FOOD SYSTEM TRANSFORMATION AT COP28

Why agroecology must be prioritised

November 2023

Key Context for COP28

- Agri-food systems generate over a third of total greenhouse gas emissions, with agriculture generating a third of that, including through systematic use of agrochemicals.
- Private and public funding for agriculture mainly supports carbon-heavy agri-food systems, including industrial farming for global value chains reliant on agrochemicals like pesticides.
- Transforming the global food system and its financing is therefore critical to limiting temperature rises to 1.5 degrees and adapting to climate change.
- Agroecological approaches offer the most significant mitigation and adaption potential, and socio-environmental co-benefits. The IPCC reports that agroecological farming could cut emissions by 2.8 - 4.1 GtCO2e per year – equivalent to 6.8% - 10% of 2021 global energy related emissions – while maintaining productive and equitable food systems underpinning adaptation.
- COP28 presents an historic opportunity to catalyse agricultural and food system transformation under the UNFCCC Paris Agreement. The UAE Presidency's COP28 Food Systems and Agriculture Agenda, and proposed Leaders Declaration on Food Systems, Agriculture and Climate Action, must translate into concerted international action, and prioritise action on agroecology.
- Most Parties to UNFCCC have already committed, albeit within other UN agreements, to transformative investment in dramatically increasing agroecological farming practices, and to major reductions in fertiliser and pesticide use. (See **Capitalising on Complementary Commitments, below.)** The implementation of these commitments must now be reflected in Nationally Determined Contributions (NDCs) and National Adaptation Plans (NAPs) presented by Parties to the Paris Agreement.
- However, COP28's potential to catalyse meaningful reform through agroecology is under threat from greenwash that perpetuates existing industrial fossil-fuelled food systems.
- While acknowledging the role companies must play in delivering solutions to global problems at scale, governments need to resist reliance on voluntary corporate pledges, cease the use public resources to support false solutions such as 'agricultural intensification', 'efficiency', 'nature-based solutions', or 'regenerative' or 'climate smart' agriculture, and hold corporates to account for their historic, current, and future emissions.
- Governments urgently need to restructure finance and food systems to deliver equitable, localised food value chains by rewarding truly agroecological practices that cut emissions, repair damaged ecosystems, improve resilience to climate shocks, and support implementation of commitments on pollution, human health and development, biodiversity, and social justice.

The Way Forward:

Parties to the UNFCCC and Paris Agreement should:

- Ensure that that the COP28 Food Systems and Agriculture Agenda successfully catalyses meaningful global and national action on agriculture and food systems transformation within the Paris Agreement.
- Ensure all related initiatives and outcomes, including any Leaders Declaration on Food Systems, Agriculture and Climate Action promulgated at COP28, explicitly prioritise agroecological principles, practices, and programmes.
- Mandate the Sharm el-Sheikh Joint Work on Implementation of Climate Action on Agriculture and Food Security to incorporate agroecology as a priority focus, building on its mandate of implementing of the recommendations of the Koronivia Joint Work on Agriculture (KJWA).
- Mandate the COP28 Presidency's strategic partner in the Food Systems and Agriculture Agenda - the UN Food Systems Coordination Hub – to centre the FAO's Scaling up Agroecology Initiative in its Food Systems and Climate Action Convergence Initiative.
- Commit to incorporate in their NDCs and NAPs, by 2025, concrete plans to implement their existing commitments to increase the implementation of agroecological farming practices, to significantly reduce pesticide and fertiliser use and pollution, and phase out highly hazardous pesticides in agriculture, as variously pledged in Targets 7 and 10 of the CBD's Global Biodiversity Framework, and Targets A7 and D5 of the ICCM Global Framework on Chemicals.
- Redirect all public finance, including investments, grants, loans and guarantees, subsidies and tax incentives, away from input-intensive industrial agriculture and meat industries to initiatives that further develop, extend, and embed agroecological principles and practices across the entire food system, from farm to fork.
- Resist and regulate false solutions and markets that sustain them (including carbon markets), including those perpetuating existing industrial food system models reliant on ongoing inputs of agrochemicals such as pesticides.
- Increase investment in independent scientific research into the effects of pesticides on soil health and soil carbon sequestration, storage, and emissions.
- Become members of and contribute new finance for targeted and scalable multistakeholder agroecological initiatives and alliances, such as the Agroecology Coalition[1], and the Global Alliance on Highly Hazardous Pesticides.

Kheria Sabar indigenous peoples join the Global People's Caravan in West Bengal, India. Photo: Paschim Banga Kheria Sabar Kalyan & Keystone Foundation

Industrial agriculture is driving climate change

Global food systems produce over one-third of all greenhouse gas (GHG) emissions, with 31% of those resulting from industrial agricultural production, including through the production and use of inputs like pesticides.[4]

Downstream globalised food system value chains significantly influence and inflate agriculture's emissions footprint, and other negative impacts, including land consolidation and food insecurity.

Meat production underpins the majority of agricultural emissions – including methane from livestock and nitrogen released from soil degradation – and generates from 3 to 100 times the GHG emissions per unit of plant-based foods.[5]

Of the 40% of habitable land on earth used for food production, a staggering 82% is ultimately employed for meat and dairy production, generating up to 53% of all food-linked emissions, while crop farming for human consumption generates merely 29% of food-linked emissions. This is despite meat and dairy supplying only 18% of human calories and 37% of protein.[6]

Meat also drives a significant portion of global pesticide use and associated emissions.

Soybean production, followed by maize, use more pesticides than any other crops on earth, and are key enabling crops for the meat industry, with 75% of soy and 56% of maize grown globally being destined for animal feed. At least 11% of global pesticide use in 2018 - including high volumes of many Highly Hazardous Pesticides (HHPs) - was for soy and maize just for animal feed. The HHP glyphosate - with among the highest emissions footprint (see below) - was the leading pesticide active ingredient used for both.[7]

Rural peoples from the Global South call for food, land, and climate justice

Rural peoples from the Global South bear the brunt of the increasing frequency and intensity of climate change-driven disasters. From 2008–2018, billions of dollars were lost as a result of declines in crop and livestock production in the aftermath of disasters, with most losses recorded in Asia, Sub-Saharan and North Africa, and Latin America and the Caribbean.[2] Six of the ten worst affected countries by climate change in the past two decades are in Asia[3], affecting millions of small scale farmers, agricultural workers, Indigenous Peoples, pastoralists and fisherfolk.

Co-organized by PAN Asia Pacific, rural communities and advocates launched the Global Peoples Caravan for Food, Land and Climate Justice in March 2023 in response to the escalating food and climate crises. Built upon the vision of radical food systems transformation through Four Pillars (1) people's food sovereignty (2) people-led agroecology (3) peasants' right to land and natural resources and (4) right to food, the People's Caravan is an awareness raising and mobilizing campaign to strengthen rural people's movements in their various struggles for food, land, and climate crisis.

Through community consultations, the People's Caravan came up with the following demands of rural peoples to policymakers attending the COP 28 climate talks:

- Transform food systems away from fossil fuels towards agroecology and people's food sovereignty
- End corporate monopoly over land, water, and natural resources
- Polluters must pay for climate crisis destruction
- End fossil fuelled wars vs. rural communities
- Ensure genuine participation of rural peoples in climate policy

Read the full petition (https://docs.google.com/forms/d/e/1FAIpQLSc8zLQkDUfsL1Lqi7LXI7EzaIKEuj3sXtIwV-99I1RP0BJcqA/viewform)

The Climate Footprint of Pesticides

Pesticides play a significant yet insufficiently recognised role in emissions from agriculture.

This must change.

Emissions in manufacture distribution and application

99% of all synthetic chemicals —including pesticides — are derived from fossil fuels, and several oil and gas companies play major roles in developing pesticide ingredients.[8]

Manufacturing one kilogram of pesticide active ingredient requires, on average, about 10 times more energy than one kilogram of nitrogen fertilizer.

Depending on type, most active ingredients generate from 11.94 to 29.19 kilograms of CO2e per kilogram produced, while some pesticides produce in excess of 40 kilograms CO2 e per kilogram.[9]

Manufacture of the world's most popular herbicide, glyphosate, generates 31.29 kilograms of CO2e for each kilogram produced, with production of the glyphosate used globally in 2014 using enough energy to fuel about 6.25 million cars for a year.[10]

Beyond their manufacture, the dissemination and application of pesticides generates more emissions still, as trucks, ships, tractors, planes, and drones deliver pesticides from factories to field. One study estimates that global pesticide production, distribution and application generated emissions of 73.2 MtCO2e, equivalent to 3.1% (range 1.0–5.8%) of global cropland emissions, or 18.4 coal-fired power stations.[11]

Chemical plant
Photo: Pixbay

Pesticides turn soils from carbon sinks to sources

Emissions from production and distribution do not begin to account for potentially far larger emissions generated by the post-application effects of pesticides.

Pesticides produce additional greenhouse gases by emitting volatile organic compounds (VOCs) which react with nitrogen oxides and UV rays to produce ground-level ozone[12] - a significant greenhouse gas that the U.S. Department of Agriculture reports to cause more damage to plants than all other air pollutants combined.[13] 80 to 90% of applied pesticides may volatilize within a few days of application.[14]

Further emissions arise from pesticides' effects on soil health and the ability of soils to convert, sequester and store carbon from the atmosphere and organic matter.

Pesticides have a detrimental effect on soil biodiversity, including on soil microfauna, and microorganisms crucial for soil health, and which play a critical role in nutrient recycling and regulate carbon and nitrogen cycles that control soil's emissions of carbon dioxide, methane, and nitrous oxide.[15]

Studies have shown that optimising carbon sequestration and storage in soil can be achieved by reducing pesticides[16], with one concluding that glyphosate-based herbicide residues in soils "greatly decreased the carbon sequestration potential".[17]

Some commonly used pesticides have also been shown to dramatically increase soil's production and emissions of nitrous oxide[18] – a greenhouse gas 300 times more potent than carbon dioxide.

There is a clear need for a substantial increase in scientific research on the effects of pesticides on soil carbon, and considering clear co-benefits of significant reductions on soil health and resilience, a precautionary approach is essential.

Farming Global Finance

Investments and financial incentives in the agriculture sector are huge but most of that support is directed to and captured by energy intensive production systems. Directing more of that investment towards agroecological systems could reduce GHG emissions while achieving "better ecological, economic and social outcomes". [19]

A recent report showed that the public is currently providing more than US $1 million a minute in global farm subsidies, much of which is driving the climate crisis and destruction of wildlife. Just 1% of the US $700 billion a year given to farmers is used to benefit the environment. Most of the remainder instead promotes high-emission livestock production, forest destruction, and pollution from the overuse of fertiliser.[20]

According to a UNEP review agricultural input subsidies and tax exemptions have encouraged overuse of pesticides and fertilisers to the detriment of human health and environment and "empirical evidence suggests they undermine welfare objectives".[21] Such subsidies are a significant fiscal burden on many countries.

According to the International Panel of Experts on Sustainable Food Systems (IPES) as much as 85% of research projects for agricultural development in Africa focus on conventional agricultural approaches and a minimal fraction incorporated elements of regenerative agroecology or focused on the substitution of harmful and synthetic products.[22] An analysis by Coventry University similarly concluded that a minimal portion of public money is channelled towards supporting the conversion to agroecological practices and steering the sector away from the use of hazardous chemical inputs.[23] As an example, only 2.7% of the EU disbursements to FAO, IFAD and WFP between 2016 and 2018 flowed to projects supporting first steps towards agroecology through a focus on substitution of harmful inputs. At the same time, over 79% of the EU and GCF agriculturally relevant funding support is for projects that focus on conventional agriculture and/or efficiency-oriented approaches.

Redirecting much or all this support to agroecological approaches to farming is essential.

The Opportunity of COP28

COP28 is the first Conference of the Parties to the UNFCCC explicitly seeking concrete commitments on agriculture and food systems transformation for climate change mitigation and adaptation.

The UAE Presidency of COP28 has established a **Food Systems and Agriculture Agenda**, and through a **COP28 Declaration on Resilient Food Systems, Sustainable Agriculture, and Climate Action**[24] it is encouraging Parties to the UNFCCC to sign a **Leaders Declaration on Food Systems, Agriculture and Climate Action.** [25]

The COP28 Presidency has formed a new strategic partnership with the United Nations Food Systems Coordination Hub (The Hub) to elevate food system transformation as a catalyst for achieving the SDGs and the targets for the Paris Agreement. The Hub has since launched a series of consultations with UN Parties on a **Food Systems and Climate Action Convergence Initiative**.[26]

A cornerstone of these initiatives is to increase the incorporation of food system policy reforms into Nationally Determined Contributions (NDCs) to climate mitigation, and into National Adaptation Plans (NAP) that countries submit as a key obligation of the Paris Agreement, by 2025.

It is essential that agroecology is the central approach to such initiatives and prioritised in all such commitments made at COP28.

Global People's Caravan in a Bengali community practicing agroecology in Dhaka, Bangladesh. Photo: Bangladesh Resource Center for Indigenous Knowledge

The promise of Agroecology in mitigation and adaptation

The Intergovernmental Panel on Climate Change (IPCC) makes clear that agroecology needs to play a major role in both mitigating and adapting to climate change and transforming food and farming systems.

The 6th IPCC Assessment Report concluded with high confidence that "agroecologically improved cropland and grazing land management have significant mitigation potential, estimated at 2.8- 4.1 GtCO2e per year".[27]

This is equivalent to between 6.8% and 10% of global energy related CO2e emissions in 2021.[28]

It reported global studies indicating that Agro-forestry stores 20–33% more soil carbon than conventional agriculture. Other systemic reviews show that agricultural diversification practices that are key components of agroecology improve water regulation, soil fertility, nutrient cycling, and carbon sequestration.[29]

The IPCC is also confident that agroecological farming "enhances adaptation to climate change, including resilience to extreme events", and concludes that "adoption of agroecology principles and practices will be highly beneficial to maintaining healthy, productive food systems under climate change".[30]

Agroecology is also recognised as a key food transformation approach by the UN Food and Agriculture Organization (FAO) and its members. The FAO's Scaling up Agroecology Initiative aims to catalyse cooperation on agroecology within the UN System and by supporting national agroecology policy and technical capacity and building synergies between countries.[31]

About Agroecology:

Agroecology is an economically viable and socially just approach to sustainable agriculture and food systems, grounded in ecological and social justice principles.

Agroecology integrates science with local and Indigenous knowledge and practice, emphasising farming in harmony with natural cycles and processes, and a political commitment to food sovereignty.

It centres farmers including women as key decision-makers with the capacity and responsibility to provide nutritious and affordable food for themselves, their communities and beyond.

Agroecology provides an established framework for sustainable farming, with a set of guiding principles and a diversity of practices and approaches, supported by scientific research and empirical evidence, that continue to evolve through experimentation and adaptation to new and changing conditions.[32]

13 principles of agroecology have been defined by the High-Level Panel of Experts (HLPE) of the Committee on World Food Security (CFS), including: reducing the use of inputs; soil health; animal health and welfare; biodiversity; synergy (managing interactions); economic diversification; co-creation of knowledge (embracing local knowledge and global science); social values and diets; fairness; connectivity; land and natural resource governance; and participation.[33]

These are aligned with the 10 Elements of Agroecology promulgated by the UN Food and Agriculture Organization (FAO) in December 2019.[34]

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Capitalising on Complementary Commitments:

Most Parties to the Paris Agreement have already committed to concrete actions commensurate with the agricultural system transformation required at COP28, albeit in other UN agreements. This includes commitments to significantly increase investment in and the uptake of agroecology at scale, reduce pesticide and fertiliser pollution by at least half, and phase out the use of highly hazardous pesticides (HHPs).

Incorporating their implementation of these commitments into Nationally Determined Contributions (NDCs) and National Adaptation Plans (NAPs) under their Paris Agreement obligations would justifiably allow Parties to plan and claim due credit for actions that have synergistic co-benefits across multiple international environmental and pollution reduction policy instruments.

Such developments are clearly envisioned in the COP28 Food Systems and Agriculture Agenda.

Target 7 of the Global Biodiversity Framework (GBF) commits Parties to reduce risk from pesticides and highly hazardous chemicals, and excess nutrients lost to the environment through fertiliser application, by at least half by 2030, with the vast majority of these reductions to occur in agriculture.[35] In the case of pesticides, this needs to involve an at least half reduction in the pesticide load applied to crops, measured as a combination of pesticide toxicity and volume of use.[36]

Target A7 of the Global Framework on Chemicals (GFC) - an international policy instrument agreed at the UN-convened 5th **International Conference on Chemicals Management (ICCM)** in Bonn in September 2023 - commits governments and other stakeholders, including industry, to have taken, by 2035, "effective measures to phase out highly hazardous pesticides in agriculture, where the risks have not been managed and where safer and affordable alternatives are available; and to promote transition to, and make available those alternatives."[37] PAN has recommended that phasing out HHPs will be the single most effective step in delivering on GBF Target 7.[38]

Target 10 of the GBF commits Parties to "ensure that areas under agriculture, aquaculture, fisheries and forestry are managed sustainably … through a substantial increase of the application of biodiversity friendly practices … such as agroecological and other innovative approaches".[39]

Target D5 of ICCM's GFC similarly commits its Parties to implement, by 2030, "policies and programmes to increase support to safer and more sustainable agricultural practices, including agroecology, integrated pest management and the use of non-chemical alternatives".[40]

ICCM in Bonn also agreed the formation of a **Global Alliance on HHPs**, as a coalition of stakeholders (countries, civil society, business, and citizens) working to implement the HHP phase out envisioned within GFC Target A7.[41] Action to support the agrifood supply chain in a transition from highly hazardous pesticides is a key plank of the work envisioned for the Global Alliance on HHPs.

Both of these complementary multilateral policy frameworks – the CBD's GBF and the ICCM's GFC – also mandate countries to take specific policy action to ensure the private sector and finance contribute to rather than undermine the implementation of these transformative outcomes.

Food system transformation is relevant to GBF Target 15 on corporate practices, and Target 18 on financial and other incentives. Similarly, Targets D2 and D7 of the ICCM's GFC, which mandate policies to bring about corporate reforms to value chains.

The climate mitigation and adaptation benefits of these agriculture-relevant transformation policy commitments are as clear as the biodiversity, human health, and pollution reductions central to the GBF and GFC respectively.

Parties to the Paris Agreement who have already signed up to these commitments on pesticide reductions, phase outs, and the roll-out of agroecological farming practices have both obligations to implement them, but also clear grounds to include that implementation in their Nationally Determined Contributions (NDCs) and National Adaptation Plans (NAPs) under the Paris Agreement. They must now do so by 2025.

The Threat of False Solutions and Greenwash:

There are clear dangers that the promise of real agroecological system transformation being built into global climate action is squandered at COP28.

Big agrochemical, agribusiness and industrial food and consumer-goods conglomerates are increasingly targeting the UNFCCC system, often presenting less effective voluntary industry-led initiatives. These risk steering climate action towards false solutions that perpetuate existing business models reliant on fossil-fuels-derived inputs, and enable further consolidation and extension of corporate control of commodified food value chains, land, and land use.

At least 160 delegates linked to big agribusiness attended COP27 in Egypt in 2022, with 27 of these linked to the top five pesticides producers.[42] This is expected to be higher at COP28.

Corporates are increasingly capturing the narrative on food system transformation within the climate negotiations, misusing the term agroecology and steering it away from real agroecological principles and approaches towards lesser outcomes.

One notable major initiative launched by the U.S. and the UAE at COP26, and set for further promotion at COP28, is the **Agriculture Innovation Mission for Climate (AIM4C)**, which seeks to increase investment in "climate smart" agriculture through public and private partnerships.[43] AIM4C is channelling over $14billion of investment into projects described as "innovation sprints" – many focussed on Agri-tech developments.

While in some cases these have some potential to reduce emissions, in many cases they are designed or dominated by major agrochemical companies to feed input-intensive bulk Agri-commodities into existing export-oriented corporate value chains. Such actions often ignore or subvert agroecology while dramatically extending questionable agri-tech methodologies and damaging inputs at commercial and industrial scales, including into smallholder landscapes. Agroecology is mentioned just once in the initiative's 51 projects – termed 'innovation sprints'.[44] (See examples, below)

One environmental expert described the grant of billions of dollars of U.S. public money for AIM4C as "a windfall for business as usual", a sentiment held by many agroecologists and food system reformers.

It is critical that new initiatives advanced in the context UAE Presidency's COP28 Food Systems and Agriculture Agenda – whether private or public sector led – embrace agroecological principles rather than promoting techno-fixes that prolong rather than transform harmful industrial models.

This includes initiatives focused on 'regenerative agriculture'. While regenerative agriculture can have many positives, including potential improvements to soil health and reduced emissions through no-till planting, using cover crops and organic fertilisers, increasing crop rotation and other techniques, the systematic use of large volumes of hazardous herbicides such as glyphosate remains a major feature for most large-scale practitioners.

Regenerative agriculture is often favoured by large companies operating on and sourcing Agri-commodities at industrial scales from enormous industrial monoculture plantations extending as far as the eye can see, dedicated mainly to feeding livestock rather than people, while leaving little room for either local communities and Indigenous Peoples, local food security or food markets, or wildlife and biodiversity.

Another danger is that techno-tweaks in industrial landscapes are further commodified as "nature-based solutions" and sold as carbon offsets to the array of large companies seeking to package up their unsustainable business models as "climate positive" or "net-zero".

The problem of ineffective and morally questionable forest and nature-based offsets is far from resolved.[45] A new era of "climate smart" agriculture offsets could be the next scandal.

AIM4C's big agrochemical innovations

The largest "innovation sprint" of the Agriculture Innovation Mission for Climate (AIM4C) is "**Revert**", a $460 million project supported by the world's largest pesticide firm, Syngenta, that aims to "restore" 1 million hectares of degraded pastureland in the Cerrado biome in Brazil, by 2030.[46] Despite its name, the project will not be reverting the land to its original status as a biodiverse Cerrado forest savanna, but will repurpose up to 25% of the area of farms within it for soy production, with seed (likely genetically modified), fertiliser, and pesticides inputs provided. This is to help supply anticipated increased demand for soy, principally from the global animal feed industry that underpins cheap industrial meat production in global markets.

The project will perpetuate the provision of pesticide-intensive commodity crops to huge Agri-commodity traders to ship to animal feed conglomerates in export markets focussed on industrial meat consumption. This seems very far from the vision demanded by independent scientists such as the IPCC.

An early AIM4C innovation sprint set up in 2021 is a $13million project of **CropLife International**, the trade body of some of the world's biggest pesticides companies.[47] It focusses on the roll out of CropLife's so-called Sustainable Pesticide Management Framework (SPMF) onto smallholder farmers in Asia and Africa, and according to CropLife's President and CEO, has focussed on increasing smallholders' access to and adoption of pesticides, and the specialist protective equipment required to prevent smallholders from being poisoned.[48]

In August 2023, CropLife promoted its SPMF concept in an unsuccessful bid to prevent the adoption of draft wording for Target A7 of the UN's new Global Framework on Chemicals (GFC, see above), which commits parties to phasing out highly hazardous pesticides in agriculture, and CropLife also sought to use its SPMF to kill Target D5 of the GFC, which commits governments to increase support to safer and more sustainable agricultural practices, including agroecology, integrated pest management and the use of non-chemical alternatives.[49]

Far from transforming the food system through agroecology, such projects will increase the number of farmers using pesticides and the area of land pesticides are applied to, and further extend the reach of big-food's global commodity-crop value chains, in ways structurally benefiting the biggest pesticides companies on earth.

Photo: Aqua Mechanical, CC BY 2.0 DEED

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Pesticide Action Network International (PAN International) is a network of over 600 participating nongovernmental organizations, institutions and individuals in over 90 countries working to replace the use of hazardous pesticides with ecologically sound and socially just alternatives.

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