Interreg Atlantic Area
European Regional Development Fund
EUROPEAN UNION

Improving the management of ATLANTIC LANDSCAPES: accounting for biodiversity and ecosystem services

ALICE

# SOCIO-ECONOMIC DYNAMICS

## Fact Sheet

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There is a growing recognition of the various ways humans benefit from the environment and the potential for Blue-Green Infrastructure Networks (BGINs) to enhance human welfare. Restoring ecosystems and promoting the interconnectedness of ecosystems (habitats and water bodies) within the landscape, offers an alternative approach to engineered solutions. The concept of ecosystem services enables the multiple contributions of the environment to human well-being to be identified.

### Economic valuation of BGINs and their benefits to society

Through the accurate identification of both the benefits of ecosystem services to human well-being and the costs of ensuring their continued delivery, appropriate allocation of resources for BGINs can be achieved. However, in many cases, the identification of these costs and benefits is challenging. This is especially the case on the benefits side. An understanding of both the market benefits and the non-market benefits derived from ecosystem services is required. Market benefits come from the market activities which are based on ecosystem services, which include; production and sale of foods, sale of timber, etc. The non-market benefits are much more complex and often require extrapolation from market activities or direct responses from consumers. These non-market benefits include the cultural services provided by ecosystem services but also regulating services such as the value of clean water and breathable air.

As demonstrated in the BGIN Ecosystem Service Benefit Framework **(Figure 1)**, identifying and accounting for the value of the benefits society receives from BGINs will influence the behaviour of both firms and industries which will have feedback effects on the management of the networks.

To value the non-market benefits a host of economic techniques can be employed, using either revealed or stated preference data. Revealed preference data uses the value of market activities to infer the benefits derived from market activities. For instance, one may infer that the value of a trip to some cultural sites by calculating the cost of the trip. Stated preference techniques ask directly the value a person places on some service provided by the natural environment. The latter method may be much more applicable to potential ecosystem service providing infrastructures like BGINs.

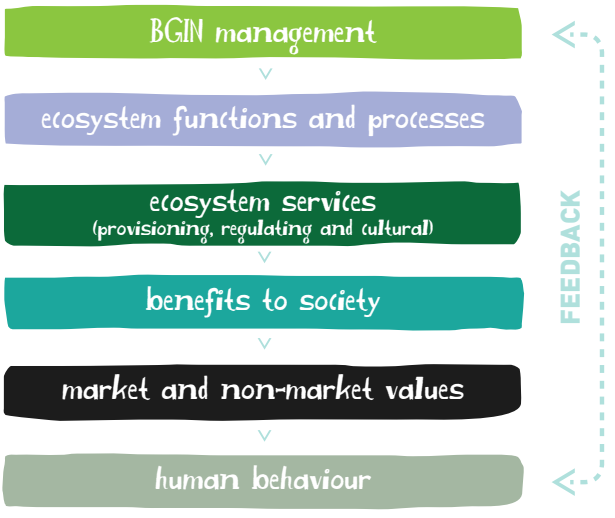


**Figure 1.** BGIN Ecosystem Service Benefit Framework. Adapted from Hanley et al. (2015)

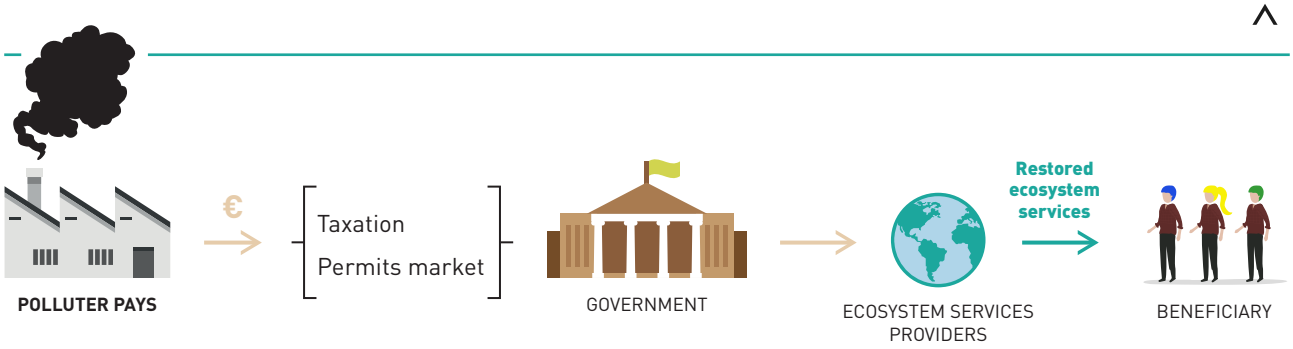


**Figure 2.** Polluter Pays.

## Financing BGIN development

Valuation provides a valuable insight into the resources that should be allocated to the enhancement of the natural environment through BGINs. However, financing is needed to produce such networks. There are a multitude of sources from which finance could potentially flow. Generally, these sources either work on the polluter pays principle or beneficiary pays principle. Although, a third source using legislative tools in the urban and pre-urban environment has recently also been adopted.

The **polluter pays (Figure 2)** principle requires that those causing loss to human well-being through their impact on the natural environment pay for its restoration. This may be through taxation or a market that sells permits, such as emission trading of greenhouse gases by the European Union. These taxes, or the taxes generated from the sale of permits, can be then used to finance environmental projects. These financing methods also has the added benefit of causing a reduction in the damage as the responsible companies or individuals are forced to internalise the external cost of their activities.

The **beneficiary pays (Figure 3)** principle requires that those who benefit from the ecosystem service pay for it. In most cases these services are paid for indirectly through taxation but could be paid directly from the beneficiary to the provider. In addition to payments through taxation, charities and crowdfunding are also readily used.

A third and growing method of financing delivery of BGINs is to stipulate, through legislation **(Figure 4)**, that those wishing to develop new urban and pre-urban areas must first develop BGINs before any commercial or residential developments commence. Governing bodies that use this approach might offer an expedited development application process to potential developers, to encourage them to participate in these programmes.

Predominantly, at least in non-urban areas, enhancement of a natural environment requires a payment to be given to landowners. These payments for ecosystem services can be seen in many agri-environmental schemes, where farmers are paid to use more environmentally friendly actions as well as afforestation programmes where monies are paid to landowners to grow forestry. These programmes aim to incentivise ecosystem service providers to produce services that benefit society when normal market forces would result in less beneficial outcomes.

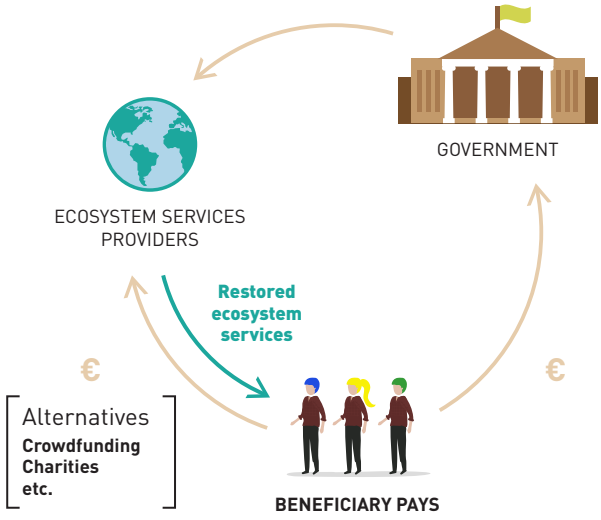


**Figure 3.** Beneficiary Pays

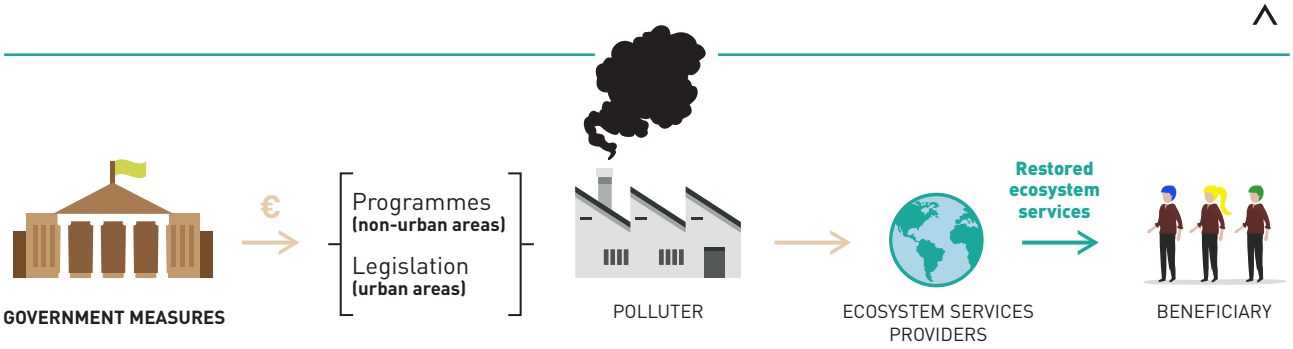


**Figure 4.** BGINs delivery financing methods.

## Barriers to BGIN development

Many barriers face those who aim to enhance the environment through policy, infrastructure and management. These barriers may fall into one of three categories: bio-physical, socio-political and acceptance.

Bio-physical barriers relate to both what can be done and how efficient it will be. Efficiency is predicated, not only on the capacity of an area to produce ecosystem services, but also on the risk factors associated with development in an area (the consequences of flooding in one area may be more costly than flooding in another) and the cost of implementing a project in an area. Bio-physical barriers should be approach using an adaptive strategy which use spatial targeting to weigh the cost and benefits of a project for any given area.

Socio-political barriers for transdisciplinary projects like a BGIN, include problems with leadership, long-term planning and the different managerial bodies not cooperating and coordination together. These barriers often present as stumbling blocks, which impede the initial stages of BGINs. In many recent case studies, researchers have been advocating for better education of the managerial stakeholders of ecosystem services providing structures. Strong leadership with well-defined roles can also help in the implementation of BGINs.

Acceptance, particularly for programmes that involve payments for ecosystem services, can be a hindrance to an otherwise beneficial project. The main reason for a landowner not voluntarily entering payment for ecosystem services (PES) programmes is that the monies offered are lower than the perceived value of the land to its owner. In these cases, a reduction in transaction costs, i.e. cost incurred from valuing the service and negotiating contracts may be beneficial.

By reducing these transaction costs more of the available funds can be allocated to landowners. There may also be non-monetary reasons for non-acceptance. These issues can be much trickier to deal with as one may have to weigh the benefits of one group against the rights, values and benefits of another.

## The ALICE project

The ALICE project will produce a framework which will allows those agents who wish to provide ecosystem provisioning programmes to identify and overcome the numerous barriers which they may face. This framework, once employed, will allow a more seamless transition towards BGINs through, not only a mapping of barriers to incentives/mitigation techniques, but also by a reduction in transaction costs which should, in turn, make more projects financially viable. The ALICE project will also interview managerial stakeholders in each of the four case study areas, about the barriers faced in different geographic and cultural regions. This will feed back into the framework development to assess the viability of one framework for many regions.

Valuation studies will also be conducted to determine the value resident stakeholders place on investing in BGIN as a method of flood risk mitigation. In these valuation studies, a spilt sample method will be employed to compare residents' preferences for BGIN or grey infrastructure to mitigate flood risk. This will provide evidence on the importance of integrated ecosystem services to the public in a situation where both methods, BGIN and Grey, ostensibly perform the same primary task of managing flood risk. In another study area, the valuation study will focus on residents' preferences for improving connectivity between ecosystems and reducing pressures to improve ecological functions and biodiversity.

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