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Climate smart or regenerative agriculture?

Defining climate policies based on soil health

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Soil-based carbon storage strategies recently secured the spotlight at global governance forums, earning attention for their value as carbon sinks and as a key component of international food security.[1] The current approaches to removing carbon from the atmosphere, which include Carbon Capture and Storage (CCS) technologies, reforestation efforts, and soil erosion prevention, were emphasized as key climate change mitigation strategies during discussions at the United Nations (UN) 23rd Convention of the Parties (COP23) in Bonn, Germany in November 2017.

Two soil regeneration strategies are facing off: one has been called Climate Smart Agriculture (CSA), the other Regenerative Agriculture (RA), which is also commonly referenced as Agroecology. This policy brief aims to define and analyze these two paradigms, which largely contradict each other, even though they share a pool of strategies and terminologies.

We will analyze the mechanism through which the UN intends to instigate reforms, attempt to gauge each paradigm's respective influence on future policies, then provide suggestions about how to move forward by fostering necessary collaboration between all actors and stakeholders. We have found that UN institutions like the Food and Agricultural Organization (FAO) and United Nations Convention to Combat Desertification (UNCCD) have dual goals: first, to consolidate agroecological research and create Best Management Practices (BMPs) that render the global agricultural system genuinely sustainable; and second, to implement climate adaptation projects. Funding streams for these projects come from corporate actors, governments, and large NGOs who are not necessarily familiar with relevant research into sustainable agricultural practices, yet are eager to fund immediate change.

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The Divide Between Regenerative Agriculture and Climate Smart Agriculture

Regenerative Agriculture

Soil-based carbon storage strategies involve the reform of conventional farming practices at the global level, converting practices that degrade soil to a wide spectrum of alternative practices that regenerate its natural vigor and microbial capacity to sequester atmospheric elements, notably carbon and nitrogen. The research agency most clearly defining and working within the Regenerative Agriculture Paradigm is the Consultative Group for International Agricultural Research (CGIAR) and its program on Climate Change, Agriculture, and Food Security (CCAFS), which attempt to consolidate global data surrounding agroecological practices.[2] The Regenerative Agriculture BMPs are based on principles of agroecology.[3] Their goal is to maintain viable farming systems by eliminating manufactured inputs and solely utilizing ecosystem processes, such as cover cropping, manure-based fertilizer use, crop rotation, and integrated grazing.[4]

Years of analysis of the complexity of soil ecosystems has allowed the scientific community to understand that microbial communities form the basis of highly fertile as well as carbon-rich soils.[5] Evidence shows that it is possible for healthy microbial communities to produce sufficient nutrients for high crop yields, as well as promote biodiversity on farmland, which acts as a natural pest control system.[6] Tillage—any form of ploughing or disrupting the soil—demonstrably leads to the oxidation of soils, damage to mycorrhizal fungi networks and ultimately to loss of organic carbon, and therefore of fertility.[7] The use of GMOs[8] or chemical inputs of any kind is not consistent with the goals of maintaining and enhancing soils' capacities to sustain the food system in the long-term.[9]

As it requires a transition to no-till systems and an elimination of chemical inputs, the implementation of the Regenerative Agriculture paradigm throughout regions and corporate supply chains would require a holistic restructuring of the way societies produce food. This process has begun with developing sets of practices that need to be customized for each specific context in the broad spectrum of farming ecosystems. The adoption of a regenerative approach is stimulated by a recognition of input costs that could be saved by restoring ecosystem fertilization and irrigation processes.[10]

Climate Smart Agriculture

The "Climate-Smart Agriculture" (CSA) paradigm was defined by the FAO and the World Bank as early as 2010 as "agricultural practices that sustainably increase productivity and system resilience while reducing greenhouse gas emissions."[11] Rather

than approaching agricultural reform holistically, CSA strategies tend to support single-practice interventions in a way that minimally disrupt modern industrial farming systems (See Table 1).

Table 1: Climate-Smart Agriculture Best Management Practices

Target areas	CSA Best Management Practices
Soil Management	• Industrial-scale monocultures using • Mechanized no-till technologies with herbicides applied to weeds • Integrated Soil Fertility Management (ISFM) - comb. Of mineral fertilizers/organic matter management • Conservation Agriculture (CA) increased profit and yield while protecting health, crop rotation and minimal soil disturbance
Crop Production	• Breeding higher yielding crop varieties • Breed for drought resistance, heat tolerant plants, Hybrid seeds & GMO use acceptable • Herbicide-tolerant (HT) and pest-resistant crops • "The replacement of potentially more virulent herbicides with the relatively more benign glyphosate creates less toxicity in the environment."[12] • Carbon capture practices
Water management	• High-efficiency/low-energy use irrigation programs • Drought-tolerant maize varieties and hybrids (African nations)

Source: https://csa.guide/csa/practices#article-35

As is evident in this table, CSA is developing as a broad paradigm that mixes mechanized no-till technologies and Integrated Soil Fertility Management (ISFM) with more benign chemical inputs[13] while promoting the use of GMOs. The CSA paradigm is tailored mostly for large-scale monocrop agriculture.[14]

Actor Network Behind CSA

Numerous corporations started pledging their support to the United Nations Climate Smart Agriculture paradigm, and advocating for the incorporation of their suggestions of what it should entail.[15] Agriculture corporate actors within the American Coalition for Ethanol and Soybean and Corn Growers Associations formed the Global Alliance for Climate Smart Agriculture (GACSA) and the North American Climate Smart Agriculture Alliance (NACSAA) in 2014.[16]

As the GACSA evolved, Monsanto became its main supporter,[17] and was joined by other major chemical companies with an incentive to contribute to CSA projects.[18] Among the international foundations and donor members of this alliance is the Gates

Foundation, which has been a powerful advocate for GMOs in African countries, presenting American crop innovations as the answer to increasing droughts related to climate change.[19] There are growing concerns that private sector supporting members of GACSA are exerting counterproductive influence over CSA project implementation through GASCA, allowing for weak monitoring and an absence of accountability mechanisms within the organization.[20]

Actors in support of RA

The Regenerative Agriculture movement advocates for the adoption of agroecological practices currently used by millions of smallholder farmers throughout the world.[21] Internationally, RA is promoted by a broad coalition that includes scientists (scientific advisory councils like INRA,[22] CGIAR), governments (notably the French Government), and NGOs, including the International Federation of Organic Agriculture Movements (IFOAM),[23] Via Campesina, Nature Conservancy, Oxfam[24] and Regeneration International.

The FAO, although an early promoter of the Climate Smart Agriculture paradigm, is also increasingly emphasizing the crucial role of agroecology. FAO recognizes the perverse effects of the agricultural policies it had previously promoted in the developing world:

> The Green Revolution's quantum leap in cereal production was often achieved at the cost of land degradation, salinization of irrigated areas, over-extraction of groundwater, the build-up of pest resistance, and damage to the wider environment, through increased emissions of greenhouse gases and nitrate pollution of water bodies.[25]

The French Ministry of Agriculture launched the "4 per 1000 initiative" during COP21 in Paris to offer a platform for bringing together governments and civil society actors (NGOs, research centers, farmers organizations) to advocate for all agricultural stakeholders to transition to agroecological practices.[26] At COP23, 190 signatories of the 4/1000 Initiative were represented – including Germany, Spain, 78 other State governments, 110 supporting organizations, and 10 major funding bodies.[27] The Global Governance organizations listed are collaborating within the Initiative's scientific policy interface (SPI), working to connect farmers to bodies of information and technology they will need to institute global reforms.

Now, the 4/1000 Initiative and the Global Soils Partnership (GSP), a collaboration between the United Nations Convention to Combat Desertification (UNCCD) and Food and Agricultural Organization (FAO), are seeking to consolidate and share this regional knowledge globally, to instigate international agricultural adaptation projects.[28]

Points of Conflict between CSA and RA

In 2015, more than 350 national and international civil society groups signed a letter urging decision-makers to reject what the groups called the "growing influence and agenda of so-called 'Climate-Smart Agriculture' and the Global Alliance for Climate-Smart Agriculture." The declaration argued that criteria for deciding what can or cannot be called "Climate Smart" across the spectrum of organizations working on CSA projects has become broad enough to justify unsustainable developments and human rights violations throughout global agricultural projects.[29] A broad coalition including more than 30 international NGOs[30] formed the Climate, Land, Ambition and Rights Alliance (CLARA) in order to closely monitor the UNFCCC negotiations in the areas of agriculture, forest and land issues and to develop a joint position.

Risks of land-grabbing

A main concern was repeating the human rights abuses and ecological damage of REDD+ policies, many of which facilitated the expulsion of small farmers and indigenous people from their ancestral lands, to accommodate monoculture reforestation schemes implemented by corporations seeking to offset their carbon footprint. The CLARA Alliance insists that human rights and land rights safeguards be integrated in any carbon-storage agricultural development projects by CSA and RA actors alike.[31]

Contradictory approaches & "greenwashing" for CSA

Concerns have also been expressed that corporate advocacy of Climate Smart Agriculture has rendered CSA strategies increasingly one-dimensional,[32] as corporate actors tend to focus on investing in singular sustainability interventions rather than holistic reform of their supply chains. Broad CSA criteria allow agribusiness corporations to take on projects under a CSA label that promote synthetic fertilizers, industrial meat production and large-scale industrial agriculture. Commonly labeled "sustainable intensification" CSA projects, many involve improving efficiency of resource use while neglecting necessary production reform.[33]

The Regenerative Agriculture paradigm requires a multidimensional approach to projects, as it involves dealing with the complexity both of ecosystems and of relationships between farmers and their land, rather than a single criterion of quantified carbon sequestered into soils. An example of the contrast between RA and CSA can be seen by comparing the Cambodia GCF project and Namibia project (see Tables 2 and 3 below).

Conflict over access to funding

At COP23, smaller, nationally-based organizations interested in promoting agroecolo-

gy in their agricultural sectors expressed that they find it difficult to access funds from large-scale climate finance institutions.[34] According to representatives from Uganda and Zimbabwe, the International Fund for Agricultural Development is currently the only group that supports smallholder farmers.[35] To speed the process of international agricultural reform, they insist that the World Bank needs to make funds more accessible to national communities, beyond just intergovernmental organizations and NGOs. Saddler, a representative of the World Bank, responded that the Bank's Green Climate Fund will facilitate collaboration between nationally-based smallholder farmers and World Bank funding.[36] However, smaller nonprofits such as Biovision[37] claim that the Green Climate Fund's application process is still too complicated for smaller stakeholders to access.

This may be due to the complexity and smaller scope of local level agro-ecological projects. A clear difference in numbers can be observed between the funding streams to CSA and RA projects: Development Banks tend to be interested in funding interventions with a specific focus, for example, investing 150 million in drip irrigation. Regenerative Agricultural projects, including agroecology projects, have so far only been allocated a fraction of the amount of money that is currently pledged to Climate Smart Agriculture at the global level.[38] The payoffs, and opportunities to form private partnerships, are less apparent in holistic management plans that would protect the soil. They have to be smaller scale, and their benefits are more complicated to measure, so it is safer to invest lower sums in agroecology projects. This is illustrated by the difference between funding for the Cambodia CSA intervention, $166 million, and the Namibia RA project, $10 million, below.

Table 2. Regenerative Agriculture projects of the GCF
Requirement: project targets every step of ag process

Country(ies)	Project Name	Objective	Funds (US$)
Namibia	SAP001: Rangeland ecosystem management	Improve rangeland/ecosystem management practices of smallholder farmers in changing climate	10 million
Uganda, Nigeria, Ghana	Building Resilient Communities, Wetlands Ecosystems and Associated Catchments	Restore critical wetlands to improve ecosystem services; Enhance the skills of subsistence farmers to diversify their livelihoods/become resilient to climate shocks;	56 million
Zambia	FP072: Strengthening climate resilience in Agro-Ecological Regions of Zambia	Takes a value-chain approach to helping smallholder farmers, w/ climate-resilient agricultural inputs and practices, sustainable water management & alternative livelihoods	137.3 million

Table 3. CSA Projects of the GCF

Country(ies)	Project Name	Objective	Funds (US$)
Guatemala Mexico	Supporting the transition to low emission, climate resilient agriculture through the creation of a risk sharing facility to unlock innovative and scalable financial instruments for MSMEs	Risk-sharing facility targets Ag MSMEs that demonstrate environmentally sustainable practices, engages lenders for longer-term loans for climate-smart investments. Will attract local and international private sector investors, resulting in private capital being channeled into these activities.	158 million
Cambodia	Climate-Friendly Agribusiness Value Chains Sector Project	(i) provide improved critical production/post-harvest infrastructure, (ii) reduce energy costs by promoting bio-energy/sustainable biomass management (iii) offer targeted agribusiness support services for selected value chains.	142 million

Strategies to boost regenerative agricultural funding

The 4/1,000 Initiative and Global Soils Partnership agreed at COP23 that the implementation of agroecological, regenerative agriculture projects will be globally promoted by the development of a set of indicators that can generate reliable projected benefits of project proposal. These indicators must be applicable throughout global farming ecosystems,[39] yet as easy to measure as simpler CSA project indicators.[40]

4/1,000 has developed a method of evaluating projects and allocating funding. They are currently piloting it with a small number of case studies throughout their member states.[41] On a larger scale, the Global Soils Partnership has developed a Science-Policy Interface Land Degradation Neutrality Scientific Framework.[42] The Global Soil Organic Carbon Map (GSOCmap) is a recent breakthrough by the GSP that will act as a "consultative and participatory process involving 110 countries" for measuring the soil-carbon impact of agricultural reform practices.[43] As the GSP grows stronger, they have started to work on widespread case studies that have attracted the funding of the World Bank (though only for projects orchestrated through the UN).

Conclusion

An increasing body of research suggests that regenerative agriculture not only could feed the world, but will be the only way to restore and maintain the health of global soils to render agricultural practices sustainably viable.[44] The UN and actors in the global governance sphere, organizations, corporations and state governments, must

collaborate to a greater extent to effectively instigate reforms to their agricultural systems that will ensure ecosystem health and therefore long-term food security. The question is now circulating throughout the global governance system funding actors of how best to support international desires for climate change adaptation projects in their agricultural sectors. Regenerative agriculture could potentially become the dominant paradigm as a strong coalition of actors, including scientists, farmers, consumers, and decision-makers is growing at the national and international levels. Two strategies will be particularly important in insuring the success of this global movement towards regenerative agriculture:

Strategy 1: Increased collaboration and more science-policy interfaces

All agricultural projects should be undertaken through partnerships between scientific agencies who understand the importance of agroecology, states, and corporations or organizations. While important work is being done to advocate for truly agroecological farming reform by multiple NGOs and UN offices, it is being done separately without a uniform set of scientific indicators, pool of funding, or technology. A grand alliance of CSA actors has made orchestrating CSA projects much easier that RA projects. Global agriculture reform efforts need to be increasingly streamlined by the FAO, UNCCD and World Bank. Through their work within the Global Soils Partnership, the FAO and UNCCD have an opportunity to mediate between corporate actors advocating for CSA and members of the Agroecology network of FAO, which includes 1300 stakeholders from 162 countries involved in a global dialogue about best practices.

Strategy 2: Streamlined funding

The most effective international change to sustainable farming practices will occur by connecting farmer stakeholders to a uniform body of agroecological knowledge and a collective funding source. Once collaborations are formed, then they should be given direct access to funding.

Tufts University's Global Development And Environment Institute (GDAE) offers a series of climate policy briefs covering the Paris agreement, the role of forests and soils, and current policies on biomass and forests.

Endnotes

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Modern practices of Regenerative Agriculture suggest the use of no-till seeding equipment, including direct planters, seed drills and air seeders.

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