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DEFINING ADAPTATION NEEDS, COUNTING ADAPTATION FINANCE AND ENABLING ACTIONS AT NATIONAL AND EUROPEAN LEVEL FINAL REPORT



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EUROPEAN LEVEL
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Contents

1.	Task 1 - Domestic adaptation needs and finance	1
1.1	Tracking adaptation budgets in EU and national policy documents	1
1.2	Accounting for expenditure with adaptation as a secondary objective; taking stock of different approaches.	3
1.3	Risks of double counting in adaptation cost tracking systems	9
1.4	Maladaptation and how to avoid it	10
1.5	Evaluation of effectiveness and efficiency of a set of actions	14
1.6	Summary	20
2.	Task 2 – Adaptation enabling activities	21
2.1	What are enabling activities for adaptation	21
2.2	Reflections on upstream nature of enabling activities	28
2.3	Potentially additional economic activities as enabling activities	31
2.4	Economic activities that can be considered to always enable adaptation	35
2.5	Technical Screening Criteria for enabling activities	38
2.6	Estimating the costs and benefits of the enabling activities	39
2.7	Enabling activities technical screening criteria and greenwashing risk	41
2.8	Summary	42
3.	References	43
Appendix 1 - Overview of definitions of “enabling activities” in the context of the EU taxonomy		47

1. Task 1 - Domestic adaptation needs and finance

1.1 Tracking adaptation budgets in EU and national policy documents

This section aims to get an overview of how adaptation budgets and ancillary costs and benefits for adaptation are considered in EU and national policy documents. Ancillary costs and benefits are defined as the costs and benefits for adaptation as a side-effect of measures for another purpose.

Tracking adaptation budgets at EU level

The European Commission allocates their budgets for periods of seven years. The most recent completed budget period is 2014-2020. For the budgets in this period, the EU used a climate coefficient methodology to quantify climate spending in the EU (ECA, 2022). This means that for each budget item, one of three coefficients is applied to indicate the extent to which the budget item is relevant to climate objectives. There are three general levels of relevance that constitute the coefficients:

- Significant: 100% of the budget item is counted towards climate spending
- Moderate: 40% of the budget item is counted towards climate spending
- None or insignificant: 0% of the budget item is counted towards climate spending.

This system is an adapted version of the Rio markers, by which development cooperation objectives are tracked. However, it does not provide information on the (ancillary) benefits of EU spending for climate adaptation specifically. Climate mitigation and adaptation goals are considered jointly. A report by Nesbit et al. (2021) finds that although in some cases it is clear what the relevant climate policy objective is (e.g. flood defence expenditure relates to climate adaptation), in many cases, it is believed that a clear distinction between the two objectives (mitigation and adaptation) is impossible to make. This overlap occurs mostly in the Common Agricultural Policy expenditure. Due to the difficulty in distinguishing between adaptation and mitigation, an overall picture of expenditure on climate adaptation (separate from mitigation) was not made in the Multiannual Financial Framework (MFF) 2014-2020, but considered jointly with mitigation goals.

Moreover, the study by ECA (2022) concludes that reporting on climate spending by the EU was unreliable. Only the positive impacts on climate were considered, not the negative climate impacts. Additionally, the final contributions to the EU climate goals were not taken into account. Thus, this method creates a risk of inflated climate spending, since the planned or committed expenses might not be adhered to.

The underlying system for the climate markers concerns the 'Intervention Fields' (IF). By this methodology, over 100 categories of intervention are defined for different types of climate action. Each IF is marked with 0%, 40% or 100% relevance to climate action, i.e. the climate markers. COWI (2016) conducts a quantitative assessment of the allocation of finances to climate action with the European Structural and Investment Funds (ESIF), in which these IFs are used as basis. Here they assume that two intervention fields (87 and 100) are exclusively focused on climate adaptation. A few more (21, 65, 85 and 86) are marked as relevant to both adaptation and mitigation, and all other intervention fields are marked for mitigation. Budgets within the ESIF are marked with IFs, which provides a means to track the total of spending on each intervention field.

The need to reflect necessary climate resilience efforts has been expressed in the EU Strategy on Adaptation to Climate Change (EC, 2021). In this strategy, the spending target has been set at 30% of the long-term EU budget for 2021-2027, with a key focus on climate adaptation. It is also noted that there will be a financing gap, given the adaptation needs. As such, other sources of financing are being explored, such as the European Investment Bank (EIB). The EIB has expressed

full support of the EU’s Adaptation Strategy (EIB, 2020). For future investments, the EC has developed guidelines for climate proofing in new major infrastructure projects (EC, 2021). These guidelines will be expanded to various EU funding programs.

All in all, we can conclude that all EU budget is being marked with climate markers, which are allocated based on a large set of intervention fields to which the budgets pertain. In theory, this means that all activities with climate goal benefits, including ancillary benefits, are marked as such. However, this system knows some flaws, which are further discussed in section 0.

Tracking adaptation spending at country level

Ramboll et al. (2021) investigate current adaptation spending in European countries. They note that only Estonia and Czechia specify the required budget for the measures in their National Adaptation Plans (NAPs) in any detail. This covers direct adaptation investments only. As for actual spending, only Germany, Belgium and France have exercised successful climate finance landscaping, which may provide a best practice benchmark for (direct) climate finance tracking across Europe. Further, only Germany and Estonia have shown comprehensive tracking of planned adaptation expenditure with regards to their National Adaptation Plans.

We have further investigated adaptation budget tracking on a national level by analysing a selection¹ of National Adaptation Plans of individual countries. The results are summarised in the assessment matrix in Table 1.1.

Table 1.1 Assessment matrix National Adaptation Plans

Parameters	Netherlands	Belgium	Finland	Estonia	Bulgaria
Adaptation budget paragraph?	Mentioned but no explicit budget	Separate estimated budget for each measure	Mentioned, but referred to general budget procedure	Yes	Yes, financial resources chapter
Estimated budget per measure?	Not quantified in NAP	Varies from €0 to €1.2 million	Not quantified in NAP	Yes	Yes, partly quantified and partly quantitatively indicated (low, medium, high)
Funding for climate adaptation by which entity?	Ministry of Infrastructure and Water Management	Varying responsible parties per measure. National Climate Commission (NCC) mostly responsible.	Varying per measure, mostly integration into ministry duties, with potential project fundings.	Budgets are allocated to administrative areas (ministries). Lion’s share allocated to Ministry of Environment	EU funds, State budget, sale of EU Allowances.
Adaptation as main objective of the measures?	Yes, 6 priorities identified.	Yes, mostly focused on increasing awareness and coordination	Yes, mainly development of research and tools	Yes, eight subgoals with specific measures	Yes, grouped by sector

¹ The various NAPs are selected based on accessibility (written in English), a quick scan of NAPs to select variety in detail, and a distribution over regions of Europe, where possible

Parameters	Netherlands	Belgium	Finland	Estonia	Bulgaria
Estimated budget per measure?	Not quantified in NAP	Varies from €0 to €1.2 million	Not quantified in NAP	Yes	No, some metrics identified but no quantitative goals set.
Quantification of benefits?	No	Monitoring indicators developed, not monetary	No, though intention to monitor progress in annual reports	Yes, quantitative targets set for each goal	No, some metrics identified but no quantitative goals set.

From the analysis it becomes clear that there is some heterogeneity in the processing of adaptation activities and their budgets between Member States. Although financial resources and budgets are mentioned in each of the NAPs, they are not always quantified and/or consolidated. Moreover, the sources of funding differ. In most analysed countries, the budgets are integrated into the various relevant ministry budgets. For the Netherlands and Finland, for instance, a reference is made to the general national budget procedures. Therefore, it is unclear from the NAPs what the amount of budget allocated to climate adaptation is.

From the five analysed NAPs, Estonia presents a good-practice example, as was also pointed out by Ramboll et al. (2021). Budgets are explicitly given, with a responsible entity, and metrics are developed to track progress on the (sub) goals quantitatively.

The NAPs differ considerably in scope and methodology. They primarily inform about activities with adaptation as the primary goal. Ancillary adaptation benefits of other measures are generally not explicitly accounted for. Countries may have programmes with synergy that were included in the NAPs. However, from the selected NAPs it cannot be deduced whether such examples of plans with ancillary adaptation benefits exist. Moreover, there is not one method by which all Member States determine their budgets; they differ greatly per Member State, to the extent that some countries do not include their budgets at all, where other countries have outlined detailed estimations.

1.2 Accounting for expenditure with adaptation as a secondary objective; taking stock of different approaches.

This section summarises different ways to track adaptation finance, and identifies advantages, disadvantages and lessons learned. The following methods are analysed:

- Rio markers
- EU MFF climate markers, based on Rio Markers
- Methods in individual countries (France, Norway, Nepal)
- Key Types of Measures (KTMs)
- EU Taxonomy

Finally, we synthesise the key strengths and weaknesses, and summarise the lessons learned for the way forward.

Rio Markers

The Rio Markers is a system set up by the OECD Development Assistance Committee (DAC), and are a method of labelling development finance on the themes of the climate convention, among which climate adaptation is one (OECD, n.d.). Each financial flow is marked by one of three scores for each of the themes. Given the theme climate adaptation, the systems gives either of 3 scores:

- RM 1: climate adaptation is not targeted, 0% of budget is marked for climate adaptation.
- RM 2: climate adaptation is a significant objective, 40% of budget is marked for climate adaptation.
- RM 3: climate adaptation is the principal objective, 100% of budget is marked for climate adaptation

The Rio Markers have been applied since 1998, with climate adaptation as additional theme only introduced in 2010. The marking is done by international organisations on the actual allocation of their funds ('multilateral outflows').

The Rio Markers are allocated according to the 'stated objective' of the financing flow. Therefore, projects can be marked differently according to the 'intent' behind the financing, rather than the expected outcome of the financing flow. It therefore does not track the actual impact on climate objectives. Moreover, the Rio Markers are developed solely for the purpose of tracking climate aid flows outside the EU, not so much the expenditures on climate action within member states of the EU. They were developed to track progress on the pledges made during the UN climate conferences (COP's) by developed countries to assist developing countries in mitigating and adaptation to climate change challenges. They are therefore not linked to the EU policy framework (EC, 2022).

However, these Rio Markers have been the basis on which the climate markers in the EU budgetary framework are developed. The three-tiered approach of 0%, 40% and 100% relevance to the theme has been applied to the EU-relevant climate objectives. This system is further discussed below.

MFF: Climate Markers

The Multiannual Financial Framework (MFF) is the method by which the European Union's budgets are regulated. It sets annual budget caps for each broad policy area for seven years at a time. The MFF's have run from 2014-2020, and currently an MFF for the years 2021-2027 is laid out. One of the policy areas is 'Environment and Climate Action'. The EU system for tracking climate expenditure within all of the MFF is based on the Rio markers. The main difference between the EU system and the Rio Markers is that the EU system focuses on the contribution made in practice, whereas the Rio Markers are allocated based on the stated motivation of the expenditures (EC, 2022).

The main advantage of this approach is the low administrative burden and the fact that national and regional administrators have multiple years of experience with this system. Levarlet et al. (2022) also finds that compared to 2014-2020, in the budgets for 2021-2027 there is a more accurate breakdown of the intervention fields (IFs), suggesting an improvement in the use of the climate marker system. The number of intervention fields has increased from 123 to 182, each assigned a climate coefficient of 0%, 40% or 100%. Moreover, each intervention field is assessed for its contribution to both climate and environmental benefits, creating the possibility of capturing environmental co-benefits. This requires that in the total expenditures, both contributions are not added together, but considered together. Of the 182 IFs, 36 and 38 are given a 40% coefficient for climate and environmental benefits respectively, and 28 and 24 a coefficient of 100% for climate and environmental benefits respectively.

The main weakness of the climate tracker system can be found in the flip side of the simplicity of the system. Because there are only three levels, it is challenging to differentiate and accurately quantify the actual expense on adaptation within the interventions. It may also lead to 'boundary issues', as found by Nesbit et al. (2021): when is expenditure sufficiently aimed at climate objectives to be considered 40% relevant to climate expenditure? Such challenging considerations can produce potentially trivial allocations to climate objectives, reducing the accuracy of the resulting grand total of EU climate expenditure.

Moreover, whereas the Rio Markers track climate adaptation and mitigation separately, the EU framework has combined these two climate objectives together in one category. In many cases, this might be appropriate, as the two goals cannot always be distinguished. However, in other cases a project may only be relevant to either of two programmes. This limits the capacity of the climate marker system to track expenditure on climate adaptation only. One solution may be to expand the framework by splitting the climate category into mitigation and adaptation, although such an approach may lead to increased risks of double counting, while now it is difficult to see ancillary impacts for either adaptation or mitigation for measures with a primary aim focussing clearly on one of them. The risk of double counting will be further addressed under 1.3.

The climate marker system seems to cover the whole of the EU MFF, with a relatively simple manner to track general climate expenditure within this framework. It does come with a few pitfalls in terms of tracking climate adaptation finance, namely the difficulty in separating adaptation and mitigation finance, and the inaccuracy of allocation as caused by applying the distinct 0, 40 and 100% multiplication factors.

Tracking systems in different countries

Other, national, approaches that avoid the use of the 100%, 40% and 0% Rio Markers approach include the recently implemented French and the Norwegian system currently under development (Nesbit et al., 2021):

- The French system does not quantify expenditures, but assigns either the marking 'favourable', 'neutral' or 'unfavourable' contribution to each of six different environmental factors. These are broadly based on the environmental factors as defined in the EU's Taxonomy regulation. This system does not attempt to work towards a grand total of climate expenditure, but rather identifies where climate objectives are considered in expenditure, and explicitly states when expenditure has negative side effects on climate objectives.
- The Norwegian system is still in development but has the ambition to quantify the *impact* of interventions on the climate objective of reducing greenhouse gas emissions, rather than quantify government *spending* on interventions aimed at climate objectives. This ambition is still associated with important methodological issues: how to measure the effect of expenditures on emissions? These problems need to be overcome in order for the system to be implemented. If successful, this method would be suitable for an analysis of expected effectiveness of the measures, but does not explicitly track the associated budgets.

An interesting example from outside Europe is Nepal. Nepal has adopted a 'Climate Budget Tagging' process. Each budget line of different ministries is tagged as being either climate relevant or not. There is a list of eleven climate relevant categories that can be applied. Demarcations are set at 20% and 60% for climate relevant programmes: if less than 20% of the budget is climate relevant, the programme is marked 'neutral'. If the climate relevant percentage exceeds 60%, it is marked as 'highly significant' and between 20% and 60% the marking is 'significant'. Nepal is still developing this method and attempting to refine it. As with the climate marker system, some weaknesses in this method can be identified as not being very precise and subject to the risk of overestimating total climate expenditure.

In conclusion, some national methods have been adopted in France, Norway and Nepal that stray from the Rio Marker approach. They each come with some benefits, but some flaws remain apparent. In general, it is challenging to design a system that is both simple in use and accurate enough for general climate adaptation financing tracking.

Key Type of Measures (KTMs)

In 2020 ETC/CCA developed a common framework and reporting approach for climate adaptation measures. The aim is to allow clustering of adaptation options and measures across Member States in the form of Key Type of Measures (KTMs). The concept of KTMs was initially developed in 2012 to simplify reporting under the Water Framework Directive (WFD) and was further advanced in 2014 (ETC/CCA, 2020). The proposal is to use five KTMs, 11 Sub-KTMs and over 25 specifications to link various attributes together:

- A: Governance and Institutional
- B: Economic and Finance
- C: Physical and Technological
- D: Nature Based Solutions and Ecosystem-based Approaches
- E: Knowledge and Behavioural change

Examples of KTMs are given in section 2.3.

This KTM approach was applied for the first time in the national adaptation reporting under the Regulation on the Governance of the Energy Union and Climate Action in 2021. Eight EU Member States (Austria, Czechia, Denmark, Estonia, Germany, Hungary, Portugal and Slovakia) voluntarily reported in total 228 KTMs in 2021.

The KTM approach is aimed at enhancing comparability and eases reporting procedures under the Energy Union Governance Regulation and its Implementing Act. The KTM approach also allows better comparisons and assessments of climate adaptation at the EU level. It is, however, not as much concerned with budget tracking, as it is with monitoring progress on types of measures related to adaptation (ETC/CCA, 2021).

One of the main desired advantages of KTMs for adaptation is the improvement of the quality of reporting, both in terms of the information itself and the interaction with the user. In turn, more harmonised reporting, increased relevance and usability of reported data and clearer outputs are expected to support the enhancement of adaptation policy making, implementation and monitoring at the EU-level and consequently at the level of the EU Member States (ETC/CCA, 2021).

However, experience with the use of KTMs in the eight EU countries makes clear that the KTMs do not provide insight into the progress in *implementing* adaptation measures, nor does it add information in terms of budgetary tracking, compared to e.g. the current climate markers. Moreover, it is noted that there might be adaptation measures that go unreported, because of difficulty in detecting them as adaptation measures. Therefore, there remains a need to precisely define what adaptation measures are in order to ensure a correct labelling of actions.

In terms of lessons learned, an added value of the KTM approach is that it attempts to capture ancillary adaptation benefits in general measures. However, it also proves difficult in practice: it is challenging to separate ancillary from primary impacts in terms of climate adaptation.

Moreover, the KTM approach might add benefits through the categorizing of various types of climate adaptation action, using the KTMs, sub-KTMs and specifications. This would require a further definition of climate adaptation actions such that they can all be labelled correctly, without omitting relevant measures with (ancillary) benefits.

EU Taxonomy

The EU taxonomy is a classification system, establishing a list of environmentally sustainable economic activities. It entered into force in July 2020 (EC, 2023). The EU taxonomy would provide companies, investors and policymakers with appropriate definitions for which economic activities can be considered environmentally sustainable. It would be an economy-wide system, which is

positive for harmonization and transparency, even though there has been debate on the 'sustainability' of identified sustainable activities (such as nuclear energy). The Taxonomy Regulation establishes six environmental objectives, including climate adaptation.

In the coming years, the EU Taxonomy may become more relevant to the classification of public adaptation spending (Ramboll et al., 2021). However, a full application seems difficult currently, due to a lack of data-availability. Nevertheless, the Taxonomy can still be useful in a different manner. For example, the Rio Marker approach could be augmented by applying the EU Taxonomy instead, adding a higher level of granularity. A mapping between the EU Taxonomy mitigation criteria and the Rio Makers for the EU budget shows that this approach has potential. Such a mapping should be repeated for adaptation criteria, with a view to national public spending.

It is important to note that the EU Taxonomy does not cover many adaptation activities financed by public institutions yet. Hence, a further development of the EU Taxonomy should be sought on the Platform on Sustainable Finance for this purpose, which covers Nature-based Solutions (NbS), environmental approaches and emergency services (Ramboll et al. 2021). The EU Taxonomy can also be used in the process of finalising the KTM. Its adaptation principles² could be a useful guide for the formulation of key adaptation measures in case the full rollout of the EU Taxonomy is not possible (Ramboll et al., 2021).

Summary: Lessons learned

Above, we have discussed a number of different tracking systems in place or in development. In Table 1.2 below, we summarise the strengths and weaknesses of each approach.

Table 1.2 Strengths and weakness of various climate expenditure tracking methods

Approach	Strengths	Weaknesses
Rio Markers	<ul style="list-style-type: none"> Relatively simple in application Distinction between mitigation and adaptation 	<ul style="list-style-type: none"> Based on 'intent' of financing, not expected outcome No link with overarching EU policy framework Limited accuracy
EU Climate Markers	<ul style="list-style-type: none"> Relatively simple in application Experience among policy makers in its use Can capture environmental co-benefits 	<ul style="list-style-type: none"> No distinction between adaptation and mitigation Risk of overestimation total climate expenditure Limited accuracy
France	<ul style="list-style-type: none"> No risk of double counting Can capture negative side benefits 	<ul style="list-style-type: none"> No quantifiable adaptation expenditure figures
Norway	<ul style="list-style-type: none"> Focused on impact rather than expenses alone 	<ul style="list-style-type: none"> Methodological issues: need to quantify impact on emissions No approach to identifying impacts beyond emissions, such as adaptation
Nepal	<ul style="list-style-type: none"> Multiple environmental factors included 	<ul style="list-style-type: none"> Limited accuracy

² The principles are, summarised: (i) based on a climate risk assessment and no adverse effect on climate adaptation (ii) favour nature-based solutions (iii) consistent with adaptation efforts on other policy levels (iv) monitored and measured against pre-defined indicators (v) complies with do no harm principle

Approach	Strengths	Weaknesses
		<ul style="list-style-type: none"> Risk of overestimation total climate expenditure
Key Types of Measures	<ul style="list-style-type: none"> Improves harmonisation of adaptation reporting Potential to capture ancillary vs. primary adaptation impact 	<ul style="list-style-type: none"> No apparent added value for budget tracking in itself Need for extensive definitions to ensure correct labelling
EU Taxonomy	<ul style="list-style-type: none"> Economy wide system, so widespread use, allows harmonisation 	<ul style="list-style-type: none"> Lack of data-availability limits application of full system.

From the analyses we conclude with some lessons learned:

- **Simplicity of a system is important.** Although the current climate markers do not provide a high level of accuracy, they are consistently applied within the EU MFF, providing some indication of climate spending overall. Given the experiences in Norway and from the KTM, adding a higher level of granularity may lead to gaps in its application and methodological issues that delay the process.
- **Adding environmental categories is possible, but is paired with risks of double counting.** Examples such as the French, Nepalese and KTM system have included more different environmental categories to be tracked within the financing system. It should be noted that marking expenditures with relevance to multiple climate objectives can increase the risk of expenses being counted twice toward a grand total. A tracking system should include a mechanism to avoid such inflation of climate expenditures.
- **Distinguishing between spending, intent and impact is important.** Tracking systems can be set up with the goal of tracking different metrics: pure spending on climate objectives, measuring actual impact on climate objectives (as intended in Norway), or tracking the intent to tackle climate objectives (such as in the Rio marker system). Each focus can lead to different results. When tracking climate adaptation expenditure, it is not just relevant to reach a certain spending goal, but to ensure that the climate goals are being reached as well. Therefore, metrics to track climate action expenditure should be complemented with an assessment of the effectiveness (impact) for the climate objectives. A potential avenue to explore could be the resilience rating system by the World Bank, as described in Box 1.1.

Box 1.1 World Bank Resilience Rating System

The World Bank has developed a resilience rating system. This system aims to rate the resilience of projects or investments according to climate resilience. It is designed to, for instance, rate the confidence in the achievement of expected climate outcomes of a project. The method puts forward guidance and specific criteria to assess projects along these resilience aims. It also provides the possibility to assess the extent to which climate, disaster risk and adaptation measures are incorporated into project proposals. The main aims of the Resilience Rating System are to better inform decision makers on the resilience of investments and projects; incentivise the implementation of climate adaptation measures; identify best practices across sectors and countries; and to guide project developers in optimising risk management in projects (World Bank, 2021).

A system like this could potentially add a quality dimension into a tracking system, rather than only the binary 'yes/no' system as follows from the climate marker system. It could add to the monitoring and evaluation of investments marked relevant to climate objectives.

1.3 Risks of double counting in adaptation cost tracking systems

This paragraph aims to identify potential double counting risks in the tracking of climate adaptation costs. Moreover, it aims to identify methods by which these risks can be mitigated.

Risks of double counting

Double counting refers to the situation where expenses for one climate objective, are also counted towards another climate objective, e.g. both climate mitigation and adaptation. When this happens, the expenses cannot simply be added together to estimate the total climate expenditures. The risk of double counting increases with further disaggregation of information, as more objectives may overlap. When it is not clearly stated that the same expense may serve multiple objectives, such double counting will occur more (Nesbit et al., 2021).

Double counting versus synergy

Before going into the methods to mitigate the risk of double counting, we discuss the issue on a broader level. A report by the European Court of Auditors (ECA, 2022) mentions that double counting has a negative connotation, whereas the underlying situation may not be necessarily negative. Double counting means that an investment serves more than one climate goal, which is generally a beneficial situation. Therefore, it is suggested that it is more appropriate to speak of 'synergy' rather than double counting.

Synergy in climate goals is, on the whole, beneficial for reaching climate goals. Whether or not synergy poses an opportunity, or a risk (of double counting) depends on the point of view. In terms of budget tracking, focus is held on the 'risk' of double counting of the expenditures, which leads to the earlier mentioned risks of overestimation of total climate expenditures. This is, however, only relevant when the metric of total climate spending is used to track progress on goals, as is done in the EU framework: 30% of the 2021-2027 EU budget should be spent on climate action.

In terms of reaching climate goals (outside spending goals), the synergy underlying 'double-counted' expenditures should be viewed as a positive development. We note that there is some tension between these two approaches. Keeping this observation in mind, some methods to alleviate this tension are outlined below.

Methods to avoid double counting

In the current climate marker system used by the EU, there is no distinction made between climate adaptation and climate mitigation. There is, however, a biodiversity category. For each intervention field, a climate marker is identified for each of the two categories (Levarlet et al., 2022). This allows for identification of synergies within projects³, but may also lead to overestimation of total climate expenditure when both goals are added together. Various avenues may be taken to mitigate the risk of double counting:

- **Abstaining from aggregating expenditures over multiple (climate) objectives.** This will avoid the overestimation/inflation of climate spending, as a grand total will not be presented. This avenue should be combined with clear communication that overlap between different

³ The synergies and trade-offs between climate and biodiversity expenditure are complex. Even when both objectives are explicitly stated, aggregate impacts at system level are not straightforward. As an example, extensification measures in agriculture may increase local soil carbon and biodiversity, but have negative effects at system level through burden shifting and global footprint effects. Similar complications apply to peatland restoration. Moreover, the timescale at which climate neutrality or biodiversity gains can be expected varies widely. The impacts at different spatial and timescales cannot be accounted for in simple budget figures.

objectives exists, such that it is clear that total climate expenditure cannot be deduced from adding the different categories together.

- **Adding (synergy) categories.** A solution would be to create more climate categories, i.e. splitting mitigation and adaptation, and adding a synergy category, that allows for a contribution to multiple goals. For instance, if a project is both relevant for climate adaptation and mitigation, they could be marked only in a synergy category for adaptation and mitigation. This does allow for all expenses to be summed into a grand total of climate expenditure and may contribute to creating a Venn-diagram-like overview of climate spending on various categories. This method adds a level of granularity to the climate marker system without much overcomplication, but the shortcomings of the climate marker system persist. Moreover, an exact picture of spending on only climate adaptation is still not entirely possible, due to overlaps within the synergy categories.
- **Abandoning the quantification of climate adaptation expenditure.** An example of a system in which double-counting is less of a risk is the French system. In this system, expenditures are only identified as having a favourable, neutral or unfavourable contribution to each of six different environmental outcomes. This identified the fact whether or not there is a positive or negative effect on climate adaptation, but does not state how much expenditure is involved (Nestbit et al., 2021)

1.4 Maladaptation and how to avoid it

The concept of maladaptation has existed in scientific literature for over two decades, with mentions of the phrase appearing as early as the 1990s (Smit, 1993; Burton, 1996; Scheraga and Grambsch, 1998). Shortly thereafter, a concrete definition of maladaptation emerged in the IPCC's Third Assessment Report as "*any changes in natural or human systems that inadvertently increase vulnerability to climatic stimuli; an adaptation that does not succeed in reducing vulnerability but increases it instead.*" (McCarthy et al., 2001). This definition contains the core concept at the center of maladaptation: it is the result of adaptation that causes an inadvertent increase in vulnerability to climate impacts. The notion of maladaptation received more attention in the IPCC's Fifth Assessment report, which defines maladaptive actions as those that "*may lead to increased risk of adverse climate-related outcomes, increased vulnerability to climate change, or diminished welfare, now or in the future*" (Agard et al., 2014). In this expanded definition, Jones et al. (2015) highlight the addition of *welfare*, which recognises that while reducing climate risk may be the primary objective of adaptation actions, there can be broader implications on economic, social, or cultural factors.

The European Green Deal Communication and the Inter-institutional Agreement accompanying the 2021-2027 MFF includes references to the "Do no harm" principle which states to avoid inflicting damage on the environment (European Commission 2019, European Parliament et al. 2020). Article 17 of the EU Taxonomy Regulation (explored in detail in the Task 2 portion of this report) defines what constitutes 'significant harm' of economic activities linking to six environmental objectives (European Parliament & Council of the European Union 2020). For economic activity related to climate adaptation it says that significant harm can be expected if adaptation actions lead to an increased adverse impact of the current climate and the expected future climate, on the activity itself or on people, nature or assets.

Figure 1.1 Concept of adaptation outcomes over time

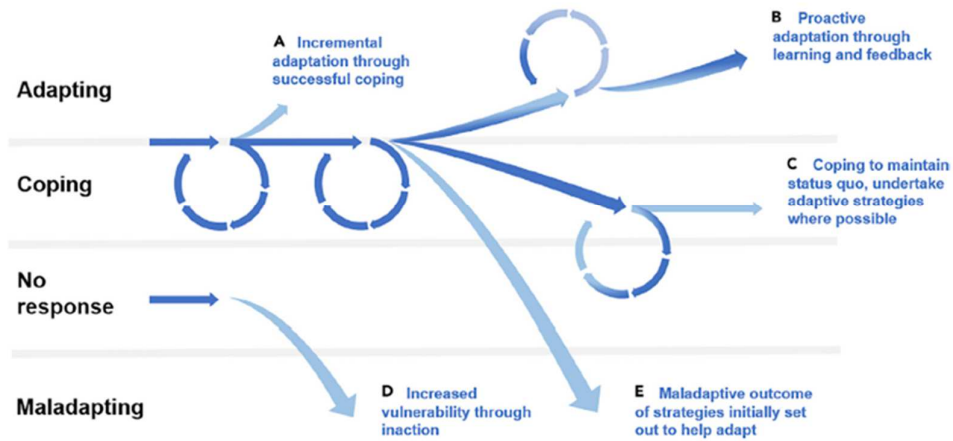


Figure 1. A Conceptual Diagram of Adaptation Outcomes over Time, Including Maladaptation

Coping strategies are short-term actions that help people get through a difficult time, usually undertaken with a belief that the “normal” situation will soon return. Coping strategies are usually high-cost and can become maladaptive over time if the situation does not improve. The figure describes different outcomes.

(A) An adaptation strategy can start out as a coping strategy focused on the short term, but then build resilience incrementally, so that it eventually leads to positive adaptation.

(B) An adaptation strategy can go through incremental stages of effectiveness, but then succeed based on learning.

(C) A coping strategy with short-term implications can be applied several times without allowing people to adapt fully, but also without making them more vulnerable.

(D) No response to a changing climate will eventually lead to increased vulnerability to climate change and can be considered maladaptive.

(E) Strategies that start out to adapt or coping can become maladaptive over time.

Adapted from Singh et al (2016).

Source: Schipper, 2020

Scholarship focused on maladaptation only began to solidify in the last decade or so, with numerous studies proposing definitions, characteristics, and frameworks through which to consider maladaptation. While most studies agree on the central element of maladaptation, debates persist as to whether this applies only to the location, ecosystem, or population where the adaptation was planned (Magnan et al., 2016). For example, a definition proposed by Barnett & O’Neill (2010) states that maladaptation “increases the vulnerability of other systems, sectors or social groups.” Here, the key word “other” implies that maladaptation does not, in principle, occur upon the location or people who have initiated the adaptation effort (Magnan et al., 2016). Further distinctions arise, for example, on how to treat maladaptation in the context of planned vs. autonomous adaptation. To this effect, Juhola et al. (2016) propose that maladaptation should only apply to planned adaptation, stating: “A negative outcome of an autonomous adaptive action should not be defined as a maladaptive outcome since the intention of the policy or measure was not to adapt in the first place.”

With this in mind, Juhola et al. (2016) go on to propose three different types of maladaptation:

- “Rebounding vulnerability,” which increases the vulnerability of the implementing and/or targeted actors (i.e. by increased exposure or sensitivity, or decreased adaptive capacity);
 - For example, a policy encouraging farmers to sell their land and take up jobs in other sectors similarly vulnerable to climate change may appear to offer short-term wage and security benefits, but is maladaptive as the farmers have no option to return to farming when the new sector faces challenges and job cuts (Schipper, 2020).
- “Shifting vulnerability,” which increases vulnerability of external actors;
 - A simple example of this would be when irrigation is developed upstream as a response to water insecurity, water is removed from the river and reduces water availability for populations downstream (Schipper, 2020).

- “Eroding sustainable development,” which creates generally negative side effects to environmental, social, and economic conditions, without specifying the affected actors.

The Box below provides information on practical examples of maladaptation.

Box 1.2 Maladaptation case studies

The literature on maladaptation (and adaptation, more broadly) contains numerous case studies and practical examples of maladaptation explored through the various dimensions discussed above. Barnett & O’Neill (2010) assess their five types of maladaptation through the case of water management in Melbourne, Australia. The combination of low rainfall levels and climate change have led to a water crisis in the State of Victoria, with the government announcing two projects to address water needs: a desalination plant and a pipeline for inter-basin transfers. In their paper, the authors explore how these projects could lead to maladaptive outcomes in each of the five categories identified. Both, for example, will require high amounts of energy and thus increase greenhouse gas emissions. The desalination plant is proposed to be built on sites significant to the Aboriginal community, and the costs for both projects are expected to be recovered via increased water costs, which will disproportionately affect low-income households. Both projects are also large infrastructure projects, which inherently lead to “lock-in” and reduce flexibility to respond to future climatic, economic, or environmental changes.

Magnan et al. (2016) present a set of four case studies to demonstrate their critical dimensions of maladaptation (maladaptation as a process, multiple drivers, spatial scale, and temporal scale). A case study from Cape Town, South Africa highlights an instance of maladaptation at private residences located close to the shoreline and subject to erosion of their coastal banks during storm surges. In response, the owners’ association installed sand bags along the bank to reduce erosion. This resulted in numerous unexpected consequences, such as a loss of beach area and thus a reduced recreational area and tourism value, as well as biophysical impacts since the bags were not UV-resistant and thus broke apart releasing plastic into the surrounding environment. The case study is used to highlight especially the spatial aspect of maladaptation – especially how a local response can have wider implications, as well as the temporal element related to urban planning and future similar development.

Avoiding maladaptation

Barnett & O’Neill identify five key characteristics of maladaptation, which were developed into five principles for avoiding maladaptation by Magnan (2014), see Table 1.3. These five principles are helpful starting points for key considerations in developing adaptation measures and strategies. Firstly, the authors note that adaptation initiatives should not increase greenhouse gas emissions, which would lead to feedback between increasing emissions and the need for adaptation. Second, adaptation efforts should be socially and economically equitable, ensuring that certain populations or sectors (especially those most at risk) do not face increasing climate vulnerability. In general, adaptation strategies should focus on lower-cost actions and measures, avoiding initiatives that may have high costs in the longer term. Additionally, adaptation should incentivise and encourage further adaptation, rather than creating dependence between actors. Finally, adaptation initiatives should avoid “lock-in” to one particular approach (as is often the case with large infrastructural investment), and rather incorporate flexibility into the strategy.

Table 1.3 Principles for avoiding maladaptation

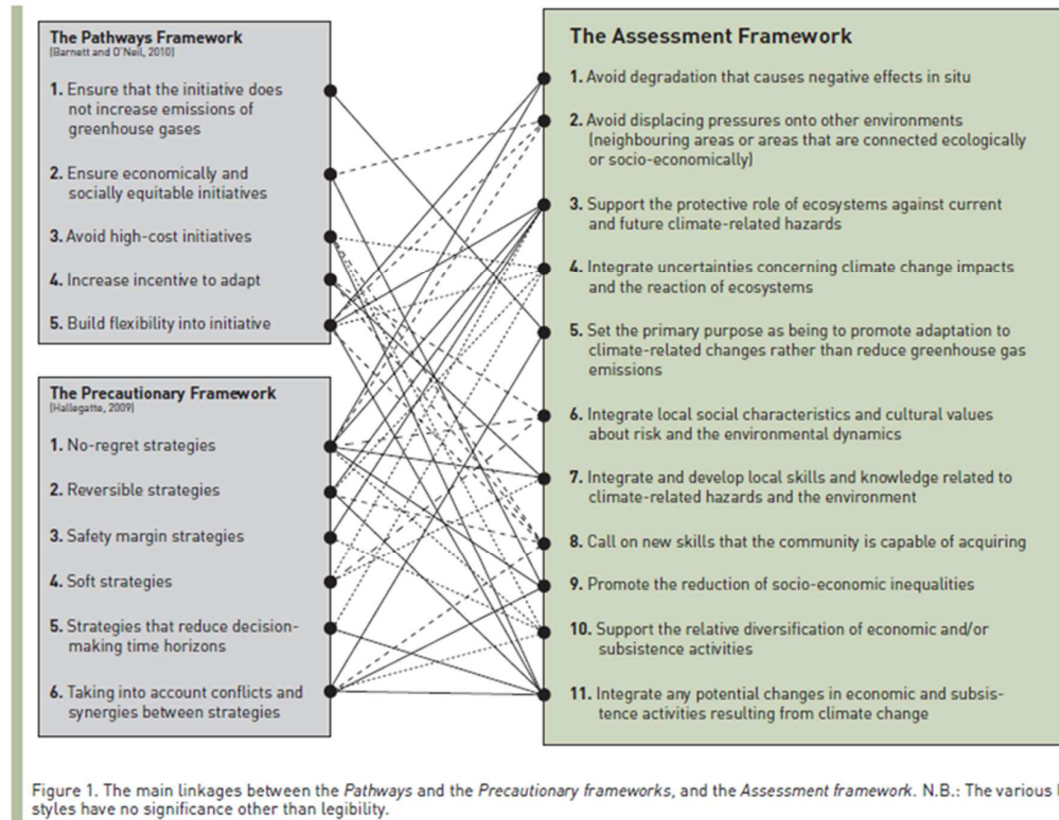
Table 1. The five principles of the *Pathways framework* (adapted from Barnett & O'Neill, 2010). The first column lists the characteristics of maladaptation identified by Barnett & O'Neill, and the second column reformulates this as principles for avoiding maladaptation.

Characteristic of maladaptation	Principle for avoiding maladaptation	Justification
Increasing emissions of greenhouse gases	1. Ensure that the initiative does not increase emissions of greenhouse gases	"The problem with energy-intensive adaptation actions is that while they may address current needs, they create a positive feedback by increasing emissions of greenhouse gases, thereby increasing the likelihood that further adaptation to climate change will be required in the future" (p.212). Adaptation must not contribute to increasing greenhouse gases emissions, as mitigation and adaptation are complementary means and goals of the fight against climate change.
Disproportionately burdening the most vulnerable	2. Ensure economically and socially equitable initiatives	"Adaptation actions are maladaptive if, in meeting the needs of one sector or group, they increase the vulnerability of those most at risk, such as minority groups or low-income households" (p.212). Strengthening part of the society by weakening the most vulnerable cannot be a sustainable option, as it will very likely result in an increase in pressures on other natural and human systems (vulnerability increase).
High opportunity cost	3. Avoid high-cost initiatives	"Approaches may be maladaptive if their economic, social or environmental costs are high relative to alternatives" (p.212). Cost-benefit analyses (on economic, social, environmental... dimensions) should be conducted before choosing the right option to implement. Neglecting such an approach can lead to adopting options that are too costly in the long run.
Reduce incentive to adapt	4. Increase incentive to adapt	Actions are maladaptive if "they reduce incentive to adapt, for example by encouraging unnecessary dependence on others, stimulating rent-seeking behaviour, or penalising early actors" (p.212). The involvement of community, economic and policy bodies into an adaptation process is of major importance to allow its achievement. This multilateral involvement however relies on various elements such as equity, risk perception, power relations, etc. that must not be eroded.
Path dependency	5. Build flexibility into the initiative	"A major issue with large infrastructural development [the one considered in the authors' case study] is the way they commit capital and institutions to trajectories that are difficult to change in the future" (p. 212). This deals with the extent to which present choices (here, infrastructural) can restrict the range of future options, and thus reduce the room for manoeuvre of the system in the future. This criterion refers to the generation of irreversibility and the induced decrease in the system's flexibility.

Source: Magnan (2014)

In their paper, Magnan (2014) puts forward a framework to avoid maladaptation. It combines the above principles from Barnett & O'Neill (2010), with the "precautionary framework" proposed by Hallegatte (2009) in a paper on adapting to uncertain climate change, to develop an 11-point "Assessment Framework" which aims to support the design of adaptation initiatives before their implementation. Through this framework, the author identifies key criteria that could help to avoid environmental, sociocultural, and economic maladaptation.

Figure 1.2. Assessment Framework to avoid maladaptation



Source: Magnan (2014)

In addition to the above-mentioned assessment framework for avoiding maladaptation, the EU-funded REGILIENCE project has recently developed a first version of a self-assessment tool for checking adaptation actions and spotting areas where further action is needed to avoid maladaptation.

The tool looks at existing risks and vulnerabilities, the choice of adaptation action(s), its implementation, and monitoring and evaluation. Information about the tool and the preliminary version can be accessed at: <https://regilience.eu/self-assessment-tool-for-maladaptation/>

1.5 Evaluation of effectiveness and efficiency of a set of actions

The design and implementation of adaptation strategies and plans has been accompanied by considerations on efficiency and effectiveness⁴ of sets of adaptation actions, including the costs and benefits of activities. Economic analysis for adaptation is not only about emphasising costs of climate adaptation actions. It provides clarity on trade-offs associated with different development paths in the medium to long term and can provide an indication of the net value of different options under different possible futures. It emphasises in a more transparent way the value of future benefits and can enhance the consideration of sustainability principles in decision-making. Economic

⁴ According to the Better Regulation Guidelines, effectiveness is understood as “the extent to which different options would achieve the objectives”. Efficiency describes the benefits versus the costs. (EC 2015)

assessments can support the identification of robust solutions with good performance for a large number of options.

Adaptation is a dynamic process, which starts with the consideration of current climate variability and considers future climate change over longer periods of time. The effective treatment of uncertainties associated with these multiple time horizons is a critical component of adaptation decision-making. A range of available methods can be used to factor in these dimensions and support adaptation decision-making. To evaluate actions and policy programmes enables the comparison of trade-offs between “wait-and-see” strategies and immediate action. To develop efficient short-term adaptation strategies and plans and in parallel avoid lock-in effects supports the application of the precautionary principle and enhance the resilience of society against future risks.

With this, economic analysis can contribute to selecting the most efficient and effective set of adaptation actions and avoiding implementation of actions with trade-offs between policy fields and on society. Such assessments can be critical to avoid financing not-optimal action sets and maladaptation in policy programmes, plans and strategies.

In the following, this section presents the main groups of economic tools and their potential use, as well as key strength and weaknesses for each. The methods include traditional economic decision support tools not explicitly dealing with uncertainty but commonly used in many policy fields (Cost-Benefit Analysis (CBA), Cost-Effectiveness Analyses (CEA) and Multi-Criteria Analysis), and a number of approaches which have been developed to incorporate uncertainty of future developments (Real Options Analysis (ROA), Robust Decision Making (RDM), Portfolio Analysis (PA), Iterative Risk Assessment Frameworks (IRAF)) The following table shows a summary of the included methods. More details for each method follow below the table. We include as far as possible examples for assessments on national level. Information can also be found in the EEA background report on Costs of Adaptation vs. Costs of Inaction (Valverde et al. 2023) and in the Urban Adaptation Support Tool in Step 4: Assessing and selecting adaptation options (Climate-ADAPT 2023).

Table 1.4 Overview of methods

Method	Description	Applicability
Cost-Benefit Analysis (CBA)	Compares costs and benefits to determine economic efficiency of actions	Well suited Low and no regret options in the near-future Where clear market values can be used
Cost-Effectiveness Analysis (CEA)	Compares different actions to achieve pre-defined targets	Well suited for short-term adaptation Where benefits should be examined in non-monetary terms Where pre-defined objectives must be achieved
Multi-Criteria Analysis (MCA)	Scores options against a set of decision criteria	Well suited For scoping options Where a mix of quantitative and qualitative data needs to be considered
Real Options Analysis (ROA)	Incorporates the value of phased implementation and flexible design in investment decisions	Well suited for the appraisal of large capital investment over the medium term Where information on climate risk probabilities is available and When future changes in operation are possible
Robust Decision Making (RDM)	Identifies options which are effective against a range of possible futures	Well suited for the appraisal of investments over long time-scales Where large uncertainties exist and

Method	Description	Applicability
		Where a mix of quantitative and qualitative information needs to be considered
Portfolio Analysis (PA)	Identifies a set of options which together provide the greatest benefits	Well suited When a number of complementary adaptation actions are possible When good economic and climate information exist
Iterative Risk Assessment Frameworks (IRAF)	Combines monitoring, research, evaluation and learning to improve future management strategies	Well suited For policy appraisal over medium-long-term; and When there are clear risk thresholds

Source: Tröltzsch et al. (2016), Watkiss et al. (2012), Tinch et al. (2015), van Alphen et al. (2021), Valverde et al. (2023), GIZ (2013), Climate-ADAPT (2023).

Cost-Benefit Analysis (CBA) is an evaluation method which focuses on determining the economic efficiency of particular adaptation strategies. It achieves this by comparing the costs associated with carrying out an adaptation option against its benefits, calculating the net benefit. Assessing the costs and benefits of adaptation options can be undertaken more narrowly considering financial budgetary costs and benefits only or more comprehensively considering the wider costs and benefits to the local economy, incl. social and environment costs and benefits.

The most important strength of CBA for adaptation comes from its structured and thorough consideration of costs and benefits which can be economically quantified to make adaptation-related decisions more transparent. It expresses results in a single metric, making it easy to compare adaptation strategies, and choose those which provide maximum social welfare. One major drawback of CBA is its need for quantitative and monetised data regarding adaptation costs and benefits. This makes it particularly difficult to apply in adaptation situations where information and data is limited, uncertainties are large and where non-market values may have an important role (e.g. biodiversity protection, health, and protection of natural resources). Monetization of some types of benefits is also critically discussed (e.g. assigning monetary value to human lives or "discounting" future benefits). However, it is important to include non-market costs and benefits in the assessments of adaptation options to realistically account for the full range of benefits and costs, even though they are more difficult to express in monetary terms.

Additionally, CBA often inadequately addresses certain concerns that are of significant importance in adaptation, such as: high uncertainty, distribution and equity, choice of an appropriate discount rate, value judgements about projects and the time and scale of the strategies being compared. CBA is very appropriate for assessing low and no regret options for market sectors and when uncertainties related to climate risk probabilities are known. It is considered good practice to use CBA in conjunction with other methodologies to form a broad evaluation framework for adaptation decision making including as well social and environmental criteria, e.g. Multi-Criteria Analysis. (Tröltzsch et al. 2016, Watkiss et al. 2012, Tinch et al. 2015, van Alphen et al. 2021, Valverde et al. 2023, GIZ 2013, Climate-ADAPT 2023)

Example for CBA: Fundació ENT (2016) (Spain).

Cost-Effectiveness Analysis (CEA) is a methodology used to compare different actions to achieve a pre-defined adaptation target. It is used to determine the least costly way to achieve specific adaptation objective. The biggest advantage of CEA is that it does not require the economic valuation of benefits. While the costs of the measures need to be calculated in monetary terms, the benefits can be expressed in any other quantified measure. This is hugely important in the adaptation context, where it can often be difficult to assign monetised values of benefits. Therefore, CEA is also a helpful tool when dealing with sectors which include significant non-market dimensions

such as biodiversity protection. CEA does not explicitly deal with uncertainties as the method relies on cost curves assuming climate stability. The use of multiple cost curves can help overcome that limitation. Further approaches, such as scenarios and sensitivity analysis, can be used to better consider the potential of different future climate change impacts.

Another disadvantage of CEA is its reliance on a single metric when comparing options. The selection of such a metric can prove difficult in adaptation decision-making as climate change impacts are very diverse. CEA is less useful when considering non-technical or “soft” options, as their effectiveness is more difficult to evaluate. This can present some issues in the adaptation field, where a large combination of diverse options may be needed to best deal with future conditions and where soft options are important (e.g. in combination with technical adaptation options).

CEA is most useful for near-term assessment, particularly for identifying low and no regret options, in areas where monetary valuation is difficult. It is most applicable where there is a clear headline indicator and where climate uncertainty is low. It is also considered good practice to undertake CEA within an iterative plan, to capture enabling steps, portfolios and inter-linkages, rather than using the outputs as a simple technical prioritisation. (Tröltzsch et al. 2016, Watkiss et al. 2012, Tinch et al. 2015, van Alphen et al. 2021, Valverde et al. 2023, GIZ 2013, Climate-ADAPT 2023)

Example for CEA: Frontier Economics et al. (2013) (UK).

Multi-Criteria Analysis (MCA) is a methodology used to assess and score adaptation options against a set of decision criteria. It integrates various assessment criteria (financial and non-financial, monetised or expressed in other quantitative terms) and priorities with respect to different criteria. MCA can effectively incorporate important dimensions in adaptation such as urgency, co-benefits, no-regret and robustness characteristics. MCA can support the consideration of uncertainty in the prioritisation of adaptation options. However, the analysis of uncertainty will usually remain subjective and qualitative. MCA provides a structured framework for combining expert judgement and stakeholder preferences and is well suited for encouraging stakeholder participation in adaptation decision-making. MCA can be used for cross-sectoral analyses which are highly relevant for the assessment of adaptation strategies or action plans which have a broad range of adaptation objectives. Because MCA considers both qualitative and quantitative information, it is especially applicable in scenarios where such a combination of factors must be considered in the ranking of adaptation interventions. In addition, the approach is well suited to encourage engagement with stakeholders as MCA allows for the consideration of stakeholder preferences in the scoring and weighing of criteria. (Tröltzsch et al. 2016, Watkiss et al. 2012, Tinch et al. 2015, van Alphen et al. 2021, Valverde et al. 2023, GIZ 2013, Climate-ADAPT 2023)

Examples for MCA: De Bruin et al. (2009) (NL) and Blobel et al. (2016) (DE)

Real Options Analysis (ROA) is a methodology that can be used to prioritise adaptation interventions while considering the possibility to adjust them in the future. Traditionally used in financial markets to mitigate investment risks, ROA can be used in adaptation to gain insight into the risks associated with investment programmes with focus on physical (real) assets. ROA can be used to determine whether interventions should be immediate or delayed and test the value of interventions which present greater flexibility down the road. ROA is most useful in situations of deep uncertainty, thus a high risk of maladaptation. ROA has a complex methodology and requires high volumes of data and resources. (Tröltzsch et al. 2016, Watkiss et al. 2012, Tinch et al. 2015, Valverde et al. 2023)

Examples for ROA are described e.g. in Manocha & Babovic (2018).

Robust Decision Marking (RDM) is a methodology which aims to identify adaptation options or strategies which can perform well over a wider range of possible futures. The focus of RDM is on minimising regret rather than optimising utility. RDM was developed to help policymakers make

more effective decisions on near-term options which could have long-term consequences, e.g. examining the performance of large infrastructure investment programmes considering multiple potential futures. RDM mostly relies on high volumes of data requiring significant resources and expert knowledge. More informal applications are possible but suffer from subjective data inputs and stakeholders' perceptions. (Tröltzsch et al. 2016, Watkiss et al. 2012, Tinch et al. 2015, Valverde et al. 2023)

Examples for RDM are Dessai and Hulme (2007) UK) and McDaniels et al. (2012).

Portfolio Analysis (PA) is a methodology focused on designing and evaluating portfolios of adaptation options and enables the identification of portfolios that have the highest possible expected return for a given risk, or the lowest degree of risk for a given rate of return. PA is an approach to handle climate uncertainty. It does so by selecting options which are effective together over a range of possible future scenarios, instead of selecting one best option for one future. The methodology involved with PA is resource intensive, requiring a high degree of expert knowledge. It relies on the use of probabilities and the availability of quantitative data. (Tröltzsch et al. 2016, Watkiss et al. 2012, Tinch et al. 2015, Valverde et al. 2023)

Example for PA: Crowe & Parker (2008).

Iterative Risk Management (IRM), or Adaptive Management (AM), is a well-established practice of combining monitoring, research, evaluation and learning as a means of improving future management strategies. IRM/AM is well suited for decision contexts characterised by high uncertainties. It can help decision makers avoid taking irreversible decisions and develop plans where decisions can be adjusted appropriately. IRM/AM encourages decision makers to consider alternative adaptation strategies and options, and phased implementation. It supports the design of flexible strategies, where decisions are made over time, and these plans adjusted as the evidence emerges. IRM/AM can be complex when multiple risks must be considered or when suitable risk threshold must be identified to trigger future responses. The methodology is relatively simple, producing results that can be easily understood. IRM/AM can be seen as a general decision-making framework, which accommodates well other methods such as multi-criteria analysis or cost-benefit analysis. (Tröltzsch et al. 2016, Watkiss et al. 2012, Tinch et al. 2015, *Watkiss et al. 2014*)

Example for Iterative Risk Management: Restemeyer et al. (2018), Haasnoot et al. (2013).

In the following table the main input requirements, strengths and challenges of the methods are summarised. More resources and expertise are necessary to incorporate uncertainties in methods such as ROA, RDM, PA than for the use of traditional methods such as MCA or CEA. Most methods require quantitative, economic data inputs. Some are usable with quantitative but not economic information, e.g. CEA, RDM or PA. In the formal approaches of these methods here presented, only MCA is usable with qualitative information.

Figure 1.3 – Input requirements, strengths and challenges of the methods

Method	Strengths	Challenges	Input requirements	Benefit Metrics	Resources / expertise
Cost-Benefit Analysis	Most useful when climate risk probabilities are known and sensitivity is small. Also where clear market values can be used.	Valuation of non-market sectors and non-technical options. Uncertainty limited to probabilistic risks and sensitivity testing	Individual scenario and climate model outputs Baseline damage costs from scenario-based IA. Quantitative adaptation effectiveness.	Economic (monetary)	Medium
Cost-Effectiveness Analysis	As above, but for non-monetary sectors and where pre-defined objectives must be achieved	Single headline metric difficult to identify and less suitable for complex or cross-sectoral risks, Low consideration of uncertainty	Scenario and climate model outputs and often baseline damage costs Effectiveness and reduction in impacts (unit / total)	Quantitative (but not economic)	Medium
Multi-Criteria Analysis	When there is a mix of quantitative and qualitative data	Relies on expert judgement or stakeholders, and is subjective, including analysis of uncertainty	Qualitative or quantitative information on climate change. Effectiveness through expert input or stakeholder consultation	Qualitative, quantitative or economic	Low - Medium
Real Options Analysis	Large irreversible decisions, where information is available on climate risk probabilities, Deals explicitly with uncertainties.	Requires economic valuation (see CBA), probabilities and clear decision points	Probability or probabilistic assumptions for climate (multiple scenarios) and decision points Baseline damage costs and adaptation effectiveness	Economic (monetary)	High
Robust Decision Marking	When uncertainty and risk are large. Can use a mix of quantitative and qualitative information. Explicitly incorporates uncertainties and risks.	Requires high computational analysis and large number of runs	Multi-model scenario and climate model outputs (more the better) Formal approach requires uncertainty information for all parameters	Quantitative or economic	High
Portfolio Analysis	When number of complementary adaptation actions and good information, Explicitly incorporates uncertainties and risks.	Requires economic data and probabilities, Issues of interdependencies	Probability or probabilistic assumptions for climate (multiple scenarios) Variance and co-variance of each option	Quantitative or economic	High
Iterative Risk Management	Useful where long-term and uncertainty challenges, especially when clear risk thresholds. Deals explicitly with uncertainties.	Challenging when multiple risks acting together and thresholds are not always easy to identify	Sets of scenario and climate model outputs, but flexible Threshold levels of risks	Quantitative or economic	Medium - High

Source: Tröltzsch et al. (2016), Watkiss & Hunt (2013)

1.6 Summary

It is important to track finance geared towards adaptation measures in order to have an overview of current efforts, plan and direct future efforts, and increase level of ambition.

However, tracking this finance is not trivial and comes with a range of challenges.

In this context, this report first looks at practice examples from selected EU Member States, namely how they track and report on their adaptation budgets.

The report then explores different ways of tracking adaptation finance and the associated risks, namely double counting. Also linked to this is the then following discussion on maladaptation which is relevant since adaptation finance should not be channelled towards measures leading to maladaptation.

Finally, the report presents different methodologies for evaluating the effectiveness and efficiency of adaptation actions, together with use cases. It is found that there is no "one-size-fits-all" approach to economic appraisal of a set of actions, programmes, etc.; and that each method presents a unique set of strengths and challenges. It is important to carefully select the most appropriate approach for each individual assessment.

2. Task 2 – Adaptation enabling activities

2.1 What are enabling activities for adaptation

This section explores if the current definition of enabling activities for adaptation from the taxonomy regulation is fit for purpose. First, it lines out the current definition, and then explores if it is fit for purpose.

Current definition

To set the scene and see the progression of how “enabling activities” for adaptation were and are understood, the table in Appendix 1 contains different definitions of “enabling activities” in the context of the EU taxonomy; this was mapped since the genesis of the definition helps understanding the key aspects. It should be noted that in the original proposed taxonomy regulation from 2018⁵, the concept of enabling activities was not yet included⁶.

The wording in the final text of the taxonomy regulation comprises the official wording. However, there is not one concise definition; rather the “enabling activities” are defined by a number of key aspects which are spread over different Articles in the taxonomy regulation itself as well as other publications.

Those key aspects are listed in the Table below.

Table 2.1 Overview of key aspects in final text of the taxonomy regulation

Aspect	Comments
[ART 16] An enabling activity directly enables other activities to make a substantial ⁷ contribution	<ul style="list-style-type: none"> The word “directly” was only introduced in the political agreement text of the regulation (from January 2020)⁸, while in earlier versions it was not present; on the contrary, the June 2019 TEG report only referred to economic activities which “have the potential to enable substantial” contributions “Directly” is challenging to define but it puts certain boundaries on upstream⁹ questions; it is not defined in the regulation text; there have been different interpretations of “directly”; e.g. the March 2022 request from Greenpeace¹⁰ to review the inclusion of nuclear energy and natural gas sectors in the Climate Delegated Act argued that in terms of “causal chains” (such as a theory of change which is a way to describe the causal chain of how an activity translates into a result) only one step in the chain can be seen as “direct”.

⁵ Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the establishment of a framework to facilitate sustainable investment. See: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52018PC0353>

⁶ Except as part of Article 6 which, among others, referred to economic activities “establishing energy infrastructure required for enabling decarbonisation of energy systems”.

⁷ “Substantial contribution” is a key concept of the whole taxonomy and not solely related to the enabling activities. Thus, it is not further explained here.

⁸ Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the establishment of a framework to facilitate sustainable investment - Political agreement. See: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=consil%3AST_5487_2020_ADD_1

⁹ For a discussion on what “upstream” means see section 2.2

¹⁰ See: https://www.greenpeace.de/publikationen/EU_Taxonomie%20request%20for%20internal%20review_3.pdf

Aspect	Comments
	<ul style="list-style-type: none"> • However, the Platform on Sustainable Finance published in October 2022¹¹ the following interpretation¹²: <ul style="list-style-type: none"> ○ Some [...] enabling activities may be more than one step removed in the value chain. Accordingly, “directly” enables does not mean that only one immediate upstream activity per target activity or use can qualify as enabling. Activities further upstream can also be considered as enabling activities [...]. ○ [It is important] that there is a clear and non-contested link between the enabling activity and the substantial contribution of the target activity. [This is given in the following situations] <ul style="list-style-type: none"> ▪ Without the enabling activity the substantial contribution of the target activity or use cannot be reached for any but exceptional cases, ▪ Without the enabling activity the substantial contribution of the target activity or use can be reached, but the target activity or use cannot be scaled while ensuring its substantial contribution, ▪ Without the enabling activity the substantial contribution of the target activity or use can be reached, but at a significantly higher cost than with the enabling activity, where the cost difference would impair market take-up of the SC target activity or use. ○ [“Directly”] does not mean that the enabling activity must be the single decisive activity in enabling the target activity or use to make a substantial contribution. For many target activities or uses that make a substantial contribution to one or more environmental objectives, there will be more than one enabling activity causing the target activity or use to make this contribution
<p>[ART 16] Enabling activities cannot lead to a 'lock-in' in assets that undermine long-term environmental goals, considering the economic lifetime of those assets</p>	<ul style="list-style-type: none"> • Lock-in (or path-dependency) aspects were also first introduced in the political agreement text. • “Lock-in” is not a tightly defined term; the taxonomy regulation does not provide a definition; the final report of the TEG¹³ from March 2020 provides some reflections on it in its footnote 24 by referring to different existing definitions from the literature¹⁴ • In short, lock-in is a situation in which a system is difficult to bring to a new path due to a number of factors. In October 2022, the Platform on Sustainable Finance published the following examples and considerations¹⁵¹⁶: <ul style="list-style-type: none"> ○ Lock-in can occur, for example, if the target activity has a level of performance that is unlikely to meet substantial contribution criteria in future;

¹¹ PLATFORM ON SUSTAINABLE FINANCE (2022) TECHNICAL WORKING GROUP Supplementary: Methodology and Technical Screening Criteria. See: https://finance.ec.europa.eu/system/files/2022-11/221128-sustainable-finance-platform-technical-working-group_en.pdf

¹² The below are direct quotations from that report.

¹³ TEG (2020) Taxonomy: Final report of the Technical Expert Group on Sustainable Finance. See: https://finance.ec.europa.eu/system/files/2020-03/200309-sustainable-finance-teg-final-report-taxonomy_en.pdf

¹⁴ The footnote 24 from that report reads: *Lock-in, and carbon lock-in, are established terms in environmental economics, but refer to market-wide dynamics, as opposed to individual economic activities. Erickson et al (2015) define carbon lock in as follows: The term 'carbon lock-in' refers to the tendency for certain carbon-intensive technological systems to persist over time, 'locking out' lower-carbon alternatives, and owing to a combination of linked technical, economic, and institutional factors. These technologies may be costly to build, but relatively inexpensive to operate and, over time, they reinforce political, market, and social factors that make it difficult to move away from, or 'unlock' them. As a result, by investing in assets prone to lock-in, planners and investors restrict future flexibility and increase the costs of achieving agreed climate protection goals*

¹⁵ PLATFORM ON SUSTAINABLE FINANCE (2022) TECHNICAL WORKING GROUP Supplementary: Methodology and Technical Screening Criteria. See: https://finance.ec.europa.eu/system/files/2022-11/221128-sustainable-finance-platform-technical-working-group_en.pdf

¹⁶ The below are direct quotations from that report

Aspect	Comments
	<ul style="list-style-type: none"> ○ In the case of adaptation enabling activities, they should not lead to a lock-in in adaptation measures that may result in increasing the risk of an adverse impact on people, nature or assets over time;¹⁷ ○ The lifetime of enabling and target activities, and the investment cycles of both are important considerations in [the assessment of if there is a lock-in]; ○ The analysis of if there is risk of lock-in needs to be performed for all identified target activities, and yield a positive result for the vast majority of target activities or uses; ● The text of the taxonomy does not per se ban lock-in situations, but only in situations where the locked-in assets undermine long-term environmental goals throughout the life cycle of those assets; ● The term “long-term environmental goal” is not defined, but it could be assumed that it refers to the 6 environmental objectives of the taxonomy, and in addition any other environmental objectives of the EU environmental acquis; ● It cannot be assumed that the focus on “long-term” environmental goals suggests that it is acceptable to undermine short-term environmental goals, also given the next point on the substantial positive environmental impact (see below).
<p>[ART 16] Enabling activities must have a substantial positive environmental impact, on the basis of life-cycle considerations</p>	<ul style="list-style-type: none"> ● “Substantial positive environmental impact” is not defined in the taxonomy regulation; it should not, however, be confused with the “substantial contribution” concept of the taxonomy¹⁸ ● Again, the Platform on Sustainable Finance published clarifications on this topic¹⁹ which include the following main points²⁰: <ul style="list-style-type: none"> ○ [This] refers to the actual environmental impact of an enabling activity on the target activity or use, and on its wider life cycle impact; ○ [It] refers to all six environmental objectives rather than only the objective that is addressed by the substantial contribution of the target activity or use; ○ An enabling activity [needs to have] a substantial positive environmental impact in the value chain in general, and when employed in the target activity in particular; ○ If an enabling activity is to be included without substantial contribution criteria for the target activity being defined, the environmental objectives ambition levels as outlined in the technical working group March 2022 report, and the TEG Report on Taxonomy should be used as guidance; ○ If the activity enables an environmental objective directly, as for example for adaptation, the specific characteristics and parameters of the enabling activity itself may be described in detail to ensure high confidence in it delivering a substantial adaptation enabling effect; ○ The enabling activity also has to be ensured not to cause significant harm in the remaining value chain and for all six environmental objectives.
<p>[ART 11.1(b)] [An economic activity that] provides adaptation solutions</p>	<ul style="list-style-type: none"> ● “Contribute substantially to preventing or reducing the risk” is not defined; ● Also, “increasing the risk of an adverse impact on other people, nature or assets” is not defined.

¹⁷ This can be linked to the question on what constitutes round “maladaptation” which is discussed in section **Error! Reference source not found.** of this report

¹⁸ In any case, any economic activity that qualifies as enabling activity already needs to be included in the taxonomy, i.e. it already needs to substantially contribute to at least one of the environmental objectives of the taxonomy.

¹⁹ PLATFORM ON SUSTAINABLE FINANCE (2022) TECHNICAL WORKING GROUP Supplementary: Methodology and Technical Screening Criteria. See: https://finance.ec.europa.eu/system/files/2022-11/221128-sustainable-finance-platform-technical-working-group_en.pdf

²⁰ The below are direct quotations from that report

Aspect	Comments
<p>that [...] contribute substantially to preventing or reducing the risk of the adverse impact of the current climate and the expected future climate on people, nature or assets, without increasing the risk of an adverse impact on other people, nature or assets</p>	

In addition to the key aspects mentioned in the regulation, there are others which are mentioned as part of reports and clarifications published by The Platform on Sustainable Finance as well as the EC. The most relevant aspects include:

- The enabling activity must be (one of) the best available option(s) in relation to the environmental objective being supported.²¹
- For the adaptation objective [...] activities may also be included with own performance criteria and enabling criteria at the same time (so called “adapted-enabling” activities).²²

It should be noted that the October 2022 report by the Platform on Sustainable Finance²³ also states that “Due to the differing intrinsic nature of the adaptation to climate change objective, [...], in addition to enabling the resilience of other economic activities, activities enabling adaptation can also have the broader objective of enabling adaptation or resilience of people or nature directly.”

In the same vein, the report states that “Where the activity enables a broader objective rather than another economic activity, as for adaptation or resilience, the conditions of Art. 16 apply to the identified “beneficiaries” of the enabling effect (e.g. a specific community or natural area).”

I.e., both paragraphs state that the conditions set out in Art 16 of the taxonomy regulation could be changed or superseded by Art 11. However, it should be noted that Art 11 specifically states that its conditions are “in addition to satisfying the conditions set out in Article 16,” which means that all conditions need to apply at the same time, including that enabling activities also need to directly enable other activities. Thus, the statement and understanding in the October 2022 report seem to be incoherent with the legal text and is therefore not included in the proposed definition further down this section.

However, two things should be noted in this regard:

²¹ PLATFORM ON SUSTAINABLE FINANCE (2022) TECHNICAL WORKING GROUP Supplementary: Methodology and Technical Screening Criteria. See: https://finance.ec.europa.eu/system/files/2022-11/221128-sustainable-finance-platform-technical-working-group_en.pdf

²² PLATFORM ON SUSTAINABLE FINANCE (2022) TECHNICAL WORKING GROUP Supplementary: Methodology and Technical Screening Criteria. See: https://finance.ec.europa.eu/system/files/2022-11/221128-sustainable-finance-platform-technical-working-group_en.pdf

²³ PLATFORM ON SUSTAINABLE FINANCE (2022) TECHNICAL WORKING GROUP Supplementary: Methodology and Technical Screening Criteria. See: https://finance.ec.europa.eu/system/files/2022-11/221128-sustainable-finance-platform-technical-working-group_en.pdf

- The study team agrees that it would be beneficial to include the idea that enabling activities can also have the broader objective of enabling adaptation or resilience of people or nature directly; however, this needs to be reflected in the legal text of the taxonomy regulation;
- It could be argued that the Climate Delegated Act²⁴ already takes the idea into account that an enabling activity also enable adaptation or resilience directly, e.g. by including education as an enabling activity and by the way the enabling SC are formulated

Is the current definition fit for purpose

Clarity of terms used in the definition

As shown above, there are many terms govern what counts as “enabling activity” in the field of adaptation. Considerations regarding “fitness for purpose” in this regard include:

- **Complexity:** What defines an “enabling activity” in the field of adaptation (and in general) is fairly complex and explanations are spread across several Articles, FAQs, and reports.
- **Definitions:** Most of the key aspects used are not clearly defined in the taxonomy regulation; however, for many there have recently been defined in reports by the platform on sustainable finance. It seems that there is no definition for “contribute substantially to preventing or reducing the risk” yet; also for the term “long-term environmental goals” there is not definition yet
- **“Substantial contribution” vs “substantial positive environmental impact” vs “long-term environmental goals”:** Those terms are similar, which can easily lead to confusion. In addition, “substantial positive environmental impact” has only recently been defined through the Oct 2022 report from the Platform for sustainable finance while “long-term environmental goals” is not yet defined.

Including the concept of “risk” in the definition of enabling activities

Risk is a key concept in the field of climate adaptation and can in short be considered to be the likelihood of an adverse climate impact happening. The goal of adaptation is to reduce this risk.

In the Article in the taxonomy related to climate change adaptation (Article 11) this is acknowledged and integrated in the text, for both, adapted activities (Article 11.1(a)) and enabling activities (11.1(b)).

The Box below shows the relevant parts of Article 11.

Box 2.1 Extracts of Article 11 of the taxonomy regulation focusing on risk

An economic activity shall qualify as contributing substantially to climate change adaptation where that activity:

Adapted activities (Article 11.1(a)): includes adaptation solutions that either **substantially reduce the risk of the adverse impact** of the current climate and the expected future climate on that economic activity or **substantially reduce that adverse impact**

Enabling activities (Article 11.1(b)): provides adaptation solutions that, in addition to satisfying the conditions set out in Article 16, contribute substantially to **preventing or reducing the risk of the adverse impact**

²⁴ Commission Delegated Regulation (EU) 2021/2139 of 4 June 2021 supplementing Regulation (EU) 2020/852 of the European Parliament and of the Council by establishing the technical screening criteria for determining the conditions under which an economic activity qualifies as contributing substantially to climate change mitigation or climate change adaptation and for determining whether that economic activity causes no significant harm to any of the other environmental objectives (Text with EEA relevance). See: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32021R2139>

However, in the other part of the Taxonomy text that also specifies what enabling activities are (Article 16) there are potential “clashes” with the concept of risk.

Box 2.2 Text of Article 16

An economic activity shall qualify as contributing substantially to one or more of the environmental objectives set out in Article 9 by directly enabling other activities to make a substantial contribution to one or more of those objectives, provided that such economic activity:

- (a) does not lead to a lock-in of assets that undermine long-term environmental goals, considering the economic lifetime of those assets; and
- (b) has a substantial positive environmental impact, on the basis of life-cycle considerations

Also, the definition of “climate change adaptation” as provided in Article 2 of the taxonomy regulation does not refer to risk but rather specifies that it “means the process of adjustment to actual and expected climate change and its impacts”.

When comparing the text of the Articles as shown in the Boxes above, it appears that the concept of risk might clash with the concept of the “directly enabling”. For example, the economic activity “Non-life insurance: underwriting of climate-related perils” is eligible as an enabling activity as per the Climate Delegated Act²⁵. However, such an activity does not directly enable the insured activities, it rather reduces the risk of adverse impacts. Or, in other words, having insurance is no clear-cut “make or break” factor, but rather decreases the risk of adverse impacts from climate change. This is in contrast to enabling activities for other environmental objectives such as climate change mitigation, which are more direct and do not rely on probability (e.g. a specific technology reliably decreases GHG emissions of the target activity).

As per clarification in the October 2022 report (see first row in Table 2.1 above) that a “clear and non-contested link [needs to exist] between the enabling activity and the substantial contribution of the target activity, [which is the case in the following situations]:

- Without the enabling activity the substantial contribution of the target activity or use cannot be reached for any but exceptional cases,
- Without the enabling activity the substantial contribution of the target activity or use can be reached, but the target activity or use cannot be scaled while ensuring its substantial contribution,
- Without the enabling activity the substantial contribution of the target activity or use can be reached, but at a significantly higher cost than with the enabling activity, where the cost difference would impair market take-up of the SC target activity or use.”

It can be argued that a non-life insurance does not satisfy any of those conditions. This would also be the case for most or all other non-structural adaptation activities (i.e. activities which do not entail the construction of infrastructures designed to decrease the climate risk) which are very common in climate change adaptation. Those activities include e.g. those which are classified in the “key-type measures” nomenclature developed by the EEA (see Table 2.8 in section 2.3) under

²⁵ Commission Delegated Regulation (EU) 2021/2139 of 4 June 2021 supplementing Regulation (EU) 2020/852 of the European Parliament and of the Council by establishing the technical screening criteria for determining the conditions under which an economic activity qualifies as contributing substantially to climate change mitigation or climate change adaptation and for determining whether that economic activity causes no significant harm to any of the other environmental objectives (Text with EEA relevance). See: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32021R2139>

“governance and institutional”, “financing and incentive instruments”, “information and awareness raising”, or “capacity building, empowering and lifestyle practices”.

Looking at explanations for a “clear and non-contested link” mentioned in the bullet points above, those activities do not fulfil those criteria, as shown on the example of “non-life insurance” in the Table below. In this fictional example of workers' compensation insurance, an insurance company insures activities of a construction company (which is assumed to be classified as “substantially contributing” in this example) whose workers who are strongly exposed to effects from heatwaves (e.g. roofers).

Table 2.2 Assessment of if the fictional example of “capacity building” would satisfy the criteria for a “clear and non-contested link”

Criteria as per October 2022 report ²⁶	Does the activity fulfil the criterion?
Without the enabling activity the substantial contribution of the target activity or use cannot be reached for any but exceptional cases,	No, rather the other way around: the target activity can perform normally expect in exceptional cases of heatwaves.
Without the enabling activity the substantial contribution of the target activity or use can be reached, but the target activity or use cannot be scaled while ensuring its substantial contribution,	No, the target activity (construction) can be scaled without insurance. During heatwaves, the workers might be less performant (e.g. from dehydration) or suffer long-term consequences (e.g. skin cancer), but this does not affect scalability of the economic activity.
Without the enabling activity, the substantial contribution of the target activity or use can be reached, but at a significantly higher cost than with the enabling activity, where the cost difference would impair market take-up of the SC target activity or use.	No. Some costs would arise when workers fall ill and/or construction needs to be halted during a heatwave, but those would not be significant.

Proposed definition

Based on of the above points, a (short) definition for “enabling activities” in the field of adaptation is proposed^{27 28} in the Table below.

Table 2.3 Proposed definition of an enabling activity in the field of adaptation

<p>An adaptation enabling activity is an economic activity which provides solutions that:</p> <ul style="list-style-type: none"> • Are one of the necessary factors that decrease climate risks to the target activity not working as intended and not having a substantial contribution (i.e. without the enabling activity, the target activity is at higher risk of not working as intended) [Direct link as well as substantial positive environmental impact] • Continue to decrease the risk in the future under reasonable worst-case climate projections over its lifetime [Lock-in] • Do not lead to maladaptation over their lifetime²⁹ [Lock-in] • Do not do signification harm to the remaining environmental objectives over their lifetime [Lock-in; also DNSH related] • Are one of the best available adaptation options
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²⁶ See first row in Table 2.1 above

²⁷ It is acknowledged that there are also the “adapted-enabling activities”. However, since they are a combination of “adapted activities” and “enabling activities” they are not further discussed in this section.

²⁸ It should be noted that this is a proposed definition for eligibility and not for performance.

²⁹ Further defined in section **Error! Reference source not found.**

It should be noted that specifically for the climate change adaptation environmental objective, in several cases the enabling activities can comply with the own performance criteria at the same time but that this is not necessary for all enabling activities.

This definition is based on the provisions from Art 16 and Art 11 of the taxonomy regulation (see Table 2.1 above) as well as the additional reflections from documents from the Platform on Sustainable Finance mentioned below that table.

Definitions in other frameworks

The study attempted to identify other sustainable finance frameworks which include the concept of “enabling activities” and compare the definitions. However, no sufficiently comparable concepts have been identified in other frameworks. For example, the Global Environment Facility (GEF) has a concept with the same name³⁰. However, they are not comparable in scope.

2.2 Reflections on upstream nature of enabling activities

This section discusses the question of how far upstream an enabling activity can be from an economic activity that needs to be adapted and still be seen as enabling adaptation. This is linked to the aspect of “directly enabling” which is discussed in the last section above.

Definition of “upstream”

“Upstream” is not a word or concept used in the taxonomy regulation. It is mentioned a few times in other documents surrounding the regulation³¹; however, in those instances, the term was used in terms of value chain considerations (e.g. in terms of raw materials used in an operation) or for discussions on floods and how upstream changes in a river can change flood risk.

In contrast, in the context of this report, “upstream” is rather linked to the discussed on what “directly enabling means”. The word “upstream” in this meaning is first used in the October 2022 report of the technical working group³².

That report states the following³³:

- “directly” enables does not mean that only one immediate upstream activity per target activity or use can qualify as enabling

³⁰ Operational Criteria for enabling Activities: Climate Change. see: <https://www.thegef.org/sites/default/files/council-meeting-documents/C.7.Inf.10-Operational-criteria-CC.pdf>

³¹ E.g. in

- Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the establishment of a framework to facilitate sustainable investment. See: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52018PC0353>
- Taxonomy Technical Report. June 2019. See: https://finance.ec.europa.eu/system/files/2019-06/190618-sustainable-finance-teg-report-taxonomy_en.pdf

³² PLATFORM ON SUSTAINABLE FINANCE (2022) TECHNICAL WORKING GROUP Supplementary: Methodology and Technical Screening Criteria. See: https://finance.ec.europa.eu/system/files/2022-11/221128-sustainable-finance-platform-technical-working-group_en.pdf

³³ It should be noted, however, that that report also uses the term “upstream” in a value chain context, namely in the following sentence: “Enabling activities may include not only upstream activities from the target, but also horizontal activities that are closely related to the enabling activity, for example, not only the manufacturing of rotor blades for wind turbines, but also their installation, maintenance and repair”

- Activities further upstream can also be considered as enabling activities, provided that there is a clear and non-contested link between the enabling activity and the substantial contribution of the target activity³⁴

However, as discussed in the section above, the explanations provided in the available documents on what “directly enabling” means could be questioned, namely since they do not seem to apply to the activities which are currently acknowledged as enabling activities in the taxonomy regulation (e.g. insurance).

Thus, this current section uses the relevant part of the definition of the last section regarding “directly enabling”, namely:

An adaptation enabling activity is an economic activity which provides solutions that:

- Are one of the necessary factors that decrease climate risks to the target activity not working as intended and not having a substantial contribution (i.e. without the enabling activity, the target activity is at higher risk of not working as intended)

Examples

Based on that definition, the Table below provides a few examples of economic activities and corresponding reflections and whether they can be considered to be an enabling activity when taking the considerations on “directly enabling” into account.

It should be noted that the economic activities in the table are not structured around the NACE codes system but are rather theoretical examples.

Table 2.4 Overview of examples

Enabling Activity	Considerations
Train the trainers for training on understanding and action on early flood warning	<ul style="list-style-type: none"> • A target activity could e.g. construction of new buildings; those new buildings were built in a flood plain with frequent but low magnitude flood events; a wide range of easy to use and nature-based adaptation measures have been put in place to reduce risk; however, the inhabitants need to take specific actions in case of flooding (e.g. seal entrances, park in specific areas) • Following the definition developed above, the training of those inhabitants would be “one of the necessary factors that decrease climate risks to the target activity not working as intended and not having a substantial contribution” • The question is if training the trainers (e.g. from a consultancy) can also be considered to be directly enabling in this case; for the sake of argument, this example could also be extended to a hypothetical extreme where trainers train trainers which in turn train trainers etc. • An argument pro “directly enabling” is that the personnel in charge of training the inhabitants would not have the necessary knowledge and expertise if they were not trained themselves; thus, this would fulfil the condition of a “necessary factor” • An argument contra “director enabling” could include that, looking at the hypothetical extreme mention above it is acknowledged that a final line needs to be drawn somewhere. However, this is refuted by the notion that those different layers of training are all considered as the same economic activity (training). The fact that this would be a very inefficient setup would need to be through the screening criteria.

³⁴ The three conditions that reports lines out on what a “clear and non-contested link” is, are already described in Table 2.2 above.

Enabling Activity	Considerations
	<ul style="list-style-type: none"> Thus, it is assumed that this would fall under the definition of being “one of the necessary factors that decrease climate risks to the target activity not working as intended and not having a substantial contribution”
<p>Construction of a new park in an urban area next to a residential home for the elderly</p>	<ul style="list-style-type: none"> The target activity in this case would be residential care activities; it is assumed that the residential home is in a highly urbanised area which leads to significant heat island effects during heat waves Albeit this is not the main or deciding intention of the park (which can be assumed to have many objectives besides the reduction of heat island effects, including mental health and well-being, biodiversity, unsealing for better infiltration), it nevertheless leads to a significant reduction of maximum and average temperatures during heatwaves in the residential home Following the definition of “directly enabling” used in this section, the construction of this park would not count as enabling activity since -while it is one of the factors of adaptation to climate change - it is not one of the “necessary” factors since other measures could be taken by the residential home, such as insulation, shading for windows, active cooling or others; Also, in the definition of the October 2022 report³⁵ (see also Table 2.2 above), this activity would not be considered as enabling This might point to a gap in the current architecture of the taxonomy regarding adaptation since designing/building/operating a nature based multipurpose structure like a park is unlikely to be included as “substantially contributing” activity (since, in the logic of the gradual development of the taxonomy the first focus is on the economic activities with the worst impact); at the same time it does not qualify as enabling activity since it does not directly enable other activities; this is likely also the case for other adaptation NBS which are usually encouraged to be multipurpose and provide wider co-benefits
<p>Providing education on climate change adaptation policy development</p>	<ul style="list-style-type: none"> A master’s programme has as main purpose to provide students with detailed knowledge, critical understanding, strategies and the tools required to develop effective adaptation policies; no specific target activity exists; as noted in section 2.1, based on Art 16 that should not be possible, but based on the additional arguments in that section it is assumed as possible for this example In terms of logic chains, this activity is fairly remote (i.e. upstream) from its final objective; the students of the programme learn how to design effective policies, then work in public administrations to develop those policies, and finally the policies are implemented on the ground which leads to climate change adaptation An argument contra “directly enabling” would be that adaptation policies would also be developed without the students from this master’s programme (or other similar education); thus, it could be argued that this is not one of the necessary factors that decrease climate risks; On the other hand, the goal of this master’s programme and comparable education is to lead to more effective policies, avoid maladaptation, use NBS, etc; it can still be debated, however, if this is one of the necessary conditions (using the definition developed in the last section); also, in the definition of the October 2022 report³⁶ (see also Table 2.2 above), this activity would not be considered as enabling Thus, it can be stated that this activity is not enabling adaptation; at the same time, it should be noted that it is already included in the Climate Delegated Act This reinforces the argument made below Table 2.1 to change the legal text of the taxonomy regulation to account for cases where the enabling activity enables the objective (adaptation) and not a target activity

³⁵ See first row in Table 2.1 above

³⁶ See first row in Table 2.1 above

Enabling Activity	Considerations
	<ul style="list-style-type: none"> This example could also be taken one step further, by not looking at the provision of education but rather the activity of developing this master's programme; however, the same argumentation as above would apply
Forest monitoring	<ul style="list-style-type: none"> In a first version of this example, the forest monitoring activity enables resilient forest management by providing data on forest conditions and provided ecosystem services; based on this data, adapted management is possible; This activity can be considered to be enabling, since it is a necessary factor to decrease climate risks since based on this data adapted forest management measures can be taken One point to be noted is that the necessity for monitoring is already mentioned as part of the screening criteria for substantial contribution for forest management (as well as for rehabilitation and restoration of forests, as well as afforestation) while the monitoring as enabling activity is not yet included in the climate delegated act In a second version of this example, monitoring is done by national authorities which use the data for enforcing forest policy which forbids certain management measures which make forests less resilient In this case, it could be debated if this counts as a "necessary factor" when the vast majority of forest managers already complies with the forest policy; it is also likely that in the definition of the October 2022 report³⁷ (see also Table 2.2 above), this activity would not be considered as enabling The two versions of this example point to a situation in which the nature of "enabling activity" of the activities of the data provider (which is assumed to be a private provider of remote sensing data) depend on the use of the data A general conclusion from this example could be that on the one hand, provision of environmentally relevant data could be considered an enabling activity (also for other environmental objectives) but that on the other hand the use of the data is relevant

2.3 Potentially additional economic activities as enabling activities

According to the EU taxonomy, there are several activities already defined as enabling activities for climate adaptation (see Table 2.5). In order to determine whether there are additional economic (or other) activities which are enabling, the definition of the term as defined in section 2.1 was used as a set of guidelines to reassess the other activities currently within the taxonomy (both under climate adaptation and mitigation), followed by NACE-listed activities which may not have been considered under the taxonomy, and the EEA KTM's.

Table 2.5 Activities currently listed as enabling activities under the taxonomy for climate adaptation³⁸

NACE	Sector	Activity number	Activity	Enabling/ Adapted enabling	Technical Screening Criteria
A2	Forestry	1.1	Afforestation	Adapted-enabling	Generic
A2	Forestry	1.2	Rehabilitation and restoration of forests, including reforestation and	Adapted-enabling	Generic

³⁷ See first row in Table 2.1 above

³⁸ EU Taxonomy Compass. See: <https://ec.europa.eu/sustainable-finance-taxonomy/>

NACE	Sector	Activity number	Activity	Enabling/ Adapted-enabling	Technical Screening Criteria
			natural forest regeneration after an extreme event		
A2	Forestry	1.3	Forest management	Adapted-enabling	Generic
A2	Forestry	1.4	Conservation forestry	Adapted-enabling	Generic
	Environmental protection and restoration activities	2.1	Restoration of wetlands	Adapted-enabling	Generic
M71.1.2, M72.1	Professional, scientific and technical activities	9.2	Close to market research, development and innovation	Enabling	Specific
J60	Information and communication	8.3	Programming and broadcasting activities	Adapted-enabling	Generic
M71.12	Professional, scientific and technical activities	9.1	Engineering activities and related technical consultancy dedicated to adaptation to climate change	Enabling	Specific
K65.12	Financial and insurance activities	10.1	Non-life insurance: underwriting of climate-related perils	Enabling	Specific
K65.20	Financial and insurance activities	10.2	Reinsurance	Enabling	Specific
P85	Education	11.1	Education	Adapted-enabling	Generic
R90	Arts, entertainment and recreation	13.1	Creative, arts and entertainment activities	Adapted-enabling	Generic
R91	Arts, entertainment and recreation	13.2	Libraries, archives, museums and cultural activities	Adapted-enabling	Generic
J59	Arts, entertainment and recreation	13.3	Motion picture, video and television programme production, sound recording and music publishing activities	Adapted-enabling	Generic

All economic activities currently listed under the taxonomy for climate adaptation and mitigation are labelled as enabling activities or otherwise. Considering the potentially ambiguous definition of the term, it was investigated whether there are other taxonomy-listed activities that could be enabling but are not yet listed as such. Those selected can be seen in Table 2.6 Activities currently included under the taxonomy which may be an enabling activity but are not listed as such (all activities are included under climate adaptation unless specified otherwise)

Table 2.6 Activities currently included under the taxonomy which may be an enabling activity but are not listed as such (all activities are included under climate adaptation unless specified otherwise)

NACE	Sector	Activity number	Activity	Justification
C (many activities)	Manufacturing	3.5	Manufacture of energy efficiency	The manufacturing of insulating products, cooling and ventilating

NACE	Sector	Activity number	Activity	Justification
			equipment for buildings	systems, heat pumps, etc. enables the adaptation of buildings to climate change, e.g. heatwaves.
E36.00, F42.99	Water supply, sewerage, waste management and remediation	5.1	Construction, extension and operation of water collection, treatment and supply systems	The operation and management of water treatment systems can facilitate increased resilience against climate change effects on supply.
E37.00, F42.99	Water supply, sewerage, waste management and remediation	5.3	Construction, extension and operation of wastewater collection and treatment	The construction of wastewater collection and treatment systems enables increased adaptation against the effects of drought on water systems.
E38.21, F42.99	Water supply, sewerage, waste management and remediation	5.8	Composting of bio-waste	The construction of dedicated facilities to separately collect bio-waste through composting and the resulting use of the compost materials can enhance environmental resilience by promoting plant growth and stabilising soils which provides drought and flood protection.
F42.91, F71.1, F71.20	Transport	6.16	Infrastructure for water transport	The construction, modernisation and operation of waterways can be managed to enable adaptation, alongside the services which facilitate this e.g. architectural, engineering. Sustainably strengthening waterways can enable adaptation.
M71 ³⁹	Professional, scientific and technical activities	9.3	Professional services related to energy performance of buildings	Architectural activities, engineering activities and related technical consultancy, technical testing and analysis all fall under NACE code M71 referenced here. Consultations and design specifically for adapting buildings to climate change are an enabling activity.

The EU taxonomy and the method in which it categorises and separates economic activities were modelled on the NACE codes system, a European industry standard classification system for economic activities. Despite this, there are several taxonomy-listed activities with no corresponding NACE code, as although the NACE is extensive, it is not entirely exhaustive, and the specific activity may not fall into an existing category. Considering that the taxonomy has been updated more recently than the NACE, it is unlikely there would be many adaptation or enabling activities found in NACE that are not already included in the taxonomy. Regardless, a screening of all 615 classes of level 4 NACE activities were screened for whether they could be an enabling activity. Those which met the relevant criteria to qualify as an enabling activity are summarised in the Table below, along with justifications for the selection.

³⁹ This is listed under taxonomy as an activity for climate mitigation, rather than for climate adaptation, but it may also enable climate adaptation.

Table 2.7 NACE-listed activities which may enable adaptation but are not explicitly listed as such under current taxonomy activities

NACE	Level 1	Specification	Justification
A1.6.1	Agriculture, forestry and fishing (A)	Support activities for crop production	Activities which increase the resilience of crops and other plants against the effects of climate change, such as organic farming or sustainable forestry techniques, may fall under this category and would enable climate adaptation.
J58.1	Information and communication (J)	Publishing of books, periodicals and other publishing activities	The publishing of books, newspapers, and journals fall under this category and if on relevant topics can serve as educational material to enable adaptation.
J61	Information and communication	Telecommunications	In line with the contribution of Arts, Entertainment and Recreation included as enabling activities under the taxonomy, telecommunication activities can play a role in facilitating knowledge sharing, research and development, and education on the topics of enhancing climate adaptation activities.
U99	Activities of extraterritorial organisations and bodies	Activities of extraterritorial organisations and bodies	Activities carried out by extraterritorial organisations, such as the UN, which facilitate or remove barriers to adaptation could be considered as enabling.

KTMs report on actions, measures, and programmes of measures for adaptation. They are distinctly different to the previously listed activities found under the taxonomy or NACE codes. The main difference is that they are designed to describe adaptation options and measures for Member States rather than economic activities. Therefore, some of the activities covered by the KTMs which enable adaptation may not be found in the taxonomy and could fill certain gaps in enabling the adaptation objective. The KTMs and their sub-KTMs which were identified as potential enabling activities are shown in the Table below.

Table 2.8 KTMs which could be considered enabling activities

KTM	Sub-KTM	Relevant specification	Justification
A: Governance and institutional	All: A1: Policy instruments A2: Management and planning A3: Coordination, cooperation and networks	<ul style="list-style-type: none"> All 	By coordinating efforts to either increase the knowledge on, or develop the technology for adaptation measure, policy instruments, high-level management, and coordination efforts can be seen as enabling activities.
B: Economic and Finance	B1: Financing and incentive instruments	<ul style="list-style-type: none"> Creation / revision of incentive mechanisms Creation / revision of funding schemes 	The creation of incentives for investment in, or development of, adaptation measures is an example of removing barriers to adaptation as an enabling activity.
C: Physical and Technological	C2: Technological options	<ul style="list-style-type: none"> Hazard / risk mapping 	The provision of supporting services for disaster and risk management in the form of hazard and risk mapping enables adaptation by contributing to substantive

KTM	Sub-KTM	Relevant specification	Justification
			positive environmental impacts. This could be through technological advancement reducing response times or by increasing/improving the mapping of hot spots for hazards.
D: Nature Based Solutions and Ecosystem-based Approaches	D1: Green options	<ul style="list-style-type: none"> Natural and / or semi-natural land-use management 	Green options involving the management of land-use for enhancing ecosystem services and nature-based solutions can facilitate adaptation through regeneration and improving the ecological integrity.
	D2: Blue options	<ul style="list-style-type: none"> Natural and / or semi-natural water and marine areas management 	Blue options involving the management of natural, semi-natural, or marine areas can facilitate ecosystem health resulting in improved carbon sinks and resilience against climate change. Waterway management (including dredging activities around rivers and canals) and coastal management can be enabling activities in their contributions to water conservation and drought management.
E: Knowledge and Behavioural change	E1: Information and awareness raising	<ul style="list-style-type: none"> Research and innovation Communication and dissemination Decision support tools and databases 	The innovation, research and development of products which are then directly put to use for climate change adaptation are prime enabling activities.
	E2: Capacity building, empowering and lifestyle practices	<ul style="list-style-type: none"> Identification and sharing of good practices Training and knowledge transfer 	In line with the development of technologies to further adaptation, the sharing of good practices, training, and knowledge transfer can all enable adaptation at an earlier stage in the value chain and substantially contribute to the environmental objectives of the taxonomy.

2.4 Economic activities that can be considered to always enable adaptation

In order to assess whether the identified list of enabling activities can be considered to always enable adaptation, the activities will be analysed by broader sector to group common influential variables and factors.

Forestry sector activities

Several activities listed under the climate adaptation taxonomy as enabling activities fall within the forestry sector: afforestation; rehabilitation and restoration of forests, including reforestation and natural forest regeneration after an extreme event; forest management; and conservation forestry. The ability for these activities to enable adaptation largely comes from the carbon storage present in forests which has major climate mitigation and adaptation potential. Afforestation specifically refers to the establishment of forested land on previously non-forested land or land which has not

been forested for a long period of time⁴⁰. The change in land-use (warranted that the land was not previously composed of original ecologically or environmentally important land, or land with high carbon sink potential) from previously unproductive land to land with high climate adaptation potential foregoes the opportunity cost of not having converted the land in the first place and brings about the added benefits of enabling adaptation.

However, the potential for afforested, rehabilitated, or sustainably managed land (among other forest sector activities) to enable climate adaptation may be dependent on several factors:

- The composition/type of land/land use of the area prior to being altered or managed.
 - Was it previously original land?
 - Was it previously another ecosystem type with carbon sink potential or other ecological value? E.g. peatland, salt marsh.
- The geographical/climatic region: the success of forests to enable adaptation may vary across geographical regions with different climate types, e.g., Mediterranean vs central Europe vs Scandinavia.
- The tree species composition: native vs. non-native trees, forest age, etc.
- Varying climate change scenario: as prevailing conditions differ under different climate change scenarios, the effects of various forest management techniques may change, including their influence on enabling climate adaptation.

In order to qualify as an enabling activity, activities must be assessed in the face of "current and future climate risks". Considering several climate change scenarios over the lifetime of the measure will be important in determining whether they 'always' enable adaptation. For example, increasing temperatures and reduced rainfall can lead to droughts and wildfires which can decimate whole forests, releasing the carbon that was once stored in them into the atmosphere. This shifts the role of the forest to a carbon source rather than sink and results in a potential maladaptation if the activity is contributing to this negative effect.

Environmental protection and restoration activities

Successfully implemented environmental protection and restoration activities, specifically in the form of restored wetlands, can enable climate adaptation in a similar mechanism as that of healthy forests in terms of helping to increase resilience against drought, store carbon, and provide overall environmental benefits.

Restoring wetlands to their original wetland condition promotes ecological integrity for biodiversity and ecosystem services in general. Following the long-term restoration of wetlands, they act as carbon sinks for mitigation and adaptation through the presence of specifically adapted vegetation and other organic sediments⁴¹. However, they can equally be converted from carbon sink to carbon source from the release of CO₂ after their degradation or destruction⁴².

It is important to note that the carbon fluxes of wetlands are largely context dependent. The carbon balance and the net cooling effect over time of restored wetlands are highly complex processes and are ultimately dependent on several factors, such as the regional geophysical and climate

⁴⁰ [UNFCCC definition of afforestation](#)

⁴¹ Abdul Malak, D., Marin, A.I., Trombetti, M., San Roman, S., Carbon pools and sequestration potential of wetlands in the European Union, European Topic Centre on Urban, Land and Soil Systems, Vienna and Malaga, 2021, ISBN 978-3-200-07433-0.

⁴² Abdul Malak, D., Marin, A.I., Trombetti, M., San Roman, S., Carbon pools and sequestration potential of wetlands in the European Union, European Topic Centre on Urban, Land and Soil Systems, Vienna and Malaga, 2021, ISBN 978-3-200-07433-0.

conditions, vegetation succession stage, and the management practices applied. Therefore, while having the potential to enable climate change adaptation, this may not always be the case.

The restoration of wetlands acts as an enabling activity as well as an adapted-enabling activity, as is the case for afforestation and the rehabilitation of forests, for example. This 'green infrastructure' can store excess water, and is thus an example of an adaptation strategy for reducing flood risk.

However, as is true for the majority of nature-based economic activities, they cannot always enable adaptation if the improvements made are nullified in the future from negative climatic effects, or do not have an overall substantial positive environmental effect. For example, land management schemes for wetland (e.g. river basins) protection which alleviates flooding by using land for water storage could have implications for greenhouse gas emissions⁴³. This illustrates the importance of considering the lifetime effects of an activity. As described in the proposed definition of an enabling activity in Table 2.3, the activity should continue to decrease the climate risk in the future under reasonable worst-case climate projections over its lifetime.

Professional, scientific and technical activities

Market research, development, innovation, and engineering/technical consulting are key sectors at the core of enabling activities, with the technical annex of the TEG taxonomy report emphasising that enabling activities are those which develop adaptation solutions⁴⁴. It is important to consider the wide scope of potential investments in this category, and how varying time horizons can affect individual activities. For example, investment in the research and innovation of drought-resistant crop varieties is likely to always enable adaptation⁴⁵. This is important to note as activities which increase the resilience of crops and other plants against the effects of climate change are included under NACE code A1.6.1 but not under any activities in the taxonomy. This is an important addition to the list of enabling activities as well as those considered to always enable adaptation. Alternatively, the development of certain GPS technologies for tracking forest fires may become obsolete with the invention of newer, more accurate technologies, therefore the activities are no longer considered to enable adaptation as they are no longer the "best available adaptation options" (Table 2.3).

Information and communication

Many activities can fall under this broad category, however, the primary activities linked to enabling adaptation include awareness raising, education, telecommunication, and published materials. Equally, these activities are included under KTM E: Knowledge and Behavioural change. The adaptation options included here can be said to enable adaptation as they contribute to reducing climate risks while not directly resulting in adaptation, i.e. the identification and sharing of good practices, training and knowledge transfer. Education and the identification and sharing of best practices (on climate adaptation topics) in particular can foster long-lasting positive effects through knowledge sharing and awareness raising. However, miseducation or misinformation can have equally negative effects.

Institutional and economic activities

Certain specifications of KTMs A (Governance and institutional) and B (Economic and Finance) can be translated into activities with potential to enable adaptation. Policies and regulations concerning

⁴³ [EEA technical report: Climate change and water adaptation issues](#)

⁴⁴ [TEG Taxonomy Report: technical annex](#)

⁴⁵ [TEG Taxonomy Report: technical annex](#)

the implementation of adaptation measures remove/reduce the risk of the adaptation measure not working as intended or not being implemented in the first place, in line with the definition set in Table 2.3. Similarly, financing and incentive instruments for the development of new technologies for climate adaptation can act as enabling activities by removing the financial barriers in place.

'High-level' activities such as these might not always enable adaptation if the activity is no longer 'one of the best available adaptation options'. For example, a specific policy implementing resilient coastal management may not always enable adaptation due to the methodology or tools involved in creating flood defences becoming obsolete, or if the objectives of the policy are in line with past climate scenarios that became irrelevant. Funding for climate adaptation may result in maladaptation if the initiatives being supported facilitate adaptation in the short-term, but negatively affect long-term vulnerability and adaptive capacity⁴⁶. Indeed, a key driver of maladaptation in climate adaptation financing is corruption and failures in integrity⁴⁷.

2.5 Technical Screening Criteria for enabling activities

The Annex 2 to the Commission Delegated Regulation (EU)⁴⁸ provides descriptions and technical screening criteria for economic activities contributing to adaptation. For the climate change adaptation objective, the technical screening criteria developed follow a process-based approach. In this Annex, fourteen economic activities are labelled as "enabling activities" and are provided with technical screening criteria in relation to their "enabling" aspect. Generic technical screening criteria (TSC) have been defined and are used for ten of the fourteen activities. Specific TSC have been defined for the 4 remaining activities (see Table 2.5 in section 2.3 above).

The generic TSC for enabling activities are defined as follows:

"The economic operator demonstrates, through an assessment of current and future climate risks, including uncertainty and based on robust data, that the activity provides a technology, product, service, information, or practice, or promotes their uses with one of the following primary objectives:

- (a) increasing the level of resilience to physical climate risks of other people, of nature, of cultural heritage, of assets and of other economic activities;*
- (b) contributing to adaptation efforts of other people, of nature, of cultural heritage, of assets and of other economic activities."*

Regarding the generic criteria described above, several elements of analysis and reflection should be highlighted:

- As indicated in the 2020 TEG report⁴⁹, technical guidance should be provided on the climate risks assessment. Indeed, standards or minimum requirements should be defined in order to ensure that alignment to the criteria is justified. Without a threshold to pass or standards to respect, assessing the alignment of an economic activity is a highly subjective exercise that could lead in certain cases to greenwashing from companies (see section 2.7 below).
- An element presented in the 2020 TEG report that was not found in EU Taxonomy Delegated Act Annex 2, is the potential alignment for activities that remove barriers to climate change

⁴⁶ Alexandre Magnan, 2014. *Avoiding maladaptation to climate change: towards guiding principles*, S.A.P.I.EN.S [Online], 7.1. URL: <http://journals.openedition.org/sapiens/1680>

⁴⁷ Green Climate Fund, 2021. Thematic Brief: Enhancing Integrity to Avoid Maladaptation. UN Climate Change Conference UK 2021. See: <https://iiu.greenclimate.fund/document/thematic-brief-enhancing-integrity-avoid-maladaptation>

⁴⁸ See: [taxonomy-regulation-delegated-act-2021-2800-annex-2_en.pdf](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32021R2800-annex-2_en.pdf) (europa.eu)

⁴⁹ [Technical annex to the TEG final report on the EU taxonomy](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32021R2800-annex-2_en.pdf) (europa.eu)

adaptation. This may exclude an entire category of activities that may significantly enable adaptation.

- The reference to a climate risk assessment might be restrictive in certain cases, especially for enabling activities. For example, financial services, or education supports, may not be subject to a proper climate risk assessment that would allow the activities to qualify, despite their contribution to climate change adaptation. A less restrictive wording could allow the inclusion of enabling activities, such as “considering the context-specific climate risks”.
- Point (a) refers to “increasing the level of resilience to physical climate risks”. To ensure that the activity provides a real impact on climate adaptation and more precisely on resilience to physical climate risks, performance indicators, threshold or baseline should be defined. These could take the shape of a % of increased resilience or refer to industry-specific standards or quantitative thresholds. This is especially true for activities involving physical intervention. Indeed, indicators and threshold should be defined for such activities to assess their enabling effect.
- Another approach, rather bottom up, that could be considered to qualify an activity as enabling, could be to consider the barriers to adaptation. For a given context, assessing the aspects that are preventing adaptation activities to be undertaken (for example, is it the lack of financial resources? Is it the lack of technical knowledge?) and activities addressing those barriers could qualify as enabling adaptation.

In addition, it was suggested that activities would generally benefit from specific criteria and examples of what is covered and what is not. This would avoid for misinterpretation from companies or consultants and also prevent the risks of greenwashing.

Finally, generic TSC for activities enabling adaptation lack of references to other frameworks, similarly to what is done for the minimum safeguards that encompass and refer to international and global frameworks. This would ensure alignment with broader objectives and would make the process of screening activities more straightforward and less subject to subjectivity for companies.

2.6 Estimating the costs and benefits of the enabling activities

This section discusses the specific challenges of reflecting on the costs and benefits of enabling activities in national adaptation plans⁵⁰.

Introduction

Section 1.5 of this report explores different methods for assessing effectiveness and efficiency of adaptation measures, such as CBA, CEA and others. The discussion in that section focuses on measures which, in the nomenclature of the taxonomy, could be classified as “substantially contributing” economic activities, i.e. their direct purpose is adaptation. A few of those methods described there can also be used for assessing the costs and benefits of those measures in monetary terms (e.g. CBA). In addition to the reflections in that section, two prior specific contracts have looked in more depth into the topic of costs and benefits of adaptation⁵¹.

The question is to what extent the assessment of costs and benefits of adaptation enabling activities differs. As discussed throughout this report, the defining property of enabling activities is that they enable the target activity to become adapted.

⁵⁰ The discussion is also relevant for regional, sectorial or other plans; however, for brevity the section only refers to national plans.

⁵¹ 3414/B2020/EEA.58231: “Overview of accessibility of the climate change adaptation finance data in Europe” and 3502/B2021/EEA.58583: “The cost of adaptation versus the cost of inaction for Europe”

It should be noted that this section purely looks at “enabling activities” and not at “adapted-enabling activities”⁵² or, in the case of the latter, only at their enabling properties of “providing adaptation solutions”.

Costs

In terms of costs, the assessment is not different from other adaptation measures. Those are usually fairly easy to identify and also express in monetary costs and entail OPEX and CAPEX of the measures over their lifetime.

Benefits

In terms of benefits, however, additional challenges accrue, in both, the identification⁵³ as well as the quantification and monetisation of benefits.

Regarding the identification of benefits, it can be expected that all relevant benefits are, by definition, indirect. This is because the activity itself does not lead to adaptation (or at least this is not its defining property), but because it enables other activities to become adapted or do adapt. Indirect benefits are typically more challenging to identify (but also to quantify/monetise) due to an additional layer of uncertainty stemming from an additional step in the logic chain.

However, the question arises if benefits actually need to be identified (and then quantified/monetised) for enabling activities since those benefits should already be reflected in the assessment of benefits of the target activities. Thus, there could be a risk of double counting. As an example, an adaptation measure in a country could aim at climate resilient forest management. In the national adaptation plan, the benefits from this would then be identified (e.g. more stable supply of wood and other forest products) and quantified/monetised (e.g. additional volume of roundwood leading to additional income in the sector). An enabling activity for this could e.g. be “Engineering activities and related technical consultancy dedicated to adaptation to climate change”, or more specifically a large-scale study that developed recommendations on how to make forest management more resilient. The costs in this case are, as usual, easy to identify (i.e. the procurement/staff/other costs for the study). The benefits of this enabling activities would be challenging to identify since a link would need to be established between the recommendations in the study and actual implementation. More importantly, however, those would be the same benefits as for the target activity (the forest management) itself.

On the other hand, there could be cases where the enabling activity is part of a national adaptation plan, while the resulting adaptation efforts in the target activities are not reflected in the national adaptation plan. This could e.g. be the case where public authorities finance a study (i.e. consultancy services) on resilient forest management, but then are not actively involved in the implementation and also do not collect data on the uptake of the recommendations in that study. In those cases the main question is data availability.

Trade-offs for member state authorities

The above has shown that it should be relatively easy to identify costs for enabling activities, while the benefits are more challenging to identify while at the same time it might also be wrong to include them since it would lead to double counting. This could lead to situations where member

⁵² See the second commission notice from 19 Dec 2022 for definition of those terms. Here: <https://ec.europa.eu/finance/docs/law/221219-draft-commission-notice-disclosures-delegated-act-article-8.pdf>

⁵³ It should be noted that there is a likelihood that an identification challenge for the enabling activities also exists the other way around – namely, that member state authorities are not aware that “enabling activities” exist upon which the adaptation activities rely; e.g. in terms of supply chains, knowledge, other others. However, this is out of the scope of this report.

state authorities decide to not include those enabling activities in the assessment of benefits and costs.

2.7 Enabling activities technical screening criteria and greenwashing risk

The rise of environmental issues, and the accompanying concerns and awareness within populations and consumers has led companies to seek commercializing green products⁵⁴, and claim environmental benefits for their activities. Indeed, the past decade has seen increasing interest from all stakeholders (customers, investors, governments, etc) in companies' disclosure about their environmental performance and indicators, as well as an increased interest for environmental-friendly products.

If maladaptation risks are highly concerning and damaging, as highlighted in section 1.4, greenwashing issues and risks should also be addressed for activities enabling climate change adaptation

Greenwashing refers to the practice of adopting behaviours or undertaking activities that make an organization or company *"appear more environmentally friendly or more ecological (more natural, healthier, free of chemicals, recyclable, less wasteful of natural resources...)* when in practice its activities pollute the environment. Greenwashing is therefore considered abusive or misleading because the company improperly positions itself as more green than it actually is"⁵⁵.

The Communication from the Commission to the European Parliament from April 2020⁵⁶ specifies that regarding greenwashing risks related to activities enabling climate change adaptation, safeguards have been put in place⁵⁷:

- *"enabling activities cannot lead to a 'lock-in' in assets that undermine long term environmental goals, considering the lifetime of those assets"*
- *"enabling activities must have a substantial positive environmental impact on the basis of lifecycle considerations"*

Despite these safeguards, greenwashing may arise in relation to these generic technical screening criteria. Through analysis and interviews, the following risks have been identified:

- The alignment evaluation process may lack of transparency and therefore make it complex to assess the true benefits of a product;
- Generic and process-based criteria both tend to be vague, and this may make it easier for companies to make misleading claims of alignment or environmental benefits for their products or activities. As highlighted in the report from the Platform on Sustainable Finance⁵⁸, the lack of clarity and guidance leads national and sector association to develop their own to support their member, which may result in *"non aligned implementation and reporting on adaptation criteria, including different ambition levels, risk assessment scope and adaptation measures assessment and overage, and general methodology"*.
- The absence of threshold or baseline to assess whether an activity qualifies for alignment may lead through greenwashing. Indeed, if looking at the *"increasing level of resilience"* part of the criteria, no threshold means that even a minor and insignificant could in principle be qualified as "aligned".

⁵⁴ [Concepts and forms of greenwashing: a systematic review | Environmental Sciences Europe | Full Text \(springeropen.com\)](#)

⁵⁵ [Greenwashing: definition and examples \(selectra.com\)](#)

⁵⁶ [EUR-Lex - 52020PC0155 - EN - EUR-Lex \(europa.eu\)](#)

⁵⁷ The meaning and wording of those safeguard have been discussed at length in point 2.1 and will not be here to avoid redundancy

⁵⁸ [PLATFORM ON SUSTAINABLE SUSTAINABLE FINANCE: TECHNICAL WORKING GROUP \(europa.eu\)](#)

To reduce the risks mentioned above, the main recommendation would be to develop industry-specific or economic activity-specific technical screening criteria. Those would be more precise and reduce the room for interpretation that can lead to greenwashing in some cases. In addition, it should be recommended to include baseline, good practices, or threshold to be met in order to ensure that a real impact is created by the activity. Another recommendation would be to focus the financial KPI on investments made towards adaptation, as turnover allocation to enabling adaptation may lead to over interpretation. Finally, to ensure better understanding of the criteria and avoid misinterpretation, concrete examples of both what is covered and what is specifically not covered could be developed to guide the users in their understanding and taxonomy alignment exercise.

2.8 Summary

The taxonomy is still recent, and many aspects are still under development, evolving, or requiring clarification.

Enabling activities are a key and novel aspect of the taxonomy and no other frameworks could be identified which include a comparable concept. However, the inclusion of the concept also presents a range of challenges. This is especially true for the climate change adaptation environmental objective which is different from the other environmental objectives for a number of reasons, including its context-dependent nature, the concept of risk and likelihood, and others.

Consequently, defining what enabling activities for adaptation are, is challenging. Currently, the defining properties are scattered across different Articles of the taxonomy regulation itself, as well as additional explanatory documents. Importantly, there seems to be some incoherence between the different described properties across those different documents. Taking all those different factors into account, the report aimed at developing a more concise definition of what enabling activities for adaptation are.

Using this definition, the report then developed a number of short case studies to explore the question of how far upstream (or in other words: how far away in the logic chain) the enabling activities can be from the target activity and came to relevant conclusions, including by pointing out additional potential challenges in the concept of enabling activities.

Following this, the report explored potential additional economic activities that could be considered for inclusion in the taxonomy framework and also discussed the possibility of identifying some activities which can always be considered enabling adaptation without the need for screening criteria. Looking at this from another direction, the report then explores how the current screening criteria could be improved.

Finally, the report looked at challenges of including the costs and benefits of enabling activities in adaptation plans as well as the risk for greenwashing in enabling activities.

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Appendix 1- OVERVIEW OF DEFINITIONS OF “ENABLING ACTIVITIES” IN THE CONTEXT OF THE EU TAXONOMY

The Table below shows the progression of the definition of “enabling activities” for adaptation throughout the legislative process of the taxonomy regulation. It should be noted that in the original proposed taxonomy regulation from 2018⁵⁹, the concept of enabling activities was not yet included⁶⁰.

When	Source	Definition
June 2019	TEG Taxonomy technical report ⁶¹	Where economic activities have the potential to enable substantial GHG emissions reductions in other sectors, these should also be included (assuming the life cycle emissions of the activity do not undermine mitigation objectives)
Sep 2019	Council negotiations ⁶²	An economic activity shall be considered environmentally sustainable [...] by enabling another economic activity to substantially improve its environmental performance with regards to [the environmental objectives].
Nov 2019	Non-paper by the EC on the TEG approach towards transitional and enabling activities (only related to climate change mitigation objective)	<p>Enabling activities would be defined as economic activities that enable substantial improvements of environmental performance in other economic activities.</p> <p>These activities are mostly part of the ‘neutral’ sectors, i.e. their environmental footprint is not significant, but they are prioritised because they enable sectors with a substantial negative environmental impact to improve.</p> <p>[...] Criteria for enabling activities are either long term or short term, depending on whether they enable low carbon activities or transition activities.</p> <p>[...] It is important to note that enabling activities by themselves do not necessarily result in the ‘enabled’ economic activity meeting the technical screening criteria.</p>
Jan 2020	Political agreement ⁶³	[Almost the same as in final text of regulation with semantic changes]
Apr 2020	Comm. from the EC to the EP concerning the position of the Council on the adoption of a	<p>Enabling activities directly enable other activities to make a substantial contribution to one or more of the environmental objectives.</p> <p>Safeguards have been put in place to prevent greenwashing. The first of these safeguards is that enabling activities cannot lead to a ‘lock-in’ in assets that undermine long-term environmental goals, considering the economic lifetime of those assets. The second of these safeguards is that enabling activities must have a substantial positive environmental impact on the basis of lifecycle considerations.</p>

⁵⁹ Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the establishment of a framework to facilitate sustainable investment. See: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52018PC0353>

⁶⁰ Except as part of Article 6 which, among others, referred to economic activities “establishing energy infrastructure required for enabling decarbonisation of energy systems”.

⁶¹ Taxonomy Technical Report. June 2019. See: https://finance.ec.europa.eu/system/files/2019-06/190618-sustainable-finance-teg-report-taxonomy_en.pdf

⁶² Proposal for a Regulation of the European Parliament and of the Council on the establishment of a framework to facilitate sustainable investment - Mandate for negotiations with the European Parliament. See: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=consil%3AST_12360_2019_ADD_1

⁶³ Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the establishment of a framework to facilitate sustainable investment - Political agreement. See: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=consil%3AST_5487_2020_ADD_1

When	Source	Definition
	Taxonomy Regulation ⁶⁴	
Jun 2020	Final taxonomy regulation ⁶⁵	<p>Recital</p> <p>Recital 42: An economic activity should qualify as contributing substantially to one or more of the environmental objectives set out in this Regulation where it directly enables other activities to make a substantial contribution to one or more of those objectives. Such enabling activities should not lead to a lock-in of assets that undermine long-term environmental goals, considering the economic lifetime of those assets, and should have a substantial positive environmental impact, on the basis of life-cycle considerations.</p> <p>Article specifically on enabling activities</p> <p>Art 16: An economic activity shall qualify as contributing substantially to one or more of the environmental objectives set out in Article 9 by directly enabling other activities to make a substantial contribution to one or more of those objectives, provided that such economic activity:</p> <p>(a) does not lead to a lock-in of assets that undermine long-term environmental goals, considering the economic lifetime of those assets; and</p> <p>(b) has a substantial positive environmental impact, on the basis of life-cycle considerations</p> <p>Article specifically on adaptation environmental objective</p> <p>Art 11.1(b): [An economic activity that] provides adaptation solutions that, in addition to satisfying the conditions set out in Article 16, contribute substantially to preventing or reducing the risk of the adverse impact of the current climate and the expected future climate on people, nature or assets, without increasing the risk of an adverse impact on other people, nature or assets</p>
Feb 2022	Climate Delegated Act ⁶⁶	<p>Recital</p> <p>[In recital 48 further clarifying that those economic activities could be] to provide technologies, products, services, information, or practices with the objectives of increasing the level of resilience to physical climate risks of other people, nature, cultural heritage, assets or of other economic activities</p> <p>Generic technical screening criteria in Annex II⁶⁷</p> <p>In order for an activity to be considered as an enabling activity as referred to in Article 11(1), point (b), of Regulation (EU) 2020/852, the economic operator</p>

⁶⁴ COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT pursuant to Article 294(6) of the Treaty on the Functioning of the European Union concerning the position of the Council on the adoption of a Regulation of the European Parliament and of the Council on the establishment of a framework to facilitate sustainable investment 2018/0178 (COD), and amending Regulation 2019/2088 on sustainability-related disclosures in the financial services sector. See: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A52020PC0155>

⁶⁵ Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088 (Text with EEA relevance). See: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32020R0852>

⁶⁶ Commission Delegated Regulation (EU) 2021/2139 of 4 June 2021 supplementing Regulation (EU) 2020/852 of the European Parliament and of the Council by establishing the technical screening criteria for determining the conditions under which an economic activity qualifies as contributing substantially to climate change mitigation or climate change adaptation and for determining whether that economic activity causes no significant harm to any of the other environmental objectives (Text with EEA relevance). See: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32021R2139>

⁶⁷ Used for most climate adaptation enabling activities, with the exception of close to market research, development and innovation; engineering activities and related technical consultancy dedicated to adaptation to climate change; non-life insurance: underwriting of climate-related perils; and reinsurance.

When	Source	Definition
		<p>demonstrates, through an assessment of current and future climate risks, including uncertainty and based on robust data, that the activity provides a technology, product, service, information, or practice, or promotes their uses with one of the following primary objectives:</p> <ul style="list-style-type: none">(a) increasing the level of resilience to physical climate risks of other people, of nature, of cultural heritage, of assets and of other economic activities;(b) contributing to adaptation efforts of other people, of nature, of cultural heritage, of assets and of other economic activities