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Natural capital accounts and public policy decisions: Findings from a survey

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Abstract

The initiatives in natural capital accounting have multiplied in the recent years, particularly concerning ecosystem accounts. Yet, natural capital accounting has been rarely used to inform public policy decisions. Based on a survey for statistical offices and ministries and independent experts worldwide, we confirm that there is very little use of natural capital accounts for public policy decisions and, more so, in developing countries. The most relevant obstacles are the lack of political support by key people and institutional leadership unable to promote policy use by other ministries. Concerning developing countries, the factor which is considered as the most relevant in preventing the use of natural capital accounts for policy making is the stage of development of the country. In addition, respondents from statistical institutes and developing countries are particularly concerned about institutional obstacles and, to a lesser extent, data availability and cooperation. Respondents from ministries and independent experts are particularly concerned about design obstacles. A key result of the survey is the need to evaluate the value-added of natural capital accounts with respect to statistics. Most probably, natural capital accounts will only be integrated in national accounts in the aftermath of a major environmental disaster.

JEL-codes: Q0, Q28, Q38, Q58.
Key words: Natural capital accounts, public policy

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1. Motivation

Since the 1970s with some pioneer projects in countries such as Norway, Canada, France, the Netherlands and Spain, we have witnessed some efforts to develop natural capital accounting (Laurans *et al*., 2013).[1]
The concept of 'natural capital' aims to underline the role of nature in supporting the economy and human well-being. Natural capital comprises of the ecosystems and abiotic assets that provide people with exploitable resources (Petersen and Gocheva, 2015). To better understand the impact of economic activities on the environment, it is important to develop natural capital accounts that complement the global system of national accounts that provides core economic indicators.This allows to monitor the changes in natural capital and hence the eventual impact on our economies and wellbeing.

The initiatives on natural capital accounting have multiplied in the recent years, particularly concerning ecosystem accounts. Some examples are the 2005 Millennium Ecosystem Assessment, the 2006 Land and Ecosystem Accounts, the 2008 Economics of Ecosystems and Biodiversity Initiative and the 2010 Wealth Accounting and the Valuation of Ecosystem Services (WAVES) World Bank project (MEA, 2005, EEA, 2006, TEEB, 2008).[2] Significant progress in the implementation of accounts is expected given the commitments at the Convention on Biological Diversity (CBD) and the European Union (EU).

Indeed, Parties to the CBD decided at the 10th Conference of Parties in 2010, to integrate the values of biodiversity and ecosystems in national accounting and reporting systems by 2020, under Aichi Target 2 (CBD, 2014). The European Union committed to the same goal under the EU Biodiversity Strategy, which has given a significant push to natural capital accounting and to ecosystem accounting, in particular (EU, 2011). These policy commitments on natural capital accounts are being made in a context of accelerated degradation of biodiversity and ecosystem services (GRET/CIRAD/CDC Biodiversité, 2014). They seek to foster better management decisions and are often closely linked to defining financing needs and mechanisms (NRC, 2005 and TEEB, 2008).

In this context, we propose to investigate why natural capital accounting has been rarely used so far to inform public policy decisions. The development of accounts is a first step to evaluate financing needs, among other things. How to ensure otherwise the effectiveness and efficiency of market-based instruments versus more traditional public interventions in natural habitats while ignoring the overall scale of the needs, while failing to integrate these needs into a comprehensive macroeconomic framework, while not being able to use accounts to raise awareness among different stake holders and policy makers.

The degradation of ecosystems' capability to deliver biomass, freshwater and natural cycles regulation or socio-cultural services is, in fact, not yet recorded in national accounts and companies' accounting books. Therefore, depreciation is not charged in the price of our consumption. Consuming ecosystem capital without paying is equivalent to creating ecological debts that are transmitted to others, to our present and future generations or to those countries from which we import products produced under unsustainable conditions. This physical degradation or ecological debts could be recovered on the basis of the costs necessary to restore ecosystems capability (Weber, 2012).

Despite hence the relevance of such accounts, the associated conceptual frameworks are still being developed. From a methodological standpoint, natural capital accounts have been mostly developed so far as a satellite account of the system of national accounts. In this process, the statisticians have had the lead, in general, with the System of Environmental-Economic Accounting Central Framework (SEEA-CF)

1 See Weber (2015) for a summary of projects on natural capital accounting since the 1970s.
2 See Petersen (2015) for a more detailed review of recent and ongoing initiatives on natural capital accounting.

becoming an international statistical standard in 2012.3 Even if it can be improved, the existence of the standard protects statisticians against critics upon the choices they make to build the accounts.4

Although this standard for natural capital accounting is useful, developed countries have yet to develop and to agree on a broader standard on ecosystem services accounting.5 There is still no scientific consensus neither on the definition of natural capital, nor on its conceptual relationship with ecosystem functions and services. There are also theoretical and empirical questions about what should be appropriate analytical scales (EFESE, 2013). Besides, as previously, this process has been characterised by tensions between various approaches. In particular, there have been tensions between statistics and modelling efforts and between initiatives that modify the boundaries of the system of national accounts framework and the emergence of multiple systems analyses (Weber, 2015). There are, for instance, very strong debates between the use of monetary versus non-monetary valuations for biodiversity and ecosystem accounting (Laurans *et al*., 2013).6 Monetary valuation is often considered as a useful tool for communication purposes, though, in some cases, it may oversimplify relationships between biophysic measures (Pascal, 2014, Tichit, 2014).7

While setting up natural capital and ecosystem services accounts is very demanding in terms of human and financial resources, the results have remained very often unexploited.8 For instance, the 2011 National Ecosystem Assessment in the United Kingdom has not been used to inform policy decisions (UK NEA, 2011 and Ekins, 2015). Moreover, while France developed its first *Comptes de Patrimoine Naturel* in the 1980s, to our knowledge, this data has yet not been used to inform policy decisions or, at least, has not been used in an explicit way (Weber, 1987).9 A recent study on economic valuation of biodiversity and ecosystems done by the Centre of Strategic Analysis for the Prime Minister in France on 2009 was neither used for policy decisions (CAS, 2009).10

Worldwide policy makers were asked, among other things, whether or not they had made use of their natural capital accounts for economic analysis through a survey developed by the United Nations (UN) for the System of Environmental-Economic Accounting (SEEA) programme (UN, 2006). Specific components of the environmental accounts were used by few countries' line ministries and agencies for planning and policy analysis such as Norway and Sweden (integration of environmental accounting data with macroeconomic planning tools), Australia (water Act) and the United Kingdom (carbon footprint and sustainable consumption) (Delos Angeles, 2011).

Despite the lack of dynamism in developed economies, there are currently international efforts to support financially and to accompany, from a technical standpoint, some developing countries in the development

3 The SEEA-CF describes stocks and changes in stocks of environmental assets.

4 The SEEA-CF suffers from some caveats since, for instance, it fails to integrate quality and quantity criteria.

5 Work of the SEEA on Experimental Ecosystem Accounts and Applications and Extensions, has not lead to an international standard. The EU has recently launched a programme, Mapping and Assessment of Ecosystems and their Services (MAES), to map and evaluate ecosystem services in member states.

6 In practice, practitioners often agree that both monetary and non-monetary valuations can be relevant depending on the context and that using a combination of both valuations can be the most appropriate. In the political arena, in contrast, there is less consensus.

7 Besides, it is difficult to give a market value to biodiversity and the relationship between biodiversity conservation and ecosystem services is still not well understood from a scientific standpoint (Lavorel, 2014).

8 For instance, Canada supported with USD five million the creation of natural capital accounts between 1992 and 1997 (Smith, 2015a).

9 Some policy makers suggest it is never explicit how such results have impacted policy decisions, but that they can play a role.

10 Civil society was quite mobilised against market-based mechanisms and besides, some of the instruments proposed needed to be adapted to local environments which required additional resources.

of natural capital accounts.11 Anecdotal evidence puts forward some difficulties in making use of this type of accounts in developing countries. For instance, the World Bank and the French Development Agency (AFD) co-funded a study on natural capital accounting in Madagascar but, to our knowledge, results have not been yet exploited due to political instability (Ollivier, 2009). The AFD also funded another study in New Caledonia but again the results remain unused in absence of political support (AFD, 2010).12

Given these premises, how to ensure the use of natural capital accounts for policy decisions in developing countries, while donor countries have very often failed in this task in their own countries? What have been the factors hindering the use of natural capital accounts for policy decisions in developed economies and what lessons can we infer for developing countries which are lagging behind in the development of these accounts? How to ensure the use of ecosystem services accounts for policy decisions in developing countries while they can be easily contested since no standard has yet been adopted internationally and developed countries themselves are having difficulty to develop the conceptual frameworks and are diverging in their approaches? These are some of questions that we would like to explore from an empirical standpoint.

Despite the current international efforts to build natural capital accounting, policy makers lack comprehensive evidence on the factors that impede the usage of these accounts for public policy, beyond a few individual illustrative cases. The survey developed by the UN for the SEEA programme already asked policy makers, among other things, whether or not they had natural capital accounts, of which nature, and whether they had used them for policy analysis (UN, 2006). Another survey was conducted recently on 21 countries and asked policy makers, among other things, whether or not natural capital accounts were used in decision-making (Milligan *et al*., 2014). Neither survey tackled the obstacles for usage, however.

Building on the stream of academic literature on natural capital accounts, we conduct a survey to bring some light on obstacles in the use of such accounts for policy decisions, in those countries in which they are currently in place. Based on the results of this survey, we propose to explore from an empirical standpoint why natural capital accounting is rarely used to inform policy decisions in developed economies. We propose as well to explore which are the specificities of developing countries. With our sample, we aim at extending UN survey's sample beyond statistical offices since the latter need not be well informed of policy uses (Smith, 2015b).

The remainder of this paper is structured as follows. In the second section of the paper, we describe the existing evidence in the academic literature on the obstacles in the use of natural capital accounts for policy decisions. We find six major obstacles: political, structural, institutional, design, data availability and cooperation. Combining these obstacles with the literature and insights from practitioners, we elaborated a survey that we describe in section three. In section four, we provide the data description. In section five, we describe the results and in section six we conclude and provide some policy insights. The survey, some details about the sample and the results of the survey can be found in the appendix (Tables A1 and A2, A3 and A4, and A5-A12, respectively).

11 The World Bank project WAVES is a good example with a budget of about 15 million USD by 2013 to set up natural capital accounts including ecosystem services in five countries.

12 New Caledonia is heading an independence referendum that, in case of being approved, will bring to an end the monetary transfers from metropolitan France. In such a context, New Caledonia will increase its dependence on nickel resources and significant policy actions to mitigate the environmental impact of this economic activity are unlikely to be strongly supported.

2. What do we know about the obstacles in the use of natural capital accounts for policy decisions?

There is a relatively small stream of academic literature on the obstacles related to the use of natural capital accounts in policy decisions. Besides, natural capital accounts are mostly published by national statistics offices, the latter often being unable to identify users and uses (Smith, 2015b). Smith (2015b) sought to identify the different users of these accounts to determine when natural capital accounts were used to analyse the political action needs or evaluate existing policies. In some countries, environmental accounts are clearly used for political decision-making as in Germany, Canada or Norway (Weber, 2015). Researchers are also interested in these accounts to derive policy recommendations.[13] The most representative example of the use of natural capital accounts by research centres is Germany. Even if we acknowledge the role of researchers to highlight relevant policy options, we only account for this type of uses of natural capital accounting when those options are actually taken over in public policy.

Overall, most of the literature on the natural capital accounting framework and its policy uses comes from accounting practitioners and international organisations aiming at better informing the design of these types of programs. Given the existing literature, we can define six main obstacles for the implementation and use of natural capital accounts for policy decisions: structural, political, institutional, design, data availability and (absence of) cooperation.

Regarding structural obstacles, the country's level of development can affect its capacity to undertake natural capital accounting programs and to continue them in the long term. The first difficulty faced by these countries is the weak development of their national accounts and the fact that they devote much of their statistical efforts to improving such accounts at the request of international financial institutions (Hecht, 2007). In addition, some developing countries are failing to develop a natural capital accounting system in a sustainable manner since they are facing resource constraints and/or lack sufficient data (Edens, 2013).[14]

Concerning political obstacles, even if it is not easy to find evidence on the role of the political sphere on the use of natural capital accounts, there are some examples. The United States, for instance, developed a natural capital accounting program in the mineral sector in the early 1990s under the Clinton administration. This politically controversial project was abandoned in 1994 following the first publication of environmental accounts (Edens, 2013). There was indeed strong opposition from the mineral resource industry (Hecht, 1999). Since then, a group of experts was convened to reconsider the various options for the country's environmental accounting system.

Although the report presented by Nordhaus and Kokkelenberg (1999) concluded at the importance of taking the assets and productive activities related to natural resources and the environment into account, little progress has been made in the United States. The *Bureau of Economic Analysis* (BEA) has so far not resumed work on natural capital accounting. Moreover, Chile also abandoned one of its natural capital account programs for political reasons (Hecht, 2000). In the early 1990s, the Chilean Central Bank started to implement natural capital accounting focusing on forests and minerals. This program concluded that the development strategy of forestry-based countries was not sustainable. This result, contrary to the policy

13 See, for instance, the Environmental valuation Reference Inventory, with over 2 000 empirical studies on the economic value of environmental benefits and human health effects.

14 International institutions are supporting many environmental accounting programs - pilots mostly - in developing countries. The United Nations Statistics Division, for instance, supported programs to take into account natural resources in national accounts in countries such as Colombia, Ghana, Indonesia or Papua New Guinea. The OECD and the European Union have also conducted such assistance plans (Harris and Fraser, 2002).

then pursued by the government, seems to be at the origin of the significant slowdown in the country's efforts on natural capital accounting (Hecht, 1997).

At the institutional level, one of the main challenges facing the countries that implement natural capital accounting is the lack of communication between environmental statisticians and environmental accounting practitioners. This problem is most acute when statisticians and accountants work in different institutions, which is quite common. This communication is nevertheless essential to deal with technical problems that may arise to best reflect the interactions between the economy and the environment (Hecht, 2000). The UN Statistics Division (UNSD) has published several papers on the implementation of natural capital accounting at national level. UNSD stresses the importance of choosing the appropriate leader in natural capital accounting (UN, 2005).

In most cases, the establishment of natural capital accounts is under the responsibility of the national statistical office or the minister of environment. When the country creates natural capital accounts for a particular resource, for instance, forests or water, the project may be entrusted to the ministry which has such competence. Central banks may also be associated with the implementation of natural capital accounts, which is mainly the case in Latin America (Edens, 2013). The Chilean Central Bank participated in a natural capital accounting program focusing on forests in the early 90s. In summary, the choice of the appropriate leader has been identified as one of the key factors for the success of a natural capital accounting program, especially in developing countries which face severe human resource constraints (UN, 2005).

In terms of the design of natural capital accounting programs, a number of international institutions including the UN, the European Commission, the IMF and the World Bank, have worked together to establish a framework for natural capital accounting. The SEEA was created in 1993 and was regularly modified to better fit the needs of countries. However, it turns out that this framework is not always appropriate in practice. For instance, Japan decided to measure environmental pressures only in physical terms. This decision was motivated by Japan’s difficulties to correctly measure the different aggregates proposed by the SEEA (Edens, 2013). Moreover, the development of ecosystem accounts is still at an experimental stage. Besides this type of conceptual problems, countries very often cannot implement all the accounts recommended by the SEEA as they face operational difficulties such as the availability of data and funding (Hecht, 2007).

The availability and quality of data is a prerequisite for the use of natural capital accounts for public policy decision-making. In most cases, natural capital accounting uses data already collected for other reasons (Hecht, 2000). This data, referred to as secondary, must be treated so as to correspond to the different concepts used in natural capital accounts. However, some countries, like Canada, produce primary data. This is data collected with the initial objective of establishing natural capital accounts. Primary data is much more expensive to obtain than secondary data. Given that natural capital if often not considered a priority by governments, there is low investment in the production of information on assets and productive activities related to the environment and natural resources.

While developed countries are able to finance natural capital accounting programs, developing countries are likely to seek external funding. Since donors are vulnerable to economic crises and often work with relatively short time horizons of three to five years. In this context, the funding source has an impact on how the work is performed (Hecht, 2000). The collection of data is a significant challenge since a country with established natural capital accounts should also have additional information so as not to underestimate its impact on the environment which further increases program costs (Lange, 2003).

In terms of international cooperation, regular and effective collaboration between countries can help improve the various natural accounting programs. This also contributes to the standardisation of practices,

prior to international comparisons. Since the early 1990s, the UNSD, the European Union, the OECD, the World Bank, national statistical offices among other organisations are working together to propose a standardised framework and methodologies for countries wishing to implement natural capital accounting (Lange, 2003).15

There is a need to develop cooperation and coordination between national statistical offices and the different ministers in charge of environmental data and information. Data should be shared prior to the implementation of frameworks (UN, 2007). Current tools, however, do not allow, comparing the management of resources between similar countries. Yet, it is an essential element to guide environmental policy in different countries, such as water management in sub-Saharan Africa. Indeed, cooperation between countries is necessary since environmental problems are trans boundary.

3. Survey

The survey is composed of two parts. The first part deals with the strategies and commitments on natural capital accounting in the country (see Table A1 in the appendix). The second part tackles the use of natural capital accounting for policy uses (see Table A2 in the appendix). In this paper, we use the term natural capital accounting to encompass both environmental-economic accounting and ecosystem accounting (WWF, 2015).16 We define natural capital accounts in the survey as the (economic-) environmental accounts that refer to the statistics that can be integrated with national economic accounts which enable to have joint analyses, while indicators are usually isolated and are more difficult to interpret.

In the first part of the survey, there are fourquestions related to the integration of natural capital accounts with national strategies and nine questions on the commitments that the country has made on natural capital accounting. The respondent could select yes, no or non-applicable. This first part of the survey recalls the potential uses of natural capital accounting as well as the ongoing international and national processes on this topic. It also seeks to identify if there any significant differences between the sample of high income and non-high income countries that may contribute to explain the results on the second part of the survey. In addition, it may reveal some differences between the samples according to the type of respondent since, depending on the country, statistical offices may not have all the requested information. This first part of the survey has largely been designed with the support of the European Environmental Agency (EEA).

In the second part of the survey, we introduce the main questions of interest for this paper. We first ask whether the country compiles or has compiled natural capital accounts. The respondent could again select yes, no or non-applicable. If the answer is positive, the respondent should then state whether or not, to his/her current knowledge, natural capital accounts have been used as input for public policy decisions in the country. The respondent could select to a great extent, somewhat, very little, not at all, very difficult to know or non-applicable.

15 For instance, since 1993, a number of experts from national statistical institutes and international organisations are meeting almost every year as part of the London Group to exchange views on natural capital accounting. The member countries of ASEAN and some Asia Pacific countries are also working together to take stock of the development of natural capital accounting and the different methods used for this purpose. The working group, supervised by the Statistical Institute of the Philippines, released many papers on the situation in the various countries as well as the difficulties, mainly technical, encountered by the states.

16 Environmental-economic accounting relates to data on individual environmental assets that directly benefit economic activity (e.g. land, mineral, timber and energy resources) as represented by the SEEA Central Framework. Ecosystem (SEEA CF) accounting, , and considers environmental assets from an ecosystem perspective and relates to how individual assets intercat within certain spatial areas to produce ecosystem services, such as regulating services, as represented by the SEEA Experimental Ecosystem Accounts (SEEA EEA).

Note that this question limited to the uses of natural capital accounts as input for policy decisions does not refer to other potential uses such as 'derivation of indicators', 'input in national accounts', 'input in research and modelling', 'basis for reporting to international organisations' (UNCEEA, 2007). Moreover, we understand public policy as "an officially expressed intention backed by a sanction, which can be a reward or a punishment." As a course of action (or inaction), a public policy can take the form of "a law, a rule, a statute, an edict, a regulation or an order" (Fischer et al., 2007). While it is not the research question of this paper, we acknowledge the prominent use of natural capital accounts as input for research and modelling (Hoekstra, 2010 and Smith, 2015).

The second part of the survey then deals with the reasons for not having used natural capital accounts as input for policy decisions or for not having used them more intensively. Building over the enabling conditions and obstacles highlighted by Edens (2014) and complementing this information with exchanges with experts from the World Bank and the EEA, we have pre-identified a set of indicators that can be aggregated in the six following obstacles previous detailed in the literature review: political, structural, institutional, design, data availability and cooperation (see Table A2 in the appendix). For each of the indicators, the respondent could select not relevant, slightly relevant, very relevant, extremely relevant or non-applicable.17 It was possible for the respondent to identify additional indicators beyond the ones already included in the question.

The second part of the survey ends with three additional questions to better characterise the type of natural capital accounts being developed in the country. Firstly, the respondent should share when the natural capital accounts were first created in the country. Secondly, the respondent should highlight the type of methodology that is being used for the development of the accounts: developed by the country, SEEA, the World Bank, other or non-applicable. Thirdly, the respondent should signal at which level(s) the accounts are being developed: local, regional, national or non-applicable. To end, the respondent was invited to share any additional relevant information.

4. Data

The survey was conducted by the French ministry of foreign affairs and international development in a joint effort with the WAVES program from the World Bank and with technical support from the EEA. We sent the survey through email to about one hundred experts from statistical offices and relevant ministries, as well as to some independent experts, between the 24th June and the 15th August 2014. In some cases, experts from statistical offices may be relatively disconnected from the policy-making process and may therefore lack information on the uses of environmental accounts for policy decisions. This motivated the inclusion of experts from relevant ministries and independent experts (see Tables A3 and A4 in the appendix).

Experts had already been identified as focal points by ongoing natural capital accounting projects such as the SEEA, WAVES and the MAES initiatives. Given the relatively small sample of experts, they were all selected for the survey without exceptions. With this coverage, we aimed at having a global stance that would enable to derive policy inferences between developing and more mature economies. There were 42 respondents of which 16 did not yet have natural capital accounts, and five completed only some of the answers. There are indeed many countries that have yet to develop natural capital accounts, especially non high income countries (UNCEEA, 2015). Besides, respondents often expressed their unwillingness to answer since, for instance, policy uses were not under their mandate or they did not share the narrow definition of policy uses described in section three.

17 Note there can be interactions between the different obstacles, which may not be independent.

In sum, 21 surveys could be exploited representing a total of 17 countries (see Table 1). That is, we have attained the optimal sample size for a normal distribution with a 90 per cent confidence level and 16 per cent margin of error, given our initial sample size (Krejcie and Morgan, 1970).18 There were multiple respondents from Austria (2), France (3) and the Netherlands (2). Within the 21 surveys, there were eight respondents from statistical offices and 13 respondents from relevant ministries and also independent experts. We have a relatively balanced data set with nine respondents from high income countries and eight from non-high income countries, according to the World Bank classification (see Tables A3 and A4 in the appendix).

Table 1. Respondents

Statistical office experts	**Ministry and independent experts**
Afghanistan (*)	Afghanistan (*)
Australia (**)	Austria (2)
Bangladesh (*)	Brazil (*)
Bosnia and Herzegovina	Belgium
Central African Republic	Burkina Faso
Denmark (**)	Colombia
Finland	Comores (*)
Guatemala	Côte d'Ivoire (**)
Guinea-Bissau (*)	Estonia
Jamaica (*)	France (3)
Kenya (*)	Ghana (*)
Liberia (**)	Iran, Islamic R. (*)
Mauritania (*)	Korea, Rep.
Mauritius (*)	Republica Dominicana (*)
Mexico (**)	Myanmar (*)
Nepal (*)	Nepal (*)
Netherlands (2)	Sri Lanka
South Africa	Uganda
Sweden	United Kingdom

Note. (*): The country does not have environmental accounts. (**): The survey file is incomplete.

5. Results

We have analysed the results of the survey for the whole sample, and then according to the income level of the country (high income and non-high income), and according to the type of respondent (statistical offices and ministries and independent experts). We present below in Tables 2-6 and in Figure 1, the results of the analysis for the first part of the survey on strategies and commitments and for the second part of the survey on the uses of natural capital accounts for policy decisions. Detailed information can be found in Tables A5-A12 in the appendix.

In Table 2 below and in Tables A5-A7 in the appendix, we can see the results of the first part of the survey. Concerning the strategies and the commitments, the maximum values that can be attained by a respondent are four (strategies) and nine (commitments) following a simple non-weighted sum. We can appreciate in Tables 2 and A5 that for the whole sample, on average there is a fairly high integration of natural capital accounts in country strategies and a relatively high endorsement of commitments.

18 The sample siwe prevented us for performing a regression analysis.

Surprisingly, the answers on strategies and commitments are quite similar when comparing the samples of high income and non-high income countries (see Tables 2 and A6). Non high income countries are just slightly less engaged in the integration of accounts in strategies. Thus, any differences we may find between high income and non-high income countries in the second part of the survey on the use of policy accounts should not derive from significant differences in their engagements at the level of strategies or commitments.

If we now analyse the samples according to the type of respondent, the differences are neither very strong (see Tables 2 and A7). Ministries and independent experts report higher values for the integration of natural capital accounts in strategies. This may reflect indeed the relative distance between statistical offices and the policy-making process and hence the lack of information that this type of respondent has of the users and uses of accounts.

Table 2. Strategies and commitments

	Strategies	Commitments	Total
Country average	2.8	6.1	9.0
High income country average	3.0	6.1	9.1
Non high income country average	2.7	6.2	8.9
Statistical office average	2.3	5.9	8.1
Ministry / independent average	3.3	6.3	9.7

Note. The values are obtained through a non-weighted sum of questions 1-2 (column 'strategies') and 3-7 (column 'commitments'). The maximum value is 5 for strategies and 9 for commitments. The values in the column 'total' are the sum of the values in columns 'strategies' and 'commitments'.

In Tables 3-6 below and in Figure 1 and in Tables A8-A12 in the appendix, we can see the results of the second part of the survey. We first evaluate whether or not, according to the respondent, natural capital accounts have been used as input for public policy decisions in the country. In Table 3, we can appreciate that respondent on average considers that natural capital accounts are used between sometimes and very little. If we disaggregate answers according to the income level of the country, we can see that in high income countries, the accounts have sometimes been used, while in non-high income countries the accounts are used between very little and not at all. If we disaggregate according to the type of respondent, there are no major differences between statistical offices and ministries and experts. In Tables A8-A10, we can see individual-country results to this question.

We note that four respondents signalled that they could not reply to the question in Table 3 since it is very difficult to know whether or not natural capital accounts are used for public policy decisions. Some respondents shared nevertheless, some of the examples they were aware of in terms of uses for policy decisions. In Austria, for instance, accounts influence environmental politics in the area of climate policy through the efficient use of resources and also by driving more investments into the environment. In the United Kingdom, accounts are used to feed in resource efficiency and sustainable procurement policies.

In the Netherlands, water, energy and the environmental goods and services sector accounts have been used for specific policies. In Finland, accounts are used to estimate environmental taxes. In the Republic of Korea, they are used to decide on the total government environmental budget. Finally, in Estonia, accounts are used to set restrictions on economic activities. For example, there is a limitation to preserve 10 per cent of the forest land from economic activities and there are also limitations on the use of shale-oil mining to ensure sustainability.

Table 3. Uses of natural capital accounts for public policy decisions

	Have natural capital accounts been used as input for public policy decisions in your country?
Average	1.7
High income average	1.3
Non high income country average	2.5
Statistical office average	1.9
Ministry / independent average	1.6

Note. For this question, the respondent could select to a great extent (0), somewhat (1), very little (2), not at all (3), very difficult to know (4) or non-applicable (5).

A sample selection bias could occur in our data set as a result of using samples from a non-randomly selected data, distorting the result of the experiment. Sample selection bias could arise if some surveyed individuals are more prone to reply to the survey when the information they convey is relatively positive. In addition, the could be subject to strategic bias, whereby the respondents could intentionally answer the survey questions in a misleading way. The respondent, for instance, may believe that a higher value would promote further investments on these accounts. However, the answers to the question in Table 3 on the uses of natural capital accounts for public policy decisions have such low scores, that the sample does not seem to suffer from these type of bias.

In Table 4, we can observe the obstacles in the use of natural capital accounts for public policy decisions for all respondents (first column). We can appreciate that the punctuation is generally quite low with some factors being merely slightly relevant. Given that in Table 3 we can see that accounts are weakly used for policy decisions, we explain this low score in Table 4 because of the close involvement of most respondents on the creation, development and/or upgrading of natural capital accounts. Many respondents directly expressed their concerns to us regarding this question, which could eventually undermine the financial and political support to this type of accounts.

Despite the overall low grade, we can see in Table 4 (first column) that there are two factors that stand out: lack of political support by key people such as politicians or head of a government agency (political obstacle) and institutional leadership unable to promote policy use by other ministries (institutional obstacle). Interestingly, these two factors are among the most important obstacles, when we look at the two samples according to the income level of the country (Table 4, second and third columns).

In addition, for the sample on non-high income countries, there are some more factors that are slightly relevant: Inadequate stage of development of the country (structural obstacle), insufficient broad engagement of stakeholders (institutional obstacle), difficulty to draw a link between natural capital accounts and policy decisions and lack of an 'umbrella framework' combining natural capital accounts and statistics (design obstacle), decreasing data availability and insufficient data because of lack of staff and financial resources (data availability obstacle), lack of strong endorsement and mainstreaming by international agencies and lack of an international forum for training and exchange (cooperation obstacle).

In sum, design, data availability and cooperation obstacles are considered as slightly relevant obstacles only in the sample on non-high income countries. Institutional and political obstacles have higher scores in non-high income countries compared to high income countries. Besides, we should highlight that in the case of the sample on non-high income countries, the factor with the largest score is being at an inadequate stage of development in the country. This result should be considered when proceeding with donor funding allocations for the creation of natural capital accounts in non-high income countries.

Table 4. Obstacles in the use of natural accounts for public policy decisions by country income level

	Total	High income	Non-high income
Political			
Strong opposition to a public policy decision from groups of interest	0.62	0.77	0.38
Lack of political support by key people	1.33	1.15	1.63
Concern that natural capital accounts deliver 'bad news'	0.57	0.54	0.63
Lack of ownership by the country	0.52	0.23	1.00
Structural			
Absence of a serious public good problem and of irreversibility risks	0.43	0.46	0.38
Inadequate stage of development of the country	1.05	0.54	1.88
Exogenous shocks have changed priorities in the country	0.62	0.69	0.50
Institutional			
Insufficiently broad engagement of stakeholders	1.14	0.92	1.50
Lack of a clear lead agency	0.90	0.77	1.13
Institutional leadership unable to promote policy use by other ministries	1.33	1.23	1.50
Design			
Difficulty to draw a link between natural capital accounts and policy decisions	1.05	1.00	1.13
Unclear guidelines	0.86	0.77	1.00
Classifications that are not very relevant to environmental policies	0.43	0.54	0.25
Lack of an 'umbrella framework' combining natural c. accounts and statistics	1.05	0.92	1.25
Data availability			
It is too early to use natural capital accounts for a fundamental policy use	0.71	0.69	0.75
Decreasing data availability	0.86	0.46	1.50
Insufficient data because of lack of staff and financial resources	1.00	0.54	1.75
Cooperation			
Lack of strong endorsement and mainstreaming by international agencies	1.10	0.77	1.63
Concerns by developing countries donors might impose 'conditionalities'	0.62	0.38	1.00
Lack of an international forum for training and exchange	0.90	0.62	1.38

Note. The respondent could select not relevant (0), slightly relevant (1), very relevant (2), extremely relevant (3) or non-applicable (4). The values in the columns 'total', 'high income' and 'non high income' are the average of the total, high income country and non-high income country individual respondent values, respectively.

If we analyse the sample according to the type of respondent, we can compare results between statistical offices and ministries and independent experts. In Table 5 (third column), we can see the results for ministries and independent experts where besides the lack of political support by key people (political obstacle) and institutional leadership unable to promote policy use by other ministries (institutional obstacle), we find that design obstacles are also slightly relevant. In particular, the difficulty to draw a link between natural capital accounts and policy decisions and unclear guidelines, for example, guidance is not (yet) available for ecosystem accounting.

Regarding statistical offices, the results are relatively different with respect to those of ministries and independent experts. In Table 5 (second column), we can see that institutional obstacles are more prominent, and data availability and cooperation are slightly relevant. In particular, the factors that are highlighted are insufficient broad engagement of stakeholders and lack of a clear lead agency (institutional obstacles), decreasing data availability and insufficient data because of lack of staff and financial resources (data availability obstacles), lack of strong endorsement and mainstreaming by international agencies and lack of an international forum for training and exchange (cooperation obstacles).

In terms of design obstacles, it is a different factor that is relatively important for statistical offices when comparing with the results of ministries and independent experts: lack of an 'umbrella framework' that combines natural capital accounts and statistics. Finally, the lack of political support by key people is a slightly relevant factor as in the sample with ministries and independent experts. Overall, there are interesting differences between the results of the samples on statistical offices and ministries and independent experts which support our choice to expand the survey beyond statistical offices.

It is important to highlight that other factors have been signalled by respondents as impeding the use of natural capital accounts for public policy decisions. Lack of awareness has been pointed out by respondents from Finland, France, The Netherlands, and Uganda. In France, there is a need to develop dissemination and communication tools and strategies. In Uganda, there is a lack of clear understanding and appreciation of the importance of natural capital accounting in guiding policy. In Finland, policy makers use their traditional sectorial data sources such as forest and energy statistics. Otherwise, other factors have been signalled. In South Africa, the statistical office relies on other government departments to obtain natural capital data.

Table 5. Obstacles in the use of natural capital accounts for public policy decisions by respondent type

Political	Total	Statistical office	Ministry/ indepen.
Strong opposition to a public policy decision from groups of interest	0.62	0.44	0.75
Lack of political support by key people	1.33	1.33	1.33
Concern that natural capital accounts deliver 'bad news'	0.57	0.44	0.67
Lack of ownership by the country	0.52	0.78	0.33
Structural			
Absence of a serious public good problem and of irreversibility risks	0.43	0.22	0.58
Inadequate stage of development of the country	1.05	1.11	1.00
Exogenous shocks have changed priorities in the country	0.62	0.67	0.58
Institutional			
Insufficiently broad engagement of stakeholders	1.14	1.33	1.00
Lack of a clear lead agency	0.90	1.22	0.67
Institutional leadership unable to promote policy use by other ministries	1.33	1.11	1.50
Design			
Difficulty to draw a link between natural capital accounts and policy decisions	1.05	0.78	1.25
Unclear guidelines	0.86	0.33	1.25
Classifications that are not very relevant to environmental policies	0.43	0.22	0.58
Lack of an 'umbrella framework' combining natural c. accounts and statistics	1.05	1.22	0.92
Data availability			
It is too early to use natural capital accounts for a fundamental policy use	0.71	0.67	0.75
Decreasing data availability	0.86	1.11	0.67
Insufficient data because of lack of staff and financial resources	1.00	1.22	0.83
Cooperation			
Lack of strong endorsement and mainstreaming by international agencies	1.10	1.22	1.00
Concerns by developing countries donors might impose 'conditionalities'	0.62	0.89	0.42
Lack of an international forum for training and exchange	0.90	1.22	0.67

Note. The respondent could select not relevant (0), slightly relevant (1), very relevant (2), extremely relevant (3) or non-applicable (4). The values in the columns 'total', 'statistical office' and 'ministry / independent' are the average of the total, statistical office and ministry / independent individual respondent values, respectively.

Interestingly, the respondent from the United Kingdom signals the lack of a clear value-added from accounts as opposed to existing environmental statistics. For instance, as far as greenhouse gas emissions accounts are concerned, the lack of use by the policy department was mostly because it was seen as a distraction from the Kyoto commitment; as far as energy accounts are concerned, decades of analysing energy balances and using them for policy purposes has left little value-added from energy accounts; as far as material flow accounts are concerned, lack of a link to products and within economy flows has inhibited their use.

Moreover, according to our respondent, as far as environmental protection expenditure accounts are concerned, the definition of spending and the lack of information on impact is a problem; as far as environmental taxes are concerned, it has been found that it is the structure of the tax which has more environmental impact than the amounts raised; as far as oil and gas accounts are concerned, some issues over valuation approaches still need to be resolved; as far as water accounts are concerned, there is low policy interest as it is not clear what is the added value from the accounts compared with water balances and other statistics; idem for forestry/timber accounts. Most interest lays in the green economy/resource efficiency policies but the weakness of material flow accounts significantly limits their use.

If we aggregate the factors impeding the use of natural capital accounts for public policy decisions, according to the obstacles defined in the literature review, we can find the results in Table 6. For the overall sample, institutional obstacles are the most relevant hindering the use of natural capital accounts. This result still holds true independently of the sub-sample that we analyse. In addition, in non-high income countries data availability and cooperation are slightly significant obstacles. In the sample with ministries and independent experts design obstacles stand out, while in the sample with statistical offices data availability and cooperation, obstacles are slightly relevant. Institutional obstacles are perceived as more prominently by respondents from non-high income countries and from statistical offices.

Table 6. Obstacles in the use of natural capital accounts for public policy decisions : Aggregated values

	Total	High income	Non-high income	Statistical office	Ministry / independent
Political	0.76	0.67	0.90	0.75	0.77
Structural	0.70	0.56	0.91	0.66	0.72
Institutional	1.13	0.97	1.38	1.22	1.06
Design	0.85	0.81	0.91	0.64	1.00
Data availability	0.86	0.56	1.33	1.00	0.75
Cooperation	0.87	0.59	1.33	1.11	0.69

Note. The respondent could select not relevant (0), slightly relevant (1), very relevant (2), extremely relevant (3) or non-applicable (4). The values in the columns 'total', 'high income' and 'non high income', 'statistical office' and 'ministry / independent' are the average of the total, high income country and non-high income country, statistical office and ministry / independent individual respondent values, respectively.

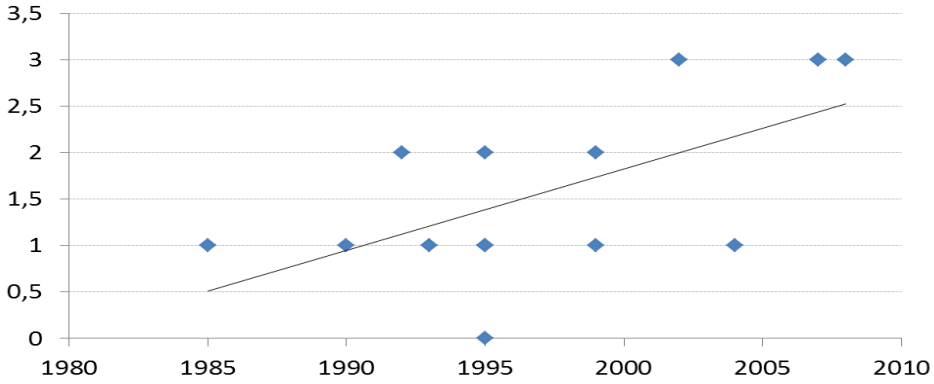
The second part of the survey provides some additional information. For instance, in Figure 1 we can see there is some positive correlation between the usage of natural capital accounts for policy decisions and the date of creation of such accounts. That is, accounts are further used for policy decisions with a certain probability, the sooner they were created. This need not be the case always since some accounts that were created decades ago are yet to be exploited and used for policy decisions.

The second part of the survey is composed of two additional questions (see Tables A11 and A12 in the appendix). In terms of the methodology being used for the development of natural capital accounts, countries are mostly following SEEA (12 respondents), followed by a methodology developed by their

own countries (six respondents). The accounts are mostly developed at national level (18 respondents), followed by regional level (six respondents).

To conclude, we have seen that the differences we might observe in the samples according to the income level and to the type of respondent are not related to significant differences in terms of the degree of commitments and strategies. We have also found that there is very little use of natural capital accounts for public policy decisions and, more so, in non-high income countries. At a factor level, lack of political support by key people and institutional leadership unable to promote policy use by other ministries stand out as the most relevant items hindering the use of accounts for policy decisions, independently of the income level of the country and the type of respondent. At an aggregate level, institutional obstacles are the most relevant for all sub-samples.

Figure 1. Correlation between the usage of natural capital accounts for policy decisions and the date of creation of the natural capital accounts



Note. The horizontal-axis represents the answers to the question 8.3 in the survey and the vertical-axis represents the answers to the question 8.1 in the survey (higher values indicate lower use).

In addition, statistical institutes and developing countries are concerned about data availability (insufficient data because of lack of staff and financial resources) and cooperation (lack of strong endorsement and mainstreaming by international agencies and lack of an international forum for training and exchange). Ministries and independent experts are concerned about design obstacles (difficulty to draw a link between natural capital accounts and policy decisions and unclear guidelines). Besides, non-high income countries and statistical offices are particularly concerned with institutional obstacles. Interestingly, the factor which is seen as most relevant in non-high income countries is the fact of being at an inadequate stage of development in the country. Finally, natural capital accounts are used for policy decisions with a certain lag with respect to their creation.

6. Conclusion and policy insights

The initiatives and policy commitements on natural capital accounting have multiplied in the recent years, particularly concerning ecosystem accounts. Yet, natural capital accounting has been rarely used so far to inform public policy decisions or, at least, has not been used in an explicit way. Based on a survey for statistical offices and ministries and independent experts worldwide, we have brought some light on the obstacles in the use of natural capital accounts for public policy decisions. Prior to concluding, we

highlight that there is probably no 'best practice' comprehensive approach to integrate natural capital accounts on policy decisions, needing to customise solutions.[19]

Through our survey, we find that, independently of the income level, countries are equally engaged in the integration of natural capital accounts in their commitments and strategies. And yet, there is very little use of natural capital accounts for public policy decisions and, more so, in developing countries. The most relevant obstacles for the use of accounts in the policy-making process, are the lack of political support by key people and institutional leadership unable to promote policy use by other ministries.[20] In terms of the political support, there has been a long debate for years between demand-driven and supply-driven natural capital accounts.

Field experience suggests that demand-driven projects are more likely to succeed in influencing public policies. Of course, independently of political support, there is still a need to raise awareness on the existence and potential uses of such accounts at the different levels of the administration, as suggested by our respondents. Local authorities can remain largely ignorant if there is no targeted awareness strategy (Labarraque and Tardieu, 2014). Raising awareness at the regional level on the potential of natural capital accounts for key EU policy areas such as the water framework directive and the floods directive, the biodiversity strategy and the cohesion policy can be also helpful to enhance usage (Petersen and Gocheva, 2015).

Regarding the institutional setting, the choice of the leading agency to be in charge of the accounts is key, as this agency should be strong enough to promote the use of accounts by third parties. The ministry of finance should be probably privileged as leading agency for the coordination of the development of natural capital accounts. In order to ensure the independence of data production and uses, the accounts should be developed in another ministry or in the statistical office. Besides, adapting existing laws or policies concerning national economic data and/or natural capital statistics as has been the case in Costa Rica, Japan, Peru and the United Kingdom, it is not a sufficient condition for the development and upgrading of natural capital accounts (Globe, 2014).

Indeed, the debate should not be centred on ring fencing natural capital accounts from political interference forgetting that the enactment of legislation, in institutional terms, is no more than a delegation of power from elected officials to bureaucrats. For instance, following the introduction of a landfill tax credit in the United Kingdom in 1996, Biffe Waste Services Limited committed some ten million pounds for 60 projects that examined material resource flows as part of the Mass Balance Program in the country (Collins and Flynn, 2015). The studies were discontinued once the tax break was withdrawn (Ekins, 2015).

In addition to these results, respondents from statistical institutes and developing countries reported to be particularly concerned about institutional obstacles and, to a lesser extent, about data availability and cooperation.[21] Respondents from ministries and independent experts are also particularly concerned about design obstacles such as the difficulty to draw a link between natural capital accounts and policy decisions

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19 Milligan *et al*. (2014) find there is no unique 'best practice' approach for legal and policy reform for natural capital accounting. In several national contexts, there is considerable interest from senior politicians to work towards decision-making informed by natural capital accounting, but a reluctance to take action in absence of clear options for what to do (what legislation should be changed and how, what policies and incentives should be put in place, …). Future analyses could take into account this factor is a more explicit way in the elaboration of the survey.

20 The WAVES program found that once there is political support from key people, support from middle management can still represent a significant hurdle.

21 Data availability depends, among other factors, on the extent to which different ministries and agencies can share data. Future analyses should include such factor among the obstacles to the use of natural capital accounts in policy decisions.

and unclear guidelines for the creation of the accounts. These results highlight the need to integrate respondents beyond statistical offices and from countries at different stages of development.

Concerning developing countries, an interesting point is that the factor which is considered as the most relevant in preventing the use of natural capital accounts for policy making is the country's stage of development. This factor, together with the very little usage of accounts in these countries for decision-making, should be taken into account by donors when deciding budget allocations on natural capital accounting. Middle-income countries are generally better candidates for the development of natural capital accounts. At the same time, developing countries often rely heavily on natural capital for income, so they can benefit the most from the development of natural capital accounts. In such countries, engaging first with the ministries of finance and planning to be sure that accounts are relevant for policy-making is key prior to the development of accounts in technical ministries of offices. Finally, natural capital accounts are used for policy decisions with a certain lag with respect to their creation and hence no rapid action should be expected immediately following initial investments on accounts. The decisions are all the more relevant that the data series are long.

A key result of the survey is the need to evaluate the value-added of natural capital accounts with respect to statistics, prior to the development of accounts. Some developed countries have already developed a significant amount of environmental statistics and accounts may not provide substantial additional information. Even in countries with few environmental statistics, the question remains relevant. Indeed, local problems and habitats might be better addressed through cost-benefit analyses and by investing in statistics. Many environmental problems are local in nature and cannot be easily addressed by natural capital accounts because accounting is mainly applicable at the national regional level.

It is interesting to draw a parallel with respect to the development of national income accounts, notably including the gross domestic product (GDP). There is evidence that the investment in data production may increase in times of crisis (for instance, during the energy crisis in the 1970s). Indeed, the fast decisions required by this situation encouraged managers to develop the information available to improve decision making (Hecht, 2000). National accounts were in fact created on the 1930s to understand whether or not the economic mobilisation program could be met for the World War II and, if so, at what costs (Marcuss and Kane, 2007).

It then took over a decade in some countries to have a national-wide economy indicator that should be regularly revised with obstacles that are very similar to the ones currently associated with the creation of natural capital accounts (Ekins, 2015). Most probably, only once we witness a major environmental event, will natural capital accounts be considered as sufficiently relevant from a policy standpoint to attain the same degree of maturity as national income accounts both in their development and in their integration within the decision-making process. In the meantime, progress in the development of such accounts will be slow. We recall that, for the time being, Hicksian income is not even reflected in SEEA publications.[22]

We note that there are two ways of using the economic and natural capital accounts in the policy process, ex-ante and ex-post, and that both are important. In this paper, we have focused on the ex-ante use of natural capital accounts. When the economic accounts are used ex-ante to shape policy, their use is mainly in economic analyses (modelling, cost-benefit analysis, etc.) done by technical experts. That kind of analysis usually occurs early in the policy process and some argue that its influence may be diluted by the time the final decision is made by senior officials and politicians who take much more into consideration that empirical analyses. Under such a hypothesis, our results on the limited ex-ante use of natural capital accounts for policy decisions would not be surprising. If we focus on the ex-post use of economic

22 According to Hicks, income in a given period of time is the maximum amount that can be consumed in that period while keeping real wealth unchanged (Hicks, 1939).

accounts, one could find many examples of policies that target the variables such as economic growth, inflation control and employment measured in the economic accounts. The success of policies is measured by economic accounts, not informed by them.

We can then make a comparison between the ex-post use of economic and natural capital accounts. Since governments make far fewer policies that relate directly to natural capital than to economic activities, there are far fewer opportunities for ex-post use of natural capital accounts than there are for economic accounts. The comparison of natural capital accounts with economic accounts in terms of importance in the policy process may hence not be fair. Further research should be undertaken to understand the relative importance of ex-ante and ex-post uses of economic accounts for policy decisions and hence make inferences about the role of ex-ante and ex-post uses of natural capital accounts in the policy-making process.[23]

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23 The authors would like to thank Robert Smith of Midsummer Analytics for this insight.

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A.1. Appendix

A.1.1. Survey

The survey constructed for this study contains the following questions reported in Tables 1 - 2.

Table A.1. Natural capital accounts: Strategies and commitments (*)

Strategies
1) Is there a sustainable development strategy in your country?
1.1) If yes, is the use of natural capital accounts being considered to provide input?
2) Is there a sectorial sustainable development strategy in your country?
2.1) If yes for one or several sectors, is the use of natural capital accounts being considered to provide input?
Commitments
3) Has your country signed the Kyoto protocol on climate change and on the reduction of greenhouse gases?
3.1) If yes, is your country reporting to UNFCCC following GIEC/IPCC guidelines?
4) Is your country participating to a REDD+ action on reforestation?
5) Is your country putting in place actions related to the implementation of the Convention on biological diversity? (**)
6) Is your country participating in an action of the World Bank Waves partnership on natural capital accounting?
6.1) If yes, are there projects ongoing or foreseen on ecosystems services accounting (forests or coasts)?
7) Is your country participating in an action of the UNEP or OECD programmes on green economy and green growth?
7.1) If yes, is the SEEA methodology being considered to participate to those programmes?
7.2) If yes, are there projects ongoing or foreseen on ecosystems services accounting?

Note. (*): The (economic-)environmental accounts refer to the statistics that can be integrated with national economic accounts which enables to have joint analyses, while indicators are usually isolated and are more difficult to interpret. (**): Note that according to the Aichi-Nagoya 2010 objectives biological diversity values should be integrated on national accounts by 2020 (Strategy A, Target 2). For questions 1 to 7, the respondent could select yes (1), no (0), or non-applicable (2). We acknowledge that some questions are not dissociated.

Table A.2. Natural capital accounts: Their uses for public policies (*)

8) Does your country compile (or has it compiled) natural capital accounts?

8.1) If yes, have natural capital accounts been used as input for public policy decisions in your country?(**)

8.2) If yes, please explain the reasons for not having used natural capital accounts as input public policy decisions in your country or for not having used them more intensively.

Political

Strong opposition to a public policy decision from groups of interest .

Lack of political support by key people (e.g., politicians or head of a governmental agency).

Concern that natural capital accounts deliver 'bad news'.

Lack of ownership by the country in the development and uses of natural capital accounts.

Structural

Absence of a serious public good problem and of irreversibility risks.

Inadequate stage of development of the country (other priorities considered more important).

Exogenous shocks have changed priorities in the country (for instance, 2008 global crisis, 1973 oil crisis).

Institutional

Insufficiently broad engagement of stakeholders.

Lack of a clear lead agency (or clear implementation structure among collaborating agencies).

Institutional leadership unable to promote policy use by other ministries.

Design

Difficulty to draw a link between natural capital accounts and policy decisions.

Unclear guidelines, e.g., guidance is not (yet) available in case of ecosystem accounting.

Classifications(***) that are not very relevant to environmental policies.

Lack of an 'umbrella framework' combining natural capital accounts and environmental statistics.

Data availability

It is too early to use natural capital accounts for a fundamental policy use.

Decreasing data availability (confidentiality of data, weaker administrative burden placed on companies).

Insufficient data to use it for policy decisions because of lack of staff and financial resources.

Cooperation

Lack of strong endorsement and mainstreaming by international agencies in their programs.

Concerns by developing countries that additional 'conditionalities' may be imposed by international organi.

Lack of an international forum for training and the exchange of experiences for policy analysis.

Other (please specify)

8.3) If yes, when were natural capital accounts first available in your country?

8.4) If yes, following which methodology? Developed by your own country, SEEA, World Bank, other, non applicable

8.5) If yes, at which level(s)? Local, regional, national, non-applicable

Do you have any comments you would like to share with us?

Note. (*): The (economic-)environmental accounts refer to the statistics that can be integrated with national economic accounts which enables to have joint analyses, while indicators are usually isolated and are more difficult to interpret. (**): Note that this question does not refer to other uses such as 'derivation of indicators', 'input in national accounts', 'input in research and modelling', 'basis for reporting to international organisations'. We understand public policy as "an officially expressed intention backed by a sanction, which can be a reward or a punishment." As a course of action (or inaction), a public policy can take the form of "a law, a rule, a statute, an edict, a regulation or an order" (Fischer *et al*., 2007). (***): For instance, see the classification on the production of manufactured goods (PRODCOM) or the classification of individual consumption by purpose (COICOP). For question 8, the respondent could select yes (1), no (0), or non-applicable (2). For question 8.1, the respondent could select to a great extent (0), somewhat (1), very little (2), not at all (3), very difficult to know (4) or non-applicable (5). For question 8.2, the respondent could select not relevant (0), slightly relevant (1), very relevant (2), extremely relevant (3) or non-applicable (4). For questions 8.4-8.5, the respondent could select yes (1), or no (0).

A.2. Respondents

Table A.3. Respondents : Statistical offices experts

Country	Statistical office	Income level (+)
Afghanistan (*)	Central Statistics Organisation	LI
Australia (**)	Australian Bureau of Statistics	HI
Bangladesh (*)	Bangladesh Bureau of Statistics	LI
Bosnia and Herzegovina	Agency for Statistics of Bosnia and Herzegovina	UMI
Central African Republic	Institut Centrafricain de la Statistique et des Etudes Eco. et Sociales	LI
Denmark (**)	Statistics Denmark	HI
Finland	Statistics Finland	HI
Guatemala	Instituto Nacional de Estadística	LMI
Guinea-Bissau (*)	Instituto Nacional de Estatística	LI
Jamaica (*)	Statistical Institute of Jamaica	UMI
Kenya (*)	Kenya National Bureau of Statistics	LI
Liberia (**)	Liberia Institute of Statistics & Geo-Information Services (LISGIS)	LI
Mauritania (*)	Office National de la Statistique	LMI
Mauritius (*)	Statistics Mauritius	UMI
Mexico (**)	Statistics Office of Mexico	UMI
Nepal (*)	Central Bureau of Statistics	LI
Netherlands (2)	Statistics Netherlands	HI
South Africa	Statistics South Africa	UMI
Sweden	Statistics Sweden	HI

Note. (*): The country does not have environmental accounts. (**): The survey file is incomplete. (+): World Bank country income level classification : Low income (LI), lower middle income (LMI), upper middle income (UMI), high income (HI).

Table A.4. Respondents : Ministry and independent experts

Country	Ministry / independent	Income level(+)
Afghanistan (*)	National Environmental Protection Agency	LI
Austria (2)	Austrian Institute of Economic Research Federal Institute for Less Favoured and Mountainous Areas	HI
Brazil (*)	Universidade Estadual de Campinas, IPBES Multidisciplinary Expert Panel (MEP)	UMI
Belgium	Bureau fédéral du Plan	HI
Burkina Faso	Ministère de l'Environnement et du Développement Durable	LI
Colombia	Departamento Nacional de Planeación	UMI
Comores (*)	Direction Générale de l'Environnement et des Forêts	LI
Côte d'Ivoire (**)	Ministère de l'Environnement; de la Salubrité et du Développement Durable	LMI
Estonia	Estonian Environment Agency	HI
France (3)	Ministère de l'écologie, du développement durable, et de l'énergie Le Centre de coopération internationale en recherche agronomique pour le développement Muséum national d'Histoire naturelle	HI
Ghana (*)	University of Ghana, Member, Board of the Millennium Ecosystem Assessment (MA), Chair, Subsidiary Body on Scientific Technical and Technological Advice (SBSTTA) of the UN Convention on Biological Diversity	LMI
Iran, Islamic R. (*)	University of Tehran, expert for the UN Convention on Biological Diversity	UMI
Korea, Rep.	Ministry of Environment	HI
Dominican R. (*)	Ministerio de Medio Ambiente y Recursos Naturales	UMI
Myanmar (*)	Ministry of Envi. Conservation and Forestry Forest, University of forestry	LI
Nepal (*)	Ministry of Science, Technology and Environment	LI
Sri Lanka	Board of Investment of SL	LMI
Uganda	National Environment Management Authority	LI
United Kingdom	Department for Environment, Food and Rural Affairs	HI

Note. (*): The country does not have environmental accounts. (**): The survey file is incomplete. (+): World Bank country income level classification : Low income (LI), lower middle incime (LMI), upper middle income (UMI), high income (HI).

A.3. Results

Table A.5. Strategies and commitments

	Strategies	Commitments	Total
Austria	2	6	8
Belgium	4	5	9
Bosnia and Herzegovina	3	4	7
Colombia	4	8	12
Central African Republic	4	4	8
Estonia	2	3	5
Finland	4	6	10
France	4	9	13
Guatemala	0	9	9
Korea, Rep.	4	5	9
Netherlands	3	8	11
South Africa	2	2	4
Sri Lanka	2	9	11
Sweden	0	8	8
Uganda	4	7	11
United Kingdom	4	5	9
Country average	**2.8**	**6.1**	**9.0**

Note. The values are obtained through a non-weighted non-rounded sum of questions 1-2 (column 'strategies') and 3-7 (column 'commitments'). The maximum value is four for strategies and nine for commitments. The values in the column 'total' are the sum of the values in columns 'strategies' and 'commitments'.

Table A.6. Strategies and commitments by country income levels

	Strategies	Commitments	Total
Austria	2	6	8
Belgium	4	5	9
Estonia	2	3	5
Finland	4	6	10
France	4	9	13
Korea, Rep.	4	5	9
Netherlands	3	8	11
Sweden	0	8	8
United Kingdom	4	5	9
High income country average	**3.0**	**6.1**	**9.1**
Bosnia and Herzegovina	3	4	7
Colombia	4	8	12
Central African Republic	4	4	8
Guatemala	0	9	9
South Africa	2	2	4
Sri Lanka	2	9	11
Uganda	4	7	11
Non-high income country average	**2.7**	**6.2**	**8.9**

Note. The values are obtained through a non-weighted sum of questions 1-2 (column 'strategies') and 3-7 (column 'commitments'). The maximum value is four for strategies and nine for commitments. The values in the column 'total' are the sum of the values in columns 'strategies' and 'commitments'.

Table A.7. Strategies and commitments by type of respondent

	Strategies	Commitments	Total
Bosnia and Herzegovina	3	4	7
Central African Republic	4	4	8
Finland	4	6	10
Guatemala	0	9	9
Netherlands	3	8	11
South Africa	2	2	4
Sweden	0	8	8
Statistical office average	**2.3**	**5.9**	**8.1**
Austria	2	6	8
Belgium	4	5	9
Colombia	4	8	12
Estonia	2	3	5
France	4	9	13
Korea, Rep.	4	5	9
Sri Lanka	2	9	11
Uganda	4	7	11
United Kingdom	4	5	9
Ministry / independent average	**3.3**	**6.3**	**9.7**

Note. The values are obtained through a non-weighted sum of questions 1-2 (column 'strategies') and 3-7 (column 'commitments'). The maximum value is 5 for strategies and 9 for commitments. The values in the column 'total' are the sum of the values in columns 'strategies' and 'commitments'.

Table A.8. Use of natural capital accounts for public policy decisions

	Have natural capital accounts been used as input for public policy decisions in your country?
Austria	1
Austria	0
Belgium	2
Bosnia and Herzegovina	3
Burkina Faso	NA (*)
Colombia	2
Central African Republic	NA (*)
Estonia	1
Finland	2
France	3
France	NA (*)
France	NA (*)
Guatemala	2
Korea, Rep.	1
Netherlands	1
Netherlands	1
South Africa	3
Sri Lanka	2
Sweden	1
Uganda	3
United Kingdom	1
Average	**1.7**

Note. For this question, the respondent could select to a great extent (0), somewhat (1), very little (2), not at all (3), very difficult to know (4) or non-applicable (5).

Table A.9. Use of natural capital accounts for public policy decisions according to country income levels

	Have natural capital accounts been used as input for public policy decisions in your country?
Austria	1
Austria	0
Belgium	2
Estonia	1
Finland	2
France	3
France	NA (*)
France	NA (*)
Korea, Rep.	1
Netherlands	1
Netherlands	1
Sweden	1
United Kingdom	1
High income country average	**1.3**
Bosnia and Herzegovina	3
Burkina Faso	NA (*)
Colombia	2
Central African Republic	NA (*)
Guatemala	2
South Africa	3
Sri Lanka	2
Uganda	3
Non-high income country average	**2.5**

Note. For this question, the respondent could select to a great extent (0), somewhat (1), very little (2), not at all (3), very difficult to know (4) or non-applicable (5).

Table A.10. Use of natural capital accounts for public policy decisions according the respondent type

	Have natural capital accounts been used as input for public policy decisions in your country?
Bosnia and Herzegovina	3
Burkina Faso	NA (*)
Central African Republic	NA (*)
Finland	2
Guatemala	2
Netherlands	1
Netherlands	1
South Africa	3
Sweden	1
Statistical office average	**1.9**
Austria	1
Austria	0
Belgium	2
Colombia	2
Estonia	1
France	3
France	NA (*)
France	NA (*)
Korea, Rep.	1
Sri Lanka	2
Uganda	3
United Kingdom	1
Ministry / independent average	**1.6**

Note. For this question, the respondent could select to a great extent (0), somewhat (1), very little (2), not at all (3), very difficult to know (4) or non-applicable (5).

Table A.11. Methodology used for natural capital accounts

	If natural capital accounts been used as input for public policy decisions in your country, following which methodology?			
	Own methodology	SEEA	World Bank	Other
Austria	0	1	0	0
Belgium	1	1	0	1
Bosnia and Herzegovina	0	1	0	0
Burkina Faso	0	1	0	0
Colombia	0	1	0	0
Finland	0	1	0	0
France	1	0	0	0
Guatemala	0	1	0	0
Korea, Rep.	0	1	0	0
Netherlands	1	1	0	0
South Africa	0	1	0	0
Sweden	1	1	0	0
United Kingdom	0	1	0	0
Average	4	12	0	1

Table A.12. Scale used for natural capital accounts

	If natural capital accounts been used as input for public policy decisions in your country, at which level(s)?		
	Local	Regional	National
Austria	0	0	1
Belgium	0	1	1
Bosnia and Herzegovina	0	0	1
Burkina Faso	0	0	1
Colombia	0	0	1
Estonia	0	0	1
Finland	0	0	1
France	0	0	1
Guatemala	0	0	1
Korea, Rep.	0	0	1
Nepal	0	0	1
Netherlands	0	1	1
South Africa	0	0	1
Sweden	0	0	1
United Kingdom	0	0	1
Average	0	2	15