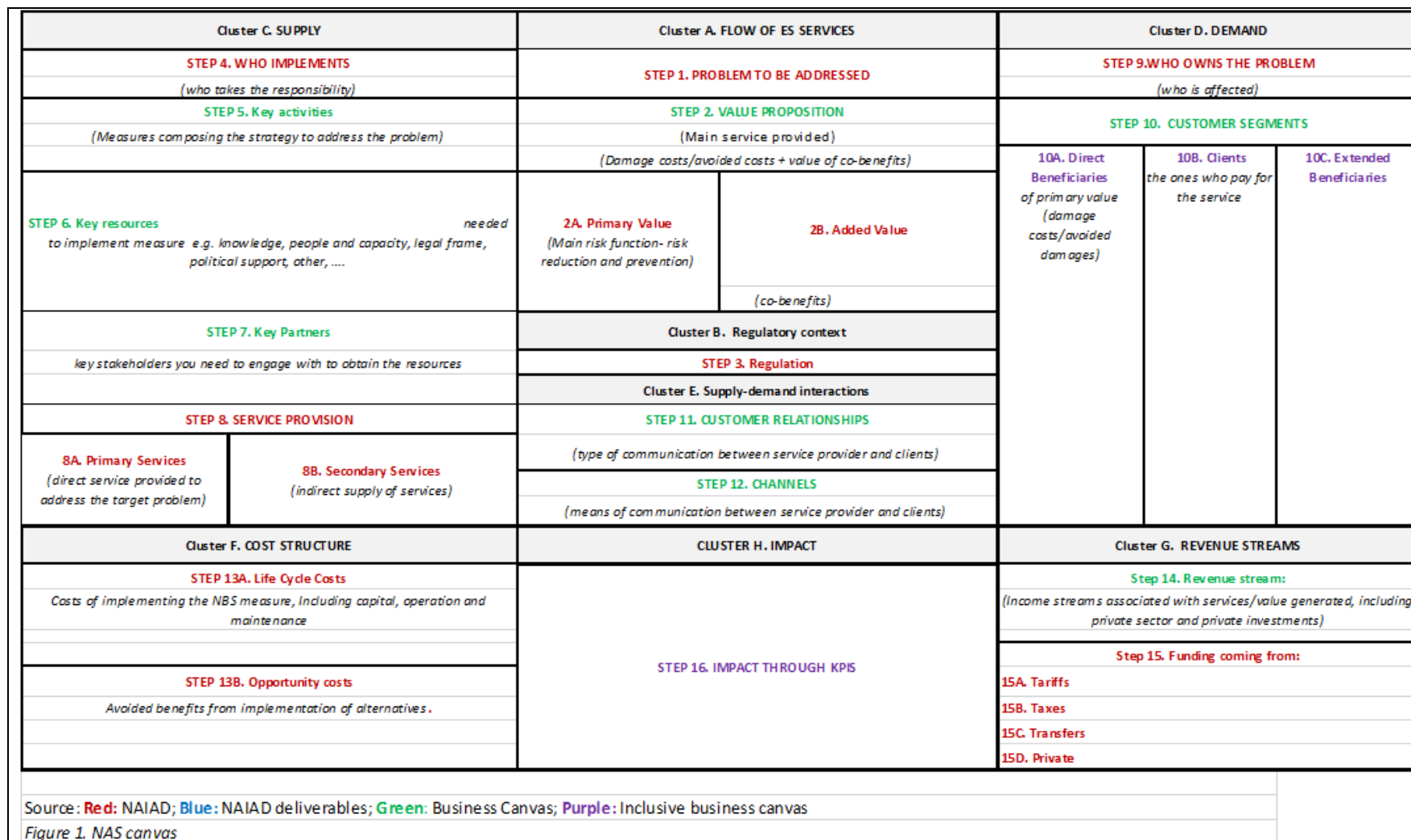


Figure 5 : NAS Canvas

5.2 A linear flow NAS canvas process and steps for application



Figure 6 : Clusters in NAS canvas

The business canvas is a quick visual way to compile the information on how value is captured in a business or organization in a one eyeshot format. However, the application can become difficult or confusing given the lack of logic and order in the display of the different elements. In order to avoid this, the NAS canvas in the canvas format has been designed following a Supply → Service → Demand sequence, following the real market logic. Furthermore, despite this facilitates the understanding, the canvas can also be displayed as a linear sequence of blocks that cluster the different components describing how value flows from the supply to the demand side, and the different elements required in this process.

The flow diagram in

Figure 6 shows the linearization and clustering of NAS canvas components and the sequential process proposed to facilitate the understanding, identification and description of those components when applied to particular NBS strategies. The sequential description of the process and components is described here below.

CLUSTER A: FLOW OF ECOSYSTEMIC SERVICES

This cluster defines the problem to be addressed and the value proposition (i.e. the main service and additional value provided) in relation to damage costs and/or avoided costs. Supporting NAIAD documents to complete this part are Damage Costs (T4.3.) and Co- Benefits (T4.3.)

STEP 1: Problem to be addressed. Cite the main problem to be addressed by the NAS strategy.

STEP 2: Value proposition. In the traditional canvas the Value Proposition is the reason why customers turn to one company over another. It solves a customer problem or satisfies a customer need. The value and main selling point of the NAS strategy will be the capacity to solve the problem (risk reduction function) plus the additional benefits it provides (additional values) which are not provided by other grey alternatives. Therefore, the value proposition is composed of the *primary value* generated by the main function (risk reduction measured through avoided damage costs) and the added value (value generated by the co-benefits). The total value can be estimated as the sum of steps 2A+2B, and will reflect the comparative advantage with other alternatives.



2A. Primary Value: in the NAIAD framework, the main value is reduction of impacts from extreme water related climate events expressed as economic losses (risk function - avoided costs (damage costs)) by risk reduction and prevention.

2B. Added value: all additional values provided that are not obtained with other alternatives (cobenefits) and provide a competitive advantage. These values should be expressed quantitatively when possible or qualitatively otherwise.

CLUSTER B: REGULATORY CONTEXT

STEP 3: Regulation. Regulation impacting or articulating the target problem management. A lack of regulation that should be required could be also highlighted.

CLUSTER C: MAPPING THE SUPPLY

STEP 4: Who implements. Identify the main agent/s responsible for implementing the strategy. If necessary, distinguish by measures within the strategy.

STEP 5: Key activities. List of activities required for the implementation of the measures composing the NAS strategy (NBS/Hybrid/grey/soft). Please list the main activities involved for the implementation of each NBS measure/s and, if possible, of any accompanying grey or soft measures.

STEP 6. Key resources. Resources needed to implement the strategy (existing and non-existing at present- non-monetary) e.g. knowledge, people and capacity, legal frame, political support, other

STEP 7. Key partners. Partners required to implement the solutions and provide the service, i.e. technology centers, regional public administrations, developers, operators,...

STEP 8: Service provision. Describe the services provided by the strategy distinguishing between:

8A. Primary service: main service provided (main target of the implemented strategy)

8B. Secondary services: array of additional services resulting from the implementation of the strategy.

Support Documents T9.4. Stakeholder Mapping and D3.2. Roles and Responsibilities

CLUSTER D: MAPPING THE DEMAND

STEP 9: who owns the problem. Who is directly impacted by the problem or suffers the problem.

STEP 10: Customer segments. Customers can be segmented into distinct groups based on needs, behaviors and other traits that they share. A customer segment for NAS may be defined through spending behaviour (customers, clients), interests, and motivations.

Supporting NAIAD documents: D9.4. Stakeholder Mapping; D 3.2. Institutional Analysis; D8.2. reg framework and D7.1. IVE Fact Sheets.

10A. Direct beneficiaries of primary value: agents that benefit from the solution through damage costs/avoided damages.

10B. Clients: the ones who are actually paying for the service. They may - or may not - own the problem, being directly responsible for it.

10C. Indirect beneficiaries: the extended beneficiaries of real and potential benefits and co-benefits who are currently not paying for the service but may be potentially interested to pay for the co-benefits generated when fully aware of their value.

CLUSTER E. MAPPING THE SUPPLY-DEMAND INTERACTIONS

STEP 11: Customer relationship. Type of relationship between customer and service provider or implementor. The possible types of relationships are personal assistance (human interaction), dedicated personal assistance (dedicating a customer representative to an individual client), self-service (no direct relationship with customer), automated (self-service with automated processes),



communities (creation of a community of users that communicates through a representative), co-creation (both customer and implementor/service provider generate value). In terms of the duration of the relationship, it can be transactional, long-term, and purpose.

STEP 12: Channels. In the traditional canvas, the communication, distribution, and sales channels comprise a company's interface with customers. Channels are customer touch points that play an important role in the customer experience. In the NAS canvas, channels are the vehicles by which the different stakeholders involved NAS implementor, possible service providers and customers communicate. i.e. email, social media, formal letters, periodic meetings,...

CLUSTER F: MAPPING THE COSTS OF THE SERVICE

STEP 13. Cost structure: different type of costs associated to the implementation of the strategy.
Support documents: WP4 Guidelines; NAIAD Indicators (under construction)

13A. *Lifecycle costs:* includes capital costs and operation and maintenance costs.

13B. *Opportunity costs:* the benefit, profit, or value that would have been generated by implementing other alternatives.

CLUSTER G: MAPPING THE ABILITY/WILLINGNESS TO PAY

STEP 14: Revenue streams. This component represents the cash a company generates from each Customer Segment. Income streams generated as a result of the service provision/value generated (PLEASE include private streams as well as public goods) for which each customer segment is willing to pay and can thus provide an economic return. Identify the different values (including both primary and additional values) that can be “payable” by the different customer segments, indicating a monetary or non-monetary quantity when possible.

STEP 15: Funding. Funding is the money required to implement the measures and can be obtained from a single source upfront, or from the customer segments. Some of the revenue streams identified in the previous step may need to be devoted to cover the LCC costs of the measure through the economic instruments explained below. Specify the existing or potential funding streams to be used for the implementation of the strategy. These can include or be a mixture of:

15A. Tariffs: Paid by the users of the product or service as a “price” (i.e. water tariff,...)

15B. Taxes: paid by the users of the product or service as a fix percentage of the value (i.e. VAT)

15C. Transfers: money provided by external actors such as primarily official development assistance, philanthropic donations, grants, etc.

15D. Private funds or investment: money invested by the private sector or private investors.

CLUSTER H: IMPACT

STEP 16: Impact KPIs. List of tangible impacts achieved by the implementation of the measure described through KPIs or key performance indicators that should be used to track the performance and efficiency of the strategy.

In order to complement the identification of elements required to generate feasible and successful business models, the process includes two more final steps aimed to identify the main conditions for success and potential barriers for implementation of the NBS strategy.

STEP 17. Success conditions: what determined the success for implemented examples

STEP 18. Existing or potential barriers: elements or factors that could constrain the feasibility or success in the implementation of the NAS strategy.



6 Conclusion

This document presents several guidelines developed in the NAIAD project under WP9 in collaboration with other work packages. Whereas the initial development of guidelines has been for internal use within the consortium, most guidelines have been adapted for wider target audiences and incorporated in the NAIAD MOOC.

The document focuses on 3 specific guidelines: (1) on the insurance value of ecosystems and economic assessment thereof, which is more conceptual in nature (2) on strategic planning and steps for planning and implementation of NBS and (3) on the use of the NAS canvas. Guidelines are specific for target audiences, a modified version can be found in the NAIAD MOOC for use by broader audiences.

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