Liberté • Égalité • Fraternité
RÉPUBLIQUE FRANÇAISE

PREMIER MINISTRE

Centre d'analyse stratégique

October 2011
No 246
LA NOTE DE SYNTHÈSE
Sustainable Development

Public incentives that harm biodiversity

Biodiversity's contribution to natural balances and the ability of ecosystems to supply services of interest to humanity is still poorly understood by the public. However, it provides us with food, fuels and construction materials. It also makes possible various processes: water purification, stabilisation and moderation of the world's climate, regulating floods and droughts, etc. Among the European Union members, France has particular wealth, and thus responsibility, not only because of the great diversity of the ecosystems on its mainland, but also of those in its overseas departments. These departments alone are hosts to 380 endemic vertebrate and 3,450 plant species, i.e. more than all of continental Europe. In France, as in the rest of the world, species have become extinct at a much faster than natural pace over the last several decades. Some experts even suggest that a new stage of mass extinction (the sixth in geological history) is underway. Essentially human in origin, this loss of biodiversity is the result of the destruction and degradation of natural and semi-natural habitats, the overexploitation of renewable natural resources, pollution, climate change and the spread of exotic invasive species.

Since the 1992 Earth Summit in Rio de Janeiro, reducing the biodiversity loss has been a recurring goal of both international and national authorities. In particular, the Conference of the Parties to the United Nations Convention on Biological Diversity, which took place in Nagoya in October 2010, led to the adoption of a strategic plan to fight against the loss of biodiversity between now and 2020. Among its various goals, reforming, eliminating or phasing out public incentives that are harmful to biodiversity has been confirmed as a priority: this is the topic of this *Note de synthèse* which adresses the French situation. ■

PROPOSALS

1. A reduction in tax credits that encourage urban sprawl.
2. Take into account the negative effects of transportation infrastructure on biodiversity, both when they are built and when they are used.
3. Charge a truly effective tax on water pollution caused by industrial wastes, taking into account their effects on biodiversity.
4. Atmospheric emissions of heavy metals should be reduced by extending the tax on polluting activities to arsenic and selenium.
5. Boost the implementation of more effective taxes.

THE CHALLENGES

The effect of public subsidies on the environment has received increasing attention at the international level for several decades. The expressed interest in incentives specifically unfavourable to biodiversity is more recent. It wasn't until the tenth Conference of the Parties to the United Nations Convention on Biological Diversity that took place in Nagoya in 2010 that a review of subsidies detrimental to biodiversity appeared, as a distinct priority. This priority consists in reforming, eliminating or phasing out public incentives, including subsidies that are harmful to biodiversity, between now and 2020 at the latest. In France, the law passed in August 2009, implementing the Environment Round Table[1], explicitly provides that the State would order an audit to identify tax measures that are unfavourable to biodiversity and propose new tools allowing a progressive shift toward a tax structure better adapted to current environmental issues. This audit has led the *Centre d'analyse stratégique* (CAS) to establish a group of biodiversity experts, economists, union representatives, business, administration and environmental associations, at the request of the Ministry of Ecology and Sustainable Development. Its report, *Public Incentives that Harm Biodiversity*, first establishes the list of public incentives that are harmful to biodiversity, then suggests proposals and reform in order to reduce or even negate this harmful impact.

After clarifying what is biodiversity and the issues brought up by its decline, this *Note de synthèse*[2] presents some proposals to mitigate the effects of public incentives identified as harmful to biodiversity.

BIODIVERSITY, PILLAR OF SUSTAINABLE DEVELOPMENT

There are many definitions of the neologism "biodiversity", which was coined by the end of the 1980s.

Initially a topic of interest only for naturalists, then an issue for environmentalists and later politicians, the concept of biodiversity has undergone significant changes. The fixed, species-centred view that prevailed at the beginning of the 19th century has gradually been replaced by an evolving, functional vision that integrates diversity within species (particularly genetic diversity), their evolution, diversity of associations of species populating ecosystems ("ecological" diversity) and, finally and more importantly, that of the interactions between species and populations.

The working group set up by the CAS defined biodiversity as the diversity of species (flora, fauna, fungi and micro-organisms), of their genes and of ecosystems, as well as their interactions, notably between species.

The group made a distinction between two categories of biodiversity. One, known as "remarkable", corresponds to entities (genes, species, habitats and landscapes) identified as having intrinsic value, albeit hard to quantify, that justifies collective dedication to its preservation. The second one is "general" (or "ordinary"), without any intrinsic value identified as such but which, through its abundance and the many interactions between its entities, contributes to varying degrees, and in ways that are sometimes essential, albeit unknown, to the way ecosystems run and produce ecosystem services[3].

The contributions of biodiversity to human life and well-being, also known as "ecosystem services", are essential to the life of society and economic activity, through supplying food, fuel and construction materials, purifying water and air, stabilising and moderating the world's cli-

(1) Articles 26 and 48 of Act 2009-967, known as *"Grenelle I"*.

(2) See "Les aides publiques dommageables à la biodiversité" (2011), *Note de synthèse* 246, Centre d'analyse stratégique, October.

(3) Centre d'analyse stratégique (2009), *L'approche économique de la biodiversité et des services liés aux écosystèmes*, report of the commission chaired by Bernard Chevassus-au-Louis, Paris.

mate, mitigating floods and drought, creating and renewing soil fertility, maintaining genetic resources that contribute to the variability of crops and livestock, producing useful substances such as medication, and providing recreational, aesthetic and cultural benefits (Millennium Ecosystem Assessment, 2005[4]).

Ecosystem services are mainly the result of **interaction between living organisms**. These interactions shape environments and the physical, chemical and biological flows within ecosystems. Air and water purification, carbon storage and soil fertility are all services resulting from the interaction of organisms with their environment. Each type of ecosystem (forest, wet zones, prairies, coral, etc.) has different corresponding functions and services that depend on the state of the ecosystem and pressures exerted on it, as well as on how humans use it[5].

Two main variables allow biodiversity to be assessed: abundance and variability. Abundance directly determines the quantity of services produced for humanity (abundance is what counts for fish stock, not genetic or specific diversity), and the probability of maintaining it. Aside from extinction, scarcity is what poses a significant problem in the current biodiversity crisis. Variability is a major factor in the adaptation potential of biodiversity, and therefore in its survival.

Biodiversity's importance cannot be reduced to protected species, otherwise known as **"remarkable biodiversity"**. It also requires the maintenance of **"ordinary biodiversity"**.

AN EXCEPTIONAL ASSET UNDER THREAT

The French territories possess exceptional biological wealth. Mainland France is one of the countries with the most diverse ecosystems in the European Union. More than 75% of the kinds of natural habitats identified as European priorities are also found on the mainland, sometimes exclusively. Furthermore, it is host to 40% of Europe's flora.

French overseas communities shelter 380 endemic vertebrate and 3,450 plant species, whether on land or in the sea, i.e. more than the whole continental Europe. Its maritime domain includes around 10% of the world's coral reefs and 20% of its atolls[6]. French Guiana's tropical forest is one of the 15 great forests left that have not been fragmented by human activity. The island of Mayotte possesses one of the few lagoons protected by a double barrier reef, and shelters 17 species (sometimes rare) of sea mammals. New Caledonia has the second highest level of endemism in the world. The southern and Antarctic French territories host the most diverse marine bird communities in the world[7].

This special ecosystem richness is an asset for France, but it also implies certain responsibilities. As in the rest of the world, French biodiversity has been increasingly undermined in the last few decades. Although the pace at which species disappear is difficult to estimate, the loss of biodiversity is rapid: some scientific assessments estimate that the rate of extinction during the last hundred years was 1,000 times greater than the natural rate.

POLITICAL AWAKENING

The 1992 Earth Summit in Rio de Janeiro, and the adoption of the Convention on Biological Diversity (CBD), which came into effect in December 1993, marked the beginning of international political interest paid to the need for a coordinated approach to biodiversity preservation.

A decade later, in 2002, Heads of state and governments who are signatories to the CBD set an ambitious goal at the sixth Conference of the Convention in The Hague: "To achieve by 2010 a significant reduction of the current rate

(4) Millennium Ecosystem Assessment (2005), *Ecosystems and Human Well-being: Biodiversity Synthesis*, World Resources Institute, Washington, DC, p. 86.
(5) *Ibid.*
(6) UICN (2005), *La France et la biodiversité : enjeux et responsabilités*, p. 8.
(7) *Ibid.*

of biodiversity loss at the global, regional and national level as a contribution to poverty alleviation and to the benefit of life on Earth". For its part, the European Union took on an even more ambitious commitment at Gothenburg in 2001: to stop the loss of biodiversity in the Union by 2010. With the failure to meet this goal, EU leaders made two major commitments in March 2010, as stated by the new Commission strategy released this year[8]:

- to halt the loss of biodiversity in the EU by 2020;
- to protect, value and appropriately restore biodiversity and ecosystem services in the EU by 2050.

Finally, in Nagoya in October 2010, the tenth Conference of the Parties to the CBD adopted a strategic plan with clear objectives for battling biodiversity loss by 2020.

As part of its commitments under the CBD, but maintaining the European Union's most ambitious approach, France adopted in 2004 the first version of its National Strategy for Biodiversity (SNB), which was supposed to stop biodiversity loss by 2010; the second version came into force in 2011 in order to "preserve and restore, strengthen and promote biodiversity" and "ensure its sustainable, fair use".

RETHINKING PUBLIC INCENTIVES THAT HARM BIODIVERSITY

In order to fulfil these commitments, several types of action have been suggested. One consists in raising awareness of biodiversity's value by trying to assign monetary value to ecosystem services. This was one of the tasks addressed by the Chevassus-au-Louis's report in 2009[9].

To reconsider public incentives that harm biodiversity is another necessary type of action.

The concept of public incentives that harm biodiversity has various meanings. The most intuitive would be financial transfers from the State or its territorial communities to a private or public agent. This transfer could be an actual payment from a public entity to the beneficiary – namely, **subsidies** – or a waiver of a monetary transfer from the beneficiary to a public entity – corresponding to **tax credits** (or tax breaks).

The OECD has a broader definition. It covers all governmental actions that could grant an advantage in terms of income or costs. It no longer concerns exclusively financial transfers. **Regulatory advantages** such as production quotas are also public aid. Price support measures for producers can also be considered as advantages. Furthermore, the **non-application or partial application of regulations** by the State constitutes a *de facto* advantage for parties that evade them[10].

Finally, economists define public incentives as the difference between observed price and the marginal social cost of production, meaning the cost including damage to society. This definition therefore takes into account the **"implicit subsidies"** resulting from failure by the tax system to internalise externalities (or the absence of property rights in the case of fishery or forest resources, for example). This broader approach matches the recommendations of the last 2009 TEEB report[11] when listing public incentives harming biodiversity.

The CAS working group uses a broad definition of public incentives harming biodiversity, which covers subsidies, tax credits, regulatory advantages, non-application or partial application of the regulations as well as implicit subsidies.

(8) European Commission (2011), Communication from the Commission to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions, *Our Life Insurance, our Natural Capital: An EU Biodiversity Strategy to 2020*, COM(2011) 244 final.

(9) *L'approche économique de la biodiversité et des services liés aux écosystèmes*, *op. cit.* This report shows how it is possible to estimate the monetary value of some services provided by several ecosystems within national territory, as well as the limits of this type of evaluation.

(10) As a result, in a ruling on "undersized fish" dated 12 July 2005, the European Court of Justice condemned France for failing to enforce measures controlling fishing activities, notably in terms of minimum fish size. France was subjected to a lump sum fine in the amount of 20 million euros and a semi-annual penalty payment of 57.8 million euros for failing to respect the minimum size of fish caught.

(11) TEEB (2009), *The Economics of Ecosystems and Biodiversity for National and International Policy Makers. Summary: Responding to the Value of Nature.*

THE FIVE MAIN CAUSES OF BIODIVERSITY LOSS

Studies published over the past two decades agree that the pressures leading to biodiversity decline, whether in France or on a global scale, may be divided into five categories:

- destruction and degradation of habitats;
- overexploitation of renewable natural resources;
- pollution;
- climate change;
- exotic invasive species.

Revealing a hierarchy between these pressures is a delicate task, even though the main effects, in France, seem to result from denaturing of soils, urban sprawl, habitat fragmentation (construction of linear transportation infrastructures) and the partial denaturing of agricultural habitats (simplification of landscapes and intensification of production systems). Pollution remains an often visible pressure, notably due to the crises it entails (fish mortality, for example). It affects all the elements (water, air, soil) and takes many forms (nitrates, pesticides, thermal waste, drug residues, etc.). Overexploitation basically affects fish, water and soil resources. So far, the impact of exotic invasive species on biodiversity has not been adequately explored, but it can be significant depending on the situation. Climate change appears to be a potentially major cause of biodiversity loss by acting on all of the balances at work in the various ecosystems. Finally, overall, the various pressures tend to reinforce each other: an ecosystem weakened by an existing pressure is generally less capable of resisting another (see box).

The harmful nature of public incentives is established once it increases one or several of these five pressures. The causal relation between a form of public incentives and the state of biodiversity is, however, sometimes difficult to demonstrate because the links are often ambivalent or indirect.

The increasing scarcity of the Great Hamster of Alsace

Considered a pest until 1993, the Great Hamster of Alsace is now in a critical situation and could permanently disappear from Alsace's natural landscape. This species is protected by the Bern Convention, dated 19 September 1979, and Habitats Directive 92/43/CEE. Beyond the species' intrinsic value, maintaining the population of Great Hamsters of Alsace "preserves an ecosystem of great ecological richness, which contributes to the overall potential for biodiversity of a significant part of the Alsatian region" (Balland report[12], 2007).

The European Commission has brought a lawsuit against France that ended in a ruling by the European Court of Justice (ECJ) on 9 June 2011, in which the court ruled that measures implemented in France, as of 5 August 2008, to protect the Great Hamster in Alsace were insufficient to ensure rigorous protection of the species.

If this is not rectified, the amount of the penalties will be decided on referral to the court under Article 260 of the Treaty on the Functioning of the European Union. A combination of three types of pressures is being exerted on the populations of the Great Hamsters of Alsace: **change in agricultural practices**, with a sharp increase in corn-growing surfaces to the detriment of common wheat, rape and barley in the 1989-2007 period; **fragmentation of habitats by the construction of road infrastructures**; and **accelerated urban sprawl**, with developed surface area in Alsace increasing by 800 to 1,000 ha[13]/year.

Among these factors, the ECJ emphasised that the expansion of corn cultivation and of urbanisation were behind the Great Hamster's decline.

PROPOSALS FOR REFORMING HARMFUL PUBLIC INCENTIVES

Given the extent and complexity of its mandate, only some proposals considered by the CAS working group are presented below. However, the members of the group are fully aware that, for other reasons, it may be decided to maintain, in the short term, public incentives identified as potentially harmful to biodiversity, and that some of these

(12) Ministère de l'Écologie et du Développement durable (2007), Plan de sauvetage du grand Hamster d'Alsace Cricetus cricetus, rapport, Pierre Balland, Inspection générale de l'Environnement, 16E/07/011, 74 p.

(13) Hectare.

incentives may positively affect other environmental aspects, or even were introduced with this goal.

PROPOSAL 1

A reduction in tax credits that encourage urban sprawl.

Urban sprawl, in the broad sense of the term, has two characteristics: low-density urbanisation, often in peripheral areas, and the under-use of already-developed city space. The spread of developed areas leads to a loss of natural habitats and often a loss of "resources", when it occurs to the detriment of the richest ecosystems in terms of biodiversity(14). It is generally irreversible. Furthermore, when it is accompanied by sealing of the soil's surface (roads, parking lots, etc.), it increases water pollution and seepage, thus contributing to a rise in water levels, increased risk of flooding and accelerating erosion. Finally, loose urban sprawl and the peripheral location of areas of activity also indirectly harm biodiversity(15) through the movement they cause, which entails the construction of new infrastructures and additional emissions of CO_2 and other pollutants.

The increased denaturing of soil in mainland France was estimated by the Teruti-LuCSA inquiry to 75,000 ha per year in 2006-2008. Areas reserved for housing (including yards) represent approximately 45% of artificialized areas. About 22% are dedicated to road networks. As shown in table 1, between 1993 and 2008 paved ground (without buildings) spread the most quickly out of all artificialized surfaces. Agricultural surfaces decreased while wooded surfaces seemed to remain the same.

This type of pressure is increased by tax provisions applied to new housing (for example, the interest-free new housing loan (PTZ), Scellier plan and other rental investment schemes for new housing), the construction of hangars and warehouses (for example, the development tax allowance), the creation of offices in Île-de-France (e.g. exemption from licensing fees for offices under 1,000 m^2, a 65% reduction in these fees for commercial spaces and 85% for storage spaces) or by the fact that peripheral urbanisation does neither pay the price of its collective facilities nor the externalities it causes.

(Mainland) France	1993	2000	2008
Total area (in thousands of ha)	54,919	54,919	54,919
Total developed area (in thousands of ha)	3,869	4,301	5,145
Land with buildings in developed areas	24.8%	24.6%	15.8%
Paved or stabilised land in developed areas	40.2%	39.2%	44.4%
Other developed spaces in developed areas	35.0%	36.2%	39.8%
Total	100%	100%	100%

Source: Annual Teruti-LuCSA Inquiry.

One way to alleviate this phenomenon would be to **adapt taxation based on the geographic location of new construction (particularly by refocusing tax advantages on inner urban areas)**. This could lead, for example, to favour housing located within cities for the PTZ+, or to define a finer geographic network that distinguishes empty spaces within cities and zones served by public transit, to implement the Scellier plan and other rental investment schemes for new construction.

The tax on commercial spaces (TASCOM), which currently has a schedule based on sales alone, without taking geographic location into account, can also be modified: the schedule's one-size-fits-all approach gives an advantage to peripheral locations, where land is less expensive, and doesn't provide an incentive for recognising external costs generated by this type of location. Therefore, the CAS working group suggests that the tax on premises located in outlying areas be definitely raised, while the

(14) Moreover, between 2000 and 2006, over a third of developed agricultural areas in mainland France was land with the best agronomic potential (source: CGDD-SOeS (2011), "L'artificialisation des sols s'opère aux dépens des terres agricoles", *Le Point sur*, Issue 75).

(15) CGDD (2009), "Dépenses de carburant automobile des ménages: relations avec la zone de résidence et impacts redistributifs potentiels d'une fiscalité incitative", Études et documents, June.

one on premises in urban centres be lowered, in order to provide an incentive for mixed cities and limiting urban sprawl.

In very specific cases (public incentives overlap on the same project, high profitability of a sector, end of the situation that caused the incentives to be created, etc.), it may be appropriate **to eliminate certain tax credits**. This could include (1) the possibility offered to regional and local authorities of exempting 50% of the development tax for individual homes built in sparsely populated areas and partially financed by the PTZ+, or even (2) the 50% deduction of the value per square metre on which the tax amount for hangars and warehouses is calculated and (3) the possibility offered to districts or inter-municipal bodies to exempt low-density payments for logistical areas, warehouses and hangars.

PROPOSAL 2

Take into account the negative effects of transportation infrastructure on biodiversity, both when they are built and when they are used.

In general, recognising damage to biodiversity should follow the "prevent, mitigate and compensate" sequence stated in the 10 July 1976 law, then reaffirmed in *The Grenelle de l'environnement II*. As preventing damage is better than repairing it, priority must be given to prevention and mitigation measures.

Based on this logic, **public financing of rail and road infrastructures should preferably be directed towards updating existing transportation networks** rather than developing new facilities.

When building new facilities, the priority must be **to mitigate negative effects on biodiversity**. If not possible, **damages to biodiversity should be internalised** by distinguishing those linked to building infrastructure from those linked to usage.

Damages linked to infrastructures are caused by soil denaturing and sealing, and the fragmentation of natural space[16]. The contracting authority is the cause of these damages and not internalising them could be interpreted, in fact, as a subsidy harming biodiversity. Internalising these effects could take the form of a tax recognising (even partially) the estimated costs of the various impacts on biodiversity.

Damages linked to the use of infrastructure affect neighbouring habitats, flora and fauna through pollution or noise emitted by vehicles. Aquatic environments could also be affected by run-off flows being changed, pollutants deposited on sealed soil surfaces being transported by water or their atmospheric fallout. Direct collisions with big-game and insects also belong to this category.

Since these damages are caused by users, it seems reasonable that they bear the cost, and not the contracting authority (which could be the State and therefore the taxpayer), particularly since the impact varies depending on the type of engine, of car and therefore the user's choice of equipment. In France, these externalities are not currently taken into account, neither by the axle tax, nor by the forthcoming eco-tax on heavy goods vehicle, nor when buying a vehicle, nor by tolls and fuel taxes. For highways, reform should **include the cost of damage to biodiversity in tolls**[17].

Furthermore, as expressed through the preferences outlined by the Boiteux report[18] and, most recently, the Gollier report[19], **the monetary values used in socio-economic assessments of infrastructure projects could be revised to include, even partially, the costs/benefits related to biodiversity**.

(16) Infrastructures for transportation could split up ecosystems when it is impassable because of security barriers, screens or heavy traffic.

(17) This solution would involve a new reform of the Eurovignette directive for heavy goods.

(18) Commissariat général du Plan (2001), *Transports: choix des investissements et coût des nuisances*, report from the working group chaired by Marcel Boiteux, Paris, La Documentation Française.

(19) Centre d'analyse stratégique (2011), *Le calcul du risque dans les investissements publics*, report from the working group chaired by Christian Gollier, Rapports et Documents, Issue 36, Paris, La Documentation française. http://www.strategie.gouv.fr.

PROPOSAL 3

Charge a truly effective tax on water pollution caused by industrial wastes, taking into account their effects on biodiversity.

The principle behind truly effective taxes is illustrated using the example of contamination of water by micropollutants, polluting substances that can have an effect even at very low doses. This same principle may also be applied to domestic and agricultural water pollution.

The 2000/60/EC directive of 23 October 2000 establishes a framework for a common water policy known as the Water Framework Directive (WFD), which aims to strengthen and improve protections for aquatic environments. From this perspective, it sets a goal for good water body status by 2015.

According to this directive, water is of "good status" when it unites both good ecological and chemical status. **"Ecological status"** is evaluated depending on parameters that are biological (for example, aquatic flora and fauna), hydrological (river continuity and flow) and morphological (depth, riverbed structure) and on more general parameters such as water temperature, salinity or even acidity. A water body's "chemical status" depends on concentrations of pollutants identified as priorities in relation to threshold levels. Furthermore, the text specifies that of these priority substances, 13 are particularly hazardous[20] and must be eliminated, at least progressively from waste by 2021 for the first 11, and by 2028 for the last two.

Assessment of the chemical status of French water bodies results in a wholly unsatisfying report: 21% of surface water bodies are of bad chemical status, while 34% are indetermined, 24% of heavily modified water bodies or artificial or semi-artificial water bodies (representing 7% of surface water bodies) are of bad chemical status, and 41% of groundwater bodies are not of good chemical status.

For industry, any party whose activities involve dumping at least one of the 11 pollutants[21] listed in Article 84 of Act 2006-1772 on water and aquatic environments, dated 30 December 2006, in natural environments, either directly or through a communal sanitation system, should pay a tax for non-domestic pollution. The maximum amount and threshold, below which the tax is not payable, is set for each of the 11 elements. This tax does not take into account the WFD's 13 priority hazardous substances. Furthermore, the applied rates are too low to work as an incentive to stop dumping and internalise damages caused to biodiversity. In fact, it constitutes an aquatic biodiversity-harming subsidy, which justifies revising it. It is therefore advisable **to refer to these 13 substances separately when calculating the tax and increasing the ceiling rates related to each of them**, in such a way as to recognise their costs to biodiversity.

PROPOSAL 4

Atmospheric emissions of heavy metals should be reduced by extending the tax on polluting activities to arsenic and selenium.

The tax on polluting activities *(TGAP)* aims to encourage industry to take into account environmental constraints in its production activities. In particular, it applies to industrial facilities emitting one or more of the 7 pollutants or groups of atmospheric pollutants[22] listed in the ministerial circular of 30 March 2011 related to the *TGAP*.

(20) Brominated diphenylethers, cadmium, chloroalkanes, hexachlorobenzene, hexachlorobutadiene, hexachlorocyclohexane, mercury, nonylphenols, pentachlorobenzene, polycyclic aromatic hydrocarbons (PAH), tributyltin components, anthracene and endosulfan.

(21) Suspended solids, chemical oxygen demand, biochemical oxygen demand, reduced nitrogen, oxidised nitrogen (nitrites and nitrates), total phosphorus (organic or mineral), toxic metals, acute toxicity, adsorbable organic halides on activated carbon, dissolved salts, heat.

(22) Sulphur oxides and other sulphur compounds (eq. SOx), nitrous oxide, nitrogen oxide and other nitrogen oxygenates except for nitrous oxide (eq. NOx), hydrochloric acid, non-methane hydrocarbons, solvents and other volatile organic compounds (eq. COVNM), and, since 1 January 2009, dust.

Heavy metals, which are essentially a product of industry, are not recognised among these pollutants. However, they can affect plants and animals in many ways that can result, for example, in lower growth or productivity (arsenic, cadmium, vanadium), chlorosis (nickel), reduced reproductive capabilities (chrome) or even neurological, digestive, cardiovascular or renal problems (mercury).

Heavy metal emissions have been greatly reduced since 1990, except for selenium, which is dropping more slowly. Selenium bio-accumulates in aquatic invertebrates and fish. It is also found in aquatic birds, and plants and soils(23). Arsenic emissions in particular have dropped a great deal(24). Nevertheless, this element is persistent and especially bio-accumulates in marine organisms. It is very toxic for algae, invertebrates and fish, as well as for land-dwelling organisms(25).

The effects of these two substances are of particular concern when they settle into the marine environment (France possesses the second largest maritime surface in the world and made it a priority during the Environment Round Table and the Round Table on the Sea). Therefore it seems appropriate to add arsenic and selenium to the TGAP as "pollutant emissions".

PROPOSAL 5

Boost the implementation of more effective taxes.

French tax law encompasses two main categories:

- taxes stemming from the law according to Article 34 of the Constitution;
- fees for services rendered and State fees.

State fees and those for services rendered are different from taxes in the sense that the sum claimed from users must cover the costs for a service or for establishing and maintaining a public work.

Furthermore, the current fee scheme suffers from several defects that entail undercharging for some natural resources and damages done to biodiversity. This undercharging therefore constitutes a type of subsidy harming biodiversity.

Fees do not always consider negative externalities caused by users. When the use of a service entails such externalities, economic theory suggests that their cost should be included in the user's invoice. In practice, this is possible when the administration that provides the service or makes the public work available also bears responsibility for correcting disturbances caused by them. Therefore the construction of noise barriers along highways could be included in the cost of investment passed on to the user through tolls. On the other hand, when expenses incurred to correct these negative externalities are the responsibility of a third organism, the criteria of the counterparty that establishes the fee scheme for services rendered prevents from corresponding costs being passed on to the user as a fee. In addition, the capping rule limits the potential for subjecting the user to a fee higher than the cost of the service in order to eventually recognise its eventual negative externalities.

Finally, neither State fees nor fees for services rendered currently include positive externalities or resulting ecosystem services. The government owns natural spaces(26) providing ecosystem services that will be influenced by its action. For example, the presence of mountain forests, their management by the ONF (National Forest Office), and the restoration of mountain territories above hydroelectric dams protect the river basins from erosion and minimise silt build-up in dams and their resultant costs. These actions also play a role in preventing avalanches. They probably lead to undercharging of State fees and therefore to a less-than-optimal management of the overall public assets and domain by the Government.

(23) INERIS (2009), *Sélénium et ses composés*, INERIS -DRC- 08-83451-01269A.doc.

(24) Arsenic emissions went down by 38% between 1990 and 2008 (Citepa, 2010 Secten report), which represents a significant drop, but less than for mercury (83%), lead (98%) or even zinc (90%).

(25) As demonstrated by tests carried out on composting worms *(Eisenia fetida)*, cotton plants *(Gossypium hirsutum)*, and soil micro-organisms (source: INERIS (2010), *Arsenic et ses dérivés inorganiques*, INERIS- DRC-09-103112-11453A).

(26) Public maritime domain, public rivers, national forests, lands allocated to the Conservatoire du littoral, etc.

As a result, it seems advisable to change the fee scheme to better recognise the negative impacts caused by users as well as positive effects resulting from good management of public services and assets. At first, this change could consist in:

- **relaxing the capping rule** in a way that will allow for finer adjustments;
- **reviewing State fee pricing** in order to make it more consistent and to take into account the effects on biodiversity;
- **allowing negative externalities to be recognised** in fees, even if the administration which supplies services is not responsible for alleviating disturbances caused by them.

In a second phase, compensation for services rendered could be extended to those provided by public ecosystems maintained in good condition by government action. This extension would enable a fee to be collected for the use of some of these services.

The same applies to fees collected by the government for the use or exclusive use of the public domain[27] (e.g., maritime domain such as beaches, undersea cables, etc.) They should be adjusted depending on the amount of damage to biodiversity in the seas, on the coasts or in the areas used. Furthermore, a similar form of taxation could be introduced beyond the 12-nautical-mile zone (which sets the boundary for public maritime domain) in the exclusive economic zone, or on the continental shelf for activities like the extractive industries.

In order to take biodiversity more into consideration when making any decision that could affect it, **the ways in which truly effective eco-taxes could be established more frequently should be carefully analyzed**, satisfying conditions in compliance with the Constitution and legal principles, especially equality before taxation.

CONCLUSION

The success of the Nagoya Conference a few days before the CAS working group was established granted increased legitimacy and relevance of the topics it had to study. Nevertheless, it highlighted that the adverse effects of harmful tax credits and public subsidies on biodiversity, and the environment in general, have been underestimated.

The CAS experts notice that recent assessments and current debates emphasize how important it is to evaluate public incentives in terms of greenhouse gas emissions, but not in terms of biodiversity, because doing so is perhaps less difficult on a methodological point of view. They recommend that greenhouse gases and biodiversity be given equal importance in upcoming environmental and economic assessments.

In 2009, the Pittsburgh G20 summit committed to rationalising and phasing out inefficient fossil fuel subsidies over the medium term. France, which holds the presidency of the G8 and G20 in 2011, could launch a similar initiative for subsidies harming biodiversity at the Cannes G20 summit by the end of the year. It would only reinforce the importance that should be given to the protection of biodiversity. Such an initiative offers several advantages: it would help implementing the Nagoya action plan, encourage an alignment of public policies, be adapted to shortcuts in public spendings decided by many governments, and contribute to establish an international governance for biodiversity, a global public asset.

October 2011
No 246
LA NOTE DE SYNTHÈSE

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(27) In accordance with Articles L. 2125-1 and the General code on public property (CGPPP).

“Les aides publiques dommageables à la biodiversité ”
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Centre d’analyse stratégique

Note de synthèse No 246 -
October 2011, is a publication
of the Centre d’analyse stratégique
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Chief Editor:
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Deputy Director general
Printer:
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