

# 1<sup>ST</sup> REPORT ON THE STATE OF NATURAL CAPITAL IN ITALY

2017

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## SYNTHESIS

ITALIAN NATURAL CAPITAL COMMITTEE



## Why an Italian Natural Capital Committee?

The National Law 221/2015 *Environmental measures for promoting green economy and limiting the excessive use of natural resources* (so-called “Collegato Ambientale”, i.e. Environmental Annex to the Stability-Financial Law) sets up the creation of an Italian Natural Capital Committee (*INCC*), composed by institutional members along with with experts appointed by the Italian Minister of Environment, Land & Sea. The *INCC*’s mandate is to provide arguments for consideration of the Natural Capital within public policy in Italy.

Specifically, the Law establishes that, to ensure the achievement of the social, economic and environmental goals coherent with the financial and budgetary annual planning, every year, by **February, 28<sup>th</sup>**, the Committee sends to the Presidency of Council of Ministers and to the Ministry of Economy and Finance a **Report** on the State of the Natural Capital in Italy.

The Report has to deliver **environmental information and data** expressed in both physical and monetary units, following the methodologies defined by the United Nations and the European Union, as well as *ex ante* and *ex post* assessment of the effects of public policies on Natural Capital and Ecosystem Services. Moreover, the *INCC* fosters the adoption, by local authorities, of environmental accounting systems and the drafting of environmental budgets. The aim is to monitor and track the implementation, effectiveness and efficiency of policies and actions in order to protect the environment as well as the state of the environment and the Natural Capital.

To date, scientific knowledge proves the fundamental value of the Natural Capital for development and human well-being. Therefore, Natural Capital has to be considered within the economic planning in Italy and its value should not be neglected when drafting policies and norms. Indeed, the path for the integration of Natural Capital within political decisions and accounting systems addresses the urgency to switch the current negative trend on biodiversity and ecosystems. This affects the correct functioning of biosphere as well as of the socio-economic system and, ultimately, individual and global well-being.

## What is meant by Natural Capital and how does it affect the well-being?

*“Natural Capital refers to the elements of nature that produce value or benefits to people (directly and indirectly), such as the stock of forests, rivers, land, minerals and oceans, as well as the natural processes and functions that underpin their operation”* (UK Natural Capital Committee)

According to a *biologic* standard, Natural Capital can be split in two main categories: living (biotic) and non-living (abiotic) elements. To the former belong all levels of biodiversity (flora and fauna) existing in terrestrial and marine ecosystems. On the contrary, the latter considers soil, subsoil (minerals, metals, fossil fuels), water and atmosphere. It is important to highlight that non-living elements can be both renewable (e.g. water, solar energy) and non-renewable (e.g. minerals, fossil fuels).

Similarly to the other forms of capital, the Natural Capital provides (today and in the future) “ecosystem services” producing benefits necessary to life and contributing to improve the individual and society well-being. For instance, ecosystem services are: clean air, clean water to drink and farm, energy from sun, energy and products from crude oil, fish for nutrition, genetic diversity for food and medical and industrial research, textile fibres for clothes, mountain landscape or urban park to walk, plants and soil micro-nutrients for disaster risk reduction, bacteria for water purification, bees and other insects to pollinate, trees and forests for climate change adaptation.

In order to be measured and allotted (qualitatively and quantitatively) to the components of Natural Capital (*assets*) from which they originates, all the above services are internationally classified in three main groups all based on the supporting service):

- ✓ **Provisioning** (food, materials, energy)

- ✓ Regulating (ecosystem functioning)
- ✓ Cultural (recreation)

Ecosystem services are crucial to support human activities. Nevertheless, their relevance is currently disregarded since many of them are **not marketed**. This means that no price is assigned to their social value. Even when a **monetary assessment** is performed, it can only partially capture all the benefits provided to human well-being (depicted in the Figure below). In any case, it requires the preliminary physical assessment of Natural Capital and ecosystem services, by means of systematic **mapping** and **accounting**.



Linkage between Ecosystem Services and Human Well-being (Source: Millennium Ecosystem Assessment, 2005)

## The Physical State of Natural Capital in Italy

Assessing quantity and quality of the Natural Capital in Italy is necessary to maintain its capacity to provide over time goods and services to current and future generations. To date, some monitoring systems exist to derive information and data to keep track of changes occurring in the components of Natural Capital and their causes. In spite of the large amount of data, there is still work to do in order to achieve a reliable and exhaustive evaluation of the Natural Capital. In fact, the mandate of the Law 221/2015 is to provide a measure of physical and economic dimensions of Natural Capital stocks and flows.

The current situation shows a quite diversified picture, varying on the actual state of the Natural Capital as well as the degree of human pressure. Particularly, coastal zones, inland waters, intensively cultivated plains and urban areas are characterized by a low level of conservation, while the reverse applies for most of hill and mountain areas across Alps, Apennines and islands. In spite of a few positive signals are recorded - namely the increase in protected areas - the general trend is negative. Main Natural Capital deterioration phenomena are the following:

### Living Components

- **Land use change** in Italy is marked out by a more and more intensive use of land, with loss of agricultural fields in the peri-urban areas, increasing building trends, settlement of commercial and tertiary activities, infrastructures and marginal lands. In turn, these produce habitat fragmentation, landscape discontinuity, high human impact on natural resources and local populations quality of life. Land consumption in Italy

keeps increasing, even though at a lower speed in last years: **between 2013 and 2015, new artificial coverage is estimated in 250 km<sup>2</sup> of land (around 35 hectares per day).**

- **Subsoil** in past years provided large amount of deposits of minerals due to its geologic features. Today, mining is basically no longer operating in Italy. **4,800 mines result active** along the whole national territory. **Only 125 out of the 3,000 deposits working in the past have still an operating license and 92 have declared to be productive in 2013.** The recovery of abandoned deposits, potentially leading to both underground and surface collapses, is still unmanaged and unsolved, thereby being a possible source of landslides, floods and surface water pollution.
- **Air quality** has significantly improved. Emissions of main polluters keep reducing as well as their concentration in atmosphere. Nevertheless, this is not enough and the general picture is still not so positive. **Particulate matter, nitrogen dioxide and ozone register high levels**, often beyond the thresholds set by the legislation, especially in urban areas and the *Po valley*.
- **Average temperature keeps increasing constantly.** 2015 was the warmest year ever in Italy. Increase since pre-industrial revolution (+1.58 °C) is higher than the worldwide average (+1.23 °C), potentially leading to important damages for human health and ecosystems.
- As regards **surface waters** (7,494 rivers and 347 lakes), only 43% **rivers** and 21% **lakes** achieve the qualitative target for the **ecological status**, and 75% and 47% for the **chemical status**, respectively.
- Data are still lacking for **underground waters**. The last update identifies 1,053 water bodies, of which only 59% is labelled “good” with reference to both chemical and quantitative status.
- **Marine and coastal waters** show many criticalities about the chemical status. Around 40% across the Italian regions has a “non good” status. The only exceptions are Sardinia and Central Apennines, where the “non good” waters are 33% and 12%, respectively.

## **Biodiversity**

**Italy is among the richest European countries with reference to terrestrial and marine biodiversity. The vascular flora is composed of more than 6,700 species (20.4% endemic, that is spontaneously present only in Italy) and account for half the species known in Europe. Fauna includes more than 58,000 species (30% endemic).**

- In order to describe and interpret the noteworthy territorial complexity and biological diversity in Italy, this Report employs a regionalization by splitting the national territory in 5 ecological-based macro-areas defined **Ecoregions** (Alps, Po Valley, Apennines, Tyrrhenian and Adriatic Mediterranean). They reflect different climate conditions, geo-tectonic and orographic systems, bio-geographical features and landscape. Further, three marine Ecoregions are also identified: Adriatic Sea, Ionian Sea, Western Mediterranean.
- **Alien/exotic species** amount to around 2,700, whereof more than 1,500 animals and the residual vegetals, fungi and bacteria. Some of them, because of their widespread availability, are potentially dangerous for human health, environment and economic system.
- IUCN (International Union for Conservation of Nature) **Red Lists**, monitoring the extinction risk of threatened species worldwide, show that in Italy, out of 1,400 vegetal species assessed, 248 are threatened at different degree and 32 probably no longer existent. As regards the 672 animal species under analysis, those at risk of extinction are about 28%.
- In this respect, it is worth highlighting that the system of **protected areas** in Italy plays a crucial role in coping with the gradual extinction of animal and vegetal species as well as habitats. Overall, the system of national/regional protected areas, along with “Rete Natura 2000”, covers around 9,474,343 hectares, equal to

21% of terrestrial surface and 19.1% of marine areas (excluding the Ecological Protection Zone) in Italy, significantly above the international agreed targets.

- Maintenance of an high value Natural Capital comes alongside the safeguard of the abundant **cultural heritage**. The current stock of Natural Capital is strictly dependent on knowledge and skills gathered by human kind over centuries interacting with natural resources. In turn, cultural heritage is pervaded by suggestions, materials, enlightenment, conditioning derived by natural resources available in each place. Agroforestry territory, as a component of Natural Capital, is crucially related with cultural heritage. Interaction among agriculture and territory has shaped over time outstanding cultural landscapes, some of them belonging to UNESCO World Heritage List. Top level Agrofood production (e.g. wine) as well as certified and biologic production come from the everlasting linkage between Natural Capital and Cultural Heritage.

## **Ecosystems**

Safe and resilient ecosystems allow for their functionality, greater adaptive capacity and less vulnerability to climate change as well as other human pressures. In short, overall higher resilience of territory. Vice versa, altering ecosystems determines the progressive loss of the capability to generate goods and services essential not only for our well-being but also for our survival. Fragmentation of natural habitats provoked by human action affects ecosystems' Natural Capital. Eventually, keeping on changing the natural conditions of habitats may lead to their complete loss, reducing the overall Natural Capital stock and related ecosystem services. Beyond that, recovering functionalities and benefits, if the loss is not yet irreversible, can be very expensive.

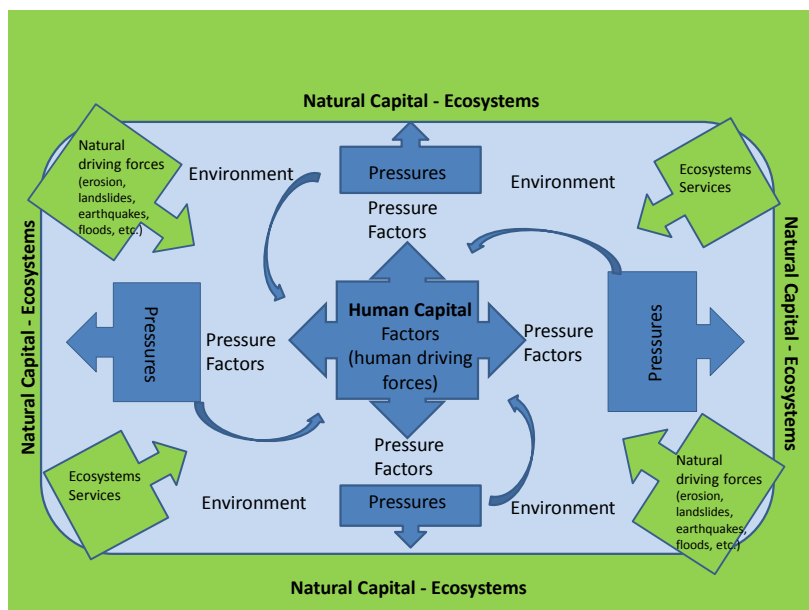
The Report shows the cartography of ecosystems and the assessment of their preservation state, preliminary for identifying priorities of restoration to maintain and enhance of ecosystem services in light of the European Strategy for Biodiversity. Such an assessment concludes that 19 ecosystems (12% of national surface), 18 (14%) and 36 (14%) have high, medium and low conservation state, respectively. The box below summarizes main features of the last category:

### **Low conservation state ecosystems:**

- ✓ Ecosystems with forestal structure, with diverse physiognomy, of the Po valley;
- ✓ Ecosystems over coastal and sub-coastal areas, major islands and north-adriatic;
- ✓ Hygrofilous Ecosystems in all biogeographic sectors with different structure and physiognomy (variable coverage and riparian forest);
- ✓ Forest Ecosystems with prevalence of deciduous oak in plain and hill environments (Alps, Pre-Alps, peninsula).

## **Pressures on Natural Capital**

There are many **human pressure factors** significantly affecting the value of Natural Capital, both deteriorating its own components and reducing ecosystems services. Analysing such factors is particularly useful to define consistent prevention, safeguard, restoration, management and enhancement of the Natural Capital. In the present report, analysis is performed through an “environmental impact pathways” scheme represented below.



From the scheme, main categories of pressures potentially affecting the state of the different Capital Natural assets are identified and synthesized (non exhaustively) in the table below.

| Main categories of pressure and threaten factors  | Asset   |
|---|---|
| - <b>Land planning:</b> land use change, habitat fragmentation.   | <i>Soil</i><br><i>Biodiversity</i>  |
| - <b>Soil consumption:</b> decisional processes about projects (infrastructure, plants, deposits, etc.) leading to artificial coverage of soil, habitat fragmentation, landscape destruction. | <i>Soil</i><br><i>Biodiversity</i>  |
| - <b>Unauthorised/Illegal Building:</b> illegal or unpunished behaviour, including missing implementation of demolition procedures and refurbishment back to the initial state.               | <i>Soil</i>   |
| - <b>Wood Fires:</b> large impact on biodiversity, greenhouse gases and deterioration/desertification of territory.   | <i>Soil</i><br><i>Biodiversity</i><br><i>Atmosphere</i>                                   |
| - <b>Biotic resource withdrawal:</b> unsustainable exploitation and biodiversity loss (e.g. fish pressure).   | <i>Biodiversity</i><br><i>Sea</i>   |
| - <b>Invasive Alien species introduction:</b> e.g. ballast water unmanaged dumping  | <i>Biodiversity</i>   |
| - <b>Abiotic resource extraction:</b> unsustainable exploitation (e.g. minerals, water).  | <i>Soil</i><br><i>Subsoil</i><br><i>Water</i>   |
| - <b>Pollution:</b> emissions in atmosphere, dumping in land and water, soil pollution.   | <i>Soil</i><br><i>Atmosphere</i><br><i>Biodiversity</i><br><i>Water</i><br><i>Subsoil</i> |
| - <b>Climate Change:</b> greenhous gases and carbon sequestration, expected impacts, effects on hydrological regimes.   | <i>Atmosphere</i><br><i>Biodiversity</i><br><i>Water</i><br><i>Soil</i>                   |
| - <b>Waste:</b> non-biodegradable waste accumulation (e.g. plastic waste in street and sea).  | <i>Atmosphere</i><br><i>Biodiversity</i><br><i>Water</i><br><i>Soil</i><br><i>Sea</i>     |

Main threats to the Italian Natural Capital seem connected to climate change across all Ecoregions, ecosystems already in critical conditions and typical and unique biological diversity. Then, soil consumption is also critical as it increases the amount of impermeable soil, exacerbating the hydrological vulnerability and reducing fertile areas. Although preliminary, the current analysis shows that the general state of Natural Capital has several criticalities, mainly related to the quality of surface waters and to the conditions of important ecosystems in the *Po valley* and along coastal zones.

## The physical assessment of Natural Capital and ecosystem services: case studies

The first issue of the Report performs a preliminary evaluation of the main assets composing the Natural Capital in Italy as well as related ecosystem services. This is done by referring to a few studies concerning forest, agriculture, coastal/marine zones and urban areas and provides a first knowledge basis to support policies and actions.

### Forests

- ✓ National forest surface covers almost 12 Mln hectares (INFC, 2015), equivalent to 39% of density of woodland over the total national land.
- ✓ The overall content of Carbon (C) stored in Italian biomass is equal to 472.7 Mln tons C (~ 1569.6 Mln tons CO<sub>2</sub>) (*Regulation Service*).
- ✓ Italian woods contains 1.3 Bln m<sup>3</sup> of timber, corresponding to timber biomass amounting to 900 Mln tons (*Provisioning Service*).

### Sea/Coast

- ✓ The Posidonia meadows' stock provides many positive ecosystems services both to marine ecosystem functioning and to direct and indirect effect to human and economic activities (e.g. tackling seaboard erosion, maintaining nursery habitats of commercial fish species, climate regulation).
- ✓ As far as climate regulation, Posidonia meadows are one of the larger CO<sub>2</sub> sink in the Mediterranean Area. In fact, every year, varying on density, between 6 and 175 g C are sequestered in 1 m<sup>2</sup> of meadows (IUCN, 2012) that at country level means a range between 24,000 and 704,000 tons C/year (*Regulation Service*).

Total amount of marine and lagoon fishing (fish, shellfish, crustacean) in 2014 is about 176,800 tons, with a global value added from the fish and aquaculture sector equal to 920,754 Mln € (*Provisioning Service*).

### Agriculture

- ✓ Analysing IUTI (Inventory of Land Use in Italy) data (1990-2014) the following outcomes emerge:
  - loss of agricultural surface, both arable land (-1,2 Mln hectares), grass and pasture land (-300,000 hectares)
  - increase in forest surface (+500,000 hectares)
  - increase in urban surface (+500,000 hectares)

Land use often involves the most fertile terrains with higher productivity, while those with lower productivity are typically left and turned back to forest.
- ✓ According to the data from the *Greenhouse Gases National Inventory Report 2016*, net CO<sub>2</sub> emissions from Agriculture and LULUCF (Land use, Land Use Change and Forestry) in 2014 amount to -6,611 Gg in grassland and 3.216 Gg in cultivated land (*Regulation Service*).

### Metropolitan Areas

- ✓ The amount of local pollutants (PM<sub>10</sub> and O<sub>3</sub>) removed by three vegetation system (deciduous, evergreen, conifer) in 3 Italian cities (Genoa, Reggio Calabria and Rome) is: (*Regulation Service*).
  - Genoa: 2,432 Mg PM<sub>10</sub> and 5,477 Mg O<sub>3</sub>

- Reggio Calabria: 2,648 Mg PM<sub>10</sub> and 4,187 Mg O<sub>3</sub>
- Roma: 2,319 Mg PM<sub>10</sub> e 3,951 Mg O<sub>3</sub>
- ✓ Globally, the amount of local pollutants removed in the three cities is equal to 7,399 Mg PM<sub>10</sub> and 13,615 Mg O<sub>3</sub>.

## Economic Assessment and Natural Capital Accounting: methods and case studies

There is large consensus both at scientific and institutional level that a proper consideration of Natural Capital and ecosystem services should inform and support public and private decisions. The inclusion of these aspects in economic, budget and financial accounts contributes to minimize the biases in prices and wrong functioning of markets as well as to provide greater attention to citizens' **well-being**. In fact, the economic assessment of Natural Capital allows taking into account all costs linked to risks and damages for the environment, the expenditures required for prevention and restoration, as well as all benefits provided by environment. This way, the consideration of the importance of ecosystem services in public and private decisions is ensured.

Since '90s, extended systems of **national accounting** have been developed. Their aim is to complement input-output matrices, that collect only marketed values of commodities and services comprised in the standard definition of GDP, with **satellite accounts** reporting the stream of natural resources (a proxy of the pressure of economic activities on Natural Capital) flowing into production and consumption processes. In particular, main references are the **System of Environmental-Economic Accounting (SEEA)**, considering only streams of materials and energy for provisioning purpose (anthropocentric perspective), and the **System of Experimental Ecosystem Accounting (SEEA-EEA)**, that also considers the indirect use of ecosystem services (ecosystemic perspective).

As regards the monetary assessment of ecosystem services flows and Natural Capital assets, SEEA-EEA suggests to employ the different approaches proposed by academia and international institutions, classified in the "**environmental valuation**" branch. In fact, in order to derive the **Total Economic Value (use and non-use)** of Natural Capital, there are a number of scientific approaches (market-based, revealed preferences, stated preferences) allowing the integration of traditional economic accounting also with monetary values assigned to Natural Capital.

This report provides synthesis of a few studies on several topics: land consumption, marine and coastal areas, wetlands. Moreover, a first attempt to measure ecosystem services at national scale is also presented. Readers should bear in mind the limitations of such elaborations. In fact, due to the complexity of the relationship between ecosystem services and human well-being, the economic valuation works only as a proxy of the value of natural resources and possibly underestimates their actual contribution to well-being.

### Land Consumption

- ✓ Evaluation of the economic value of 10 ecosystem services loss due to change in land use occurred between 2012 and 2015. Main impacts related to: crop productivity loss (424 Mln €/year), Carbon capture and sequestration (up to 145 Mln €/year) and erosion protection (> 100 Mln €/year).

### Marine and Coastal Areas

- ✓ Evaluation of the economic value of Carbon sequestration (up to 129 Mln €/year) and coastal erosion protection (up to 402 Mln €/year) provided by *Posidonia* meadows.
- ✓ Evaluation of national value of cultural services derived by coastal ecosystems (27 Mld €/year).

### Wetlands

- ✓ Evaluation (*ex ante*) of the economic value of 9 ecosystem services connected to two options for creating wetlands in the *Sacca di Goro* basin (Ferrara province in Emilia Romagna region): the largest impact is on mortality reduction of clams due to the decrease in nutrients discharge (up to 8.3 Mln €/year).



### Country-wide Ecosystem Services

- ✓ Evaluation of the economic value of 8 ecosystem services referred to 6 ecosystem types, globally estimated equal to 338 Bln € (23% of GDP).

## Guidelines for the assessment of effects of public policies on Natural Capital

The assessment of effects of public policies on Natural Capital is a goal to be pursued systematically and organically. It requires a medium-long term approach, characterised by two different but complementary scopes:

- **prevent and mitigate *indirect negative effects*** on Natural Capital of sector policies for economic development at national and local scale;
- promote **positive effects**, by means of public policies *directly* addressing preservation, restoration, management and promotion of Natural Capital stock and ecosystem services flows.

Based on the analyses carried out in this report, the following logical scheme is offered, organised in categories to be developed to assess the impact of public policies on Natural Capital.

### **A. The development of an accounting system explicitly considering Natural Capital and ecosystem services at the different governance levels (central and local) of public administration in charge of managing the budget for Natural Capital.**

This area is required by the necessity to ensure the systematic collection and monitoring of stock and flows data of Natural Capital and its components, in order to have a clear and transparent mapping of Italian ecosystems and Ecoregions. Methodological main reference to develop accounting system extended to Natural Capital and ecosystem services is given by the UN international standards (*SEEA* and *SEEA-EEA*).

### **B. The creation of an as much coordinated as possible system of data collection and statistical analysis for pressures on Natural Capital, involving all categories of agents playing a role in national accounting (firms, households, public sector).**

It refers to the link between the data on the state of Natural Capital and public decisions. In other words, all the information – driving forces, pressure factors, impact chains – affecting the state of Natural Capital, its component and ecosystem services flows. The issue refers, on one hand, to the necessity of identifying, quantifying and monitoring over time the decisional processes that may generate impacts on ecosystems and related services. On the other hand, to the need for the effective coordination of different policies, strategies and actions of sector planning that may have an impact on Natural Capital, for instance by enhancing the contribution of the National Strategy for Sustainable Development in the Economic and Financial Document (*EFD*, “DEF” in Italian) and more extensively to the National Reforms Program (*NRP*, “PNR” in Italian) (see table below).

Within the realm of pressures, industrial policies are also considered. The main guideline in this respect is the development of an extended accounting for firms with non-financial data reporting the actual pressures on Natural Capital generated by firms. The Legislative Decree 30 December 2016, n. 254, adopting the Directive 2014/95/EU on non-financial reporting of entities with public relevance is a first step towards this direction.

| Main categories of pressure   | Public policies, Strategies, Plans  |
|---|---|
| - <b>Overarching (development, fiscal policy, public expenditure)</b> | - Government Budget, Economic and Financial Document<br>- National Strategy for Sustainable Development, implementing UN Agenda 2030) (ongoing)   |
| - <b>Land Planning</b>  | - Convention Concerning the Protection of the World Cultural and Natural Heritage (1972)<br>- Convention on the Protection of the Underwater Cultural Heritage (2001)<br>- Convention for the Safeguarding of the Intangible Cultural Heritage (2003)<br>- UNESCO Man and the Biosphere Programme (MAB) |

|  |   |
|--|---|
|  | <ul style="list-style-type: none"> <li>- Convention on the Value of Cultural Heritage for Society (Faro Convention, 2005)</li> <li>- Council of Europe Framework Convention on the Value of Cultural Heritage for Society (2005)</li> <li>- European Landscape Convention (2000)</li> <li>- European Convention on the Protection of Archaeological Heritage (1992)</li> <li>- Land Regional Plans</li> <li>- Urban Green National Plans (ongoing)</li> <li>- Renewable Energy National Action Plan</li> <li>- National Urban Agenda</li> <li>- Rural Development Programme</li> <li>- Internal Area National Strategy</li> <li>- 2017-2022 Tourism Development Strategic Plan</li> <li>- Harbours and Ports Logistics National Strategic Plan</li> <li>- Plan of Parks</li> <li>- Natura 2000 management Plan</li> <li>- Landscape Plans ex art. 143 of Legislative Decree 42/04</li> <li>- Airport Development National Plan</li> <li>- Electric Vehicles Refilling Infrastructure National Plan</li> <li>- Liquefied Natural Gas National Strategy</li> <li>- Transport and Logistics General Plan (expected) and forecasts on priority infrastructure considered in the pluri-annual Planning Document (Code of Contracts)</li> <li>- Hydrologic Risk Prevention National Plan</li> <li>- River Basins/Districts Plans</li> </ul> |
| - <b>Land Consumption</b>              | <ul style="list-style-type: none"> <li>- Regulatory Plans</li> <li>- Harbour and Port Logistics National Strategic Plan</li> <li>- Airport Development National Plan</li> <li>- Transport and Logistics General Plan (expected)</li> <li>- Ex-Ante Environmental Assessment Procedures at Plan and Project Scale (European Union programs evaluation, SEA, CBA, EIA)</li> </ul>   |
| - <b>Illegal/Unregulated Building</b>  |   |
| - <b>Forest Fires</b>                  | <ul style="list-style-type: none"> <li>- Forest Settlement Plans</li> <li>- Forest Fire Prevention Plans</li> </ul>   |
| - <b>Human Induced Climate Change</b>  | <ul style="list-style-type: none"> <li>- Climate Change Adaptation National Strategy</li> <li>- Greenhouse Gases Reduction National Action Plan</li> <li>- CO<sub>2</sub> Reduction National Plan (Air Transport)</li> <li>- National Energy Strategy</li> <li>- Renewable Energy National Action Plan</li> <li>- Energy Efficiency National Action Plan</li> <li>- Zero Energy Buildings National Action Plan</li> <li>- Electric Vehicles Refilling Infrastructure National Plan</li> <li>- Liquefied Natural Gas National Strategy</li> <li>- Ex-Ante Environmental Assessment Procedures at Plan and Project Scale (European Union programs evaluation, SEA, CBA, EIA)</li> </ul>   |
| - <b>Biotic Resources Exploitation</b> | <ul style="list-style-type: none"> <li>- Biodiversity National Strategy</li> <li>- Marine Environmental Strategy</li> <li>- Agricultural Biodiversity National Plan</li> <li>- Fishing and Aquaculture National Plan</li> <li>- Biologic National Strategic Plan</li> <li>- Ex-Ante Environmental Assessment Procedures at Plan and Project Scale (European Union programs evaluation, SEA, CBA, EIA)</li> </ul>  |
| - <b>Abiotic Resources Extraction</b>  | <ul style="list-style-type: none"> <li>- Waste Prevention National Program</li> <li>- Renewable Energy National Action Plan</li> <li>- Environmental Sustainability of Public Consumption Action Plan</li> </ul>  |
| - <b>Pollution</b>                     | <ul style="list-style-type: none"> <li>- Phytosanitary Products Sustainable Use National Action Plan</li> <li>- Air Quality Regional Plan</li> <li>- Basin Plans</li> <li>- Ex-Ante Environmental Assessment Procedures at Plan and Project Scale (European Union programs evaluation, SEA, CBA, EIA)</li> </ul>  |
| - <b>Waste</b>                         | <ul style="list-style-type: none"> <li>- Non-biodegradable Waste Generation Prevention Policies</li> <li>- Public or State Property Territory Cleaning and Recovery Policies</li> </ul>   |

|            |  |
|------------|--|
| - Research | - Research National Program<br>- Agrifood and Forest Sector Innovation and Research Strategic Plan |
|------------|--|

**C. Enhancement of technical skills in the public sector for assessment related to Natural Capital and Ecosystem Services (mapping, physical quantification, monetary assessment).**

This area refers to professional skills, methodologies and guidelines for the *ex ante* and *ex post* assessment of effects of public policies on Natural Capital.

Based on existing procedure, establishing standard and uniform assessment methods of Natural Capital and ecosystem services (guidelines and manuals for those in charge of the assessment) are extremely important. The adoption of a common glossary (definitions, measurement units, classifications, fields of assessment, etc.) and evaluation standards (principles, methods, parameters, reference and benchmark values, etc.) in Italy, based upon the current knowledge and manuals/guidelines already developed at EU and international level, is a necessary condition to provide an effective and efficient assessment of Natural Capital when preparing and/or verifying policies.

It is worth stressing that the assessment methods should be organized through two main channels:

- a) defining and adopting guidelines for the *ex ante* quantification of expected impacts and damages for the Natural Capital;
- b) defining and adopting guidelines for the *ex ante* quantification of expected benefits from restoration, management and enhancement of the Natural Capital.

**D. Propose new institutional responsibility aiming to build a normative procedure for the ex ante sustainability assessment of the EFD (DEF) and the NRP (PNR) (consistent with the UN Agenda 2030 and the National Strategy for Sustainable Development - NSSD), highlighting the main goals of restoration, management and enhancement of the Natural Capital.**

The assessment activities required to *prevent* indirect negative effects of sector policies on Natural Capital and to *maximize* positive direct effects of restoration, management and enhancement have a high degree of complexity. Thus, main efforts should be focused on the main mechanism of public choices, the *EFD*. The suggestion is the definition of a regulatory procedure for the *ex ante* assessment of the *EFD*, along with the *NRP*, with the Italian goals set in the *NSSD* and particularly those connected with the Natural Capital. It is worth noting that the National Budget Law already established the use of a subset of “Fair and Sustainable Wellbeing” (BES) dashboard indicators in the *EFD* as well as in the *ex post* assessment of the National Budget Law.

**E. Integrate Natural Capital within the current procedures of ex ante assessment of plans, programs and projects (European Union programs evaluation, Strategic Environmental Assessment – SEA, Cost-Benefit Analysis – CBA and Environmental Impact Assessment – EIA).**

Such an integration should also consider monitoring and assessment systems for the implementation of structural policies funded by **European Union funding programs**. In this respect, data collection systems, shared methodologies and experience gained by regional and central offices can provide robust feedbacks and support monitoring and assessing effects of structural policies on Natural Capital.

Shifting to the **project level** and related assessment through *CBA* and *EIA*, the Legislative Decree 228/2011, reforming the decisional process of capital account expenditure of central government, commits to provide an *ex ante CBA* about project feasibility (initial step of project design cycle). Unfortunately, this obligation, coherent with the integration of Natural Capital in the *ex ante* assessment at project level, has been rarely fulfilled so far.

In fact, the *ex ante* assessment of effects on public policies on Natural Capital required by the Law 221/2015, Art. 67, reflects an opportunity to increase the amount of public investments. Moreover, it represents the main reason for Italy to adopt national guidelines for all obliged administrative offices, with a two-fold purpose. On

one hand, to assess benefits – including enhancement of Natural Capital – derived by environmental protection projects. On the other hand, to consider explicitly external costs of pollution, including those affecting the Natural Capital stock and ecosystem service flows.

**F. Enhancement of environmental assessment of economic subsidies provided by sector public policies (Environmental Harmful and Friendly Subsidies Catalogue).**

This aspect refers to all those measures of financial incentives provided by the Government (direct and indirect subsidies, such as tax cuts and fiscal exemptions). The Environmental Harmful and Friendly Subsidies Catalogue, required by the Law 221/2015, Art. 68, and yearly released by the Italian Ministry of Environment, Land and Sea, represents an informative tool to support Government policies.

**G. Environmental Fiscal Reform and other economic instruments for Natural Capital protection.**

The current framework of the Italian environmental taxation, annually monitored by *ISTAT*, appears to have a low degree of coherence and would require a more rational and transparent reform, with reference to both fiscal duties and the reuse of revenues for public expenditures needs. Indeed, **only 1% of environmentally-related tax revenues (578 out of 55,722 Mln € in 2015) is ear-marked to environmental protection.** Moreover, 82% of revenues refers to energy taxes, with diversified level of taxation disconnected by its energy content, 17% to transport vehicles and less than 1% on specific pollutants or natural resources.

A Natural Capital oriented environmental fiscal reform should primarily concern the last category. For instance, it should study the implications of a tax on “natural” land consumption, on surface and underground water withdrawal, raw materials extraction, on local emissions provoking large negative impacts on ecosystem services (e.g. NO<sub>x</sub> for eutrophication, SO<sub>2</sub> for acidification).

**Ecosystem Services Payment Schemes** represent another important policy instrument to support Natural Capital protection and enhancement. They are innovative tools for environmental taxation directly linked to the measurement of the benefits provided by ecosystem services, while ear-marking revenue to the resource managers providing the ecosystem services would allow funding for protection, restoration and enhancement of those resources.

Based upon the increasing research on this topic and some applications in the real world, the Law 221/2015, Art. 70, promotes for Italy the design and the adoption of such a scheme at national level. To date, procedures and features of an environmental and ecosystem payment scheme in Italy are under the planning phase and will be included within the overall reform of the regulation on national parks (Law 394/1991).

Also in light of the lasting public finance weakness, other innovative instruments – such as **government green bonds** – can be envisaged to strengthen public investments for Natural Capital, starting from those concerning the recovery of ecosystems functionality, generally based upon voluntary efforts but providing large benefits for communities.

## **Perspectives and Recommendations**

Based upon this first report, the *INCC* identifies, as a matter of priority, the following list of activities. It will allow developing reports over the next years with a more proactive and constructive approach and in line with the regulatory tasks.

**Identification of measures to increase data knowledge useful for the assessment**

1. Establishing a homogeneous categorization of Natural Capital assets, Ecosystems and Ecosystem services.
2. Contributing to recognize, along with *ISTAT*, *ISPRA*, main research institutes, scientific societies and universities and their respective *expertises*, methodologies and actions to fill data lack, such to keep developing an agreed and robust environmental accounting system at national level.

3. Identifying minimum quality thresholds of ecosystems beyond which ecosystem services, and socio-economic activities relying on those, are seriously jeopardized. Thus, creating and promoting the adoption of an assessment system of the degree of exposure and risk for Natural Capital assets while monitoring the relevance and the potential impact of main human-based pressures.
4. Adopting a modelling framework to provide *ex ante* and *ex post* assessment of the impacts of public policies on the state of Natural Capital and ecosystem services.
5. Developing guidelines for a shared approach on physical assessment of Natural Capital, taking into account the *UN SEEA* and *SEEA-EEA* accounting systems and contributing to promote a nation-wide recognition and assessment of the qualitative state of ecosystem services.

### **Recommendations**

With respect to the above perspectives and the initial assessment offered in the report, it seems necessary to define clear goals with short- and medium-term deadlines on the monitoring of the state of Natural Capital and its inclusion within public decisions. At the same time, it is crucial to define goals for both Natural Capital stock preservation and endangered assets recovery.

To this purpose, the list below reports the main recommendations of the *INCC* on actions to undertake in the medium-short run:

- ✓ Adopting a Natural Capital Action Plan, based upon the present report.
- ✓ While preparing the *EFD*, the new measures to be included in the *NRP* should be preliminarily subject to a coherence assessment with respect to the relevant goals up to 2030 concerning the Natural Capital within the context of the UN Agenda 2030 and the *NSSD*.
- ✓ Integrating the Natural Capital accounting and connected prevention, restoration, management and promotion targets within land planning mechanisms and tools at all governance levels, also through *ex ante* environmental assessment procedure of plans, programs and projects (European Union programs evaluation, *SEA*, *CBA* and *EIA*).
- ✓ Extending, within the reform of the Code of Public Contracts, the field of application of the minimum environmental criteria for Green Public Procurement (*GPP*), by including in the cost evaluation – according to the approach of life cycle assessment – also those costs for the natural resources consumption and pollution suffered by communities.
- ✓ Strengthening the system of marine and terrestrial protected areas, highlighting their contribution in terms of biodiversity and ecosystem services protection, improving the system of ecological connections and green infrastructures, promoting systemic policies in each Ecoregion, in the European network *Natura 2000* and in the national and regional parks network.

### **Topics deserving further analyses**

- Adopting adequate accounting reforms to provide a unitary vision of public expenditure (consolidated expenditure of public administrative offices at all governance levels) aiming to Natural Capital prevention, restoration, management and enhancement, including the Eco-budget (Eco-bilancio, previsionale) and the Eco-report (Eco-rendiconto, finale).
- Establishing a Natural Capital and ecosystem services accounting system, integrated with the standard national and public sector accounting, coherent with the international methodologies (*UN SEEA* e *SEEA-EEA*), by involving Regions, the National Statistical System (*SISTAN*) and the Environmental Protection Network National System (*SNPA*).
- Strengthening green finance tools to build green infrastructure, in order to cope with climate change and to enhance Natural Capital recovery measures, representing a model of sustainable development.

- Providing an assessment of the implementation of the “Chart of Rome on Natural and Cultural Capital”, approved under the Italian Presidency of the EU Council in 2014, with reference to the 5 proposed themes: improving knowledge, investing on Natural Capital, ensuring natural ecosystems functionality and integrity, interconnection between Natural and Cultural Capital, establishing synergies among green infrastructures, rural and urban areas.
- Gradually increasing the overall amount of public expenditure devoted to Natural Capital safeguard, also by considering self-financing systems.
- Implementing innovative financing tools through a reform of the tax system more oriented to Natural Capital protection and sustainable use.
- Relying upon information reported in the Environmental Harmful and Friendly Subsidies Catalogue, starting a program of Natural Capital harmful subsidies phase out, also increasing environmental conditionalities in the provision of sector-specific subsidies.
- Deepening the potential use and spread of *green bonds* to fund projects for Natural Capital protection, also waiting for a full implementation of the Paris Agreement commitments within the context of the UN Framework Convention on Climate Change.