



GREEN INFRASTRUCTURE IMPLEMENTATION AND EFFICIENCY

ENV.B.2/SER/2010/0059

Annex IV: Benefit Groups

22 December 2011

Institute for European Environmental Policy

Together with:

Ecologic Institute, Germany

GHK, United Kingdom

Syzygy, Netherlands

TAU Consultora Ambiental, S.L, Spain

University of Antwerp, Belgium

VITO, Belgium



Institute for European Environmental Policy (IEEP)

London office:

15 Queen Anne's Gate
London SW1H 9BU, UK
United Kingdom

Brussels Office:

Quai au Foin, 55
Hooikaai 55
1000 Brussels
Belgium

Contact persons:

Graham Tucker (Project director)

Direct tel.: +44 (0)20 7340 2688
Fax: +44 (0)20 7799 2600
Email: gtucker@ieep.eu

Leonardo Mazza (Project coordinator)

Direct tel.: +32 (0) 2 738 74 77
Fax: +32 (0)2 732 40 04
Email: lmazza@ieep.eu

1 OVERVIEW OF KEY GREEN INFRASTRUCTURE BENEFIT GROUPS, SERVICES AND FUNCTIONS WHICH SUPPORT THE PROVISION OF RELATED BENEFITS

Benefits Group	Green Infrastructure services/function	Quantitative Benefits	Monetary Benefits
Natural Resources (e.g. cereal crops, vegetables, livestock, food, timber, natural medicines. local breed varieties; fruit and juices from orchards)	Capacity to provide a diversified portfolio of products <ul style="list-style-type: none"> • Forests for wood supply • Total area of cropland/grassland suitable for livestock • Total area of low input cropland 	<ul style="list-style-type: none"> • Production in tonnes, m³ and/or hectares • Quantity of certified products • Number of wild species used as food/ornamental resources etc. • Employment sustained by sectors 	<ul style="list-style-type: none"> • Market value of products
	Maintenance of soil fertility <ul style="list-style-type: none"> • Soil carbon content • Species composition, aggregated in functional groups (eg biomass of decomposers, proportion of different trophic groups) as an indicator of process capability 	<ul style="list-style-type: none"> • Increased yield attributable to soil quality 	<ul style="list-style-type: none"> • Market value of contribution to production
	Biological Control <ul style="list-style-type: none"> • Abundance and species richness of biological control agents (eg predators, insects, etc.) • Changes in disease burden as a result of changing ecosystems • Range of biological control agents (eg in km, regular/aggregated/random, per species) 	<ul style="list-style-type: none"> • Increased yield attributable to biological control 	<ul style="list-style-type: none"> • Market value of contribution to production
	Pollination <ul style="list-style-type: none"> • Abundance and species richness of wild pollinators • Range of wild pollinators (eg in km, regular/aggregated/random, per species) • Proximity to natural habitat 	<ul style="list-style-type: none"> • Increased yield attributable to pollination 	<ul style="list-style-type: none"> • Market value of contribution to production
	Storage of freshwater resources <ul style="list-style-type: none"> • Groundwater recharge • Total area of inland water bodies and inland wetlands 	<ul style="list-style-type: none"> • Population served by renewable water resource • Total annual freshwater consumption by sector 	
Water management (e.g. natural drainage, irrigation and drought prevention, water purification)	Regulation of water flows <ul style="list-style-type: none"> • Water infiltration capacity/rate • Water storage capacity in mm/m • Floodplain water storage capacity in mm/m 	<ul style="list-style-type: none"> • Deprived households at risk from flooding • Reduced surface water run-off 	<ul style="list-style-type: none"> • Avoided costs of property damage • Avoided costs of grey infrastructure (e.g. dam construction)
	Water purification <ul style="list-style-type: none"> • Water quality in aquatic ecosystems (sediment, turbidity, phosphorous, nutrients, etc.) • Biological indicators: eg Index of Biological Integrity, • Nitrogen retention • Nitrogen removal 	<ul style="list-style-type: none"> • Population served by high water quality 	<ul style="list-style-type: none"> • Reduced waste water treatment costs for domestic and commercial users
Climate regulation and adaptation	Carbon storage and sequestration <ul style="list-style-type: none"> • Total amount of carbon sequestered / stored =sequestration / storage capacity per hectare x total area (Gt CO₂) 	<ul style="list-style-type: none"> • Total amount of carbon removed and contribution to the achievement of climate change targets 	<ul style="list-style-type: none"> • Price of non-traded/traded carbon
	Temperature control <ul style="list-style-type: none"> • Evapotranspiration rate • Canopy stomatal conductance 	<ul style="list-style-type: none"> • Reduced peak summer surface temperatures • Building energy savings – heating and cooling 	<ul style="list-style-type: none"> • Building cost savings – heating and cooling

	Storm damage control <ul style="list-style-type: none"> Wind attenuation potential 	<ul style="list-style-type: none"> Deprived households at risk from storm damage Deprived land at risk from storm damage 	<ul style="list-style-type: none"> Avoided costs of property damage Avoided costs of damage to natural resource production
Health and well-being	Air quality <ul style="list-style-type: none"> Atmospheric cleansing capacity in tonnes of pollutants removed per hectare Downward pollutant flux, calculated as the product of dry deposition velocity and pollutant concentration 	<ul style="list-style-type: none"> Total amount of pollutants removed and contribution to air quality targets 	<ul style="list-style-type: none"> Reduced mortality from reduced respiratory illnesses Avoided cost of air pollution control measures
	Accessibility for exercise and amenity: <ul style="list-style-type: none"> Reduced stress levels and improving mental health Increased physical activities 	<ul style="list-style-type: none"> Human health impacts expressed in disability adjusted life years (DALY = years of life lost + years lived with disability) 	<ul style="list-style-type: none"> Health care savings from e.g. reduced obesity, cardiovascular diseases Avoided indirect costs, such as earnings lost due to inability to work
	Noise regulation Natural sound absorption capacity	<ul style="list-style-type: none"> Persons/year where defined threshold in dB is not exceeded due to natural sound absorbers 	<ul style="list-style-type: none"> Health care savings from e.g. reduced cardiovascular diseases
Investment and Employment	Image enhancement Scenery, amenity, environmental quality	<ul style="list-style-type: none"> Perception surveys on the attractiveness of an area for workers/investors Number of products whose branding relates to cultural identity 	<ul style="list-style-type: none"> Direct spending on branded local and regional products Indirect and induced effects resulting from supplier and employee expenditures (GVA)
	Investment and Employment Employment resulting from green infrastructure initiatives	<ul style="list-style-type: none"> Temporary employment impacts of green infrastructure provision On-going employment impacts of maintenance Summary of employment sustained by sectors (e.g. agriculture, forestry, tourism and recreation) 	<ul style="list-style-type: none"> Effects on wider economy (tourism, inward investment – value of investment and expenditure, effect on GVA)
	Labour productivity Scenery, amenity, environmental quality <ul style="list-style-type: none"> Amount of workplace individuals benefiting from GI investment or existing GI 	<ul style="list-style-type: none"> Impact on worker's effectiveness on the job 	<ul style="list-style-type: none"> Savings from reduced short-term absenteeism from work
Tourism and recreation	Tourism Scenery, amenity, environmental quality, products, flagship species and habitats	<ul style="list-style-type: none"> Employment supported by tourism Amount of nature tourism Number of visitors to protected sites per year 	<ul style="list-style-type: none"> Tourism expenditure Expenditures for wildlife watching Travel costs
	Recreation Exercise, scenery, amenity	<ul style="list-style-type: none"> Number of local users for hiking, camping, nature walks jogging, winter sports, water sports, angling, horse riding, hunting, cycling 	<ul style="list-style-type: none"> License fees for hunting and angling Indirect and induced effects resulting from expenditure Willingness to pay/accept access fees (consumer surplus)
Education	Research and education Flagship species and habitats, endemic species	<ul style="list-style-type: none"> Total number of visits, specifically related to education or cultural reasons Total number of educational excursions Number of TV programmes, studies, books etc. featuring sites and the surrounding area 	

Land and property values	Land and property Exercise, scenery, amenity	<ul style="list-style-type: none"> Changes in the number of residents 	<ul style="list-style-type: none"> Residential land and property value uplift (<450m from green space) Commercial land/property value uplift
Resilience	Resilience Ecosystem Services defined by a wider portfolio of services provided, with particularly emphasis on regulating and supporting services	<ul style="list-style-type: none"> Scoring according to portfolio of services and functions provided 	<ul style="list-style-type: none"> Option value defined by stated preference methods
Conservation benefits	Existence value of habitat, species and genetic diversity		<ul style="list-style-type: none"> Stated preference methods
	Bequest and altruist value of habitat, species and genetic diversity for future generations		<ul style="list-style-type: none"> Stated preference methods

Source: adapted from Genecon LLP 2010