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RESEARCH ARTICLE

Measuring agroecology: Introducing a methodological framework and a community of practice approach

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Over the last few years, a small but increasing number of researchers and organizations has been involved in tracking funding flows to agroecology, analyzing development assistance, climate finance, and research funds for their contribution to an agroecological transformation of food systems, including as part of the efforts to achieve the Sustainable Development Goals. This has led to the emergence of a community of practice (CoP) meeting and exchanging in a number of different forums—Financing Agroecology Civil Society CoP, the Agroecology Donor Group, and the Working Group on Financing and Investments of the Coalition for Food Systems Transformation Through Agroecology (Agroecology Coalition). In this article, we report on a process of collaboratively developing a methodological framework, using the High Level Panel of Experts of the Committee on World Food Security 13 principles of agroecology as foundation. This framework overcomes some limitations of previous methodologies for evaluating degrees of agroecological integration (including those using Gliessman's 5 levels of food system change) and facilitates a robust qualitative assessment of projects, programs, and project portfolios with respect to their "agroecologicalness." The framework conceives of agroecology as paradigm-shifting rather than as incremental improvements to existing food systems. It enables global comparability as well as local contextualization of each principle. While the need for this framework arose from the desire to monitor—and increase—financial support for an urgently needed transformation toward agroecology, the framework can equally contribute to the design of projects and programs, which aim to radically transform food and farming systems. It also has value as an educational tool, in specifying through statements of value and concrete examples, what agroecological work aims at. This article introduces our framework and argues for an expanded CoP approach to use it widely and share the results through the digital platform that will be developed for that purpose.

Keywords: Food systems, Transformation, Evaluation, Paradigm-shift, Multiple dimensions of agroecology

1. Introduction

Agroecology is increasingly recognized as an effective pathway toward food systems transformation, contributing significantly to addressing converging socioecological crises (International Assessment of Agricultural Knowledge, Science and Technology for Development, 2009; International Panel of Experts on Sustainable Food Systems [IPES-Food], 2016; Food and Agriculture Organization of the United Nations [FAO], 2018a; High Level Panel of Experts [HLPE], 2019; Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, 2019; Intergovernmental Panel on Climate Change [IPCC], 2019; Herren et al., 2020; Wanger et al., 2020; IPCC, 2022).

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However, funding for the development of agroecology in particular territories or associated research does not match this recognition. There have been increasing efforts to track finance flows to agroecology, in order to identify the amount of money that donor countries and other institutions make available for a transition to sustainable food systems, and in order to increase and leverage existing funds (DeLonge et al., 2016; Pimbert and Moeller, 2018; Achterberg and Quiroz, 2020; Biovision and IPES-Food, 2020; DanChurchAid, 2020; Moeller, 2020; Vermeylen and Schutter, 2020; Anderson and Bruil, 2021; Botreau et al., 2021; New Economics Foundation and Croatan Institute, 2021; Olivera and Popusoi, 2021; BothEnds, 2022; Global Alliance for the Future of Food [GAFF], 2022; Greenberg and Muchero, 2022).

As part of these studies, the methodological question arose as to what makes a project more or less agroecological, that is, under which conditions a funding stream can be said to be supporting agroecology. This is particularly important in the light of increasing attempts to water down the radically transformative[1] ambitions of agroecology by co-opting or ill-defining it.

Following Pimbert and Moeller (2018), most of the studies analyzing finance flows adopted a version of Gliessman's 5 levels of food system change (see Box 1) as a metric to guide assessment. However, it soon became obvious that the framework offered by Gliessman's 5 levels was not adapted for the requirements of assessing the "agroecologicalness" of particular projects and that a different approach was needed to do so. Illustrating the dynamic evolution of agroecological thinking—transitioning from the "field level" to the "territorial food system" as discussed by Pimbert et al. (2021)—more recent frameworks have used the principles and elements of agroecology for evaluation, reflecting a more nuanced and integrated, albeit analytically more complex approach.[2] In this article, we introduce a new framework for measuring the degree of agroecological integration in projects and project portfolios, which builds on and further develops existing approaches, and we describe its development. Most of the work has been carried out in the context of the Financing and Investment Working Group of the Agroecology Coalition.

In Section 2, we outline why, and to what ends, a new framework for assessing agroecology was needed. In Section 3, we present the practical background, the process, and actors that were involved in developing a new framework. In Section 4, we outline the conceptual framework that was developed and the way it works and can be used. We outline ways to get involved in the use of the framework in Section 5 and outline our community of practice (CoP) approach, before we conclude this article in Section 6 by summarizing the key distinguishing features of our framework, including but not limited to its contribution in terms of operationalizing agroecology principles in an evaluation framework that can also act as a pedagogical tool. Supplementary material accessible alongside this article presents the full assessment rubric of the framework, as well as a test case assessment to illustrate the functioning of our framework "in action."

2. In search of a framework

Box 1. Gliessman's 5 levels of food system change

LEVEL 1: Increasing the efficiency of industrial and conventional practices in order to reduce the use and consumption of costly, scarce, or environmentally damaging inputs (resulting in, e.g., reduced use of off-farm inputs, such as fertilizers, pesticides, water, and energy; reduced waste; improved yields).

LEVEL 2: Substituting alternative practices for industrial/conventional inputs and practices (e.g., replacing synthetic fertilizers with compost; using alternative pest control; organic farming systems).

LEVEL 3: Redesigning the agroecosystem, so that it functions on the basis of a new set of ecological processes (e.g., complex crop rotations and polycultures, integration of production systems into surrounding ecosystems, landscape-based approaches, ecosystem-based adaptation, diversity-oriented interventions).

LEVEL 4: Re-establishing a more direct connection between those who grow our food and those who consume it (e.g., short food chains and webs, Community Supported Agriculture [CSA] schemes, relocalization of food systems and markets within the same territories).

LEVEL 5: Building a new global food system, based on equity, participation, democracy, and justice, which is not only sustainable but helps restore and protect earth's life support systems.

Each level builds on and incorporates the preceding levels. The first 3 levels concern the farm system (already mentioned in Gliessman, 1998), whereas Levels 4 and 5 concern the wider societal dimension and overarching food system (added to the framework in Gliessman, 2015).

When applied as a metric to guide the assessment of projects and portfolios, the Gliessman framework has considerable shortcomings. It needs to be stated upfront that, of course, Gliessman never intended his 5 levels to guide agroecology assessments, but rather to guide the conversion toward ecological management (Gliessman, 2016). However, even though this was not the author's intention, Gliessman's levels can be taken to suggest a stepwise transition process based on a common starting point of external input intensive, monoculture, industrial, or conventional agroecosystems, which does not reflect the reality for many smallholder farmers in the Global South.

Moreover, Gliessman's levels 1–3 represent progressions within what we can understand as the agronomic or environmental dimension of agroecology, with

1. The word "transformative" is used in this article to denote an actual capacity for change, while "transformational" is understood as the process that intends change but may or may not result in it.

2. See, for example, FAO's Tool for Agroecological Performance Evaluation, available at https://www.fao.org/agroecology/tools-tape/en/ and the 3 versions of Biovision's Agroecology Criteria Tool (ACT, Business ACT and Farm-level ACT), available at https://www.agroecology-pool.org/methodology/.

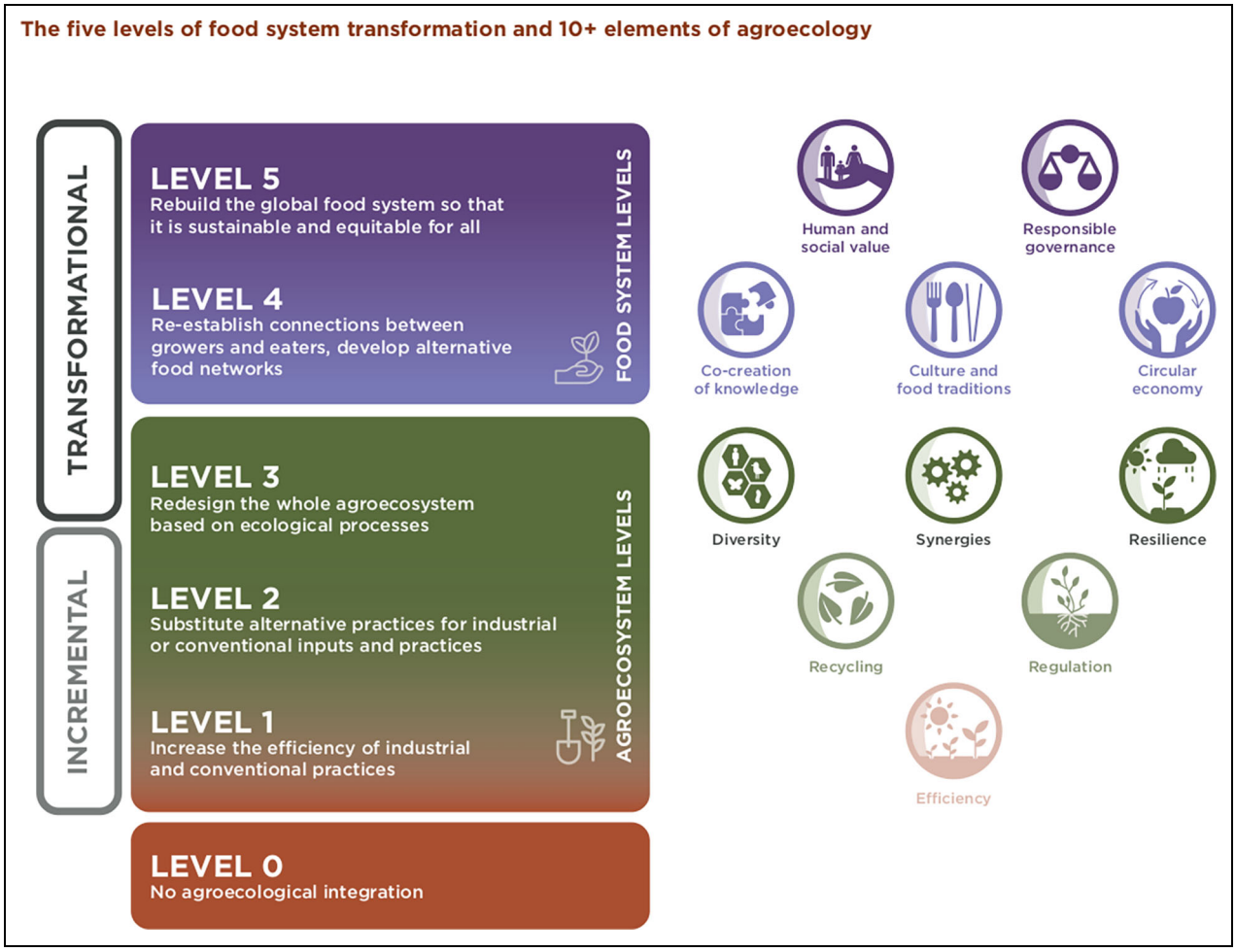

Figure 1. Agroecology criteria tool conceptual map. This figure visualizes a version of how the 10+ elements of agroecology developed by Food and Agriculture Organization of the United Nations (FAO) have been mapped onto Gliessman's 5 levels of food system change. This mapping with the additional progression from "incremental" to "transformational" as we move through the levels risks suggesting a stepwise movement from level 1 to level 5 and a linear progression through the FAO elements. The figure is taken from Biovision and IPES-Food (2020, p. 73).

associated changes applied at the field and farm level only. Only Levels 4 and 5, understood as further progressions toward sustainable food systems, concern the social/economic/political dimension. However, in reality, an agroecological transition is likely to unfold in multiple dimensions at once with parallel processes at work simultaneously. While Gliessman recognizes this complexity in his broader opus, the use of Gliessman's levels for agroecology assessment purposes, without additional caveats and explanations, risks reducing this complex reality to a linear process, thereby potentially limiting the scope of transformative agroecology.

The levels were developed as a heuristic framework to open conversations about transformation of food systems (Gliessman, 2014, 2016). However, once used as a methodological tool for assessment, its shortcomings needed addressing and different studies had to find new and additional categories to be able to deal with the materials under investigation. For example, the report "Money Flows" (Biovision and IPES-Food, 2020) makes use of the idea of "social enablers" to categorize projects, which address the social dimensions of food systems, yet do not address the environmental dimension or work at the field or farm level. Similarly, a study on EU and Green Climate Fund finance flows (Moeller, 2020) uses additional categories, such as "governance institutions," when projects support the development of specific governance mechanisms without any activities at the field or farm level.

Conceptually, this remains unsatisfactory, as the "real world" of projects and programs has to be made to fit a theoretical framework that is not adapted for the purpose. Moreover, while mapping the FAO's 10 elements of agroecology onto the Gliessman levels (as in, e.g., the Agroecology Criteria Tool, which was used by some of the finance flow studies, see **Figure 1**) has great advantages for communication and awareness raising purposes, it also risks misconstruing the elements as steps in a progression toward an agroecological food system. This would be a misrepresentation, as the elements are intended to be understood as an integrated and nonhierarchical or sequential whole (Barrios et al., 2020; FAO, 2023).

In parallel to these studies on finance flows, the Tool for Agroecology Performance Evaluation (TAPE) was being developed and tested by the FAO and partners. TAPE has

Table 1. The 13 agroecology principles consolidated by the High Level Panel of Experts (HLPE)

HLPE Principle	HLPE Description
1. Recycling	Preferentially use local renewable resources and close as far as possible resource cycles of nutrients and biomass
2. Input reduction	Reduce or eliminate dependency on purchased inputs and increase self-sufficiency
3. Soil health	Secure and enhance soil health and functioning for improved plant growth, particularly by managing organic matter and enhancing soil biological activity
4. Animal health	Ensure animal health and welfare
5. Biodiversity	Maintain and enhance diversity of species, functional diversity, and genetic resources and thereby maintain overall agroecosystem biodiversity in time and space at field, farm, and landscape scales
6. Synergy	Enhance positive ecological interaction, synergy, integration, and complementarity among the elements of agroecosystems (animals, crops, trees, soil, and water)
7. Economic diversification	Diversify on-farm incomes by ensuring that small-scale farmers have greater financial independence and value addition opportunities while enabling them to respond to demand from consumers
8. Co-creation of knowledge	Enhance co-creation and horizontal sharing of knowledge including local and scientific innovation, especially through farmer-to-farmer exchange
9. Social values and diets	Build food systems based on the culture, identity, tradition, social, and gender equity of local communities that provide healthy, diversified, seasonally, and culturally appropriate diets
10. Fairness	Support dignified and robust livelihoods for all actors engaged in food systems, especially small-scale food producers, based on fair trade, fair employment, and fair treatment of intellectual property rights
11. Connectivity	Ensure proximity and confidence between producers and consumers through promotion of fair and short distribution networks and by re-embedding food systems into local economies
12. Land and natural resource governance	Strengthen institutional arrangements to improve, including the recognition and support of family farmers, smallholders, and peasant food producers as sustainable managers of natural and genetic resources
13. Participation	Encourage social organization and greater participation in decision-making by food producers and consumers to support decentralized governance and local adaptive management of agricultural and food systems

been designed for a participatory, on-the-ground evaluation of agroecological performance and does not lend itself very well to the analysis of project portfolios, especially with a high number of projects and when limited information is available on each of the projects.

Given the caveats and limitations of the existing tools and frameworks, there has not been, until recently, an ideal framework for the important methodological step of measuring the degree of agroecological integration in project portfolios in a pragmatic and yet holistic manner.

3. Developing a framework

Conversations about the need for a methodological framework arose in different fora as a CoP formed around the aforementioned studies. This emerging CoP had the aim to promote agroecology, divestment from industrial agriculture, and a rethinking of funding modalities in support of food systems transformation. Within this community, consensus grew that an appropriate methodological framework would need to be:

- conceptually rigorous (based on an understanding of a spectrum of approaches to food system transformation that would be more or less strongly transformative in different aspects or dimensions of food systems);
- adaptable to different (ecological, social, and economic) contexts;
- useful for the analysis of relatively large project portfolios with often only superficial documentation (i.e., not a deep dive into single projects about which detailed information is available);
- user-friendly; and
- aligned with a conception of agroecology as based on the 13 principles identified by the HLPE on Food Security and Nutrition in their report to the Committee on World Food Security.

The desire to build a framework on the 13 principles consolidated by the HLPE (see **Table 1**) rather than the 10 FAO elements is grounded in the greater nuance the principles provide. As expressed by the HLPE (2019), the 13 principles of agroecology, which were consolidated from the existing literature by the HLPE in an iterative process, are clearly aligned with the 10 FAO elements. Yet, the 13 consolidated principles are slightly more differentiated and "articulated as actionable statements containing normative . . . and causative . . . aspects" (Wezel et al.,

2020). As such, they have come to be preferred by researchers internationally. Nonetheless, recognizing the alignment with the FAO 10 elements is important, as the latter are so far the only internationally agreed language on the proposed features of agroecology.

Having said that, it is of course also important to recognize that HLPE principles could still be improved upon—for example, water is not given the importance it deserves among the principles and it might make more sense to separate social values from diets rather than combine these in a single principle. However, for the purposes of an assessment framework that needs to have sufficient international weight and buy-in, it was agreed that the set of principles needed to be used without any modification.

In June 2022, a 3-day workshop was hosted by the German Federal Ministry for Economic Cooperation and Development (BMZ) to share experiences and develop a common approach to continue finance analyses in ways that would make the different studies as consistent with one another as possible to create a basis for comparability. At this workshop, 3 key groups came together: The Civil Society Community of Practice on Financing Agroecology, The Financing Agroecology Donor Group, and the Working Group on Financing and Investments of the Agroecology Coalition. Participants included representatives of civil society organizations, farmers organizations, international institutions (FAO, United Nations Environment Programme [UNEP], and International Fund for Agricultural Development [IFAD]), as well as researchers and technical cooperation officials.[3] On the first day, we shared experiences, compared needs, and it was decided to further develop a proposal for an assessment framework that had been put together by researchers at the *Centre for Agroecology, Water and Resilience* (CAWR), in conversation with program officers at the social justice umbrella organization *Cooperation Internationale pour le Développement et la Solidarité* (CIDSE).[4] Effective and productive, the following 2 days were spent adapting and refining the proposal and have resulted in the framework presented here.

Among other, the following decisions were made as a frame for the framework:

1. The framework will be based on the 13 principles defined by the HLPE, while recognizing their alignment with the FAO 10 elements.
2. The framework will be translated into an online tool, with an offline (spread sheet-based) version for individual use. An accompanying "user guide" and video tutorial will be developed. The online tool will focus on collating data from different finance flow and portfolio analysis exercises, hosted by the agroecology coalition or another organization.
3. TAPE remains the tool of choice for participatory, farm- or territorial-level assessments of performance; our new framework is particularly well adapted for portfolio analysis. Performance and impact assessment is out of its scope. TAPE can be used alongside our new framework to assess performance on the ground. The 2 tools are meant to complement each other, and together, they can provide evidence on the positive impact of agroecological transformations for sustainability imperatives.[5]
4. Evaluative ratings under each principle (on a 0–2 spectrum, see Section 4) are based on a qualitative assessment by the user and should take into account specificity of context, location, scale, and other particularities.
5. Qualitative assessment will be based on the information that is available (such as project documents). In this context, it is crucial to understand that robust qualitative assessments are not subjective—they have strong justifications and are clear about the reasons for their conclusion.
6. All 13 principles are important, which means that for the calculation of the final score of a project, all principles will be equally weighted.

In the months since the Berlin workshop, based on the approach developed by the participants, a spreadsheet operationalizing the framework was developed by one of the authors (Stephanie Piers de Raveschoot) to provide a preliminary "tool," which can be easily used and tested. The spreadsheet has then been tested through test assessments of existing projects by 13 organizations. Feedback has been collected and based on this, an online prototype has been developed by Statistics for Sustainable Development for finalization on an open-source platform. At the time of writing, this online prototype has been tested by 11 organizations (the majority of which also was involved in testing the original spreadsheet).

3. Participants comprised: Alexander Lingenthal (BMZ), Ameen Minhaj Murtaza (Agroecology Fund), Anne Maina (African Biodiversity Network), Carlos Barahona (Stats4Development), Caroline Broudic (EC), Emile Frison (International Panel of Experts on Sustainable Food Systems), Esther Penunia (Asian Farmers Association), Fabio Leippert (Biovision Foundation), François Delvaux (*Cooperation Internationale pour le Développement et la Solidarité* [CIDSE]), Gisele Henriques (*Voluntary Service Overseas*), Ingrid Prem (*Deutsche Gesellschaft für Internationale Zusammenarbeit* [GIZ]), Matthias Geck (Biovision Foundation), Nina Moeller (*Centre for Agroecology, Water and Resilience* [CAWR]), Octavio Sotomayor (*Economic Commission for Latin America and the Caribbean*), Stéphanie Piers de Raveschoot (SDC), Rémi Cluset (FAO), Rikke Olivera (IFAD), Siham Drissi (UNEP), and Vincent Dauby (CIDSE).

4. Inspired by Table 3 in the High Level Panel of Experts' (HLPE) agroecology report (2019, p. 61) on a spectrum of approaches to sustainable food systems, the CAWR-CIDSE proposal expressed value statements for 2 poles of a spectrum—between business as usual and transformative agroecology—under each HLPE principle. It grouped principles into 4 dimensions: environmental, sociocultural, economic, and political in order to highlight the multidimensional nature of agroecology.

5. It needs to be noted that, as concluded at the TAPE Validation workshop on May 2 and 3, 2023, TAPE as a methodology is still being validated and requires further adjustments, reformulations, and contextualization.

Principle	AE Score	Spectrum of values	Tags / Criteria / Indicators / Examples for high score
Recycling	2	Relies on natural processes and has mostly closed resource cycles (nutrients, water, biomass, ...) using predominantly local renewable resources, and/or encourages circular economy, especially in waste management	• Closing nutrient cycles through biomass recycling - at farm or landscape level depending on context (e.g. produce and use own compost, manure incl humanure, biofertiliser) • Wastewater (greywater) & waste recycling • rainwater harvesting • Reusable or recyclable packaging
	1	PARTIALLY	
	0	Makes no effort to close resource cycles or contribute to circular economy, and introduces non-recyclable materials	
	n/a	Project cannot address any dimension of recycling	

Figure 2. Excerpt of the agroecology assessment framework in table format. This figure illustrates the agroecology assessment framework by displaying the rubric for the principle "recycling." The "spectrum of values" expresses value statements at the 2 poles of the spectrum—from 0 or "business as usual" approaches to 2 or "transformative agroecology" approaches. As the principle "recycling" can be nonapplicable, the rubric also gives a short indication of that this would entail that the project under assessment cannot address any dimension of recycling. Moreover, the rubric lists a number of "tags/criteria/indicators/examples" that could hold when a high score is given. This list is not comprehensive as we cannot claim to represent the full diversity of possible contexts in which agroecological transformation takes place. However, the list serves as an illustration and guide for the user during assessment.

4. Introducing the framework

To clarify, the framework exists to evaluate individual projects, or entire portfolios of projects, for their degree of agroecological integration or, we might say, their "agroecologicalness." **Figure 2** shows its basic structure through the example of the HLPE principle of recycling. The entire framework rubric is presented in the Supplementary Material to this article. The framework's key aspects are introduced in turn.

4.1. Red flags

The framework introduces a set of "red flags" against which projects will initially be screened (**Table 2**). Red flags specify practices that run counter to agroecological values. Any project raising a red flag will automatically be ranked as zero across all principles and hence does not need to be rated for individual principles, saving time when project portfolios are large. Projects with any "red flags" (one example: promotion of GMOs) do not qualify as agroecological no matter how the rest of their work looks like. Projects that do not raise any red flags will then enter the full assessment.

Red flags exist to make assessment easier, but also in order to counter the cooptation and watering down of agroecology by organizations aligned with the interests of big agribusiness.

4.2. 0-2 spectrum

Projects are assessed on each of the 13 HLPE principles, on a scale between 0 and 2, where 2 is an aspirational expression of a strong transformative approach, 1 represents partial alignment, and 0 represents no alignment (or business as usual). Decimals can be used if individual users need to express further gradations.

4.3. Spectrum statements per principle

Each of the 13 HLPE principles is expressed in 2 "value statements," representing the 2 poles (0 and 2) of the spectrum. These statements exist to guide the judgement of the user and facilitate assessment.

4.4. Nonapplicable and always-applicable principles

Some principles can be out of the scope of individual projects (e.g., a project focused on grain production may not address animal health), and the framework indicates when that might be the case. Principles can thus be rated as nonapplicable (N/A). This mechanism is included to avoid that projects with a narrow focus, but with an important contribution to agroecological transitions, are excluded from the assessment or rated negatively. However, 4 principles are always applicable and cannot be rated N/A. These are co-creation of knowledge, social values and diets, fairness, and participation. These must always be rated and would be rated 0 if the project in question does not address these. This ensures that the project overall score is reduced for projects, which do not address these important agroecological principles.

4.5. Dynamic list of examples/indicators/ tags/criteria

For each principle, criteria for or examples of good or transformative practice are listed. Developed by a working group at the Berlin workshop and in subsequent weeks, these are meant to be informative and support users in the rating of the principles, but importantly will not automatically determine the rating. These examples give an indication of the kind of practices or approaches that would support a decision for a high rating. The list of criteria is dynamic and can evolve: New examples can be added over time, for example,

Table 2. Red flags of the agroecology assessment framework

Red Flag	Definition and Justification
Genetically Modified Organisms (GMOs)	*Project introduces GMOs and associated genome-editing technologies* GMOs are generally considered incompatible with the principles of agroecology, both from agronomic and social perspectives (Altieri, 2005). One of the key concerns is that GMOs often rely on monocultures, leading to a reduction in biodiversity within production systems. Additionally, many GMOs are engineered with herbicide resistance genes, which necessitates the use of herbicides associated with environmental toxicity and soil fertility reduction (Tsatsakis et al., 2017). Furthermore, GMO varieties are primarily commercialized by a few large multinational companies that dominate the market. These varieties are protected by intellectual property rights, resulting in increased costs for farmers and creating harmful dependencies on agro-industries, particularly impacting smallholder farmers. Notably, the development of GMOs typically excludes the participation and involvement of farmers in the decision-making processes.
Synthetics	*Project focuses on the promotion of synthetic fertilizers and pesticides* The production and utilization of synthetic fertilizers and pesticides have profound adverse effects across multiple dimensions. These effects include the collapse of biodiversity (Alliot et al., 2022; Rigal et al., 2023), pollution of air, water, and soil (Carvalho et al., 2017; Benton et al., 2021; Pathak et al., 2022), impacts on human health (Curl et al., 2020; Inserm, 2021), and the escalation of greenhouse gas emissions (Tripathi et al., 2020).
Monoculture	*Project focuses exclusively on promoting extensive single cash crop production at the expense of diversified strategies* Monoculture, monocropping, and industrial-scale feedlots lead to uniformity at the heart of agricultural systems. This uniformity is associated with a dependency on synthetic fertilizers, pesticides, and preventive use of antibiotics, which has negative outcomes for the sustainability of food systems (IPES Food, 2016). Genetic uniformity in agricultural systems has systematically generated vulnerability to epidemics and other biotic and abiotic stresses (Scarascia-Mugnozza and Perrino, 2002). Monocultures and highly mechanized practices are directly linked to land degradation (Shannon et al., 2015). Large-scale monocultures also entail widespread contamination of soil and water through runoff and erosion (Boardman et al., 2003). They also lead to wild biodiversity reduction (Gallai et al., 2009), economic and health vulnerability of farm workers, food insecurity, and cultural erosion (Owens et al., 2010; Bacon et al. 2012; Ye et al., 2013; Gliessman, 2014).
Productivity	*Project focuses exclusively on productivity resulting in avoidable destruction of vital ecosystems and their functions and services* The prioritization of productivity at the expense of ecosystem integrity is considered an exclusionary criterion for agroecological projects, as it contradicts the integrated nature of agroecology as defined by the Food and Agriculture Organization of the United Nations (FAO, 2018b) and the HLPE (2019). The FAO underscores agroecology as a holistic approach that concurrently addresses agronomic, ecological, social, and economic aspects to enhance the sustainability and equity of food systems. The HLPE distinguishes agroecology from other approaches by emphasizing its focus on sociocultural, environmental, and governance dimensions while ensuring productivity is not compromised rather than solely emphasizing productivity enhancement.
Seed systems	*Project actively promotes regulations and/or actions that hamper and/or destroy local and farmer-managed seed systems* Seeds, in addition to soil, water, and sunlight, form the foundation of agriculture. Throughout history, farmers have been actively involved in the selection, preservation, storage, sharing, and planting of seeds, which has significantly contributed to agricultural biodiversity (Moeller, 2021). The right of farmers to engage in these practices is recognized and protected under Article 19 of the Declaration on the Rights of Peasants and Other People Working in Rural Areas, endorsed by the United Nations Human Rights Commission in 2018. The knowledge of seed preservation, exchange, and storage systems plays a critical role in supporting agroecological systems that prioritize the empowerment of producers (Pimbert, 2022). Consequently, initiatives that undermine local and farmer-managed seed systems cannot be regarded as agroecological, as they contribute to the erosion of these essential components. This includes the implementation of restrictive seed laws and regulations, which prioritize the adoption of uniform, standardized, and certified seeds while disregarding alternative sources. Similarly, the enforcement of stringent intellectual property rights on plant varieties and traits further exacerbates this erosion (GAFF, 2016).

(continued)

Table 2. *(continued)*

Red Flag	Definition and Justification
Factory farming	*Project focuses on large-scale intensification of animal production*
	Factory farming (feedlots and other large-scale and intensive animal production) is in conflict with numerous principles of agroecology, particularly those related to animal health and biodiversity. The practices employed in factory farming contribute to the destruction of natural habitats, leading to a reduction in overall biodiversity. This system also drives deforestation and causes pollution of air, water, and land (Turner, 1999). Furthermore, factory farming poses a significant threat to small-scale farmers who rely on livestock for their livelihoods but struggle to compete with the scale and efficiency of industrial operations (D'silva, 2000).
Women and marginalized groups	*Project excludes or actively discriminates against women and other marginalized groups*
	Food systems serve as significant sources of livelihood for women, with global statistics indicating that 36% of women are employed in agrifood systems, a percentage that can exceed 70% in certain regions (FAO, 2023). Achieving gender equality and promoting women's economic empowerment are therefore crucial for fostering inclusive food systems, as women fulfill critical roles as agricultural producers, farm managers, processors, traders, wage workers, entrepreneurs, and decision-makers regarding household nutrition. The prevailing food systems contribute to the perpetuation of social inequalities, as marginalized social groups experience higher levels of food insecurity and suffer from food-related health impacts.Agroecology embeds at its core the values of fairness, participation, and justice, ensuring that food systems are built with and based on social and gender equity and the culture, identity, and tradition of local communities. It encourages a rights-based approach addressing the political, social, economic, and cultural rights, including food sovereignty, the right to food, food justice, and women's empowerment. Agroecology also draws on the ancestral knowledges of peasants and indigenous peoples (Pimbert et al., 2021), whose practices and food systems help preserve global biodiversity (FAO, 2021).
Processed food	*Project focuses exclusively on promoting highly processed, industrially produced foods (with low nutrient value)*
	The consumption of processed foods, particularly ultraprocessed foods (UPFs), has significant implications for both human health and the environment. The production of UPFs involves the use of harmful ingredients, excessive packaging, and large-scale industrial processes, which contribute to environmental waste, resource depletion, and the release of potentially harmful compounds (Seferidi et al., 2020). Moreover, highly processed foods heavily rely on and exacerbate the demand for a limited number of high-yielding plant species, thereby undermining the diversity of traditional crops, cuisines, and diets (Leite et al., 2022). These products also have a negative impact on nutrition, as studies have shown that a high consumption of UPFs is associated with low dietary diversity and inadequate intake of essential micronutrients (Marrón-Ponce et al., 2023). By exclusively promoting highly processed or industrially produced food, the development of agroecological food systems and the promotion of health-supporting nutrition are undermined.
Extractivism	*Project promotes extractive raw material production that depletes local resources over time*
	The operations of extractive industries have profound detrimental effects on local ecologies and result in the depletion of value and resources within affected communities. Extractivism encompasses a complex set of practices, mindsets, and power dynamics that justify and enable destructive socioecological modes of organizing life through domination, violence, depletion, and one-sided relationship (Chagnon et al., 2022). Such dynamics are frequently observed in development projects that enable the forceful appropriation of natural resources, such as land and water grabbing, thereby directly undermining the progress of agroecological transformations (Anderson et al., 2021).
Human rights	*Project promotes approaches that violate rights, including customary rights, ignores prior informed consent, or results in population displacement and/or land grabbing*
	The promotion of human rights is an inherent component of the concept and overarching framework of agroecology, forming the bedrock for the establishment of sustainable food systems (HLPE, 2019). Agroecology strives to alleviate poverty, hunger, and inequalities while safeguarding the right to food, food sovereignty, indigenous rights, and sustainable production and consumption practices that ensure future generations' access to food (De Schutter, 2012; FAO, 2018b; HLPE, 2019; Wezel et al., 2020). It is essential to acknowledge that any project that violates the principles outlined in the 1948 Universal Declaration of Human Rights cannot genuinely contribute to the promotion of healthy food systems and agroecology.

proposed by users or other practitioners, and a mechanism for doing so is currently being developed by the CoP.[6]

4.6. Robust qualitative assessment

To aid robustness, the framework enables documentation of the criteria that have contributed to the specific ratings of each principle and encourages adding specific notes that justify their selection.

4.7. Budget calculation formula

To calculate the percentage of a project's budget that is considered contributing to the agroecological transformation, we make a simple mathematical calculation using the following formula (see also the Example Assessment in the Supplementary Material to this article for an example case and calculation):

[sum of the individual ratings multiplied by 100][7]

divided by

[number of applicable principles multiplied by 2][8]

5. Areas for improvement? Testing the framework in a wider CoP

The assessment framework and its associated online tool were created within the context of an emergent CoP that has evolved over time. As stated by Wenger (2011): "Communities of practice are groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly." The intentional coalescence of individuals and organizations who were developing and testing different aspects of evaluating agroecology provided an opportunity to combine the collective intelligence and complementary strengths of participants. For example, a constructive critical review of the Biovision ACT tool by CIDSE and CAWR led to new ideas for how to improve or even to create a new tool. Later in the process, the participation of Stats4SD provided a new technical capacity to adapt the developed framework into a useable tool via an online interface. The emergence of the agroecology coalition provided a platform through which to promote and deploy the framework and its associated tool, which is now being tested for further iterative development. Indeed, the framework has been tested by 13 of the organizations participating in the Berlin workshop—often though not always by individuals who did not participate in the discussions and development of the workshop. Three further organizations also reviewed the framework (without testing it through test assessments). Feedback has been collected in order to improve the tool as well as the conceptual framework underlying it. To date, feedback has included issues of clarification, which will be addressed in a user guide accompanying the tool, as well as small improvements in textual formulation of value statements and examples. It is in this spirit of adaptive learning and of cooperation rather than competition among a diversity of actors that the framework and its associated tool have been able to reach their potential. The ongoing connection through the CoP will facilitate further improvements and new applications as the community evolves and as new communities of practice form and interact.

The online tool will be available for use by organizations who wish to assess, monitor, and track their own investment or project portfolios. It will keep data private when desired but will encourage sharing of (some) data in order to constitute a kind of overall "tracking mechanism," which aggregates information on investments in agroecology across a number of different organizations. As such, the *tool* has a very clear objective and is designed with this in mind.

The underlying *conceptual framework*, on the other hand, may be useful in a greater diversity of contexts. We foresee that it could contribute to the design of projects and programs, as well as funding calls—ensuring that these are as transformatively agroecological as possible. It may also act as a "conversation starter," which a group of people could use in order to discuss such things as their agroecological initiative's aims and goals, specific approaches to discrete objectives, or how to improve transformation of food systems holistically in a local context. The framework also has pedagogical value inside and outside of the classroom, wherever agroecology, food systems transformation, or sustainable agriculture is being discussed.

This article is hence also an invitation to form communities of practice on understanding, evaluating, conceptualizing, and creating food systems transformations through agroecology. The framework introduced here provides a useful tool in starting or advancing conversation on agroecological transformation. We would hence hope that other communities of practice would use the framework and share the results of their evaluations, and over time, critique and contribute to improving the framework we have presented.

6. The current list of examples/indicators can be found in the assessment framework rubric provided as Supplementary Material to this article. To clarify: this is not the final version. The list of examples/indicators is meant to be dynamic, and indeed, the whole framework is meant as a dynamic framework of which we provide a first snapshot here. Like any good, open-source methodological framework, anyone is free to add to it or change it for their own particular purposes, though proper attribution is expected and we would encourage communication in the spirit of a community of practice, so that others can learn from any adapted versions.

7. Individual rating here refers to the rating associated to each individual principle evaluated.

8. Two is the maximum possible rating per principle, which is why we multiply the number of applicable principles by 2 to achieve the maximum possible sum of ratings. This allows us to divide the sum of actual ratings for each individual principle by the maximum possible sum of ratings. When this is then multiplied by 100, the percentage score ("how agroecological is this project?") is achieved. The budget of the project that flows in support of agroecology is then that given percentage of the total project budget. This, of course, is a proxy. Other, less nuanced proxies have been used to calculate agroecology budgets (see studies tracking finance flows in the Introduction above). In-depth analysis and discussion of individual project assessments is needed to determine whether the rest of the budget is destined to nonagroecological practices or simply an indication of the degree of agroecology embodied in the project.

6. Conclusion

It is important to underline that we recognize that this framework is just that: a framework. It can be used to guide decisions in either project evaluation or design contexts, but it cannot replace real live thinking humans with varied experience and knowledge—these are needed to make careful judgments and come to appropriate conclusions. The framework will yield best results when used by individuals who are sympathetic and committed to food systems transformation through agroecology. It is also acknowledged that it is relatively coarse-grained and does not go into details of on-the-ground project implementation—the framework does not pretend to be the best tool for all types of evaluations.

However, we believe that the framework is a useful and important step in bringing more clarity to what agroecology is, how agroecology principles can be operationalized in an evaluation framework, and thus, how programs can be analyzed and ultimately encouraged to shift toward an agroecology that reflects all of its core principles. When adopting a principles-based approach to agroecology, there is a risk that projects cherry-pick principles that are relatively easier to implement (e.g., principles in the environmental/agronomic dimension, such as enhancements in biodiversity) without adopting the more challenging political, economic, and social dimensions. Not least to counteract this, our framework provides a conceptualization of agroecology across multiple dimensions (environmental/agronomic, social, cultural, economic, and political) that are all equally important for food systems transformation. It relies on built-in mechanisms to ensure equal prioritization across these dimensions—specifically through equal weighting and always applicable principles. This, alongside the introduction of red flags, is intended to safe-guard against the cooptation of agroecology. Illuminating multiple dimensions is crucial not only for analyzing project portfolios of donor organizations and countries' investments in agriculture, and monitoring spending, but also for enabling agroecology transformations more widely.

Data accessibility statement

No datasets have been generated as part of this research. The online tool can be freely accessed on https://agroecology-coalition.org/agroecology-finance-assessment-tool/.

Supplemental files

The supplemental files for this article can be found as follows:

Table S1: Multidimensional continuum of approaches to sustainable food systems: full framework rubric (.pdf)

Document S2: Example Assessment (.pdf)

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