Promoting Adaptation to Changing Coasts

New transferable methodology for identifying and cataloguing risks/issues.

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Author(s):
Thomas Drouet, Camille Simon, Ben Fouqué

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Work package lead
Camille Simon

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Foreword

The Promoting Adaptation to Changing Coasts (PACCo) project is a cross-border initiative which is financially supported by the INTERREG VA France (Channel) England project co-financed by the European Regional Development Fund.

The broad aim of PACCo is to demonstrate that it is possible to work with stakeholders in estuarine regions to deliver a range of benefits for people and the environment by adapting pre-emptively to climate change. It has a total value of €27.2m, with €18.8m coming from the European Regional Development Fund (ERDF).

The project focuses on two pilot sites: the Lower Otter Valley, East Devon, England and the Saâne Valley in Normandy, France.

For more information see: [Promoting Adaptation to Changing Coasts (pacco-interreg.com)]

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1. Introduction

Estuary environments are rich in biodiversity, providing a wide range of ecological features and ecosystem services (e.g., nurseries, food sources, reproduction sites and shelter for various species). Estuaries and their catchments are also highly prized by humans because of the beneficial land uses they offer, such as agriculture, fishing, urban development and coastal tourism. Consequently, these already extremely fragile ecosystems have been substantially altered by these activities, with profound implications for the biodiversity. This is particularly the case in the Lower Otter and Lower Saâne valleys, which have witnessed great changes to their estuaries over the centuries as they have been subjected to substantial development and physical modification. Today, due to the consequences of climate change and the sea level rising these estuaries, their land uses and their environmental quality are facing new challenges.

The aim of the PACCo project is to implement a management model to help estuaries adapt to the impacts of climate change, which will have a particularly significant impact on estuary areas. The various partners involved in PACCo are seeking to reduce the impact on ecosystem quality during successive stages of the project and in the long term. The implementation of the PACCo project could have harmful consequences for biodiversity in the two valleys during their construction phases if construction risks were not mitigated. To mitigate this, risk management measures must be put in place at the beginning and updated throughout the project via a regular review process. In the case of the PACCo project, right from the initial design phase, work was done to identify specific potential risks related to adaptive management of heavily modified estuary. Following this initial identification phase, solutions were developed to anticipate these risks and reduce their impacts.

To this end, the aim of this deliverable is to provide a new methodology for identifying and characterising the specific risks and issues involved in implementing an adaptive management approach in estuary environments where human activity has substantially impacted on the quality of ecosystems and their ability to function. This reference tool could be reused by future climate change adaptation projects in estuary environments, to help develop their risk and issue management approach.

2. Methodology

In order to correctly use the risks and issues registers specific to the adaptive management of heavily modified estuaries, it is important to understand their various component parts.

2.1 Risks and issues: definitions and distinctions

It is important to make the distinction between a risk and an issue. This distinction is essential to ensure effective management of the various risks and issues, in order to minimising their impacts.

2.1.1 Definition

A risk: a hazard or undesirable event, its occurrence is uncertain. Due to its consequences, the project may fail to meet its objectives with regard to: completion date, costs, specifications (technical, quality, performance, reliability, etc.), company image, legal, social, environmental etc... A risk is a danger of varying predictability that may impact the outcome of the project. It is not possible to eliminate all risks entirely, but preventative actions may be implemented to mitigate them.

An issue: a difficulty which must be resolved in order to obtain the desired result: an unstable or hazardous situation which requires a decision to be made. Issues can vary in their severity and significance, and are often unexpected, which is why they need to be dealt with urgently. To avoid being caught off-guard, it is important to predict as many potential issues as possible that may arise during the project.

2.1.2 Risk/issue distinction

Something that is uncertain (a risk) can be managed through preventative measures. Something that is certain (an issue) can only be dealt with through remedial actions. The main difference between a risk and an issue lies in the definition of the two terms. By definition, an issue is an event that has already occurred and has a purely negative impact on the project. A risk, by contrast, is a potential event, which may or may not occur in the future, and which (if it occurs) will have negative implications for the project's objectives. This key difference determines how the threat will be dealt with in order to eliminate it. In the case of risks, mitigation plans or measures can be implemented in advance. In the case of issues, it is necessary to react to the occurrence of the event in order to resolve it as quickly as possible.

This difference in the timing of the measures explains why it is important to deal with the potential events separately through independent risk and issue registers. A risk can develop and transform into an issue. If an issue was previously identified as a risk, it is important to record it within the risk register. A risk can become an issue if, despite the implementation of mitigation measures, the risk is not entirely eliminated and the threat remains. Residual

risk, or a risk that is impossible to control (e.g., flooding), must be monitored closely by project members.

2.2 The four phases of the project

Each risk and issue are associated with the specific project phase during which it occurred (issue) or is most likely to occur (risk). The four phases are:

1- Project set up: This initial phase of the project involves the launch of the initial studies and analysis. It is also known as the pre-project phase. During this phase, objectives are set and initial guidelines are laid out in order to meet these objectives. This is also the phase where the team and main contributors are identified, in order to establish who is involved in and affected by the project. A feasibility study is carried out to identify the main issues that may arise during the project and determine the scope of the project. The deliverables are also set out at this phase. Public acceptance of the project is essential during this phase.

2- Design and planning: During this phase, team members set out the project's main areas of focus, establishing what needs to be done, how it should be done and with what means. This is the phase in which the budgets are calculated, to estimate and establish the costs involved in implementation of the project. This phase lays the groundwork for the creation of a project plan containing the schedule, tasks to complete and the various constraints. This is the phase where the risks and issues must be anticipated, so that solutions can be implemented to avoid disrupting the project delivery and impacting its success/implementation

3- Implementation and construction: Once the project plan has been drawn up and the project partners identified, the execution phase can begin. This involves the practical implementation of the different tasks. The planned actions are carried out to meet the completion of the project. During this phase, the various project partners and members ensure compliance with the planned actions, schedule and expenses, and intervene if any changes are needed. This phase also sees an increase in communications about the project with stakeholders and the public, to keep them informed of the work progress. This phase ends when the various operations are completed and approved.

4- Post construction: This is the phase for assessing the result once the work is completed. It provides an opportunity to harness the value of the various aspects of the project and learn the key lessons.
In the case of climate change adaptation projects, this phase also involves the implementation of follow-up actions to measure the positive outcomes of the project. Beneficial outcomes may only become apparent several years after the project implementation, so follow-up work needs to be planned accordingly.

2.3 Risk register

The register is a tool which highlights the main identifying features of the risk and describes it. This information can then be used to implement effective measures in advance, in order to mitigate or even eliminate the risk. Risks are categorised according to the phase in which they may arise or become an issue. The same risk may appear in several phases of the project. In the register, risks are recorded against the phase where they are most likely to arise.

ID: number used to link the risk to the issues register and to the associated solution (mitigation measures) (WP T1.2.1).

Project phase: Phase in which the risk is most likely to transform into an issue. Once the project phase is completed, the risk may remain and it can only be eliminated if it is linked to a specific phase.

Identification phase: Phase in which the issue was identified.

Risk identification: risk name. This name shall be reused in the issue register if the risk evolves, and shall also be reused in the solution register (Deliverable WP T1.2.1).

Nature of the risk: establishing the nature of the risk is the first step towards determining the risk type. There are several different types of risk:

- Financial: costs which exceed estimates, budget shortfall, etc.
- Landownership: all risks linked to property management.
- Human: all risks for which humans are directly responsible. This risk type ranges from poor communication with the general public to fears that may be felt by the partners and public regarding the project.
- Project management: this risk relates to the various aspects linked to project construction and development.
- Lead times/schedule: delays on the part of contractors or suppliers; poor estimations of timeframes. Deviation from schedule due to poor initial estimation of the time needed to complete tasks.
- Technical: the project involves the use of a new programming language or a new technique that staff are not yet familiar with, unsuitable software, breakdown of outdated hardware
- Legal: regulations and laws to comply with, bankruptcy of a supplier, etc.
- Environmental: negative impacts of the project on the environment, or an environment-linked event that has an impact on the project (flooding, drought, storm, etc.)
- Organisational: change in the company policy, economic changes, inappropriate allocation of responsibilities for given tasks, several people assigned to the same tasks without a clear division of roles, insufficient involvement of stakeholders and, in particular, of the project sponsor(s).
- Public perception: the type of construction work and the image conveyed by project partners have a direct impact on the public's perception of the project.

Risk description: Description of the main aspects. This description also sets out the causes of the risk.

Impact(s)/consequence(s): identification of potential impacts which may occur when a risk transforms into an issue. These impacts may have serious consequences for the progress of the project. Thinking about these possible impacts can help staff to find solutions to eliminate or mitigate the risk and its impacts.

Site: this is a European project with two different sites (the Otter and the Saâne). Even though these two projects are similar, differences may arise, particularly as a result of external factors. It is therefore important to state whether the risk in question applies to one site or both.

Probability x Impact = Criticality: these three columns help to evaluate and rank the risks (see part: Risk assessment) before solutions are found and implemented to mitigate the risk.

Risk that has become an issue: this final column in the risk register can be used to indicate risks that were identified but changed into issues. This serves to keep a record of the risks which did ultimately materialise.

2.4 Risk assessment

Risk assessment is carried out in a qualitative manner. It takes two factors into account: **impact** and **probability**. When these two factors are multiplied together, they provide the **criticality** of a risk. This method enables risks to be quickly sorted and ranked in order of priority. Probability is measured on a scale of 1 to 4, where 1 is "*very unlikely*" and 4 is "*very likely*". Impact is also measured on a scale of 1 to 4, where 1 describes a "*minor*" impact and 4 a "*catastrophic*" impact. The qualitative method is the most effective way of swiftly sorting risks and ranking them in order of priority. If the probability is high (4) and the impact is "*severe*" (3), the allocated score will be 12 (4x3). It is important to use the same method across the whole project. When assessing risks or filling in the columns, inconsistency of approach between members of the same team can hamper the identification, monitoring and prioritisation of risks. To prevent such inconsistencies from occurring, it is important for all members of the project to meet in order to mention all the risks and issues, and thereby allocate consistent scores.

Criticality	X	Impact			
		1 - Minor	2- Significant	3 - Severe	4 - Catastrophic
Probability	1 - Very unlikely	1	2	3	4
	2 - Unlikely	2	4	6	8
	3 - Likely	3	6	9	12
	4 - Very likely	4	8	12	16

Criticality = Impact x Probability

The criticality level can be used to assess whether a risk is potentially dangerous for the project and classify it in one of four categories. The grid is made up of four columns and four rows, covering the impact and probability factors mentioned previously. Scores therefore range from 1 to 16 and are distributed across four criticality levels. Scores ranging from 1 to 3 represent a "***low***" risk, while 4 to 7 is a "***moderate***" risk, 8 to 11 a "***significant***" risk, and 12 to 16 a "***critical***" risk.

Criticality	Score	Colours
Low	1 to 3	
Moderate	4 to 7	
Significant	8 to 9	
Critical	10 to 16	

This assessment can be used to create an order of priority for managing the risks and assist in implementing enhanced measures to monitor risks that have a high criticality.

2.5 Issue register

The issue register is developed in the same way as the risk register. Some of the columns (ID, project phase, issue identification, nature of the issue) are similar to the risk register. For risks already identified in the first register, the same information simply needs to be transferred into the issue register.

Issue description: Explanation(s) of why the issue occurred.

Impact(s)/Consequence(s): Impacts and consequences of the issue when it materialises and affects the project. Impacts on the project objectives may be financial, may affect the image of the project or the biodiversity protection objectives.

Identification date: Date on which the issue arose.

Resolution date: Date on which a solution was applied in order to eliminate the issue.

Issue status: Current status of the issue. A number of status options are available for each issue.

- Resolved: the issue has been eliminated and is no longer a threat.
- Processing: a solution has been found and is being implemented.
- Ongoing: the issue is still ongoing, and no solution has yet been found or implemented to combat it.

Priority: Like the criticality levels for risks, issues will also be assessed according to their priority. This method will help to determine which issues need to be dealt with as a priority.

2.6 Assessment of issues

Issues are assessed in the same way as risks. In order to rank the issues according to their level of priority this is calculated using a matrix:

- Impact, corresponding to the magnitude of the consequences
- Urgency, which can be expressed by the probability of the issue arising

The priority is determined by multiplying these two factors together **Impact x Urgency = Priority**

The table below shows how to multiply the impact by the urgency to obtain the priority index ranging from 1 (minimum) to 5 (maximum). Defining the impact and urgency across three levels makes the assessment process easier.

Priority	X	Urgency		
		1 - Low	2 - Moderate	3 - High
Impact	1 - Low (incident)	1	2	3
	2 - Severe (accident)	2	4	6
	3 - Critical (catastrophic)	3	6	9

Priority	Score	Colours
Not a priority	1	
Low priority	2	
Priority	3 and 4	
High priority	6	
Top priority	9	

The priority levels can be classified into five categories to provide a broader scale on which to interpret the priorities and make it easier to rank the issues into priority order.

2.7 How to interpret the registers - example

To help you interpret the register, here is an example relating to risk R20:

This risk was identified in advance and the probability of it materialising as an issue is highest in the final phase of the project (post-construction). Named "*Floodplain reconnection can restore natural processes of erosion and sedimentation*", the nature of the risk is environmental and may occur in both valleys as follows: "*Due to the reconnection of the rivers to the sea, the tide will access the floodplain. The new volumes of water or changes in its movement may cause erosion or sedimentation. These processes will be observed especially at the toe of existing or new structures (e.g., bridges) where the flow velocities may be high.*". If this risk materialises, there could be impacts and consequences for both valleys. If the risk transforms into an issue "*Erosion could destabilise structures (e.g., bridges, embankments) and excessive sedimentation could affect the flow of water in the creek networks. In addition, changes in water movement flow may impact on existing access or on adjacent habitats which may be protected (for example SSSI in the Otter Valley).*".

Given the construction of the rigid-framed bridge in the Saâne valley and the bridge in the Otter valley, this risk is relevant to both sites. If nothing is done to mitigate this risk, it is "*very likely*" (4) to materialise, and this could have "*significant*" impacts (2). With a score of 8 (4 x 2), therefore this risk is "*significant*", meaning that preventative measures need to be implemented. To date, this risk has never evolved to become an issue.