



INHERIT
Health | Equity | Environment

Cost-benefit evaluations: approaches and effects

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- Economic assessment of behaviour-change related health interventions
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Social cost-benefit analysis

- Why a CBA is needed?

To improve the understanding of social costs and benefits of interventions with a societal impact and evaluate if benefits exceed costs of implementation

To evaluate the trade-offs and synergies between alternative interventions or cross-sectoral measures

- How CBA can contribute?

The results from the CBA can be used to set up policy priorities and identify objectives that incorporates the interests of different stakeholders and different population groups

CBA metrics

Net Present Value

$$NPV = \sum_{t=0}^n \left[\frac{B_t}{(1+d)^t} \right] - \sum_{t=0}^n \left[\frac{C_t}{(1+d)^t} \right]$$

Cost-Benefit Ratio

$$CBR = \frac{\sum_0^n B_t}{\sum_0^n C_t}$$

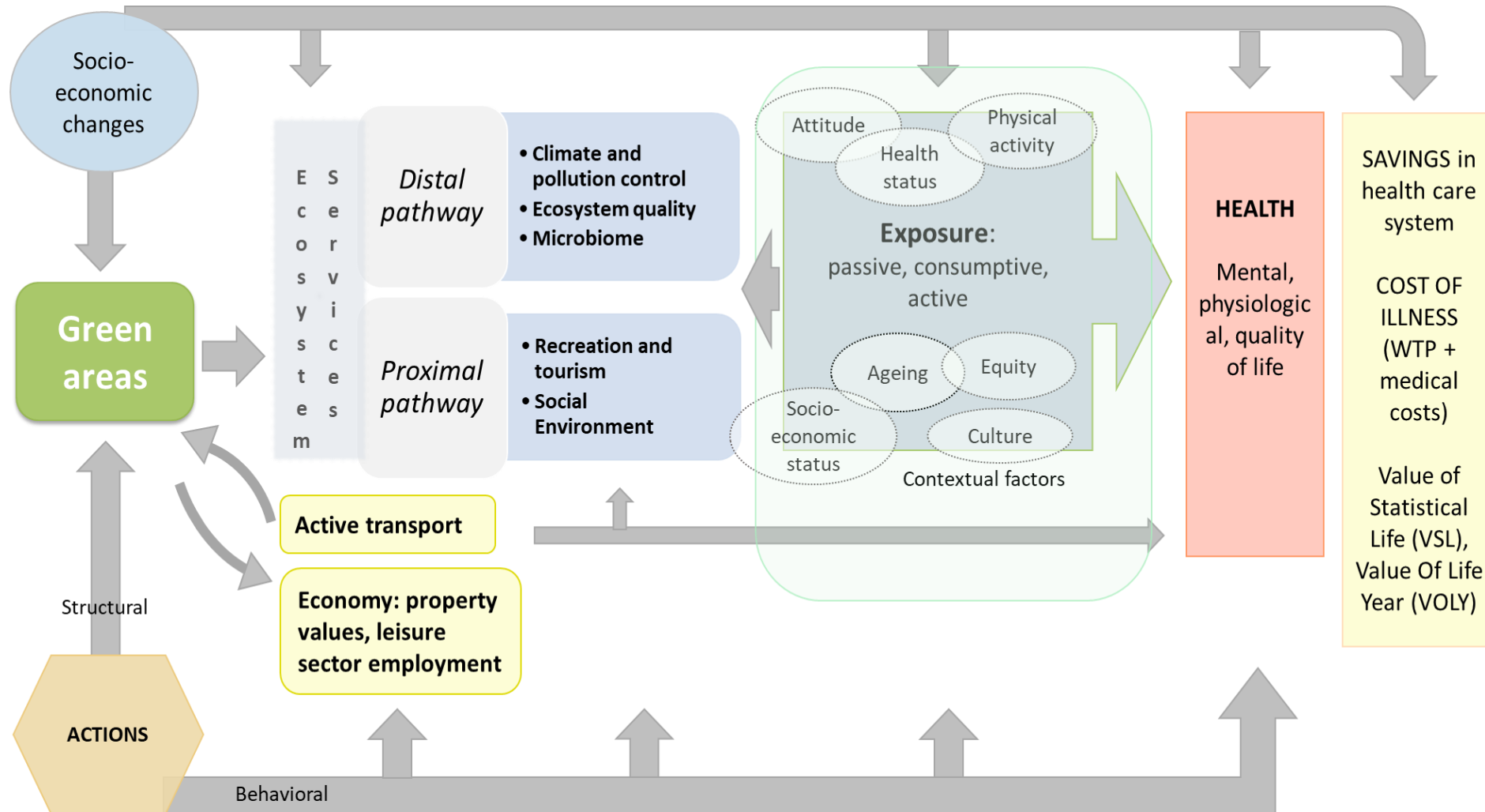
Expected outcome: estimate and compare the net benefits of different pathways under different scenarios (including future projections)

- NPV or BCR by scenario
- NPV or BCR in different time scales

Case study on green area: Thinking Fadura (Basque Country, Spain)

- To design a new public space to promote healthier and more sustainable lifestyles by inclusive access to natural park through a combination of nature-based solutions with sporting facilities
- Opening the park area (where sporting facilities are located) to the general public
- Multiple programs: restructuring the park with new elements to improve access, motivate physical activity, guarantee safety, environmental quality, protect river + promotional activities
- Inclusive participatory process involving affected groups to generate equal opportunities and promote access for all, with special attention to vulnerable groups
- A public space for diversity, equity and positive interactions

Conceptual framework Thinking Fadura - link with BeDPSEEA



Operationalising BeDPSEEA for evaluation

Costs	Environmental benefits	Health benefits	Social benefits	Economy	Non-market values
<ul style="list-style-type: none">• Landscape design and definition of services• Analysis-diagnosis of sporting facilities and surroundings• Proposal for design in collaborative format• Diagnosis by general public• Project execution• Public participation process and continuity in future• Opportunity costs	<ul style="list-style-type: none">• Reduced CO₂ emissions• Reduced air pollution• Buffer extreme temperatures• Reduced noise pollution• Reduced soil pollution• Water retention• Biodiversity and effects on the river and wetland	<ul style="list-style-type: none">• Increase life expectancy• Reduced mortality risk• Reduced risk of diseases• Mental health improvements• Quality of life and wellbeing• Risks for health:<ul style="list-style-type: none">• Allergies and VBD• Temporal noise pollution• Temporal impact on traffic	<ul style="list-style-type: none">• Equity• Child and elderly welfare• Social connectivity and cohesion• Knowledge and education (awareness)	<ul style="list-style-type: none">• Increased active transport (fuel savings)• Increasing property values• Increased employment in leisure and sporting sector• Risks<ul style="list-style-type: none">• Temporal impact on traffic	<ul style="list-style-type: none">• Recreation and amenity (use value)• Option value• Existence value (intangible or non-use)

Benefit indicators for CBA: health

Group of Indicators	Potential benefits	Indicator	Physical unit	Monetary unit	Justification	Data source
Health	Longer lives	Life expectancy, reduced mortality risks (all cause).	Reduced mortality risk	VSL, VOLY	Expected reduced mortality due to improved quality of life and reduction in disease occurrence.	Literature review on health impacts, use of previous meta-analysis, survey for self-data reporting on health (qualitative).
	Healthier lives	Risks for predefined health outcomes (direct benefits from exposure + indirect benefits from heatwaves and air pollution reduction)	RR, DALY, QALY, and Qualitative indicators	VOLY, Cost of Illness, costs savings in health care systems	Due to more people can use the green areas. Extreme temperature reduction in surrounding areas (UHI). Variation in expected exposure.	
	Mental health improvements (e.g. stress)	Risk (objective) and qualitative indicators (subjective)	DALY, QALY, and Qualitative indicators	VOLY	Provision of a place to relax, to escape, nicer view and if people involved in maintaining the garden a sense of achievement.	
	Well-being	Well-being index, etc.	Well-being index (unit-less)	€ per marginal change in the index	Improved well-being.	
Risks for health	Allergies and other diseases related to a higher exposure to green areas	Risk for predefined health outcomes	RR, DALY, QALY	VSL/VOLY/Cost of illness	Additional risks for other diseases	Literature review on health impacts, use of previous meta-analysis, survey for self-data reporting on health (qualitative).
	Temporal noise pollution	Measuring noise pollution during construction works	RR, DALY, QALY	VSL/VOLY/Cost of illness	Additional risks temporary	Stakeholder workshop, survey for self-data reporting on health.
	Impact on the traffic during the construction work	Measuring Impact on the traffic during construction works	RR, DALY, QALY	VSL/VOLY/Cost of illness	Additional risks temporary	

CBA scenarios for behavior-change related health intervention

Multiple interacting drivers:
demographical, socio-economic,
cultural, technological, political-
legal

Emphasis on environmental
policies and behavioural changes



Expected outcome: assess the net benefits of **behaviour-change related health interventions** under different scenarios (socio-economic, demographic, technological changes...)

Critical issues for evaluation

- Valuation of health benefits and indicators for health
 - New health endpoints (mental health and wellbeing)
 - Physical and economic metrics (QALY, DALY, VSL, VOLY, WTP, Cost of Illness...)
 - Synergetic effects on health instead of isolated stressors
- Effectiveness of intervention
 - Structural (accessibility, facilities, safety) and non-structural interventions (information and promotion)
 - Health benefits will depend on the drivers of change and people attitudes and perception (changing habits driven by psychological attitudes, social acceptability, imitative behaviour, feeling of being part of the group.....)
- Exposure
 - Different levels of involvement (passive, consumptive, active)
 - Metrics

Critical issues for evaluation (con't)

- Persistence of health benefits
 - Setting able to promote continuous and long-term behavioral changes
 - How to disentangle preferences about the timing of benefits (current generation versus future generations)
 - Discounting future benefits discourages sustainability
 - High discount = lower future benefits ... but major costs are in short term, while benefits expected more in the middle and long term
- Equity aspects (environmental justice)
 - Poor accessibility of healthy lifestyle to disadvantaged groups
 - Access to green areas is often highly stratified based on income, ethno-racial factors, age, gender, disabilities.
 - Problems of safety in low-income settings

Critical issues for evaluation (con't)

- Paternalism vs empowerment
 - Systematic evidence suggesting that individual preferences lead to suboptimal decisions (normative attitudes)
 - Empowerment requiring collaboration of people who actively participate to the process of change
- Data transfer
 - Applying data developed in one setting to a distinct alternative setting (epidemiologic or economic data)
 - Generalizable indicators for assessing viability of interventions
 - Health risk modelling (study heterogeneity: method, health outcome, exposure)
- Double counting
 - WTP for amenity and aesthetic vs WTP/VOLY for mental health...
 - Pricing CO2 emissions reduction includes many benefits...

Conclusions: decision making perspective

- Under societal perspective, all benefits and costs should be included (avoiding double counting)
- Policy makers more interested to benefits having immediate economic impact (e.g. medical costs saved), less on non-economic and delayed effects
- Disaggregated by beneficiaries and affected groups (general pop, deprived groups, health sector, government, private sector) and time period
- Several *CBA* ratios can reflect a range of predefined viewpoints (e.g. health sector, industry, consumer, society) for decision making
- Sensitivity analysis, different discount rates including zero rate