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# Environmental Science and Policy

journal homepage: [www.elsevier.com/locate/envsci](http://www.elsevier.com/locate/envsci)

## Do governments track the implementation of national climate change adaptation plans? An evidence-based global stocktake of monitoring and evaluation systems

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### ARTICLE INFO

#### Keywords:

Monitoring & evaluation  
Climate change adaptation  
National adaptation plan  
Adaptation policy  
Global stocktake

### ABSTRACT

Although over 70 countries adopted a national climate change adaptation plan (NAP), little is known about the extent to which these plans are implemented. NAP monitoring and evaluation (M&E) systems can play an important role in tracking implementation but have rarely been studied. Based on a systematic review including outreach to country representatives and international organizations, a comprehensive inventory of NAP M&E systems is compiled documenting government practices from over 60 countries. In contrast to previous studies, this stocktake does not rely on stated intentions of M&E but requires evidence such as monitoring and evaluation reports. The extent of NAP M&E involvement globally and countries' respective status are determined and compared to a baseline from the 2017 Adaptation Gap Report of the United Nations Environment Programme. Results show a 40% increase in the number of countries that are developing or using NAP M&E systems and almost a doubling of published NAP evaluations. However, over 60% of countries that adopted a NAP do not systematically assess its implementation, leaving a critical gap in understanding the impacts of NAPs. These findings support calls for greater attention to the quality of adaptation planning and for assessing its implementation and effectiveness.

### 1. Introduction

Adaptation to climate change has been recognized as an important policy matter by more than 170 countries (Nachmany et al., 2019). Since its adoption in 2015, the Paris Agreement has provided additional momentum by encouraging all countries to pursue national adaptation planning (UNFCCC, 2015, Article 7.9). The 2020 progress report on national adaptation plans (NAPs) by the secretariat of the United Nations Framework Convention on Climate Change (UNFCCC) found that “125 of the 154 developing countries had undertaken activities related to the process to formulate and implement NAPs” (UNFCCC, 2020a, paragraph 16). However, little is known about the extent to which these plans have been implemented and even less about their effects.

Literature on adaptation governance has traditionally examined processes of adaptation planning and mainstreaming rather than their impacts on adaptation action (e.g., Bauer et al., 2012; Mullan et al., 2013). More recently, attention has shifted to the quality of planning and its potential effectiveness (Möhner et al., 2021; Olazabal and De

Gopegui, 2021; Runhaar et al., 2018). The Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) likewise observed: “There is a minority of academic literature that provides information on the implementation of adaptation plans, in contrast with the large accumulation of literature that discusses concepts, strategies, and plans of adaptation” (IPCC, 2014, p.877). In addressing this gap, this article examines if countries are tracking the implementation of their NAP and if they report on progress made.

To date, literature on monitoring and evaluation (M&E) of adaptation has predominantly focused on the level of projects or communities rather than at the national level (Bours et al., 2014; Adaptation Committee, 2016). Very few articles have addressed mechanisms that countries use to assess the implementation of their NAPs (Leiter, 2015; Klostermann et al., 2018). This article therefore conducts a global stocktake of NAP M&E systems and compares it to a baseline from 2017. In contrast to previous studies, it assesses the actual evidence of M&E practices rather than stated intentions of M&E in government documents. The article concludes by discussing the implications for our

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<https://doi.org/10.1016/j.envsci.2021.08.017>

Received 1 November 2020; Received in revised form 17 August 2021; Accepted 23 August 2021

Available online 16 September 2021

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understanding of adaptation progress and calls for further empirical research into the implementation of adaptation policy.

## 2. Monitoring and evaluation of national adaptation plans

The Paris Agreement mentions a national adaptation plan as a possible part of adaptation planning processes that “each Party shall, as appropriate, engage in” (UNFCCC, 2015, Article 7.9). While the term “national adaptation plan” (NAP) is therefore applicable to all countries, differences in countries’ planning systems mean it is not universally used. For example, some countries have action plans that jointly cover mitigation and adaptation (e.g., the Philippines) or use other designations such as a national adaptation strategy (e.g., South Africa) or a national adaptation programme (e.g., the United Kingdom). The term NAP is therefore used in this article as an umbrella term referring to an operational planning document from a national government that is explicitly directed at adaptation to climate change and that “include[s] a mix of policies and measures with the overarching objective of reducing the country’s [climate] vulnerability” (Niang-Diop and Bosch, 2005, p.186).<sup>2</sup>

M&E has been viewed as an integral part of adaptation planning (UNFCCC, 2010). Accordingly, one of the four elements that the NAP technical guidelines propose is: “Reporting, monitoring and review” (UNFCCC, 2012). A recent assessment of 54 national documents addressing adaptation gives the impression that most had “invested significant effort” in M&E during the planning process (see Table 3 and 5 in Morgan et al., 2019). However, this analysis is based on a three-point Likert scale with very low thresholds where a simple acknowledgement of the importance of M&E and an unspecified “consideration” of M&E were sufficient to score the middle or highest category, respectively. Consequently, its findings are contradicted by another study of 38 NAPs which found the plans to be “weaker in the articulation of implementation and monitoring measures, raising concerns about whether plans will translate into action and how success will be measured” (Woodruff and Regan, 2019, p. 53). An earlier study likewise found that very few national adaptation M&E systems have advanced beyond initial steps, i.e., concluding the opposite of what Morgan et al. claim (Leiter et al., 2017). This contradiction points to the need for a systematic review of M&E systems used by national governments to track the implementation of their adaptation plans.

Literature on assessing adaptation progress has so far been predominantly focused on the level of projects and communities (Bours et al., 2014; Faulkner et al., 2015; Adaptation Committee, 2016; Leiter, 2018). Very few studies have examined national adaptation M&E systems, i.e., the arrangements and procedures governments put in place to track if action on adaptation is taken and if their country becomes better adapted to a changing climate (Leiter, 2015; EEA, 2015, 2020; Klostermann et al., 2018). Hammill et al. (2014) analyzed the national adaptation M&E systems of eight pioneering countries. A first global review was undertaken for the Adaptation Gap Report 2017 of the United Nations Environment Programme (UNEP) (Leiter et al., 2017). Since then, at least 43 additional countries have begun engaging in the NAP process (UNFCCC, 2017, 2020a). Accordingly, Woodruff and Regan (2019)’s study of NAPs recommends to “continue to research and develop approaches to evaluate and track adaptation progress” (p. 69).

Adaptation planning is typically depicted in form of a policy cycle that includes M&E (Adaptation Committee, 2015). However, whether M&E is actually undertaken is rarely examined. Scott and Moloney

(2021) observe that “there is scant empirical evidence of how local governments are completing the adaptation planning cycle by monitoring or evaluating their efforts” (p. 1). At the national level, an evaluation in Europe found that less than half of countries that had planned a periodic review of their NAP were actually monitoring its implementation (European Commission, 2018). This article therefore examines to what extent countries are indeed tracking their NAP implementation.

## 3. Material and methods

### 3.1. Scope and research questions

This study explores whether there is an overarching M&E system for a country’s NAP as suggested by the NAP technical guidelines (UNFCCC, 2012). It does not attempt to identify specialized monitoring systems (e.g., of flood-safety policies) that may provide information relevant for adaptation. Furthermore, separate M&E systems of sectoral or sub-national adaptation plans, where existing, are not within the scope of this article. For example, some federally organized countries have state-level climate actions plans (e.g., India) which occasionally have M&E systems separate from a national adaptation M&E system, e.g., in some provinces of Morocco and South Africa (Hammill et al., 2014; Western Cape Government, 2020). However, NAP M&E systems usually draw on information from sectoral monitoring systems and, to different degrees, from subnational data sources (Hammill et al., 2014; Leiter, 2015).

Earlier studies have shown that numerous countries are developing NAP M&E systems, but that few have become operational (Leiter et al., 2017). The extent to which countries are following-up on adopted NAPs is currently not known. Therefore, the research questions are:

1. Which distinct development stages of NAP M&E systems are common in practice?
2. Do countries have dedicated arrangements for monitoring and evaluating the implementation of their national adaptation plans?
3. To what extent has this situation changed compared to a 2017 baseline?
4. What practices can be observed regarding the development of national adaptation M&E systems and their role in the policy cycle?

These questions directly respond to the research need expressed by Woodruff and Regan’s (2019) study of 38 NAPs and to the need for methods to assess national adaptation progress (Ford et al., 2015; Berrang-Ford et al., 2019). They are also highly relevant to the debate on how to inform the Global Stocktake of collective progress under the Paris Agreement (Adaptation Committee, 2021).

### 3.2. Research design and analytical framework

Previous studies of M&E in national adaptation planning often relied on stated intentions rather than on evidence of M&E systems’ existence and usage. To fill this gap, an empirical research design has been chosen that is able to identify and validate relevant evidence from multiple sources (see Section 3.3). Two comparative frameworks of NAP M&E systems have been considered as possible analytical frameworks, namely the M&E supplementary materials to the NAP technical guidelines (Price-Kelly et al., 2015) and a study of three European NAP M&E systems (Klostermann et al., 2018). Both frameworks outline components of NAP M&E systems but do not describe different stages of their development process and operation that could be used to compare countries. Another gap in both frameworks concerns differences between monitoring and evaluation. Monitoring is commonly defined as tracking ongoing implementation and informing its management whereas evaluation is seen as assessing effectiveness and lessons learned (OECD, 2002). Both processes may be organized separately under a common NAP M&E system. While the two frameworks acknowledge the

<sup>2</sup> Contrary to the study by Morgan et al. (2019), National Adaptation Programs of Action (NAPAs), which were introduced in 2001 for Least Developed Countries to present a list of priority funding needs, are not considered as a NAP because they are not an operational planning instrument. For the same reason, Möhner et al. (2021) do not include them in their account of national adaptation planning.

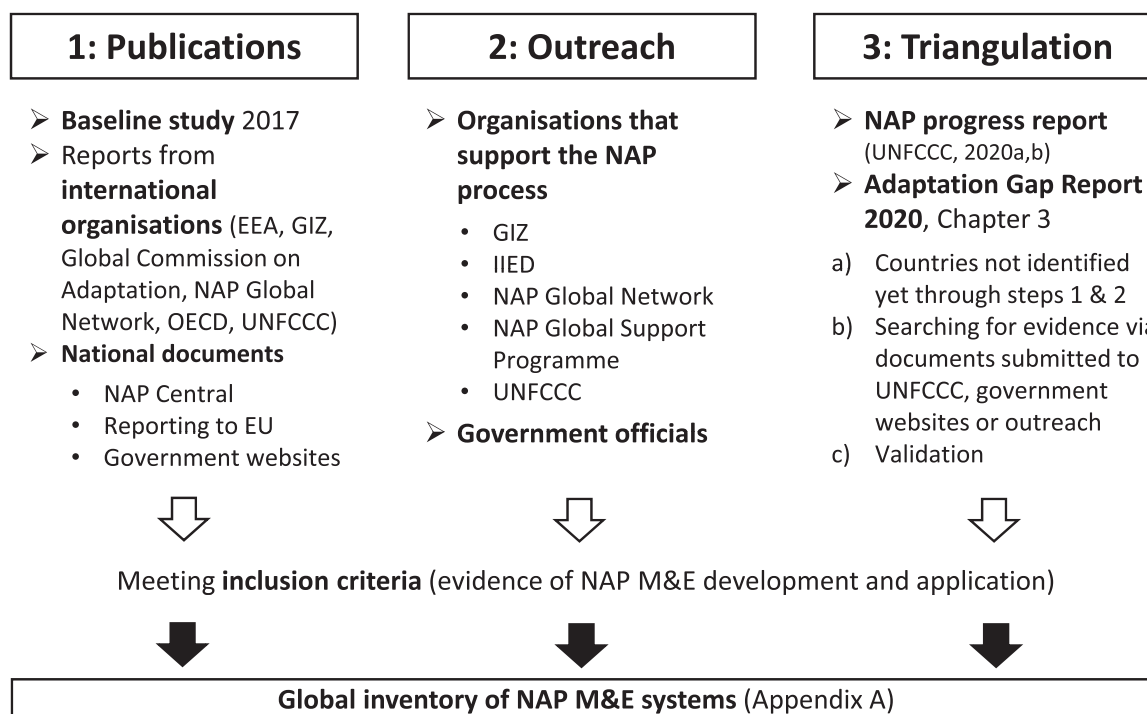


Fig. 1. Steps of the search strategy and triangulation.

**Table 1**  
Themes on NAP M&E development practices and the policy cycle.

| Theme                                     | Aspects to be addressed   |
|---|---|
| Motivation to undertake NAP M&E           | What motives countries to engage in developing NAP M&E systems?<br>What types of legal and policy mandates for the development of NAP M&E systems emerge from the stocktake?      |
| Development process of the NAP M&E system | What characterizes the development of NAP M&E systems?<br>How is the development process coordinated and who is involved?<br>What role have support organizations played?         |
| Role of NAP M&E in the policy cycle       | Are countries utilizing M&E reports as part of the policy cycle?<br>Do monitoring and evaluation serve different functions?<br>How are findings from the M&E system communicated? |

differences, they do not elaborate on their practical implications.

In the absence of a suitable framework, the four descriptive M&E development stages of the baseline study are used as a starting point. However, rather than adopting them a-priori, the observed evidence is used to test how well they are able to describe the current global status of NAP M&E systems. An advantage of this approach is its openness to the diversity of countries' adaptation planning contexts and ways of conducting M&E. This exploratory design is complemented by a systematic review as outlined in the next section.

### 3.3. Data gathering and analysis

Systematic reviews have become a common method in climate change adaptation research (Berrang-Ford et al., 2015). They aim at systematically and transparently searching relevant information to answer the research questions. Information on the current status of NAP M&E systems is so far largely unavailable in the scientific literature. Therefore, a novel search strategy has been designed that combines

multiple sources of published and unpublished information and assesses their completeness through a triangulation with two global reports from the UNFCCC secretariat and UNEP, respectively (Fig. 1). To be included, information has to be explicit about ways of tracking the implementation of NAPs or needs to directly describe NAP implementation progress or its evaluation.

A distinctive feature of this study is that it requires evidence of the actual development or application of M&E. Accordingly, general statements of the intention of undertaking M&E in the future, for example included in NAPs or Nationally Determined Contributions (NDCs), are not sufficient for inclusion. Two types of evidence are considered: published documents (usually published by government entities or on their behalf) and evidence from key informants. Examples of published evidence are monitoring and evaluation reports and any documents that contain details of the NAP M&E system and its development. A second source of evidence is information from people directly involved in the development or application of NAP M&E systems, either government officials or employees of international organizations. To ensure the validity of this type of information, only information from contacts personally known to the author were considered.

The systematic review took place in three steps (Fig. 1). First, publications on NAP M&E were identified and screened for relevant evidence. NAP M&E is a highly specialized topic that is addressed internationally by only a few organizations and that is covered by technical bodies under UNFCCC, namely the Adaptation Committee and the Least Developed Country Expert Group. The starting point of the identification was a baseline study undertaken as part of UNEP's Adaptation Gap Report 2017 (Leiter et al., 2017). This baseline was complemented by relevant reports published by international organizations (European Environment Agency, OECD), development cooperation entities (Germany's bilateral development agency (GIZ) and the NAP Global Network), civil society organizations (the International Institute for Environment and Development, IIED) and a background paper for the Global Commission on Adaptation (Leiter et al., 2019). National documents were identified via the NAP online portal of the

**Table 2**  
Stages of NAP M&E development and application.

| Status                  | Developing a NAP M&E system  |  |  | Communicating NAP M&E information   |  |   |  |
|-------------------------|--|--|--|---|--|---|--|
|                         | Stating a commitment intention   | Early stage  | Development stalled  | Advanced stage  | NAP M&E system approved  | Progress report published   | Evaluation published   |
| <b>Short definition</b> | Intention of undertaking M&E   | Tangible efforts towards NAP M&E development   | NAP M&E development has stopped before 2015  | Details of the NAP M&E system have been developed   | The final NAP M&E system has been approved   | Information on implementation progress published  | Evaluation published   |
| <b>Common features</b>  | Either a generic commitment without any details or a specific commitment outlining, e.g., the intended time interval of reporting, but with otherwise just general or hypothetical information | Observed actions include: A training on NAP M&E, stakeholder outreach on the objective and basic aspects of the M&E system, draft institutional arrangements, a draft list of indicators, inventories of relevant data sources, formation of a working group | Tangible or advanced steps had been undertaken before 2015 but the efforts seem to have stalled. | Observed actions include: An M&E framework detailing objectives and components of the M&E system, a results framework with outcomes and outputs, an elaborate system of indicators, an expert group developing the NAP M&E system, final institutional arrangements | Observed forms include: A published NAP M&E plan, agreements between ministries to share data and operationalize the M&E system, a formal approval by relevant government bodies, a formalization through laws or regulation | At least one detailed report with information on the progress of NAP implementation has been published. | At least one comprehensive evaluation of NAP implementation has been published. All types of evaluations (including mid-term evaluations) count. |
| <b>Examples</b>         | Niue, State of Palestine   | Benin, Cook Islands, Jordan  | Australia, Mongolia, Tunisia   | Canada, Grenada, Thailand   | Indonesia, St. Lucia   | Brazil, Japan, United Kingdom   | Chile, Finland, Philippines, Spain   |

UNFCCC secretariat<sup>3</sup> and through the ‘Climate Change Laws of the World’ database.<sup>4</sup> In addition, information on adaptation planning under the EU monitoring regulation<sup>5</sup> and as part of the evaluation of the EU Adaptation Strategy (European Commission, 2018) was screened for relevant evidence. Information about other industrialized countries was searched for at relevant government websites, usually those of the Ministry of the Environment or of a technical environment agency.

Published information might be outdated and ongoing developments are not necessarily reported publicly before completion. Therefore, in a second step, the main organizations that support developing countries on the topic of NAP M&E were contacted, namely the UNFCCC secretariat, the NAP Global Network, the NAP Global Support Programme, IIED, and GIZ. These organizations are in direct contact with the responsible country authorities which ensures that information is up-to-date. In a few cases, government officials were contacted directly where personal connections already existed. Outreach took place via email in October 2020 and again between February and July 2021.

To reduce the risk of missing existing evidence of NAP M&E systems, information gained from steps one and two was triangulated for completeness through two global accounts, the NAP progress report from the UNFCCC secretariat (UNFCCC, 2020b), and a review of country submissions to UNFCCC by Möhner et al. (2021). Both sources do not contain any details about the respective NAP M&E systems. To verify that indicated countries are indeed engaged in NAP M&E, three avenues were pursued: (1) the UNFCCC secretariat was contacted for further details, (2) the website of the responsible ministry was searched for further information, and (3) where contact persons were known, outreach as described under step two was carried out. Results of the triangulation are described in Appendix B.

Evidence gathered through these three steps was compiled in a global inventory of NAP M&E systems (Appendix A). Documents that were not available in English or German were translated using free online document translation websites<sup>6</sup> (the inventory includes documents in 12 languages). The information in the inventory was then qualitatively analyzed as follows. For the first research question, countries included in the inventory were plotted on a continuum from the least advanced to those with fully operational M&E systems. The plot showed common stages where multiple countries had advanced to a similar level. The features of these stages were used to revise the four categories of the baseline study (see Section 4.1). Countries were then grouped according to the newly defined stages which answered research question 2 (see Section 4.2). To analyze changes since 2017 (third research question), the baseline from 2017 was adjusted to be comparable to the new stages (see Appendix C). To structure responses to the fourth research question, three themes and corresponding aspects were defined (Table 1) focusing on observations from the stocktake that make a novel contribution and have not been addressed in detail elsewhere or not with global coverage.

## 4. Results

### 4.1. Common development stages of NAP M&E systems

The evidence in the inventory was analyzed for commonalities among countries regarding the degree of M&E development or application they have reached. Countries were plotted from the least advanced to the most advanced and those at similar levels were grouped

<sup>3</sup> NAP Central: <https://www4.unfccc.int/sites/NAPC/Pages/national-adaptation-plans.aspx>.

<sup>4</sup> <https://climate-laws.org/>.

<sup>5</sup> The latest reporting round was in 2019. Country’s submissions are available in the country profiles of the Climate Adapt Portal: <https://climate-adapt.eea.europa.eu/countries-regions/countries>.

<sup>6</sup> <https://translate.google.com> and <https://www.deepl.com>.

**Table 3**  
Countries according to the development stage of their NAP M&E system.

| Stage                                   | Countries (as of 1 August 2021)   | Proportion per region  |
|---|---|--|
| Early stage                             | (6 countries) Benin, Cook Islands, Jordan, Paraguay, Sri Lanka, Uganda  | Non-Annex-I (6): 100%<br>Africa (2): 33%<br>Europe (0): 0%<br>LDCs (2): 33%<br>SIDS (1): 17%     |
| NAP M&E development stalled before 2015 | (6) Australia, Mongolia, Nepal, Poland, Tanzania, Tunisia   | Non-Annex-I (4): 66%<br>Africa (2): 33%<br>Europe (1): 17%<br>LDCs (2): 33%<br>SIDS (0): 0%      |
| Advanced stage                          | (22) Albania, Bulgaria, Cameroon, Canada, Colombia, Ethiopia, Fiji, Grenada, Ireland, Moldova, Morocco, Mozambique, Nauru, Peru, Rwanda, Senegal, St. Vincent and the Grenadines, Suriname, Thailand, Togo, Tonga, Vietnam  | Non-Annex-I (19): 86.5%<br>Africa (7): 32%<br>Europe (4): 18%<br>LDCs (3): 14%<br>SIDS (3): 14%  |
| NAP M&E system approved                 | (5) Finland, Indonesia, Philippines, St. Lucia, Turkey  | Non-Annex-I (4): 80%<br>Africa (0): 0%<br>Europe (2): 40%<br>LDCs (0): 0%<br>SIDS (1): 20%       |
| Monitoring information published        | (23) Austria, Belgium (Flanders), Brazil, Burkina Faso, Cambodia, Chile, Cyprus, France, Germany, Japan, Kenya, Kiribati, Lithuania, Mexico, Netherlands (Delta Programme), Norway, Portugal, Slovakia, Spain, South Africa, South Korea, Switzerland, United Kingdom | Non-Annex-I (9): 39%<br>Africa (3): 13%<br>Europe (13): 56.5%<br>LDCs (3): 13%<br>SIDS (1): 4.5% |
| Evaluation published                    | (15) Belgium, Cambodia, Chile, Czech Republic, Finland, France, Germany, Ireland, Mexico, Netherlands, Philippines, South Korea, Spain, Switzerland, United Kingdom   | Non-Annex-I (5): 33%<br>Africa (0): 0%<br>Europe (10): 67%<br>LDCs (1): 7%<br>SIDS (0): 0%       |

**Notes:** “Non-Annex I” refers to the countries not listed in Annex I of the UNFCCC Convention from 1994. Figures are rounded to the nearest half-percentage.

together. The aim was to determine common stages that are sufficiently distinct to ensure a reliable designation of countries. The resulting stages of NAP M&E development were then compared to the four stages that had been used in the baseline study in 2017, namely (1) Initial steps, (2) Advanced stage, (3) Fully operational and reporting, and (4) Evaluation published (Leiter et al., 2017). It became apparent that four stages were not sufficient to describe the observed record. The former third stage was therefore split into two, adding a new one for approved but not yet applied M&E systems. Another new stage was added for countries whose development of NAP M&E arrangements appears to have stalled and not resumed since the Paris Agreement got adopted. Minimum requirements were also defined for the entry level stage. In particular, mere statements of intent or very general M&E sections in NAPs were not considered as evidence for having started the development of a NAP M&E system.

Table 2 outlines common stages of developing or applying NAP M&E systems as observed in the inventory. A distinction is made between four development stages and two reporting stages. The stocktake showed that some countries first developed a monitoring system followed later on by an evaluation method (e.g., Germany). It was therefore considered whether Table 2 should consist of two separate development processes, one for monitoring and one for evaluation. However, at present this would have only made a difference for a relatively small number of countries, i.e., would have disproportionately increased the complexity compared to the added value. In many cases, information on the development of the evaluation method was also not available.

**Table 4**  
Number of countries engaged in NAP M&E.

| Stage  | Number of countries |      | Proportion of countries engaged since 2015 |                          |
|--|---------------------|------|--|--------------------------|
|  | 2017                | 2021 | 2017:Out of 40 countries                   | 2021:Out of 57 countries |
| Number of countries for which evidence of M&E development or application was found                           | 46                  | 63   | 2017:Out of 40 countries                   | 2021:Out of 57 countries |
| Number of countries involved since 2015, i.e., excluding those where M&E development appears to have stalled | 40                  | 57   | 100%                                       | 100%                     |
| Early stage  | 7                   | 6    | 17.5%                                      | 10.5%                    |
| Process stalled before 2015  | 6                   | 6    | (Excluded since process stalled)           |                          |
| Advanced stage   | 14                  | 22   | 35%  | 39%                      |
| M&E system approved  | 4                   | 5    | 10%  | 9%                       |
| Monitoring published   | 14                  | 23   | 35%  | 40%                      |
| Evaluation published   | 8                   | 15   | 20%  | 26.5%                    |
| NAP monitoring is under development (early stage or advanced)  | 21                  | 28   | 52.5%                                      | 49%                      |
| At least one NAP monitoring and/or evaluation report published   | 17                  | 27   | 42.5%                                      | 47.5%                    |
| At least one monitoring AND one evaluation report published  | 5                   | 11   | 12.5%                                      | 19.5%                    |

**Notes:** Countries can appear twice in the reporting stage. Therefore, percentage values across stages do not add up to 100%. Percentages are rounded to nearest half-percent. Table 3 contains the list of countries.

Therefore, in cases of a temporal disconnect between the development of monitoring and evaluation arrangements, the development stages in Table 2 refer only to the development of the monitoring system. Although this presents a simplification, it serves the purpose of obtaining an overview of countries' NAP M&E status. Details of the type and format of evaluations are included in the inventory (Appendix A).

#### 4.2. Extent and status of NAP M&E systems

The systematic review identified over 100 documents detailing the status of the NAP M&E systems of more than 60 countries (Appendix A). Countries were classified according to the common stages and their features as outlined in Table 2. Explanations for each country's classification are described in Appendix A.

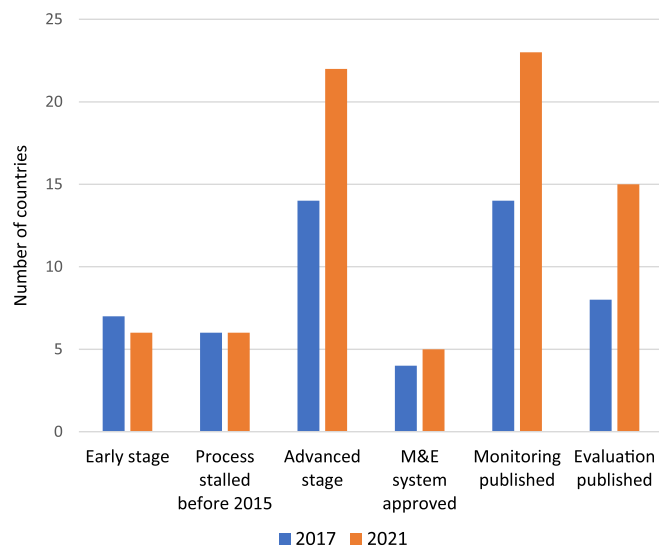
In total, 63 countries were found to have been engaged in the development or application of a NAP M&E system at some point in time (Tables 3 and 4). However, in six countries the development of the NAP M&E system appears to have stalled more than five years ago, leaving 57 countries that have been engaged since the adoption of the Paris Agreement. Out of these, six countries are still in an early phase while 22 (39%) are at an advanced stage. Moreover, 23 countries have published information about the progress of their NAP implementation at least once and 15 countries have undertaken at least one NAP evaluation. Eleven countries (~20%) have published both a progress report and completed an evaluation, namely Belgium, Cambodia, Chile, France, Germany, Mexico, the Netherlands, South Korea, Spain, Switzerland and the United Kingdom.

While the stocktake identified countries on all continents and across all levels of economic development, the proportion of developing countries among those that report on NAP implementation is currently 39% while just accounting for one-third of those that have published an evaluation (Table 3). So far, only three Least Developed Countries were found to have published a NAP implementation report, namely Burkina Faso, Cambodia, and Kiribati. Noteworthy is the high proportion of European countries (accounting for more than half of those reporting

**Table 5**

Number and proportion of countries with a NAP that are tracking its implementation and reporting about it.

|  |  |
|--|--|
| Out of the 70 countries that have adopted a NAP, evidence could be found that: | 23 countries (33%) have published at least one progress report                               |
|  | 15 countries (21.5%) published at least one NAP evaluation                                   |
|  | 27 countries (38.5%) published at least one progress <i>and/or</i> one evaluation report     |
|  | 11 (16%) countries published at least one progress <i>AND</i> at least one evaluation report |



**Fig. 2.** Number of countries per NAP M&E stage in 2017 and 2021.

and two-thirds of those that evaluate, respectively) which can be partly explained by the early start of adaptation planning in Europe and by efforts from the European Commission to promote adaptation M&E by member states (EEA, 2020; Biesbroek et al., 2010). Japan and South Korea are the only non-European industrialized countries so far that communicate information on NAP implementation to the public.

Table 4 shows the proportion of countries in each of the six stages out of the 57 countries for which evidence of NAP M&E has been found. Of additional interest is the proportion out of all countries that adopted a NAP. As outlined in the second section, countries use different titles for their adaptation planning documents. In contrast to other clearly defined documents under the UNFCCC and the Paris Agreement such as National Communications or NDCs, there is no global list of countries with a NAP. In fact, the number of countries varies with the applied conditions of what counts as a “NAP”. Using the definition of a detailed planning instrument on adaptation (see Section 2), the number can be estimated by adding the following: (a) NAPs from developing countries submitted to NAP Central (23),<sup>7</sup> (b) member countries of the European Environment Agency indicated as having a NAP (30 out of 33 countries) (EEA, 2020, Table 1.2<sup>8</sup>), (c) countries that were identified through the systematic review as having adopted a NAP but are neither listed on NAP

<sup>7</sup> As of 1 August 2021, the list includes 24 countries, but Uruguay’s is a sectoral adaptation plan, leaving 23: <https://www4.unfccc.int/sites/NA/PC/Pages/national-adaptation-plans.aspx>.

<sup>8</sup> The document distinguishes between adaptation strategies (30 countries) and adaptation plans (20). Yet, most of the adaptation strategies are very detailed (e.g., Italy’s is 195 pages, Ireland’s is 110) and therefore count as a NAP under the definition used in this article.

Central nor are EEA members (17).<sup>9</sup> Hence, the minimum number of countries with a detailed national adaptation planning instrument in place is estimated at 70 which is just above half the number of countries reported by Nachmany et al. (2019) as having adopted an “adaptation framework” (120 countries) which they define as containing obligations and principles on adaptation (i.e., applying lower requirements than for an operational planning instrument). Given that no evidence of NAP M&E was found through the systematic review for any of the 70 countries not already included in the inventory, the estimated lower boundary of 70 countries with a NAP can be put in relation to the number of countries that evidently report on NAP implementation. The results are shown in Table 5.

Compared to these figures, a recent analysis of NAPs, NDCs and National Communications (Möhner et al., 2021) found a far higher number of countries that have supposedly “undertaken” NAP monitoring (67 countries) and “planned or undertaken” an evaluation (60). The difference was found to be largely due to counting *intentions* for M&E rather than evidence of M&E having actually been undertaken (see Appendix C). While most NAP documents state some form of intent about M&E, the systematic review found only a minority of countries to be at the reporting stage. In addition, the first round of NDCs available until mid-2020 typically stated intentions which further explains the difference. Hence, the evidence-based figures reported in Table 4 are more robust estimates of the number of countries engaged in NAP M&E than intention-based ones.

Despite the outreach to NAP support organizations and officials, it is possible that additional countries are engaged in NAP M&E or are more advanced than shown in Table 3, for example where M&E development or application is undertaken as part of government internal operations and remaining undisclosed to the public. However, triangulation with the NAP progress report of the LEG (UNFCCC, 2020b) shows that only a small number of countries might have been missed (Appendix B). It is therefore expected that the inventory contained in Appendix A presents a fairly complete account of the global extent of NAP M&E as of 1 August 2021, particularly for countries in the most advanced stages.

#### 4.3. Changes compared to 2017

To enable a comparison, the baseline from the 2017 Adaptation Gap Report (Leiter et al., 2017) had to first be adjusted according to the revised number of M&E development stages (see Section 4.1). In addition, information obtained through the systematic review allowed reconstructing the situation in 2017 and comparing it with the baseline. For Argentina and Costa Rica which had originally been categorized as being at an early stage, no evidence of NAP M&E activities could be found. In contrast, several countries were missing from the baseline and have been added. In essence, the comparison of the original with the reconstructed baseline demonstrates the superiority of the systematic review compared to the non-systematic search that was conducted in 2017. The adjusted baseline is shown in Appendix C.

Since 2017, 17 additional countries have engaged in NAP M&E (Table 4). Almost ten countries more are in the advanced stage and in the progress reporting stage, respectively (Fig. 2). The number of NAP evaluations almost doubled. Most notably, the number of developing countries sharing information on NAP implementation more than doubled between 2017 and 2021. Small Island Development States (SIDS) in particular increased their engagement in NAP M&E. Meanwhile, the group of six countries that appeared to have stalled their NAP M&E development before 2015 remained in this status in 2021 which confirms the original classification. Given the otherwise strong

<sup>9</sup> Albania, Australia, China, Cook Islands, Indonesia (RAN API), Japan, Mexico (Programa Especial de Cambio Climático), Nauru, Niue, Peru, Philippines (NCCAP), Russia, South Africa, South Korea, Thailand, Tonga, Turkey.

increases, it is surprising that the number of countries that are in an early stage decreased by one country. This may be due to a detection bias in cases where early-stage activities are not documented in publications and where contacts through the surveyed NAP support organizations do not exist. However, funding for NAP readiness from the Green Climate Fund is likely to increase this score (see Section 5). Overall, there is a clear trend of more NAP M&E systems becoming operational and resulting in monitoring and evaluation reports.

#### 4.4. Development of NAP M&E systems and their role in the policy cycle

Country examples referred to in this section are based on documents listed in Appendix A.

##### 4.4.1. Motivation and mandate

The engagement of an increasing number of countries in NAP M&E raises the question what motivates them to do so. Countries generally state very similar purposes for undertaking NAP M&E as captured by [Environment and Climate Change Canada \(2018\)](#): “A robust approach to evaluating progress is needed to increase understanding, support informed decision-making and continuous improvement, and ultimately, enhance climate resilience” (p.6). Countries are also influenced by international reporting provisions and regional organizations. In Europe, EU member states need to report biennially on progress in national adaptation planning to the European Commission, and the European Environment Agency has put a strong emphasis on M&E ([EEA, 2015, 2020](#)). Globally, the increase in NAP M&E in recent years might be due to a number of factors including greater awareness for the need to adapt, a momentum among countries to renew or newly establish more detailed adaptation policies, and reporting provisions in the Paris Agreement. In fact, countries are encouraged to report on adaptation progress under the enhanced transparency framework and through Adaptation Communications ([UNFCCC, 2018a](#), Decisions 18/CMA.1; [UNFCCC, 2018b](#), Decision 9/CMA.1).

Another explanation is the inclusion of M&E requirements in national climate change laws. In at least nine countries, M&E of adaptation implementation is stipulated by law (Fiji, Finland, Greece, Japan, Kenya, Ireland, Mexico, Norway, and the UK). Mandates for NAP M&E were also found in national climate change policies (e.g., in South Africa and Grenada) or in the NAP itself (e.g., in Paraguay and Peru). In Moldova, a government decision formalized an adaptation planning process including M&E. The type of mandate can directly influence the NAP M&E development process. Country experiences show that a weak mandate can make involvement of line ministries difficult and slow down the elaboration of the NAP M&E system ([Leiter, 2013; Hammill et al., 2014](#)).

##### 4.4.2. Development of NAP M&E systems

An interesting finding of the stocktake is that NAP M&E systems are rarely fully developed at the time a NAP is adopted. While it is common for NAPs to include an M&E section, its level of detail and specificity varies widely. It often just contains statements of intent or relatively general descriptions of future M&E arrangements. Some NAPs contain more specific guidance, for example about the content of future progress reports (e.g., in Grenada’s NAP) or they list the development of an M&E system among the NAP’s priority actions (e.g., in the NAPs of Albania and St. Vincent and the Grenadines). Countries that were classified as more advanced regarding M&E had, for example, developed detailed results frameworks including outcomes, outputs and indicators as in the National Climate Change Action Plan of the Philippines or in Tonga’s joint action plan on adaptation and disaster risk reduction.

In some cases, specific M&E plans or frameworks are published as separate documents after the NAP has been adopted, e.g., in Fiji, St. Lucia and the Philippines. Some countries commission studies of possible M&E designs and indicators and have them published by technical environment agencies, e.g., in Germany, the Netherlands and

Ireland. A consistent finding for most countries is that the development process of the NAP M&E system has taken many years. In Germany, for example, it took five years from the first publication of a system of draft indicators to the publication of the first monitoring report. The reasons for these multi-year development periods are manifold. For one, the number of stakeholders that need to be consulted and whose active involvement is required is high, usually including numerous line ministries and technical agencies and, depending on the scope of M&E, also subnational authorities.

Another reason are resource or capacity constraints. For example, the NAP M&E frameworks of Kenya and Mozambique could not be implemented as the necessary data and staff was not available. Kenya is therefore currently simplifying its adaptation M&E system. Other countries also changed the intended structure of the NAP M&E system over time, e.g., to adjust it to new domestic policies or as a result of lessons learned during the development process (e.g., Colombia). In some countries, notably Brazil, incoming administrations de-prioritized climate action and delayed associated work including NAP progress reporting. After all, M&E is not just a technical matter, but can influence the policy debate (e.g., if it shows a lack of progress) and be in turn shaped by politics of various kinds (from power plays between ministries to the general stance of an administration towards transparency).

The development process of NAP M&E systems is generally coordinated by the same government entities that coordinate the NAP, typically the Ministry of the Environment or a technical agency. Some countries have formed technical working groups to coordinate the NAP M&E development process, e.g., in Finland. It is also common to engage government-external expertise. For example, Canada and Finland established advisory groups for the formulation of indicators and Germany, South Africa and the UK commissioned studies and involved the scientific community and relevant business associations, e.g., from the insurance or tourism industry. However, the M&E development process is not commonly documented and only few countries have published studies about the development of the NAP M&E system (e.g., Germany and the UK).

The stocktake also found that the development of NAP M&E systems is a continuously evolving process that often proceeds even as first monitoring reports have been published. For example, Austria, Germany, Kenya, Mexico, South Africa, South Korea and the United Kingdom have all continued to advance their M&E system after the first monitoring or evaluation report was published. Germany, for instance, has developed a methodology for a NAP evaluation as an additional component to the existing monitoring and progress reports. The fastest countries to produce a NAP progress report were those that opted for a pragmatic design with the intention to elaborate it concurrently, e.g., Brazil. Hence, in contrast to the usual practices of M&E of projects where the M&E design is typically kept constant throughout the duration of the intervention, national adaptation M&E systems are more dynamic and often evolve over time.

The stocktake shows that practically all developing countries engaged in NAP M&E received financial or capacity building support from bi- or multilateral donors, either at the start of the process in form of e.g., a training or for the entire development of the NAP M&E system. M&E support is either provided as part of overall NAP support projects or as specialized support, e.g., requested through the country support hub of the NAP Global Network.<sup>10</sup> Two organizations have provided specific NAP M&E support to more than ten countries (Germany’s International Development Agency (GIZ) and the NAP Global Network (IISD)) and another two to at least five countries (the International Institute for Environment and Development (IIED) and the United Nations Development Programme including via the NAP Global Support Programme). France, Japan and the European Union have also funded NAP M&E support.

<sup>10</sup> <https://napglobalnetwork.org/activities/supporting-national-level-action/>.

#### 4.4.3. M&E and the policy cycle

Almost half of the 23 countries that published a NAP progress report also conducted an evaluation. Some countries completed their first progress report only recently (e.g., Burkina Faso) or are still in an early phase of NAP implementation which partially explains why just four developing countries have published a NAP evaluation report to date (Cambodia, Chile, Mexico, Philippines). In fact, the stocktake found twice as many progress reports than evaluation reports. The often higher frequency of progress reports, e.g., in Mexico or Spain is a contributing factor, although this is not the case in every country (e.g., Austria intends to publish a joint M&E report). Four countries have published evaluations without having public progress reporting in place (Czech Republic, Finland, Ireland, Philippines) but each of them is close to finalizing or has already approved its monitoring system.

M&E sections in NAPs commonly describe monitoring and evaluation as separate processes whereby the purpose of evaluations is to assess results, generate lessons and provide recommendations. In contrast, progress reports typically assess the degree of implementation (e.g., in Brazil, France and Germany). In several countries, the process of conducting evaluations is organized separately to progress monitoring. In the United Kingdom and Ireland, a national climate law has established independent expert bodies that evaluate progress. In other countries, NAP evaluations are being commissioned by government agencies, but carried out by third parties (e.g., in Germany and Mexico). Some countries combine M&E in a joint report (e.g., intended by Austria) or use the label “M&E report” with different emphases on, for instance, recent implementation (e.g., Brazil’s first NAP M&E report) or on achievements and remaining gaps (e.g., in the Philippines). A smaller number of countries also stated they would undertake government-internal monitoring on an annual basis (e.g., the Czech Republic), but this could not be verified.

By now, NAP evaluations have informed the preparation of successive NAP documents in at least half a dozen countries (e.g., in Chile, Spain and South Korea). Mid-term evaluations have provided inputs for the remaining implementation period in, for instance, Belgium and Cambodia. However, the number of countries that have gone through more than one implementation and reporting cycle (i.e., countries that have adopted the third iteration of their NAP) is still small (Germany, South Korea, United Kingdom). These countries have institutionalized NAP reporting and sequenced it in a way that informs the policy review process. Successive NAP iterations have also been informed by insights from progress reports (e.g., in Germany). Hence, the traditional view from project-level M&E where monitoring and evaluation have well-defined and clearly separate functions (OECD, 2002) does not necessarily apply in the same way to national policy M&E arrangements.

The most common format in which findings of NAP M&E systems are disseminated are progress or evaluation reports or reports to parliament. Appendix A includes more than 50 NAP M&E reports with the United Kingdom accounting for almost 20%. NAP reporting typically has a multi-year frequency. For example, Austria and Germany publish a NAP monitoring report every four to five years. While numerous countries’ NAP documents state an intent for annual progress monitoring (e.g., in Brazil and the Philippines), this has rarely been realized, at least not via public reports (the Czech Republic mentions annual government-internal monitoring). Some countries use a biennial cycle of progress updates instead, e.g., Portugal and the United Kingdom. Very few countries are currently sharing NAP indicator data in online portals (exceptions are Cambodia and South Africa).

## 5. Discussion

Less than 40% of countries that adopted a NAP were found to monitor or evaluate its implementation. Even if the five countries with approved NAP M&E designs are included, it still means the majority of countries with a NAP in place does not have mechanism to systematically track its implementation. Without at least basic ways of following-

up on plans, their effectiveness as a main driver of adaptation action can be called into question. Moreover, global indicators such as the SDG indicator “13.2.1 Number of countries with (...) national adaptation plans” (United Nations, 2020, p. 14) risk misleading policy makers and the public by assuming that adaptation is being taken care of. While national adaptation planning is essential, whether it is also effective depends on a variety of factors and cannot be assumed as given. The findings of this study therefore support calls for a greater emphasis on the quality of adaptation planning and highlight the need to assess their implementation and its effects.

Europe is currently the only continent where M&E of the NAP forms a regular part of the policy cycle in the majority of its countries (EEA, 2020). However, the comparison between the situation in 2017 and 2021 (Fig. 2 and Table 4) shows a substantial increase in the number of developing countries that track and report their NAP progress. This trend is partly due to targeted support from specialist organizations like the NAP Global Network whose donors respond to obligations under the Paris Agreement to support developing countries in matters related to adaptation planning and transparency (Article 13, paragraphs 14 and 15). The number of countries engaging in the development of NAP M&E systems is likely to further increase as a result of NAP readiness funds from the Green Climate Fund. As of November 2020, proposals from 57 countries had been approved for NAP support which can include M&E, as is the case in Bangladesh and Moldova (GCF-IEU, 2021, p. 40). Furthermore, increased anchoring of M&E provisions in national climate laws also provides an impetus to put in place mechanisms that support effective implementation (see Section 4.4.1).

Whether NAP M&E systems are able to fulfill their intended purposes depends on whether their design is suitable, operationally feasible and whether gathered information is disseminated effectively. This study did not examine the quality and usefulness of the individual NAP M&E systems. Moreover, even well-functioning M&E systems do not guarantee ambitious action. Future research therefore needs to examine the fit between NAP M&E systems and their intended purposes as well as the factors that determine how well NAP M&E functions in practice.

An important advancement of the current study is its focus on actual evidence rather than on stated intentions of M&E which, as it turns out, often remain unfulfilled. The evidence-based stocktake demonstrates that a reliance on stated intentions in documents such as NDCs leads to a gross over-estimation of the number of countries that have actually undertaken NAP M&E. For example, the number of countries reported by Möhner et al. (2021) is three to four times higher than what the evidence suggests (67 rather than 23 countries as having “undertaken” monitoring and 60 rather than 15 countries as having an “evaluation planned/undertaken”; see Section 4.2). This finding is potentially transferable to other topics and it cautions against inferring the state of actual practice from future-oriented statements in country submissions to UNFCCC. Instead, the findings confirm the need for more empirical research on the implementation of climate policies (Rykkia et al., 2014).

Another contribution of the stocktake is a better understanding of the development and practice of NAP M&E systems. Previous studies of NAPs like Morgan et al. (2019) or Woodruff and Regan (2019) have treated M&E in simplistic ways, usually distinguishing only the presence or absence of M&E. Given the large differences between NAP M&E systems that were already noted by earlier research such as Hammill et al. (2014), EEA (2015) and Leiter et al. (2017), the meaningfulness of such simplistic accounts is very limited. In addition, the stocktake found that the development process of NAP M&E systems proceeds through multiple stages over multi-year periods and can evolve dynamically (e.g., simultaneously reporting and advancing the M&E methods for future reports). Accordingly, NAP M&E systems differ from traditional project-level M&E practices which needs to be accounted for in their design and needs to be considered by those that support NAP M&E development. This finding confirms an earlier analysis by Berrang-Ford et al. (2017) that adaptation M&E frameworks developed for the project, community or sector-level cannot simply be “scaled-up” to be used as



## NAP M&E systems.

The lack of mechanisms to track implementation is significant given the importance placed on NAPs under the Paris Agreement as a central part of countries' adaptation response (Article 7.9) and because of the sizable investment that has already been made in developing NAPs (USD 55 million disbursed for adaptation planning readiness by the Green Climate Fund alone; GCF-IEU, 2021, pp. 40–49). The current lack of knowledge on national adaptation progress inhibits our ability to assess whether countries are effectively preparing individually and collectively for the risks posed by climate change. The Paris Rulebook acknowledges the role of NAP M&E systems by stipulating:

“112. In order to enhance their adaptation actions and to facilitate reporting, as appropriate, each Party should report on the establishment or use of domestic systems to monitor and evaluate the implementation of adaptation actions. Parties should report on approaches and systems for monitoring and evaluation, including those in place or under development.” (UNFCCC, 2018b, Decision 18/CMA.1, Annex, paragraph 112).

In fact, NAP M&E systems are highly relevant for the debate on how to assess global progress of adaptation under the Global Stocktake of the Paris Agreement because information provided by countries will be among the primary inputs (UNFCCC, 2018b, Decision 19/CMA.1). Countries that monitor adaptation actions can therefore benefit from a better understanding of their domestic progress while generating information to fulfill international reporting requirements (Leiter et al., 2017). Accordingly, future research should examine the content and usage of NAP M&E systems and its influence in national adaptation processes as well as its role for global adaptation assessments.

## 6. Conclusion

Literature on adaptation planning has paid little attention to how implementation will be tracked. This gap is addressed through the first evidence-based global stocktake of NAP M&E systems which substantially advances previous accounts by documenting government practices from over 60 countries. It finds that M&E mechanisms are often developed only after NAPs have been adopted and typically take several years before reporting commences. This study therefore clarifies recent contradictions in the literature on NAPs about the extent of M&E (see Section 2). In fact, less than 40% of the 70 countries that adopted a NAP report on progress or evaluate it. This situation greatly affects the ability to understand whether adaptation planning makes a difference. It also reduces the information basis countries have to report to UNFCCC and to inform the Global Stocktake. While the number of countries engaged in developing or applying NAP M&E systems has increased by more than 40% compared to 2017, the majority are not operational yet. This gap calls for further attention to M&E as part of NAP processes and NAP support, including readiness support from the Green Climate Fund. Further research on the quality and usage of NAP M&E systems is essential to understand how they can best support adaptation policy and action.

## Funding

Funding for this research was provided by the UK Economic and Social Research Council (ESRC) under grant number ES/P000622/1, project reference 2098296.

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Acknowledgements

I am very thankful to all country representatives and colleagues who provided information on the NAP process and the status of its M&E system for various countries. I am particularly thankful for the close collaboration from the NAP Global Network hosted by the International Institute for Sustainable Development (IISD), from Germany's International Development Agency (GIZ – Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH), the UNFCCC secretariat and the International Institute for Environment and Development (IIED). I am also grateful for very helpful comments from Declan Conway, Tim Forsyth and two anonymous reviewers.

## Appendix A. –C. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.envsci.2021.08.017.

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