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Authors: Verina Ingram, Teresa Sarsana, Marina Benitez-Kanter (WU)

Reviewers: Verina Ingram (WU), Valerie Nelson (UoG), Thirze Hermans (WU)

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TC4BE Project Summary

Demand for agricultural commodities from EU agrofood systems is driving land use change in biodiversity-rich countries in the Global South, leading to major biodiversity losses. Globalisation processes have led to increases in EU imports of commodities such as soya and palm oil. EU trade has becoming increasingly ‘telecoupled’, i.e. characterised by distant, coupled human and natural systems via highly inequitable global value chains, which have extensive socioeconomic and environmental impacts.

Tackling the EU’s global biodiversity footprint is a top EU policy priority. Transformative change pathways are needed for safe and just transitions; but there are plural perspectives on what might constitute transformative change for food territories and systems, including telecoupled ones, and how to achieve it. New EU policies, such as Farm to Fork, may significantly re-shape agro-food trade between the EU and producer countries, with a range of potential implications for employment, livelihoods, but also equity, justice, and biodiversity. Much depends upon the purpose of the food system or territory, but there is contestation on potential food futures at different scales. There are increasing calls for systemic levers, but barriers to action are significant.

The Transformative Change for Biodiversity and Equity (TCforBE) project², (2022 – 2026), will support transdisciplinary research to co-generate transformative change pathways in the context of telecoupled agrofood systems. It will engage diverse stakeholders and explore plural perspectives within the EU and partner countries of Cameroon, Colombia and Kenya, including EU and national policymakers and Indigenous Peoples and local communities. The project aims to strengthen stakeholder capacity on transformative change pathways leading to enhanced biodiversity and equity outcomes.

Underpinned by multi-stakeholder social learning cycles and attention to plural values, the researchers will seek to co-generate and co-analyse transformative change pathways at different scales for highly telecoupled landscapes and to facilitate dialogues between landscape actors and national and EU scales. To inform these learning cycles and dialogues, researcher driven activities will enrich the landscape and national learning processes and contribute to an overall analysis of transformative change pathways in telecoupled contexts. Envisaged research and learning activities include:

- Conceptual work on transformative change and biodiversity and equity pathways in telecoupled food and agriculture contexts, and synthesis and analysis of findings.
- Exploration of plural perspectives on transformative change at EU, national and landscape scales through qualitative research.
- Social learning cycles at landscape scale: participant-driven learning to co-generate transformative change pathways for food systems and territories (creative learning activities) and to inform/reflect upon planned researcher-led activities (e.g. rural imaginaries research, Bayesian tool development, case studies of corporate and regenerative enterprises). Analysis and social learning on plural perspectives on transformative change at national scale and identification of land use change drivers (e.g. commodity impacts, at-risk biodiversity hotspots, and sustainable landscape initiative impacts).
- A global dialogue, facilitated by the Global Landscapes Forum, will link the transdisciplinary processes between the scales, supported by additional dissemination and communication activities.
- Generation of scenarios and modelling of EU agrofood systems transformations.
- Analysis of interconnected processes and levers including EU biodiversity governance, trade, legal, consumer, collective action and sustainable finance levers and social innovations



1. Background

1.1 TCforBE aims and objectives.

Demand for agricultural commodities from EU agrofood systems is driving land use change in biodiversity-rich countries in the Global South, leading to major biodiversity losses. Globalisation processes have led to increases in EU imports of commodities such as soya and palm oil. EU trade has becoming increasingly 'telecoupled', i.e. characterised by distant, coupled human and natural systems via highly inequitable global value chains, which have extensive socioeconomic and environmental impacts.

Tackling the EU's global biodiversity footprint is a top EU policy priority. Transformative change pathways are needed for safe and just transitions; but there are plural perspectives on what might constitute transformative change for food territories and systems, including telecoupled ones, and on how to achieve it. New EU policies, such as Farm to Fork, may significantly re-shape agro-food trade between the EU and producer countries, with a range of potential implications for employment, livelihoods, but also equity, justice, and biodiversity. Much depends upon the purpose of the food system or territory, but there is contestation on potential food futures at different scales. There are increasing calls for systemic levers, but barriers to action are significant.

The Transformative Change for Biodiversity and Equity (TCforBE) project², (2022 – 2026), will support **transdisciplinary research to co-generate transformative change pathways in the context of telecoupled agrofood systems**. It will engage diverse stakeholders and explore plural perspectives within the EU and partner countries of Cameroon, Colombia, and Kenya, including EU and national policymakers and Indigenous Peoples and local communities. The project aims to strengthen stakeholder capacity on transformative change pathways leading to enhanced biodiversity and equity outcomes.

The project aims to inform policy discourse, e.g. the EU's Green Deal implementation, and especially the Farm to Fork Strategy, which aims to reduce the environmental and climate footprint of the EU food system and its climate resilience, and specifically responds to expert scientific advice that highlights a particular need for more social science evidence on **how to achieve a sustainable food system**. The project will generate such evidence, as well as contributions from and to environmental science on biodiversity measurement and valuation.

The project will also engage national policymakers and seek to inform landscape stewardship strategies in study landscapes in Africa and Latin America.

TCforBE contributes to four HORIZON EUROPE specific outcomes: 1) Sustainable pathways, 2) human dimensions, 3) social norms, behaviours, values, and 4) inform/motivate transformational change. The project work packages (WPs) address all the outcomes in a cross-cutting way and are arranged according to *scale of interest* (e.g. EU and global, national producer countries, landscape levels).

There are seven **work packages** addressing the project's specific objectives (Box 1), each with associated results and deliverables:

- WP 1 will generate insights on EU policies and societal shifts under new green policies in relation to food systems and modelling of potential impacts on relevant biomes.



Box 1: TCforBE Specific Objectives

Objective 1: Deepen understanding and capacity of agrofood policymakers on transformative pathways for biodiversity and equity in EU telecoupled agrofood systems.

Objective 2: Identify, assess, and engage EU policymakers and stakeholders on demand-side consumer country governance arrangements for transformative change in telecoupled EU agrofood systems for positive biodiversity and equity outcomes.

Objective 3: Analyse and assess the potentials and limitations of existing biodiversity metrics, measurements, and finance levers (EU Action 68) and derive innovative financial instruments to achieve high biodiversity business transformations that are aggregable and scalable to impact and transform current mainstream finance logics (EU Actions 72 and 73).

Objective 4: Identify, co-analyse, and assess, with policymakers and stakeholders, national supply side producer country policies, scenarios and transformative change pathways for biodiversity and equity.

Objective 5: To co-generate transformative change pathways for sustainable and regenerative landscapes, with high biodiversity and equity outcomes, drawing on new evidence and tools on biodiversity imaginaries, commodity impacts, SLI effectiveness/impacts, and corporate/regenerative enterprise.

Objective 6: Synthesise evidence and build global, regional and landscape learning to foster transformative change on biodiversity and equity.

- WP 2 explores transformative governance arrangements and levers for change. This includes analysis of trade and legal levers, social movements and collective action, and biodiversity governance initiatives, as well as identifying the best ways to engage with EU and other scale learning and communications stakeholders.
- WP 3 will summarise the taxonomy and related regulations targeting and enabling Biodiversity measurement and develop sustainable finance pathways that are aggregable and scalable to impact and transform current mainstream finance logics.
- WP 4 – national scale engagement and research – identification of current visions of future relating to food and territories (Q methodology), followed by social processes and researcher led activities to co-frame and co-learn on transformative change pathways including generation of scenarios, geospatial mapping of commodity and policy impacts.
- WP 5 – landscape scale engagement and research - activities as in WP4, but the transformative change pathways will include generation of a Bayesian tool drawing on Q methodology and social learning, corporate/regen case studies, rural imaginaries (political ecology and ethnography).
- WP 6 will involve a conceptual framing, but also synthesis of findings and support for inter-landscape and global / EU dialogues on transformative change pathways.
- WP7 concerns management, dissemination and communication of the project.

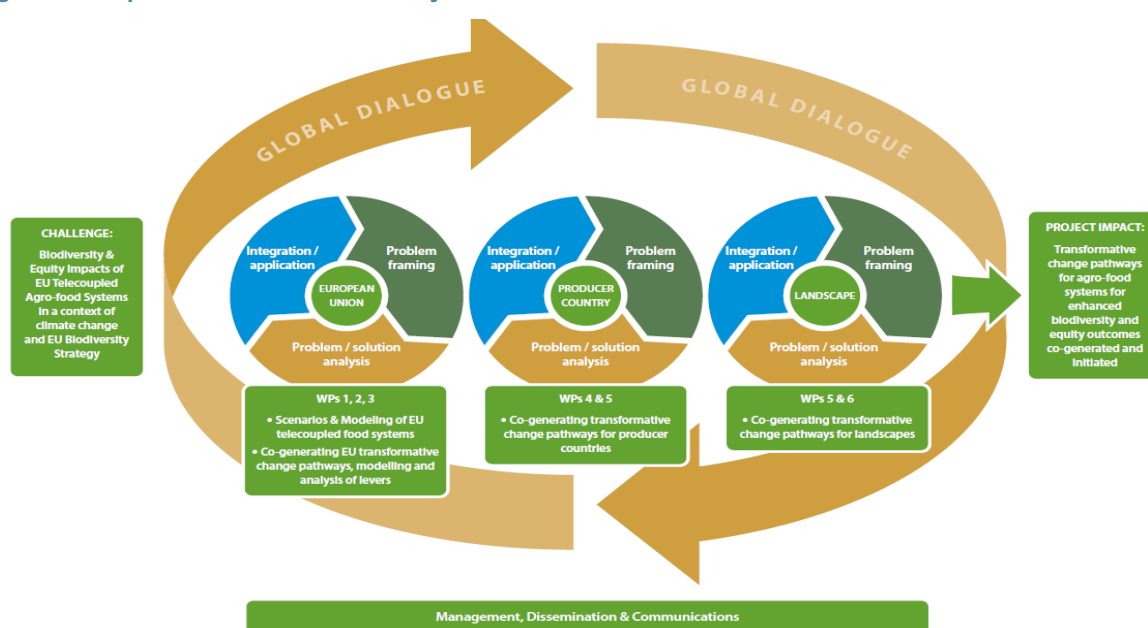
All work packages will engage with communications, WP7 has a particular focus on making the knowledge, tools and methods generated by the project available to global audiences through appropriate media, to inform policy dialogues and learning. The transformative change pathways for landscape approaches, will be shared with and disseminated to policymakers, researchers, and agro-food system stakeholders.

1.2 TCforBE overall approach.

The overall approach is underpinned by **multi-stakeholder social learning cycles** and ensuring attention is given to plural values. The researchers will seek to cogenerate and co-analyse transformative change pathways at different scales for highly telecoupled landscapes and to facilitate dialogues between landscape actors and national and EU level stakeholders.

To inform these learning cycles and dialogues, researcher driven activities will enrich the landscape and national level learning processes and contribute to an overall analysis of transformative change pathways in telecoupled contexts (Figure 1).

Figure 1 Components of the TCforBE Project



The envisaged research and learning activities include:

- Conceptual work on transformative change and biodiversity and equity pathways in telecoupled food and agriculture contexts, and synthesis and analysis of findings.
- Generation of scenarios and modelling of EU agrofood systems transformations. Understanding the potential implications of EU policy and societal transitions for low and middle income countries that link to the EU through telecoupling is vital as dietary shifts are already occurring and policy decisions are being made which may reduce or change EU country sourcing patterns.
- Exploration of plural perspectives on transformative change at EU, national and landscape scales through qualitative research.
- Analysis of interconnected processes and levers including EU biodiversity governance, trade, legal, consumer, collective action and sustainable finance levers and social innovations.)
- Analysis and social learning on plural perspectives on transformative change at national scale and identification of land use change drivers (e.g. commodity impacts, at-risk biodiversity hotspots, and sustainable landscape initiative impacts.)
- Social learning cycles at landscape scale: participant-driven learning to co-generate transformative change pathways for food systems and territories (creative learning activities) and to inform/reflect upon planned researcher-led activities.
- A global dialogue, facilitated by the Global Landscapes Forum, will link the transdisciplinary processes between the scales, supported by additional dissemination and communication activities.

Table 1 The Study Producer Countries and Landscapes

Country	Landscapes	Landscape characteristics
Cameroon	Dja-Tridom	<ul style="list-style-type: none"> • Emerging cocoa agrofood systems export timber and non-timber forest products (NTFP) trade, mining • Medium-high levels of telecoupling • Sustainability landscape initiatives (SLI) e.g. Dja Green cocoa landscape • Large areas of rapidly degrading high-biodiversity forests, increasing agriculture
Colombia	Eastern Plains Llanos Orientales Magdalena River Cauca River	<ul style="list-style-type: none"> • Agricultural expansion for palm oil, cattle ranching, and reforestation programs. • Megadiverse landscapes • 20% in conservation and 30% in communal lands but facing violence, illicit economies, and weak state presence. • Appropriation of public lands, encroachment into natural parks, local elites driving deforestation, displacement of smallholders
Kenya	Mau forest – Masai - Mara river basin	<ul style="list-style-type: none"> • Wetlands - expanding rice production and fish farming, and grasslands with grazing systems • High biodiversity forests, conservation areas • Tea-avocado-fruit-livestock-timber-NTFP-horticulture systems • Medium levels of telecoupling • Large areas of high biodiversity forest ecosystems & extensive agriculture • Regenerative change & SLIs: MaMaSe program
	Mt Kenya	<ul style="list-style-type: none"> • Grasslands (grazing systems) and tea-fruit-livestock-timber-horticulture systems • High biodiversity forests, conservation areas • Large areas high biodiversity forests, protected areas & extensive agriculture • Medium-high levels of telecoupling • SLIs: Mt Kenya Forest Landscape Restoration



2. TC4BE project transdisciplinary glossary

This glossary draws on a conceptual paper being developed to guide the TC4BE project and engage with academics on the main concepts of transformative change (Nelson, Ingram et al. 2024). It aims to give transdisciplinary and plural definitions perspectives on key terms used in the project.

The glossary is being developed and revised throughout the project. This version (Version 1) has been used for the first 18 months of the TC4BE project.

Biological diversity

The variability among living organisms from all sources including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part. This includes variation in genetic, phenotypic, phylogenetic, and functional attributes, as well as changes in abundance and distribution over time and space within and among species, biological communities and ecosystems. Source Ipbes glossary Diaz et al. 2015. "The IPBES Conceptual Framework – Connecting Nature and People." *Current Opinion in Environmental Sustainability* 14: 1–16. doi:10.1016/j.cosust.2014.11.002

Biobased economy

An economic activity involving the use of biotechnology and biomass in the production of goods, services, or energy. IPBES glossary.

Indigenous people & local communities (IPLC)

"Are the holders of unique languages, knowledge systems and beliefs and possess invaluable knowledge of practices for the sustainable management of natural resources based on their traditional values, visions, needs and priorities. Are inheritors and practitioners of unique cultures and ways of relating to people and the environments. Indigenous people have retained social, cultural, economic and political characteristics that are distinct from those of the dominant societies in which they live". Ipbes glossary

The term "Indigenous Peoples and local communities" and its acronym "IPLC" are widely used by international organizations and conventions to refer to individuals and groups who self-identify as indigenous or as members of distinct local communities. We adopt this terminology in this assessment, with particular emphasis on those who "maintain an inter-generational historical connection to place and nature through livelihoods, cultural identity, languages, worldviews, institutions, and ecological knowledge". Sustainable use assessment IPBES, 2020; Chapter

Circular economy

A model of production and consumption, which involves sharing, leasing, reusing, repairing, refurbishing, and recycling existing materials and products for as long as possible, thereby extending the life cycle of products. It implies minimizing waste. When a product reaches the end of its life, its materials are kept within the economy wherever possible.

Consumers

In the economic sense (not ecological) - embodies notion of individual citizens and businesses that consume agri-crops and products, in an (Keynesian) economic model that is driven by consumer spending, where spending on such products is seen as a percent of gross domestic product, and other major components of GDP (such as gross private domestic investment, government spending, and imports netted against exports).

Consumption

agrifood consumption embodies notion of supply and demand and consumption for human and non-human (generally animal) use. Embodies inequalities as whilst technologies have enabled increases in food crop productivity, malnutrition and food insecurity continue to affect the health and well-being of approximately 800 million people worldwide. Altieri and Rosset (1999) argued that world hunger is the result of an unequal decision-making in agriculture that for too long has been hijacked by company investors, who are motivated about making innovations for the lucrative opportunities of the agroindustry, rather than assisting to fulfil the needs of people's



foods. This linear trend in agriculture is the outcome of the industrial revolution philosophy predicating the idea that the world is only a repository of resources to be harvested and manipulated, with the sole goal of creating wealth. Within this framework, problems of poverty, global climate change, food insecurity, and economic development remain of little or no interest to the handful of agribusiness corporations, whose real motivation is to generate the highest profits all the times (Borsari et al. 2014a). https://link.springer.com/referenceworkentry/10.1007/978-3-319-95726-5_78

Convention on Biological Diversity

The Convention on Biological Diversity (CBD) is a multilateral treaty. The Convention has three main goals: the conservation of biological diversity (or biodiversity); the sustainable use of its components; and the fair and equitable sharing of benefits arising from genetic resources. Its objective is to develop national strategies for the conservation and sustainable use of biological diversity, and it is often seen as the key document regarding sustainable development.

Coxeur

Also known as intermediary, middleman or trader, usually an individual or sometimes a small enterprise, which operates in a commodity value chain generally buying direct from farmers at the farm gate and selling on to traders.

Customary lands

Lands, territories, and resources that are governed by indigenous peoples and local communities according to a system of 'customary' rules and norms.

Downstream

Downstream in a value chain refers to activities after processing and manufacturing, getting the finished goods to the end consumer(s).

Environmental human rights defenders

"Individuals and groups who, in their personal or professional capacity and in a peaceful manner, strive to protect and promote human rights relating to the environment, including water, air, land, flora and fauna". UN General Assembly (2016). A/71/281.

Family farm

"An agricultural holding which is managed and operated by a household and where farm labour is largely supplied by that household".

Equity

A comparative concept, which examines the distribution of benefits and costs among peoples (distributive equity) as well as the procedures (procedural equity) and pre-existing conditions (contextual equity) that limit or facilitate people's access to decision-making procedures, resources and, thereby, benefits. Adapted from McDermott and Mahanty (2013).

Equity comprises three interlinked dimensions: **Distributive** equity highlights the need to consider not just the allocation of benefits, but also of costs and risks. Decisions about distribution can be justified on the basis of equality, social welfare, merit or need. **Procedural equity** encompasses fairness in political processes and participation in decision-making. **Contextual equity** recognises the fact that the playing field is never level, but that people's capabilities and their access to resources and power determine the extent to which they are able to utilise procedural equity to determine the best distributive outcome for themselves. ipbes glossary <https://www.ipbes.net/glossary-tag/equity>

Food security

"All people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets people's dietary needs and food preferences for an active and healthy life."



Food systems

A sustainable food system is one that delivers food security and equitable nutrition without compromising the socioeconomic and environmental wellbeing of future generations. This means that it is profitable, has broad-based benefits for society, and a positive or neutral impact on the natural resource environment.

Future-making

comprises activities such as research on future visions and narratives, participatory and action-research exercises to elicit new visions and scenario building, modelling, foresight-type activities, as well as arts-based work such as speculative fiction, and more conventional scientific and economic scenarios and modelling.

Governance

Adaptive governance

Adaptive governance literature focuses on “procedurally rational policy, supported by intensive natural and social sciences” and on adapting to societal changes, in contrast experimental or transformative sustainability governance itself seeks to change Dilemmas/trade-offs or gears?

Biodiversity governance

(Pascual et al 2022) governance “has the capacity to respond to, manage, and trigger regime shifts in coupled social–ecological systems at multiple scales” (Chaffin et al. [2016](#)). governance needs to be integrated, adaptive, and equitable across natural and social systems in order to be truly transformative (Visseren-Hamakers et al. [2021](#)). not only should issues of social equity be at the core of transformative governance discourses, but, correspondingly, problems of justice and asymmetric power relations, corporate capture, or greenwashing need to be tackled in parallel (Teichmann et al. [2020](#), Kenner and Heede [2021](#), Supran and Oreskes [2021](#)), as vested interests by powerful actors can limit or derail attempts at sustainability transformations (Blythe et al. [2018](#), Pickering et al. [2021](#), Visseren-Hamakers et al. [2021](#)).

Landscape governance

“ ‘Landscape governance’ in telecoupled landscapes considers the translocal relations between landscapes where (ecosystem) products and services originate, and landscapes where these same products and services are consumed. It analyses the translocal nature of these products and services, and how these translocal relations are reflected in governance arrangements. This approach includes individual systems such as ecosystems, farms, urban areas, watersheds to look at larger regions where these different elements interact – see Figure 1. In the ‘telecoupling’ literature the described single system (which is telecoupled to another one) is often referred to as coupled human and natural systems (CHANS). A unique factor in CHANS approach is the consideration of the connection between the human and natural systems and spaces at multiple scales. This connection is similarly included in the landscape approach. “(Hermans, van Oosten et al. 2023)

“Landscape governance in the domain of geo-politics and political geography builds on the notion of environmental governance that refers to “the set of regulatory processes, mechanisms and organizations through which political actors influence environmental actions and outcomes; it includes the actions of the state and, in addition, encompasses actors such as communities, businesses, and NGOs” and includes spatial dimensions that (a) thematize the role of space, scale, and place in governance processes; (b) rescales statehood vocabulary in its analyses of the transformation of the nation state; and (c) links social (including governance) processes to their biophysical and material conditions. It incorporates multiscalar, global-local processes in the analysis of landscape formation; shows how politics and authority are (re)shifting among various administrative and spatial levels (eg globalisation and localisation); and it biophysical and material conditions to social analysis often using a social-ecological systems and actor-network theory lens. (Arts et al., 2017)” (Hermans, van Oosten et al. 2023)



Governance pathways

Multiple routes or pathways are seen as possible to sustainability transformations, in this context aiming for more biodiverse and equitable landscapes and value chains. Pathways refer to specific (existing and new) configurations of societal actors and governance institutions in landscapes, national and global level and value chains towards desired futures and changes. These configurations are networks where societal, non-state and state actors on multiple scales are considered together with different types of nature (e.g. agricultural lands, wild areas) and societal outcomes – such as equity. Different pathways are possible for the actors in these configurations, which points to the possibilities for national governments to (co)develop policy strategies and regulatory measures aimed at actors in these specific contexts, as well as traditional and customary institutions, market-based and corporate actors' interventions, to enable transformative change. Events, actions and processes can lead to changes in the level (on the same scale), or of changes in levels at other scales, termed scale dynamics in the pathways. Inspired by PBL [Exploring Nature-Positive Pathways \(pbl.nl\)](https://pbl.nl/en/explore/positive-pathways).

Human rights

Human rights protect human beings and their dignity in war and in peacetime. These rights are protected under international law, and it is the duty of states to ensure they are respected, protected and fulfilled. To this end, the United Nations has developed a body of binding conventions, all stemming from the 1948 Universal Declaration of Human Rights. There are three main types of human rights:

1. Civil and political rights, e.g. The right to life, peaceful assembly and religious freedom
2. Economic, social and cultural rights, e.g. The right to work, to education, and to social security
3. Rights of the third generation, e.g. The right to development and to a clean and healthy environment

Inequality

Inequality therefore refers to the phenomenon of unequal and/or unjust distribution of resources and opportunities among members of a given society. Sin Yee Koh, in [International Encyclopedia of Human Geography \(Second Edition\)](#), 2020

Justice

A term which describes, in absolutes, the distribution of goods and bads (distributive justice), fairness of political processes that allocate resources (procedural justice) and the context of the culture –the hegemonic beliefs, practices and institutions that guide actors – in question (contextual justice). Adapted from McDermott and Mahanty (2013).

Indigenous peoples

There is no single definition of indigenous peoples, because such a definition may not be workable in all contexts. However, Indigenous peoples have unique and distinctive cultures, languages, legal systems and histories, and most have a strong connection to the environment and their traditional lands and territories. They also often share experiences of discrimination and marginalisation. Self-identification is a key criterion for indigeneity. 4.

Kunming-Montreal Global Biodiversity Framework

The Kunming-Montreal Global Biodiversity Framework (GBF) is an outcome of the 2022 United Nations Biodiversity Conference. The GBF was adopted by the 15th Conference of Parties (COP15) to the Convention on Biological Diversity (CBD) on 19 December 2022. It has been promoted as a “Paris Agreement for Nature”. It is one of a handful of agreements under the

auspices of the CBD, and it is the most significant to date.



Leakage or spillover

defined as where unsustainable production activities are instead transferred from one region to another or from one type of producer to another (Henders & Ostvald 2014; Garrett et al., 2016; Gibbs et al., 2016; Alix-Garcia & Gibbs 2017). This displacement may be the result of increases in conservation restrictions in existing production regions (de Waroux et al., 2017; Garrett et al., 2017; Meyfroidt et al., 2013). Leakage can occur if the reduced impact of the value chain of one commodity (e.g. sugarcane) is cancelled out by increased impact of another (e.g. palm oil) (Larsen et al., 2008; Newton et al., 2013; Boström et al., 2015). Leakage also occurs when individual value chain sustainability initiatives are contaminated by laundering/whitewashing of deforestation via the introduction of unsustainable products into the system (Gibbs et al., 2016). For example, unsustainably produced products are mixed with sustainably produced ones in warehouses.

Leverage points

Leverage points are possible entry points to changing complex systems (Meadows et al, 1999). The deepest leverage points are paradigm- and values-shifts with the capacity to change an entire system. Shallower interventions focus on highly tangible leverage points that are easier to implement, but they lead solely to incremental change (Meadows et al, 1999). Deep leverage points can shift systems, but they are clearly harder to effect in practice (Abson et al, 2017; Riechers et al, 2021, Fischer et al, 2019). Dorninger et al (2020) foreground system goals, intent and rules, calling for greater attentiveness to worldviews in empirical studies, and deeper and multiple interventions across system characteristics. They identify inherent biases in scientific approaches towards certain kinds of system interventions and technological approaches which focus on mechanical system changes.

Levers

Points that can be employed to fundamentally transform systems –conceptualized as complex interactions and interdependencies between humans and non-human "parts" -towards sustainability. Leverage points vary in depth and thus transformative power; shallow points produce small changes in a system, whereas deep points can address the root causes of sustainability. (Adapted from Leventon et al., 2021).

Local communities

Non-indigenous traditional communities, including Afro-descendant communities and others who have collective customary systems of land tenure and social organisation. This term is commonly used in this sense in international law and policy

Market

A physical and regular gathering of people for the purchase and sale of provisions and other commodities as well as the area or arena (physical or digital) in which commercial trade and transactions are conducted.

Marketing

Marketing is about identifying and meeting human and social needs. Definition of marketing by the American Marketing Association: *The activity, set of institutions, and processes for creating, communicating, delivering and exchanging offerings that have value for customers, clients, partners and society at large.* Coping with these exchange processes calls for considerable amount of work and skill. Marketing management takes place when at least one party to a potential exchange thinks about the means of achieving desired responses from other parties. Marketing Management is the art and science of choosing target markets and getting, keeping and growing customers through creating, delivering and communicating superior customer value. Marketing is thus a societal process by which individuals and groups obtain what they need and want through creating, offering and freely exchanging products and services of value with others.

Multidisciplinary

Transdisciplinarity is often confused with *multidisciplinary research* and *interdisciplinary research* (Lawrence et al., 2022). *Multidisciplinary research* cooperation of researchers from different disciplines seeking to address the same problem using their disciplinary concepts,



methods and knowledge (Thomas, et al., 2018). “draws on knowledge from different disciplines but stays within their boundaries” (Choi & Pak, 2006, p. 351). *Interdisciplinary research* harmonizes links between disciplines into a coordinated coherent whole (Choi & Pak, 2006), disciplinary knowledges (concepts, methods and results) from different disciplines are integrated and one conceptual framework, methods, and results are developed (one common language) (Thomas, et al., 2018), and result in its own interdisciplinary concepts and methods and often much closer interaction than multidisciplinary research (Thomas, et al., 2018). Multidisciplinary and interdisciplinary research are often *explicitly or implicitly* mentioned in definitions of transdisciplinarity (Lawrence et al., 2022) where this is not a replacement for multidisciplinary or interdisciplinary research, but a supplement.

Pathways

“In the context of the IPBES global assessment, trajectories toward the achievement of goals and targets for biodiversity conservation and management of nature and nature’s contributions to people”. IPBES Sustainable use assessment Global assessment (1st work programme)

“In the context of the IPBES global assessment, trajectories toward the achievement of goals and targets for biodiversity conservation, the management of nature and nature’s contributions to people, and, more broadly, the UN 2030 Sustainable Development Goals” IPBES Values assessment DOI: 10.5281/zenodo.5657079

“Pathways” consist of descriptions of different strategies for moving from the current situation towards a desired future vision or set of specified targets. They are descriptions of purposive courses of actions that build on each other, from short-term to long-term actions into broader transformation. They are closely related to normative or policy or target-seeking scenarios”. IPBES Values assessment

Peasants

“A peasant is a man or woman of the land, who has a direct and special relationship with the land and nature through the production of food or other agricultural products. Peasants work the land themselves and rely above all on family labour and other small-scale forms of organizing labour. Peasants are traditionally embedded in their local communities, and they take care of local landscapes and of agro-ecological systems. The term peasant can apply to any person engaged in agriculture, cattle-raising, pastoralism, handicrafts related to agriculture or a similar occupation in a rural area. This includes indigenous people working on the land. The term peasant also applies to the landless.

Plurality

Plurality is central to transformative change approaches. plurality; more than bringing of diverse knowledges together to solve a complex puzzle, this means recognizing that certain worldviews have been suppressed and that some worldviews have greater affinity for values of solidarity and care, rather than market values (IPBES Values Assessment, 2022)

Scholars assume outputs of TDR include new theoretical perspectives and practical methodologies to solve a societal problem, but co-production process can fail due to insufficient attention to power (Turnhout et al., 2020; Chambers et al., 2022) because

- equality among participants is not self-evident, for example because elite actors have more resources and can shape the process to serve their interests or because scientific knowledge has a stronger authority in comparison to other knowledge systems.
- participatory processes often dominated by a depoliticized discourse that uses scientific arguments to evoke universalized ideas (Turnhout et al., 2020, p. 16).
- co-production processes can empower some actors over others because if subject to political and social pressures (Turnhout et al., 2020).

TDR, being a co-production process, is both a knowledge-making and a political practice, inevitably affected by power imbalances and political structures (Turnhout et al., 2020). Power imbalances and challenges emerging from political structures cannot be managed away (Turnhout et al., 2020). co-producing processes with multiple stakeholders will always require decisions that will influence power relations and political structures.



Producer

A term, often used interchangeably with the term farmer, for a person and their household who are cultivating and thus producing agri foods and commodities on an area of land (a farm or plot).

Telecoupling

“Telecoupling is based on the idea that most landscapes are directly or indirectly shaped by development trends in distant landscapes, influencing the flows of ecosystem goods and services across the globe (Hull and Liu, 2018). Telecoupling contrasts with more locally driven or territorial approaches which tend to underestimate the importance of such distant trends, and falsely assume that local stakeholders are in control (ibid.). There is a small but growing body of literature on telecoupling, emphasising that the costs and benefits of ecosystem goods and services are often spatially distant, in which nature-inclusive transitions in one place may be a driver of agricultural intensification and environmental deterioration in another, leading to new inequalities and interdependencies (Llopiz et al., 2019). Some telecoupling scholars focus on geo-spatial modelling and remote sensing as instruments to map and assess telecoupled processes (McCord et al., 2018). Other scholars examine how interactions between distant stakeholders under telecoupling can engage in a process of social learning, herewith becoming part of innovative biodiversity governance schemes (Martin-Lopez et al., 2019).” (Hermans et al 2022)

Transdisciplinarity

Trans- means beyond, over or across. Transdisciplinary research transcends disciplinary boundaries and uses knowledges and methods from various disciplines, similar to interdisciplinary research. TDR is a process in which disciplines are assembled and information is recombined (Choi and Pak (2006, p. 357). In this process, academics (and others) puzzle about new potential connections that can result in the emergence of new ideas, concepts, methods and empirical knowledge (Choi & Pak, 2006). different intensities identified of transdisciplinarity (Huutoniemi et al., 2010) Klein; repko and);

Different degrees of knowledge integration (in problem definition, conceptualization, methods, and results) (Huutoniemi et al 2010). Ramond et al & West article – validity of diff knowledges & voices & framings

Trans- also refers to a crossing of boundaries between science (and scientists) and society. In TDR the emergence of new ideas, methods and knowledge is rigorous from an academic perspective and is relevant to societal problems. This is because TDR involves academic and non-academic actors through a knowledge co-production process (Thomas et al., 2018). Thus, there is a process to integrate research and practice (Repko and Sot), which is often also referred to as knowledge coproduction or more specifically action research.

TDR has the “desire to actively apply knowledge to the betterment of man and society (Mahan, 1970, pp. 194-195)”, focuses on complex and societally relevant problems and aims to contribute to their solution and therefore is inherently future-oriented. Involves academic and non-academic actors through a knowledge co-production process that combines research and practice (Thomas et al., 2018). Thus, the co-produced knowledge is rigorous from an academic perspective and relevant to complex societal problems (Herrero et al., 2018).

Transformative change

A fundamental, system-wide reorganization across technological, economic, and social factors. A paradigm shift that establishes sustainability as the norm rather than the altruistic exception. (Adapted from Díaz et al., 2019)

IPBES Global Assessment defines transformative change as ‘a fundamental, system-wide reorganisation across technological, economic and social factors, including paradigms, goals and values. We build on this definition through reference to the depth, breadth and dynamics of system reorganisation. Depth refers to change that goes beyond addressing the symptoms of environmental change or their proximate drivers, such as new technologies, incentive systems or protected areas, to include changes to underlying drivers, including consumption preferences, beliefs, ideologies and social inequalities (IPBES, 2019; Patterson et al., 2017; Scoones et al., 2015). Breadth refers to change across multiple spheres, with emerging consensus that transformation requires co-evolutionary change across different spheres of society, including



personal, economic, political, institutional and technological ones (Harvey, 2010; O'Brien & Sygna, 2013; Pelling et al., 2015; Temper et al., 2018; Westley et al., 2011). Dynamics and processes refer to the emergent patterns of change across 'depths', 'breadths' and time that unfold as non-linear pathways. These may be characterised by 'punctuated equilibrium' in which more stable periods of incremental change are punctuated by bursts of change in which underlying structures are reorganised into new states (Patterson et al., 2017; Westley et al., 2011). IPBES glossary

Relational value

The values that contribute to desirable relationships, such as those among people and between people and nature, as in Living in harmony with nature. IPBES glossary

Social learning

The processes supporting social learning necessarily entail 'sustained interaction between stakeholders, on-going deliberation and the sharing of their knowledge in a trusting environment' (Cundill and Rodela 2012, p. 7). Likewise, Reed et al. (2010) considered that one of the essential outcomes of social learning is to foster changes in understanding that go beyond the individual and occur through social interactions. These conceptualizations of social learning therefore encompass multiple outcomes, from reaching common understanding (e.g. Schusler et al. 2003; Scholz et al. 2014; Vander Wal et al. 2014) to changing relations between stakeholders by, for example, building more trust to enable collective action (Cundill and Rodela 2012; De Kraker 2017)

Social learning can be defined as a process in which learning occurs *in a social context through interaction*. Drawing on insights from psychology about how people learn from observations of the behaviour of others in social interactions, multi-stakeholder social learning processes can be used to build trust and enable participants to better understand the perspectives and values of others.

Smallholders

Small farmers who rely principally on family labour, lack formal corporate management structures, and typically, grow a mixture of crops for home consumption and for markets.

Supply chain

The network of all the individuals, organizations, resources, activities and technology involved in the creation and sale of a product, from the delivery of source materials from the supplier to the manufacturer, through to its eventual delivery to the end user. The management and logistics of getting a product from A to B.

Sustainable Development Goals (SDGs)

The Sustainable Development Goals (SDGs) are a collection of seventeen interlinked objectives designed to serve as a "shared blueprint for peace and prosperity for people and the planet, now and into the future". The SDGs are: no poverty; zero hunger; good health and well-being; quality education; gender equality; clean water and sanitation; affordable and clean energy; decent work and economic growth; industry, innovation and infrastructure; reduced inequalities; sustainable cities and communities; responsible consumption and production; climate action; life below water; life on land; peace, justice, and strong institutions; and partnerships for the goals. The SDGs emphasize the interconnected environmental, social and economic aspects of sustainable development by putting sustainability at their centre.

Upstream

Upstream in a value chain refers to activities related to sourcing and transportation of raw materials needed in a manufacturing process.

Value chain

The processes, inputs, outputs and stakeholders involved in creating and adding value to a product, from the plant-based raw material, through processing and production, to delivery to final consumers and ultimately, its disposal.



3. References

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