Protocol: Co-production of NbS–health definitions, conceptual framework and causal pathways

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EUROPEAN COOPERATION IN SCIENCE & TECHNOLOGY

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Within COST Action CA23133, a series of four thematic workshops was organised to support the co-production of a shared conceptual understanding of the relationships between nature-based solutions (NbS), biodiversity, ecosystem functioning and human health. The workshops brought together interdisciplinary perspectives to inform the development of harmonised definitions and an integrated conceptual framework, as well as the identification of causal pathways linking NbS interventions to health outcomes.

The co-production process was structured around four workshops:

1 WG1 NbS–Health Impact Assessment Workshop

24 April 2025

Focused on ideation of conceptual and methodological approaches to assessing the health impacts of NbS, including relevant health outcomes, ecological and environmental determinants, potential benefits and risks, and knowledge gaps in existing assessment approaches.

2 WG1 Co-production Workshop

2 September 2025

Addressed developing shared definitions and terminology, conceptualising NbS–health relationships, and identifying key components and causal pathways for an integrated conceptual framework. The agreed definitions were then organised into a conceptual NbS-health framework and an associated health impact matrix. The framework articulates intervention domains including urban green and blue space, restoration, sustainable water and vector habitat management and climate adaptation measures, the mediating pathways, and the resulting physical, mental and social health outcomes. The impact matrix operationalises this structure by relating intervention types to health outcomes and pathway dimensions in terms of expected direction, timing and distribution of effects across population groups.

3 WG1 Workshop on NbS–Socio-behavioural Interventions

22 September 2026

Explored the role of social and behavioural mechanisms in mediating NbS–health relationships, including nature engagement, physical activity, social interactions, accessibility and health equity. Focus was on how ecological interventions interact with socio-behavioural factors that influence health outcomes.

4 WG1 NbS Case Study Sites Workshop

28 September 2026

Focused on the application of the conceptual framework to NbS case study contexts, considering intervention characteristics, ecological and socio-economic conditions, relevant causal pathways and opportunities for identifying measurable indicators.

Across the workshops, the co-production approach integrated ecological, environmental, public health and social science perspectives. Discussions addressed the multidimensional nature of NbS–health relationships, potential positive and adverse health pathways, and the importance of contextual factors influencing intervention effectiveness. Health equity, differential vulnerability, and intergenerational justice were considered cross-cutting dimensions relevant to assessing NbS benefits and risks.

The workshops laid the groundwork for consolidating harmonised NbS–health terminology, an interdisciplinary conceptual framework, a causal pathway structure, and candidate indicators linking ecological interventions to environmental exposures, behavioural mechanisms, and health outcomes. The process also helped identify methodological and evidence gaps to inform subsequent research, indicator development, and the evaluation of NbS health impacts across diverse geographical and socio-ecological settings.

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