Report on pre-test and pre-validation of contextualised intervention methods

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PLANET4B

BETTER DECISIONS FOR BIODIVERSITY AND PEOPLE

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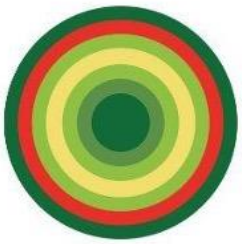

PLANET4B

BETTER DECISIONS FOR BIODIVERSITY AND PEOPLE

Key deliverable information

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Deliverable description

This deliverable reports on 1) developing three experiential learning games (e.g. adapting fisheries, forests, development of agriculture and biodiversity), 2) contextualising framing, nudging and other heuristics treatments, and 3) integrating key biodiversity foci into deliberative, creative and arts-based methods. The report also collects feedback on the deliberative, creative and arts-based intervention methods from the case-study partners and preparation of final protocols for further deployment on the ground concerning differences in social factors, local languages, priority biodiversity issues.

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List of abbreviations and acronyms

Acronym	Definition
BFG	Biodiversity Food Governance Game
CG	CzechGlobe – Global Change Research Institute of the Czech Academy of Sciences
CGE	Culture Goes Europe
CU	Coventry University
DC	Dadima's CIC.
DMP	Data Management Plan
ESSRG	Environmental Social Science Research Group
FiBL	Research Institute of Organic Agriculture
FUG	Forum Urban Gardening
GD	GoodIssue nonprofit Ltd.
IFZ	Interdisciplinary Research Centre for Technology, Work and Culture
LC	Learning Community
MLU	Martin Luther University Halle-Wittenberg
NINA	Norwegian Institute for Nature Research
PLANET4B	understanding Plural values, intersectionality, Leverage points, Attitudes, Norms, behaviour and social lEarning in Transformation for Biodiversity decision making
RCM	Reflexivity-Contextualisation-Matrix
RU	Radboud University
SB	Stakeholder Board
SSI	Socio-Scientific Issues
UNEP-WCMC	UN Environment Programme World Conservation Monitoring Centre
UNIPI	University of Pisa

Table of Contents

Key deliverable information ..... *iii*

Acknowledgements ..... *iv*

List of abbreviations and acronyms ..... *v*

Table of Contents *1*

Executive summary *2*

1 Introduction *2*

2 Methodological approach *3*

3 Results: pre-testing, pre-validation and alignment of contextualised intervention methods to individual cases *13*

3.1 Experiential learning games 13

3.2 Attention, framing, nudging and social norms relevant methods 15

3.3 Deliberative, creative and arts-based methods 16

4 Conclusion and outlook *22*

References *24*

Statement on data availability *25*

Statement on ethics *25*

5. Annex – Intervention Protocols *26*

Executive summary

- This report documents the internal PLANET4B process of selecting, pre-testing, adapting and aligning individual research-based intervention methods to the eleven individual case studies.
- The report provides an overview of how the task of aligning intervention methods to intersectional and biodiversity challenges of individual case studies was managed by the Task leads and engaged with by the wider consortium, including through a range of collective – online, offline, in-person, plenary, small-group – and independent case study level working.
- The overview is complimented by a more detailed account of the approach taken to 1) developing three experiential games, 2) contextualising the framing, nudging and other heuristics, and 3) integrating key biodiversity foci in the deliberative, creative and arts-based methods, in accordance with the specificities of the individual cases.
- Protocols for 28 methods implemented within individual PLANET4B case studies are included as an Annex.

1 Introduction

The methodological design of PLANET4B aims to simultaneously advance understanding and contribute to achieving transformative change via research intervention. To achieve this, Work Package 2 of the project is centred around the development and application of three complimentary sets of engaged research methods: experiential learning games; attention, framing, nudging and social norms relevant techniques; and deliberative, creative and arts-based methods (for further detail see Deliverable 2.1). In testing and analysing their ability to improve understanding, attitudes and behaviours with respect to the prioritisation of biodiversity within decision making, varying combinations of these methods are being applied within eleven widely varying case studies (see here).

Advancing understanding of the potential for research-based intervention methods to change the ways in which people think and behave requires considerable sensitivity to the process of selecting and applying such methods. This includes, for example, the aims and objectives of the project (both overarching and case study level), the specificities of each individual study case and associated research participants, and the positionality, time, skills and expertise of the research team. The diversity of sectoral, geographical, socio-cultural and political issues addressed across the eleven PLANET4B case studies, as well as the scalar differences between them (from local to global), makes the PLANET4B project an opportune research lab in which to further investigate the relative significance of such factors. At the same time, so too does the size and diversity of the research consortium (including e.g. 16 partners of both academic and practitioner profile, from 10 countries). Furthermore, regarding the overall scientific framing of PLANET4B, the prioritisation given to investigating the role of intersectionality in creating a plurality of knowledges, beliefs, attitudes and values towards biodiversity, in turn brings further nuance to understanding how and why different research-based intervention methods are engaged with and responded to by research participants with varying degrees of affect and outcome.

In recognition of the importance of the "backstage" research process, the work programme of PLANET4B includes a full Task dedicated to iteratively selecting, pre-testing, adapting and aligning individual research-based intervention methods to the eleven individual study cases (Task 2.2 – Aligning intervention methods to intersectional and biodiversity challenges of individual case studies). Guided by the question: what processes and parameters need to be attended to when selecting and aligning research-intervention methods to individual case studies and research participants, the purpose of this report is to document what this process has involved and with what outcomes to date. Specifically, this includes reporting on 1) developing three experiential learning games (e.g. adapting fisheries, forests, development of agriculture and biodiversity) 2) contextualising framing, nudging and other heuristics treatments, and 3) integrating key biodiversity foci into deliberative, creative and arts-based methods. Protocols, providing detailed guidance on how to apply such methods (totalling 28 methods, with each protocol primarily derived from first hand experience of adapting and applying the method within a PLANET4B case study), are contained in Annex 1. The report also provides a basis for the subsequent collection of feedback on the use of these three sets of intervention methods by the case study partners in e.g. D3.2 and D3.3.

The remainder of the report is structured as follows: in section 2 we document the overall methodological process for supporting consortium partners in their selection and alignment of individual methods to the needs and specificities of their associated individual cases. In section 3, we explain the respective approaches for developing the experiential games (3.1), contextualising the framing, nudging and other heuristics (3.2) and integrating key biodiversity foci in the deliberative, creative and arts-based methods (3.3). In section 4, we conclude on key findings arising from this process, reflect on the limitations and also outline the next steps in relation to the application and further iterative refinement of the intervention methods within the individual cases. The annex contains protocols for 28 methods (collated alaphabetically).

2 Methodological approach

Task 2.2 is part of PLANET4B´s Work Package 2, which aims to map and advance transformative and creative methodologies to trigger behavioural and institutional change. Task 2.2 was preceded by Task 2.1 ("Map transformative, deliberative and creative intervention methods for practice") which mapped a range of existing methods for their potential application in biodiversity research settings and in the contexts of the PLANET4B case studies (see Deliverable 2.1). The purpose of Task 2.2 is to provide a testimony of the methods selection and development considering case study needs and contexts. In parallel, Task 2.3 has trained consortium partners on the deployment of methods featured within the three methods sets (see Deliverable 2.3) within the individual PLANET4B case studies. Task 2.2 will, in turn, inform the final Task (2.4) of this Work Package: a catalogue of methods to be applied beyond PLANET4B (Deliverable 2.4, month 36).

Work Package 2 is especially informed by the activity of Work Package 3, which coordinates the empirical case study research. Of particular, note in the context of this current report, is the establishment (via Task 3.1) of a Learning Community (LC) in each of the five place-based intensive case studies, and a Supervisory Board (SB) in each of the six sector-based extensive case studies. The membership, size and

process informing the selection of individual LC/SB members vary in accordance with the specificities of each individual case (for a detailed account see Deliverable 3.1). However, in all cases, the LCs and SBs constitute expert stakeholders who are informing the research process, inclusive of (e.g.) participating in research interventions (intensive place-based cases), debating emerging findings (all cases), and contributing to the wider impact and output dissemination of the project (all cases).

At the time of writing, a range of research-based intervention methods have been selected, adapted and applied within the eleven case studies. Working collaboratively with the respective case study LCs and SBs, the PLANET4B consortium partners responsible for leading individual cases now in the process of, and/or has already completed, applying their selected methods, in accordance with the interests, viewpoints and engagement capacities of targeted research participations. This report provides a detailed account of the methodology guiding the process up until this current point.

The first phase of the current Task began with representatives from all consortium partners attending an online Task 2.2 Methods Alignment Workshop in June 2023. In terms of broader work programme sequencing, the workshop took place shortly after the completion of Task 2.1 (see above). Accordingly, a major resource and point of reference for consortium partners from the outset of the current task has been the 100 methods featured in Deliverable 2.1 "Directory of Key methods most suitable for biodiversity decision-making contexts" (Methods Directory). In preparation for the workshop, partners were asked to revisit the Methods Directory, with the intention that the time spent together during the workshop could be concentrated towards drafting and peer-reviewing an initial long list of methods to be used in each of the eleven case studies.

The workshop began with a plenary presentation from the Task lead (CU) and PLANET4B co-coordinators (MLU, WCMC). During the presentation, partners were reminded of the main sub-groupings of methods contained within the Methods Directory. They were encouraged to approach the task of selecting individual methods in accordance with the case specific aims, objectives and needs, including particularly their primary points of biodiversity and intersectional focus. Guiding prompts to stimulate their thinking included:

- Who do you want to influence?
- Where do you want to make an impact and bring about changes in attitudes?
- What resources are available per case (e.g. time, travel, personnel) and at work package level?

Partners were also reminded that the Methods Directory remains a "living resource" and accordingly to continue looking for and sharing any additional methods of potential utility within the project.

As a further source of guidance for the selection of individual methods, the "Reflexivity-Contextualisation-Matrix" (RCM) (developed within PLANET4B and featured within Deliverable 2.1) was also re-presented to the consortium partners, together with some illustrative examples of the potential matrix positioning of individual methods from each of the methods set (see Figure 1). The matrix was developed to help selection of

methods based on the desired level (interpersonal, intrapersonal and institutional) cases want to target, and the situatedness of the method (abstract or context-based). Partners were then asked to access and navigate a pre-populated Miro board for the purpose of drafting an initial longlist of methods (per case study). The logic here was that partners could work individually on their associated case study, but with the simultaneous possibility for peer input and comparison across the shared virtual space.

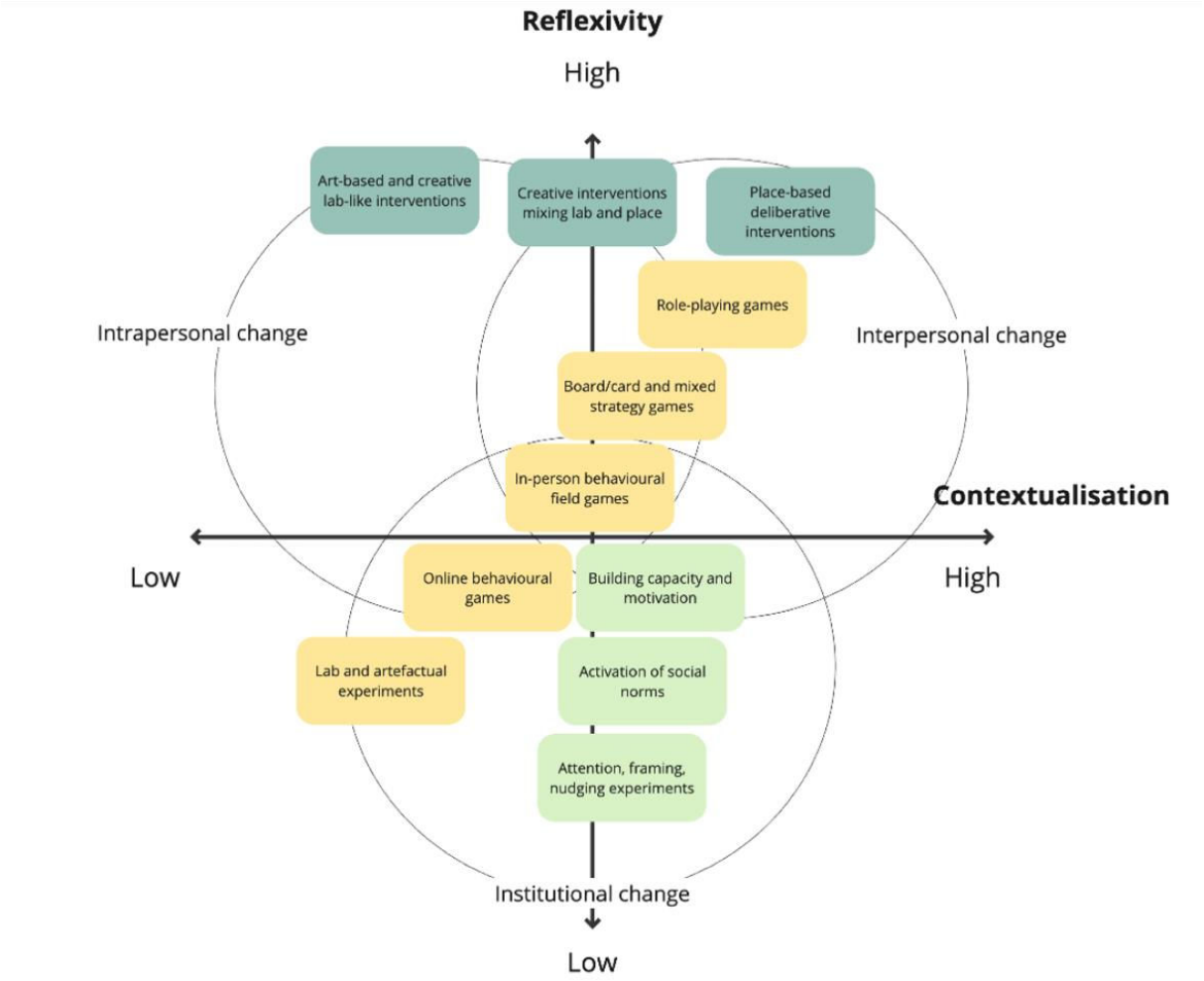

Figure 1. Reflexivity-Contextualisation-Matrix (RCM). Source: Soliev et al. (2023).

Within the Miro board a dedicated space had already been pre-allocated to each case study. The space contained a list of the 100 methods featured in the original Methods Directory (organised by method set), plus also an open space for additional method suggestions. To facilitate the partners working in the Miro board, the next hour of the workshop was organised using a world-cafe style arrangement, such that they could each compile their long lists within a series of smaller break-out group environments. The partners were invited to attend break-out rooms for one or more of the three methods sets at their own discretion, in accord with the specificities of their associated case studies and their initial impressions as to which methods / method set(s) would be most applicable: breakout Room 1, focusing on experiential learning games, was facilitated by MLU; Room 2, focusing on attention, framing, nudging and social norms relevant techniques, was facilitated by WCMC; and Room 3, focusing on deliberative, creative and arts-based methods, was facilitated by CU.

During the workshop all partners were able to make substantial progress with drafting case study level long lists. At the end of the session the partners were asked to continue working on them across the coming weeks and notify the Task lead (CU) once it was completed. As part of this process, they were also encouraged to explore what combinations of methods had been long listed for other cases.

The next step in the process was for consortium partners to consolidate their original long list of intervention methods identified during the workshop into a draft shortlist of those deemed to be of best potential fit. This stage was initiated by the Task lead (CU) from August 2023. For each case study the respective lead partners were asked to address the following points (within a shared excel file):

- Individual method
- Reason for selection of individual method (in accordance with case study specificities)
- Confidence / existing familiarity with using this intervention method
- Target participant group
- How the method will be adapted to align with specificities of case study, including:
  - Biodiversity issue/challenge
  - Intersectional characteristics
  - Other relevant case specific characteristics
- Any additional support needed from Task leads / other consortium partners to:
  - Adapt method design to specifics of case study
  - Implement method in case study
- Desired intervention outcome(s) to be achieved and/or knowledge to be generated
- How the impact arising from the intervention method will be measured/recorded
- Any relevant additional information (e.g. resource constraints, concerns, additional resource needs, etc.)

In October 2023, a further Task 2.2 workshop was held during the annual (in-person) consortium meeting. The focus of this workshop was primarily towards discussion of methods and instruments for assessing impact and reach in connection with the interventions shortlisted for use in the individual case studies. This included a plenary presentation (by MLU) together with pre-testing (by all attendees) of a pilot survey for capturing a baseline and assessing change. It also included a recap (via plenary presentation) on attention, framing, nudging and social norms methods which partners may wish to further consider for application within individual case studies. Two small group break-out exercises were then undertaken, with partners asked, firstly, to physically map (via use of post-it notes and a large wall axis) their targeted intrapersonal, interpersonal and institutional impact levels; and secondly, to discuss how their selected methods will help them achieve the desired level of impact, as well as how the impact will be measured. In addition, partners were encouraged to raise any questions or concerns in connection with their draft shortlists of interventions and/or any particular biodiversity challenges and intersectional social dimensions featuring within their case study. More broadly, the annual consortium training was also used as an opportunity to expose all partners to a broad range of interventions from across the three main PLANET4B interventions sets. This was achieved by way of

encouraging all those leading sessions during the event to incorporate one or more associated intervention into its design. Table 1 below provides a list of the resulting range of 24 interventions utilised and/or illustratively referenced during the annual meeting.

Table 1. Methods featuring during the October 25th-27th, 2023 Consortium meeting, Nijmegen, Netherlands.

#	**Methods**
1	Pub quiz
2	Transdisciplinary knowledge co-creation
3	Knowledge exchange
4	Imagery
5	Nudging & framing*
6	Experiential games*
7	Participatory video*
8	Bingo
9	Fishbowl
10	Surveys
11	Small group discussion
12	Plenary debate
13	Visualisation matrices
14	Visual representation
15	Training / providing information & support
16	Participatory systems mapping
17	Scenario workshops
18	Story telling
19	Comics*
20	Creative voice
21	Music and song
22	Role play
23	Tweeting
24	Experiential and informal learning over dinner
[*indirectly via illustrative example]	

To encourage partners to consider a wider range of intervention methods than they may have had prior first-hand experience of using, the information requested from them extended to any training and support needs in connection with the application of individual methods. Depending on the nature of any declared training needs, pre-planning for this included a consortium-wide training event (Berlin, January 2024, see Deliverable 2.3), one-to-one consultations with other consortium members who already

possessed expertise in a respective method, and the possibility for contracting in an external expert (e.g. participatory filmmaking, visual minuting, gamification session facilitator, etc.). As it turned out, however, requests for additional support have thus far only been made by two partners – CU and FiBL in connection with the involvement of a professional filmmaker, to support participatory filmmaking and a multi-media exhibition.

In parallel to the Task 2.2 work programme, consortium partners were also further prompted to continue critically reflecting on their selection and alignment of methods via their engagement with the associated activities of three other Tasks. 1): the Work Package 3 / Task 3.1 bi-monthly cross-case meetings – whilst these online meetings have primarily served as a broader forum for internal sharing of updates and problem solving of any challenges with respect to the running of individual case studies, they have also enabled all partners to raise questions and/or remain up-to-date about empirical activity and specific biodiversity and social characteristics of individual cases; 2) the Work Package 6 / Task 6.2 mid-term iteration of the Data Management Plan (DMP) – for this partners were asked to compliment the overarching project level DMP with associated individual case study level DMPs, inclusive of providing summative information on all methods to be used within each case; and 3) the case study dialogues component of Work Package 1 / Task 1.5 – for this, partners leading on individual case studies were paired with another consortium partner who then guided them through a pre-configured set of semi-structured ("dialogue") questions as a basis for exploring relationships between theory/ies of change, the Leverage Points framework, the RCM (see Figure 1 above), focal biodiversity challenges, intersectional dimensions and associated case study level research intervention approaches being pursued.

Table 2, below, provides a breakdown of the individual methods shortlisted for each of the eleven case studies at the mid-way point of PLANET4B (April 2024).

Table 2. Shortlist of contextualised intervention methods to be applied in individual case studies (April 2024).

Intensive, place-based, action-learning cases:		
Name	**Location**	**Shortlisted Methods**
Enabling intersectional nature recreation and biodiversity stewardship for urban resilience	Greater Oslo, Norway	• Photovoice • Behavioural observations • Survey • Key stakeholder mapping • Participatory (leverage points) system mapping • Deliberative (Learning Community) workshops • In-depth interviews • Focus groups • Participant observation
Opening Nature and the outdoors to Black, Asian and ethnic minority communities	Central England, UK	• Photovoice • Citizen Science activities (Biodiversity in my cupboard, iNaturalist, Mouth Count) • Participatory filmmaking • Storytelling • Deliberative (Learning Community) workshops • Workshop in nature • Debriefings

		• Participatory (leverage points) system mapping • Semi-structured interviews • Photography • Online WhatsApp community
Urban Youth	Erfurt, Germany	• Movie screenings / outdoor cinema • Earth walking (outdoor education) • Hike / night hike • Mindfulness and meditation • Biodiversity-Food-Governance game • A choice architecture experiment with supermarket carts (followed by surveys) • Debriefings • Participatory (leverage points) system mapping • Deliberative (Learning Community) workshops • Semi-structured interviews
City food for biodiversity and inclusion, Graz	Graz, Austria	• Biodiversity-Food-Governance game • Training, providing information • Living Lab • Stigmergic gardening • Horticulture workshops • Workshops in nature • Excursions / field trips • Storytelling • Photo exhibition • Participatory (leverage points) system mapping • Deliberative (Learning Community) workshops (1. Policy 2. Community) • Semi-structured interviews • Focus groups
Agro-biodiversity and religion, Switzerland (Swiss attitudes towards agriculture and biodiversity)	Switzerland	• Scenario vignette • Photovoice • Photo exhibition • Participatory video • Participatory (leverage points) system mapping • Deliberative (Learning Community) workshops • Semi-structured interviews
Extensive, sectoral, knowledge-exchange cases:		
Name	**Location**	**Research Intervention Methods**
From "ego-system to eco-system" in fashion	Italy	• Scenario workshops (XCurve) • Excursions/fieldtrips • Policy / document analysis • Semi-structured interviews • Participant observation
Agro-biodiversity management	Hungary	• Actor mapping • Photo exhibition • Participant chosen art • Focus groups • Expert interviews
Environmental awareness	Hungary	• Photovoice • Photo exhibition • Drama / community theatre • Debriefings – inc. visual cards (mood cards)

raising in education		• Literature review • Key informant interviews (semi-structured) • Participant observation • Survey
Agriculture and migration	EU	• Participatory system mapping • Semi-structured interviews • Qualitative data analysis • System analysis workshops
Trade and global value chains	Brazil – EU	• Literature review • Policy / document analysis • Semi-structured interviews • Participant observation • Focus groups / workshops
Sustainable investment behaviour	Global – EU – Norway	• Literature review • Document analysis • Semi-structured interviews • Reference group discussions

In accordance with the iterative and action-learning nature of the case study component of PLANET4B, the list of methods shortlisted for use in the eleven case studies continued to be adapted and evolve during the course of the next six months. Table 3, below, provides an updated list of the methods which have already been used and/or are currently still in the process of being brought to a close within the case studies at the time of writing (December 2024). Of these, detailed protocols are included in the annex to this report for those which fall into the focal PLANET4B methodological categories of experiential learning games, and deliberative, creative and arts-based methods (totalling 28 individual methods – see annex). In the case of the third focal PLANET4B category of contextualising framing, nudging and other heuristics treatments, relevant interventions, which have been still running, will be featured in the Catalogue of transformative intervention methods for various enabling players and contexts (D2.4), on our website and on relevant open access repositories (along with further updates on the other interventions as well).

Table 3. Contextualised intervention methods applied in individual case studies (December 2024).

Intensive, place-based, action-learning cases:		
Name	**Location**	**Shortlisted Methods**
Enabling intersectional nature recreation and biodiversity stewardship for urban resilience	Greater Oslo, Norway	• Key stakeholder mapping • Participatory (leverage points) system mapping • Deliberative (Learning Community) workshops • Focus groups • Participant observation
Opening nature and the outdoors to Black, Asian and ethnic	Central England, UK	• Citizen Science activities (Biodiversity in my cupboard, iNaturalist) • Participatory filmmaking • Storytelling • Deliberative (Learning Community) workshops • Workshop in nature

minority communities		• Debriefings • Participatory (leverage points) system mapping • Semi-structured interviews • Photography • Online WhatsApp community
Urban Youth	Erfurt, Germany	• Movie screenings / outdoor cinema • Hike / night hike • Mindfulness and meditation • Biodiversity-Food-Governance game • A choice architecture experiment with supermarket carts (followed by surveys) • Debriefings • Participatory (leverage points) system mapping • Deliberative (Learning Community) workshops • Semi-structured interviews
City food for biodiversity and inclusion, Graz	Graz, Austria	• Biodiversity-Food-Governance game (with IFZ students) • SSI-Workshops (thematic focus: functional biodiversity) • Living Lab • Stigmergic gardening • Horticulture workshops • Workshops in nature • Excursions / field trips • Storytelling • Photo exhibition • Participatory (leverage points) system mapping • Deliberative (Learning Community) workshops (1. Policy 2. Community) • Semi-structured interviews • Debriefings
Agro-biodiversity and religion, Switzerland (Swiss attitudes towards agriculture and biodiversity)	Switzerland	• Scenario vignette • Photovoice • Photo exhibition (forthcoming, 2025) • Participatory video • Participatory (leverage points) system mapping • Semi-structured interviews
Extensive, sectoral, knowledge-exchange cases:		
Name	**Location**	**Research Intervention Methods**
From "ego-system to eco-system" in fashion	Italy	• Scenario workshops (XCurve) • Excursions / fieldtrips • Policy / document analysis • Semi-structured interviews
Agro-biodiversity management	Hungary	• Stakeholder mapping • Photo contest (agrobiodiversity) • Drawing workshops • Cookbook • Vegetable exhibition • Expert interviews • Participatory (leverage points) system mapping
Environmental awareness	Hungary	• Photovoice • Photo exhibition

raising in education		• Drama / community theatre • Debriefings – inc. visual cards (mood cards) • Literature review • Key informant interviews (semi-structured) • Participant observation • Survey
Agriculture and migration	EU	• Participatory system mapping • Semi-structured interviews • Qualitative data analysis • System analysis workshops • Participatory (leverage points) system mapping
Trade and global value chains	Brazil – EU	• Literature review • Policy / document analysis • Semi-structured interviews • Participant observation • Focus groups / workshops
Sustainable investment behaviour	Global – EU – Norway	• Literature review • Document analysis • Semi-structured interviews • Reference group discussions

3 Results: pre-testing, pre-validation and alignment of contextualised intervention methods to individual cases

3.1 Experiential learning games

Based on the review of interventions (Deliverable 2.1) and the needs and dialogues with the case study partners, it was decided to develop two experiential learning games from scratch and to adapt one already existing game (instead of adapting two existing ones and developing one from scratch). As the fishery and forestry games, as originally planned for adaptation, focus more on revealing causality in decision-making than on learning, experiential games with stronger focus on social learning by the participants were selected for further development and use in the project. Thematically, the new/adapted games still cover different forestry and species links to biodiversity.

Further, guided by the Reflexivity-Contextualisation-Matrix developed within D2.1 for analysis and selection of interventions (see Figure 1), the aim in developing, adapting, contextualising, and pre-testing experiential learning games was two-fold. Namely, to achieve a set of experiential learning games that would cover both the reflexivity dimension – ranging from open-ended creative experiential learning games where no set of predefined or precalculated scenarios exist (e.g. as with many negotiation games particularly applied in legal studies and political sciences) to the ones that have many predefined scenarios based on specific model estimations (e.g. as with many games from behavioural economics); and, the situatedness dimension – ranging from those covering the issues that are place-specific and more directly related to biodiversity (where cognitive learning is particularly important) to those that raise rather abstract and universal questions that are (still) indirectly relevant for biodiversity (where normative and relational learning is particularly important).

Developing, pre-testing, contextualising experiential game 1: Biodiversity-Food-Governance (BFG) Game

This is a cooperative game to stop and reverse biodiversity loss that integrates insights from economics, sociology and political sciences on the one hand, and natural sciences on the other. The game combines such concepts as production and consumption, citizenship and governance, wealth and poverty, biodiversity and resilience, with players making decisions on a simulated board either explicitly or implicitly in relation to each of these concepts both as an individual and as a group. It is based on economic model estimations but with room for political improvisation. The game is followed by a debriefing where players have the chance to reflect on and debate the experiences they have gone through, thus potentially turning their experiences into actionable knowledge. The draft version of the game was developed in Year 1 of the project and since then it has gone through multiple rounds of pre-testing and improvement, with students, the Learning Community in the case study Urban Youth (Germany), and the project partners. Feedback was also received at the Global Conference of the International Association for the Study of the Commons in July of 2023, a community known to be specialised in behavioural experiential games. Pre-testing of the game has led to its contextualisation in multiple ways. In particular, while the earlier version of the game was developed with generic characters, it has been decided to give participants of the game a chance to self-define their characters to some extent (giving them backstories and developing their characters' descriptions either from a player's own experiences or observations of the given characters) and to

predetermine key intersectionality dimensions of them (explicitly migration background, implicitly age, gender, socio-political orientation). Debriefing as a part of the intervention package has also been pre-tested every time the game was played. As a result, a list of topics has emerged that are recommended for guiding the debriefing, a process of reflecting on the game experience and linking it with the real-life situations. These include getting into debriefing and disconnecting from the roles; understanding of what happened; general perception of usefulness of what happened; specific perception of the potential of the intervention to trigger intra-, inter-, institutional change; perceptions on intersectionality; learning about biodiversity specifically.

Generally, the BFG game was continuously developed with the Urban Youth case study in mind, where young people constitute the Learning Community. Yet, the pre-testing demonstrated that the game can also be relevant for audiences with mixed age groups, including younger and older age categories. From the project partners, CGE in Germany intends to deploy this game in the field – with the Learning Community (where there are periodically new members) and by the Learning Community members for the audiences beyond the Learning Community (e.g. at the events external to the project).

By the end of April 2024, the beta version of the game and debriefing guidelines have been completed and made available for (translation and) use by the partners upon request. The final version will be made available with open access..

Developing, pre-testing, contextualising experiential game 2: Biodiversity negotiation game – Global Forces, Local Faces

This is a negotiation game around a controversial dam construction in a large forested area and energy production that involves interests from a wide range of actors. The issues that are at the heart of the negotiation game are climate change and biodiversity (also in competition with one another), resource allocation (justice and coordination), livelihood and prosperity (needs, rights). After testing the GLOCON game (simulation game on land grabbing) (Galonska-Wäldele, 2020) with the students of political sciences and sociology at MLU in Year 1, which served as an inspiration, the draft version of the Biodiversity Negotiation Game was developed in Year 2. The current version of the game has been pre-tested with two students in a table-reading format – going through the initial statement, scenarios of the negotiation and interests of the involved actors. The goal of this table-reading was to ensure both the theoretical and practical conflicts of addressing biodiversity loss in the context of local and national development and international relations are embedded in the game. For the contextualisation of the game, a specific real-life case of Belo Monte Dam in Brazil (Fearnside, 2017; Calvi et al., 2020; Mayer et al., 2021) has been selected. Yet, the context-specific details were only inspired by the case and the final descriptions are fully fictionalised (and we should note that any overlaps are purely coincidental). The underlying theoretical structure of the conflicts were levelled (to suppress some of the details that seemed potentially too distant for a regular learner), sharpened (to make some conflicts between issues and actors more prominent), and assimilated with the easily recognisable contextual cues for potential learners in case study locations involved in the project. Partners with regular activities at educational organisations (universities, schools, educational NGOs), including the CAC who works with a network of schools across Europe and beyond, are discussing the application of this game. In April 2024 the beta version of the game has been completed and made

available for (translation and) use by the partners upon request. The final version will be made available with open access.

Adapting, contextualising, and pre-testing experiential game 3: Biodiversity Jenga®

This is an icebreaker activity that facilitates learning about biodiversity within ecosystems with a simple and familiar game, but with much less preparation than the two above. The key learning components in the game include the metaphoric comparisons of the dynamic Jenga® structure that constantly changes with additions or removal of the Jenga® pieces, with the complex processes of how ecosystems and biodiversity function and collapse (de Ruiter et al., 2005). The game is in the process of being adapted from the earlier variations of the biodiversity Jenga® game (e.g. Evans, 2020) that were used to introduce how biodiversity and ecosystems function and their importance to general public from a natural science perspective (for example in shopping centres or exhibitions) or students studying ecosystems (Umphlett et al., 2009), which often required the presence of an accompanying expert that could draw parallels. Thus, the game can serve as a valuable starting point for discussing the complex dynamic processes around biodiversity.

The project team sees a particular value in exploring the potential of such a game in learning environments where there is no easily accessible natural science expert. The examples could be family and friends' circles, in accordance with what Jenga® was intended in the first place, but also schools and other places of learning where there is often expertise in facilitation but not everyone is necessarily specialised in biodiversity. The pilot elements of the new Jenga® such as using a gameboard to link the bricks to particular scenarios for species were developed in Year 2 and are still being tested. The project partner (CU) who is leading the work on the adaptation and pretesting of this game has also been in contact with the developers of the previously stylised Jenga® games so that the lessons from development and use of the existing game are well taken into account (Evans, 2020). One novel element that is being considered is to create an option for the game participants, particularly at schools, to co-create their own and locally contextualised versions of the game. This feature will make the game directly relevant for any setting, including the PLANET4B case studies and beyond. Besides, the game is expected to be particularly useful in project dissemination spaces – including to engage policymakers. The beta version of this newly adapted game is now available for testing and feedback by project partners. The final version will be made openly accessible for public use and dissemination from Spring 2025.

3.2 Attention, framing, nudging and social norms relevant methods

The attention, framing, nudging and social norms relevant methods have been continuously highlighted and discussed throughout the project. At the time of writing, MLU is also in process of developing one such method – a choice-architecture experiment (see below), for potential future application in connection with the Urban Youth, Germany case study. However, to date, whilst some consortium partners initially long- and shortlisted these as primary interventions, none have so far explicitly applied them within the case studies (see below). Reasons for this include that overall partners have preferred interventions that target more reflexive and intentional forms of social change, compared to those that aim to achieve change via altering default

choices, for example. Relevant here is the fact that most of the emphasis in PLANET4B, in connection with the eleven case studies is on more profound forms of change at the level of values, beliefs, attitudes. Limited prior experience with these sets of methods has also likely contributed to these types of interventions being seen as less preferable.

In connection with the Urban Youth case (Germany), a specific choice-architecture method is to be tested based on Huitink et al. (2020). It is planned to co-design, with the Learning Community members, a nudging experiment, on activating social norms and affection for biodiversity prioritisation. The plan is first to conduct survey-based research on understanding how theoretically designed knowledge and affection nudges could facilitate more pro-biodiversity decisions by individuals and then to test the promising findings from the survey in a specific field setting. In our case (following Huitink et al. 2020), the focus is on shopping decisions and therefore a supermarket is selected as a real-world field setting. The main aim here is to assess whether the nudges have an impact on triggering more pro-biodiversity shopping choices. In this process, we would like to pay special attention to young people in two important ways: 1) from the perspective of what and how members of the Learning Community learn from co-designing and co-implementing this research (our assumption being that they learn how subtle changes sometimes could potentially bring about change at larger scales); and 2) from the perspective of actual research findings, where we should be able to see whether and to what extent nudges have heterogeneous effects on different age categories (our assumption is there will be heterogenous effects in accordance with some shopping patterns expected from different age categories). Similarly, the role of gender and other sociodemographic characteristics can be explored in such research. The nudging experiment is being co-developed by MLU and CGE ensuring integration of local specifics and context. In the case study “City food for biodiversity and inclusion, Graz”, led by IFZ and FuG, social norms relevant methods are being applied that includes training and providing information. Whereas other cases may implicitly work with, for instance, various nudges (e.g. framing within scenarios workshops), in practice these particular methods have not yet been explicitly pinpointed and adjusted to other cases with experimental research instruments. Nevertheless, to take stock of lessons learnt from interventions in different contexts, we plan to develop more general choice architecture exercises and experimental surveys focusing on issues addressed across case studies.

Besides case specific interventions, pre-testing of online survey experiments has been undertaken with the involvement of partners, with the primary aim to understand to what extent the survey questions can capture attitude towards biodiversity and changes due to research interventions (e.g. the biodiversity-food-governance game). These survey experiments include, for instance, questions on consideration of biodiversity, relevant priorities and general socio-demographic questions to allow mapping changes due to the interventions. Once completed, these instruments will be made open access.

3.3 Deliberative, creative and arts-based methods

All except three of the case studies (Trade and Global Value Chains (RU); Sustainable Investment Behaviour (NINA); Enabling intersectional nature recreation (NINA)) have thus far confirmed the inclusion of deliberative, creative and arts-based methods in

their approach (for full list and associated protocols, see annex). Table 4 provides an overview of the original rationale for selection of each individual method, as well as how they are being adapted and aligned to the specific biodiversity and intersectionality characteristics and points of foci of each individual case (as reported by the associated case leads). In all cases the deliberative, creative and arts-based methods are being used in combination with more traditional scientific methods (i.e. interviews, focus groups, participant observation), and in many cases also in combination with methods drawn from the experiential games and the attention, framing, nudging and social norms methods sets (see Table 3 for a full (current) list).

Table 4. Deliberative, creative and arts-based methods in case studies (April 2024).

Enabling nature recreation and biodiversity stewardship for urban resilience, Norway *Alexander Engen Aas-Hanssen (OOF), Reidun Bolsø (OOF), Yennie K. Bredin (NINA), Helene Figari (NINA), Vegard Gundersen (NINA) & Johan Hval (OOF)*
• *Paricipant observations* in nature using *mapping by drawing* will be conducted during visits to organised nature recreation activities for children and youth with disabilities with varying physical and/or mental disabilities. We will use the gathered material to establish preliminary categories for types of places / physical elements, activities, social interactions may constitute important parts of the nature experiences of the children/youth. The aim is to understand the environmental settings that promote positive nature experiences, and to identify the main barriers. Researchers will attempt to actively engage with the children/youth and/or their companions in their own environments. To gain deeper insights into their own perceptions of these experiences. Participant observation is well-suited for both the subject matter and the target research participants of this study (children with disabilities and their guardians). Mapping by drawing may prove a valuable tool not only for gathering data, but also to enhance and enrich communication and feed-back processes between researchers and the study participants (co-creation). • If feasible, NINA will also employ *photovoice* as a method to gain insight into specific elements in nature that are of particular importance to the children/youth, or that hinder engagement with nature. These approaches will enable better understanding of the relationship between the children/youth, the social environment, and nature (i.e. the outdoor spaces/places). In participating and conversing with the children/youth and their companions during the nature recreational activities NINA will seek to engage in discussions about the value and importance of nature on an equal basis.
Opening nature and the outdoors to Black, Asian and ethnic minority communities, England *Lindy Binder (CU), Geraldine Brown (CU), Alex Franklin (CU), Geeta Ludhra (DC), Subash Ludhra (DC) & Barbara Smith (CU)*
• The research intervention activity for this case is centred around the membership of the Learning Community (LC) and the programme of *LC deliberative workshops*. In addition to year long series of scheduled in-person and online meetings, the LC membership is also very active in contributing to a dedicated private WhatsApp group. Contributions to the WhatsApp space range from photos and videos, to sharing of media articles, to written reflections on their recent (and/or current in-the-moment) nature-based activity. Regular comments and appreciation are also shown for the activity of posts contributed by other group members. As such the group incorporates photovoice method to share and reflect on their personal relationships with biodiversity and the British countryside as members of Black, Asian and minority ethnic communities. The WhatsApp group facilitates peer learning, peer support and a safe space to share. • *"Biodiversity in my cupboard"* can be categorised as a "Citizen Science" style of method. The method was proposed for use in this case by the Learning Community (LC) as a direct result of the discussions arising from the first two LC workshops. It was also partly inspired by the PLANET4B cooking challenge exercise which took place during the Task 2.3 consortium

training meeting (see Deliverable 2.3). LC members have been invited to look in their kitchen cupboards or fridge, choose five items that they frequently use, and take a photo of the ingredient list and note the country of origin for the product as a whole. The returns will be collated and discussed with the group at the third LC meeting (scheduled for June 2024), as a basis for increasing understanding and awareness of the indirect impacts of food consumption behaviour on biodiversity. The group are also currently in the process of planning a further two Citizen Science activities, including setting up a Dadima's group project on iNaturalist app to record their interaction with biodiversity over the summer period and an activity to record a species (moths) over a 24-hour period.

- *Participatory filmmaking* has been selected for the contribution it offers both with respect to process and output. It will be used with the LC to draw together and share their experience, knowledge, viewpoints (and potentially social histories) of engagement with biodiversity and the outdoors. In so doing the aim is to both empower and promote further critical reflection by the LC members, whilst at the same time serving also to showcase and promote greater public recognition of the diversity of values attached to biodiversity. It is anticipated that the film will incorporate multiple biodiversity stories, highlight key messages, and document the engagement of the LC in the Citizen science activities. The significance of initiatives such as DC's nature walks in opening-up nature to Black, Asian and ethnic minority communities will also be featured in the film with the aim of promoting other such initiatives to become established elsewhere in the UK.
- *Storytelling* is actively encouraged as a way for LC members to share with others about how particular experiences across either their lifetime and/or other family members, have contributed to shaping their individual relationship with biodiversity and the countryside. Storytelling is a flexible method that opens a space for exploring individual perspectives on specific biodiversity issues. The method is a powerful tool for learning and sharing and can be a fun inclusive activity. Thus far storytelling has been incorporated into both the LC workshops and the individual LC member research interviews.
- The final LC workshop (scheduled for September 2024) will take place in a botanical garden. The setting will be used to run a "workshop in nature" with a specific focus on a key biodiversity issue. A core aspect of the programme of LC workshops is that it creates opportunities for learning. This learning is both top down and bottom up, learning delivered by subject experts and generated by LC participants. The approach used across all LC activities is pedagogical, situational and reduces the nexus between academics and members of civil society. Data collected will include observation, one-to one interviews, participant feedback and reflections on the activity and a range of digital data.

Urban Youth, Germany

Maryna Bykova (CGE), Ammalia Podlaszewska (CGE), Zafar Saydaliev (CGE), Ilkhom Soliev (MLU), Torsten Wähler (MLU) & Agnes Zolyomi (MLU)

- A series of monthly *movie screenings / outdoor cinema events* are being scheduled by CGE on topics related to PLANET4B. The screenings will be followed by group discussion about the issues raised. The screenings will be open to the general public together with specific targeted invitations to the members of the LC and young people of Erfurt.
- *Earth walking (outdoor education)*: CGE are running two trainings on outdoor education in youth work and integrating Earth Walking as a method of intervention in outdoor settings. Earth walking is thematically engaging but also logistically easy to implement. In incorporating this method as part of the PLANET4B LC activity several adaptations are foreseen, such as route selection, choosing routes with various biodiversity elements, as well as topics for discussion, and topics for reflection. Tasks will be assigned to research participants for reflecting on and then for group discussion sessions and a debriefing after the walk has been completed.
- A *night hike* is an outdoor education method that CGE already uses in some of their other outdoor learning projects, but which will also be tested with their LC members as a form on research intervention. The method will be scheduled for use during the spring or summer months. As with the Earth walking method (see above) the route will be planned to incorporate

various biodiversity elements, as well as topics for individual reflection and subsequent group discussion as part of a final debriefing.

- *Mindfulness- and meditation-based* intervention will also be incorporated in the mix of methods used with the LC members of this case study. The main adaptation will be the facilitated direction of the self-reflection (and associated subsequent debriefing) towards biodiversity.
- *Excursions / field trips* will be organised for the LC members to various German cities to explore different urban biodiversity initiatives. Through such study visits research participants will be supported in exploring and developing new ideas of their own for potential changes which could be made to the prioritisation of positive biodiversity practices within urban settings.

City food for biodiversity and inclusion, Graz

Andreas Flach (FUG), Sandra Karner (IFZ), Mirjam Krauser (FUG), Andreas Motschiunig (FUG), Katharina Santer (FUG), David Steinwender (IFZ) & Anita Thaler (IFZ)

- *Stigmergic gardening* (for example communicating via signs such as “water me“, "harvest me” potentially used in combination with provision of a watering can to nudge) is being considered for use as an intervention method with the citizen LC members (and potentially members of the wider public) during the planning and implementation phase of the pilot green space: a biodiverse community garden. It is also used to address language barriers (e.g. by pictograms) and will be adapted to ensure that engagement with the method results in co-created knowledge on cultivated and wildlife biodiversity.
- *Horticulture workshops* will be applied with the citizen LC members as a means of enabling capacity and knowledge building on sustainable gardening and supporting greater awareness of biodiversity. Through horticulture workshops information on environment, biodiversity, food and climate change can be co-created and provided practically. The method also directly supports skill sharing and exchange of experience, leading to better results than just providing information theoretically. The participative design of the workshops will aim at actively engaging the LC members, providing an approach and space in which to establish trust, mutuality and empowerment of the participants.
- *Workshops in nature* will be used with the citizen LC members in order to connect them to the natural environment.
- *Excursions / field trips* will be incorporated into the programme of activities for both the citizen and policy LCs. Thus far the method has been implemented in the form of an organised walk through the Graz pilot green space with representatives from local government and from third sector community organisations. During the walk specific attention was directed to intersectional aspects in alignment with the focus of the case.
- *Storytelling* is currently being considered for use as either i) an interactive tool for prompting exchange between people from policy / administration and the citizens engaged in the biodiverse community garden; or ii) as a method for promoting dialogue and exchange on different perspectives amongst the citizen LC members. In adapting the method to the project, environmental aspects will be included as part of the task, with LC participants encouraged to tell stories which are connected/related to biodiversity, food, gardening practices, etc. Storytelling will be used as an engagement method with the citizens LC to allow people to connect/relate to different topics (e.g. on their experiences with biodiversity, food preparation) and thus also to support the community building process. The connection between personal life (e.g. difficulties) and the resulting (non-) opportunities to experience nature and biodiversity helps us understand what these groups of people need in order to be able to increase their engagement with nature and prioritisation of biodiversity.
- Use of *photo exhibition* is currently under consideration, depending on the willingness and interest of the LC members. A collaboration has been established with the Topothek of the Graz Museum, who are willing to conduct the photo making. An exhibition (e.g. in the Graz Museum, at planned festivities and/or at a local community centre) is also still an option.
- *Living Lab*: the Graz pilot green space essentially represents a living lab, whereby LC members and the wider public are brought together over an extended time period for solution-orientated generation of ideas, planning and action in a “real life” setting. The pilot green space / biodiverse community garden provides a combined physical and behavioural experimental “space” for intervention in connection with urban food growing, intersectionality (gender) and biodiversity prioritisation. It acts as a starting point for a wider Living Lab

process, namely the step-by-step planning and realisation of a "biodiverse edible park", beyond the project duration, where the pilot garden is located.

Agro-biodiversity and religion, Switzerland
Robert Home (FiBL) & Ghezal Sabir (FiBL)

- *A scenario vignette* is being used to elicit responses about how a person would farm in a way that is in harmony with her/his religious and spiritual beliefs given an abandoned (uncultivated) farmland that he/she inherits. The rationale for using this method is that the farmer describes their decision making and provides insight into his motivations and perspectives on factors that influence his farming decision making. It also prompts the interviewees, who are farmers, to think about religious / spiritual-based farming by placing them in an observant, hence contemplating, position as they are removed from their current farm structure and can imagine a farm they would create in harmony with their religious and spiritual beliefs. Thus, using a scenario is more appropriate in this context to explore the opinion of the participating farmers and to steer the attention of the farmers towards value-based farming. Within the case study this method is being used as part of the interviews with farmers. The vignette is centred around the intersection between religion and farming practice. This vignette is preceded by questions related to biodiversity and its connection to religious and spiritual beliefs.
- *Photovoice* is being included within the interviews such that participating farmers can visually display the issues they face working on their farms and biodiversity related practices. Incorporation of pictures supports gaining access to aspects which farmers may otherwise struggle to verbalise. By working with the pictures, the farmers are better able to describe the challenges they face and/or their biodiversity positive activities within the context of their farm. This also provides the opportunity to get farmers to actively evaluate a farming practice considering its connection to their religious and spiritual values. This has the potential of priming the farmers to view their farming practices in light of their religious and spiritual beliefs.
- *Photo exhibition* is currently being considered as an option for public display of visual material together with an accompanying narrative. This will potentially include photovoice material generated by the research participants, together also with photo and video material collected by the lead researcher. Discussions are currently ongoing with "House of Religion" to act as a potential host venue for the exhibition.

From "ego-system to eco-system" in fashion, Italy
Maura Benegiamo (UNIPI), Marta Bonetti (UNIPI), Gianluca Brunori (UNIPI), Roberto Gronda (UNIPI), Pedro Navarro Gambín (UNIPI), Daniele Vergamini (UNIPI) & Matteo Villa (UNIPI)

- *Scenario workshops (X-curve)* are being used (as elaborated by Drift Rotterdam, see Hebinck et al. (2022)) with the experts of the Stakeholders Board, and in a workshop with PhD students. Drawing on the multi-level perspective (MLP) of sustainable transitions, the X-curve provides a simplified depiction of transitions that explicitly captures the patterns of "build-up" (the creation of new alternative practices and structures), and "breakdown" (the destruction of existing practices and structures), and their interactions. It functions as a sense-making tool to explore potential interventions for system change as part of collectively created narratives. Within the context of PLANET4B the X-curve supports the co-creation of a narrative about a future biodiversity-friendly fashion sector and the identification of the dynamics of transitions to promote this desired vision.
- *Excursions / field trips* are being used in the form of a textile tour. The tour was attended by members of the case study academic (UNIPI) research team. A visit to companies in the Prato district that recycle natural fibres, and associated discussions with personnel during the tours has provided the team with a better understanding of the opportunities and obstacles of moving towards fashion with less negative impact on biodiversity.

Agro-biodiversity management, Hungary
Borbála Lipka (ESSRG) & György Pataki (ESSRG)

- *Actor mapping* has provided a useful base for the systems mapping and leverage point task (which constitutes a core element of Work Package 3, Task 3.2: Systems mapping and

transformative interventions) and so has been incorporated as part of the process. The approach taken has involved identifying an initial list of actors from the data generated from expert interviews, then drawing a map of actors and discussing it further with the SB.

- Creating a *photo exhibition* provides an opportunity to invite participants to look around at their own pace and choosing, in an environment capable of stimulating them to think about the topic of agro-biodiversity and engage in getting to know it better. This method has the added value of flexibility to incorporate different complimentary activities (e.g. discussions, storytelling) alongside photo exhibition. Findings from the case study research undertaken to date indicate that the aesthetic aspect of agro-biodiversity (crops, seeds, etc.) is very undervalued even though it holds a lot of potential to engage people who are not connected to the topic "by nature". Target participants/audience groups will include urban gardeners, farmers, Community Supported Agriculture members and students.
- *Participant chosen art*: the SB is enthusiastic about the idea that the importance of agro-biodiversity can be best captured by different art forms in order to raise awareness about the topic and reach people who are not directly connected to agriculture. Accordingly, discussions are currently ongoing with the SB members to further select which art forms would be most applicable in the context of this case. Target participants and/or audience groups will include students, gardeners, farmers, artists, gastro bloggers, families. Every event organised in connection with this method will be tailored to the topic of agro-biodiversity (e.g. drawing vegetables, cookbook about easily growable but uncommon crops, storytelling with the main topic of seeds). The aim is to touch the emotions of people, to raise awareness through engaging them with the beauty and diversity of plants and seeds and through the rational mind. In tailoring the method to the specific focus of this PLANET4B case study ESSRG will define specific categories for showing the diversity of agriculture (e.g. urban gardens, diversity on the plate). Also currently being explored is the possibility to take the photo exhibition to a place (or places) that are active in the field of climate change or sustainability, and to link the exhibition to other activities linked to seeds. In curating the exhibition, a connecting theme of "stories in seeds" will be used as a basis for raising awareness about the importance of caring about biodiversity.

Environmental awareness raising in education, Hungary
Kármen Czett (ESSRG) & Eszter Kelemen (ESSRG)

- *Photovoice*: Talking about one's relationship to nature is often difficult, especially in young generations (due e.g. to peer pressure, difficulty in expressing emotions verbally). In such situations visual methods can be conducive to better enabling research participants to express opinions and feelings (and alongside, they can also be used for the documentation of observations). Mobile phones are becoming part of children's lives, with their use for taking photographs being a well-known activity for kids over ten. The selection of photovoice is also informed by previous research undertaken by the consortium partner (ESSRG) which resulted in good experiences – not just by allowing quieter children to share their opinion, but also by initiating dialogue in the wider community (in the whole class or in the school). Within the context of this case study photovoice will be used to explore how children perceive their relationship to biodiversity (or to nature more broadly) and if this perception be altered by different (experiential) learning activities (e.g. school gardening).
- *Photo exhibition* has been selected for use in the closing stages of the Photovoice method (see above). With this closing element, ESSRG aims to elevate the topic (children-nature interactions in school gardens/schools) and initiate a public discourse in the local community. Depending on the support of the SB, the photo exhibition may also be translated to larger scales (i.e. openly accessible in online format or integrating it with the thematic week on sustainability (a one-week voluntary programme for Hungarian schools in every spring semester). Participating schools can decide whether or not they would like to have the exhibition. It is anticipated that there will be at least one exhibition in June or September 2024 (in a secondary school).
- *Drama / community theatre* has been selected in follow on from findings arising from expert interviews. Several expert interviewees highlighted that the regular school environment and the content taught in the classes are very much focused on the cognitive aspects of biodiversity related issues and lack affective involvement. Káva Theatre, an independent artistic group has been invited to the secondary schools where ESSRG is assessing the

impact of the school garden. They perform a participatory theatre play focusing on biodiversity, where students are able to interact and take on specific roles. ESSRG researchers observe the play and organise a reflexive dialogue (debriefing) a few days later to assess its impacts. The intervention are used to target the affective (and partly also, the cognitive) aspect of environmental attitudes. This intervention is only applied in secondary school as the play is designed for the age group 14-18.

- *Debriefings*, including visual cards (i.e. mood cards to initiate the discussion), are undertaken in immediate follow on from the community theatre performances (see above).

Agriculture and migration, EU

Mahsa Bazrafshan (FiBL), Robert Home (FiBL) & Lina Tennhardt (FiBL)

- This case study does not work with an existing community of actors, but rather a Europe-wide network of individuals. Bringing diverse actors from multiple countries together in one place for a traditional participatory system mapping would be very difficult. However, this method is easily adaptable to individual use cases. In the context of this study, FiBL has adapted it such that they will first undertake a participatory system mapping exercise with a small group of experts from diverse disciplines. The system developed in this setting will then be verified at individual study sites across Europe (Switzerland, Germany, UK, Romania) and with individual actors (i.e. farm owners/managers and migrant farm workers) at those sites using semi-structured interviews and system analysis workshops. This allows considerations for language barriers and also to the potential vulnerable status of some migrant workers. The experts involved in the initial hearing phase will be included in a second iteration to discuss national-level results and provide EU-wide policy recommendations.

4 Conclusion and outlook

PLANET4B seeks to change mindsets, inspire new ways of working and living and contribute to enhanced policy agendas through the very process of undertaking research, as well as through the resulting research outputs. Guided by the question: what processes and parameters need to be attended to when selecting and aligning research-intervention methods to individual case studies and research participants, the purpose of this report has been to document what this process has involved and with what outcomes to date. Specifically, this has been addressed in the context of: 1) developing three experiential learning games (e.g. adapting fisheries, forests, development of agriculture and biodiversity); 2) contextualising framing, nudging and other heuristics treatments; and 3) integrating key biodiversity foci into deliberative, creative and arts-based methods.

As has been illustrated in the preceding sections, the overall approach adopted has manifested in the selection and adaptation of a relatively wide range of methods across the eleven individual PLANET4B case studies. Moreover, whilst some methods feature across a number of cases (e.g. storytelling, photo exhibition), and all cases are informed by the inclusion of either a LC (biodiversity-food-governance game, place-based “intensive” case studies) or SB (sector-based “extensive” case studies), the combination of methods/methods sets being applied and the ways in which they have been adapted, is bespoke to the specificities of each case.

Notably, in accordance with the co-creative and action-learning design of the overall PLANET4B empirical programme, the selection of individual methods continues to proceed in an iterative manner. In doing so the consortium partners remain respectful and open to being shaped by the views and needs of their respective LC/SB participant collaborators. They also remain committed to capitalising on findings by way of further developing individual methods for their future use as forms of research-based

interventions targeting the prioritisation of biodiversity decision making for wider use both within and beyond PLANET4B (a core selection of which will be included in the final WP2 Deliverable (D2.4, October 2025) – Catalogue of transformative intervention methods for various enabling players and contexts).

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Statement on data availability

This report collates together data from a range of both written and oral sources, including workshops, associated preceding PLANET4B deliverables and shared work files. The latter of these – a dedicated excel file, detailing choice and rationale for selection of individual methods per case study (see section 2, above) – will be made openly available on the PLANET4B repository before the close of the project. All public PLANET4B deliverable reports will also be made openly available within the repository (and, alongside, via the project website).

Statement on ethics

This work used published material available on the Internet. No personal data were collected, so no ethical issues are apparent. The authors have no conflicts of interest to declare.

5. Annex – Intervention Protocols

Table of Contents

Agrobiodiversity photo contest (online) *(Authors: Borbála Lipka, György Pataki, Anna Bajzák, Judit Ruprech)* ***.....28***

BFG game (working title): Biodiversity-Food-Governance game for social learning *(Authors: Ilkhom Soliev, Michał Pająk, Torsten Wähler, Edit Hunyadi)* ***.....33***

Biodiversity in the cupboard *(Authors: Barbara Smith, Alex Franklin, Geraldine Brown, Claire Lyons, Lindy Binder)* ***.....39***

Biodiversity Jenga® *(Authors: Lindy Binder, Barbara Smith, Ilkhom Soliev, Claire Lyons, Alex Franklin, Geraldine Brown)* ***.....44***

Community mapping for promoting biodiversity decision-making *(Authors: Sandra Karner, Reni Hofmüller)* ***.....48***

Cookbook *(Authors: Borbála Lipka, Katalin Réthy, Judit Ruprech, Gyorgy Pataki)* ***..54***

Debriefing *(Authors: Karmen Czett, Eszter Kelemen)* ***.....59***

Diversity moves! *(Authors: Edith Zitz, Sandra Karner)* ***.....64***

Drawing in nature workshop *(Authors: Borbála Lipka, Katalin Réthy, Dorottya Poór, György Pataki)* ***.....69***

Excursions / field trips / company visit *(Authors: Marta Bonetti, Pedro Navarro-Gambín)* ***.....74***

Global Forces, Local Faces: a biodiversity negotiation game *(Authors: Ilkhom Soliev, Theresa Kühne, Annabel Eckmann, Edit Hunyadi, Agnes Zolyomi)* ***.....79***

Horticulture training series *(Authors: Katharina Santer, Christina Seliger, Sandra Karner, Mirjam Krause)* ***.....86***

Nature-based mindfulness and progressive-muscular-relaxation *(Author: Mariana Matoso)* ***.....93***

Nature experience stroll *(Authors: Lindy Binder, Katharina Santer, Christina Seliger)* ***..... 101***

Nature hike *(Author: Mariana Matoso)* ***..... 105***

Nudging experiments to activate social norms and affection for biodiversity prioritisation *(Authors: Sven Grüner, Julian Jäger, Edit Hunyadi, Ilkhom Soliev)* ***. 109***

Outdoor cinema *(Author: Mariana Matoso)* ***..... 117***

Participatory filmmaking *(Authors: Geraldine Brown, Alex Franklin, Barbara Smith, Lindy Binder, Claire Lyons)* ***..... 121***

Participatory photo exhibition *(Authors: Eszter Kelemen, Kármen Czett)* ***..... 126***

Participatory theatre *(Authors: Eszter Kelemen, Kármen Czett)* ***..... 132***

Photovoice *(Authors: Claire Lyons, Ghezal Sabir)* ***..... 137***

Socio-Scientific Issues (SSI) workshop *(Authors: Andrea Frantz-Pittner, Sandra Karner, Merima Ramic)* ***..... 145***

Storytelling *(Authors: Lindy Binder, Sandra Karner)* ***..... 152***

Vegetable exhibition *(Authors: Borbála Lipka, György Pataki, Katalin Réthy)* ***..... 156***

WhatsApp for promoting biodiversity decision-making *(Authors: Geraldine Brown, Alex Franklin, Barbara Smith, Lindy Binder, Claire Lyons)* ***..... 160***

Who am I? *(Authors: Lindy Binder, Geraldine Brown, Claire Lyons, Alex Franklin, Barbara Smith)* ***..... 165***

Workshop in nature *(Authors: Geraldine Brown, Alex Franklin, Barbara Smith, Lindy Binder, Claire Lyons)* ***..... 169***

X-Curve method for participatory workshops *(Authors: Pedro Navarro-Gambín, Marta Bonetti)* ***..... 173***

1. Intervention method

Agrobiodiversity photo contest (online)

Authors: Borbála Lipka, György Pataki, Anna Bajzák, Judit Ruprech

2. Summary of the method

An agrobiodiversity photo contest is an intervention method designed to celebrate and promote awareness of biodiversity within agricultural settings. Participants are encouraged to capture photographs showcasing the variety of plant, animal, and microbial life in their gardens, farms, or community spaces. Together the photographs can create an educational and visually appealing showcase of biodiversity (Harman et al., 2023)

Within PLANET4B the method has been used for amateur photographers and gardeners to share pictures of different aspects of diversity in their garden or local farm. There were five categories: the winner in each of the categories is awarded a seed-related prize.

3. Use context (within PLANET4B)

3.1. Relevant social aspects of biodiversity being addressed

This PLANET4B case study addresses agrobiodiversity – the link between nature and human culture – particularly in relation to the diversity of seeds. Focal points of the case study include the maintenance of seeds, seed saving and conservation work. The scope of the case study extends to understanding what intervention(s) could be done in order to develop a seed system that supports agrobiodiversity better. The study also analyses the relationship between farmers involved in conservation and their seeds, and seeks to raise awareness of the diversity in cultivated plants. Operating in alternative food networks, the farmers and gardeners engaged in these activities tend to be subsistence farmers and amateur gardeners who connect with civic movements (e.g. agroecology, permaculture, etc.) and public research activities (on-site farm experiments).

The agrobiodiversity photo contest method encourages participants to spend time in their garden or farm recognising and choosing suitable subjects to photograph that demonstrate diversity within agriculture and gardens. It has potential to influence not only the photographers, but also anyone engaging with the photographs either through an exhibition or where they are shared online.

3.2. Relevant intersectional dimensions

This PLANET4B case study focuses on open pollinating vegetable varieties and their seeds, considering that the whole seed system needs to support diversity, human and non-human. Incorporated within the study (within the context of seed systems) is an exploration of gender roles at a systemic level. Working with seeds is highly gendered: the management of seeds (including selection, seed saving, seed cleaning and seed storage) almost always belongs to the realm of women. The current (mainstream) seed system is built up in a way that is focused on production and disregards the role and importance of reproductive work (e.g. the importance of small-scale seed saving, conservation of genetic diversity, the role of community seed networks). A more resilient seed system is needed to support (agro)biodiversity.

3.3. Relative focus given to different levels of social change

Individual level change	*Community level change*	*Institutional level change*
Medium	Medium	Low

4. Roles

4.1. Participants

Take photographs of diversity in gardens and farms in response to chosen category(ies) and submit them electronically to be judged by a panel.

4.2. Facilitators

- Select a suitable judging panel (see section 6 for more detail).
- Prepare information about the contest with support from the judges, e.g. the 5 categories for entry, a brief on judging criteria for the photos.
- Share the information on social media and through targeted newsletters.
- Ensure all participants are made fully aware of data management practices, their rights and any risks of participation, including via Participatory Information sheets and securing of informed consent (if the material is to be used publicly and/or for research purposes.
- Receive submissions of photographs.
- Organise submissions into relevant categories for judging.
- Amalgamate judges' scores.
- Contact winners to award prizes.

4.3. Judges

- Define the categories for entry.
- Define the criteria for scoring the photos; a professional photographer can provide guidance on what technical elements to look for, but judges may want to agree on additional preferences, e.g. original presentation of biodiversity.
- Scores and/or viewpoints of judging panel can be gathered in an excel sheet, or preferred software, from which facilitators can rank and identify the winners for each category.

5. Materials

- A camera or camera phone (participants)
- The means to upload photos to the internet (participants)
- Participatory information and ethical consent forms
- Prizes for winners and runners-up in each category

6. Instructions

6.1. Select a suitable judging panel with due consideration to diversity of age, gender, ethnicity, etc. Within PLANET4B, the judging panel was made up of the Agrobiodiversity management Stakeholder Board, members of Magház Community Seed Bank Association and external professionals involved in the topics of specific contest categories.

6.2. With the panel, select categories that have relevance to the biodiversity issue you are addressing. In the PLANET4B case, for example, the five categories were: Diversity in Action, Agrobiodiversity in Cities, School Gardens, Stories in Plants, Is it Diversity or Uniformity? The final category required a series of 5-10 photos.

6.3. Share the contest information with the target group. Within PLANET4B, Magház Community Seed Bank social media was utilised, and the case study Stakeholder Board shared the contest through their channels. Contest information can include photography tips and any specific instructions such as size of picture, deadline for submission (within PLANET4B the contest remained open for three months over early summer) and where it needs to be submitted. Ensure information is provided on competition rules and rights of participants. Also, where the method is being used for research purposes and/or there is intention to further use the submitted images, ensure that full Participatory Information is provided and informed consent secured from all participants.

6.4. Collect submitted photos into a centralised online location and organise in relevant categories (within PLANET4B submission was via email attachment).

6.5. Send out reminders of the competition.

6.6. Score photographs against relevant criteria in Excel (or selected software). Judges may receive some guidelines from a photography expert about what to look for in a photograph.

6.7. Amalgamate scores and identify the winner. If it is very tight between the top photographs in any category, hold an additional meeting with the judges for that category (either in person or online) in order to finalise the decision.

6.8. Contact winners and arrange for sending them their prizes. In the case of PLANET4B the prizes consisted of books, seeds and a year's membership to Magház Community Seed Association.

6.9. Once the competition is complete, and informed consent has been secured to do so (see above) the facilitator may wish to host an exhibition of the photographs. Note: if participants have been assured anonymity, ensure that there are no aspects of the photo which breach this; if images include human subjects they must not be used / not used without explicitly securing the informed consent of all such subjects.

7. Data collection and synthesis

Where email addresses are retained in order to contact contest winners, use a password protected device. After the contest, all personal data should be deleted. If permission has been sought, photographs can be retained and used with appropriate credits.

8. Checklist for implementation

- Judging panel
- Suitable categories

- Method of publicising contest
- Email address (or alternative way) to receive submissions
- An online space to hold and organise photographs
- An excel sheet (or similar) to support adjudication
- Prizes and method for delivery

9. Critical considerations

9.1. Ethics of care / ethical considerations

- Provide full participatory information and secure informed consent of the participants in accordance with ethical research practice, the purposes for which the competition is being run and any potential future use of the submitted images.
- Include in the entry rules of the contest how and where winners' names and photographs will be shared.
- Delete any personal data after the contest ends.
- If hosting an exhibition see the PLANET4B photo exhibition proforma for further guidance.

9.2. Power dynamics and relations

- The contest may favour people with better quality cameras, the judging criteria should be defined to fairly adjudicate on the skills and equipment of all entrants.
- There may be an inherent bias towards people with access to natural spaces / or those that can travel to natural spaces.
- Ensure that the competition categories and advertising methods appeal to individuals from diverse social and cultural backgrounds, and that the prizes awarded are socially and culturally appropriate. Organisers might achieve this by consulting with various communities and co-create categories and prizes, adverting through various platforms (especially on the ground community groups) and ensuring the guidance is available in multiple languages. Where possible, the judging and organisation panel should include people from a diversity of cultural backgrounds, who are aware of and sensitive to different community interests.

10. Top tips

- After the launch of the contest follow up with regular reminders about the contest to ensure optimal reach.
- Consider the best time of year to hold the contest. The PLANET4B project held the contest from late April to early August, as this is a time people might be in their gardens or outside in nature. Other times, however, may be more conducive depending on the particular aspect of biodiversity which the competition is aimed at addressing. If the proposed participants are children, the competition could run in the school holidays.
- In the PLANET4B case study, the facilitator(s) took as much of the administrative burden from the judges as possible, however, the facilitators' and judges' roles could be combined.
- Consider intersectionality when selecting the judging panel.

11. Measuring impact

This method was used in PLANET4B within an 'extensive' case study. There was no place-based Learning Community, so impact was not measured. However, in a different context, this method has the potential to deliver impact at an intrapersonal and interpersonal level. At the intrapersonal level can be measured by assessing participants' reflections on their experiences. Organisers could include a brief survey for entrants asking how participating in the competition affected their awareness of biodiversity or their connection to nature. Additionally, participants could be invited to submit a short description alongside their photo, explaining what they learned or observed during the process, offering qualitative insights into personal growth and awareness. If the photographs are exhibited, they may spark a reaction in the viewer, this impact could be gauged by a comments book at the exhibition, or by sending attendees a follow-up survey.

At the interpersonal level, impact can be measured by tracking engagement on social media, such as the number of likes, comments, shares, and posts using a designated competition hashtag. A content analysis of this data might reveal if the competition is initiating conversations about biodiversity and agroecosystems. If the photos are exhibited, this could provide an opportunity for discussion, especially if there is an opportunity to meet the photographers. Impact could be measured through observations at the exhibition, or through a follow-up survey.

12. Links to external resources

Harman, J., Hipsley, C.A., Jacobus, L.M. et al. 2023 BMC Ecology and Evolution image competition: the winning images. BMC Ecol Evo 23, 32 (2023). https://doi.org/10.1186/s12862-023-02141-x

1. Intervention method

BFG game (working title): Biodiversity-Food-Governance game for social learning

Authors: Ilkhom Soliev, Michał Pająk, Torsten Wähler, Edit Hunyadi

2. Summary of the method

This is a structured individual and collective decision-making game that aims to facilitate experiential learning in relation to biodiversity, agriculture, consumption and their interlinkages with market and political systems. The players are confronted with social dilemmas related to biodiversity, food, and governance. In a series of rounds, they make explicit decisions (e.g. choosing between producing more or less, consuming more or less, voting for certain candidates) and implicit decisions (e.g. deciding to speak up or not in the community council, putting pressure on peers or not about their decisions) that affect the state of their livelihoods and biodiversity. The game can last approximately 90 minutes, and a follow-up debriefing is strongly recommended for facilitating social learning that can last up to 60 minutes. The game requires at least seven players and one facilitator (and a maximum of 14 players and two facilitators). Overall, the game and the debriefing session aim to foster a deeper understanding of social dimensions of both biodiversity and direct and indirect drivers of biodiversity loss by linking in-game experiences with real-world decision-making.

3. Use context (within PLANET4B)

3.1. Relevant social aspects of biodiversity being addressed

This intervention method creates space for experiencing individual and community decision-making while observing simulated outcomes of these decisions in a series of rounds. The game also allows experiencing institutional decision-making from the bottom up; that is, collective rulemaking and enforcement of the devised rules. In the biodiversity domain where actions of individual actors are not easily linked to the consequences of these actions, it is a particular challenge to prioritise biodiversity, especially in the face of tangible and short-term individual benefits. The complexity of the resource system, where causal processes have difficulty of attribution and can be lengthy, makes monitoring and control of any external measures very demanding. This means internalisation of norms that prioritise biodiversity within decision-making are particularly important for sustaining biodiversity, despite the uncertainty inherent to complex systems. But experiencing and learning about such decisions and their consequences in real life takes either a very long time or has to be learned indirectly – for example via information from others and not through one's own experience (the vast majority of people, both those in powerful positions and those who are not, make decisions that affect biodiversity but typically do not have direct experiences of biodiversity decline). The game allows for experiential learning by combining psychological, economic, sociological, and political dimensions of biodiversity decision-making, helping participants understand how individual and group decisions affect biodiversity. It makes these connections more tangible and fosters deeper reflection on the consequences of their choices.

3.2. Relevant intersectional dimensions

The game addresses multiple intersectional dimensions in two important ways. First, it provides short role descriptions that describe different experiences, preferences, and struggles that are typical in most societies across key intersectionality dimensions, such as age, gender, education, and income, but also those related to values surrounding nature, such as more anthropocentric and instrumental and more eco-centric and non-instrumental. Second, through a specific role, it allows experiencing exclusion from and inclusion in political decision-making (particularly, in the role of a person with a migrant background).

3.3. Relative focus given to different levels of social change

Individual level change	*Community level change*	*Institutional level change*
High	High	Medium

4. Roles

4.1. Participants

This game requires at least 7 participants and one or two facilitators.

Each role can be played by more than one person. As the players should be seated around a table, it is recommended maximum to have 2 participants per role. This means, the maximum number of participants is 14 (and one or two facilitators).

The participants do not need any prior knowledge or preparation, but they should plan approximately 2-3 hours for the entire game experience, including the debriefing.

4.2. Facilitators

One or two facilitators prepare the game materials and place where it will be played. Before the game, they need to print out the game board and cards and test the spreadsheet for recording the players' decisions and calculating the points. They also need to read, and ideally practise, the debriefing questions. A very effective way to learn how to become a facilitator is to participate in the game at least once. If this is not possible, good preparation and facilitating the game in a group with familiar participants is useful, before playing in groups that have participants that the facilitator(s) has (have) not met before. To support the facilitation process, there is a detailed script (instructions manual) for the game facilitators.

5. Materials

- Game printouts. This includes (a) the game board and cards for placing on the table (highly recommended in colour); and (b) the game manual (detailed script and instructions) for the facilitator, which includes the description of the game preparation, its flow, and the debriefing questions afterwards (colour if possible, but black and white print is also fine as this is seen only by the facilitator).
- Game spreadsheet. This is used for calculating points in each round of the game – the facilitator uses a computer to insert the numbers based on the decisions players make in each round, the spreadsheet turns these numbers into points of the players, and the facilitator announces who receives how many points and what the state of biodiversity is. If there is a projector and screen in the room, it can also be displayed on the screen.

- A short survey before and after the game. This is administered by asking all participants to answer a few simple demographic questions online (the link provided in the materials) before the game (e.g. university students, local community activists, a group of friends) and then a further set of questions about their individual experience of playing the game immediately after all rounds of the game have been completed.
- 5 small tokens (ca. 2 cm) or similar items (coins, pins, magnets, figurines, or these can be cut out from a sheet of paper). These are needed to show the state of biodiversity, current land and consumption policies, and current state of governance on the game board. It is helpful to have a stopwatch or an hourglass with 3 minutes for timing the community council discussions.
- Optional: a voice recorder or camera. It is relatively well-established practice to use such games and debriefings to analyse how participants make decisions and what they learn through participating in the game. If this is the case, and given the facilitators have informed and written consent from the participants (a template for which is also available in the links to external resources), it can be useful to record the game either using a voice recorder or a camera. The recording can be analysed later by the researchers. Recording only some parts that are of interest to the researchers (for example, only the debriefing to understand participants' reflections and discussion afterwards) is another option.

6. Instructions

The game has been tested multiple times with various audiences and will continue to be tested and adjusted through summer of 2025. Once it is fully finalised, it will be made an Open Access resource.

7. Data collection and synthesis

There are multiple ways in which the game can be useful for understanding social change related to biodiversity. The key options for data analysis and synthesis include:

- Understanding decision-making during the game. For this, researchers can analyse the decisions recorded in the game spreadsheet and optionally record the communication during the game, which would allow exploration of how different developments in the communication can be linked to different individual and collective decisions. For example, do people make more pro-biodiversity decisions after some specific type of communication during the community council? Does it rather happen after the event cards?
- Understanding the reflections and learning after the game. For this, researchers might want to analyse the recording of the debriefing session. One can also use pre- and post-game surveys to understand the main takeaways, including how socio-demographic or other characteristics in the group can explain these takeaways at least in part. For example, can certain intersectionality dimensions better predict how participants can explain key concepts?
- Understanding the longer-term implications of playing the game and participating in debriefing sessions. Generally, there is an indication in the research that playing such games more than once can substantially improve the learning effects (e.g. Crookall, 2010). If it is possible, data can be collected and analysed each time to observe the dynamics in learning. Where participants provide their consent to be contacted at a later point, one can conduct follow-up surveys and in-depth interviews about the key concepts embedded in the game.

8. Checklist for implementation

- Allocate sufficient time to check the game materials (the facilitator manual with detailed script, the printout board and cards, and the spreadsheet), hypothetically test on your own and imagine how you can facilitate the game with a group.
- If the game is to be used as a research tool, make sure to take care of formal ethical approval in time (see next section). If not (for example for trying it with friends) still consider ethical aspects even if it might not be a formal requirement (e.g. are there any issues that might be sensitive for your specific group, are there language or other limitations).
- Ensure sufficient time is allocated on the day of the game to administer both the pre- and post-surveys. This will help to maximise response rates and ensure that data is collected consistently across all participants. If the pre-game survey is administered on the same day as the game, plan to have participants complete it as part of the introductory session to make the process seamless and reduce the likelihood of missing responses.
- Plan when and where you would like to conduct the game and with whom.
- If participants are known (e.g. members of your own team or community, students in your class) select a suitable location and date. If participants are unknown (e.g. as a general experiment in an unknown group) think how and where you would like to advertise the game depending on your purpose (and potentially whether and how you can offer some rewards for participation).
- Prepare informed consent forms for participants for signing before the game (be prepared that some participants who confirmed earlier might not show up on the day of the game).
- Prepare the room as described in the facilitator manual.
- Consider having a small (symbolic) present for the group (e.g. organic and fair-trade chocolate) and for one person who can be considered a “winner” if they have the highest number of points, and the state of biodiversity is not in red at the end of the game.

9. Critical considerations

9.1. Ethics of care / ethical considerations

It is not known that the game can have any harm to the participants, but it is not excluded that in a game situation there could be heated discussions, particularly if it is related to more sensitive topics. Sometimes heated discussions are a sign that certain topics are close to the heart of some of the participants. This needs to be treated carefully by the facilitator, including, if necessary, with participants reminded of the importance of using constructive, respectful and inclusive language. It is highly recommended that the facilitators receive training on both facilitation skills and dealing with potential conflict. To create an environment that is respectful and constructive for all participants, facilitators are recommended to have training in 1) diversity in learning, 2) intercultural sensitivity and 3) conflict management, all with specific focus on facilitation (or teaching) situations. Many educational organisations offer such courses. The game has been developed by experienced and trained scholars and practitioners who took every precaution to avoid any structurally insensitive language, but participants might not have had similar experiences or training. This means that to fully predict what happens in the game is not possible, but it is possible to state that the chances of something happening well beyond what is usual in interactive social learning environments in terms of sensitive topics are slim.

It is important to make sure that the game is conducted in a place that is (easily) accessible to all expected participants and it is a place where one can spend 2-3 hours with comfort and suitable amenities (temperature, bathroom facilities, availability of water, etc.).

One should also think of data protection measures if any data is collected. It is a must to a) have basic training on ethics, b) obtain ethical approval from a relevant institutional review board, and c) prepare well before the game to be able to understand what topics can become more sensitive (for example, how to talk about and moderate discussions related to various intersectionality dimensions embedded in the game such as lifestyles, migration background, age, gender).

9.2. Power dynamics and relations

There are different levels of power dynamics and relations that deserve attention. The political part of the game will explicitly and implicitly deal with power dynamics. People can vote and nominate, run for office, make decisions about policies for the next round, etc. Those who have experience in public speaking and are keen to express themselves are likely to have some advantage in various situations, but there are no guarantees that these are perceived positively by the other participants.

Anything that is not acceptable by broader societal norms (e.g. disrespectful language) needs to be addressed as in any other social situation. As instructed in the facilitator's manual, it is good to remind participants that the game is not personal and that actions undertaken within the game should be confined to the activity itself, although it cannot be completely free of it.

What is particular about this game, due to its design, is its intentional minimisation of interventions from the facilitators beyond what is in the facilitator's manual. This is to allow participants to experience and discover dilemmas and how they can address them on their own. The debriefing session is key in prompting participants to convert their experiences from the game into potential lessons. It can also be used to help participants clarify and understand what happened during the game.

10. Top tips

- For the facilitator or researcher – it is highly recommended to study the game materials and try to play it first with a group consisting of familiar individuals (friends, colleagues), and while doing so, trying to understand what the specific purpose of playing the game could be with the target audience (learning something specific, research, testing experimental treatments, other or mixture of these).
- For participants, this is a game that is best done without preparation.
- To increase the learning effects (to gain knowledge about biodiversity, to learn communication skills for various social situations where individual interests might clash with the interests of a group, to develop understanding of social, economic and political dimensions of biodiversity), it is highly recommended to play the game more than once. This recommendation involves both playing several rounds during a single session and, where feasible, conducting multiple sessions with the same or a different group to deepen learning and understanding.
- If the game is used with representatives of groups, communities, and organisations beyond one's own, it is highly recommended that the timing, place, and invitations of participants be planned together.
- Evidence of impact may take a range of forms and generally is not easy to capture. For example, it can be a sign of learning if participants provide positive feedback and can better explain the concepts embedded in the game, but also when they are critical and/or continue discussing their experiences beyond the game.

11. Measuring impact

It is useful to think (well in advance) about measuring impact in terms of areas of impact to be measured and the methodology of measuring impact.

In terms of areas of impact, the game can be relevant for all three – intrapersonal, interpersonal, and institutional – levels of social change targeted by PLANET4B. In practice, one can measure such impacts by looking at changes in 1) knowledge, attitudes, and perceptions (intrapersonal), typically assessed via surveys or interviews conducted before and after the game to capture shifts in participants' understanding of biodiversity, attitudes towards sustainability, and perceptions of individual and collective actions; 2) communication dynamics and collective decisions (interpersonal), analysed by reviewing records from the game and debriefing sessions to explore how participants negotiate, collaborate, and make group decisions, highlighting shifts in dialogue quality or group norms; and 3) suggestions, agreements, enforcement, and revision of new rules (institutional) during the game and debriefing, as well as real-life decisions following the game, which may reflect institutional impact when ideas are applied to organisational practices, policy discussions, or broader societal norms.

In terms of the methodology of measuring impact, all social research methods can be relevant: experimental (for example, creating control and experimental group in a classroom and testing how participants can explain some related concepts when playing the game and participating in conventional seminars in contrast to going through conventional seminars only), case study (in-depth understanding of a community of people who played the game), cross-sectional (looking at many participants of the game and seeing if there are associations or causality between key variables of interest), longitudinal (in-depth understanding of participants and their decision-making over time before and after playing the game), comparative (looking at the potential effects from playing the game in different contexts and with different types of participants).

1. Intervention method

Biodiversity in the cupboard

Authors: Barbara Smith, Alex Franklin, Geraldine Brown, Claire Lyons, Lindy Binder

2. Summary of the method

The aim of the method is to encourage participants to reflect on how personal food choices affect biodiversity. The method can be used with any group of people (and scaled to different age groups) to stimulate discussion. The process facilitates a discussion around a food and its ingredients – their origin, their production and distribution, and the impact of these factors on biodiversity both locally and globally. Ultimately, the aim is to give agency to participants in day-to-day decision-making in relation to biodiversity conservation and restoration, to amplify that even relatively small decisions can make real world changes.

3. Use context (within PLANET4B)

3.1. Relevant social aspects of biodiversity being addressed

A starting point for this work is a pressing concern with 'a green inequality' (Howard Boyd, 2022). Such 'green inequality' is characterised by ethnic minorities encountering barriers leading to a disconnect from the natural environment. This has ramifications for reversing biodiversity decline, strategies aimed at raising awareness, individual and policy prioritisation of biodiversity and understanding and responses to biodiversity loss. This intensive case study sets out to explore how biodiversity is understood, perceived, engaged with, and valued by ethnic minority communities.

This links directly to one of the overarching aims of the PLANET4B project which is to address the exclusion or marginalisation of ethnic minorities in biodiversity decision-making.

3.2. Relevant intersectional dimensions

The case study focuses on men and women living in the UK who identify as members of ethnic minority communities. In the UK, the term "ethnic minority" generally refers to racial and ethnic groups that are less represented in the population, thereby categorising diverse populations (Dacosta et al., 2021). Individuals from migration backgrounds have varied life histories and levels of affluence; people from ethnic minority backgrounds exist across all socioeconomic categories, sectors, and professions (Rishbeth et al., 2022). An intersectional approach will help us identify both the similarities and differences among participants, providing a nuanced understanding of how racialised communities experience nature and the outdoors.

3.3. Relative focus given to different levels of social change

Individual level change	*Community level change*	*Institutional level change*
High	High	Low

4. Roles

4.1. Participants

Participants are co-researchers in the process. They gather data by taking photographs, co-interpret data in a face-to-face workshop, and discuss the impact of the process on their food choices. Generally, a relatively small group of participants (4-10 people) makes the face-to-face workshop component more manageable, therefore, if the group is much larger, it is recommended that the group is sub-divided into groups of ca. 6-10.

4.2. Facilitators

The role of the facilitator is to:

- Co-ordinate the initial data collection (in this case photographs of each participant's selected food item).
- To provide resources (including: (e.g.) WhatsApp group for participants to share their photographs; materials (see section 5, below) to facilitate workshop discussion).
- To transcribe the ingredient list and identify the main producing countries prior to the workshop.
- To select and arrange a suitable venue for the workshop discussion.
- To facilitate discussion in the workshop, supporting the participants in interpreting and evaluating the data they have collected.
- To end the session by facilitating a short debriefing.
- To record key points of the discussion for subsequent analysis.

5. Materials

- Camera / camera phone
- Large poster sized (A1 or A0) map of the world (if your group is large, you will need one map per 10 participants)
- Map pins (with paper flags large enough to write a single word) – one set per map

6. Instructions

6.1. Participatory information is provided and informed consent secured from all participants.

6.2. Participants are asked to select five items that they frequently use from their food cupboard and instructed to take two photographs – one showing the product with its name, and a second showing the ingredient list (if it has more than one ingredient) clearly enough that it can be read. Participants are also asked to note the origin of the item if it is given.

6.3. The photographs should be uploaded to a space where the facilitator can receive them – WhatsApp, or similar, can be useful but there should also be an option where only the facilitator has access, such as email (to enable anonymity within the participants).

6.4. The facilitator creates two tables: 1. A table of the all the items shared and their origin; 2. A table of all the ingredients listed on the products, with the top five producers of each of those ingredients noted. This data can be obtained from FAO, USDA and Statista (the former two are free, the latter is a paid for service frequently subscribed to by academic organisations (see section 12, below)). The

facilitator also creates a summary that encapsulates the main food items and their origin.

6.5. The facilitator prepares workshop materials by writing the name of the ingredients on the flags of the map pins – one ingredient per flag. You will need one map and one set of map pins per group.

6.6. The participants are invited to a face-to-face workshop. If there is a large group of participants, facilitators divide them into groups of no more than 10 people. Participant groups gather around a map of the world, each group has one facilitator. Ideally each facilitator is supported by an additional researcher whose role is to record notes on issues raised during the group discussion.

6.7. Participants are invited to take the map pins with the ingredient names on and stick them into map to identify the country that they believe produces most of the relevant product. Facilitators should allow 10 minutes of free discussion while this process takes place. After 10 minutes the facilitator starts to contribute to the process, feeding back on how close the participants are in their estimation of which countries are the largest producers. Some brief discussion of the implications of global food production and how this impacts biodiversity is useful.

6.8. The facilitator then invites the participants to consider the following questions in a structured conversation:

How large is the land area that production consumes and what is it displacing?
Is it displacing important wildlife habitat? For example, facilitators could raise the following: Does this displace endangered species? How fragile is the ecology of the landscape it is grown in? Is it displacing a locally important crop that was kinder to the local ecosystem? Or is it a new crop that is inherently regenerative and is helping to restore the landscape?

What kind of farming system is it grown in?
Facilitators could lead a discussion that considers the following: Is the crop grown in an intensive monoculture that is reliant on pesticides? Or an organic agroforestry system with no inputs? Is it a regenerative system that aims at soil restoration? Could the system be changed and would this change how the participants changed their food choices?

How valuable for biodiversity is the crop itself for biodiversity?
Topics for discussion could be: Does the crop support wildlife? Could its benefit to wildlife be improved by changes to farming practice?

Does the crop rely on wildlife directly?
Topics could include: Does the crop need pollinators? Does it provide other resources for other species (shelter or food). Could it be farmed organically if enough pest predators are maintained in the landscape and would this benefit biodiversity?

As a final closing discussion (debriefing), participants as asked to feedback on how the process has made them think about food choices and whether the experience will influence their food choices in the future. What will they change?

6.9. Decide next steps and dissemination. Participants decide along with the facilitator whether the exercise is now complete or if they would like to disseminate their results and, if so, what form that would take.

7. Data collection and synthesis

This method supports qualitative analysis of data generated by the participants during the workshop discussion. In thematically analysing key points raised during the process of plotting the food items on the world map and responding to the proposed four structured questions, researchers may also wish to refer back to the two tables listing the food items

originally selected by the participants (1. A table of the all the items shared and their origin; 2. A table of all the ingredients listed on the products)

8. Checklist for implementation

- All materials procured and ready
- Appropriate space for the workshop
- Participant information sheets and securing of informed consent (ethics)

9. Critical considerations

9.1. Ethics of care / ethical considerations

Ethics of care in this method revolves around creating a supportive and empathetic environment where participants feel comfortable sharing their experiences. The process may involve capturing deeply personal reflections, so researchers must maintain a respectful and sensitive approach. People may not feel comfortable sharing their food cupboards for fear of being judged so ensure that an option is made available for participants to contribute their food items anonymously.

In biodiversity research, the ethics of care also encompasses environmental stewardship. Researchers should ensure that the methods used do not harm local ecosystems, particularly when working in vulnerable habitats or with endangered species. Participants should be encouraged to reflect on how their photographs might contribute to environmental awareness and advocacy.

- Ensure informed consent is obtained from all participants.
- Address concerns about privacy, confidentiality, and potential risks.
- Develop a plan for managing sensitive or controversial images.

9.2. Power dynamics and relations

Researchers often come from outside the community and bring different cultural assumptions, authority, and resources. This can create imbalances, where participants may feel pressured to align their responses with the researchers' expectations.

To mitigate these issues, fostering a participatory and collaborative environment is crucial. Researchers must adopt a listening role, ensuring participants' voices are not overshadowed by academic or institutional priorities. Equal partnership is critical in defining the project's direction, interpreting the images, and determining the research outcomes.

People may not feel comfortable sharing their food cupboards for fear of being judged so it is important to ensure that this part of the process can be anonymous.

10. Top tips

- The ‘how’ knowledge allows for a more nuanced discussion that considers more than just ‘miles travelled’. Make space for participants to share their own knowledge of ‘organic’, ‘agroecological’, ‘seasonal’, ‘local’, ‘grassfed’, ‘free range’, etc. if relevant.
- As the largest producers are revealed, there may be reflection on conscious or unconscious biases towards certain countries for a variety of political reasons that may or may not have any direct relevance to biodiversity. While not shutting down discussion of the political economy around food too abruptly, steer the conversation back to biodiversity.

- This is an empowering exercise because participants have control over their food choices and may make different choices as a result of these discussions.

11. Measuring impact

Impact arising from using this method will primarily be at the intrapersonal and interpersonal level. The impact is likely to be on food choices individuals make and how they share this information with others in their social network. We also anticipate that there will be a change in perception of how to evaluate the impact of personal actions more generally on biodiversity.

To capture the impact, participant perceptions and actions can be gathered via recording of individual comments during the final debriefing stage of the group discussion and/or in follow-on using testimonials, interviews and questionnaires. Information should be gathered using an appreciative inquiry approach at the following points in the process to track change; prior to the activity, immediately after completing the session and then a month or two later.

12. Links to external resources

References

Dacosta, C., Dixon-Smith, S and Singh, G. (2021) *Beyond BAME: Rethinking the politics, construction, application, and efficacy of ethnic categorization*, Coventry: Higher Education Research Action Group (HERAG).

Howard Boyd, 2022 in State of the Environment, health, people and the environment (26th Jan 2026). Environmental Agency (accessed October 3rd, 2024). State of the environment: health, peopl and the environment – GOV.UK (www.gov.uk)

Rishbeth, C., Neal, S., French, M. and Snaith, B. (2022) Included outside: Evidence synthesis for engaging under-represented groups in nature. Evidence Briefing, Natural England Technical Information Note, TIN185. Natural England, York.

Databases

FAO Food and Agriculture database: https://www.fao.org/faostat/en/#home

USDA World Agricultural Production: https://fas.usda.gov/data/world-agricultural-production-10112024

Statista: https://www.statista.com/

1. Intervention method

Biodiversity Jenga®

Authors: Lindy Binder, Barbara Smith, Ilkhom Soliev, Claire Lyons, Alex Franklin, Geraldine Brown

2. Summary of the method

The aim of the method is to use the familiar Jenga® or similar tumbling blocks game with a customised board, to encourage conversation about biodiversity loss and to tangibly illustrate how species loss can potentially lead to ecosystem collapse. The game is simple and quick to play with an element of jeopardy when the tower comes crashing down. The blocks represent species. The blocks (species) are assembled as a tower that sits on the gameboard. The players use a die to move around the board and follow instructions on the square they land on. The instructions will direct the player to remove or add a block of a particular type (an insect or bird for example) and offer a rationale ("too many pesticides, remove 1 insect" or "new hedgerows planted, add a bird"). The game helps players conceptualise how removing species from a system through tangible actions can cause instability, thereby illustrating the interconnectedness of nature. The game is over when the tower collapses (signifying ecosystem collapse).

The game is for everyone, but there is an adaptation, for playing with older children and students learning about biodiversity in an educational setting, where each brick represents a specific plant or creature that has been researched ahead of the game by members of the class and assigned a corresponding card.

3. Use context (within PLANET4B)

3.1. Relevant social aspects of biodiversity being addressed

This game addresses a lack of awareness and understanding of the impact of species loss on ecosystem stability. Biodiversity Jenga® is designed as a conversation starter for discussions about biodiversity loss, so it is suitable for anyone unaware of the risks. It is very quick and simple to play, and the dimension of jeopardy makes it exciting to both play and watch. It is designed to increase awareness of the precarity of ecosystems through biodiversity loss, and to encourage consideration of human actions that affect it.

3.2. Relevant intersectional dimensions

The aim is to provide an introduction to ecosystems for children in secondary and primary education, or as an icebreaker for community groups or the business sector. In an education setting, the game can be built upon to add detail to biodiversity and specific ecosystem understanding depending on the age, ability and curriculum relevant topics to be studied. While it is suitable for children, it was designed to be played by any group that would benefit from seeing the risk to the ecosystem of biodiversity loss.

3.3. Relative focus given to different levels of social change

Individual level change	*Community level change*	*Institutional level change*
Medium	Medium	Low

4. Roles

4.1. Participants

Participants are game players. The game can be played with 2-6 players. For larger groups of people, multiple games can be played concurrently by dividing people into groups of six or fewer.

Without a debrief, the game can be played in 5-15 minutes.

4.2. Facilitators

The simple version of the game was designed not to need much facilitation, however prior to playing, a facilitator will need to:

- Print a PDF of the board.
- Adapt a Jenga® or other tumbling blocks game so that the colours on the bricks correspond with the colours on the board.

It would also help if the facilitator explains (e.g. at the beginning or end of the session) the limitations of the Jenga® model compared to a real ecosystem (for example in real world ecosystems species have functional roles that may mean that they play a greater or lesser role in ecosystem stability).

Facilitators can use the experience to pose questions and stimulate discussion among participants.

5. Materials

- PDF printout of the board in colour (can be laminated if required)
- Die (can be virtual/phone app)
- Tokens to move around the board, enough for one per player (can be a coin)
- A Jenga® or similar tumbling blocks game with the ends of the bricks coloured to correspond with the different species colours on the gameboard
- [Optional: a recording device should you plan to audio-record the discussion]

6. Instructions

Preparation:

6.1. Colour both ends of the Jenga® (or other toppling) bricks according to the six colours on the Biodiversity Jenga® board: green=plants, blue=fish, red=mammals, purple=birds, pink=insects, orange=amphibians. In a typical Jenga® set of 54 bricks there will be nine of each colour. You can use pens, paint, nail varnish, crayons, coloured stickers, etc., but make sure you only add colour to the ends as the other surfaces of the bricks are designed to slide against each other.

Gameplay:

6.2. In groups of 2-6 (3-4 is probably ideal) assemble the Jenga® tower in the middle of the board. Roll the die to determine who will go first.

6.3. The first player then rolls the die and moves their token to the corresponding number of spaces. Players can start from any corner.

6.4. The player then follows the instructions on the square. (For example: forest fire, remove one plant – the player must remove a green brick from the tower and place it in front of them). There may be more than one instruction on a square (indicated

by an additional triangle). Once the instruction(s) have been followed, this concludes the player's turn and play continues clockwise. If the instruction requires the player to place a brick back into the tower, this must not be added to the top layer but to somewhere that a brick has already been removed. If the player doesn't have the correct colour brick to return to the tower, play passes to the next player.

6.5. Continue until the tower topples (the ecosystem collapses).

6.6. The facilitator can use the game as a short icebreaker for a lesson, business meeting, or other activity, concluding by recognising the limitations of the game to mimic a real ecosystem. The facilitator may choose to pose some questions to build understanding, such as, but not limited to:

Could you predict when the ecosystem was going to collapse?

What impact can your choices make on species conservation or loss? Is there anything you might do differently as a result of playing this game?

Did the tower ever collapse when you were *returning* a species to the ecosystem? – Do you think this would happen in the real world?

What are the limitations of this model compared to a real ecosystem?

7. Data collection and synthesis

When *being* used as part of a research intervention, data can be collected via group observation during the playing of the game and/or as part of a post-game debriefing. In both cases either written notes or digital recording can be used to see what sorts of discussions the game provokes – such as new learnings (e.g. 'I hadn't realised fast fashion would impact biodiversity') or behaviour changes (e.g. 'I'm going to reduce how much plastic I use to reduce microplastic pollution'). Because the game is relatively simple to facilitate it is suitable (if necessary) for the same individual to take the role of facilitator and data collector. If recording data, participants would have to give informed consent.

Collected data can be thematically analysed, either as a stand-alone data set, or (e.g. if the game is being played as an icebreaker) as part of a series of interlinked activities across a longer workshop session.

8. Checklist for implementation

- Materials procured, printed and adapted
- Appropriate space to play
- If collecting data, provision of participatory information sheets and securing of informed consent (ethics)

9. Critical considerations

9.1. Ethics of care / ethical considerations

- If collecting data, ensure participants are provided with participatory information and give informed consent. In the case of children, consent will also need to be collected from their parent/guardian and (if applicable) any associated legal permissions for interacting with children secured.
- The subject of biodiversity loss may trigger anxiety around environmental change in some participants. Sometimes heated discussions are a sign that

certain topics are close to the heart of some of the participants. This needs to be treated carefully with constructive, respectful and inclusive language.
- It is important to make sure that the game is conducted in a place that is (easily) accessible to all participants.
- If using a giant Jenga®, set up the game on the floor rather than a table to mitigate any injury from falling bricks when the tower collapses.

9.2. Power dynamics and relations

The game itself is designed to need minimum facilitation, but for subsequent discussion and/or debriefing it is important for the researcher/facilitator to be mindful of their own cultural assumptions, authority and resources that may make a participant feel pressured to align their responses with the researcher/facilitator's expectations. The facilitator may also need to ensure none of the gameplayers dominate the resulting discussion with their views at the expense of other players' voices.

10. Top tips

- The game can be adapted to reflect specific ecosystems.
- It is useful if there is an ecologist on-hand to explain how and why biodiversity loss can cause ecosystem collapse.
- Recognise the limitations of the model: the tower is built randomly, but a real ecosystem has plants and insects at the bottom, and apex predators at the top, and there are feedback loops within the system (e.g. if the tower were built with the apex predators at the top and we took one off, it would have no effect, but in reality the removal of apex predators would have a significant impact on the whole ecosystem). There are no reptiles in the game, and for the six classes/genera the number is equal for each, whereas ecosystems largely contain more plants and insects, than birds or mammals. The primary focus of this activity is awareness of the real risks of biodiversity loss and starting the conversation.
- If using giant or garden Jenga ®, print the game board on A3 paper.

11. Measuring impact

This activity is designed to start people thinking about biodiversity loss, not necessarily to change habits. We do not aim to collect data on impact using this game, but an optional simple reflection before and after playing, with its associated discussion, would indicate if playing the game has had any influence on attitudes towards biodiversity. We imagine the game may be used primarily to stimulate thinking as the beginning of a deeper engagement with biodiversity loss.

12. Links to external resources

To our knowledge, no previous biodiversity/ecosystem Jenga® game has employed a board. Some other ecosystem games based on Jenga® and academic papers about them can be found at:

https://actionfortheocean.com/toolkit/peruvian-food-chain-jenga/

https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1026&context=hprccpubs

https://theconversation.com/wildlife-conservation-needs-to-change-and-the-game-of-jenga-can-help-us-see-why-131534

https://www.science.org/doi/10.1126/science.1096112

1. Intervention method

Community mapping for promoting biodiversity decision-making

Authors: Sandra Karner, Reni Hofmüller

2. Summary of the method

This proforma is adapted to the PLANET4B context, but is based upon the manual by Risler & Ares (2018).

"Territory is the socially-built space" (Milton Santos, 2021).

This method goes back to the basic concept(s) of participatory and collective mapping/cartography, which is based on ideas of critical mapping/cartography (Risler & Ares, 2018). Community mapping involves community members or a group of community members (e.g. women*) sharing their experiences, relationships, knowledge, and ideas to collaboratively create a map. This practice is typically carried out in an inclusive manner. The method aims to highlight the relationship between a place and its local communities, and should consider not only the spatial and natural context, but also social, political, and economic aspects. The mapmaking process itself may serve as a catalyst for transformation, and the final product(s) (e.g. a plan for designing a green space) value diverse or explicitly marginalised perspectives, voices and needs (Risler & Ares, 2018).

Community maps visually represent a community's/group's perception of their space, showcasing significant physical and sociocultural features (Risler & Ares, 2018; Santos, 2021). Community mapping processes and outcomes are regarded as more inclusive and democratic than technical plans, making them useful tools for fostering individual empowerment and driving social change. Several examples (see. e.g. Cochrane & Corbett, 2018) highlight the potential of community mapping to contribute to social justice issues and positive societal change.

3. Use context (within PLANET4B)

3.1. Relevant social aspects of biodiversity being addressed

In PLANET4B community mapping was used with the BeSt Graz Citizen Learning Community (LC) of mainly migrant and socio-economically disadvantaged women of various ages (between 17 and 65+ years) in Graz. Over a period of 9 months, this women*s group was guided through a process of setting-up and cultivating a garden, while dealing with various aspects of the topic of biodiversity in so-called 'research units', where various methods, such as the one described, were tested.

The method addresses inequalities in designing natural environments, territories and access to good food.

Access to healthy, sustainably produced food that respects diverse culinary traditions is not guaranteed for all residents. Disadvantaged groups, in particular, often face limited access to alternative forms of food supply, such as community gardens. The situation regarding the use of urban green spaces and access to nature is similarly unequal. Sustainably designed edible green spaces and community gardens can be an effective strategy to improve food security in low-income urban areas. Additionally, involving citizen groups, especially those typically excluded from planning processes, in the design of urban green spaces can foster social cohesion within communities and help reconnect people with nature.

3.2. Relevant intersectional dimensions

The risk of poverty and social exclusion has immediate consequences for decisions regarding the food provision of those affected. Single-parent households, single women, and particularly elderly women living alone are often affected. People with a migration background are also at a higher risk of poverty or social exclusion. The community mapping method may be used to take an intersectional approach as it can challenge dominant worldviews, provide counter-narratives, and be used as a tool of resistance and to address power hierarchies.

3.3. Relative focus given to different levels of social change

Individual level change	*Community level change*	*Institutional level change*
Medium	High	Medium

4. Roles

4.1. Participants

In the community mapping activity, participants actively engage in a collaborative process of creating and reinterpreting maps to challenge dominant narratives about territories (Risler & Ares, 2018). They use their everyday knowledge and experiences to identify and highlight the most pressing issues in the area (e.g. what should an urban green space serve for; for whom, to what extent, etc.). This involves reflecting on functions to be fulfilled, specific needs, responsibilities, connections to other topics (e.g. biodiversity and nature, gardening, food production, social inclusion, health, culture and arts, etc.), and marking the consequences of different actions and events in the territory.

The process often begins with a conventional map, like a printed cadastral map. Participants then share their perspectives and insights, critiquing and transforming the initial representation of the territory based on their collective knowledge (Risler & Ares, 2018). This helps bring to light hidden issues and those that are not easily represented, to foster dialogue and to develop participatory projects aimed at addressing the area's challenges.

To develop new territorial narratives, tools that promote participation and reflection through dialogue are essential. Iconographies, pictograms, and maps provide accessible opportunities for participants to share ideas and highlight significant issues. At first glance, these resources might seem limiting, but they actually enhance collaborative efforts and enrich the process by adding aesthetic and symbolic dimensions. This approach broadens participatory research methods and deepens our understanding of everyday, historical, and collective realities. Participants are encouraged to modify existing visual aids or create their own representations using images, symbols, texts, and more.

4.2. Facilitators

Role of the facilitator:

- Establish the mapping scope.
- Prepare/print a map of the territory.
- Prepare icons and other visual material.
- Ensure appropriate workshop space arrangements.
- Advise in the use of visual mapping material.
- Facilitate discussions.

- Guide participants towards the defined topic of focus (i.e. managing risk that discussion may become very broad).
- Timekeeping (i.e. managing risk for sprawling discussions).
- Ensure ethics approval and informed consent of all participants.
- Ensure proper documentation (depending on the data to be collected).

5. Materials

- Large printed maps of the territory
- Visual tools (markers, pencils, adhesives, scissors, and thematic icons)
- Participant information and informed consent sheets (ethics)

6. Instructions

6.1. Preparatory work:

- Fixing the mapping scope: Before setting up the workshop, the facilitator should reach out to the mapping coordinators, which may include groups, cultural centres, social movements, and institutions (Risler & Ares, 2018). The facilitator needs to clearly understand their expectations, the topics to be addressed, and the areas the workshop will cover. This initial contact will help to develop a specific proposal, which can later be refined and expanded upon by the workshop participants.
- Invitations: If the workshop is open to the public, the invitation should clearly state that there are no requirements or limitations for participation. However, it is worth considering potentially conflicting interests and tensions within diverse groups, as well as challenging group dynamics. The invitation strategy should be tailored to the mapping exercise's specific aim(s).
- Preparing the basic map: "Maps for the relevant areas can be accessed through the Land Registry, although there may be a fee for copies" (Risler & Ares, 2018). Additionally, enlarged photocopies of maps with map datum can be obtained from stationary stores (Risler & Ares, 2018). Another option is to create a hand-drawn representation of the territory, or to download maps via a search engine or directly from www.openstreetmap.org.
- Preparing visual tools: Images, icons, drawings, texts, frames, newspaper clippings, or any other resource which fosters the communication to be printed as stickers/cards, which then can be used by participants for the mapping activity. Blank stickers/cards should also be prepared such that participants can do their own drawings/text (Risler & Ares, 2018).

6.2. Introduction:

- Participants briefly introduce themselves by stating their names, the activities they are involved in, or the institutions they represent, along with their expectations for the workshop.
- If the participant group is familiar with each other, a check-in exercise can be implemented instead of the introductory round (e.g.: How do I feel today? What is my favourite drink on such [a hot summer day]?).
- For larger groups, one-by-one introductions and check-in statements may be omitted, as this takes too much time. Instead, group exercises, such as lining up or other icebreakers, can be used. The community mapping method may be implemented with up to 50 persons.
- The facilitator explains the activities planned for the workshop, outlining the topics to be covered, the duration of each session, and the overall objectives.

A visual presentation may be prepared, or a dialogue may be held instead. It is essential to emphasise the critical and reflective potential of working with maps and graphic tools. Additionally, it is important to clearly explain how participants can creatively and freely engage with these tools, utilising pre-designed materials and contributing their own drawings.

6.3. Mapping in break-out groups:

- After the introduction, participants can be divided into smaller groups of 8 to 10 members. This division can be based on a fun activity or arranged according to a specific topic chosen by the facilitator (Risler & Ares, 2018).
- The working area should be well-lit and equipped with tables that offer enough space for the map(s), along with the necessary resources and tools provided at the beginning of the workshop. If the work is to be done outdoors, proper places to sit and/or work on the ground can be prepared (Risler & Ares, 2018).
- The facilitator should rotate among tables to answer questions, encourage participation, and address any doubts related to the use of graphic and visual resources, as well as how to engage with the devices (Risler & Ares, 2018).
- Depending on the size of the group and participants' productivity and concentration, the mapping time may vary. We suggest granting around one hour as reference time.

6.4. Sharing results:

- Once all groups have completed the mapping exercise, each group are invited to share their results. These results should be displayed in a way that ensures that everything is visible to everyone. As the different topologies are discussed, the facilitator should ask questions or make comments to encourage debate. This moment is crucial for the continuation of the workshop, as it quickly highlights both the differences and similarities among participants (Risler & Ares, 2018).
- Alternatively/additionally, the facilitator can take notes to organise the information into a diagram. This diagram may include the main topics of the workshop or focus on the key points of a SWOT analysis (Strengths, Weaknesses, Opportunities, and Threats). This information can then be presented to the group, serving as the foundation for planning future actions (Risler & Ares, 2018).

6.5. Closing

- Clarifying further steps respectively on what will be done with the mapping results.

There are many more ways to implement community mapping activities; a good overview of various examples is compiled in the Manual of Collective Mapping (see section 12, below, for external resource links).

7. Data analysis and synthesis

Collected data:

- Community map(s)
- Records of the discussion
- In case applicable: SWOT results

The qualitative analysis of the data can be used for further planning of the territory, for initiating projects, for discourse analysis, and for assessing impact.

8. Checklist for implementation

- All materials prepared (maps, icons and other visual material, markers, scissors, etc.).
- Workshop space properly prepared (consider different arrangements for indoor and outdoor venues).
- Participatory information sheets (ethics) distributed to participants in advance and their informed consent secured.

9. Critical considerations

9.1. Ethics of care / ethical considerations

"Mapping is not always used as a tool to empower individuals and communities. Sometimes participatory mapping serves primarily as a method for data collection, extracting information from participants rather than empowering them" (Risler & Ares, 2018).

Additionally, mapping processes can lead to unintended consequences. They may exacerbate conflicts, influence land use and ownership, and facilitate the expansion of state control. They can also be instrumentalised and used to coerce public support, as individuals might be less likely to oppose decisions if they have been involved (even superficially) in a mapping process.

9.2. Power dynamics and relations

"The most significant forms of official mapmaking are means to express and exert power and control. What gets included and excluded on a map, how it is represented, and why a map is made are all questions linked to power" (Risler & Ares, 2018). Mapmaking is not merely the drawing of maps; it is the creation of power relations, and it is linked to the claim of control over space. Community mapping may have the potential to shift power; however, there is the need to document / make transparent how these power shifts occur, for whom, and for how long.

9.3. 'Technisation' of the method

There is a particular risk that community mapping might tend toward being overtly technical (e.g. supposed 'objectification' to avoid conflicts), despite recognising the essential political nature of maps, which needs the integration of social, economic and political components.

9.4. Inclusiveness

Marginalisation is often deeply rooted, which might also be reproduced in community mapping activities, resulting in ongoing exclusion. This exclusion can affect various groups, including individuals with low socioeconomic status, those living in remote or deprived city areas, ethnic communities, migrants, the homeless, people with disabilities or mental health challenges, and senior citizens.

10. Top tips

- Set clear objectives.
- Clear and transparent communication about the aim(s) of the mapping, and the use of its outcomes.
- Communicate realistic expectations.
- Ensure that maps are socio-culturally and politically contextualised.
- Verify that capacity for participation exists.
- Thoroughly consider whom to engage, and whom NOT to engage (if applicable, implement 'positive discrimination' of marginalised groups).

- Hold the workshop on-site at the territory to be mapped.
- A basic set of thematic icons can be downloaded online: https://iconoclasistas.net/recursos/ ; additional icons can be drawn by participants and facilitators or be professionally designed in collaboration with artists.

11. Measuring impact

Intrapersonal: assessment of the degree of empowerment and acquisition of new insights and changed perspectives through interviews and questionnaires after the mapping activity (short-term (days); middle-term (3-6 months)).

Interpersonal: group reflection after the mapping activity (ad hoc). In the PLANET4B case the mapping was repeated (middle-term (3 months)): In which respect does the second map look different compared to the first? Why did we change plans?

Institutional (middle-term; long-term): project ideas are brought forward; mapping plans are (partly) implemented. (Indicators for) transformative change in the territory can be observed/measured (Risler & Ares, 2018).

12. Links to external resources

Cochrane, L. & Corbett, J. (2018) Participatory Mapping. In Cochrane & Corbett (eds): *Handbook of Communication for Development and Social Change*. Springer. p. 1-9. DOI: 10.1007/978-981-10-7035-8_6-1.

Risler, J. & Ares, P. (2018) Manual of Collective Mapping. Critical cartographic resources for territorial processes of collaborative creation. ICONOCLASISTAS.

Santos, M (2021) *The Nature of Space*. Duke University Press: USA

1. Intervention method

Cookbook

Authors: Borbála Lipka, Katalin Réthy, Judit Ruprech, Gyorgy Pataki

2. Summary of the method

Cookbooks can promote biodiversity-positive decision-making by guiding readers towards engaged food practices and choices. By featuring seasonal recipes that incorporate heritage varieties and underutilised crops, they empower people to connect their eating habits with the preservation of biodiversity. Cookbooks also provide a space for knowledge exchange and to document traditional recipes and ingredients, highlighting rich biocultural heritage and fostering ecological management of food resources (Sánchez et al., 2024).

Within PLANET4B the cookbook method has been used to produce a vegetarian cookbook showcasing recipes with vegetables that are easily grown in the case study country (Hungary in this case), but not popular (or underutilised, or not known at all). The book includes tips on how to grow key ingredients and their historical or cultural significance.

3. Use context (within PLANET4B)

3.1. Relevant social aspects of biodiversity being addressed

This PLANET4B case study addresses agrobiodiversity – the link between nature and human culture – particularly in relation to the diversity of seeds. Focal points of the case study include the maintenance of seeds, seed saving and conservation work. The scope of the case study extends to understanding what intervention(s) could be done in order to provide individuals with knowledge and agency to make decisions that have a positive influence on agrobiodiversity, promote stronger and extended heirloom seed networks, to develop a seed system that better supports (agro)biodiversity. It also analyses the relationship between farmers involved in conservation and their seeds, and seeks to raise awareness of the diversity in cultivated plants. Operating in alternative food networks, the farmers and gardeners engaged in these activities tend to be subsistence farmers and amateur gardeners who connect with civic movements (e.g. agroecology, permaculture, etc.) and public research activities (on-site farm experiments).

The cookbook introduces people to vegetable varieties that are suited to their local climate, but less known and underutilised. This knowledge has the potential to create a meaningful impact on both individuals and communities.

3.2. Relevant intersectional dimensions

This PLANET4B case study focuses on open-pollinated vegetable varieties and their seeds, considering that the whole seed system needs to support diversity, human and non-human. Incorporated within the study (within the context of seed systems) is an exploration of gender roles at a systemic level. Working with seeds is highly gendered: the management of seeds (including selection, seed saving, seed cleaning and seed storage) almost always belongs to the realm of women. The current (mainstream) seed system is built up in a way that is focused on production and disregards the role and importance of reproductive work (e.g. the importance of small-scale seed saving, conservation of genetic diversity, the role

of community seed networks). A more resilient seed system is needed to support (agro)biodiversity.

3.3. Relative focus given to different levels of social change

Individual level change	*Community level change*	*Institutional level change*
High	Medium	Low

4. Roles

4.1. Authors / Researchers

- Identify suitable (adapted to the climate, but underutilised) vegetables.
- Research cultural or historical background of selected vegetables.
- Take photographs of vegetables as they grow, as well as the process of making meals with them.
- Write recipes featuring the key vegetables, and provide any relevant additional information about them (e.g. plant cultivation tips and the plant's origin story).
- Edit and publish the recipe book.

Within PLANET4B, because this method was utilised as part of an extensive sectoral case, collaboration was limited to the two authors of the cookbook who are members of local Stakeholder Board (one is a vegetable grower, the other is a photographer). Should the method be taken up elsewhere (e.g. in an in-depth place-based case study) consider extending the collaborative aspect so as to engage a greater number of stakeholders in the selection and collation of recipes for the book, together also with associated tips, information and storytelling narrative.

5. Materials

- A camera
- Access to a vegetable garden or site where the vegetable(s) can be grown
- A kitchen
- Access to reference sources for researching the history of the vegetable and identifying recipes
- If involving research participants – participatory information and informed consent sheets

6. Instructions

6.1. Photograph ingredients growing on the farm or garden.

6.2. Harvest ingredients and come up with suitable recipes (in the context of this PLANET4B case study there were twelve main ingredients and twelve recipes, although some of the ingredients featured in more than one recipe)).

6.3. Photograph the recipe at various stages of preparation through to completion.

6.4. Research the plant's origin story (in the context of PLANET4B this was done from a combination of existing knowledge and desk-based research).

6.5. Write the recipes to include plant cultivation tips and the plant's origin story as well as photographs.

6.6. Publish as open access and promote in in locations aligned with the target audience (within the PLANET4B case study the cookbook was published online, on the website of Magház Community Seed Association.).

6.7. Translate into other languages if time/budget allows.

7. Data collection and synthesis

Within the PLANET4B case study data collection was limited to the informational material and images collected for the featured vegetables. The data was organised into twelve recipes and published as a cookbook.

The cookbook method can also be used as a method to engage collaboratively with multiple research participants (e.g. in an in-depth place-based case study) In this context consideration should be given to extending data collection to storytelling sessions and/or semi-structured interviews with those involved in creating in recipe book. Data could also be collected from those who use the cookbook resource (e.g. simple survey to explore its impact on their understanding and behaviour towards heritage vegetables). Such data can then be analysed using a mixture of qualitative (e.g. thematic and narrative analysis) and quantitative (e.g. surveys) research methods.

8. Checklist for implementation

- A camera
- Vegetables
- A kitchen to make the recipes
- A computer to upload the recipe book
- Participatory information and informed consent sheets for all collaborating participants.

9. Critical considerations

9.1. Ethics of care / ethical considerations

- Ensure recipes are easy to follow and ideally written in a native language.
- If inviting contribution of recipes, ensure all recipe creators or developers consent to their recipes being included in the book. Additionally, agree terms of recognition, and credit all contributors.

9.2. Power dynamics and relations

To use the cookbook, readers will need access to basic kitchen equipment, ingredients (including heritage varieties), and a certain level of cooking skill. Similarly, if readers plan to grow the heritage varieties, they will require growing space, gardening tools, skills, and sufficient time to cultivate crops. These requirements create potential power dynamics, particularly for those living in insecure housing or with limited access to cooking or growing spaces. To make the cookbook more accessible, authors should avoid requiring specialist equipment or complex methods. Instead, the cookbook could feature a variety of recipes and gardening tips suitable for different levels of experience and resource availability. Additionally, creators might encourage readers to engage with the cookbook in community settings, such as community gardens, to share resources and reduce individual requirements.

10. Top tips

- Consider where to publish the cookbook, to target people with an interest in gardening vegetables. In the PLANET4B case, it was published on the Magház Community Seed Association website.
- Consider when best to launch the cookbook (in the PLANET4B case it was published online at Christmas as a free gift to Magház's followers). To encourage greater engagement, you could publish or re-launch it just before the best season to plant key ingredients, or to coincide with a harvest festival or community meal.
- Include lots of pictures.
- Consider also including additional information such as provenance of recipes, recipe contributors' memories linked to seed sowing, harvesting, cooking feature vegetable (etc.) and/or simple associated biodiversity facts. However, take care to avoid adding too much text such that the book does not become overly dense and thus insufficiently simple for users to engage with.
- The compilation of the cookbook could be an opportunity to engage stakeholders by inviting them to share knowledge (technical/historical/cultural) on the vegetables, as storytellers, and/or as contributors of recipes.

11. Measuring impact

This method was used in PLANET4B within an 'extensive' case study. There was no place-based Learning Community, so impact was not measured. However, in a different context, this method has the potential to deliver impact at intrapersonal, interpersonal, and institutional levels. At the intrapersonal level, the cookbook may inspire readers to reflect on how their food choices influence biodiversity, fostering a deeper personal connection to sustainable eating. At the interpersonal level, it could stimulate meaningful discussions about why certain vegetables are under-used and cultural identity, encouraging collective exploration of food practices that are connected to biodiversity. Finally, at the institutional level, the cookbook could inform menu planning in public institutions such as schools, hospitals, and prisons, promoting biodiversity-conscious practices on a broader scale.

Impact can be measured using various methods tailored to these levels. For instance, social media engagement provides immediate insights, such as tracking how many people like, share, or comment on posts about the cookbook. Encouraging users to share photos of their meals or use a designated hashtag enhances visibility and provides a direct measure of participation. Feedback to the cookbook also indicates impact. In the PLANET4B project, for example, positive feedback was accompanied by requests for heritage seed varieties, suggesting readers were changing their gardening habits. Additionally, tracking sales or download statistics can offer a quantitative measure of the cookbook's reach.

To achieve a more formalised assessment of impact, a survey could be introduced. This survey might be offered to readers at the time of download, assessing their initial knowledge or views on biodiversity and heritage seed varieties. A follow-up survey, sent at a set time later, could gauge changes in attitudes or behaviours, providing a more longitudinal perspective on the cookbook's influence. In addition, where the method is used to engage a number of research participants in sourcing content for the book, towards the end of the project they can be invited to a debriefing session to share their experiences and discuss the personal impact of being involved.

12. Links to external resources

Link to cookbook (in HU): https://drive.google.com/file/d/1ag3P5DGE-zMokol-2Dh1xXk0nSD3U6_j/view

Sánchez, C.G., Aguilera, C.L., Moreno-Santoyo, R., Rivera, L.P., Carrillo, S.M. and Herrera, L.D., 2024. Living community cookbook: transdisciplinary collaboration for constructing recipes with biocultural value. *Ecology and Society*, *29*(4). https://ecologyandsociety.org/vol29/iss4/art12/?utm_source=chatgpt.com

1. Intervention method

Debriefing

Authors: Karmen Czett, Eszter Kelemen

2. Summary of the method

Debriefing is a discussion aimed at securing reflection after an intervention has taken place to help clarify ideas and emerging thoughts. It can be conducted with individual participants or, in the case of methods involving multiple participants, with the whole group. Along with securing reflections on the participants' 'raw' experience, understanding and perceptions of the intervention, facilitators/researchers can share further details about the purpose of the intervention and get feedback on the process. A further function of debriefing is to express, discuss and resolve any thoughts or emotions that may arise – therefore it is important to keep in mind the different mindsets and abilities of the participants during the discussion and to use techniques and tools, such as mood cards, to help them engage where appropriate.

3. Use context (within PLANET4B)

3.1. Relevant social aspects of biodiversity being addressed

Within the context of PLANET4B, the organising researchers used debriefing in two cases: after an interactive class discussion and after a participatory theatre piece – both focused on biodiversity. For the class discussion, the participants were 13-year-old students, with the focus partly on understanding the complexity and role of biodiversity. In addition, they were asked further questions about their feelings and emotions in relation to their school garden and their expectations of the current and future processes in nature. In the case of the participatory theatre play, the participants were 15-year-olds, and the focus was on societal disconnection from nature and the social and ecological problems that this causes. Here too emotions were an important focus.

3.2. Relevant intersectional dimensions

In the context of debriefing sessions, a number of intersectionality dimensions come into play, as so many factors determine who can be engaged in the conversation and how. In the case of PLANET4B, age was a key consideration, as it was already very important to tailor the questions to the age group of the participating classes. In addition, gender is particularly important, especially in terms of group dynamics – if one gender identity is heavily over-represented, it can overwhelm speakers of the other gender identities, so it is also important to balance this. Social class and geographic location of the participants are also important in determining discussion topics – for instance, consumption habits may vary. In the case of PLANET4B, the researchers worked with children, using various techniques and tools to ensure the participation of children with special educational needs (for more on this see section 5, below).

3.3. Relative focus given to different levels of social change

Individual level change	*Community level change*	*Institutional level change*
Medium	Low	Low

4. Roles

4.1. Participants

The number of participants is important, as a discussion in a smaller, friendly atmosphere is more likely to create a safe space that is comfortable for the participants and better in terms of data too, because the discussion is going to be more open and in-depth. Regarding their role, the focus is on exploring thoughts, emotions and specific observations, which can be facilitated by a variety of techniques and tools adapted to the composition of the group. Participants do not need to prepare for the discussion, but it is important to do it shortly after the intervention has taken place. This is so that the experience is fresh and as much detail as possible is remembered. However, it is better if the discussion is not immediate, so that they have time to process what has happened. It is important to note that in the case of PLANET4B, the participants were young teenage children (13- and 15-year-old students), so with older/younger groups different circumstances may occur.

4.2. Facilitators

The most important task of the facilitators (who in the case of PLANET4B were the researchers themselves) is to put together a carefully designed set of questions for the debriefing discussion. The questions should be related to the intervention experienced but may also stray from it and raise other issues related to the topic/research. In the case of PLANET4B, for example, after an interactive class or theatre play on biodiversity, there was a discussion about the nature-relatedness of the participating students and society in general and how this was represented in the class/play. It is also very important that facilitators are prepared with techniques and tools to support the discussion (for more on this see section 5, below). Ensuring safe space is also essential, so it is important to treat participants as equal partners, avoiding any hierarchy.

In terms of data collection, ideally two people should act as facilitators, distributing the work: one to talk to the participants and the other to take notes and photos. It is important to do this in the least disruptive way possible so as not to intimidate participants.

4.3. Other observers (e.g. teachers, etc.)

In the PLANET4B debriefing sessions children were much more open when only the facilitator(s) were present, rather than when the teacher was also present. This is difficult in a school setting, of course, as it is the teacher's responsibility to supervise the children, but it may be possible to ask the teacher to keep themselves occupied during the debriefing session.

5. Materials

In both cases, during the use of debriefings in the PLANET4B education case study, mood cards were used to facilitate the conversation, in order to engage students with a more visual and artistic approach. The mood cards depicted a scene related to the human-nature relationship and they had to choose the one they thought best suited the discussed topic (for example, the one that best described their emotions about the school garden or a

strong, symbolic sentence from the play). Once everyone has chosen a card, it is worth looking for volunteers who are willing to share why they chose that card. Then, with the help of the participants, you can look for patterns between the cards chosen – this can also provide an interesting nuance to the research data.

In addition, within the PLANET4B education case study, the discussions ended with a fact-based, quiz game-like section, also designed to cater for a variety of needs. Nature-related topics from around the world were brought in to showcase the progress of conservation. In addition to engagement, this was necessary to end the discussion on a positive note, avoiding any risk of otherwise leaving participants with uncomfortable feelings afterwards.

There are certain ice-breaker techniques that facilitators can apply in the beginning or at the end of debriefing sessions, such as human thermometer (facilitators ask a simple question, e.g. what the participants' opinion on a certain topic is, how they are feeling at the moment, etc., and offer a response based on a the reading of a thermometer) – these can also be related to the intervention, helping to either jump right into the discussion, conclude it on a positive note, or measure potential changes in mood.

6. Instructions

6.1. Intervention – although it is not technically part of debriefing, step 'zero' should be the intervention (e.g. theatre play, interactive class, etc.), which is then discussed during the debriefing.

6.2. Compiling a guide – compiling a list of topics that help participants express their thoughts and emotions regarding the intervention and the broader theme (e.g. biodiversity crisis), as well as collecting data throughout the discussion. Writing an appropriate list of questions, possibly framed by ice-breaker exercises. In addition, it is important to think about tools and techniques to help address the issues. It is important to bear in mind that not all groups/participants may be able to express themselves verbally, so in addition to using a variety of techniques and tools, it is also worth preparing guiding questions to help them.

6.3. Techniques and tools – looking up and mastering the discussion techniques as well as purchasing/creating any supporting tools (e.g. mood cards) that the facilitators would like to use.

6.4. Organising the debriefing session – finding a location and time, discussing it with the participants and then booking it. To ensure maximum participation in this session it is important that participants are made aware that there will be a debriefing session from the outset of the preceding intervention.

6.5. Executing the debriefing session – traveling there, helping participants get there (if needed), bringing the tools (if there are any), having the group discussion. Ideally involving more than one research team member in the running of the session (see section 7, below), such that the roles of facilitator and note taker can be divided.

6.6. Analysing data – discussing and analysing the data that came out from the debriefing. Let participants know they can contact the facilitators/researchers if they have any unresolved feelings, emerging questions, etc.

6.7. Publishing and disseminating results.

7. Data collection and synthesis

In the context of how the debriefing method was used within the PLANET4B educational case, the best way to collect data is to have two facilitators present; while one leads the discussion, the other takes notes and occasionally pictures. The notes should include the comments made, the group dynamics and the participants' interactions with each other and with the facilitator. In the context of how the method was used within the PLANET4B educational case, recording the discussion is not advisable, as it could compromise the feeling of a safe space for participants, make them uncomfortable, and lead them to withhold information.

It is important that if tools are used, such as mood cards, these are documented separately – what cards were chosen and why, whether they show common patterns, and whether the note-taker can see anything emerging from them already. In the case of PLANET4B, facilitators took photos of the chosen cards.

Notes can be analysed qualitatively, either using qualitative content analysis or the grounded theory approach. If debriefing is used in different groups, the analysis can highlight how certain factors of intersectionality influence the participants' thoughts and emotions in relation to the different topics.

8. Checklist for implementation

- A debriefing guide, i.e. a set of questions adapted to the discussed topics
- Tools if appropriate (e.g. mood cards)
- Well-prepared facilitator(s)
- Participants
- A room with chairs and a large table, available with no interruption for the length of the debriefing – if nature-related topics are discussed, an outdoor classroom is preferable
- Participatory information and informed consent (ethics)

9. Critical considerations

9.1. Ethics of care / ethical considerations

A debriefing session aimed at getting participants to talk openly about their thoughts and emotions can be intimidating for introverted, less verbal people. It is therefore important to make it clear that participants can choose not to participate in any activity, refuse to answer questions, or even withdraw from the discussion entirely if they feel uncomfortable. Facilitators should prioritise the needs and comfort of participants above all else, with valuable data and research findings taking secondary importance. If a particular topic proves too sensitive for participants, facilitators can carefully improvise and adjust the discussion as needed. This approach ensures that while some expected data may not be collected, participants are not subjected to emotional distress.

9.2. Power dynamics and relations

Facilitators have more power to control the debriefing session process, even by setting the topics and questions. Moreover, during PLANET4B's education case study debriefings, the participants were children, which created further inequality by placing the facilitators in a kind of hierarchical, 'teacher' position. Therefore, it is important to make participants as aware as possible that they can refuse to answer and/or participate in any other ways at any time. The different dimensions of intersectionality can create further power imbalances, so it is important that facilitators use different techniques to help the group dynamics to create equal opportunities for participation.

9.3. Time

Make sure that participants have enough time for immersing themselves in the discussed topics and then expressing themselves in the way they find suitable. Bear in mind the time constraints but stay respectable at all times (e.g. do not stop someone in the middle of their sentence, etc.).

10. Top tips

- Always consider the age group and other possible vulnerabilities of your participants.
- Do not be afraid to (carefully) improvise if an interesting topic comes up or you perceive discomfort from your participants' side (even if it is only one person).
- Bear in mind the maximum number of participants – a smaller group can be better to reveal thoughts and emotions, but a too small group can also be too intimidating. Ideal group size varies between 6-12 participants (depending on the nature of the intervention and participants). If you have more participants, consider having two discussion facilitators and running two group discussions in parallel (in which case ensure to also have sufficient physical space for each group to talk separately).
- Debriefing sessions make the most sense after an intervention. It is worth leaving enough time to process the experience, while not allowing too much time to pass so people forget what happened. In the context in which the debriefing was used within the PLANET4B education case study the recommended minimum time in-between is 1-2 days, and maximum 2-3 weeks.
- Before the PLANET4B education case study debriefing sessions, psychologists were contacted to ask advice about engaging with children – what methods are suitable, how power dynamics can be avoided, etc. Although this is not a necessary step in every case, if you are working with vulnerable groups, such as children, consider discussing your process with external experts.

11. Measuring impact

Debriefing alone is most likely to deliver impact at an intrapersonal level, as it is mainly a tool for conscious processing after a particular intervention. A debriefing session should be held if you want to have an in-depth discussion about a previous intervention. In which case the discussed intervention is likely to have delivered an impact. Although it is worthwhile to combine this method with (participatory) observation during the intervention, a subsequent debriefing session can help to better measure the impact, e.g. by giving space to people who are less engaged (e.g. in a participatory theatre piece) or to people who prefer to express themselves visually (e.g. with mood cards) rather than physically/verbally. It can also potentially be used to further enhance the impact (i.e. through the encouragement of conscious reflection and/or by discussing with participants the original research intention (which may not always be apparent to participants based on their perception and experience of participating in the intervention).

To measure the impact, it is important for the facilitator(s) to take notes, ensuring that all significant observations are documented. While data analysis is primarily used to assess the impact of the intervention, it inevitably includes the influence of the debriefing session. Therefore, it is crucial to account for this during the discussion by using appropriate tools and providing space for feedback from all participants.

1. Intervention method

Diversity moves!

Authors: Edith Zitz, Sandra Karner

2. Summary of the method

The aim of the Diversity moves! method (as adapted for use within PLANET4B) is to encourage participants to reflection on various aspects of (bio-)diversity, based on personal experiences. The method, which takes the form of a workshop, addresses both ecological diversity in a green space (such as a community garden) *and* the sociological diversity of the participants' group.

The Diversity moves! workshop format:

- Combines elements of self-exploration, in addition to qualifications and skills informally acquired by the participants.
- Helps to make hidden competencies of the participants visible.
- Builds knowledge regarding political participation (e.g. in Austria/Province of Styria, a number of elections were held in 2024: communal, national and European elections, which were significantly influenced by discussions around climate change and ecological topics).
- Encourages participants to value and enjoy the diversity of green spaces (e.g. gardens).

3. Use context (within PLANET4B)

3.1. Relevant social aspects of biodiversity being addressed

In PLANET4B the Diversity moves! method was implemented with the BeSt Graz Citizen Learning Community (LC). This LC primarily consisted of migrant and socio-economically disadvantaged women aged between 17 and 65+. Over a period of nine months, this group of women* was guided through the process of establishing and maintaining a garden while exploring various aspects of biodiversity within designated 'research units.' In these units, various methods, including Diversity moves!, were tested and implemented.

Urban gardening projects can be challenging to establish due to the need for strong group commitment, collaboration, and a willingness to engage in cooperative decision-making processes. When participants are not well-acquainted, these factors can pose significant obstacles to successful organisation.

The goal of implementing the Diversity moves! workshop in this specific context was to highlight the broad range and high level of competence within the group. This visibility facilitates the effective collaboration among a diverse group of women* involved in pioneering urban gardening activities.

3.2. Relevant intersectional dimensions

The visible characteristics of the group may include (e.g.) ethnic background, citizenship, languages spoken, experience (or lack thereof) in the national or international labour market, number of children, age, living conditions, socioeconomic status, asylum-seeking experiences, general travel experiences, physical strengths, and age.

When individuals – specifically women – face multiple forms of structural and personal discrimination, it can lead to tensions and a lack of collaboration (Schutzbach, 2024). However, in the context of the group with which this method was used within PLANET4B, they were notably empathetic and cooperative despite some individuals likely carrying the weight of significant personal experiences.

3.3. Relative focus given to different levels of social change

Individual level change	*Community level change*	*Institutional level change*
High	High	Medium

4. Roles

4.1. Participants

The participants are the "experience experts" in the process. They share their personal knowledge and provide constructive feedback to each other in a supportive group environment.

4.2. Facilitators

Specific expertise of at least one of the facilitators: The facilitator should be qualified in gender, diversity and inclusion-issues (anti discriminatory approach) and should ideally also have an ecological background and knowledge of political concepts.

The facilitators are responsible for creating the invitation, developing the content, tailoring the method to the given setting, and establishing the workshop schedule. They also identify a suitable location for the workshop (e.g. in PLANET4B, a community garden) and prepare the infrastructure – table, chairs, shade (for outdoor venues), food, beverages, and additional materials.

If the workshop is held in several languages (in accordance with the characteristics of the participants), the facilitators handle translations and ensure that each participant can follow/contribute to the discussion, for example, by using translation tools.

If the workshop is audio recorded appropriate technical equipment should be prepared and operated.

The facilitators moderate the entire process and encourage a setting where everyone has enough room and feels comfortable communicating. At the end of the workshop, they organise a reflection session, gather feedback, summarise the findings, and take photographs for visual documentation.

5. Materials

- Name tags (in case of engagement of external facilitators)
- Various materials to implement the activities (e.g. cards with plus- / minus-symbols, cards with Braille if appropriate, pins, pens, rope)
- Camera
- Table, chairs, sunshades/rain protection if outdoor
- Beverages and snacks
- Participant information and informed consent sheets (ethics)

6. Instructions

6.1. Onboarding: creating a welcoming environment. Introducing the instructors/facilitators. Distributing name tags (in case the facilitator(s) and participants do not know each other).

6.2. Positioning exercise: The group creates a continuum along a rope. Possible questions:

- Who speaks more than one language? What's the word for "garden" in your first language?
- Do you come from the global north/south?
- Since when have you lived in this neighborhood?
- Do you go to the garden by foot/public transport/car?
- Do you know the garden of [place or sightseeing attraction in the neighbourhood] (e.g. "Castel of Eggenberg": a very well-known baroque castle near the women*s garden in Graz)?
- Do you take pictures in the garden? Have you already been on social media today?
- Are you authorised to vote? Are you going to vote in the next elections?

This step helps to make the diversity of the informal competencies of the group visible and more explicit.

6.3. Connecting with nature / the green environment: Participants are asked to find their special space in the garden and move there. Break-out group work with 2-3 persons on questions: Where in the garden do I find power/love/adventure/age/chaos? Reflect on your decision and enjoy the natural environment/garden.

6.4. Sharing your decisions with the group: Participants are invited to share and discuss with the group: e.g. discussions about "Where do I find chaos in the garden?" can be steered to further reflections on "Is chaos positive or negative?", "Should and can I influence it?", "How can my interventions impact biodiversity?", etc.

6.5. Introduction to the concepts of accessibility – diversity – inclusion – belonging, and discussion thereof (e.g. for the concept of accessibility, the official definition from the responsible competent authority could be Introduced, and connections could be discussed on various scales):

- Micro-level: Can I get into the community garden GAIA EGGFENBERG? Are there restraints that make it difficult for me to enter this setting? Do I feel welcome with my gardening talents?
- Meso-level: Can I, as a migrant woman, easily enter the labour market in my town? Are there structural barriers that hold me back? Do I feel welcome with my qualifications?
- Macro-level: Can I easily get knowledge of and get acquainted with local networks that are helpful for me as a migrant woman? Do I feel welcome with my identity?

6.6. Discussing: participants are encouraged to discuss these concepts in the very specific context (e.g. being part of a women*s gardener group):

(source unknown[1])

- How can I show solidarity in all four of the following areas?
- What do these concepts mean to me as a [woman*]?
- I feel I belong to the garden –when I feel [calm, grateful, relaxed, joyful, …]
- What does it mean for this green space/our garden?
- What does that mean for the community/society?

6.7. Closure, thanks and goodbye: collecting participant feedback and summarising the insights gained during the workshop. Fruits and vegetables can be collected if the workshop is held in an edible green space. Celebrating the harvest together and, if applicable, consuming it together.

7. Data collection and synthesis

This method does not primarily aim at collecting data to be analysed. Where it is used for this purpose documentation can include: photographs, written notes of interesting information and observations (during the workshop implementation and from the feedback part). Outputs generated by participants can also be stored (e.g. a poem elaborated by one of the break-out groups was kept).

8. Checklist for implementation

- Appropriate space for the workshop implementation.
- Check if the weather (forecast) allows you to work outside.
- Ensure that specific needs are considered: e.g. childcare or space for children to participate in the workshop or stay nearby; appropriate translation capacities; handicaps (e.g. Breil cards, removing physical barriers, etc.).
- Ensure all materials are procured and ready.

9. Critical considerations

9.1. Ethics of care / ethical considerations

Create an exciting, joyful, and trustful environment where people are encouraged to share their experiences and competencies openly. Emphasise confidentiality rules (as defined in your ethics informed consent agreements) to create a ‘safe space’.

Participation of persons with specific needs: make sure that appropriate arrangements are given that make all persons feel comfortable and welcome.

Participation of parents: ensuring an atmosphere where parents with children and children also feel welcome.

9.2. Power dynamics and relations

Diversity moves! workshops should be facilitated by individuals with expertise in diversity training. Creating an atmosphere that is sensitive to the group's diversity is essential. This involves being mindful of both spoken and body language, symbols and signs, photographs (such as those taken with smartphones), and the use of social media. Employing communication techniques that support individuals with limited language skills is also essential.

10. Top tips

- If possible, it is very valuable to hold the workshop outdoors in the green space that can be connected with.
- Create appropriate room for everyone to express themselves that corresponds with forms of communications participants feel familiar with.
- Avoid a framing of stigmatisation – not being in line with the mainstream as enrichment for society.
- An external facilitator with similar (special) need(s) as group members supports the establishment of a trustful atmosphere.
- When an external facilitator/expert is hired, it is important that the facilitators, who usually guide the group are present as well as this supports the establishment of a trustful atmosphere.
- Culinary goodies (collected berries, garden harvest) supporting in enjoying nature; if nothing at the site, bring something along, which refers to the natural surrounding (e.g. Juice connecting to an orchard; Elderberry-juice, tea, jam connecting to wild plants).
- Calculate enough additional time if you work in several languages – and ensure suitable translation support.

11. Measuring impact

Intrapersonal: The method focuses on integrating self-awareness of personal competencies with socio-political empowerment (e.g. knowledge about citizen participation and election processes) and gardening knowledge. Its positive impact can be observed when participants feel at ease engaging with these aspects and are willing to share their experiences in the group.

12. Links to external resources

Austrian Federal Office for safety in Health Care: https://www.basg.gv.at/en/barrierefreiheit

Franziska Schutzbach (2024): Revolution der Verbundenheit. Wie weibliche Solidarität die Gesellschaft verändert. [in German] Droemer HC; ISBN: 978-3426279045.

Endnote: [1]Quote may be partly attributed to Liz Fosslien and Mollie West Duffy, authors of the book *No Hard Feelings: The Secret Power of Embracing Emotions at Work, captures the essence of the three dimensions of diversity and inclusion.*

1. Intervention method

Drawing in nature workshop

Authors: Borbála Lipka, Katalin Réthy, Dorottya Poór, György Pataki

2. Summary of the method

Drawing in nature workshops offer a way for participants to engage with biodiversity and develop a deeper connection to their surroundings. The act of drawing encourages careful observation, helping participants to notice intricate details and the often-overlooked elements of a biodiverse space. Asking participants to draw something they find unappealing can challenge preconceived ideas and highlight the importance of every element in an interconnected system. By blending creativity and focused attention, these workshops foster mindfulness and an enhanced understanding of the richness and value of natural environments (Angeler, 2023). Within the agrobiodiversity management PLANET4B case study the method was used in the form of a three-hour drawing workshop, held outside on a small farm and run by an expert facilitator.

3. Use context (within PLANET4B)

3.1. Relevant social aspects of biodiversity being addressed

This PLANET4B case study addresses agrobiodiversity – the link between nature and human culture – particularly in relation to the diversity of seeds. This includes the maintenance of seeds, seed saving and conservation work. The project aims to enhance understanding on what intervention(s) could be done to develop a seed system that better supports (agro)biodiversity. An additional focus is on understanding the relationship between farmers involved in conservation and their seeds. The case study highlights the diversity present in cultivated plants, alongside the biodiversity found in uncultivated nature, which is often better understood. It highlights seed-saving and the maintenance of diverse varieties via reciprocal caring relations, and also via continuous experiential learning about and with nature. Operating in alternative food networks, the farmers and gardeners engaged in these activities tend to be subsistence farmers and amateur gardeners who connect with civic movements (e.g. agroecology, permaculture, etc.) and public research activities (on-site farm experiments).

In the PLANET4B agrobiodiversity management case study participants were asked to walk around the vegetable garden, observe and listen to nature, and find something to draw that they liked the most, something they did not like, and something they were most surprised at due to its unfamiliarity, etc. After their individual drawing, participants were encouraged to randomly exchange with someone else their drawings and then, inspired by the other's drawing, continue to draw another series of pictures.

This drawing in nature workshop assisted participants to slow down, immerse themselves in the garden, and to explore and reflect upon their relationship with nature. The method gives participants an opportunity to connect with nature, explore the aesthetics of diversity, become more attentive to details and often invisible creatures and better understand and value different elements in a garden or agricultural setting.

3.2. Relevant intersectional dimensions

This PLANET4B case study focuses on open pollinating vegetable varieties and their seeds, considering that the whole seed system needs to support diversity, human and non-human. Incorporated within the study (within the context of seed systems) is an exploration of gender roles at a systemic level. Working with seeds is highly gendered: the management of seeds (including selection, seed saving, seed cleaning and seed storage) almost always belongs to the realm of women. The current (mainstream) seed system is built up in a way that is focused on production and disregards the role and importance of reproductive work (e.g. the importance of small-scale seed saving, conservation of genetic diversity, the role of community seed networks). A more resilient seed system is needed to support (agro)biodiversity.

3.3. Relative focus given to different levels of social change

Individual level change	*Community level change*	*Institutional level change*
High	Medium	Low

4. Roles

4.1. Participants

Find and draw different items within a natural environment as led by a facilitator.

4.2. Facilitators

- Advertise the workshop.
- Identify a suitable outdoor location.
- Collect necessary materials (see section 5).
- Arrange transport (if applicable).
- Introduce participants to the outdoor space.
- Give brief introduction to artistic methods and equipment provided.
- Give participants tasks to find and draw certain things (see section 6 for detail).
- Monitor the time for each task, notifying participants when to begin finishing that task
- Facilitate brief discussion between tasks.
- If collecting research data, ensure participant information is provided and informed consent is sought in advance.

5. Materials

- An outdoor location (in the context of the PLANET4B case study, the farm of a member of the Agrobiodiversity Management Stakeholder Board was used)
- Tables and benches
- Marquee or gazebo to protect from weather
- Paints and brushes, pencils, pens, chalks
- Sketch pads
- Pots of water

If collecting research data:

- A recording device
- Participant information and consent forms

6. Instructions

6.1. Advertise the event and provide a system for people to sign up.

6.2. Organise tables in the outside space with all the art materials, ensure suitable protection against weather conditions (sun, rain, wind).

6.3. If possible, give a short tour of the usable outside space (we used part of a small farm, and the farmer led the tour).

6.4. Give a brief introduction to arts and artistic materials (led by art facilitator).

6.5. Give participants their first task – to walk around the vegetable garden, observing and listening to nature and when they find something they like, to draw/paint it. Participants can take the sketch books with them and draw at any location within the outside space or be based at the table if they prefer – or a mixture of the two.

6.6. Bring the group back together after the first drawings (after approximately ten minutes) and give a short opportunity to share. It is possible that participants randomly exchange their drawings and, inspired by the other's drawing, continue with another drawing, finally producing a series of drawings that might relate to each other.

6.7. This method continues with a drawing task followed by a short discussion. Some tasks may be given longer than ten minutes. Other tasks can include 'find something you don't like', 'find something that disgusts you', 'find a pattern'. Where the subject drawn had negative connotations, the farmer (if available/applicable) can give information as to whether it is something that has some benefit or value on the farm.

7. Data collection and synthesis

Any names and email addresses collected in order to organise the workshop need to be stored in accordance with data protection laws. After the workshop, all personal data should be deleted unless informed consent has explicitly been given for it to be retained.

If using the sessions to generate data, the discussions can be recorded, the facilitator/researcher may wish to take notes during the workshop. If this is the case, participant information sheets and informed consent forms will be necessary as well as obtaining consent for any photographs taken.

8. Checklist for implementation

- A suitable location
- Materials (as specified in section 5)
- A way to advertise the workshop (the PLANET4B project used the art facilitator's webpage, Magház Community Seed Association social media, and the location farm's social media)
- A way for people to sign up to the workshop and provide necessary contact details
- An art facilitator
- A location expert (e.g. farmer, gardener (if possible))
- If collecting data, informed consent and participant information sheets

9. Critical considerations

9.1. Ethics of care / ethical considerations

- Delete any personal data after the workshop ends.
- If you are collecting data from discussions, ensure you have sought appropriate permissions.
- Attendees may have access needs that may prevent them from moving around the open space, ensure accommodations are made beforehand and that the selected space is suitable to the participant group.
- Be attentive to any specific needs of individuals in the group and attempt to make adaptations where possible (e.g. translation, support for participants with a physical disability, etc.).
- Choose a location easily accessible by car or public transport, or if not possible, consider providing transport.

9.2. Power dynamics and relations

- Participants may feel pressure to align themselves with others around what is beautiful and what disgusts them. Try to ensure that there are no right or wrong answers.
- Participants may have a mix of artistic backgrounds and those with less experience may not feel so comfortable. Encourage participants by explaining that art is subjective, and that the purpose of the workshop is not about artistic ability but about connecting with nature.
- Some participants may have less experience being in countryside spaces which may make them feel less comfortable exploring nature. Positive and patient facilitation should mitigate this.
- Ensure participants know and agree what will happen to their artwork or photographs of it, after the event.

10. Top tips

- Consider the time of year. Prepare as well as possible for weather with coverings such as a gazebo to protect from sun or rain.
- People can be afraid of drawing to begin with. Spend time making them feel comfortable and be patient.
- Ensure there is a flat surface for participants to work on and/or sketch books with thick covers to enable a portable flat surface.
- Consider numbers – this workshop would be difficult with groups of more than twenty or fewer than five (ten people attended the PLANET4B workshop).
- Ensure there is plenty of time (with PLANET4B the workshop was planned to last for up to four hours). The time for different tasks can vary. If people finish one of their pictures before it is time to return to the group, they tend to be happy wandering around, or sitting in, the garden.

11. Measuring impact

This method was used in PLANET4B within an 'extensive' case study. There was no place-based Learning Community, so impact was not measured. However, in a different context, this method has the potential to deliver impact at intrapersonal and interpersonal levels. At the intrapersonal level, participants might develop a deeper connection to the natural world by paying close attention to details they may have previously overlooked. The process of drawing and the directed activities, such as drawing unappealing objects, may shift the participants perceptions of the natural world.

At the interpersonal level, group discussions that follow the drawing allow participants to share their discoveries and insights. These conversations might lead to a greater understanding of others' perspectives and a collective appreciation for the interconnectedness of biodiversity. The group discussions provide an opportunity for participants to share stories about their connections to nature, through which participants might find a shared interest or concern, deepening a collective responsibility for elements of biodiversity.

Pre- and post-workshop surveys can be used to track changes in participants' attitudes and perceptions of nature and biodiversity. With participants' consent, group discussions can also be recorded, creating a dataset for researchers to analyse for impact. This might reveal shared experiences, shifts in collective understanding, or emerging themes of appreciation and collaboration. Additionally, participants could write or record personal reflections to accompany their drawings, allowing them to tell a more detailed impact story and explore individual transformations.

12. Links to external resources

Angeler, D.G., 2016. Viewing biodiversity through the lens of science… and art!. SpringerPlus, 5, pp.1-11. https://link.springer.com/article/10.1186/s40064-016-2831-z

1. Intervention method

Excursions / field trips / company visit

Authors: Marta Bonetti, Pedro Navarro-Gambín

2. Summary of the method

Feld trips/excursions offer a different approach to learning than in-lesson teaching. They are based on the premise that the subject of study/interest (e.g. in the case of PLANET 4B fashion case study, a company and a short supply chain) needs to be experienced directly.

The excursion can be a half or full day or be multi-day, involving a residential stay. They can be organised for small or large groups and include a facilitator and/or expert guide. Seeing and learning about examples, initiatives, and content first-hand can deepen understanding, broaden horizons, foster teamwork, and contribute to personal development.

3. Use context (within PLANET4B)

3.1. Relevant social aspects of biodiversity being addressed

In the context of the PLANET4B Italian case study, which investigates nature-positive transformative change in the global fashion system, field trips included visits to several factories that share a commitment to more sustainable fashion principles. These factories are making a transition from fragmented and globalised fibre and fashion supply chains to more localised production and consumption models that prioritises quality over quantity. The excursion provided researchers with the opportunity to gain insight into operational environments, observe systems and machinery that are typically not seen. This experience enhanced the comprehension of the multifaceted factors (technological, economic, cultural, etc.) that shape production and consumption patterns and can facilitate or impede change towards biodiversity positive fashion.

3.2. Relevant intersectional dimensions

The manner in which the intervention is implemented and the degree of autonomy afforded to researchers within the visited site will determine which dimensions of intersectionality can be addressed. For instance, a visit may facilitate contact with workers of different genders, ages, and nationalities, engaged in a range of tasks and production roles. In the case of PLANET4B fashion case study, a visit to a textile production facility showed a workforce comprising almost exclusively female workers of advanced adult age. In contrast, other traditional activities necessary to the circular economy appeared to be characterised by a high presence of young immigrant workers. In general, field visits have the potential to facilitate contact with individuals who are difficult to reach through standard research methods (such as interviews and focus groups).

3.3. Relative focus given to different levels of social change

Individual level change	*Community level change*	*Institutional level change*
High	Low/Medium	Low

4. Roles

4.1. Participants

In the extensive case study, the field trip was mainly employed as a 'rapid fieldwork approach' (Eden et al., 2019), designed to obtain information within a limited timeframe. During the research, the team employed a variety of qualitative techniques for data collection, including participant observation, interviews, photography and audio-visual recording.

To some extent, all individuals participating in the visit (including workers and various stakeholders) can be considered as co-researchers and thus as participants in a learning process. The effectiveness of this learning process can be enhanced by incorporating a return period during which the results of the visit are presented.

4.2. Facilitators and field trip coordinator

The role may vary in accordance with the specific objectives of a visit.

In the context of a field trip with research objectives, as in PLANET4B, the coordinating role assumes particular significance. The coordinator is responsible for planning the visit and, most crucially, for sharing the objectives with the host company at the preliminary stage, negotiating the researchers' autonomy in moving around the field and the different actors' willingness to participate. Moreover, the role encompasses the management of practical aspects and logistical considerations.

In the context of organising a visit with the aim of raising awareness and targeting other participants who are not part of the research group (e.g. students, members of associations, citizens, etc.), the role of the facilitator assumes particular relevance, including the provision of support for observation and discussion both before, during and after the trip, thereby assisting participants in the interpretation, evaluation and assessment of the experience.

4.3. Field trip host

The role of the host is important for ensuring the success of the visit, particularly where the visit is conducted with the intention of addressing pre-defined research objectives. Within the PLANET4B fashion case study, we encountered very favourable conditions when using this method. One host, with whom we had shared the project's objectives from the beginning, played a pivotal role in facilitating the visit. He facilitated access to all pertinent company departments and enabled direct engagement with the various stakeholders involved in promoting sustainability within the company, including the sustainability manager, the financial manager, the designer, and employees from across the organisation. Furthermore, the host provided a dedicated room for research interviews to take place and was available for further discussions. Finally, the host attended a presentation of the collected data at a later date.

5. Materials

A company visit may require the conventional materials associated with field data collection, including an audio recording device, potentially a camera and supplementary batteries. It may be advantageous to have a computer available for the purpose of demonstrating previously collected data. Informed consent forms are made available in case of personal data collection. If photographing people, it is necessary to gain written informed consent; consent is also required where the method is used in accompaniment with research

interviews. In certain instances, the visit can be arranged through a tour operator, which requires the payment of a registration fee.

6. Instructions

6.1. Organising a field trip requires careful planning, which may vary in accordance with the objectives of the excursion. These objectives may range from raising awareness (only) to conducting research, supplementing longer fieldwork.

Pre-visit arrangements include the following tasks:

6.1.1. (Co-)defining the objectives, research questions and agenda of the trip.

6.1.2. Organising a pre-trip meeting with the researchers/participants to ensure a common understanding of the purpose of the excursion and to provide background information.

6.1.3. Preparing the research tools, such as an observation grid or an interview framework.

6.1.4. Assigning clear roles, such as note-takers, observers, or photographers.

6.1.5. Arranging a pre-visit: organising travel to the site and other logistical considerations, including costs and transportation.

6.2. Visit and data collection using the selected research tools.

During the company visit, researchers/participants will have the opportunity to increase their knowledge through the utilisation of a range of tools, including observation and interviews.

6.3. Data analysis: After the visit, the researchers will conduct a data analysis utilising their own distinctive methodologies in alignment with the broader research design.

6.4. In the context of a company visit undertaken with the objective of raising awareness and targeting groups of people different from the research team, it is crucial to encourage the participants to engage in reflexive thinking, prompting them to identify any unexpected discoveries. A survey can be employed to measure the impact of the visit. Alternatively, individuals can be invited to take part in a debriefing session.

7. Data collection and synthesis

The field trip can be combined with qualitative research methods such as individual interviews, observations, and photography to collect data. It is recommended that interviews are audio recorded and field journals are used for observations. In general, the data will be qualitative and textual and could be analysed in different ways (e.g. content analysis, narrative analysis to define transition pathways, etc.) in accordance with the research aims, objectives and guiding research questions.

The data synthesis could have several outputs such as: different perceptions of fashion's impact on biodiversity, conditions and barriers for transformative change, role of consumers, etc.

A company visit may be particularly relevant to develop a preliminary understanding of the sector and identify areas for further study, or be triangulated by conducting a literature review of similar research.

8. Checklist for implementation

- Be clear about the objectives of the company visit (i.e. research goals or awareness raising).
- Identify the company and share the objectives, negotiating the possibility of interviewing different workers and visiting different departments.
- Explore the company's availability for further contact after the visit to arrange further interviews and information.
- Determine whether the company would be interested in a presentation of the research findings involving the workers met during the visit and other interested parties.
- Ensure that sufficient time is allocated for the visit.
- Confirm that all necessary materials are available before starting (see section 'Materials').
- Make sure to record any interviews and/or observations.
- Where the fieldtrip forms part of a research project, obtain informed consent prior to any data collection.
- For visits primarily aimed at raising awareness, provide assessment tools to measure the learning outcomes.

9. Critical considerations

9.1. Ethics of care / ethical considerations

Obtain ethical approval and make sure that all participants are informed about the project details and objectives before inviting them to participate (e.g. by providing informed consent forms, project links, access to project publications, etc.).

Depending on the objectives of the project, encourage the participation of actors that have been historically marginalised within the analysed system. This might involve the selection of the facilitators (e.g. members of a specific community, translators, etc.).

Since system transitions are a highly political topic which can have tangible implications for the participants, hot topics and emotional discussions are likely to emerge. In such instances, facilitators must make sure that the conversations remain respectful. In particular, the facilitator is required to always maintain a respectful approach.

In accordance with the instructions of the host company and the informed consent, certain information, including the names of company customers, may be discussed on the basis that it must not to be shared. It is thus imperative to ensure that any such requirements and fully adhered to (e.g. including guarantees of complete anonymity).

9.2. Power dynamics and relations

Being on-site offers the opportunity to gain a 'direct' insight into a company's operations. However, not only are all experiences partial and mediated, but company visits are also gaining importance as a tool to improve the company's reputation and marketing position (Polifroni et al., 2016). When organising a field visit to a company, it is important to avoid becoming a passive 'tourist', as this approach can lead to biased results. A number of measures can be taken to mitigate this risk. These include critical thinking, the triangulation of information gathered from different sources, negotiating with the host to ensure the participation of employees and worker at different levels of the organisational structure, and the possibility of having access to a space that corresponds to the operational reality of the company.

10. Top tips

- Allocate sufficient time to engage and inform the host organisation in relation to the objectives of the visit, thus enabling the appropriate preparation to be made, including the possibility of meeting employees with diverse roles and responsibilities within the organisation.
- The topic of biodiversity remains underexplored, even among companies engaged in green transition. Such organisations are often unaware of the direct relevance of their activities to biodiversity. It is therefore important to highlight the correlations between these practices and biodiversity, both during the visit and in subsequent discussions with participants.
- The visit can also be an empowering exercise because participants can relate the experiences from the visit and the new information to their real-life choices (for example, related to clothing as in this PLANET4B case study), the reflection sessions before, during and after the visit provide space for discussion.
- Visiting companies that promote production and consumption models that are more respectful of biodiversity can help to reduce eco-fear and facilitate constructive engagement with environmental issues.

11. Measuring impact

The direct impact of using this method will be at the intrapersonal and interpersonal levels, and possibly indirectly through participants' communication with actors at the institutional level. The intrapersonal and interpersonal impact is likely to be on the clothing choices individuals make (sustainable companies, fibres used, respect for workers' rights).

There could also be a change in perception of how the company's actions and business model can impact on nature and biodiversity and the way sustainability is communicated. To capture the impact, participants' perceptions and actions can be gathered through testimonies, interviews and questionnaires. It is recommended that information is gathered using an appreciative inquiry approach, at the following points in the process, to track change: before the activity, immediately after the session, and then a month or two after the visit.

12. Links to external resources

Company Visit

Eden, G., Sharma, S., Roy, D., Joshi, A., Nocera, J. A., & Rangaswamy, N. (2019, November). Field trip as method: a rapid fieldwork approach. In Proceedings of the 10th Indian Conference on Human-Computer Interaction (pp. 1-7).

Pollifroni, M., Militaru, G., & Ioana, A. (2016). The creation of value generated by the" company visit:" a theoretical model of evaluation. *Economics, Management, and Financial Markets*, *11*(1), 338-347.

Fashion and biodiversity

Textile Exchange (2023), Biodiversity landscapes analysis: https://www.thefashionpact.org/wp-content/uploads/2023/10/biodiversity-landscape-analysis.pdf

Ellen MacArthur Foundation, (2021) A deep dive into biodiversity and fashion: https://www.ellenmacarthurfoundation.org/fashionexamples#:~:text=The%20linear%20way%20in%20which,value

1. Intervention method

Global Forces, Local Faces: a biodiversity negotiation game

Authors: Ilkhom Soliev, Theresa Kühne, Annabel Eckmann, Edit Hunyadi, Agnes Zolyomi

2. Summary of the method

The Biodiversity Negotiation Game "Global Forces, Local Faces" is a game, where all participants are assigned a role which they must then advocate for in a simulated negotiation. In a fictional yet realistic scenario, the game addresses challenges like climate change, poverty, resource distribution and biodiversity conservation. The game is designed for 13-23 participants, making it adaptable for diverse group sizes. This is a game that ideally requires a dedicated day – for example in school, workshop, summer camp, or university weekend seminar – where participants dedicate a substantial amount of time throughout the day to simulate the negotiations (ideally 6-7 hours including multiple breaks). The game's objective is three-fold: 1) to engage participants in an interactive, hands-on experience that demonstrates the complexity of decision-making; 2) to highlight the global influences within local conflicts, and 3) to explore the roles of various actors, privileges, social resistance, and power hierarchies. It also encourages participants to consider the broader context of global-local interactions and their implications for biodiversity governance.

3. Use context (within PLANET4B)

3.1. Relevant social aspects of biodiversity being addressed

The game addresses several social aspects related to biodiversity. Firstly, it helps to break down the complexity of biodiversity decision-making, helping participants grasp the multidimensional impacts of decisions on biodiversity on local and global scales. This hands-on approach helps participants link policy decisions to real-world social and environmental impacts. It encourages reflection on global systems shaping local biodiversity outcomes and highlights challenges to achieving fair solutions. Secondly, it can help to build a stronger sense of involvement within biodiversity topics by encouraging empathy and a deeper understanding of diverse perspectives on biodiversity. This engagement is encouraged by helping participants experience the trade-offs and conflicts that real-world biodiversity decisions involve. Moreover, the participants experience how to negotiate with unfavourable policy-institutional conditions and how these impact the outcome of biodiversity policies.

3.2. Relevant intersectional dimensions

The negotiation game considers various intersectional dimensions through participants experiencing diverse identities, power hierarchies and social positions connected to the different roles. These roles, from marginalised groups like indigenous communities and local fishers to powerful actors such as CEOs of international agribusiness corporations, make it tangible how economic class and institutional power determine who has decision-making authority. The game also offers an opportunity to explore complexity even within those seemingly powerful actor profiles. Moreover, it shows the intersection of socioeconomic disadvantage and environmental vulnerability, demonstrating that those with fewer

resources and less political power often face the greatest environmental risks and consequences. This interplay of identities and power dynamics encourages participants to reflect on how decision-making processes can either perpetuate or challenge systemic inequities.

3.3. Relative focus given to different levels of social change

Individual level change	*Community level change*	*Institutional level change*
High	High	Medium

4. Roles

4.1. Participants

This game requires at least 13 participants and one facilitator. The game can be easily extended to 23 roles and if there is need, more than one participant can represent one role.

Participants are encouraged to be active, understand the different perspectives and defend them through argumentative discussions. They are further encouraged to think strategically, leveraging alliances and compromises to advance their assigned roles' goals. They must listen to each other, negotiate conflicting goals and be able to empathise with others. By embodying these perspectives, participants engage in complex decision-making and develop insights into the varied motivations, values, and constraints of each group.

4.2. Facilitators

Instructors (for example, if this is played with university or school students, we are referring to the course instructor) prepare the game, and make sure that all roles are assigned. The roles are randomly assigned by the instructor, all except the negotiation facilitator and equality officer (depending on group size), since they should be highly motivated to manage the group discussions. They prepare the key materials, such as the scenario and background information, the different roles, event cards and the schedule. Further preparations concern the necessary materials on site to ensure the smooth running of the game and the well-being of the participants (think of having a break for food and drinks, bring pens and paper, etc.). Facilitators should also remain attentive to group dynamics, stepping in to ensure equitable participation, particularly for roles with less perceived power or when needed for certain participants based on group dynamics.

5. Materials

There are essential materials so that the negotiation game can be played as required. The following key materials are needed: the schedule for the game, the scenario and background information, the role description and the event cards. These materials need to be printed out beforehand – see the materials section where this is made available as a single .pdf file. Additional items required include paper, pens and tape for name tags. Furthermore, a projector, an online pad and optionally a flip chart are required. It is also advisable to test all technical equipment, such as the projector and online pad, ahead of time to prevent disruptions during the game.

One should plan (and if budget permits, cater for) refreshment / comfort breaks, including a break for lunch, since the game takes about seven hours.

6. Instructions

6.1. Print out the game manual and read it carefully.

6.2. In preparation for the game, select a suitable room with a large round table for discussion, also (ideally) with the option for participants to disperse into other rooms or corridors during the informal round.

6.3. Distribute the roles at least one day (recommended: two) before the game. The roles should be randomly assigned except for the negotiation facilitators, as they will moderate the discussion and should be motivated to do so. Depending on the number of participants, different role allocations are possible for the dialogue assembly.

6.4. Print out the game materials and distribute them to the participants before the game. These include: the scenario and background information and schedule (everyone), the role descriptions (each role receives an individual role description), and the event cards (instructors hold them and decide to use depending on the game flow via the facilitators or journalists).

6.5. Prepare the necessary supporting materials. This includes paper, pens, tape for name tags, one projector, an online pad (e.g. in “Systemli Pad” or “Riseup Pad”) and optionally a flip chart.

6.6. Once all participants have gathered in the room, the negotiation game can start. In consideration of the schedule of the game, the negotiation facilitators navigate the other participants through the negotiation rounds, ensuring that the individual events take place within the specified times (welcome/introduction round/discussion round, etc.). Participants should also be given sufficient time to prepare opening statements during informal rounds. The slots in the schedule can be adjusted individually, although the specified time of seven hours should not be significantly exceeded. Facilitators should ask participants to note important points from each round to help with discussion during the evaluation.

6.7. The game ends with the evaluation round. Therefore, the negotiation facilitators are given guiding questions to enable a meaningful evaluation of the game.

7. Data collection and synthesis

In order to understand change in biodiversity decision making, the data analysis should include the following:

- Understanding the decision making during the game. For this it is necessary to analyse the recorded decisions of the game made by the participants. This should involve looking at how certain decision-making processes took place and what influenced these decisions.
- Understanding the reflections and learning after the game. For this, it is necessary to analyse the recording of the evaluation round at the end of the negotiation game. One can also examine how understanding of key concepts embedded in the game appear in these discussions.
- Understanding the longer-term implications through playing the game. For this it can be necessary to play these kinds of role-playing games more than once. Generally, there is an indication in the research that playing such games more than once can substantially improve the learning effects (e.g. Crookall, 2010). If possible, the relevant data can be collected and analysed each time to observe the dynamics of learning. Additionally, game participants, where they provide consent, can be contacted at a later date for a follow up study to understand to what extent they can

remember their game experience and if they report any changes in their real lives that can be connected to this experience.

- In order to draw a direct comparison, it could be helpful to conduct a presurvey on the same day to determine possible changes in social norms regarding biodiversity. For this, sufficient time must be planned before the start of the game.

8. Checklist for implementation

- Allocate sufficient time to check the game materials (the game manual), hypothetically test on your own and imagine how you can organise the game with a group.
- If the game is to be used as a research tool, make sure to take care of formal ethical approvals in time (see next section). If not (for example for trying it with friends) still consider ethical aspects even if it might not be a formal requirement (e.g. are there any issues that might be sensitive for your specific group, are there language or other limitations).
- Ensure sufficient time is allocated on the day of the game to administer both the pre- and post-surveys. This will help to maximise response rates and ensure that data is collected consistently across all participants. If the pre-game survey is administered on the same day as the game, plan to have participants complete it as part of the introductory session to make the process seamless and reduce the likelihood of missing responses.
- Plan when and where you would like to conduct the game and with whom.
- If participants are known (e.g. members of your own team or community, students in your class) select a suitable location and date. If participants are unknown (e.g. as a general experiment in an unknown group) think how and where you would like to advertise the game depending on your purpose (and potentially whether and how you can offer some rewards for participation).
- Prepare informed consent forms for participants to sign before the game (be prepared that some participants who confirmed earlier might not show up on the day of the game).
- Prepare the room as described in the game manual.

9. Critical considerations

9.1. Ethics of care / ethical considerations

- Participants may find the discussions emotionally charged, especially if they have personal connections to environmental or social justice issues.
- Facilitators are encouraged to maintain neutrality, but implicit biases can influence how they guide discussions.
- It is highly recommended that the facilitators receive training on both facilitation skills and dealing with potential conflict. To create an environment that is respectful and constructive for all participants, facilitators are recommended to have training in 1) diversity in learning, 2) intercultural sensitivity and 3) conflict management, all with specific focus on facilitation (or teaching) situations. Many educational organisations offer such courses.
- The game has been developed by experienced and trained scholars and practitioners who took every precaution to avoid any structurally insensitive language, but participants might not have similar experiences and training. This means that to fully predict what happens in the game is not possible, but it is possible to state that the chances of something happening well beyond

what is usual in interactive social learning environments in terms of sensitive topics are slim.

- Dealing with human subjects requires obtaining an ethical or institutional review board approval before data collection. For this purpose, an independent commission advises on whether ethical standards are upheld throughout the research process. For example, participants must be informed about the background and purpose of the study, their right to withdraw from the study, exclusion criteria, potential harm of participation, etc. (informed consent).
- Specific data protection measures should be put in place (for example as regulated by the General Data Protection Regulation of the European Union and national ethical regulations).

9.2. Power dynamics and relations

- The roles assigned to participants inherently create power imbalances, reflecting the real-world dynamics of such conflicts. There is a possibility that the simulation might unintentionally reinforce or validate existing power hierarchies, especially if outcomes favour economically powerful actors over vulnerable ones.
- After the game, facilitators should address any biases or power issues that emerged and encourage constructive discussions on fairness and inclusion. They should also be mindful of cultural differences, especially in international groups.
- Those who have experience in public speaking and are keen to express themselves are likely to have some advantage in various situations, but there are no guarantees that these are perceived positively by the other participants.
- Anything that is not acceptable by broader societal norms (e.g. disrespectful language) needs to be addressed as in any other social situation. It is good to remind participants that the game is not personal, and actions undertaken within the game should be confined within the activity itself, although it cannot be completely free of it.

9.3. Representation and sensitivity

- The fictional scenario includes indigenous populations and their displacement, which can evoke real-world issues of marginalisation. There is a risk of reinforcing stereotypes or trivialising their struggles. A reflective and sensitive approach to this topic is a precondition for the game and it raises questions about the positionality of the participants.

9.4. Participants' engagement

- Some participants might not take their roles seriously or struggle to immerse themselves in the scenario. This could undermine the learning experience for the group. If this happens, a dialogue should be initiated with the players concerned outside the room. If necessary, individual players may need to leave the game prematurely. To prevent this, ensure that all questions are clarified in advance and address any uncertainties the players may have about their roles before the game begins.

9.5. Time management

- Complex negotiations may exceed the allocated time, especially if discussions become heated or participants struggle to compromise. It is also important to avoid ending the session at an inopportune moment, such as in the middle of a heated debate, to ensure the process reaches a meaningful conclusion.

9.6. Language and accessibility

- If the game involves participants with varying levels of fluency in English (or in another language to which it is translated), misunderstandings or exclusion could occur. Similarly, participants with different cultural or educational backgrounds might struggle to engage with the given materials. To address this, facilitators should allow sufficient time for preparation, formulate instructions and procedures in simple, accessible language, and, where possible, provide translations or visual aids to support understanding.

9.7. Space

- The setting and resources available for the game might not adequately simulate the complexity of real-world dynamics. A poorly chosen environment could diminish the game's quality.

10. Top tips

- Allow enough time to carefully prepare all materials and find a suitable location.
- Make it clear in advance that the person who is the negotiation facilitator should take responsibility for the discussion and the flow of the game, approaching the role with confidence and sensitivity. Try to clarify any questions or uncertainties before the game.
- Ensure that participants understand their roles and responsibilities in advance to avoid confusion during the game.
- Test all technical equipment, such as projectors or online pads, before the session to prevent delays.
- Encourage participants to stay immersed in their roles throughout the game, reminding them of the learning objectives.
- Allocate time for informal discussions between rounds to allow participants to strategise and reflect.
- Set clear ground rules at the start to create a safe and respectful environment for all participants.
- Be prepared to adapt the schedule slightly if discussions run over but aim to stay within the overall allocated time.
- Encourage facilitators to record key negotiation moments and outcomes to analyse role dynamics and decision-making processes.
- Utilise the online pad to track participant interactions and emerging narratives for further analysis.

11. Measuring impact

The negotiation game has the potential to create impact on multiple levels.

On the intrapersonal level, participants can develop a deeper understanding of the complexities involved in decision-making processes and shifting attitudes towards biodiversity and heightened awareness of global environmental challenges. These outcomes can be particularly explored during the discussion in the evaluation round at the end of the game.

On the interpersonal level, the game encourages collaboration and dialogue, whereby participants foster empathy and the ability to find compromises among conflicting interests. This can be surveyed by observing the flow of the game and paying attention to how collaborative and non-collaborative decisions were made.

On an institutional level, the game could raise awareness of the need for comprehensive and equitable biodiversity policies. For this, the agreements, suggestions or revision of new institutional rules during the game can be looked at more closely, additionally the real-life decisions after the game can be surveyed.

12. Links to external resources

At the time of finalising this protocol, the game materials are still being polished. Once this process is complete, the detailed materials will be available via the website of PLANET4B project (www.planet4b.eu).

Crookall, D. (2010). Serious games, debriefing, and simulation/gaming as a discipline. *Simulation & Gaming*, *41*(6), 898-920.

1. Intervention method

Horticulture training series

Authors: Katharina Santer, Christina Seliger, Sandra Karner, Mirjam Krause

2. Summary of the method

The horticulture training method orientates around a series of workshops that are part of a longer process extending over several months. Various individual activities are implemented, which gradually become effective throughout the process. The goal of these workshops and activities is to build a community garden in collaboration with a group of local residents and/or other local stakeholders. The method is suitable for use with participants from a full range of backgrounds and there is no need for individuals to have had any previous horticulture experience.

The horticulture training series is designed for:

Knowledge and Skills Exchange: Participants engage in hands-on activities after receiving explanations about the tasks and the underlying processes. Following an introduction, participants work independently, in groups, or with the assistance of facilitators. The facilitators should maintain a structured overview to identify when participants need support with existing or new tasks.

Peer-to-Peer Learning: This approach encourages collaboration of participants with different knowledge and skills, for instance, when a person with some gardening knowledge teams up with someone gardening for the first time.

Capacity Building: Participants learn collaboratively as a group and get supported as individuals. The goal of this method is to empower participants in a manner which also acknowledges and embraces their intersectional diversity. After a learning-by-doing process, participants can continue and independently create and operate their own initiatives, such as managing and developing a community garden.

3. Use context (within PLANET4B)

3.1. Relevant social aspects of biodiversity being addressed

This method can be beneficial for individuals who have limited knowledge of gardening or feel disconnected from nature. It is especially important for those who struggle with personal responsibility or decision-making. Additionally, it fosters collaboration and teamwork, addressing the needs of participants who may feel disempowered. This approach is particularly helpful for women* who lack self-confidence, especially when it comes to engaging in physical work.

3.2. Relevant intersectional dimensions

In PLANET4B the horticulture training series was used with the BeSt Graz Citizen Learning Community (LC). This LC is comprised of mainly migrant and socio-economically disadvantaged women of various ages (between 17 and 65+ years years). Over a period of 9 months, this women*s group was guided through a process of setting-up and cultivating a garden, while dealing with various aspects of the topic of biodiversity in so-called ‘research units’, where various methods, such as the horticulture training series, were tested.

The participant group may have several critical intersectional dimensions, including gender, race, age, cultural background, and religion. The method accommodates people of various genders and diverse social and cultural backgrounds. While the group may be diverse in most of these dimensions, it is also crucial that the individual participants have something in common (e.g. in the case of the PLANET4B LC, a group of socially disadvantaged women* who share a common interest in gardening).

3.3. Relative focus given to different levels of social change

Individual level change	*Community level change*	*Institutional level change*
High	High	Medium

4. Roles

4.1. Participants

The participants are active in the whole process and fulfil various roles throughout a series of activities. In some phases of the process, they require clear instructions, while in others, they engage in co-creative process planning and design at both conceptual and practical levels. Their active engagement fosters, over time, a sense of ownership over the process and the outcomes.

Within the group, participants adapt their roles depending on the specific activity. Based on their individual skills, they may be experts or beginners. For instance, one participant may have advanced knowledge in a specific area, such as planting seeds. In this case, that person can take over the role of a mentor, providing explanations, assistance, or support to someone who is still a beginner.

4.2. Facilitators

It is recommended to implement activities with more than one facilitator, to ensure proper guidance for participants.

The facilitators are responsible for the process planning and structure of the activities, always adjusted to the participants' (women's*) needs and interests. They plan, organise, and explain tasks to the group, ensuring clarity in each step so that participants can work independently. It is essential for facilitators to be transparent and explain where they sourced materials, how they developed their plans, and why specific steps were chosen. After introducing new tasks, they take the role of supporters and observers. They create a framework for the meetings, which includes a plan and assigned tasks, and they provide assistance where needed (e.g. developing a work plan for weekly meetings in the garden, organising tools and materials, and preparing the shared space for reflections).

Facilitators also encourage peer-to-peer learning through strategic pairings based on participants' skills, considering which individuals can benefit from learning together. They act as open-minded listeners when someone faces a problem and provide support should anyone feel unsure in their tasks or work.

Time keeping is a very important task: Facilitators serve as time managers during activities. They structure the events and communicate the time allocated for each activity to participants. Therefore, a well-structured plan is essential to ensure that there is enough time for each task. For example, in the context of the PLANET4B Graz community garden, it was important to adhere to the schedule for a group break and to begin and end as a team with check-in and check-out rounds.

5. Materials

Materials can be structured in two levels.

Planning:

- Planning sheets
- Conceptions of activities
- Post-its for collecting ideas of participants
- Participatory information and informed consent sheets (ethics)

Practical implementation of activities:

- Various tools/equipment/materials needed for gardening, social group activities, reflection rounds, seasonal festivities

6. Instructions

The following instructions explain the main steps of the overall process and then describe one example of a specific horticulture training activity.

6.1. Define the aim:

- What is the goal which should be reached in the project? The goals are first set from the facilitators, but can then be gradually adapted to participants' expectations once the project has started.

6.2. Making a plan for the whole term of the project:

- This is work in progress, as the plan is always adapted to the participant's interests, which are specified during the project implementation.

6.3. Recruitment of participants:

- Define who should be recruited for the project (e.g. through actor mapping), explore the right channels and the best format(s) to launch a call (cooperate with community insiders or stakeholders).

6.4. Group building (needs 2-3 meetings):

- Exploring the participants explicit and implicit knowledge and skills. Reflect on what is needed to work with this specific group, what is needed from the facilitators' perspectives, what is needed by the participate. Adapting the project aims to participants' needs and expectations.

6.5. Starting the working and learning process – through of series of workshops and activities.

6.6. Reflections with participants after each meeting.

Example of seeding activity:

The aim of this activity is that the participants learn how to seed plants.

Within PLANET4B the seeding training activity included planting vegetables in the garden beds of a community garden. It is important to note that the recruitment of participants took place prior to the start of the entire garden project. By the time the seeding activity occurred, a group of women had already been formed.

In previous meetings with the group, the facilitators presented a seeding plan to the participants. The participants were invited to share their interests and ideas about which vegetables and herbs should be seeded or planted in the garden. The facilitator used this input to create a work plan for the seeding activity day:

- Welcoming and Check-In round
- Social group activity (e.g. games)
- Presenting the tasks of the day (preparing garden beds and seeding different plants)
- Participants pairing
- Preparing garden beds and seeding
- Break (e.g. everyone brings food and drinks to share)
- Preparing garden beds, seeding and watering the garden beds
- Check-Out round with reflections about the training day

The facilitators set up various workstations in the garden, organised according to the specific tasks that need to be completed:

- Working station 1: seeding beans, preparing a hay bed for potatoes and planting potatoes.
- Working station 2: preparing the garden bed for potatoes and planting potatoes.
- Working station 3: preparing two garden beds and seeding mangold and beetroot.
- Working station 4: building a tower of hay for planting potatoes.

For each workstation, the facilitators prepare the necessary tools, such as shovels, measuring tapes, and strings, along with the seeds or potatoes for planting.

The facilitators prepare the communal area in the garden to welcome the participants. After a check-in round and a group activity, they explain each workstation by demonstrating the tasks involved. Additionally, the facilitators provide an information sheet for each workstation. The sheets contain information about:

- The tools needed for participants to complete the work.
- Step-by-step instructions for preparing the garden beds (e.g. digging, adding compost, levelling the bed, etc.).
- An introduction on how to seed or plant (e.g. measuring the distances between rows and seeds, using strings to mark distances, etc.).
- The recommended spacing for planting individual seeds or potatoes.

The facilitators organise the group into pairs and allow them to choose their tasks. The participants work with the provided instructions in pairs. The facilitator is available for questions and assistance.

After completing their tasks, the groups present each other's results and reflect on what was helpful and what they learned. Guiding questions can include:

- Do you feel more confident in your gardening abilities after this training? Why (or why not)?
- What did you find particularly useful? What did you enjoy most?
- How did interacting with other participants enhance your learning experience?
- Could you contribute skills/knowledge? Which?
- How do you plan to apply what you learned?
- Is there any additional information or resources you would like to receive?
- What topics would you like to explore further in future horticulture training sessions?

Time management is crucial during these activities. Before the work begins, facilitators communicate how much time participants will have for each task (for example, within PLANET4B for the seeding activity, approximately 45-60minutes per workstation). Additionally, the facilitators schedule short breaks for the participants, allowing them to share food and drinks while taking time to rest and converse.

7. Data collection and synthesis

This method is supportive for generating a range of data. Within PLANET4B the method has been used with a focus on collecting qualitative and visual data for subsequent thematic analysis, including:

- Planning and timetable
- Reflection rounds with participants
- Pictures for documentation
- Workshop protocols
- Written reflection for every meeting through facilitators (e.g. reflection diary)
- Semi-structured interviews after completion of the training series

8. Checklist for implementation

- A suitable green space in which to undertake the horticulture series (e.g. a community garden
- Annual plan of tasks and timeline
- Plan for each meeting
- Preparation for any specific additional requirements of an individual group (e.g. language translation, accessibility, mobility support)
- Methods and games for group building
- Clear aim what should be reached at the end
- Weather forecast when working outside
- Participant information and informed consent sheets (ethics)

9. Critical considerations

9.1. Ethics of care / ethical considerations

When working in a process with people private stories will come up. Be transparent agree on clear rules (beyond the formal consent) on how to deal with private and confidential conversations.

9.2. Power dynamics and relations

Facilitators should be attentive to the group dynamics and respond appropriately when necessary. It is essential to allow time in each meeting for everyone to speak at least once, ensuring that all participants feel seen and heard. This can be achieved through Check-In and Check-Out rounds. The facilitator should create a welcoming atmosphere and prepare introductory questions, such as, “How is the weather affecting your mood today?” Each participant should have the opportunity to share their well-being. To conclude the activities, the facilitator should encourage participants to reflect on the workshop experience.

9.3. Language

When working with participants from various cultural backgrounds, they may communicate in different languages. Facilitators need to translate tasks into these languages or facilitate communication between participants. This process requires significant additional time and effort.

9.4. Accordance with nature

Cultivating a garden on a ‘wild’ natural plot could reveal ethical questions in the group, which the facilitators should be aware of. Potential ethical implications can arise when cultivating a garden on a plot of land that is considered 'wild' or natural: In the PLANET4B Graz-based case, it was a ‘wild’ piece of land, which was not used by the city/local community and

encroached by neophytes, without relevant value concerning biodiversity, but certainly relevant as wildlife habitat, and a beekeeper has set up his hives there.

Facilitators should consider the long-term implications of converting a wild plot into a garden. Ethical implications may refer to a disruption in the local ecosystem through gardening activities. Facilitators need to consider (including together with the participants) how the activities might affect wildlife, native species, flora and fauna and biodiversity in general. Other aspects may arise around the sustainability of gardening practices, including pest control (e.g.: How does the group treat the slugs in the garden? How to treat neophytes?).

Issues around aesthetics or the cultural and historical value of the plot for the local communities could also raise ethical questions when cultivating a garden. Facilitators play a crucial role in guiding discussions around these issues and ensuring that diverse perspectives are considered in the decision-making process.

10. Top tips

- It is essential that facilitators first gather information about the participants' existing skills, including to leverage the diverse abilities within the group.
- Focus on community building from the very beginning.
- Incorporate social activities in every meeting.
- Facilitate check-in and check-out rounds where participants can share their thoughts and feelings. Also, facilitate reflection meetings in the group (e.g. how do I feel in the group, what do I need to feel welcome in the garden).
- Ensure transparency in the working and planning process.
- Regularly collect ideas and thoughts of participants.
- Open events for visitors to show the work to motivate and empower the participants.
- Support the self-sufficiency of the participants in the working processes.
- Continuity in facilitators is important (the entire process and related activities in the PLANET4B context were coordinated and guided by the same three facilitators).
- Maintain flexibility in planning (e.g. concerning the weather and equipment).
- The PLANET4B horticulture training series involved gardening activities held weekly from March to November (although not all meetings might be considered as "training sessions" per se.). Each individual session lasted approximately 2-4 hours, with individual activities planned in accordance with the gardening year.

11. Measuring impact

At the intrapersonal level, participants' self-confidence, sense of empowerment, and knowledge of gardening techniques before and after the training series can be assessed. This can be achieved through self-reflections where participants document their comfort and independence in gardening tasks, as well as their connection to nature through reflection circles.

At the interpersonal level, the development of teamwork and collaboration skills can be observed through group assessments, feedback forms, and facilitator observations. Effective peer support, shared decision-making, and conflict-resolution skills can be assessed to evaluate how well participants collaborate and assist each other. Furthermore, regular reflection circles within the group can offer qualitative insights into interpersonal development and group cohesion.

12. Links to external resources

Krause, M., Thaler, A., Santer, K., Karner, S., Seliger, C., & Steinwender. D. (2024) Sowing change: A women*'s garden as queer-feminist intervention in biodiversity research. Queer STS Forum 9/2024. https://queersts.com/wp-content/uploads/2024/12/Forum-9-2024_36-50_Krause-Thaler-etal.pdf

Mittermair, L. (2023) Gemeinsam wachsen: Das transformative soziale Potenzial von Gemeinschaftsgärten in Graz und Ljubljana. Universität Graz. https://unipub.uni-graz.at/obvugrhs/download/pdf/9776655

1. Intervention method

Nature-based mindfulness and progressive-muscular-relaxation

Author: Mariana Matoso

2. Summary of the method

The mindfulness and progressive-muscle relaxation session is a guided meditation practice aimed at fostering a deeper sense of connection to nature, reducing stress, and promoting emotional release. Conducted outdoors, the session invites participants to ground themselves in the natural environment through guided sensory awareness exercises, breathing techniques, and progressive muscle relaxation. This experience enables participants to connect physically and emotionally with the surrounding ecosystem, enhancing their sense of presence and fostering a heightened awareness of their place within the natural world.

3. Use context (within PLANET4B)

3.1. Relevant social aspects of biodiversity being addressed

The mindfulness session addresses issues of disconnect from nature and lack of awareness of natural surroundings. In a modern context where many people have minimal contact with natural environments, this intervention helps participants reconnect with nature on a sensory and emotional level. The guided mindfulness exercises support participants in cultivating a peaceful awareness of their surroundings, fostering an appreciation for biodiversity by encouraging them to notice the subtle details and processes in the environment, such as the sound of leaves rustling or the warmth of sunlight.

3.2. Relevant intersectional dimensions

This method can be adapted to be inclusive of various ages and abilities, with the setting and pace adjusted to meet diverse needs. Participants from urban or culturally different backgrounds may find this experience particularly impactful, as it offers a sensory immersion in nature they may not often encounter. Consideration of accessibility needs, such as the physical setup and the level of engagement required, ensures all participants can benefit from the intervention.

3.3. Relative focus given to different levels of social change

Individual level change	*Community level change*	*Institutional level change*
High	Medium	Low

4. Roles

4.1. Participants

Participants are encouraged to immerse themselves fully in the experience, remaining present and quiet to deepen their connection to the environment. They are invited to release judgments or distractions and allow the guided meditation to foster relaxation and openness to the surrounding nature.

4.2. Facilitators

Facilitators play a role in creating a supportive and calm atmosphere, setting up the space thoughtfully, and guiding participants through the meditation. They must be attentive to the emotional tone of the group, prepared to support participants who may experience unexpected emotions, and provide gentle guidance to help participants engage meaningfully with the practice.

5. Materials

Required materials include a guiding script, questions for post-session reflection, picnic blankets or sports mattresses for comfort, and a quiet, safe, outdoor space conducive to relaxation. Facilitators should ensure that the location is free from hazards, such as poisonous plants or ant nests, and provide a serene environment.

6. Instructions

6.1. Identify a suitable natural setting, ensuring safety and comfort for participants. If applicable (e.g. if externally owned) secure any necessary permissions for use of the space. Complete any logistical planning/arrangements for participant travel to and from the site.

6.2. Identify participants' (dis)abilities or health conditions which may impact participation, ensure relevant adaptations are made to ensure the method can be practiced by all bodies.

6.3. Distribute blankets or sports mattresses for participants to sit or lay on comfortably.

6.4. Invite participants to settle in and begin the session with grounding breathing exercises.

6.5. Use the guiding scripts to lead participants through progressive muscle relaxation, sensory awareness, and mindfulness prompts that connect them to the natural surroundings. Use both scripts continuously, and adapt the script to the group experiencing the method, ensuring inclusiveness.

Mindfulness script: (15-20 minutes):

Sit or stand with your back against a tree. If you feel safe doing so, close your eyes. Deep breaths x 5.

Feel the tree trunk against your body. Consider how the tree is simply being. It isn't trying, striving, or judging. It is an alive, peaceful presence. Let that presence – that unconditional support – prop you up. There is nothing for you to do right now, either.

(Pause).

Feel the weight of your body on the earth. The sense of your feet or legs on the ground.

Consider the live beings beneath you – microscopic, unseen, underground, supporting and sustaining everything around you.

Thank them for allowing you to share their space. Feel the presence of the ground holding you up. Notice the support it gives, without asking anything in return. Feel the live energy of the earth.

(Pause).

Notice if allowing yourself to be still is bringing any emotions to the surface. If it is, allow those emotions to be there with you. When we take the time to be present, it's normal to notice emotions, especially uncomfortable ones, arise. Without emotions, you wouldn't be human!

Notice the temperature of the air against your skin.

Tune into the aliveness of your body feeling that temperature, and, if there's a breeze, the sensation of it against your skin.

Take a few deep breaths. Offer gratitude for the free, nutritious air going into your lungs.

Feel your lungs expanding and contracting, and the sensation of the air nourishing you, keeping you alive. Reflect on how that air is feeding your body, and blood, and cells. How it supports your heart and organs; your brain and your skin.

(Pause).

Feel your tongue in your mouth. Notice where it's sitting, what it's touching. Allow yourself to taste whatever is in the air, even if that taste is nothing. What does nothing taste like?

(Pause).

Are there any other physical sensations on your skin? Any heat, or coolness? If there's sunlight, notice the feeling of that. Feel the fabric of your clothes against your body.

(Pause).

Tune into any sounds happening around you. If there is birdsong, see if you can notice the different types. If there are leaves rustling, notice that sound for a while. Allow the sounds around you to wash through you. Are there sounds you hadn't noticed before? Are more emotions arising from being present and tuning in? Allow them to be here with you. Use the sounds around you to become aware of all the life existing around you.

(Pause).

Again, if there are any emotions arising – wanted or unwanted – see if you can allow them to share the space. They are energy, alive like the rest of you, asking simply to be allowed to exist.

(Pause).

If your eyes have been closed, open them. What do you see in front of you? Take in the textures of the trees, of the ground. The variation of colors in the sky.

The different shades of green, brown, black, grey, any other color you might see. The shapes of branches or other flora. The natural movement of life.

(Pause).

Offer some gratitude to your surroundings for sharing their space with you, and for supporting all of life – including you.

You are a living being, awake and alive right now. There will never be another now, and there will never be another you.

Deep breaths x 5.

The following script on Progressive Muscle Relaxation has been informed by Berkley Law script, with the instructions copied from there (20-30 minutes):

Progressive muscle relaxation is an exercise that relaxes your mind and body by progressively tensing and relaxation muscle groups throughout your entire body. You will be asked to tense each muscle group vigorously, but without straining, and then suddenly release the tension and feel the muscle relax. You will tense each muscle for about 5 seconds. If you have any pain or discomfort in any of the targeted muscle groups omit that step. Throughout this exercise you are encouraged to focus on visualising the muscles tensing and a wave of relaxation flowing over them as you release that tension. It is important that you keep breathing steadily throughout the exercise. Now let's begin (Berkley Law, n.d.).

"Begin by finding a comfortable position either sitting or lying down in a location where you will not be interrupted. Close your eyes.

Allow your attention to focus only on your body. If you begin to notice your mind wandering, bring it back to the muscle you are working on.

Take a deep breath through your abdomen, hold for a few seconds, and exhale slowly. Again, as you breathe notice your stomach rising and your lungs filling with air.

As you exhale, imagine the tension in your body being released and flowing out of your body.

And again inhale…. and exhale... Feel your body already relaxing.

As you go through each step, remember to keep breathing.

Now let's begin. Tighten the muscles in your forehead by raising your eyebrows as high as you can. Hold for about five seconds. And abruptly release feeling, in order that tension should fall away.

Pause for about 10 seconds.

Now smile widely, feeling your mouth and cheeks tense. Hold for about 5 seconds, and release, appreciating the softness in your face.

Pause for about 10 seconds.

Next, tighten your eye muscles by squinting your eyelids tightly shut. Hold for about 5 seconds, and release.

Pause for about 10 seconds.

Gently pull your head back as if to look at the ceiling. Hold for about 5 seconds, and release, feeling the tension melting away.

Pause for about 10 seconds.

Now feel the weight of your relaxed head and neck sink.

Breath in…and out.

In…and out.

Let go of all the stress.

In…and out.

Now, tightly, but without straining, clench your fists and hold this position until I say stop. Hold for about 5 seconds, and release.

Pause for about 10 seconds.

Now, flex your biceps. Feel that buildup of tension. You may even visualise that muscle tightening. Hold for about 5 seconds, and release, enjoying that feeling of limpness.

Breathe in...and out.

Now tighten your triceps by extending your arms out and locking your elbows. Hold for about 5 seconds, and release.

Pause for about 10 seconds.

Now lift your shoulders up as if they could touch your ears. Hold for about 5 seconds, and quickly release, feeling their heaviness.

Pause for about 10 seconds.

Tense your upper back by pulling your shoulders back trying to make your shoulder blades touch. Hold for about 5 seconds, and release.

Pause for about 10 seconds.

Tighten your chest by taking a deep breath in, hold for about 5 seconds, and exhale, blowing out all the tension.

Now tighten the muscles in your stomach by sucking in. Hold for about 5 seconds, and release.

Pause for about 10 seconds.

Gently arch your lower back. Hold for about 5 seconds, relax.

Pause for about 10 seconds.

Feel the limpness in your upper body letting go of the tension and stress, hold for about 5 seconds, and relax.

Tighten your buttocks. Hold for about 5 seconds…, release, and imagine your hips falling loose.

Pause for about 10 seconds.

Tighten your thighs by pressing your knees together, as if you were holding a penny between them. Hold for about 5 seconds…and release.

Pause for about 10 seconds.

Now flex your feet, pulling your toes towards you and feeling the tension in your calves. Hold for about 5 seconds, and relax, feel the weight of your legs sinking down.

Pause for about 10 seconds.

Curl your toes under, tensing your feet. Hold for about 5 seconds, release.

Pause for about 10 seconds.

Now imagine a wave of relaxation slowly spreading through your body, beginning at your head and going all the way down to your feet.

Feel the weight of your relaxed body.

Breathe in…and out…in…out….in…out" (Berkley Law, n.d).

Now, when you feel ready start slowly stretching your body as if waking up from a dream. When you are ready to come back, gently open your eyes.

6.6. Allow pauses during the session for silent reflection and sensory immersion.

6.7. Conclude the session with a series of deep breaths, gradually guiding participants back to awareness of their immediate environment.

6.8. Conduct a reflective discussion using prepared questions to help participants articulate their emotional and sensory experiences during the session. With participant consent, audio record the debriefing sessions.

Questions:

How did the exercises make you feel, both physically and mentally?

Did you notice any changes in your stress levels during or after the session?

How did spending time in nature during the session affect your feelings or thoughts about the environment?

Can you describe any moments during the session when you felt particularly connected to the natural surroundings? What was that experience like for you?

Do you believe there is a difference in effect if these types of sessions are conducted in nature/outdoors versus in an inside environment?

Did the session change the way you think about nature or the environment? If so, how?

After this experience, do you feel more interested in learning about or participating in activities related to protecting the environment? Why or why not?

7. Data analysis and synthesis

For the mindfulness and progressive-muscular-relaxation session, a focus group after the session allows participants to reflect on and discuss the emotional and mental effects of the activity in a supportive group setting, capturing insights into the personal and political dimensions of transformation by highlighting changes in attitudes and group norms.

When this exercise was tested in our local P4B learning community pilot "Youth4Biodiversity", this yielded notable physical and emotional impacts, with participants reporting deep relaxation and emotional release. Physically, participants experienced a profound sense of calm, with many describing how physical tension dissipated completely. Emotionally, participants found that the natural setting allowed suppressed feelings to surface, with some noting that certain prompts during the session even evoked near-tearful responses. These experiences collectively fostered a heightened sense of calm, described by one participant as feeling "almost high" from the depth of relaxation.

The natural surroundings played a crucial role, amplifying the session's impact compared to an indoor setting. Participants observed an increased sense of connection to nature, initially finding discomfort in small annoyances like insects, yet gradually accepting them as part of the experience. This shift in perception fostered a sense of peaceful coexistence with the environment, with participants reflecting on nature's resilience and humanity's fragility and potential for harm. This mindfulness practice in nature not only relaxed participants but also expanded their perspective on the interdependence between humans and nature, with Youth4Biodiversity participants reporting that it enhanced their ecological empathy and appreciation.

Participants expressed a strong desire for future nature-based mindfulness activities, suggesting that combining meditation with hikes or nature walks could further deepen their connection to the environment. This feedback underscores the potential for nature-immersed mindfulness sessions to cultivate both emotional well-being and environmental awareness.

8. Checklist for implementation

- Confirm the safety and suitability of the chosen outdoor space.
- Have all materials, including the script and blankets, ready.
- Set a calm and supportive tone for participants from the start of the session.
- Ensure facilitators are prepared to guide and respond to participants' emotional needs.

9. Critical considerations

9.1. Ethics of care:

- Receive ethical approval following institutional protocol. Provide participants with an informed consent form prior to initiating the activities, listing the purpose of the activity and project, what is involved in the method, the anonymity of data and data storage process.
- Some participants may experience strong emotions or vulnerabilities during mindfulness practice. Facilitators should allow participants the option to process emotions privately, leave the session if needed, or request additional support. It's essential to respect each participant's pace and comfort level.

9.2. Adaptability:

- Be mindful of environmental factors, such as weather and terrain, which may impact participants' comfort. Adjust the session length and setting as needed to ensure inclusivity.

10. Top tips

- Encourage facilitators to experience the session as participants before leading it, deepening their empathy and insight.
- Take cues from the participants' pace, allowing adequate time for silent reflection and sensory engagement.
- Use gentle guidance to encourage participants to stay present but avoid rushing or forcing engagement.
- When choosing the place for the activity, take into consideration the weather conditions: if it is raining and cold season, consider conducting the activity outdoors but in a protected place (ex. open tent); if it is sunny and warm season, consider conducting the activity in the shadow.

11. Measuring impact

Impact can be assessed through both intrapersonal and interpersonal changes. Intrapersonal impact includes shifts in personal well-being, stress reduction, and connectedness to nature. Interpersonal impact involves participants' reflections on group unity, shared vulnerability, and empathy toward one another. Evaluating responses in the post-session discussion provides valuable insights into participants' emotional and sensory experiences, the depth of their connection to the natural environment, and their sense of collective presence, offering a holistic view of the intervention's effectiveness.

12. Links to external resources

Practicing mindfulness in addressing the biodiversity crisis (Gerber et al., 2023). https://conbio.onlinelibrary.wiley.com/doi/pdfdirect/10.1111/csp2.12945

Mindfulness in sustainability science, practice, and teaching (Wamsler et al., 2017). https://link.springer.com/article/10.1007/s11625-017-0428-2

Progressive Muscle Relaxation Script (Berkley Law n.d.). https://www.law.berkeley.edu/files/Progressive_Muscle_Relaxation.pdf?utm_source=chatgpt.com

1. Intervention method

Nature experience stroll

Authors: Lindy Binder, Katharina Santer, Christina Seliger

2. Summary of the method

During a 'nature experience stroll' participants are invited to self-organise in pairs and then walk around an outside green space discussing their personal relationship with nature. Where required these discussions are stimulated via prompts (given by a facilitator), such as: 'What are my experiences with gardening?'; 'What is my point of view on food and environmental sustainability?'; 'What is my reference to being out in nature?'.

3. Use context (within PLANET4B)

3.1. Relevant social aspects of biodiversity being addressed

Within PLANET4B the 'nature experience stroll' method was the first intervention implemented with the BeSt Graz Citizen Learning Community (LC). This LC comprises of a group of majority migrant women.

The 'nature experience stroll' is a very simple method which does not require any preparation or expertise from participants, and very little from facilitators. During its use within PLANET4B the main focus was to enable people to interact with each other in a comfortable fashion with the aim of building a community. In order to ensure biodiversity was considered from the outset, the pairs were given prompts to discuss, (e.g.) around food or being out in nature, as they walked. It was also important that the walk took place in an outside natural space (within PLANET4B, the method was used in a plot set aside for a community garden that would eventually be built by the participants).

3.2. Relevant intersectional dimensions

The experience stroll method is suitable for a wide range of intersectional dimensions, however the location for the stroll must be accessible in accordance with any physical mobility impairments of members of the group.

Within PLANET4B the group with which the method was used was all female and mainly migrants from different locations now living in the city of Graz, Austria. They had responded to an information evening where they were introduced to the wider Graz urban community food growing project and the opportunity to build a community through gardening activities and research activities of which the nature experience stroll was the first.

3.3. Relative focus given to different levels of social change

Individual level change	*Community level change*	*Institutional level change*
Medium	Medium	Low

4. Roles

4.1. Participants

To have a conversation, stimulated by given prompts, with a partner while walking around an outside space. Active listeners when asking the questions to the other person.

4.2. Facilitators

To welcome participants, put them in pairs and give them the prompts. Facilitators may wish to ask for (and document) feedback from the pairs in a plenary at the end.

5. Materials

(Optional) Paper and pens to note what the interview partner said.

6. Instructions

6.1. Select a suitable outdoor location (within PLANET4B, a community garden was used) in accordance with the specifics of the group, and if applicable arrange for transportation of participants to the site.

6.2. Provide participatory information and secure informed consent.

6.3. Welcome people.

6.4. Encourage participants to come together in pairs (ideally with an individual with whom they are not already familiar) and invite them to walk around in the greenspace, sharing and discussing with their partner about their personal relationships with nature.

6.5. Offer participants prompts to facilitate this discussion. For example: 'What are my experiences with gardening?', 'What is my point of view on food and environmental sustainability?', 'What is my reference to being out in nature?'.

6.6. The duration of the walk depends on the total time available; approx. 30 minutes per pair has proven to be an appropriate time.

6.7. Bring the pairs back together and invite them to introduce their partner and tell the group about what they have discussed during their experience stroll.

6.8. Facilitate a plenary around ideas discussed if appropriate. Ensure this can be translated if necessary.

7. Data collection and synthesis

Within PLANET4B this method was used as a 'warm up' exercise (for encouraging the engagement of each individual, as well as for the purpose of supporting community building within the learning community group as a whole), as such no specific data was collected (and the method was run without the final plenary component).

If the facilitator uses a plenary to ask for feedback on what was discussed in the pairs, this can be recorded either via audio or notetaking, assuming appropriate permissions have been sought, with the arising qualitative data then thematically analysed.

This method is also potentially useful as part of an initial process of baselining the worldviews, perceptions, knowledge and experience levels of a new group.

8. Checklist for implementation

- A safe outdoor space for walking
- Prompts for discussion
- Participatory information and informed consent sheets (ethics)

9. Critical considerations

9.1. Ethics of care / ethical considerations

Ensure there is no potential physical risk to participants in the outdoor space. If mobility is an issue for any participants, choose somewhere where there are paths or where the terrain can be navigated by all individuals.

Give clear guidelines of the area to walk in, so all pairs can be reached when the time is up or ask pairs to return to the starting point at a specific time. Allow for 20-40 minutes of walking and talking in pairs.

Ensure if there are language barriers to allow enough time for translation. One of the women in the Learning Community used an app to translate to and from Russian.

9.2. Power dynamics and relations

Allowing participants to choose their partner (rather than being assigned by the facilitator) gives the pair some autonomy as they choose where they walk and how they discuss the topics.

10. Top tips

- Ensure pairs can communicate without language barriers (when used within PLANET4B participants were paired such that they can speak their first language or a language they spoke well).
- Allow extra time if there will need to be translation.
- Ensure enough space to walk around – an outdoor space is preferable especially when the focus of discussion is nature or biodiversity.
- If there is time, the pairs can be switched around and asked to repeat the exercise with their new partner.
- Mention that this is a listening exercise – highlighting to participants the importance of actively listen to the person who talks and not interrupting someone while talking, but also ensuring that the time is equally shared.

11. Measuring impact

When used in PLANET4B with the Graz LC, to allow informal discussion and relationships to develop, none of the conversations were recorded. This was the first of a series of methods used with this LC, and impact from all the methods as a whole will be collected after eight months of interaction.

However, for use in a different context, this method is potentially useful as part of an initial process of baselining the worldviews, perceptions, knowledge and experience levels of a new group.

12. Links to external resources

https://equiip.eu/activity/activity-4-walk-and-talk/ https://www.shs-conferences.org/articles/shsconf/pdf/2020/13/shsconf_shw2020_03007.pdf

1. Intervention method

Nature hike

Author: Mariana Matoso

2. Summary of the method

The hike is an immersive, outdoor experience designed to connect participants with nature while fostering environmental awareness and teamwork. Participants develop a closer relationship with the environment by engaging in a shared physical challenge within a natural setting. Along the way, facilitators guide discussions about local biodiversity and ecological resilience, helping participants contextualise their role in conservation. This method cultivates both a personal connection to nature and a collective environmental consciousness.

3. Use context (within PLANET4B)

3.1. Relevant social aspects of biodiversity being addressed

The hike intervention addresses several social dimensions related to biodiversity. Primarily, it tackles the disconnect from nature by physically immersing participants in the natural environment, fostering a sense of connection essential for conservation attitudes. Additionally, it promotes social engagement and inclusion – especially relevant for diverse groups, as hiking is a cultural norm in some places like Germany, offering an accessible way for participants, including migrants, to bond and integrate through shared outdoor experiences. Lastly, the hike builds social capacities by requiring participants to support one another, encouraging team building and mutual reliance in a neutral, nature-based setting.

3.2. Relevant intersectional dimensions

The hike considers various intersectional factors, particularly age and physical ability, ensuring the chosen path accommodates different levels of agility while remaining challenging enough to engage participants. Disability considerations are addressed by planning accessible routes or providing additional support where needed, allowing inclusivity across physical capabilities.

3.3. Relative focus given to different levels of social change

Individual level change	*Community level change*	*Institutional level change*
High	Medium	Low

4. Roles

4.1. Participants

Participants are active participants in the experience, responsible for staying engaged, following safety protocols, and supporting each other along the way. Their role extends beyond merely completing the hike; they are encouraged to participate in group reflections and discussions, fostering a collective awareness of biodiversity issues. In order to ensure

the framework that enables teamwork, trust and potential for a deep experience, consider conducting the hike with a group of 10-15 people (max. 25 people).

4.2. Facilitators

Facilitators prepare the hike route, ensuring it is safe and suitable for all participants. They provide context on biodiversity topics during the hike, share information about local ecosystems, and facilitate group discussions. Facilitators are also responsible for maintaining group cohesion and supporting participants who may need assistance, ensuring the experience remains inclusive and impactful.

5. Materials

Essential materials are required for both safety and comfort, including a map, GPS device or cell phone with network coverage, first-aid kit, sufficient water and food, and appropriate clothing and footwear for all participants. Additionally, facilitators carry extra supplies and coordinate equipment sharing to ensure everyone is prepared for the hike's demands.

6. Instructions

6.1. Select and research an outdoor location suitable for the hike, ensuring it aligns with the physical abilities of the target group.

6.2. Prepare necessary materials, distribute the map to participants, and assign positions in the group (front runner, middle support, and sweeper):

- The path of the hike is decided previously and followed by all the participants, in order to ensure teamwork, however the positions assigned can be changed while the hike takes place, enabling participants to try different roles and trust each other.

6.3. Set expectations with participants, introduce the objectives of the hike, and outline safety protocols.

6.4. Begin the hike, stopping periodically to discuss notable biodiversity, share local environmental history, and answer participants' questions.

6.5. Break for a picnic, allowing participants time to rest and connect with nature.

6.6. Continue the hike, reinforcing principles of Leave No Trace by ensuring no garbage is left behind.

6.7. Conclude with a group reflection, discussing experiences, challenges, and insights gained during the hike.

7. Data collection and synthesis

Regarding the hike, the *Extended Inclusion of Nature in Self Scale* questionnaire (Martin & Czellar, 2016) can be administered to assess participants' perceived closeness to nature before and after the hike. This scale utilises a series of diagrams with varying levels of overlap between “Self” and “Nature” circles, symbolising different degrees of ecological integration. Participants select the image that best describes their sense of connection with the natural environment. Each selection is assigned a score from 1 (least overlap) to 7 (most overlap), with higher scores indicating a stronger perceived connection to nature.

For example, in our piloting of this method, participants’ responses varied, with scores ranging from 3 to 6. This variation reflected differing individual perceptions of nature

integration. The average score across participants was 4.89 out of 7, which suggests a generally moderate-to-high level of closeness to nature. This average indicates that the hike positively influenced participants' feelings of ecological integration. The overall increase in perceived closeness to nature suggests that the hike effectively fostered an enhanced sense of connection with the natural environment.

The results highlight the hike's potential as a tool for promoting environmental awareness and connection. The average score reflects that, for most participants, the hike facilitated a meaningful sense of belonging within the natural world, a finding that supports the use of outdoor experiential methods in biodiversity engagement.

Additionally, as part of a debriefing stage at the end of the hike, reflecting upon the experience, the feelings and emotions that it propelled, the connections between the group and with nature, and the participants' potential openness to engaging in local conservation activities this conversation can also be recorded and analysed in a format of additional qualitative research. It can be a structured debriefing or un-structured and informal reflection. Both ways could enable participants to deep dive into their experience and therefore provide researchers with a greater understanding of the method.

8. Checklist for implementation

- Ensure participants have maps and understand emergency procedures.
- Pack a complete SOS kit.
- Establish and communicate the group's emergency response protocol.
- Print the questionnaire and add pens.
- Prepare the picnic lunch: a) if the hike happens as part of a longer format (ex. 2 days in the forest), take the time before the hike to let participants prepare their own lunch kits form the common kitchen; b) if the hike is a separate one-time event and there is budget, the facilitators should prepare the lunch picnic beforehand and bring it with them; c) if the hike is a separate one-time event without budget, inform participants beforehand that they should bring their packed lunch with them.
- Prior to the hike, check (dis)ability levels of the participants, ensuring the path chosen is suitable for the group.

9. Critical considerations

9.1. Ethics of care:

- Receive ethical approval following institutional protocol. Provide participants with informed consent form prior to initiating the activities, listing the purpose of the activity and project, what is involved in the method, the anonymity of data and data storage process.
- Select a path that matches the group's physical capabilities. Establish safety rules, such as avoiding unknown plants or fungi without guidance and sticking together as a group.
- Ensure that at least two facilitators are present, when working with a small group (up to 10 people). Ensure another facilitator is present for every (up to) 5 extra participants.

9.2. Environmental preparedness:

- Confirm that all participants have suitable clothing and footwear and provide additional resources if needed.

10. Top tips

- Adjust the pace to match the group so that everyone would feel comfortable (a minimum 1-hour hike with an easy-type difficulty path should be possible to be done with any group, yet for a group of 12 healthy young people – ex. our piloting – a 2-hour hike with medium-type difficulty path was perfectly adapted by the participants).
- Consider placing the slowest participant at the front to set a manageable pace.
- Prepare background information on the hike location's biodiversity, history, and any notable species or ecosystems.
- Ensure facilitators have conducted the hike themselves beforehand, getting to know the specificities of the path.
- Consider selecting a circular path as this ensures the whole hike "there and back" takes place to different paths.
- Carry extra food and water in case any participants require additional support.
- Develop thought-provoking questions for post-hike discussions to encourage reflection on the experiential learning process.

11. Measuring impact

The hike's impact is assessed across intrapersonal, interpersonal, community, and institutional levels. Intrapersonal impact involves shifts in nature connectedness, measured through the *Extended Inclusion of Nature in Self Scale* before and after the hike. Interpersonal impact can be observed through group dynamics, with the hike fostering social bonds and mutual support among participants. On the community level, post-hike reflections gauge participants' openness to engaging in local conservation activities. Finally, the hike can influence institutional impact indirectly, as participants may become more inclined to support policies that protect natural spaces following a meaningful nature experience.

12. Links to external resources

Communicating ecological awareness through hiking Mount Argopuro (Dirgantara et al., 2024):
https://www.e3s-conferences.org/articles/e3sconf/pdf/2024/25/e3sconf_icyes2024_02004.pdf

1. Intervention method

Nudging experiments to activate social norms and affection for biodiversity prioritisation

Authors: Sven Grüner, Julian Jäger, Edit Hunyadi, Ilkhom Soliev

2. Summary of the method

Nudging experiment is a technique frequently used in the field of behavioural sciences and public policy to steer behaviour subtly, without restricting available alternatives of choice. Nudges are typically easy to implement at low cost. In this protocol, we describe how to implement a nudging experiment drawing from our experience in using nudges to activate social norms and affection to foster attention to biodiversity. In the context of PLANET4B, short text and images were used to provide information with facts from biodiversity research (e.g. decline rates, estimated value, health-related significance) and some creative affection-based messages (e.g. well-known phrases or their variations expected to raise empathy to biodiversity-related action). The overall goal of this research-oriented intervention, where we employ a survey experiment and a field experiment, was to find out which social norms work best to prioritise biodiversity during a daily shopping activity of citizens when visiting a supermarket.

3. Use context (within PLANET4B)

3.1. Relevant social aspects of biodiversity being addressed

In the context of PLANET4B, the intervention method was designed to understand to what extent nudges can activate social norms (authority from a scientific or public figure) and affection (emotions such as humour, empathy, feeling sad or happy) to bring biodiversity-relevant information to the attention of the participants. In both the general population survey and the supermarket experiment, all nudges are designed to encourage pro-biodiversity behaviours related to grocery shopping. Identifying the most effective interventions can help retail businesses such as supermarkets, as well as policy makers who regulate these businesses, adopt these strategies to subtly influence customer behaviour, extending the benefits to a wider audience, ultimately contributing to what becomes a prevailing norm, habit, discourse, etc.

3.2. Relevant intersectional dimensions

Depending on how the intervention is done – during PLANET4B as a survey and a field experiment – it can address different intersectionality dimensions. For example, a quota-representative study of a country's population (in our case, the German population) can investigate the role of age, gender, education, etc. in attitudes towards certain actions. Another approach is a field experiment conducted in a supermarket which can be used to engage with shoppers while they are making their purchases. Such field experiments have the potential to investigate similar intersectionality dimensions, but they also allow participation of people who are hard to reach across all social milieus via standard survey methods (such as those not actively participating in online surveys which are also typically marginalised groups).

3.3. Relative focus given to different levels of social change

Individual level change	*Community level change*	*Institutional level change*
Medium	Low	High

4. Roles

4.1. Participants

The nudging experiment, when conducted in the form of a survey only, typically presents participants, for example selected from a panel of registered respondents (list of people available to the researchers), with various pieces of information, and subsequently inquires about their intended shopping behaviours.

When the nudging experiment is in the form of a field experiment, for example conducted in a supermarket, participants are actual supermarket customers in their real-world shopping situations.

An approach which incorporates both a larger hypothetical survey experiment and a real-world field experiment allows comparison of intended and real behaviours, providing deeper insights into the impact of interventions in different contexts, while potentially facilitating change in real-world behaviours.

4.2. Facilitators

Facilitators for this intervention method ideally need to have one or two team members with strong experimental expertise. In principle, some nudges that are known to have substantial effects could be implemented by an organisation without experimental expertise (for example, changing what is a default choice in various situations). But to understand if and how this nudge is working in a specific case, community or organisation (meaning beyond the rather general effects reported in the academic literature), one still needs an experimental expert.

5. Materials

Materials depend on the exact method. The exact method is usually defined by the research question on the one hand, and the practical opportunities and limitations on the other hand. In the case of PLANET4B we wanted to answer the research question of how individuals respond to nudges aimed at activating social norms and affection for biodiversity prioritisation in a daily shopping context. We then decided first to understand how people in the general population react to various nudges activating social norms and affection in an opinion poll; and then to explore if and how some of the nudges with most support in the general population could work in a real-world context.

Survey experiments typically require a questionnaire where certain information or questions are designed differently (treatments) for different groups (so-called experimental and control groups) (see e.g. Bryman, 2016; Huitink et al., 2020; Stantcheva, 2022). For example, do people support pro-biodiversity action more when the information about biodiversity is related to nature, health, risks, etc.? People who participate in the survey should be randomly assigned either to a treatment or a control group. This is important for understanding if the treatment – for example, information framed differently – has an impact (sometimes referred to as a cause-and-effect relationship) on how people respond. Once an experimental survey with a questionnaire has been developed, one can consider how exactly data could be collected – in person, online, via telephone, or otherwise. One can

also consider collaboration with professional survey teams at research institutes and universities and/or companies. Nowadays, quota-representative studies are quite popular. These studies mimic the general population of a country concerning characteristics such as age, income, and gender.

Field experiments typically require a natural decision-making environment. For example, in our case we look at a supermarket (one can think of many real-world settings for a field experiment such as schools, workplaces, communities, larger-scale sectors of the economy, specific companies that provide public service, internet, etc.). Ideally, the experiment should be conducted in multiple supermarkets to increase the sample size and address potential location-specific factors that may only apply to a single supermarket. We then developed a summary concept for sharing with the representatives of the supermarket(s), including the goal of the study, ethical and data use concerns, visual examples (e.g. a prototype of an inlay for trolleys), the detailed but clear stepwise procedure – what is needed from whom and when, and contacts of the researchers. It is important that both parties – researchers and the representatives of the decision-makers in the organisation where the field experiment is conducted – have an in-depth exchange and clear agreement about the experiment and how the findings from the experiment will be used (later publication of the results, use of the knowledge to redesign existing practices, etc.).

Field experiments typically also employ questionnaires or observations – in any case, the researchers will have to decide on what should be the treatment (e.g. images located in supermarket carts that activate social norms and affection), what they would like to observe as a result of treatment (e.g. shopping decisions) and how they can best measure reactions of people to the treatment (e.g. receipts of the customers).

6. Instructions

Identify the most promising interventions for inclusion in a survey with the general population (intended shopping behaviours).

- *6.1.* Literature review to develop a specific research question.
- *6.2.* Conceptual development of several interventions (nudges).
- *6.3.* Designing the actual nudges (ideally with a practice partner).
- *6.4.* Obtaining ethical approval.
- *6.5.* Conducting an Internet-based survey (if budget permits, with the help of a professional survey company) to find out the most promising interventions to explain intended biodiversity-related shopping behaviour.
- *6.6.* Data analysis: if and what nudges work and how.

Using the most promising interventions in the field (could be done independently from the survey above or before a survey, depending on that some steps here could be combined with the steps needed to develop a survey).

- *6.7.* Literature review to develop a specific research question.
- *6.8.* Conceptual development of several interventions (nudges).
- *6.9.* Designing the actual nudges (ideally with a practice partner).
- *6.10.* Obtaining ethical approval.
- *6.11.* Selecting and getting in touch with supermarkets.
- *6.12.* Conducting the experiment in the selected supermarket(s): one day without any treatment – which serves as the control group; and the other day using the

promising interventions from the survey results (for example, the same day and time the following week to have both groups as identical as possible with the exception of the intervention of interest).

6.13. Getting in touch with the customers: asking customers after their shopping activities to answer a short questionnaire (socio-demographics and shopping-related questions) and information about their shopping behaviours (e.g. taking a picture of the receipt). If possible, conduct the survey as soon as the customer has made payment.

6.14. Data analysis: if and what nudges work and how.

6.15. Writing up the results and making the knowledge available to others.

7. Data collection and synthesis

Data collation:

- Pre-test or validate the experiment (e.g. in our case nudges expected to activate social norms and affection for pro-biodiversity shopping behaviour) by asking people beyond your team (e.g. friends and family, students, people at the marketplace, visitors of the supermarket where you are planning to conduct the experiment later, larger opinion polls)This procedure helps identify and correct any "obvious" errors that may have been overlooked and provides an initial indication that the approach is on the right track.
- Make any adjustments after the pre-test and validation before launching the main data collection.
- Launch the main data collection (survey, field experiment).

Data analysis:

- To find out if and how nudges work in a survey experiment, people can directly be asked about their reactions and intended behaviours after being exposed to a treatment. At a later point, they can also be asked about their real-world decisions. Alternatively, one could combine these and collect data at multiple instances (for example over time, or at different locations).
- To understand the effect of treatments during a field experiment, in a study that uses randomisation, one can compare mean values of the treatment and control condition related to the main behaviour being studied (variable of interest). For example, if one would like to understand whether locational placement of a certain information (inlay in a trolley) in a supermarket leads to certain products being purchased more or less than otherwise, the treatment is this information and the main behaviour being studied is whether people purchase certain product more or less.

Data use:

Data obtained by the survey experiment or field experiment can be used for generating new knowledge about how people make decisions, understanding better what works and how in practice and in different contexts, in learning and teaching of social dimensions related to the key topic of the experiment (in this case, the role of social norms and affection in pro-biodiversity action in a daily shopping context).

8. Checklist for implementation

8.1. Overall planning and preparation

- Define objectives: Clearly outline the purpose of the survey or field experiment and the research questions.
- Literature review: Ensure the experiment builds on existing studies and identifies gaps in knowledge.
- Target population: Identify and understand the demographics, characteristics, and preferences of your target population.
- Hypothesis formulation: Develop clear and testable hypotheses.
- Ethics approval: Obtain approval from an institutional review board (IRB) or ethics committee.

8.2. Designing the experiment

- Experimental design: Choose a specific experimental design (e.g. randomised control trial).
- Randomisation: Develop a plan to randomly assign participants to control and treatment groups.
- Survey instrument: Design clear survey questions or experimental interventions.
- Pre-test: Conduct a pilot to test the clarity of questions and functionality of field protocols.
- Sample size calculation: Determine the minimum number of participants required for statistical power.

8.3. Logistics and resources

- Location: Identify field sites or online platforms suitable for conducting the experiment.
- Budget: Plan for costs, including participant incentives, transportation, and materials.
- Team training: Train enumerators or field staff on ethical conduct, survey procedures, and data collection tools.
- Data collection tools: Prepare survey forms, mobile apps, or other tools to collect data.

8.4. Planning implementation

- Planning recruiting participants: Consider how to ensure fair and transparent recruitment methods.
- Planning informed consent: Develop a text that ensures participants understand the purpose, procedures, their rights before participation, and debriefing (if required).
- Planning monitoring fieldwork: Plan to supervise the process to ensure adherence to protocols and avoid bias.
- Planning how to handle missing data: Plan for contingencies such as participant dropouts or incomplete responses.

8.5. Planning data management

- Planning data privacy: Implement measures in advance to protect participant data, such as anonymisation and secure storage.
- Planning quality checks: Plan how to verify data for consistency, completeness, and accuracy.
- Planning document procedures: Plan how and where to maintain detailed records of methodology, decisions, and any deviations from the plan.

8.6. Planning analysis and reporting

- Planning data cleaning: Have a plan for preparing data for analysis by removing errors and handling missing values appropriately (which software and who).
- Planning statistical analysis: Ensure that you have a clear plan for using appropriate methods to analyse the data and test hypotheses.
- Planning transparency: Make sure that you document all analysis steps, including pre-registered hypotheses and methods.
- Planning dissemination: Consider how you will share findings through reports, presentations, or academic publications.

8.7. Planning follow-up

- Planning feedback loop: Think about gathering feedback from field staff and participants to improve future research.
- Planning ethical obligations: Think if you can be prepared to address any unintended consequences or concerns that can arise during the experiment.

8.8. Planning impact assessment

- Planning impact assessment: Think how you will evaluate the outcomes and implications of the study.

9. Critical considerations

9.1. Ethics of care / ethical considerations

Dealing with human subjects requires obtaining an ethical or institutional review board approval before data collection. For this purpose, an independent commission advises on whether ethical standards are upheld throughout the research process. For example, participants must be informed about the background and purpose of the study, their right to withdraw from the study, exclusion criteria, potential harm of participation, etc. (informed consent). Specific data protection measures should be put in place (for example as regulated by the General Data Protection Regulation of the European Union and national ethical regulations).

9.2. Power dynamics and relations

In experimental studies, critical consideration of potential power dynamics and relations is important for informing a number of decisions. One such decision relates to avoiding the use of deception in social experiments (for example, introducing information that is not factually accurate but might sound probable to see if people change their behaviour in response to this information). Deception is avoided as it can undermine trust, harm participants, and compromise ethical standards. Misleading participants about the nature of a study also violates the principles of informed consent, potentially causing distress or damaging relationships between researchers and communities. Additionally, it risks reducing the credibility of future research if participants become sceptical of researchers' honesty. From a scientific perspective, deception can also introduce biases, as participants may behave differently once they suspect they are being deceived. Therefore, most ethical guidelines emphasise transparency, respect for participants, and minimising harm to ensure integrity and trust in research. In rare cases, deception in social experiments is acceptable only when it is necessary to answer significant research questions, no alternative methods are feasible, and the potential benefits outweigh the risks. It must be approved by an ethics board, involve no or minimal harm, and include a debriefing to inform participants afterwards.

Further, before conducting the experiment, it is crucial to provide clear and comprehensive guidance on all aspects of participant engagement to those who will be collecting data (how to obtain a so-called informed consent). This includes detailed instructions on how to approach participants respectfully and ethically, ensuring they feel at ease and are fully informed about their role in the study. We should note the ethically sensitive concern here that the customers at this point provide their consent to participate in the questionnaire, but they have already been exposed to nudges before providing their consent. This is typically the acceptable practice in field experiments when interventions, if any (such as nudges described here), do not limit otherwise available choices, inflict no harm, and have been approved by an ethical review committee as described above (or known as institutional review board in some places). The guidance should also emphasise the importance of formulating and delivering questions in a neutral and unbiased way to prevent influencing responses. Furthermore, protocols should outline how to interact with participants professionally, empathetically, and with cultural sensitivity, aiming to reduce power imbalances and cultivate a trusting and collaborative environment.

10. Top tips

- Keep in mind: the term "experiment" is defined here – both in the form of surveys and field interventions – as a systematic process of identifying cause-and-effect relationships and NOT simply as "trying something out" or "experimenting with something", even if in a colloquial language such use of the term is very typical.
- Involve an experienced social scientist early on, ideally with advanced experimental expertise – otherwise, there are simply too many blind alleys that one can discover only after investing a lot of time, energy and resources, not to mention the mistakes that can lead to unfounded conclusions and misinterpretation of the processes and results. Generally, consider working in teams: fieldwork often requires input from different people (for example in our case, knowledge of quantitative/experimental methods, knowledge of biodiversity, knowledge in communication and design, knowledge of conducting surveys online or in person, etc.).
- Think about the entire study process, including research question(s), experimental methods, sampling, and approaches to data analysis before collecting data since they are interlinked with each other. Do not think "I will start data collection and then figure out how to analyse it" or "isn't it easy to nudge, we can simply show some images or try different messages?".
- Consider the uncertainty of the study and plan enough extra time for dealing with situations when things do not go as expected (especially when planning activities that depend on other actors, such as when you need the agreement of the supermarket to collaborate).

11. Measuring impact

It is useful to think about measuring impact in terms of areas of impact to be measured and the methodology of measuring impact.

In terms of areas of impact, nudging can be relevant for all three – intrapersonal, interpersonal, and institutional – levels of social change investigated in PLANET4B. In practice, one can measure such impacts, by looking at changes in 1) knowledge, attitudes, perceptions (intrapersonal) typically via surveys or interviews; 2) spillover effects from change in the behaviour and decisions of one individual on others (interpersonal) via observations of social change in linked individuals originally not part of the experiment; 3) developing new default rules and practices but also narratives and discourse (institutional) via analysing the changes in organisational, institutional, and other broader societal practices and norms.

In terms of the methodology for measuring impact, in an experimental research design one can create a control and experimental group and comparatively analyse the change in the main variable of interest. The task is then to understand to what extent the change seen in this variable of interest can be attributed to the treatment of the experiment. In other words (in the case of a field experiment) to what extent the purchase decisions of the individuals can be attributed to the images that individuals might have been exposed to in the shopping trolley.

In the long run, the effects of the experiments – both in survey and field – can be further studied using different approaches in follow up studies or additional follow up measures resulting from the original experiment (did the supermarket engage in any further activities related to this experiment – hire more people working on this, reorganise the shelves, organise capacity building, create a new internal regulation, etc.). This could comprise an in-depth case study of a community where the experiment was conducted, a cross-sectional study where one can look at many participants of the experiment and see if there are associations or causality between key variables of interest, an in-depth longitudinal study to understand participants and their decision making over time after participating in the experimental intervention, a comparative study looking at the potential effects from participating in the experiment in different contexts.

12. Links to external resources

Bryman, A. (2016). *Social Research Methods. 5th Edition.* London, UK: Oxford University Press.

Huitink, M., Poelman, M. P., van den Eynde, E., Seidell, J. C., & Dijkstra, S. C. (2020). Social norm nudges in shopping trolleys to promote vegetable purchases: A quasi-experimental study in a supermarket in a deprived urban area in the Netherlands. *Appetite, 151*, 104673. DOI: https://doi.org/10.1016/j.appet.2020.104655

Stantcheva, S. (2022). How to run surveys: A guide to creating your own identifying variation and revealing the invisible. https://scholar.harvard.edu/files/stantcheva/files/How_to_run_surveys_Stantcheva.pdf (accessed November 27th, 2024).

1. Intervention method

Outdoor cinema

Author: Mariana Matoso

2. Summary of the method

The outdoor cinema method involves setting up a screening in a natural setting, allowing participants to view and discuss a documentary on biodiversity. Within PLANET4B, for example, the method was used to screen *Virunga* (2014), which focuses on mountain gorillas in Congo's Virunga National Park and the impacts of armed conflict on biodiversity and local communities. This experience encourages participants to reflect on the challenges of conservation, the importance of protected areas, and the broader social and environmental implications of biodiversity loss, sparking discussion and fostering a deeper, empathetic connection to the issues presented.

3. Use context (within PLANET4B)

3.1. Relevant social aspects of biodiversity being addressed

The outdoor cinema method can be used to address social issues like lack of biodiversity awareness, complexity in biodiversity information, and the need for a more profound understanding of conservation. By presenting biodiversity information in a cinematic format, the intervention stimulates engagement, helps break down complex issues and presents them in an accessible way. This approach enhances participants' understanding and encourages greater empathy, especially when discussing the human and ecological costs of environmental degradation.

3.2. Relevant intersectional dimensions

Cultural background plays a key role in this intervention. Participants from diverse backgrounds may connect differently with the themes of the documentary, especially when the film explores environmental and social challenges unfamiliar to them. This diversity enriches the discussion, as each participant brings unique perspectives, fostering a more inclusive understanding of global biodiversity issues.

3.3. Relative focus given to different levels of social change

Individual level change	*Community level change*	*Institutional level change*
High	Medium	Low

4. Roles

4.1. Participants

Participants are encouraged to immerse themselves in the documentary and, afterwards, share their opinions, reflections, and emotional responses with others. Their role extends beyond passive viewing, as they actively engage in discussions, offering insights that contribute to a collective understanding of biodiversity challenges.

4.2. Facilitators

Facilitators play a role in setting up the space and introducing the film. They provide background context on the documentary's themes and guide a post-viewing discussion with questions designed to provoke thought and connect the documentary's message to the participants' own lives and perceptions of biodiversity.

5. Materials

Essential materials include a projector, electricity source, computer, internet access, screen or sheet for projection, speakers, and comfort items such as pillows, blankets, and picnic blankets. These materials help create an inviting atmosphere, allowing participants to focus fully on the film and ensuing discussions.

6. Instructions

6.1. Select an outdoor location with suitable space for a movie screening. Obtain permission for the venue and for screening the film. Secure necessary permissions and Film Copyright Licence if applicable, for screening the film, obtain permission from the copyright owners in the form of a licence, whether or not you are showing to a paying audience. Owning a film on DVD or subscribing to a streaming service only grants you rights for home use and does not mean you are permitted to show the film publicly.

6.2. Choose a documentary that aligns with biodiversity themes, ensuring it's suitable for the target audience.

6.3. Set up the screening area with all necessary materials, and arrange a welcoming, comfortable environment.

6.4. Allow participants to settle in, circulate a QR code with the pre-movie survey and give people time (10 minutes) to answer it.

6.5. Provide a brief introduction to the documentary's themes and start the screening.

6.6. After the film, give participants a few minutes to discuss informally before initiating a guided discussion.

6.7. For debriefing purposes, after giving time for participants to digest what they have seen and decompress from the silence, introduce a set of prepared questions to lead the discussion on the film's key themes and connections to biodiversity. Record the discussion, in order to gather the data provided.

6.8. Circulate the QR code with the post-movie survey and give participants time to answer it (10 minutes).

6.9. Conclude the event by thanking participants and packing up materials.

7. Data collection and synthesis

For this intervention, impact can be measured through pre- and post-film surveys, evaluating changes in participants' awareness, attitudes, and personal commitment to conservation. Pre-film surveys assess baseline knowledge and attitudes towards biodiversity, while post-film responses capture shifts in understanding and personal responsibility. This approach allows facilitators to measure the intervention's success in fostering both intellectual and emotional engagement with biodiversity issues.

The outdoor cinema session, featuring the screening of *Virunga*, demonstrated the potential of film to shape participants' awareness and attitudes toward biodiversity conservation. For guiding data analysis, questions could explore shifts in knowledge (e.g. familiarity with Virunga National Park and biodiversity challenges before and after the film), changes in perceptions of the importance of protected areas (e.g. how the film influenced views on conservation's global significance), and understanding of threats to biodiversity (e.g. recognition of climate change, habitat loss, and corporate influence as key concerns). Additionally, analysis could examine changes in personal responsibility and engagement, such as participants' perceptions of their impact on conservation efforts and willingness to engage in social or community-driven conservation activities. These focal points could help assess the effectiveness of film as a tool for promoting biodiversity awareness and inspiring behavioural change.

8. Checklist for implementation

- Ensure the screening area is appropriately set up and all materials (projector, sound system) are functioning.
- Prepare and review questions for the guided discussion.
- Confirm permissions for outdoor screening and documentary use.

9. Critical considerations

9.1. Ethics of care / ethical considerations

- Receive ethical approval following institutional protocol. Provide participants with an informed consent form prior to initiating the activities, listing the purpose of the activity and project, what is involved in the method, the anonymity of data and the data storage process.
- Choose a film appropriate for the audience, considering the sensitivity of specific images or themes. If the film contains potentially distressing content, provide a warning at the session's start.
- Ensure the film is legally permitted for public, non-commercial screening.

10. Top tips

- Select a film with themes likely to resonate with the target group.
- Select a location suitable for the outdoor movie experience – for example a park, a forest, or even a backyard. Screenings that are located in proximity to a natural environment can lead to greater immersions, but it should be adapted to the groups needs and accessibility requirements.
- Devote time to crafting discussion questions that encourage deep, reflective dialogue.
- Consider the social dynamics, allowing space for individual reflections and group insights.
- When choosing the location of the activity, consider the weather conditions: if it is raining and cold season, consider conducting the activity outdoors but in a protected place (e.g. an open tent).
- Include subtitles in the movie screening, ensuring inclusivity and mitigating language barriers.

11. Measuring impact

The impact of the outdoor cinema session can be effectively measured through pre- and post-movie surveys, capturing shifts in participants' knowledge, attitudes, and emotional engagement with biodiversity. By comparing responses before and after the film, we can assess intrapersonal changes (such as personal attitudes, awareness, and sense of responsibility towards conservation) and interpersonal changes (such as empathy, group cohesion, and a sense of community involvement).

The survey should have targeted questions that align with the documentary's themes and objectives. To ensure accuracy and reliability, it is beneficial to use a validated scale that measures specific constructs, such as environmental empathy, perceived individual impact, and connectedness to nature (ex. How important do you think the conservation of biodiversity in protected areas like Virunga is for the global ecosystem?; Which factors do you consider the biggest threats to biodiversity in protected areas like Virunga?; How effective do you believe watching documentaries like "Virunga" is in raising awareness about biodiversity conservation compared to other methods (social media, classroom education, news outlets, etc.)?; How do you feel your actions or lifestyle impact biodiversity and conservation efforts?; How likely are you to engage in local conservation activities or initiatives?). Administering the survey immediately before and after the event allows facilitators to capture fresh impressions, helping to reveal both cognitive and emotional shifts.

In addition to individual attitudes, the survey should include questions that explore the participants' sense of community and collective action, reflecting on the feeling of "being part of a community" and taking meaningful action for conservation. These insights can be essential for understanding the social bonding effect of group activities on environmental engagement, measuring participants' commitment to biodiversity, and evaluating how the shared experience may inspire further involvement in community-focused conservation efforts.

12. Links to external resources

https://en.wikipedia.org/wiki/Virunga_(film)

https://www.imdb.com/title/tt3455224/

1. Intervention method

Participatory filmmaking

Authors: Geraldine Brown, Alex Franklin, Barbara Smith, Lindy Binder, Claire Lyons

2. Summary of the method

This method seeks to involve research participants in an inclusive filmmaking process. Participatory filmmaking aims to blur the lines between the filmmaker and the participants, enabling individuals to share their everyday biodiversity stories and actively contribute to the film's narrative and direction. This approach promotes the democratisation of research, allowing participants to influence the film's look, content, and key messages. Collaboration occurs with input from both filmmakers and researchers. Ultimately, this method empowers participants to narrate their stories, generating new knowledge and insights about their perspectives and experiences. It is a versatile method that can be applied to various groups.

3. Use context (within PLANET4B)

3.1. Relevant social aspects of biodiversity being addressed.

A starting point for this work within the context of the PLANET4B project is a pressing concern with 'a green inequality' (Howard Boyd, 2022). Such 'green inequality' is characterised by ethnic minorities encountering barriers leading to a disconnect from the natural environment. This has ramifications for reversing biodiversity decline, strategies aimed at raising awareness, individual and policy prioritisation of biodiversity and understanding and responses to biodiversity loss. The UK intensive case study in which this method was used sets out to explore how biodiversity is understood, perceived, engaged with, and valued by ethnic minority communities. This links directly to one of the PLANET4B project's overarching aims, which is to address the exclusion or marginalisation of ethnic minorities in biodiversity decision-making.

3.2. Relevant intersectional dimensions

The case study focuses on men and women living in the UK who identify as members of ethnic minority communities. In the UK, the term "ethnic minority" generally refers to racial and ethnic groups that are less represented in the population, thereby categorising diverse populations (Dacosta et al., 2021). Individuals from migration backgrounds have varied life histories and levels of affluence; people from ethnic minority backgrounds exist across all socioeconomic categories, sectors, and professions (Rishbeth et al., 2022). An intersectional approach will help us identify both the similarities and differences among participants, providing a nuanced understanding of how racialised communities experience nature and the outdoors.

3.3. Relative focus given to different levels of social change.

Individual level change	*Community level change*	*Institutional level change*
High	Medium	Medium

4. Roles

4.1. Participants

Participants are the filmmakers in the process. They gather visuals (photographs and moving images) and audio data, capturing their everyday biodiversity stories, views and experiences. The process is supported by at least three face-to-face or online workshops in which participants learn about the method and contribute to the decision-making about the film's overarching aim, objectives, key messages, content and presentation. Consideration is needed to manage the data collected (quality, volume, images included). Generally, a small group of participants (4-12 people) makes the face-to-face or online workshop component more manageable. It ensures that all involved have an opportunity for their stories and views about biodiversity to be included and the interconnections between stories to be captured.

4.2. Facilitators

The role of the filmmaker/facilitator is to:

- Co-ordinate the collection of visual or audio data.
- To provide support with filmmaking techniques.
- To facilitate discussion in the workshop, supporting the participants in decision-making about film content, editing process, key messages and audience.

5. Materials

- Camera/camera phone
- Phone/audio recording facility
- Training material on filmmaking

6. Instructions

6.1. Participatory filmmaking is an approach that encourages collaboration between researchers and communities. Additionally, there is the opportunity to collaborate with a professional filmmaker. For this project, the researchers chose to collaborate with a filmmaker who was well-known to the team and had experience working with both communities and academic partners.

6.2. The facilitator (filmmaker and/or researcher) delivers a workshop to participants outlining participatory filmmaking and filmmaking techniques. During this opening session information is provided and informed consent (ethics) secured from all participants.

6.3. The facilitator (researcher) delivers a session on ethical considerations (in association with filmmaking) and establishes a process for sharing visual and audio data.

6.4. The facilitator (researcher) creates a WhatsApp group and/or repository for uploading photographs, moving images and audio files. The photographs should be uploaded to a space where the facilitator can receive them – WhatsApp or similar can be helpful, but there should also be an option where visual and audio data can be sent directly to the filmmaker.

6.5. Participants share their biodiversity stories over a specified period of time that is in line with the project timeline. Open communication is important between all

involved, so participants can access information and support when required and filmmaker/researchers can input into the process if requested.

6.6. The shared material is collated by the researcher/filmmaker.

6.7. A Screening Session workshop is organised. This workshop provides an opportunity for participants to dialogue about the film with one another and with the filmmaker (assuming, as was the case in the use of this method within PLANET4B, a professional filmmaker is contracted to support with the process of editing). Participants will review the collected material, ask technical questions, and discuss the next phases of the filmmaking process. The workshop can be creatively conducted; for example, the discussion could take place during a walk in nature with the group. This approach offers a chance to gather additional data and facilitate both formal and informal conversations.

6.8. Based on the feedback gathered during the first screening workshop the professional filmmaker (and researcher) edit the collated material into a draft final version of the film.

6.9. A second Screening Session workshop is organised. During this workshop the amended version of the film is shared with participants. The session allows for some final editing recommendations. It also provides a space for the group to discuss and decide on the next steps and dissemination of the film.

6.10. The Film is finalised, shared with participants and in follow on, disseminated publicly.

7. Data collection and synthesis

Participatory filmmaking allows participants to identify and communicate their personal views and experiences, capture commonality, difference within a group, and consider how the perspectives shared connect and reflect wider biodiversity discourse.

Analysis of data generated from this method, this should include, but also not be limited to, the material selected for inclusion in the final film. Potentially equally as important is the wider pool of generated images and narration, including any material actively deselected for inclusion. Also relevant are the group discussions and decision-making during the preliminary workshops and subsequent screening workshops.

Within PLANET4B the data generated from the participatory filmmaking process was complimented by semi-structured interviews with each individual participant prior to their engagement with the method. Once the film has been completed a further round of interviewing (subject to the availability of each individual) and a group debriefing session is also planned. Where a professional filmmaker is contracted it can also be valuable to interview them about their editorial decision-making process and overall approach to engaging with the research participants.

Various analytical frameworks can be applied to analyse visual data. The primary goal is to focus on what the image or video aims to convey.

There is also potential for the researchers to deepen their understanding by using discourse analysis to further interrogate data captures in workshop discussions, but this is optional.

8. Checklist for implementation

- All training materials procured and ready
- Appropriate space for the workshop
- Tips sheet about capturing data (visual and audio)

- Examples of participatory films with a focus on nature and/or biodiversity
- Participatory information and securing of informed consent (ethics)

9. Critical considerations

9.1. Ethical considerations

Researchers should ensure that the methods used adhere to the principles of not causing harm to people but also not harming local ecosystems, particularly if engaging with vulnerable habitats or endangered species.

- Ensure informed consent is obtained from all participants.
- People may want to remain anonymous, so the measures required to maintain anonymity must be considered.
- Address concerns about privacy, confidentiality and potential risks.
- Develop a plan for managing sensitive or controversial images.
- Ensure that participants are fully made aware and understand that the film will be placed in the public domain.

This method requires consideration of creating a supportive environment in which participants can share the experiences they have captured. The process may involve capturing deeply personal reflections, so researchers must be aware of how to effectively engage in researching sensitive issues.

9.2. Power dynamics and relations

Researchers often come from outside the community and bring different world views, cultural assumptions, authority, and resources. This can reinforce inherent power imbalances between researchers and research participants who may feel pressured to align their responses with the researchers' expectations. It is important to ensure that the approach used aims to minimise this inherent power imbalance and that participants are fully involved in decision-making throughout the process about what is included and excluded, and that the film retains participants' perspectives and the key messages that they want the film to communicate.

Building an inclusive research environment that centres participants' views and experiences is critical to mitigating this power imbalance. This requires that the filmmaker and researcher(s) ensure participants' voices are at the forefront of the film production, that they define the project's direction, interpret the images, and determine the research outcomes.

Researchers also need to consider how they engage and respond to the potential for the narratives and for participants to produce a film that offers a counter-narrative.

10. Top tips

It is crucial not to underestimate the time and commitment required from everyone involved in participatory filmmaking, especially during the editing stage. Sufficient time is necessary to review the film, reach a consensus on the content, gather feedback from participants, and finalise the version.

While it is not essential to collaborate with a professional filmmaker, if you do so it is important to choose someone carefully. This role demands an individual who can engage positively with communities, co-facilitate workshops, inspire creativity, and provide practical filmmaking advice. The filmmaker will also be crucial in the editing process, making important decisions about what to include and exclude from the final film.

Participatory film making should be an inclusive process. Workshops need to be facilitated with care. They provide an opportunity for participants to engage in a community building

process and this requires engagement in decision-making about all aspects of the film being produced. These workshops also serve to bring people together, gather additional data that can be included in the film and insights about the engagement process itself. Additionally, they play a crucial role in identifying the potential audience and the key messages that the group wishes to convey.

It is important to continually remind participants of ethical considerations, such as confidentiality and anonymity. Therefore, agreeing on a process for what is included and excluded will support the participatory filmmaking process.

11. Measuring impact

This method can potentially impact the intrapersonal, interpersonal, and institutional levels. Participants make a personal investment in contributing to the film. This involves them reflecting and making decisions about the story they want to share with others, so it offers a valuable individual learning experience but also has benefits that extend beyond the group. Workshop activities encourage further learning opportunities through dialogue with each other, researchers, and the filmmaker.

The film offers participants a means of communicating directly through their community networks, but using the medium of film also allows for communicating more widely as it can be shared with other community stakeholders working in and outside this field.

Similarly, on an institutional level, the film provides insight into key messages about the everyday biodiversity stories from a minoritised group. The film is a resource that can be shared with key policy stakeholders and a tool for facilitating informal and formal learning and potential action.

Interviews at the start and end of the process can be used to gather participant perceptions and actions to capture the impact and evaluate change.

Questionnaires can be used to gather information during the subsequent dissemination activities. Information should be gathered using an appreciative inquiry approach at the following points in the process to track change: prior to the activity, immediately after completing the session, and then a month or two later.

12. Links to external resources

References

DaCosta, C., Dixon-Smith, S. and Singh, G. (2021) *Beyond BAME: Rethinking the politics, construction, application and efficacy of ethnic categorization*, Coventry: Higher Education Research Action Group (HERAG).

Howard Boyd, 2022 in State of the Environment, health, people and the environment (26th Jan 2023). Environmental Agency (accessed October 3rd, 2024). State of the environment: health, people and the environment – GOV.UK (www.gov.uk)

Rishbeth, C., Neal, S., French, M. and Snaith, B. (2022) Included outside: Engaging people from ethnic minority backgrounds in nature. Evidence Briefing, Natural England Technical Information Note, TIN185. Natural England, York.

Resource Links

Methods for Change – Research Methodologies – Aspect

Resources for participatory film making – Search Videos

Full article: Framing Representations: Documentary Filmmaking as Participatory Approach to Research Inquiry

1. Intervention method

Participatory photo exhibition

Authors: Eszter Kelemen, Kármen Czett

2. Summary of the method

Photos provide a unique opportunity to visualise, surface emotions, and generate discussion around different aspects of biodiversity. Photo exhibitions consist of photos taken by citizens and are displayed to various groups or communities. Exhibits can (for example) track changes within nature over time, document societal marginalised voices or values, raise awareness of specific issues, and promote problem-based learning, among other purposes. Photo exhibitions are often organised as a closing part of a research or a community-based project, where pictures taken by project participants are displayed and introduced to the wider community to deliver broader impact. Photo exhibitions, especially their opening and closing ceremonies, can become lively gatherings where community members meet, share, and learn. While pictures themselves are emotionally and cognitively stimulating, the narratives which accompany the pictures can further deepen their impact as these share the underlying stories.

3. Use context (within PLANET4B)

3.1. Relevant social aspects of biodiversity being addressed

In PLANET4B, as part of the education case, we created a photo exhibition in one of the partner schools where a photovoice study had been conducted. The pictures displayed at the school hall were taken by students during school garden classes. Two main themes were selected as the focus of the pictures: nature in the school garden, and relationships in the school garden (the latter included both human-human and nature-human relations). The displayed photos addressed three social aspects of biodiversity. First, by capturing the beauty and diversity of tiny plants and animals, the pictures raised awareness of biodiversity. Second, by recording some ecological functions and services (e.g. pollination or pest control), the photos provided visual information on the ecological system and its complex interactions. Third, by shedding light on mutual relationships between the human and non-human actors of the garden, the pictures addressed the disconnect from nature and visualised the diverse values attributed to it. To highlight these deeper messages, the photos were exhibited together with short narratives by each of the photographers.

3.2. Relevant intersectional dimensions

Photos are a form of visual communication, which makes them a perfect tool to reach out to diverse audiences irrespective of age, gender, race, level of education, cultural background and most types of disabilities (except visual impairments). While photos can be very inclusive on the side of the recipients, in the PLANET4B education case we observed slight gender and age differences on the side of photographers. In our case, female photographers focused more on natural elements, beauty, and playfulness, while male photographers focused on physical activity, built elements, and caring-stewarding relationships. Additionally, we found that secondary school students (age above 14) can link more abstract themes to the pictures, while children of younger ages relate more to the actual content of the pictures.

3.3. Relative focus given to different levels of social change

Individual level change	*Community level change*	*Institutional level change*
Medium	High	Low

4. Roles

4.1. Photographers

A photo exhibition can display professional (artistic) pictures as well as photos taken by members of a specific community. If aiming to organise a photo exhibition on biodiversity, photographers need to have at least some basic knowledge about biodiversity and related ecological phenomena, as well as an interest in this topic. If citizens take photos as part of a community activity, joint discussions can help reveal various interesting aspects and the focal themes can be defined collectively. Some basic tips on composition, lighting and other technical aspects of photography should also be shared. Once pictures are taken, photographers should select their preferred ones and explain the stories behind them (see the photovoice method protocol for how to co-develop these narratives). Photographers can also take part in the opening ceremony, acting as a living library. This encourages the sharing of diverse perspectives and fosters open dialogue, facilitating co-learning.

4.2. Facilitators

If the photos are created as part of a community project, facilitators play an important role during the first phase by creating an open atmosphere, enabling knowledge sharing, and facilitating dialogue. Facilitators might also play a crucial role during the exhibition; encouraging interaction between the photographers and the visitors, and fostering community learning.

4.3. Host and organisers

A key success factor of a photo exhibition is the venue, which should be an open and welcoming place, central to the given community. The host can help with the technical parameters (such as providing and arranging the poster stands, helping with the lighting and sound system if the opening ceremony requires, etc.). Ideally a guest book can also be displayed at the venue to record feedback from the visitors.

4.4. Visitors

Visitors' engagement can range from passive viewers to active participants of joint discussions. The level and form of their engagement largely depends on how the exhibition is organised and facilitated.

5. Materials

Large-scale printed photos using high-quality paper (at least A5 or larger), passe-partout for a more elegant look (dispensable), titles and/or narratives of the photographers printed on paper, poster stands or screens (or if none of those are available, a sufficiently large white wall surface to display the photos, attached using pins or stickers). All this material should be made available at the venue, which is ideally an open community space visited by a lot of people.

If the photo exhibition is intended to be a public outcome of a preceding photovoice study, ensure that photographers have access to smartphones or digital cameras during the photovoice study (unless the methodology / photovoice study context specifically requires otherwise). You will also need a laptop or a computer to make necessary edits (agreed upon with the photographers) and access to a sufficiently high specification printer to print the pictures and the narratives.

6. Instructions

6.1. If organising a photo exhibition on biodiversity, first you need to reach out to (potential) photographers (if you would like to create the pictures as part of a community project, see the photovoice method protocol for further information).

6.2. Participant information and informed consent must be secured from all participants at the outset. This should also include the specification of copyrights (in most cases, copyrights should be granted to the photographers). If photographers are young or disabled people, consent should be secured both from them and from their legal guardians. For instance, in the PLANET4B education case photographers were 12-14 years old students. As they were not legally independent yet, their parents or legal guardians were asked for a written consent, while the students were asked for verbal consent. Researchers always followed the stricter consent (so if parents granted consent, but their children did not, the children were free of participation).

6.3. Discuss your plan with the photographers (ideally 4-6, to give sufficient space for all of them) and agree on shared objectives. Make sure that the ideas and needs of the photographers are reflected in the concept of the exhibition – this is crucial to get them engaged and to create a sense of ownership. In this phase also agree in the timeline and whether the exhibition will be displayed at a single venue or will be organised as a travelling exhibition.

6.4. Let the photographers do their work (create the pictures, select the most preferred ones, and create the narratives). This might take a few days to a weeks or months, depending on the project. For instance, if the exhibit aims to capture the current status of biodiversity, pictures can be taken in a short time period, but if the aim is to display changes in nature, more time is needed to capture these changes.

6.5. In the meantime, check potential venues. Consider the venue's location, accessibility, size, atmosphere, technical parameters, as well as potential costs involved. While most of the time it is easy to find a venue for a community-based photo project free of charge, certain venues might charge a rent fee.

6.6. Once the venue is selected, negotiate the details (how many pictures can be displayed, for how long, who sets up and takes down the exhibition, who archives the pictures, etc.).

6.7. Discuss and agree on the technical details of the opening ceremony and fix the date together with the venue and the photographers. If you wish to close the exhibition as a community event, discuss closing ceremony details also (optional).

6.8. If you are interested in impact, create a short feedback form or think about other ways of assessing impact (see section 7 and 11 of this protocol). Think about how to record the number of visitors in the easiest way (e.g. launch numbered admission tickets or use automated systems such as internal cameras to retrieve the number of visitors). If there are no easy ways to record the number of visitors, think about how to estimate approximate numbers.

6.9. As the event gets closer, plan the opening ceremony with special emphasis on interactions between the photographers and the visitors. If you have experience with facilitation, you can act as the main facilitator – otherwise it is useful to invite a professional facilitator (or ask the venue if they can help with this).

6.10. Advertise the exhibition through community networks, local newspapers, and the venue's social media channels. You can also ask the photographers to invite their community.

6.11. At least one week before the opening ensure all the pictures and titles/narratives are selected by the photographers and made available to you in digital format. Ensure the pictures are of high resolution. You can arrange the printing of the photos and the titles/narratives with everything in hand a few days before the exhibition opens.

6.12. The day before the exhibition bring all materials to the venue and arrange the exhibition with the hosts (depending on the availability of the venue). If the opening is in the afternoon, it might be enough to arrange the photos and the printed stories on the same day, however this holds the risk of insufficient time to resolve any identified problems with displaying the photos (etc.).

6.13. Be there on time, welcome the photographers and the visitors, and facilitate the event according to the plans. After the opening ceremony, make sure that the feedback form (or any other ways of impact measurement) is in place and data is collected.

6.14. If you organise a travelling exhibition, pack all the material, ship it to the next venue in a secure way, and install and open the exhibition again (repeat steps 4-6, and 8-12 for each venue).

6.15. The photographers and the venue host(s) might be interested in a closing discussion to reflect on their perceptions of and experiences with the exhibition, which can provide further impressions for you to assess the overall impact. Once the exhibition – or the series of the travelling exhibition – is completed, archive the work as previously agreed with the photographers and the (last) venue, and according to the copyright rules included in the consent forms. At this point the feedback can be analysed.

7. Data collection and synthesis

Data collection can take the form of:

- Number of visitors.
- Feedback is collected through a simple questionnaire (online is more practical, you can display it as a QR code and participants can fill it out by using their mobile phones).
- Qualitative feedback collected through a visitors' book.
- Observations conducted during the opening (and if relevant, the closing) ceremony regarding topics discussed, group dynamics and depth of interaction, etc.

You may also wish to consider running a debriefing after the exhibition is completed (see the debriefing protocol for further information).

Quantitative data can be analysed using basic descriptive statistics, while qualitative information can be analysed using qualitative content analysis. If you opt for a travelling exhibition, data collected in the different localities can serve as a good basis for comparative analysis.

8. Checklist for implementation

- High resolution photographs and narratives printed in good quality
- Central and easy-to-access venue selected with suitable technical parameters
- Photographers and facilitator attendance for the opening ceremony
- Exhibition advertised
- Exhibition installed and key personnel present for the opening ceremony and closing ceremony
- Feedback form prepared and made available for the opening ceremony
- Participant information sheet and securing of informed consent (ethics)

9. Critical considerations

9.1. Ethics of care / ethical considerations

Taking a picture takes only a few minutes but photos remain with us (especially in digital format) for a long time. Therefore, it is crucial to respect privacy regulations (i.e. if there are pictures where people are recognisable, they need to have given consent). This is especially important if children or people living with mental impairments participate – in that case their legal representatives should be asked for consent. Pictures of nature's deterioration might be disturbing (e.g. animal cruelty). The organisers and the photographers should jointly decide on how to deal with such photos – if they get displayed, visitors should be informed of potentially disturbing images and advised how to avoid such images.

9.2. Power dynamics and relations

Those who choose the venue will have power over who can access and benefit from the photo exhibition. If the venue is a school visitors will likely mainly be students, teachers, and parents. If it is a community hall, the exhibition might be more accessible for youngsters, the elderly, and other members of the community. However, those who are marginalised (e.g. people of colour, with migrant or LGBTQIA+ background, or disabilities) might still find the venue and the exhibition itself inaccessible and not representative of their daily lifeworld.

One way to open the exhibition to different community groups is to invite them to be the photographers themselves, so they can show their realities to the majority. Another (but probably less impactful) possibility is to select a venue that is central for these vulnerable communities (e.g. in the club where they gather, or even outdoor in a park where they used to enjoy nature).

10. Top tips

- Create the exhibition as a community-project, where photographers, hosts facilitators and visitors are all locally rooted – this way the exhibition can contribute to community development and generate community-led pro-biodiversity actions.
- Invite photographers to the opening ceremony to tell their stories, if they are comfortable with social interaction. The exhibition can also act as a living library where stories are shared, which can generate deeper understanding, emotional engagement, and shared visions.
- Turn the opening ceremony into a community festival to increase its impact. This can be achieved in different ways, e.g. if you combine the exhibition with another community event, pick a date which is historically important for the given community, invite local artists (e.g. the local choir or a poet) to add further sparks to the exhibition, or organise a community dinner together with the exhibition.

- Consider combining this method with a debriefing session (e.g. of participating community photographers, after the exhibition has been held) – see the debriefing protocol for further information.

11. Measuring impact

A biodiversity focused photo exhibition can deliver impact at the interpersonal level, especially if it is organised as a community-based project. Through awareness raising and community building, a photo exhibition can create a shared history and future vision of local human-nature relations, initiate small scale nature conservation or restoration projects, or (e.g.) mobilise people to protest harmful developments by external actors. To achieve these wider impacts, however, it is crucial that the awareness generated during the exhibition is channelled into future actions through community empowerment and mobilisation. Assessing these wider impacts can be done through various qualitative and quantitative ways (e.g. observation, interviews, focus groups, surveys).

1. Intervention method

Participatory theatre

Authors: Eszter Kelemen, Kármen Czett

2. Summary of the method

Community theatre refers to theatrical performances that are created by, or engage, people who are part of the same community. The thoughts of the involved citizens shape the performance; therefore, the theatre becomes a tool of empowerment and enables the community to talk about issues of concern. Community can be broadly understood here: including people living in the same locality, or those going to the same school, or joining the same interest group or NGO, or suffering from the same vulnerability. The level of citizen engagement can also vary – sometimes citizens lead the whole process from ideation to the final performance, in other instances a professional group or NGO initiates the process by following a societal mission and collaborates with citizens at specific points of the process. Either way, citizens become engaged in co-creating the performance and turn from passive audiences into active participants of the play.

3. Use context (within PLANET4B)

3.1. Relevant social aspects of biodiversity being addressed

In PLANET4B we used a participatory theatre play to invite secondary school students to think about the deeper relationships between the economic system, our individual choices, and biodiversity. The play, called 'Blindspot', was developed by the Káva Theatre Group together with WWF Hungary. It shares a fictive story of commodifying and overusing a natural resource (a healing plant). The audience is invited to immerse themselves in the story, stepping into the roles of employees at a company that improved the village's economic prosperity while simultaneously degrading the natural environment and harming the health of local residents. As the story unfolds, and various (often contradictory) standpoints get revealed, participants develop a deeper understanding of the complexity within biodiversity related decision making and the trade-offs involved. At one point in the play, participants are offered the choice of leaving the company, which fosters critical thinking and moral argumentation. The play also reinforces the importance of community decision-making and transparent communication (instead of distorted marketing messages in relation to trade-offs between biodiversity and the economy). Finally, a facilitated discussion at the end of the play invites students to reflect on their roles and share their future expectations, which links back to their everyday lives and the current socio-economic reality.

3.2. Relevant intersectional dimensions

The 'Blindspot' theatre play was developed for youth groups (aged between 14-18) to help them better understand the complexity of biodiversity related decision making. The play gives them an opportunity to raise their voice, live their emotions in a safe space (especially their frustration and anger) and find strength in collaboration and joint action. The play also enables a reflection on gendered roles and brings cultural stereotypes to the surface.

3.3. Relative focus given to different levels of social change

Individual level change	*Community level change*	*Institutional level change*
High	High	Low

4. Roles

4.1. Participants

Participants (students) are engaged in the play from the beginning until the end – on a voluntary basis. In the case of the play script used in the PLANET4B case study, 25-35 students participated in the 3 hours long sessions (with a comfort break in the middle). They can take part in physically shaping the fictional village, and they are recruited to play the role of company employees. Within their role of employee, they face decision making predicaments where they can make different (individual or collective) choices. At a specific point of the play, and after it ends, the actors step out of their roles and ask students to reflect on their own roles and their future expectations.

4.2. Theatre group

When this method was conducted for the PLANET4B project a writer-dramaturg developed the original idea and wrote the play, in collaboration with experts of WWF Hungary. Visuals were designed by external designers. The whole play was brought together by a director. Three members of the Káva Theatre Group – who are also drama teachers – performed the play. During the performance the actors played different roles and acted as facilitators of group discussions.

4.3. NGOs / experts with natural scientific background

Experts provide a solid understanding of the natural scientific context, as well as explaining the complexity of social-natural interactions. This expertise is crucial for the theatre group to create a realistic and scientifically sound situation. In this case, WWF Hungary also contributed – as part of their role as the main financial donor – to creating the 'Blindspot' performance.

4.4. Observers

Observers are not necessary, but they can be useful. Within the PLANET4B project, the 'Blindspot' performance is mostly played in regular school classes, and the class teacher often participates. Through their presence (as a passive observer) the class teachers can understand students' frustrations and can use the shared experience to facilitate further reflection and joint action in future classes. Based on the feedback from class teachers, engaging with the method offers teachers an opportunity to learn about internal group dynamics and the strengths of their students. In addition to the class teachers, researchers might act as observers. During PLANET4B performances, two or three researchers were present as passive observers. Researchers identified moments of doubt and signs of transformation (i.e. changes in individual and group behaviour during the play and what led to such individual and collective changes). For instance, in one of the observed performances, three female students became very vocal about intergenerational injustices while they were playing their roles, which went against the mainstream benefit maximising logic. Their commentaries raised further questions amongst the group and were echoed by

more and more students. Thus, when the script offered the decision of leaving the company, almost a third of the participants stood up and left the room.

5. Materials

Material requirements strongly depend on the exact play. In the PLANET4B case, in addition to the professional script, basic, low-tech scenery and costumes were used – costumes were changed a few times during the play. Besides the scenery and the costumes, a large room is required with chairs arranged in a large circle. Additionally, having a quiet room next to the main room can be useful if a participant needs some silence for reflection.

6. Instructions

6.1. If you would like to organise a drama play on biodiversity, first you need to choose whether you develop it yourself as a community theatre, or you search for a theatre company who has designed a relevant play, or with whom you can co-develop a biodiversity related play.

6.2. If choosing to develop the play as a community theatre, there are guidelines available from multiple online sources (see one example among the external links, section 12 below). You might want to invite biodiversity experts at this early phase of development to ensure that the play is scientifically sound.

6.3. If you choose to work with an established theatre group, establish if there are any groups with a relevant play on biodiversity or similar topics (e.g. climate change, nature deterioration, etc.). You can also check if there are groups who specialise in participatory methods and/or teaching.

6.4. Once a relevant theatre group(s) has been identified, discuss your ideas with them. If building on an existing play, establish what edits will need to be made so the play is suitable to your needs. During this discussion you should clearly communicate the age group, socio-cultural background, and any other intersectionality aspects that might influence the reception of the play. Make sure that you agree on the necessary adaptations (e.g. shorter timeframe, easier language, etc.). This planning phase might take a few weeks or months.

6.5. Whether you develop the play as a community theatre or with an established artistic group, you will need to secure funding to cover the costs. If contracting professionals and designing the drama play from scratch the method will be relatively expensive. If it is possible to secure voluntary contributions, a smaller budget may suffice, this will still need to cover the costs of the scenery, the costumes, renting a place for rehearsals, etc.). Nevertheless, engaging a professional dramaturg or drama teacher(s)might be crucial to achieve the expected impact.

6.6. Once funds are secured and all preparations (i.e. writing the play or tailoring it to your specific needs) are done, fix a date and location, and also dedicate sufficient time to recruiting participants. To reach your expected impact you might advertise the play through different channels (i.e. social media, local newspapers, or existing community networks). Alternatively, you can also approach certain groups (in the PLANET4B case, a school or a specific class of a school) and invite them in a targeted way.

6.7. Provide all participants – and where applicable their legal guardians – with participatory information (ethics) and secure their informed consent.

6.8. Be there on time, arrange the room, welcome the participants – then PLAY and observe your impact!

6.9. Once the play is ended, consider organising a debriefing session to discuss experiences and deepen the impacts.

7. Data collection and synthesis

If using observers during the play, they should create written notes containing their observations. Research observations should include how participants interact and how they react to certain situations during the play. If there are reflection rounds during or after the play, the notes can also include the content of the narratives.

Notes can be analysed qualitatively, either using qualitative content analysis or the grounded theory approach. If the play is performed in different communities, the analysis can highlight how intersectionality aspects influence the reception of the play and its potentially transformative impact.

We do not recommend recording the play or taking photographs directly of the participants, as it may intimidate them, make them feel insecure about expressing themselves, and therefore limit the impact of the performance. However, debriefing discussions can be audio recorded for further analysis.

8. Checklist for implementation

- A script adapted to biodiversity issues
- Well-prepared and skilled actors who are ideally also facilitators (if not, consider involving a facilitator as well)
- Costumes
- Scenery
- Room with chairs, available with no interruption for the length of the whole play + the closing reflection
- Refreshments for the actors / all participants
- Participants
- A participant information sheet and informed consent form

9. Critical considerations

9.1. Ethics of care / ethical considerations

Participatory theatre plays can be intimidating for more introverted people; therefore, it is very important to let participants decide how much they would like to engage, and to not push anyone to act/participate in certain ways. Actively participating in a drama play about destroying nature and the subsequent consequences (as per the script used in the PLANET4B case study) can evoke strong emotional responses, which some participants may find difficult to process. Participants may wish to leave the room and find a quiet space to reflect on feelings that arise during the play. It is crucial to allocate time after the performance to share personal experiences and thoughts in a safe environment. It is even better if a few days after the play there is an opportunity for a debriefing session, where participants can reflect upon the play and its central topic while keeping a bit more distance from the actual experience.

9.2. Power dynamics and relations

The actors or drama teachers who lead the performance have more power over the process than the participants. In the PLANET4B case this was further strengthened by the fact that

the actors were adults while the participants were students. This can create unwanted hierarchies which might either limit the willingness to actively take part or force a desire to please. To mediate this power imbalance, the actors should explain the process carefully before they start the play, emphasising that the level of engagement is a voluntary decision of the participants. Engaging with the participants as early as possible (e.g. during the design of the play) is another way to give them influence over the process. Finally, the arrangement of the room – seats in a circle, stage in the centre – means that actors are physically at the same level as participants. Such staging decisions can reinforce the equal positions in the room.

10. Top tips

- Always consider the age group and potential vulnerabilities of your target group and tailor the language and the complexity of the story accordingly.
- Set medium-sized groups of participants (in the PLANET4B case 25-35 people were participating at the same performance). Too small and too large groups can equally limit the scope of interaction.
- If you have the resources/contacts it is advisable to work with professionals (dramaturgs, drama teachers, actors as well as biodiversity experts) as their knowledge and experience are critical to reach the expected impacts.

11. Measuring impact

The impact of a biodiversity theatre play is mainly at the intrapersonal and interpersonal levels. It fosters critical reflection and raises doubts about the current malfunctioning socio-economic system. Moreover, as it allows the participants to make decisions, it models the potential ways in which societal change can be triggered. These experiences, together with the strong emotional involvement of participants, can contribute to changing mindsets and evoking deeply held, sustainability-aligned values (intrapersonal change). Moreover, as participants can see and be influenced by each other's reactions during the play, they can also experience the power of collective decisions, which can trigger stronger collaborations and more active involvement in pro-biodiversity community actions (interpersonal change). These impacts can be assessed through participant observation, and patterns of change can be identified through the qualitative analysis of observation notes. To assess longer term impacts, it is useful to follow the participating group for at least a couple of weeks after the performance and use multiple tools (e.g. debriefing, interviews, or focus groups) to better understand how the play influenced their individual and community decisions.

12. Links to external resources

Asante, E. 2022. From Theory to Practice: The Process of Participatory Theatre in Community Development. Journal of Social Science Studies, *9*(1). https://www.macrothink.org/journal/index.php/jsss/article/download/19467/15213&ved=2ahUKEwjJh_fD0fqJAxVIxQIHHSftOO4QFnoECBoQAQ&usg=AOvVaw19uJCEYvlzTFqEHQHkIN3R

1. Intervention method

Photovoice

Authors: Claire Lyons, Ghezal Sabir

2. Summary of the method

Photovoice is a participatory research method that allows individuals to document their experiences, concerns, and lived reality through photography. The method often culminates in some form of exhibition, where the images and accompanying narratives are shared with an audience that may include policymakers, academics, or other community members.

3. Use context (within PLANET4B)

3.1. Relevant social aspects of biodiversity being addressed

This method is often applied in the context of marginalised, underrepresented or vulnerable communities, as the visual medium of photography offers an accessible and appealing format for people to share their unique perspectives and stories. Photovoice is not simply about photography but about fostering empowerment, facilitating critical dialogue, and promoting social change. Its primary aim is to enable communities to articulate their experiences and advocate for issues that matter to them.

Photovoice can also be used to get participants to talk about sensitive topics and to reflect on topics that are not often discussed in particular settings. For example, photovoice has been used within PLANET4B to encourage discussion about the connection between religious and/or spiritual beliefs and agrobiodiversity related behaviour of farmers in Switzerland. Farming is a mainstream topic and farmers' leadership in politics and policy making process is prominent in Switzerland. However, talking about one's religious/spiritual beliefs is considered a private topic that is not discussed publicly, yet it can play a role in influencing farmer's attitudes and behaviour regarding biodiversity. Within PLANET4B photovoice was used to connect farmers' religious beliefs with their farming behaviour in a way that is respectful of God's creation or other living beings who have the right to exist and live.

3.2. Relevant intersectional dimensions

Photovoice allows participants to visually articulate their layered experiences, capturing nuanced struggles such as social exclusion, discrimination, or unequal access to resources. The method's accessibility ensures that participants who may not feel confident expressing themselves verbally – whether due to language differences, educational background, or other factors – can communicate their realities. By enabling participants to showcase how these intersectional dimensions influence their lives, photovoice fosters a richer understanding of the problem and creates a compelling platform for advocacy and dialogue across diverse communities and stakeholders. Implementing flexible parameters when photographing allows people from different walks of life to engage with their own stories, including religious beliefs. Ideally participants can choose to capture their beliefs at play in whatever form they chose.

3.3. Relative focus given to different levels of social change

Individual level change	*Community level* change	*Institutional level* change
High	High	Medium (from low to high depending on the type of institution)

4. Roles

4.1. Participants

Generally, photovoice projects include participants and facilitators, however other roles such as mentors or community partners may also be involved.

- Participants have multiple roles, including photographers, data gatherers, and co-researchers.
- Participants may assume additional roles including trainers, coordinators, mentors and facilitators.
- Ideally participants are involved during all research phases, including method selection, planning, training, and implementation. Their involvement may need to be reviewed based on time / project restraints.
- Participation encourages reflection on life dynamics, self-advocacy, confidence, critical thinking, and decision-making.
- Participants may confront difficult realities or insecurities about the value of their contributions. It is vital to validate participant's perspectives and provide adequate support.

4.2. Facilitators

- A researcher should foster a participatory and collaborative environment, adopting a listening role, ensuring participants' voices are not overshadowed by academic or institutional priorities.
- The role of the facilitator is to manage the logistics, budgets and timeline of the project, support with technical issues and guide/mentor participants.
- Facilitators provide resources and support, helping groups become self-sufficient and to work effectively.
- Facilitators are not neutral; they are accountable to the group and its goals for social change. Understanding the local context is key, they must approach with humility.
- Training participants as photovoice facilitators can enhance the credibility of the project.
- To reduce the burden for participants, facilitators can offer to take a picture on their behalf / at their direction. Facilitators should judge and adjust the method to reduce the burden of data collection on participants while still preserving participants' agency in the process.

5. Materials

- A camera, charger, cables for uploading photos for each participant (some projects ask participants to use their own phone cameras, this can save money but may exclude people and result in varying quality of photos)
- Paper, pencils, pens notebooks – for participant journaling and fieldnotes, participants can write notes, or may wish to draw corresponding pictures

- Example photos for the training phase, these photos will be used to highlight symbolism, reality, arranged scenes, lighting, composition, etc.
- Display materials, photo boards, frames, printers, printing paper, projectors (these materials may vary depending on the type of exhibition)
- Voice recorders – for recording meetings; participants may also with to record/journal their thoughts rather than writing them down (this could be an important consideration with different groups, i.e. children)
- Computer – for uploading and storing images
- Gallery / display space, either virtual or in person
- Participant consent forms

6. Instructions

6.1. Planning the photovoice project:

Before embarking on a photovoice project, it is essential to define the goals and expected outcomes clearly. Who are the participants? What are the core issues they want to document? At this stage a research question should be designed with the community, reflecting their concerns and perspectives. The research question should be clear, open (i.e. not a yes or no question), and visually answerable. In biodiversity research, for example, this could involve exploring local environmental concerns, practices, or changes. The timelines of photovoice projects vary, if the purpose is to encourage researchers to reflect on a contained issue / use the method in combination with other tools, photovoice can also be conducted in a single session (i.e when used as part of an interview). In this case, the interview should be conducted on-site (e.g. on a farm) where an activity discussed takes place (e.g. farming practices). If the purpose of the researcher is to consider how a phenomenon is perceived in multiple ways more sessions will be required.

6.2. Recruitment and training:

Participants in photovoice projects can potentially include individuals who may not have previous experience with photography. In such cases – especially where there is an intention to publicly exhibit the photographs – training sessions are advised to adequately train participants. Training should cover basic photography skills (symbolism, reality, arranged scenes, lighting, composition, etc.), ethical considerations, and the project's overall goals. Discussions on consent, confidentiality, and cultural sensitivities are crucial. In cases where participants already have extensive experience in photography (participants own and use smartphones), the emphasis during any training can focus on more advanced photography.

In biodiversity contexts, the training should also address how participants can effectively document their relationship with their environment. For instance, they might be encouraged to focus on species that hold cultural significance, document environmental degradation, or capture how biodiversity loss affects their livelihoods.

If photovoice is used in an interview setting, participants should be primed to think about the photographing activity at the beginning of the interview. This helps participants think about what they would like to photograph by the end of the interview. Participants can continue to reflect on their photos after the interview, and send over the photos and additional reflections at a later date.

6.3. Photography and documentation:

In the framework of a photovoice project which is being run over a series of weeks or months (or even years), participants are provided with cameras and encouraged

to take photographs that reflect their experiences. Participants may take the camera with them and take photos during their day-to-day lives. Alternatively, fieldwork photography sessions at a specific site may be arranged. In terms of timeline, the photography phase should continue until all participates have a portfolio that they feel adequately answers the research question. Often participants take multiple images which they then need to reduce into a shortlist (e.g. 30 photos), and ultimately, a final list which they would be willing to exhibit.

During this short-listing stage participants may wish to discuss and reflect upon their images and the photography process. These meetings can be run by the facilitator, or they may be self-organised (in which case a community mentor may be present). This process allows participants to reflect on their photos, share their stories, and engage in critical discussions. The aim is for participants not just to present what they captured but to interpret the images, providing deeper meanings and contextualising them within their lived experiences. Participants are encouraged to keep a journal during this stage (this may be written, voice recorded, or drawings) to document their emotions, and thought processes, and reflect on the research question.

When using photovoice in a one-time interaction setting (such as an interview), a couple of photos can suffice in conveying the message the participant would like to share, and answering the research question.

6.4. Exhibition and advocacy:

The final step often involves a public exhibition or presentation where participants showcase their work to a wider audience. This can constitute a crucial phase where photovoice transitions from research into advocacy. Through exhibitions, these photographs and stories can be shared with policymakers, the public, or other stakeholders to advocate for social or environmental change.

For example, a photovoice project focusing on biodiversity might aim to highlight the community's needs regarding natural resource management or demonstrate the impacts of deforestation on local species.

The exhibition can also create an opportunity to bring about collective reflection as in the PLANET4B case study of farmers' religious and/or spiritual values and biodiversity.

7. Data collection and synthesis

Analysis in photovoice is participative and involves interpreting images within the cultural and environmental context of the participants in a group setting. The process can be tailored to the specifics of the individual project (e.g. number of sessions with individual participants, duration of photovoice method, etc.), but often unfolds in the following sequence:

1. Photo Selection: Participants choose photos they wish to share and narrate.
2. Contextualisation: Participants explain the stories and ideas conveyed by their photos and how these relate to the research question. This stage involves critical and collective dialogue. The conversation may be unstructured, or the facilitator may guide it by asking open-ended questions and encouraging participation. Some facilitators use the SHOWeD framework to steer the discussion, which includes questions like:
    - What do you SEE here?
    - What is really HAPPENING here?
    - How does this relate to OUR lives?
    - WHY does this concern, situation, or strength exist?

- How can we become EMPOWERED through this new understanding?
- What can we DO about it?

3. Codification and Selection: Participants categorise their responses, sorting the data into issues, themes, or theories. The facilitator should assist in identifying realistic actions in accordance with these categories. At the end of the process, participants collectively choose the images they want to include in the photovoice project. The number of selected photos can vary depending on the intended outcome or exhibition format. Participants should also provide captions for these photos, which may be written or recorded, explaining their significance in relation to the broader research question.

Alternatively, in contexts where may not be practical to conduct in-depth analysis with participants within the timeframe of the project or the availability of the participants, the below analysis steps may prove more applicable:

1. How does the photo(s) and its message address the research question?
2. Identify the common themes that emerge from this data and compare to the rest of the data – which in the context of the PLANET4B biodiversity and religion case study was the semi-structured interview data.
3. Note any themes that may fit best under 'other findings' and not just restricted within the frame of the research questions and objectives.
4. Write about the themes that best fit the pictures and the narrations for the pictures.
5. Note the differences among the participants (e.g. this was done within the PLANET4B case study by comparing demographics data collected from them). Can the differences in demographics explain some of the differences seen in photos and photo narrations?
6. Where possible share a draft synthesis with the participants for their review and agreement. Alternatively, a coded and categorised copy of the data with this draft can also be shared with an external researcher for coding to determine inter-coder agreement. The data can be analysed using qualitative data analysis methods.

8. Checklist for implementation

Define goals and objectives:

- What are the key issues to explore? For example, biodiversity loss, deforestation, or the impact of local conservation initiatives.

Recruitment and training:

- Select participants directly involved with or affected by the issues at hand.
- Provide training on basic photography skills, ethics, and project goals.

Ethical considerations:

- Ensure informed consent is obtained from all participants.
- Address concerns about privacy, confidentiality, and potential risks.
- Develop a plan for managing sensitive or controversial images.

Photography period:

- Allow sufficient time for participants to document their perspectives and experiences.
- When used within the PLANET4B biodiversity and religion case study, this method formed part of a single research interview only. In other contexts, where (e.g.) it is

being used over a longer time frame and/or as a standalone method, regularly check in with participants to provide feedback and support.

Facilitated reflection:

- Organise group discussions to reflect on the images and their meanings. Encourage dialogue that explores the photographs' cultural, social, and environmental significance. Within the PLANET4B biodiversity and religion case study, for example, participants were asked to reflect on how they engage with their beliefs in their normal farming practice. With biodiversity brought to focus during the interview, a participant farmer would have the opportunity to reflect on their farming practice and its influence on biodiversity on their farm.

Analysis and presentation:

- Work with participants to develop narratives to accompany the images.
- Prepare a final exhibition, report, or presentation that reflects the priorities and perspectives and the individual participants.

9. Critical considerations

9.1. Ethics of care

Ethics of care in photovoice revolves around creating a supportive and empathetic environment where participants feel comfortable sharing their experiences. The process may involve capturing deeply personal or emotionally charged images, so researchers must maintain a respectful and sensitive approach.

In biodiversity research, the ethics of care also encompasses environmental stewardship. Researchers should ensure that the methods used do not harm local ecosystems, particularly when working in vulnerable habitats or with endangered species. Participants should be encouraged to reflect on how their photographs might contribute to environmental awareness and advocacy.

9.2. Power dynamics and relations

Researchers often come from outside the community and bring different cultural assumptions, authority, and resources. This can create imbalances, where participants may feel pressured to align their responses with the researchers' expectations.

To mitigate these issues, fostering a participatory and collaborative environment is crucial. Researchers must adopt a listening role, ensuring participants' voices are not overshadowed by academic or institutional priorities. Equal partnership is critical in defining the project's direction, interpreting the images, and determining the research outcomes.

9.3. Biodiversity specificity of methods

When applying photovoice to biodiversity-focused research, adapting the methodology to reflect the specific environmental context is important. Local communities often have unique relationships with their environment that may differ from those studied in other social research contexts. For example, biodiversity knowledge is frequently passed down orally rather than visually, meaning that some connections to biodiversity might be difficult to capture through photographs. Additional storytelling techniques or interviews may be necessary to ensure that these layers of knowledge are documented alongside the images.

9.4. Time and resources

Depending on how they are designed photovoice projects can potentially demand significant investment in time and resources, both for the researchers and the participants. It takes time to build trust with communities, provide adequate training, conduct the photography sessions, facilitate group discussions, and organise exhibitions. When tailoring the design

of a photovoice project to an individual project it is essential to ensure that it accords with the availability, needs, interest and commitment of the target group to participate in the study. Within the PLANET4B biodiversity and religion case study, by designing the method in a way which involved embedding it within a research interview it was possible to utilise it in a condensed manner which also facilitated stakeholder participation.

In biodiversity contexts, seasonal variations, weather conditions, and the life cycles of plants and animals may further complicate the project timeline. The timing of a photovoice project may need to align with specific environmental events, such as harvest periods, migration seasons, or times of environmental stress.

9.5. Local language issues

Language barriers can present challenges in photovoice projects, particularly in rural or indigenous communities where researchers may not speak the local language. Miscommunications can lead to misunderstandings, limiting the richness of the data collected. To address these challenges, it is essential to involve local translators or community leaders who can help bridge language gaps. In biodiversity studies, local names for species or ecological practices may not have direct translations, requiring researchers to work closely with participants to ensure accurate and culturally appropriate documentation.

Additionally, it is important to respect the participants' languages during the final presentation phase. When showcasing the photographs in public exhibitions, ensuring that captions or stories are presented in both the local language and the researcher's language (e.g. English) reinforces respect for the community's linguistic identity.

10. Top tips

- Ensure a balance is achieved between providing participants with instructions on the aims of the exercise and at the same time encouraging them to feel enabled and confident enough to select images of their own choosing (i.e. avoiding peer pressure).
- Consider engaging stakeholders at the beginning of the project. Stakeholders may be able to join a project session, host a photography field trip, provide expertise or host/support the exhibit.
- Prior to opening an exhibition to the public consider hosting a private premiere exhibition for all featured participants and their immediate connections.
- Consider holding multiple exhibitions (e.g. both in-person *and* online exhibits, social media) to reach a larger audience (see photo exhibition protocol for more details).
- Consider planning for social learning opportunities, incorporate interactive sessions where participants learn from each other's experiences and insights.

11. Measuring impact

Interpersonal and intrapersonal impacts of photovoice include enhancing written and oral communication skills, cultivating a deeper understanding of diverse perspectives, and strengthening relationships within the community. Participation in the project can cultivate awareness of specific issues, prompting individuals to reconsider their roles and develop their 'voice'. Photovoice can develop negotiation, decision-making skills, while the photography/curation skills gained can also bolster participants' self-esteem. Measuring these impacts could involve inviting participants to maintain journals, capturing both subtle shifts (e.g. changes in attitudes) and tangible changes (e.g. adopting new hobbies like community gardening). Researchers could delve deeper through follow-up interviews, documenting these insights ethnographically. Additionally, display cards placed at

exhibitions can capture the reflections of attendees, shedding light on the method's broader interpersonal impact.

At the institutional level, photovoice exhibitions can act as catalysts for collaboration among community organisations, offering a platform for networking and shared initiatives. A key goal is to engage institutions and stakeholders capable of driving meaningful change. Successful exhibitions may attract media attention or foster artistic collaborations. Public interest and support can further galvanise impact, as compelling photographs and their narratives are difficult for policymakers to ignore. Measures of institutional impact might include legislative or policy changes, the creation of partnerships among organisations, or the initiation of meaningful dialogue between institutions and project participants.

12. Links to external resources

Photovoice Facilitation Guide

Budig, K., Diez, J., Conde, P. *et al.* Photovoice and empowerment: evaluating the transformative potential of a participatory action research project. *BMC Public Health* **18**, 432 (2018). https://doi.org/10.1186/s12889-018-5335-7

Williams, R. R., Holtmann, C., & Sachs, W. L. (2024). *Sacred Snaps: Photovoice for Interfaith Engagement*. Taylor & Francis.

Swanson, S. S., & Ardoin, N. M. (2021). Communities behind the lens: A review and critical analysis of Visual Participatory Methods in biodiversity conservation. *Biological Conservation*, *262*, 109293. https://doi.org/10.1016/j.biocon.2021.109293

1. Intervention method

Socio-Scientific Issues (SSI) workshop

Authors: Andrea Frantz-Pittner, Sandra Karner, Merima Ramic

2. Summary of the method

The approach of "Socio-Scientific Issues Teaching" (Zeidler & Kahn, 2014), which is based on a broader understanding of 'scientific literacy', offers a framework to develop competencies for decision-making in socially relevant issues, where scientific/technical knowledge is combined with ethical and social perspectives.

Participants are confronted with so-called 'vignettes', which are short narrative presentations of a complex controversially discussed – within PLANET4B, the vignettes were centred upon a biodiversity-related problems.

Inspired by the presented narratives, participants develop and articulate their personal position on the issue(s) at stake by considering different facts and perspectives. The fact-based decision-making, supported by scaffolding techniques in a real-world context, provides insights into the multidimensionality of biodiversity and supports the development of more reflexive perspectives.

This protocol describes a series of three SSI workshops; each could also be held as a stand-alone intervention.

3. Use context (within PLANET4B)

3.1. Relevant social aspects of biodiversity being addressed

In PLANET4B, the Socio-Scientific Issues (SSI) workshop method was implemented with the BeSt Graz Citizen Learning Community (LC) (Austria). Three Socio-Scientific Issues (SSI) workshops were conducted with this LC, which primarily consisted of migrant and socio-economically disadvantaged women aged between 17 and 65+. Over a period of nine months, this group of women was guided through the process of establishing and maintaining a garden while exploring various aspects of biodiversity within designated 'research units.' In these units, various methods, such as the SSI workshops, were tested and implemented.

As the relevance of the biodiversity crisis is not apparent throughout society, it often receives too little attention. The SSI method addresses this lack of awareness about why biodiversity matters for us all, as well as the lack of understanding of its societal contextualisation: how it affects and how it is affected by various societal factors, and which (potential) conflicts this implies.

Through SSI stories ('vignettes'), concrete references to the participants' life contexts can be established, highlighting the importance of biodiversity for them personally and for society more broadly.

The SSI workshop format engages participants in making decisions on solving complex real-world problems that require not only scientific/technical knowledge but also critical thinking, ethical reasoning, and the ability to make informed decisions. SSIs are controversial or debated issues where science and society intersect, such as biodiversity loss, climate change, genetic modification, or the ethics of artificial intelligence.

Using the SSI method helps participants to apply scientific/technical knowledge to real-world problems, while also considering broader social, ethical, and political contexts, ultimately fostering a deeper and more comprehensive form of scientific literacy.

3.2. Relevant intersectional dimensions

The SSI method provides a platform where participants can connect scientific concepts to everyday life; using customised vignettes to create concrete connections to the realities of the participants' lives. In this way, the topic of biodiversity becomes more accessible to people with little scientific literacy. Therefore, the method is well suited to target groups that are difficult to reach through conventional educational programmes or have little interest in engaging with biodiversity. The discursive examination of different points of view and the negotiation of decisions within an SSI workshop also makes it possible to work with heterogeneous groups, to give space to otherwise marginalised points of view and to support social learning.

The SSI method provides a platform for participants to connect scientific concepts to their everyday lives. Using customised vignettes, concrete connections of biodiversity-related issues to the realities of the participants are created. As a result, the topic of biodiversity becomes more accessible and exciting to individuals with limited scientific literacy as well. Generally, this method is particularly effective in reaching target groups that are educationally disadvantaged, difficult to engage with through conventional educational programmes, or may have little interest in the topic of biodiversity.

Additionally, the discursive examination of perspective-taking and the negotiation of decisions during an SSI workshop enables collaboration within heterogeneous groups. It allows space for marginalised viewpoints and fosters social learning.

In the context of PLANET4B, SSI workshops were conducted with a diverse group of women* from different ethnicities, cultures, and religious backgrounds. These workshops emphasised themes such as diversity, nativeness and foreignness, as well as belonging and otherness concerning both nature/biodiversity and society.

3.3. Relative focus given to different levels of social change

Individual level change	*Community level change*	*Institutional level change*
High	Medium	Low

4. Roles

4.1. Participants

Participants engage actively in perspective-taking as they relate the vignette story to their own experiences and knowledge. They also consider the viewpoints of the individuals mentioned in the vignette. This process requires engagement with other group members and their circumstances. Additionally, participants must be open to potential shifts in viewpoint.

4.2. Facilitators

Facilitators need to design and tailor the set-up for the workshop(s) regarding technical arrangements, content, and facilitation methods. The vignettes' content represents a central element of the workshop design. Thus, this needs to be carefully considered regarding what

may interest and be relatable to the targeted participants. Theoretical background/input can be prepared by the facilitator or invited experts.

Facilitators should create a customised setup for the workshop(s), focusing on technical arrangements, content, and facilitation methods. The content of the vignettes is a crucial aspect of the workshop design, so it is essential to consider what will be of relevance/interest to the target participants. Theoretical background/input may be provided by either the facilitator or invited experts.

5. Materials

The main materials for this method (as used within a PLANET4B LC workshop) consist of three vignettes related to the theme of functional biodiversity (Ramic & Frantz-Pittner, 2024, in print).

The first vignette (see instruction point 6.1., below) focuses on the participants' specific experiences with garden fruits. It describes the selection of different apple varieties in a shop or orchard, considering ecological, economic and social aspects. From this starting point, a thematic progression should take place that explores the concept of functional biodiversity in a broader context (e.g. climate change context, resilience, agronomic aspects, culinary, etc.), ultimately connecting it to the social aspects of diversity in the subsequent sessions.

The second vignette (see instruction point 6.2., below) describes the challenge of planting a park in line with climate change, considering the opportunities and dangers of neophytes.

The third vignette (see instruction point 6.3., below) takes up the current political discourse (within Austria) on e.g. a 'national guiding culture' ('Leitkultur' in German) and raises the question of the guiding culture of e.g. a community garden.

Along with the vignettes, additional workshop materials must be prepared to facilitate the associated supporting activities: spider web templates, paper, pens, markers, stickers, tree cadastre plan, etc.

To gather facts for the decision-making process, scientific information should be synthesised in an easy to grasp way (e.g. on cards describing different apple varieties).

Material for sensual experiences can include (e.g.): apple buffet with different apple varieties; a real park environment with trees.

Ethics materials: Participatory information and informed consent sheets (ethics).

6. Instructions

6.1. Workshop 'The functional diversity of apples'

6.1.1. Onboarding: Creating a welcoming environment. Introducing the instructors/facilitators. Distributing name tags.

6.1.2. 'Apple buffet' vignette: The participants taste and evaluate different apple varieties and the facilitator presents the first vignette: "For a market stall, suitable apple varieties are to be selected. During the tasting, the different customers have different preferences and objections. Should the apples be cheap, locally grown, stored and transported in a climate-friendly way, usable for different purposes, harvested under fair working conditions, etc.?" Good arguments for different positions are presented.

6.1.3. Group discussion: Which arguments would we agree with, what do we find less important?

6.1.4. Value reflection using a spider web diagram (Kyburz-Graber et al., 2010): How do I make my food choices? – First individual work, then group discussion).

6.1.5. 'Apple orchard' vignette: Two sisters inherit an apple orchard. They want to replant it, taking into account ecological criteria, apple varieties with different uses, preserve old varieties, have as long a harvest period as possible and generate sufficient harvest to survive economically. Which varieties of apples should they choose?

6.1.6. Theoretical input on functional biodiversity: The facilitator or invited expert explains what it means and why it is of relevance.

6.1.7. Group work: planting an apple orchard: Participants are provided with information about site conditions and apple variety characteristics (easy-to-understand fact cards) to plan an orchard that meets the sisters' requirements. Different viewpoints within the group need to be discussed and joint decisions about which varieties to be planted in the orchard need to be negotiated within the group.

6.1.8. Closing*:* Gathering participant feedback along with a summary of insights gained during the workshop, concluding with apple-based dishes brought by the facilitator and/or participants.

6.2. Workshop 'Biodiversity in the Park'

6.2.1. 'My favourite tree': The participants draw their ideal image of a tree (focusing on functions, such as who lives in it, how big the shade is, and what pleases people, etc.) and present it to the group.

6.2.2. 'Climate trees' vignette: The head of the municipal gardening department is facing a dilemma: they need to plan replacement plantings in the city park for trees damaged by climate change. One colleague suggests selecting trees from warmer climate zones that are resistant to the effects of climate change. However, another colleague strongly disagrees and raises concerns about the potential dangers of introducing non-native species. How should the planner make their decision?

6.2.3. Selecting a tree: Participants explore the city park to find trees that match their drawings of the ideal park tree. Using a tree cadastre plan (see section 12, below, for external resources), they identify each tree and determine its country of origin. The countries of origin are then marked on a world map.

6.2.4. Break with vegetarian buffet: As the participants enjoy the food, they engage in a discussion about the origins of the vegetable plants on their plates. They explore which countries or regions the plants originally came from, considering how many of our food plants are neophytes and which ones have always been native to their area. To aid in this exploration, a world map is used to mark the regions of origin for the plants featured in the buffet.

6.2.5. Group work: The arguments of the two gardening department employees detail the dangers of invasive species and the opportunities presented by new plant species in an ecosystem. The participants evaluate which of these arguments they agree with.

6.2.6. Discussion: How do we define native and alien plant species? What are the opportunities and threats? How should we decide on replanting trees in the park?

6.2.7. Closing: Gathering participant feedback along with a summary of insights gained during the workshop.

6.3. SSI workshop 'Belonging and Otherness'

6.3.1. 'All different-all equal': Participants form a circle. Questions are posed to the group, such as "Who was born in this city?" "Who has a garden at home?" or "Who has a pet?" Those who can answer "yes" to the questions move to the centre of the circle. The group then reflects on the similarities and differences among the participants.

6.3.2. 'Guiding culture' vignette: An Austrian minister is advocating for an 'Austrian guiding culture', a kind of code of behaviour, which defines what is considered desirable in our country in order to protect our national identity. But what exactly should a guiding culture entail? Is it truly possible to define one in a pluralistic society?

6.3.3. Group discussion: 'What characterises Austrian?': What are the criteria and characteristics that are considered essential for Austria/n?

6.3.4. Break-out group discussion: 'When do I feel at home?' Participants discuss in pairs/small groups: When do I have a sense of belonging, regardless of my origin?

6.3.5. Plenary discussion: How would we answer if we were asked about the minister's ideas?

6.3.6. 'The guiding culture in our garden': The participants are asked to design a door sign expressing how diversity is lived in a specific community context (e.g. their GAIA women*s garden) and which guiding culture should prevail there.

6.3.7. Closing: Gathering participant feedback along with a summary of insights gained during the workshop.

7. Data collection and synthesis

This method is supportive for generating a range of data. Within PLANET4B the method has been used with a focus on collecting qualitative and visual data for subsequent thematic analysis, including:

- Notes of observations taken during the workshop
- Audio records of discussions and reflections
- Pictures of outputs (orchard, design, spider nets)
- Semi-structured interviews with participants

8. Checklist for implementation

- Name tags
- Content for vignettes and inputs elaborated
- Participatory information and informed consent sheets (ethics)
- All workshop materials prepared
- Workshop venue arranged; sunshade/rain protection prepared (for outdoor venue)
- Apple buffet, beverages, snacks

9. Critical considerations

9.1. Ethics of care / ethical considerations

Creating an exciting, joyful, and trustful environment where people are encouraged to share their experiences and viewpoints openly is essential. Emphasise confidentiality rules (as defined in your informed consent agreements) to create a 'safe space'.

Make sure that appropriate arrangements are given that make all persons feel comfortable and welcome. Set rules for appreciative communication.

Participation of parents: ensuring an atmosphere where parents with children and children feel welcome; offer childcare.

9.2. Power dynamics and relations

Creating an atmosphere that is sensitive to the group's diversity is essential. This involves being mindful of spoken and body language, symbols and documentation. Employing communication techniques that support individuals with limited language skills is essential. Consider participants' anticipated scientific literacy for presenting scientific facts and content.

A wide variety of perspectives can be precious concerning the learning potential. However, this also may imply inhibitions for perspective-taking and conflicts in decision-making. Experienced facilitation is essential.

10. Top tips

- The setting relies heavily on the co-creation of knowledge. Expert input is only useful and necessary at a few points.
- The vignettes are designed in such a way that there is no single correct solution. It is important to ensure that all positions put forward by the participants are valued.
- It is beneficial not to keep discussions too narrowly focused, allowing participants to incorporate their individual experiences and knowledge (e.g. about other types of fruit) into the decision-making process.
- The individual workshops can also stand alone. The chosen combination closes the loop from individual experience to ecological and social aspects of diversity back to the participants' environment (e.g. in the GAIA women*s garden).

11. Measuring impact

Intrapersonal: assessing through final feedback and ex-post interviews if and in what respect participants changed their perspectives.

Interpersonal: observations during the workshop in group decision making; interpreting outcomes – e.g. agreements on community rules (e.g. door sign for the garden).

12. Links to external resources

Kyburz-Graber, Regula, Nagel, Ueli & Odermatt, Freia (2010): Handeln statt hoffen: Materialien zur Bildung für Nachhaltige Entwicklung für die Sekundarstufe I. Spektrum Schule. Klett und Balmer Verlag, Zug. ISBN: 978-3-264-83945-6.

Merima Ramic & Andrea Frantz-Pittner (2025): SSI Vignetten für einen multi-perspektivischen Blick auf biologische und gesellschaftliche Vielfalt. https://icse.ph-freiburg.de/downloads/unterricht/

Sami Zeidler & Dana Kahn (2014): It's Debatable: Using Socioscientific Issues to Develop Scientific Literacy, K-12. NSTA Press, National Science Teachers Association. ISBN: 978-1-938-94600-4.

Tree cadastre plan: A tree cadastre plan is an interactive map that shows all the trees in an area. It contains information about the species, origin and year of planting for each tree. For the PLANET4B case we used the cadastre of the city of Graz: https://geodaten.graz.at/WebOffice/synserver?project=baumkataster&client=core

1. Intervention method

Storytelling

Authors: Lindy Binder, Sandra Karner

2. Summary of the method

Storytelling can be highly effective and evocative as a way of encouraging participants to gain new knowledge, awareness, appreciation and/or interest in a wide range of issues associated with biodiversity (and beyond).

Storytelling as a research method can take multiple forms, including oral, written, visual (e.g. storyboarding), role play and theatrical enactment. Artefacts can also be enlisted to support and enrich storytelling both on the part of the participant storyteller and how the story is received by a target audience.

3. Use context (within PLANET4B)

3.1. Relevant social aspects of biodiversity being addressed

In PLANET4B biodiversity storytelling was used with the BeSt Graz Citizen Learning Community (LC). This LC is comprised of mainly migrant and socio-economically disadvantaged women of various ages (between 17 and 65+ years years). Over a period of 9 months, this women*s group was guided through a process of setting-up and cultivating a garden, while dealing with various aspects of the topic of biodiversity in so-called 'research units', where various methods, such as the one described, were tested.

The biodiversity storytelling was used to encourage individuals to create meaningful personal connections with, and further consider the link between, food and biodiversity. It was also used to facilitate broader knowledge sharing about agricultural, historical and cultural information relevant to individual fruits and vegetables and how they can have a positive or negative effect on biodiversity.

The participants were invited to choose a favourite fruit or vegetable. They were divided into two groups (one German-speaking, one English speaking) and invited to share autobiographical information through the artifact of the fruit or vegetable they had chosen. These stories often included cooking and gardening practices, and they were all related to participant's specific biographic backgrounds (cultural contexts, family traditions, childhood experiences, etc.).

As the Learning Community connected over their experiences with nature, food preparation, etc. it supported the community-building process. The connection between personal life (e.g. difficulties) and the resulting (non-) opportunities to experience nature and biodiversity helped the researchers better understand what this group of people needed in order to increase their engagement with nature and prioritisation of biodiversity.

3.2. Relevant intersectional dimensions

The visible characteristics of the group may include (e.g.) ethnic background, citizenship, languages spoken, experience (or lack thereof) in the national or international labour market, number of children, age, living conditions, socioeconomic status, asylum-seeking experiences, general travel experiences, physical strengths, and age.

When individuals – specifically women – face multiple forms of structural and personal discrimination, it can lead to tensions and a lack of collaboration (Schutzbach, 2024). However, in the context of the group with which this method was used within PLANET4B, they were notably empathetic and cooperative. despite some individuals likely carrying the weight of significant personal experiences. Additionally, storytelling is inclusive and accessible for a diverse range of participants.

3.3. Relative focus given to different levels of social change

Individual level change	*Community level change*	*Institutional level change*
Medium	Medium	Low

4. Roles

4.1. Participants

Choose a favourite fruit or vegetable and let the facilitator know in advance of the session, and use this fruit or vegetable to share personal experiences with a small group (6-8).

If applicable, participants bring their favourite fruit or vegetable along.

4.2. Facilitators

To prepare the participants through guiding questions to share their stories using a fruit or vegetable as an inspiration. Collect information about their choices before the storytelling activity and prepare fact cards with information about the favourite fruits or vegetables. Based on the prepared fact cards, facilitators share information about some of the fruits and vegetables chosen, touching on farming, culture and/or history as well as the impact of the artefact on biodiversity.

Then, facilitate the sharing of participants' stories in small groups where a common language can be spoken.

5. Materials

- Information cards about specific fruits or vegetables
- Chairs and/or blankets arranged in a shape conducive to story telling
- Examples/samples of chosen fruit and vegetables
- Participatory information and informed consent (ethics)

6. Instructions

In advance of the storytelling session (two weeks approximately):

6.1. Invite participants to choose a favourite fruit or vegetable and share this with the facilitator. Based on this information, facilitator prepare information cards about the fruits and vegetables chosen.

6.2. Inform the participants that they should prepare a short story about their favourite fruit or vegetable to orally share with others at the meeting. The time granted to tell their story should also be specified in advance (within PLANET4B participants were asked to prepare stories of approximately five minutes duration). Provide simple guiding questions help participants with preparing their story. For example:

- How does it refer to your biography?
- Has anything changed regarding this fruit or vegetable over time (e.g. taste? Cultivation methods? How you prepare it?, etc.)?
- What kind of development would you wish in the future regarding the fruit or vegetable (e.g. better taste, availability, other varieties, processing, etc.)?

During the event:

6.3. The facilitators explain the method and remind participants of any guiding questions for their stories. If it is a large group divide the participants into smaller sub-groups of 6-8 with a facilitator assigned to each. Invite the participants to take turns in sharing their story to their group. Also encourage them to ask questions or comment on each story that is told.

6.4. The group gathers in a plenary. The facilitators encourage participants to further reflect and exchange with each other about the stories shared.

6.5. Facilitators present the fact cards considering biological, ecological, culinary and other aspects of the selected fruits and vegetables (e.g. mushrooms – producing enzymes for industry; tomatoes – cultural, agrobiodiversity aspects; potatoes – historical aspects).

6.6. Invite each participant to choose a fact card to discuss in more detail. If the group has up to 15 participants, this can take place in a plenary session. For larger groups, it is advisable to create smaller break-out groups.

6.7. Exchange with participants further easily accessible information sources (e.g. from social media sources).

6.8. Enjoying together the fruits and vegetables which were brought along by participants/facilitators together with facilitation of broader group reflection (How did I like the method? What was new for me?, etc.).

7. Data collection and synthesis

An audio recording can be made of the session and/or field notes taken by a member of the research team.

In the context of PLANET4B the data generated from this method is being thematically analysed and reflected upon alongside all the other methods being used with this (BeSt Graz) Citizen Learning Community.

8. Checklist for implementation

- Arrange the place in accordance with the size of the group (and/or number of sub-groups).
- Provide participatory information and secure informed consent (ethics).
- Send the participants the guiding instructions and supporting questions two weeks in advance and ask them to communicate their selected fruit/vegetable to the facilitator.
- Prepare fact cards based on the fruits and vegetables chosen.
- Prepare recording facilities if you intend to record.
- Arrange translation facilities/translators (if applicable).
- If the number of participants requires that the group is divided into sub-groups ensure you have one facilitator per subgroup; also, if recording via fieldnotes only ensure that there is a notetaker (in addition to the facilitator).

9. Critical considerations

9.1. Ethics of care / ethical considerations

Inform participants in advance about what will happen in the session, what will happen with their data and their inputs. Obtain consent for this. Explain to the participants that the session will be facilitated in an appreciative manner and as a safe space in which everyone is able share and feel welcome. Facilitators can also support this by (e.g.) ensuring everyone has an opportunity to speak, by encouraging appreciative responses to all shared stories, and by maintaining good time keeping.

9.2. Power dynamics and relations

Where possible, ensure personal stories can be told in the native language.
Where applicable ensure gender of researchers/facilitators is appropriately aligned to that of the participating group. For example, when using this method in PLANET4B with the Graz group of migrant women, we only had female facilitators.

10. Top tips

- Ensure people can talk in a setting and language in which they feel comfortable because they are telling their personal story – ideally in their native language if a facilitator or technical devices (e.g. translator app on the mobile phone) can support this.
- Ensure there is enough time to talk. Where there is a more than one language represented, allow double time in a plenary so everything can be translated.
- Facilitators can share their stories too. The facilitator sharing their own story first can be useful for breaking the ice.
- Ask also for a second favourite fruit or vegetable to avoid everyone choosing the same – and if necessary, ask some individuals to prepare a story in accordance with their second choice.
- Because it encourages people to share personal stories this method gives an opportunity for people to get to know each other and builds community. Accordingly, it can be a good method to use as an early intervention. However, if using as an early intervention this also requires prior knowledge on the part of the facilitator that all participants will feel comfortable and safe taking on the role of storyteller.
- Consider inviting also an experienced horticulturalist to provide further responses and tips, but if doing so ensure that their demographic is sufficiently aligned to that of the group (e.g. with the Graz group of migrant women, the invited expert would be a woman).
- Consider hosting the session outside (e.g. in a community garden).

11. Measuring impact

Impact can be measured qualitatively via a dedicated group reflection at the end of the session. Within PLANET4B this method was used as one of a range of methods with the Graz Citizen LC. Accordingly, the LC was asked to reflect on their experience of being part of the project over seven months, as well as at the end of each individual session unit.

12. Links to external resources

https://www.tandfonline.com/doi/abs/10.1080/08873631.2012.646890

1. Intervention method

Vegetable exhibition

Authors: Borbála Lipka, György Pataki, Katalin Réthy

2. Summary of the method

A vegetable exhibition is an engaging event that celebrates the diversity of vegetable varieties while highlighting the vital role of biodiversity in agriculture and food systems. They provide a platform for producers to share sustainable, biodiversity-supportive growing practices and enhance visitors' understanding of the ecological, cultural, and nutritional value of heritage varieties. By showcasing heirloom varieties as well as 'exotic' varieties, these events preserve genetic diversity among plant species and cultural diversity, as plants often carry stories and traditions tied to specific communities or regions but also emphasise the importance of curiosity about new species and varieties that is a key in adaptation to the changing climate. Growing and sharing these seeds stimulates the continuation of culinary practices, rituals, and agricultural knowledge, fostering collective support for growers and sustainable practices (The National Heirloom Exposition).

Within the PLANET4B Agrobiodiversity management case study this method was used to showcase different heirloom and exotic vegetable varieties. The growers displayed them as a public exhibition as part of an existing event to share information about the varieties and offer opportunities for tasting.

3. Use context (within PLANET4B)

3.1. Relevant social aspects of biodiversity being addressed

This PLANET4B case study addresses agrobiodiversity – the link between nature and human culture – particularly in relation to the diversity of seeds. Focal points of the case study include the maintenance of seeds, seed saving and conservation work. The scope of the case study extends to understanding what intervention(s) could be done in order to provide individuals with knowledge and agency to make decisions that have a positive influence on agrobiodiversity, promote stronger and extended seed networks, to develop a seed system that better supports (agro)biodiversity. The study also analyses the relationship between farmers involved in conservation and their seeds, and seeks to raise awareness of the diversity in cultivated plants. Operating in alternative food networks, the farmers and gardeners engaged in these activities tend to be subsistence farmers and amateur gardeners who connect with civic movements (e.g. agroecology, permaculture, etc.) and public research activities (on-site farm experiments).

The vegetable exhibition method links growers and consumers, empowering consumers to make agrobiodiverse choices in the vegetables they consume and grow in their gardens and giving growers a platform to showcase their produce. It can also be an opportunity for seed swapping.

3.2. Relevant intersectional dimensions

This PLANET4B case study focuses on open pollinating vegetable varieties and their seeds, considering that the whole seed system needs to support diversity, human and non-human. Incorporated within the study (within the context of seed systems) is an exploration of gender roles at a systemic level. Working with seeds is highly gendered: the management of seeds (including selection, seed saving, seed cleaning and seed storage) almost always

belongs to the realm of women. The current (mainstream) seed system is built up in a way that is focused on production and disregards the role and importance of reproductive work (e.g. the importance of small-scale seed saving, conservation of genetic diversity, the role of community seed networks). A more resilient seed system is needed to support (agro)biodiversity.

3.3. Relative focus given to different levels of social change

Individual level change	*Community level change*	*Institutional level change*
Medium	Medium	Low

4. Roles

4.1. Growers (exhibitors)

- Grow their fruits or vegetables.
- Participate in the design and planning of the exhibition (optional).
- Harvest and transport their produce to the exhibition.
- Talk to consumers and answer questions about their produce.
- Give a short plenary talk about their varieties (if willing, if appropriate).
- Participate in any associated research activity (e.g. debriefing, interview, survey, short feedback note) (optional).

4.2. Facilitators

- Liaise with growers to find a suitable time of year/season to showcase their vegetables.
- Identify suitable location or event to host the vegetable exhibition.
- Procure all necessary materials (see section 5).
- Be a contact point between the event organisers / location host and the growers, identifying if there is opportunity and/or appetite for one or more attending growers to give a presentation.
- On the day, help facilitate discussion between the public and growers as needed.

5. Materials

- Display area (e.g. table(s))
- A marquee or gazebo to protect from weather (in the PLANET4B case study the exhibition was held in a marquee)
- Labels/information on exhibited produce
- Exhibited produce – fruits, vegetables seeds
- Plates and knifes to portion the vegetables into bite-size taster sample pieces
- Small envelopes or packages for seeds
- Participatory information and informed consent sheets (if collecting research data)

6. Instructions

6.1. Identify an event (and location) that would be suitable to host a vegetable exhibition (and secure the agreement of the organisers), or plan the exhibition as a free-standing event. In the case of PLANET4B, for example, the exhibition was held as part of a local hemp festival and the annual meeting of the Magház Association, a (national) Hungarian community seed bank.

6.2. Advertise the vegetable exhibition. In the case of PLANET4B, the hemp festival hosted the vegetable exhibition as part of its activities and looked after advertising, and the growers came from the Magház Association. Attendees were people who already had an interest in gardening.

6.3. Identify and invite growers to showcase their varieties and, if they wish to do so, work with them to co-design it. Secure their informed consent (where the exhibition forms part of a research study).

6.4. Organise the fruit and vegetables on the table with identity labels.

6.5. Encourage growers to talk to attendees who are interested in their varieties. There is also an opportunity for growers to talk to each other and share their experiences and tips for growing.

6.6. If possible, one or more growers can do a presentation as part of the event.

6.7. Cut up some varieties into bite-size pieces to offer a tasting.

6.8. If appropriate, offer an opportunity for seed swapping.

6.9. Invite participants (exhibitors and/or public attendees to share their experience of the event (e.g. via survey, interview, leaving brief feedback, or via a debriefing).

7. Data collection and synthesis

The vegetable exhibition method is suited to capturing both quantitative and qualitative data. To capture the qualitative data, it would be possible to canvas exhibitors and/or public attendees and ask them to share their experiences of the event. This data could be captured via survey, interview, feedback station at the event, or via a debriefing. Organisers might consider creating a QR code with a link to the survey or feedback form, with an option to sign-up to an interview or debriefing session. This data could be used to understandings of heritage varieties, barriers and enablers of growing and eating these varieties. Qualitative data could be gathered on the number of vegetable varieties exhibited, the number of exhibitors and the number of visitors. If the event is held over continuous years (e.g. every autumn) this data might indicate if changes in engagement over time.

8. Checklist for implementation

- Gazebo or marquee
- Tables for the crops
- Benches or chairs to sit
- Pieces of papers + pens for the labels
- Knife (in case there's also a tasting)
- Plates (in case there's also a tasting)
- Small packages for seeds (in case there's a seed swap)
- Participant information and consent forms (if collecting research data)

9. Critical considerations

9.1. Ethics of care / ethical considerations

- Consider allergies and hygiene where people are eating food.
- If collecting data via interviews, provide participant information and appropriate consent forms.

9.2. Power dynamics and relations

- Ensure consumers know there is no cost associated with tasting the vegetables.
- If there are likely to be attendees who do not speak the local language, consider writing the vegetable labels in more than one language.
- Ensure people with very little knowledge of vegetables feel comfortable asking their questions.

10. Top tips

- It is possible to use negative circumstances to have useful conversations. The vegetable exhibition in PLANET4B came after a very poor year for growers and this was represented in the variety of vegetables, however, this provides a platform to talk about climate change and the effect it has on agriculture.
- Inviting a local journalist can help amplify the reach of the event.
- Consider how to market the event in terms of who you want to reach. In the PLANET4B case, the intention was not to attract as many people as possible but to further engage those who already had an interest in gardening.

11. Measuring impact

This method was used in PLANET4B within an 'extensive' case study. There was no place-based Learning Community, so impact was not measured. However, in a different context, the vegetable exhibition method has the potential to deliver impact at the intrapersonal and interpersonal level. At an intrapersonal level, tasting the vegetables might lead visitors to connect their eating experience with agrobiodiversity, or to change in their purchasing and cooking habits. Surveys, interviews, a feedback station at the event, or via a debriefing session could provide an indication of intrapersonal impact, specifically if researchers sought data on how attitudes had changed. Interpersonal impact could emerge from the event, as it would bring people together, potentially instigating connections and conversations. Growers might have an opportunity to connect and share knowledge and best practice tips forming a community of knowledge. This impact might be measured over time, e.g. if the growers keep in contact after the event, or if people who attended the event change their habits. Researchers could consider sending a survey to attendees/exhibitors 3 months after the event to ask if anything has changes in their practices.

12. Links to external resources

Garden Organic (n.d.) *Why we grow heritage seeds* (online): https://www.gardenorganic.org.uk/what-we-do/hsl/why-we-grow-heritage-seeds

1. Intervention method

WhatsApp for promoting biodiversity decision-making

Authors: Geraldine Brown, Alex Franklin, Barbara Smith, Lindy Binder, Claire Lyons

2. Summary of the method

WhatsApp Messenger can be used to engage with a group of research participants as a form of research-based intervention. Using WhatsApp as a research tool is beneficial because it is easily accessible, user-friendly, and serves as a communication platform that connects participants and researchers.

WhatsApp offers various forms of communication, including instant one-on-one or group sharing of voice messages, text messages, links to relevant biodiversity research, news items, and nature-related images, videos, and other files. These services come at no additional cost beyond the user's internet access, whether through mobile data or Wi-Fi, allowing research to be conducted seamlessly across different locations and times.

This method fosters participant engagement, builds community, and creates space for discussing biodiversity issues, promoting shared learning, and enabling participants to share their everyday biodiversity stories. It is a versatile approach that can be applied to various groups. However, we are mindful that it requires internet access and recognise the importance of being aware of digital inequities.

3. Use context (within PLANET4B)

3.1. Relevant social aspects of biodiversity being addressed

Within PLANET4B WhatsApp Messenger is being used to engage with and further build community amongst research participants who were members of an intensive case study Learning Community (UK case). A starting point for the focus of this research is a pressing concern with 'a green inequality' (Howard Boyd, 2022). Such 'green inequality' is characterised by ethnic minorities encountering barriers leading to a disconnect from the natural environment. This has ramifications for reversing biodiversity decline, strategies aimed at raising awareness, individual and policy prioritisation of biodiversity and understanding and responses to biodiversity loss. This intensive case study sets out to explore how biodiversity is understood, perceived, engaged with, and valued by ethnic minority communities.

This links directly to one of the PLANET4B project's overarching aims, which is to address the exclusion or marginalisation of ethnic minorities in biodiversity decision-making. This method was used as a means of supporting the democratising the research process creating a space in which participants engaged with the issue on their own terms.

3.2. Relevant intersectional dimensions

The case study focuses on men and women living in the UK who identify as members of ethnic minority communities. In the UK, the term "ethnic minority" generally refers to racial and ethnic groups that are less represented, thereby categorising diverse populations (Dacosta et al., 2021). Individuals from migration backgrounds have varied life histories and levels of affluence; people from ethnic minority backgrounds exist across all socioeconomic categories, sectors, and professions (Rishbeth et al., 2022). An intersectional approach will

help us identify both the similarities and differences among participants, providing a nuanced understanding of how racialised communities experience nature and the outdoors.

3.3. Relative focus given to different levels of social change

Individual level change	*Community level change*	*Institutional level change*
High	Medium	Low

4. Roles

4.1. Participants

One of the primary goals of using WhatsApp as a research tool is to create an engaged research community and have a space for sharing views and experiences. Participants are invited to interact with each other and the project team. They are encouraged to share their thoughts, experiences, and activities, as well as to raise any questions that arise and have some connection to an aspect (directly or indirectly) related to the study. Additionally, participants can share visual and audio content that captures their everyday biodiversity stories. While this method can accommodate a large group, managing the information and fostering community is more effective with a smaller group, ideally consisting of no more than 20 participants.

4.2. Facilitators

The role of the facilitator is:

- To ensure there are clear guidelines about using WhatsApp.
- To agree and establish an ethical process with participants about the use of WhatsApp and consent to use the content uploaded and to address issues of anonymity.
- To act as moderators should an issue arise related to misuse of the WhatsApp group, for example, concerns about the appropriateness of the material shared.
- To engage in the co-creation process and become part of the community and not merely uninvolved bystanders.
- To monitor information shared by the group. This may involve responding to messages, stimulating engagement and exchange between group members and overseeing information shared.
- To co-ordinate the export of WhatsApp data.
- To analyse WhatsApp data.
- To share information with participants.

5. Materials

- Phone with access to the internet and WhatsApp
- Participatory information and informed consent sheets (ethics)

6. Instructions

6.1. Inception meeting in which the aims/objectives of the research are agreed with the participants and (b) sufficient support is secured from majority of research participants for a WhatsApp to be set up and used as a method to support research study. It is important that participants are informed that, in line with research ethical guidelines, membership of the WhatsApp group is voluntary.

6.2. Facilitator delivers a workshop ((in person or online) to participants outlining issues associated with using WhatsApp and ethical considerations and co-develop a code of conduct for the group's use of the application. It is important that participants are informed that they can leave the group at any point with no implications for their involvement in the research study.

6.3. The facilitator creates the WhatsApp group.

6.4. Facilitators engage with participants on the WhatsApp group on an ongoing basis; this may need engaging with the group outside of regular working hours.

6.5. Participants share information and their nature/biodiversity stores for the duration of the study.

6.6. Facilitator consults participants about continuing and/or discontinuing with WhatsApp at the end of the study.

7. Data collection and synthesis

The information collected from WhatsApp can be exported for analysis and uploaded to a data management tool, such as Chat Stat. This offers additional qualitative data for analysis; use of emojis, messages sent, images shared, and an overall assessment of the WhatsApp conversations. Key findings will contribute to understanding participants' everyday relationship with biodiversity, alongside data that captures an aspect of participants' engagement in the study and illuminates potential limitations of WhatsApp as a research tool.

8. Checklist for implementation

- All training materials procured and ready
- Appropriate space for an ethics workshop
- Tips sheet shared about using WhatsApp
- Providing participatory information and securing informed consent (ethics)

9. Critical considerations

9.1 Ethical considerations

Researchers should ensure that the methods used adhere to the principles of not causing harm there is a need for ethical consideration to be at the forefront when using this method:

- Obtain informed consent from all participants. It is important to ensure that informed consent pays particular attention to the sharing of visual data.
- People may want to remain anonymous, so the measures required to maintain anonymity must be considered.
- It is important that potential participants understand that using WhatsApp is voluntary, they do not need to join the WhatsApp group and can remove themselves from the group at any time without ramifications for their involvement in the study.
- Address concerns about privacy, confidentiality and potential risks.

- Develop a plan for managing sensitive or controversial images.
- Ensure that participants are fully made aware and understand that the information shared will be visible to all members of the group.
- Be willing to discuss problematic or inconsiderate use.

As noted by Colm (2022), WhatsApp's proximity to participants' daily lives blurs the time and space boundaries, so the ethics process must also be clear and adaptable to potential ethical situations that may arise. The WhatsApp group will capture personal reflections, so researchers must be aware of how to effectively research sensitive issues and ensure ongoing monitoring and reflection of ethical considerations.

9.2 Power dynamics and relations

Researchers often come from outside the community and bring different worldviews, cultural assumptions, authority, and resources. This can reinforce inherent power imbalances between researchers and research participants, who may feel pressured to join the WhatsApp group and align their responses with the researchers' expectations. It is important to ensure that the approach used aims to minimise this inherent power imbalance and that there is transparency in how researchers use the WhatsApp group. Participants must be informed that their participation is voluntary, and they do not need to be part of this online community; it is also essential to reassure participants that they have control over how they engage with the group and can delete or mute the group if they so choose.

10. Top tips

- Share stimulating links with accessible language.
- Engage with posts.
- Use software such as Chatstats service to keep an eye on who is less active and accordingly ensure especially to comment/engage with any posts they make.
- Positive news sharing (i.e. not just biodiversity doom and gloom).
- Supporting engagement by adding posts when things go a bit quiet.
- Sharing updates from the project and planned activities.
- Having more than one facilitator helps with having a diversity of comments/reactions, etc. from the 'side' of the research team.
- Keep a balance – encouraging members to engage but also not overwhelming them with too much content and/or requests.
- The aim is to build a community so participants should be encouraged to share achievements/celebrations and significant events happening in their lives.

11. Measuring impact

This method can potentially impact the *intrapersonal* level. Participants make a personal investment in contributing to the WhatsApp group. This involves reflecting and making decisions about the information they want to share with others, offering valuable individual experiential learning. The range of information shared and the opportunity to communicate directly with each other and facilitators offer further learning opportunities that can support understanding and facilitate change.

A further impact, at the *interpersonal* level, is the capacity for participants to build social connections in which they learn from each other and engage with nature and biodiversity in new ways outside of the study.

Interviews at the start and end of the process can gather participant perceptions and actions to capture the impact. Analysing the data exported from the chat can also be a valuable source of capturing change.

12. Links to external resources

References

Colm A., (2022) Using WhatsApp for focus group discussions: ecological validity, inclusion and deliberation, Qualitative Research Vol. *22*(3) 452-467.

DaCosta, C., Dixon-Smith, S. and Singh, G. (2021) *Beyond BAME: Rethinking the politics, construction, application and efficacy of ethnic categorization*, Coventry: Higher Education Research Action Group (HERAG).

Howard Boyd, 2022 in State of the Environment, health, people and the environment (26th Jan 2023). Environmental Agency (accessed October 3rd, 2024). State of the environment: health, people and the environment – GOV.UK (www.gov.uk)

Rishbeth, C., Neal, S., French, M. and Snaith, B. (2022) Included outside: Engaging people from ethnic minority backgrounds in nature. Evidence Briefing, Natural England Technical Information Note, TIN185. Natural England, York.

Resource Links

WhatsApp Groups in Social Research: New Opportunities for Fieldwork Communication and Management – Temirlan Jailobaev, Kanykey Jailobaeva, Myrzagul Baialieva, Gulsaadat Baialieva, Gulnara Asilbekova, 2021

How scientists are using WhatsApp for research and communication

1. Intervention method

Who am I?

Authors: Lindy Binder, Geraldine Brown, Claire Lyons, Alex Franklin, Barbara Smith

2. Summary of the method

'Who am I' is a simple game which is particularly suitable as an 'icebreaker' towards the start of a group session. Participants are invited to identify what plant or creature they are (it is attached to their forehead) by asking 'yes' or 'no' questions of the other participants.

The method is intended to be a fun activity aimed at encouraging participants to engage with the subject matter of biodiversity in an inclusive and light-hearted way. It also contributes to building community within the group.

The method duration can be used flexibly. For an extended session, once individuals have correctly guessed 'who am I', the facilitator can invite participants to share any stories about their experience/knowledge of the species; the facilitator can also provide some engaging and memorable facts about the species in question.

3. Use context (within PLANET4B)

3.1. Relevant social aspects of biodiversity being addressed

Research highlights that Global Majority communities have historically lacked representation in biodiversity decision-making across all policy levels. Within PLANET4B the 'Who am I' game was used as an icebreaker with representatives from ethnic minority communities. The participants had attended at least one walk led by DADIMA's CIC, a community-led walking group, but this was the first time some of them had met one-another and also their first session as volunteer members of the PLANET4B case study Learning Community (LC).

The 'Who am I' game was used with the LC to have some fun together, build relationships, and encourage conversation between participants about the plant or animal they had been assigned. During the session participants were encouraged to share what they knew about the species featured in the game, including biological and cultural references and reflect on their own experiences of nature while growing up.

3.2. Relevant intersectional dimensions

The 'Who am I' game is suitable for diverse participants, including different ages, genders, ethnicities, religions, and educational backgrounds. To ensure an inclusive and enjoyable experience, the plants or animals selected for the game should be familiar and easily guessable for the group members. The game can also encourage intercultural exchange about the varying significance of individual species across different communities.

3.3. Relative focus given to different levels of social change

Individual level change	*Community level change*	*Institutional level change*
Medium	Low	Low

4. Roles

4.1. Participants

Participants are game players. In groups of 4-12, players ask questions of each other to work out the identity of the plant or animal affixed to their forehead.

- Players wear a card attached to their forehead that depicts a picture and name of a plant or creature.
- They ask a question with a 'yes' or 'no' answer to try to determine 'who' they are.
- After an individual has successfully guessed who they are, they continue to answer yes or no to the participants still asking questions.
- After everyone has successfully guessed who they are, participants are encouraged to share stories and/or further discuss whether they have any previous experience or specific knowledge of any of the plants or creatures featured in the game.

The game can be played in 10-25 minutes depending on how many are in a group.

4.2. Facilitators

Ahead of the day:

- Prepare the game materials (see section 6, below) – where possible align the selection of plants and animals to the overall aims and objectives of the associated workshop and/or to the anticipated biodiversity knowledge of the participating individuals.

On the day:

- Assist the participants in attaching the 'Who am I' images (see section 6, below).
- Explain the instructions of the game.
- If people are finding it hard to guess, give clues.
- Prompt further discussion and personal reflection amongst participants about the featured plants and animals.

5. Materials

- 2cm wide ribbon cut into 1m lengths
- Sticky Velcro cut into squares and affixed to the centre of the ribbon and the back of a card
- Laminated cards with a picture and name of a plant or animal (1 piece of A4 makes 8 cards)
- Optional: whilst this method was used in PLANET4B as an icebreaker, if it is to form part of a research process a recording device can be used to audio-record the discussion
- Participatory information and informed consent sheets (ethics) (where the game forms a component of a research process)

6. Instructions

Preparation:

6.1. Cut 2cm width ribbons to approximately 1 metre length each. Enough for one per participant.

6.2. Attach a sticky Velcro square to the centre of each piece of ribbon.

6.3. Create cards (playing card size) of plants and animals, with both picture and name (for example, butterfly, daisy, oak tree, snail, hedgehog, owl). Laminate.

6.4. Attach the corresponding Velcro square to the back of the cards so they can be fastened to the ribbons once they are tied around a forehead.

6.5. Prepare some engaging facts about each of the plants and animals as a basis for prompting further discussion (if required).

On the day:

6.6. Hand out the ribbons and encourage the participants to tie them around their foreheads.

6.7. Stick a card to the Velcro square on the ribbon. Ensure the participant does not see it.

6.8. Explain that participants can only ask 'yes' or 'no' questions (e.g. 'what colour am I?' is not allowed. 'Am I green?' is fine).

6.9. If people are finding it hard to guess, you can give clues.

6.10. Once an individual has correctly guessed, share (pre-prepared) engaging facts about the featured plant/animal.

6.11. After everyone knows what they are, prompt further discussion and sharing of stories in connection with the plants and animals featured in the game.

6.12. The facilitator can use the game as a short icebreaker for a lesson, business meeting, or other activity. If collecting data from the discussion, this can be audio-recorded.

7. Data collection and synthesis

If data is collected this could be done via written notes or audio-recording the conversation to see what sorts of discussions the game provokes (e.g. Why would I prefer to be a ladybird rather than a snail?, Do I think some 'biodiversity' is more valuable than others?, Have I ever encountered a hare during a countryside walk?, Does this species have a particular cultural significance for me?).

Alternatively, the game can be used as an icebreaker without any directly associated data collection.

8. Checklist for implementation

- Materials procured, printed and adapted
- Appropriate space to play
- If collecting data, ensure informed consent (ethics)is secured

9. Critical considerations

9.1. Ethics of care / ethical considerations

- If collecting data, ensure participants give informed consent, and in the case of children, consent will also need to be collected from their parent/guardian.
- The subject of biodiversity loss may trigger anxiety around environmental change in some participants. Sometimes heated discussions are a sign that certain topics are close to the heart of some of the participants. This needs to be treated carefully with constructive, respectful and inclusive language.
- It is important to make sure that the plants and animals are sufficiently easy to guess so that the game is experienced in a fun and inclusive manner by all players.

9.2. Power dynamics and relations

The facilitator must be mindful of their positionality and how this may influence how participants engage in the game. For example, participants may feel a need to align their responses with what they perceive to be the researcher's expectations. The facilitator may also need ensure all participants can share their view and experiences.

10. Top tips

- The game can be adapted to reflect particular creatures. For example, the PLANET4B LC goes for walks in the Chiltern Hills in Oxfordshire, UK, so we chose plants and animals for the cards they may see on their walk (such as 'red kite').
- Depending on your group, choose how specific you want to be (we chose 'familiar' creatures and plants, e.g. bluebell, daisy, oak tree are specific but well known. 'Snail' was chosen rather than 'white-lipped snail', 'owl' rather than 'tawny owl'.
- Be mindful of the cultural significance of certain plants and creatures as well as biological significance (e.g. in some cultures the owl is considered 'wise': in others, foolish).

11. Measuring impact

This activity is designed to build community and start people thinking about how they feel about biodiversity, not to change habits. The discussion after the game will give an indication of how people think about different plants and creatures and how much knowledge participants already have. It can be a good starting point for a longer period of engagement on the topic of biodiversity after which you could ask aligned follow up questions (e.g. do you still think negatively towards e.g. a snail?).

Informed consent is needed if the data is recorded and used for research purposes.

12. Links to external resources

This game is essentially a biodiversity themed version of the board game 'Headbandz' or the Digital game 'Heads Up'.

1. Intervention method

Workshop in nature

Authors: Geraldine Brown, Alex Franklin, Barbara Smith, Lindy Binder, Claire Lyons

2. Summary of the method

'Workshop in nature' is an approach that promotes conscious engagement with an area of green space of high environmental quality (within which the workshop is run) as a basis for promoting sharing of knowledge about ecology and biodiversity. The workshop enables participants to immerse themselves in the greenspace, connect with nature and focus on ways in which individuals can learn about things they can do in their own greenspaces (e.g. garden) to support biodiversity and/or for those who may not have access to a high-quality greenspace it also offers a learning opportunity.

The aim is to deliver an activity-based workshop with an educational dimension to inspire participants' engagement with nature and ecological learning and how they can translate this into their own environmental practice. The workshop in nature includes a social aspect in which participants share biodiversity stories and engage with a professional expert (e.g. horticulturalist). The aim is that participants will develop a greater connection to nature through immersive activities and improve their knowledge and agency to support biodiversity (including e.g. via practical gardening tips and opportunities to share their views and experiences).

3. Use context (within PLANET4B)

3.1. Relevant social aspects of biodiversity being addressed

In the UK, ethnic minorities communities encounter barriers leading to a disconnect from the natural environment. This has ramifications for reversing biodiversity decline, strategies aimed at raising awareness, individual and policy prioritisation of biodiversity and understanding and responses to biodiversity loss. The workshop in nature method sets out to explore how biodiversity is understood, perceived, engaged with, and offers participants practical tips and advice.

3.2. Relevant intersectional dimensions

The UK PLANET4B case study focuses on men and women living in the UK who identify as members of ethnic minority communities. In the UK, the term "ethnic minority" generally refers to racial and ethnic groups that are less represented in the population, thereby categorising diverse populations (Dacosta et al., 2021). Individuals from migration backgrounds have varied life histories and levels of affluence; people from ethnic minority backgrounds exist across all socioeconomic categories, sectors, and professions (Rishbeth et al., 2022). An intersectional approach will help us identify both the similarities and differences among participants, providing a nuanced understanding of how racialised communities experience nature and the outdoors.

3.3. Relative focus given to different levels of social change

Individual level change	*Community level change*	*Institutional level change*
High	Medium	Low

4. Roles

4.1. Participants

The workshop in nature method allows for the inclusion of an outdoor experience with an educational dimension in which participants can improve their knowledge and understanding of biodiversity and ecology. Within PLANET4B the method was used in connection with a garden of high biodiversity and aesthetic quality. Whilst the primary focus was on the garden/gardening, the workshop was also aimed at enhancing the participant's wider ecological consciousness. During the PLANET4B workshop in nature participants were invited to interact with nature, each other and a gardening expert. They were encouraged to share their thoughts and experiences, gain information and advice, and consider the biodiversity aspect from a gardening expert.

Whilst this method can accommodate a large group, managing the information and engaging with a practical activity is more effective with a smaller group, ideally consisting of no more than 20 participants.

4.2. Facilitators

The role of the facilitator is to:

- Identify an appropriate location for the activity.
- Identify an expert to deliver a guided tour of the space (e.g. in the case of the PLANET4B workshop held in a garden, the lead gardener).
- Ensure that material such as feedback forms or other project-related information needed for the session is prepared in advance.
- Encourage participants to consider topics/questions they would like to explore on an individual basis with the expert.
- Be part of the activity and not merely uninvolved bystanders.
- Support participants' engagement in the workshop.
- Facilitate a discussion about the activity and key learning.
- Capture feedback from the discussion.

5. Materials

- Access to a greenspace (ideally of high environmental quality)
- Expert professional (to act as site guide)
- Suitable attire (weather dependent)
- Information sheet
- Pen and note pads
- Refreshment

6. Instructions

6.1. Facilitator to organise an appropriate location and expert for the workshop. There will need to be space for group discussion and necessary amenities.

6.2. Facilitator to organise travel to the location.

6.3. Facilitator to ensure the location is suitable/accessible for participants.

6.4. Facilitator(s) play a role in guiding participants during the workshop, supporting their engagement with the activity.

6.5. Facilitator(s) encourage participants to share their biodiversity stories, their impressions of the green space, and to ask questions to the expert site guide.

6.6. Facilitators to capture feedback on the session – participants should be asked to complete a short feedback survey at the start and finish of the workshop and/or participate in a debriefing discussion at the end of the session.

7. Data collection and synthesis

The workshop in nature method is especially suited to capturing qualitative (field notes, participant feedback) and visual data (photography or video) of participants' engagement in the workshop.

A short questionnaire or group discussion can be used to capture feedback (beginning and end of the session) about the groups' expectations about the workshop and its impact on participants' understanding of biodiversity and actions they can take.

This information can be analysed thematically.

8. Checklist for implementation

- Prepare and review questions for group feedback.
- In collaboration with participants identify an appropriate location.
- Risk assessment of location and activity.
- Identify potential experts to lead educational input about biodiversity.
- Provide participant information and secure informed consent (ethics).
- Communicate travel arrangements.
- Organise refreshments.
- Check with venue access to amenities.

9. Critical considerations

9.1. Ethical considerations

Researchers should ensure that the methods used adhere to the principles of not causing harm there is a need for ethical consideration throughout use of this method:

- Ensure informed consent is obtained from all participants.
- People may want to remain anonymous, so the measures required to maintain anonymity must be considered, particularly if collecting visual data.
- Consideration should be given to environmental factors, such as weather and terrain, which may impact participants' engagement with the activity. It is important for the facilitators to be flexible in their approach to support inclusion.

10. Top tips

- Pre-planning is essential. Consult with participants prior to organising the activity. It is important to ensure the location in an appropriate and accessible location and suitable for conducting a feedback session. If equipment is required, it is important to check availability.
- Ensure that facilitator(s) are clear about their role and how they can support the activity and the expert.
- Provide participants with an outline of the day with timings.
- Ensure that participants are notified about wearing appropriate attire.
- Organise refreshments.

11. Measuring impact

This method can potentially impact the intrapersonal and interpersonal levels. It involves reflecting and making decisions about the information participants want to share with others, offering valuable individual experiential learning. The range of information shared and the opportunity to communicate directly with an expert, with each other and with facilitators offer further learning opportunities that can support understanding and facilitate change.

A further impact is the capacity for participants to build social connections in which they learn from and apply learning.

A questionnaire and/or group discussion at the start and end of the process can gather participant perceptions and actions to capture the impact. If possible, a follow-up conversation 3 months after the session will support capturing learning over time.

12. Links to external resources

References

DaCosta, C., Dixon-Smith, S. and Singh, G. (2021) *Beyond BAME: Rethinking the politics, construction,* application *and efficacy of ethnic categorization*, Coventry: Higher Education Research Action Group (HERAG).

Resource Links

Empowered in Nature – wellbeing and personal development

A Decade of Outdoors Experiential Workshops: Facilitator Reflections and Tips Judy A.K. Bornais, David M. Andrews, Alice L.E.V. Cassidy, W. Alan Wright, Marie-Jeanne Monette EJ1218719.pdf

1. Intervention method

X-Curve method for participatory workshops

Authors: Pedro Navarro-Gambín, Marta Bonetti

2. Summary of the method

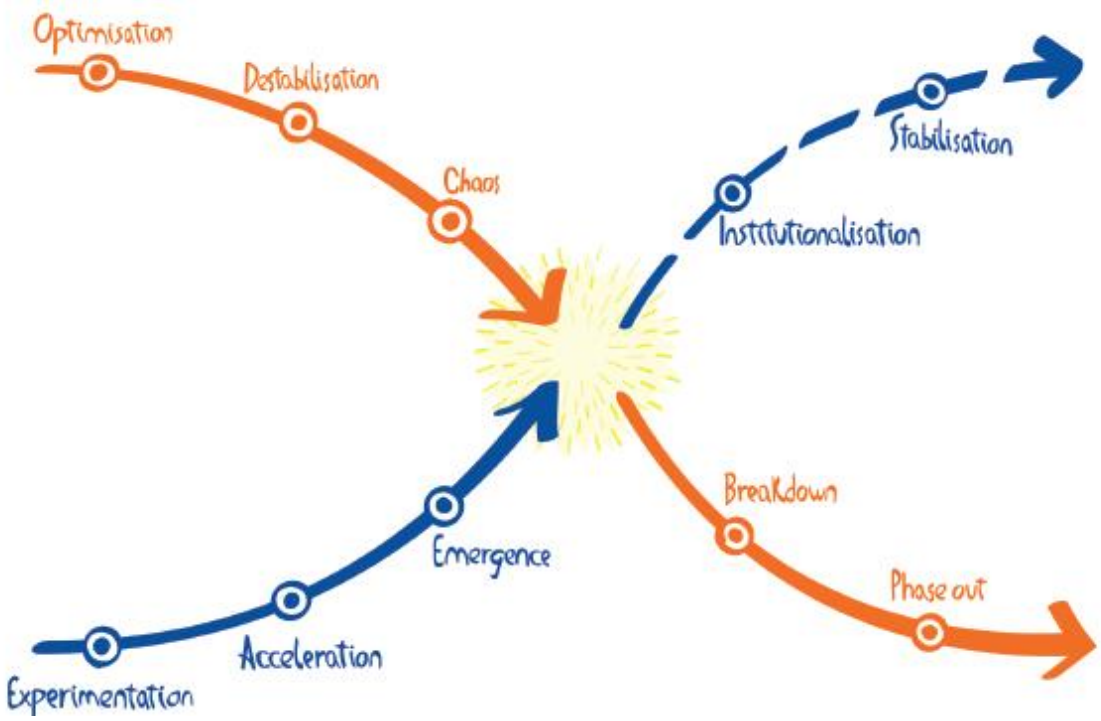

Figure 1. X Curve Graphic Depiction.

The X Curve workshop (Figure 1) is a sensemaking tool developed by the Dutch Research Institute for Transitions (DRIFT institute) to foster collective narratives on system change.[1] It is a visual device aimed at creating a richer understanding of transition dynamics within societal and/or specific contexts. Transitions are fundamental changes in the culture, structure, and practices of societal systems. Apart from helping workshop participants better understand systems, it is useful to set priorities (i.e. by developing shared visions and discussing common agendas), support decision-making (i.e. by jointly identifying interventions, strategies, resources, and instruments to foster change in different phases of the policy process) and manage learning and institutional change (i.e. by enabling transformative change while paying attention to learning processes and the reflexive capabilities of actors). The method is useful in multi-stakeholder settings (both online and in person) where systems change is explored. Moreover, although it can be used at any point of the project's development, it is encouraged to apply it in co-creation workshops or self-reflection exercises in early or intermediate project stages.

3. Use context (within PLANET4B)

3.1. Relevant social aspects of biodiversity being addressed

In the context of the PLANET4B project, X-Curve workshops explored the connection between Fashion and Biodiversity. The method was useful to create a common understanding and awareness of the impact of fast fashion on biodiversity. Through this

method participants connected their expertise and experiences in sustainable fashion with issues surrounding biodiversity (e.g. by highlighting connections between direct drivers of biodiversity loss with indirect societal dynamics). These workshops fostered a shared vision for future practices within the fashion industry and allowed participants to reflect upon actions and policies which are needed to arrive there. X-Curve could also be used to explore transition dynamics in a multi-stakeholder setting, addressing a lack of awareness about biodiversity loss and the actions needed to tackle it. This has the potential to increase social engagement with the problem of biodiversity loss, improve understandings of systems dynamics, and explore the barriers and enablers of change emerging from unfavourable institutional conditions.

3.2. Relevant Intersectional Dimensions

Intersectional dimensions are relevant to X-Curve in two main ways:

First, as with many other participatory methods, the co-creation and multi-stakeholder setting means historically marginalised actors are encouraged to engage in the workshop. Depending on the goal of the exercise, diverse embodied experiences of (e.g. human-nature relations or biodiversity impacts, can be sought to enrich the reflection about transition dynamics).

Second, the tool can be used to identify intersectional dynamics that might either jeopardise or foster transformative change. In the PLANET4B case, for example, highly educated Italians involved in the textile industry can be contrasted with the millions of historically disempowered, predominantly female workers in the textile and fashion industries of the Global South. The latter were identified as key agents of change. In this way, the X-Curve method served to encourage reflexivity and highlighted who was absent from the discussion. These reflections can help guide decisions on whether to include or exclude certain actors in future discussions.

3.3. Relative focus given to different levels of social change

Individual level change	*Community level change*	*Institutional level change*
Medium	High [but highly dependent on the context and the group involved in the workshop]	Medium [in settings where policymakers and other relevant institutional actors are present]

4. Roles

4.1. Project Managers / Researchers

In the PLANET4B project the case study leads (researchers) held two main responsibilities:

First, they defined the boundaries of the topic at stake and the expected objectives of the workshop. For example, the scope of the discussion might require the prioritisation of a specific type of system (e.g. energy systems, water systems, fashion systems) in a specific context (e.g. neighbourhood, city, region, country, etc.). Although the boundaries of the system can later be contested and re-defined, the better defined the boundaries are, the more insightful the workshop will be. Moreover, clear objectives will help with the application of the method and the analysis of its results (e.g. to define a future vision and future pathways, to identify transformative interventions).

Second, the case leads selected participants for the X-Curve workshops and set where they will meet (i.e. physical space, for how long, etc.).

4.2. Facilitators

The case leads/researchers can facilitate the workshops, but it is not mandatory. In the case of PLANET4B, researchers acted as facilitators. They were assigned three important roles:

First, in terms of content, the facilitators introduced the discussion topic and the method, explaining transition dynamics and the function of X-Curve. Moreover, they supported participants in better understanding the societal system under study.

Second, the facilitators focused on the workshop process, guiding participants through its different phases, triggering discussions when needed, and focusing on group dynamics (e.g. making sure that everyone can equally participate).

Third, the facilitators acted as reporters or storytellers, focusing on providing examples, encouraged insights, summarising previous points, and connecting arguments from different participants.

These three roles can be played by the same people, but it is encouraged to have separated roles, so the workshop develops smoothly.

4.3. Participants

Workshop participants play the most important role in the X-Curve, since the results of its application depend on the expertise and experiences they bring and the conversations and reflections they engage with. Participants are invited to actively engage in each of the phases of the workshop, write Post-it notes with their thoughts, explain them, and comment on the thoughts of other participants. They are also invited to ask clarification questions and suggest modifications during the wrap-up phase.

5. Materials

The materials depend on the type of workshop (i.e. in person or online, session 1 or 2). For an in-person workshop, facilitators should prepare:

- A printed X-Curve diagram with four quadrants corresponding to four types of transition dynamics (i.e. convert dominant practices, build up new practices, phase out unwanted practices, and scale up and institutionalise successful practices);
- Post-its, markers and pen, flipcharts.

For a digital workshop, facilitators should prepare:

- A digital canvass with the X-Curve with four quadrants corresponding to four types of transition dynamics (e.g. using online whiteboards);
- Clear instructions for participants regarding where and how to access this canvass.

For both formats, facilitators should also prepare:

- For session 1: Materials/Presentation to introduce the workshop and to show the narrative or vision for the selected cases, i.e. highly dependent on the topic and the objectives, it is possible to start by creating the vision or prepare it in advance (see Figure 2 for an example);
- For session 2: Infographics, posters or visualisations of results from session 1 (see Figure 3 for an example).

As an example from the PLANET4B fashion case, for the first session we prepared a presentation about the results of our preliminary research on fashion and biodiversity. In the second workshop, we used the vision from the first session to start the discussion.

For all sessions a participant information sheet and informed consent form should be provided.

Figure 2. Example of graphic material used in Session 1 of one of our X-Curve workshops.

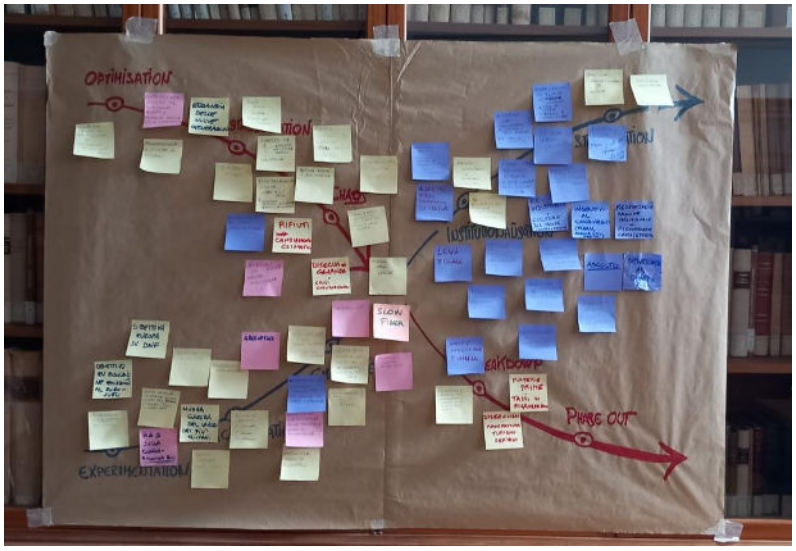

Figure 3. Printed X-Curve graphic covered with Post-its after Session 2 in one of our X-Curve workshops.

6. Instructions

A complete manual about the X-Curve preparation and application can be found in the booklet: *X – Curve: A sensemaking tool to foster collective narratives on system change*.

The X-Curve workshop is divided into two sessions. Each of the sessions has different phases. Holding the sessions on separate days is advised, although in the PLANET4B case we always held the sessions in the same day separated by a break, due to logistic and time constraints. The number of participants is flexible, but it is recommended to have a minimum

of 6 and a maximum of 10 participants. In you have more participants, divide them into groups. In our experience, 6-7 participants was ideal, as it allowed time for everyone to actively participate. Regarding the duration, we recommend a minimum of 2 hours for each of the sessions.

Preparation: welcome the participants, show the agenda for the session, explain the X-Curve and briefly introduce transition dynamics.

6.1. Session 1: Identifying transition dynamics.

6.1.1. Defining system boundaries [10-20 min]:

General advice: Choose a system demarcation in advance based on the target audience and participants. In case the boundaries are not clearly pre-determined, present them to the participants. Let participants discuss it and provide suggestions to better define the boundaries, if any.

Practical application: In PLANET4B, we predefined a 'fashion-biodiversity' system based on our analysis of direct and indirect drivers of biodiversity loss. We presented it (e.g. the key relationships between the fashion industry and biodiversity, a list of key drivers identified in the literature) and collected feedback from the participants, which helped us to better define system boundaries.

6.1.2. Discuss future visions [30 min]:

General advice: Participants are invited to discuss their desired visions and explore how different they are from current reality (i.e. is it radically different or an optimisation of the current system).

Practical application: In the case of PLANET4B, we used the vision identified in the first workshop held to spark discussions in future workshops with different actors. It is recommended that time horizons in the far future are defined. In our case, we set it in 2054, 30 years after the workshop was conducted. We used a vision infographic and Post-its to allow the participants to add ideas to the previously defined future vision.

6.1.3. Identify transition dynamics [40 min]:

General advice: Invite participants to identify and discuss the different activities and practices that can be currently observed in the system under analysis. Guiding questions drive the discussion, helping participants explore the patterns of transitions dynamics. Make sure the focus is on current practices and activities, not on future interventions. Key actors and available resources can be included in the discussion.

Practical implementation: Start by preparing the X Curve canvas and give some time (10 minutes) to participants to reflect and write Post-its with their ideas. Then ask them to place the Post-its along the X-Curve with the transition dynamic. In doing so, the participants should select a location for their Post-its in line with where they think the current practice/activity fits. Use guiding questions to facilitate the discussion/reflection. Examples of guiding questions from our workshops about the fashion system and biodiversity:

- Which new initiatives are emerging?
- Which actors promote change?
- Where and how do innovations become visible and accessible?
- Which ideas and practices are abandoned?
- Which structures of the fashion system are changing?
- What activities and practices will disappear/emerge in the future?

6.1.4. Reflect on transition dynamics [30 min]:

General advice: Focus on the emerged elements (e.g. the role of grassroots movements, changing consumption patterns, political mobilisation, technological changes, etc.) to make collective reflections. Group elements according to similarities and identify clusters that stand out. After that, wrap up the session, inform participants about the next steps, and prepare the knowledge management and data analysis.

Practical implementation: Example guiding questions from our workshops:

- What patterns do you see emerging?
- Did we expect these results?
- What are the areas more/less populated.
- What should be changed/eliminated/built/institutionalised?

Intermediate phase: knowledge management:

6.2. Session 2: Identifying interventions.

6.2.1. Recap session 1 [10 min]:

General advice: Use storytelling to summarise the main elements of the system boundaries, future visions, and transition dynamics that emerged in Session 1 (e.g. mention how the discussion started, what happened next, what were the most surprising outcomes, any disagreements, and where the discussion ended).

Practical implementation: You can use infographics, summary figures, etc.

6.2.2. Identify interventions [40 min]:

General advice: Establish a discussion about how to move forward into action. Each of the X-Curve quadrants represents an action perspective.

Practical implementation: Have participants reflect for 20 minutes about potential interventions and let them write Post-its that they can later place in the X-Curve quadrants. Use the future vision to reflect on the desirable future. Example questions from our workshops:

- What interventions come to your mind to accelerate transformative innovations?
- How can we scale-up or institutionalise emergent desirable practices?
- How can we gradually eliminate certain ideas and structures that are not desirable?
- What elements of the old system should remain?
- How do we manage those who will suffer losses from the transition?

6.2.3. Reflect on interventions:

General advice: Reflect on types of interventions that are more relevant and how they make sense within a broader portfolio. Reflect on potential synergies between the interventions and the current strengths of the system.

Practical implementation: Example guiding questions from our workshops:

- What interventions are short-term and which ones are long-term?
- Which interventions can you participate in?
- Will new knowledge and skills be necessary?
- Which funding/financial resources are necessary?
- What are the alignments with local, national, and international policies?

6.2.4. Main takeaways and follow-up' [30 min]:

General advice: Finish the session by having the participants reflect on the lessons learnt during the process. Take an action perspective and invite the participants to use the results to reflect on their own role in fostering transitions. This phase can also focus on prioritising interventions in terms of their feasibility or suitability.

Practical implications: A new canvass can be used to sort out the WHAT, WHO, WHERE, WHEN, and HOW elements of a prototyped intervention. A follow-up can include another in-depth co-creation session to move forward with those prototypes.

7. Data collection and synthesis

In terms of data analysis and synthesis, it is recommended to record the workshops or have notetakers to collect data, in addition to the physical outputs (e.g. Post-its, X-curve quadrants, etc.). The type of data emerging from the workshops are highly dependent on the goals of the exercise and the modifications in each phase (e.g. in the case of reflecting on prototyped interventions in the last phases of the exercise, specific data about a single intervention could be collected). In other cases, the data about interventions will be more general. In general terms, the data will be qualitative and textual, and it could be analysed in different ways (e.g. content analysis could contribute to the system map and future vision, narrative analysis could define transition pathways, etc.). The data synthesis could have several outputs:

- Session 1: system map (highly dependent on the system theory used in the project), shared vision, list of actors, resources, goals, clustered transition dynamics, and priority areas.
- Session 2: portfolio of interventions and intervention elements (e.g. knowledge and skills, funding, governance models, policy frameworks, etc.).
- Both sessions: transition pathways and strategies.

8. Checklist for implementation

- Be clear about what system you are interested in reflecting on and the objectives of the project/research before preparing the method. If you are not interested in analysing transition dynamics or reflect on change processes, this might not be the most adequate method.
- Select the participants according to the system identified and the project objectives (e.g. if the objective of the workshop is data collection, you might want to select relevant experts; if the objective is to foster reflection and learning, you might want to choose people who have a potential impact on the system).
- Make sure to allocate enough time and a proper space (in-person or online) for the workshop.
- Make sure you have all the materials (see section 'Materials') before starting.
- Make sure to have enough facilitators (i.e. at least three) whose tasks have been clearly defined before the workshops start.
- Make sure to record the workshop or have notetakers.
- Follow the instructions and be mindful of the time.
- Encourage participants to make written outputs and express clearly their ideas, ask for clarification if necessary.
- Make sure to clearly identify the elements discussed (i.e. transition dynamics, interventions), so that there is as little room as possible for the re-interpretation of the results afterwards.

9. Critical considerations

9.1. Ethical considerations

Obtain ethical approval and make sure that all participants are informed about the project details and objectives before inviting them to participate (e.g. by providing informed consent forms, project links, access to project publications, etc.). Depending on the objectives of the project, emphasise the participation of actors which have been historically marginalised within the system analysed. This might involve a high level of flexibility regarding the allocation of time and spaces for the workshop (e.g. adapting to participants' schedules, looking for easily accessible spaces) and the selection of facilitators (e.g. members of a specific community, translators, etc.). Since system transitions are a highly political topic which might have implications for the life quality of the participants, hot topics and emotional discussions are likely to emerge. In those cases, facilitators must make sure that the conversations remain respectful. At the end of the workshops, offer the possibility to share the workshop results with participants and to anonymise their names.

9.2. Power dynamics and relations

As with any other participatory co-creation method, the creation of a horizontal and healthy group dynamic is crucial to get the most out of the workshop. Unequal power relations in the conversation must be managed so that everyone has equal space to participate and express their ideas. This might imply asking some people to step back in case they are participating too actively and inviting some participants to explain their ideas when they have not talked much. All interventions must be listened to and accounted for in the data synthesis. Facilitators must step in to ensure that participants understand everything, that the objectives of the different phases are fulfilled, and to control the time of interventions.

10. Top tips

- Organise a rehearsal before the actual workshop to develop a good sense about the time needed for each phase and better define the guiding questions.
- Use Post-its of different colours for each of the phases/elements of the workshop (e.g. we used yellow for transition dynamics and blue for interventions).
- Dedicate more time in the discussion to the elements that the participants deem more relevant.
- Leave enough 'silent time' for the participants to reflect upon what has been discussed.
- Make sure to separate the discussion topics in each of the phases (e.g. it is very likely that the participants will start to talk about interventions in the 'transition dynamics' phase). Try to re-orientate the discussion and make them understand that there will be time for everything.
- Make sure to do the wrap-ups and dedicate time to the concluding sections so that the conclusion of the workshops is clear. This is especially necessary when robust outputs (e.g. well-defined transition pathways) are the expected output.
- Make sure that participants write down their most interesting insights they share. The more organised writing outputs, the better.
- The X-Curve method could also be used to include non-human perspectives in the picture.

11. Measuring impact

The potential impact of the X-Curve is highly dependent on its objectives. Where the main objective of the workshop is data collection (e.g. to co-create system maps and visions, as was the case of our first workshop), no intrapersonal, interpersonal, or institutional change would be easily measurable, at least in the short run.

If the purpose is to define strategies, interventions, transition pathways, etc. that could be used to inform the practices of specific communities or the policy process, the impact of the method could be measured at the interpersonal and institutional level.

At the interpersonal level, certain social norms or relations might have changed after the workshop. In our case, this could imply changing fashion purchasing habits or engaging in slow fashion behaviours. To capture impact, participants' perceptions and actions can be gathered through testimonies, interviews and questionnaires. This would require an understanding of how these norms and relations were before.

In cases where the results of the workshop are aimed at informing changes in business models or policies (i.e. formal institutional changes), these could be observed in the medium to long term. However, formal institutional changes are complex and depend on many factors, i.e. it would be difficult to assess whether the change was caused by the method.

If the objective is to foster collective reflection and learning about a specific process of change or transition, impact could be measured at the interpersonal and intrapersonal levels. The easiest way to do this would be to ask participants to complete a short survey before and after the workshop to check whether their level of awareness and knowledge about the system/topic/transition dynamic has changed. Otherwise, further behavioural changes could also be measured by gathering testimonies, interviews and questionnaires ex-post. Finally, another way would be to carry out a concluding debriefing session/phase focused on systematising the experience of the participants during the workshop, in which the collective learnings could be assessed.

12. Links to external resources

Dutch Research Institute for Transitions (DRIFT) website: https://drift.eur.nl/en/

X – Curve: A sensemaking tool to foster collective narratives on system change. https://drift.eur.nl/app/uploads/2023/08/X-Curve-booklet-DRIFT-EIT-Climate-KIC-2022-1.pdf

Endnote: [1] The development of the method and its description was based on the booklet X – Curve: A sensemaking tool to foster collective narratives on system change, included in the external links at the end of the document. We contribute with the specific insights from our own application to our case study 'Fashion and Biodiversity'