



Agroecology in Climate Change Policy: Leverage Points for Transformative Action

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Declaration

I declare that this thesis is all my own work [except where specified otherwise] and that I have not obtained a degree in this University, or elsewhere, on the basis of this work.

Signed: *Joe Orion*

Date: 8/27/21

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Abstract

The practice of agroecology is based on embedding holistic agronomic practices within an integrated context linking agricultural policies and practices to social and economic justice and nutrition and food security. This systematic approach centering people and their needs and knowledge has the potential to engender transformative change in food systems and beyond. As climate change continues to challenge agricultural production systems worldwide, and exacerbate existing inequalities, agroecology offers the potential to reorient widespread approaches to agriculture focused on production of high input commodity crops toward a focus on community food security and environmentally beneficial resource management. Because of the potential that agroecological approaches offer to climate change adaptation and mitigation as well as helping to meet other Sustainable Development Goals (SDGs), it is critical to understand whether and where policies supporting agroecology are in place. The Paris Agreement created a context in which international climate change commitments can be assessed through the National Determined Contributions (NDCs); using these as a benchmark for understanding the role of agroecology in signatories' national policy goals provides a way to understand whether and how agroecology is present in international policies. Further investigation into policy processes supporting agroecology at the national and sub-national level provides a framework for understanding potential leverage points for further policy integration between national and international agriculture-related climate commitments.

Introduction

Agroecology has great potential to increase agricultural resilience to climate change through its multifaceted, whole systems approach that links agricultural system productivity to social and economic justice for food producers, as well as a focus on enhancing on-farm biodiversity and ecosystem function (Wezel, et. al., 2020). The holistic approach to food production and distribution embodied by agroecological principles also leads to improved food security and nutrition for farmers and the communities where they live (Kerr, et. al., 2021). Implementation of agroecologically-aligned policies can also enhance the potential of meeting SDGs (Altieri and Nicholls, 2020), which in turn help to increase the adaptive capacity of farmers managing the effects of climate change (de Schutter, 2020).

However, the definition of agroecology is broad and somewhat contested – to some it specifically refers to ecologically oriented on-farm agronomic practices, while to others it encompasses a wider range of social, political, and economic frameworks embodied by empowering small-scale producers with policies that support their dignified livelihoods (Loconto and Fouilleux, 2019). Agroecology is also simultaneously situated as a science, an agricultural practice, and as a social movement in different contexts and among different actors in the food system (Rivera-Ferre, 2018). Regardless of definition, its focus on the integration of social, economic, and ecological well-being means that agroecology has the potential to engender true transformation of the food system (Gliessman, 2016). As the scientific and practical features of agroecological systems become more recognized for their potential to transform agricultural livelihoods, there is concern that the social movement aspect of agroecology – which calls for significant transformation of current food system policies and trajectories – will be left out of policies due to entrenched economic and political interests interested in promoting “business as usual” approaches (Giraldo and Rosset, 2017).

In 2015, the International Forum for Agroecology developed the Nyéléni Declaration, which underscores the integrated social, economic, ecological, and practical aspects of agroecology, as a means for providing a comprehensive definition of the ethics, practices, and orientation of agroecology as a movement (LVC, 2015). Building on the trajectory of highlighting the interconnections between ecologically-based agricultural production systems and beneficial livelihood outcomes, in 2018 the FAO adopted the 10 Elements of Agroecology as a way to measure and scale up implementation and adoption of agroecological production systems (Barrios, et. al., 2020). In 2019, the High Level Panel of Experts on Food Security and Nutrition concluded that agroecology - with its focus on integrated agricultural livelihood systems - is fundamental to bringing about necessary food system transformation (Leippert, et. al., 2020).

Agroecological practices have great potential to enhance climate change resilience, adaptation, and mitigation, as well as provide for meaningful outcomes of co-benefits including biodiversity, improved nutrition and food security, and diversified economic outcomes (Sinclair, et. al., 2019). Many of these practices are specifically referred to as key components of agricultural adaptation to climate change in a report generated for the UNFCCC (Meridian Institute, 2011). Agroecological farming practices include improving soil health through reduced tillage, use of cover crops and animal manures for soil fertility building, and crop rotation and

diversification, as well as improved water management (Altieri, et. al., 2015). The core principles of agroecology also include knowledge sharing, strengthening local economic opportunities, equitable land and resource access and governance, all of which contribute to the type of food system transformation necessary to adapt to climate change (Leippert, et. al., 2020). By focusing on traditional and diversified skills, nutrition and food security, and knowledge co-creation, agroecology also has the potential to foster increased gender equity and women's representation in food systems (Anderson, et. al., 2019). As governments, NGOs, farmers and resource managers, and civil society groups contend with increasing and interrelated climate and food system challenges, it is clear that agroecology offers durable, flexible, and long-lasting solutions to these significant and growing concerns (Smith, et. al., 2020).

Now that most countries in the world have signed onto the Paris Agreement, the mechanisms of actions embedded within the agreement, specifically the Nationally Determined Contributions (NDCs), represent a means by which parties to the Agreement can be assessed around what is and is not included in their climate policies, as well as whether the pledges will meet global climate targets (Van Dyck, et. al., 2016). The development of NDCs and the Global Stock Take (GST) to increase ambition and ensure mitigation goals are being met represents a significant and measurable climate-related policy instrument from which national and sub-national policies can align to, support, or detract from (Hermwille, et. al., 2019). However, the NDCs vary widely in their scope, rigor, and scale and process of implementation (Pauw, et. al., 2018). This is partly due to the uneven process of preparing the NDCs between signatories of the Paris Agreement, with some countries having less access to data and other resources that would have contributed to more comprehensive commitments (Röser, et. al., 2020). With many countries adding climate policy into existing social, political, and economic policymaking frameworks and networks, it is critical to understand the interactions of these policy processes to ensure the ambition of the commitments put forward by the NDCs will fulfill the goals of the Paris Agreement (Pauw, et. al., 2018). In some cases, the NDCs were created as a means of fulfilling the Paris Agreement, but haven't been based on robust national or sub-national policies to assist with their implementation (Laudari, et. al, 2021).

Policymaking around environmental concerns is known to regularly entail cross-scale networking and feedback processes (Bulkeley, 2005). Sub-national and non-state actors engage with climate-related policies in a variety of ways, which can result in varying effects on the

scope and efficacy of NDCs (Hsu, et. al., 2020). This type of polycentric, multi-level engagement in policy creation and implementation represents the type of diverse and inclusive governance that many have sought to bring about in the climate change policymaking sphere (Jordan et. al., 2015). However, embedded power structures are still at play even though there may be diverse stakeholders involved in the policymaking process, and may lead to more “business as usual” policy outcomes (Morrison, et. al., 2017).

Aligning climate policies with national and sub-national economic development, land use, and other policies creates opportunities for coordination from local to national levels, which in turn can ensure implementation of meaningful and actionable climate policies (DiGregorio, et. al., 2017). The NDC development process is well-suited to integrate feedback from multiple stakeholders in the policymaking process (Paim, et. al, 2020). However, with diverse actors working at different scales and nodes within the policymaking framework, there remains a question about coherence between NDCs and other national, regional, and sub-national policies leading to desired outcomes as far as reaching climate targets and enabling adaptation (Di Gregorio, et. al., 2019). Despite the potential for lack of coherence among NDCs and national, regional, and sub-national policies, the ongoing requirements for reassessment built into the NDC framework, as well as the ways in which the process itself contributed to cross-sectoral and cross-scale interactions between different levels of government, non-state actors, and civil society, may contribute to future NDCs being more representative of national policy priorities (Röser, et. al., 2020).

When it comes to agricultural policies, the first round of NDCs varied widely between countries in terms of types of practices supported and general focus (Johnson, 2018). Agriculture has generally been under-represented in climate policy negotiations, though the NDC process created an opportunity to give more prominence to the agricultural sector (Soto Golcher, et. al., 2018). With the next iteration of NDCs coming forward in 2020-2021, and repeated every 5 years after that during the GST process, there are many opportunities for strengthening and implementing policies that can be reflective of agricultural policy goals shared at every scale of engagement (Ross, et. al., 2019). For climate-related land use and agricultural policies in particular, the NDCs represent an opportunity to simultaneously enhance SDGs, which in turn can help strengthen commitments to meeting NDCs by demonstrating the

interconnected and synergistic nature of these commitments (Atteridge, Verkuijl, and Dzebo, 2020).

Given the robust benefits that agroecological practices offer to agricultural climate change adaptation and mitigation efforts, as well as their contribution to overall transformation of food production and livelihood systems, it is important to determine whether and how agroecology is represented in sub-national, national, and international climate policies. It is especially relevant to determine the presence of agroecology in NDCs, as this investigation can help frame where different actors in national and sub-national policymaking can converge to identify those policy frameworks that can best amplify agricultural and other policies best-suited to address both climate change and sustainable development. In order to both scale up agroecology and meet the commitments of emissions reductions and other climate-related goals, it is necessary to align international policies with national, sub-national, regional, and local policies (Ostrom, 2010). Identifying whether there is policy coherence among the various levels of agricultural and climate policymaking helps to identify knowledge and policy gaps, potential levers for change for further policy integration and implementation, as well as policy bottlenecks or areas where policies may be working against each other.

Methodological Approach

In this study, I sought to determine the presence of agroecology in international climate policies, as well as national and sub-national domestic agricultural or resource management policies. I first looked at the number of countries that featured agroecology policies at the national or sub-national levels. To do this, I undertook a search for “policy” using FAO’s AgroecologyLex database to determine the presence of national and sub-national policies supporting agroecology. I also utilized the findings of Giraldo and McCune (2019), who provide an in-depth look at agroecology policies in Latin America, some of which were not included in the FAO AgroecologyLex database.

From there, I examined the NDCs of each of the countries that feature national or sub-national policies supporting agroecology using the UNFCCC’s Interim NDC Registry, and searched the documents for “agroecology,” if submitted in English, “agroecología,” if submitted in Spanish, “agroécologie,” if submitted in French. I also searched the documents for the phrase “agro” in case of different or hyphenated spellings (such as agro-ecology). From there, I

analyzed which countries include agroecology in both their international climate policies through their NDCs and also support agroecology in their national and sub-national policies, which point to coherent commitments to agroecological-based agricultural endeavors as a means to strengthen climate goals.

I also analyzed available literature pertaining to the presence of agroecology in NDCs utilizing data from Leippert, et. al. (2020) and Johnson (2018), but found slightly different results from what their analyses show. I examined whether this discrepancy was due to updated submissions omitting the term agroecology from the NDC text by looking at both archived and updated first NDCs for all countries mentioned by Leippert, et. al., (2020) and Johnson (2018) as including agroecology in their NDCs. Because of this discrepancy, I also searched all of the NDCs mentioned by Leippert, et. al. (2020) and Johnson (2018) for “agro” in order to determine the presence of agroecology, agro-ecology, agroecología, agroécologie, or an alternative spelling of the word. Then, to ascertain whether references to agroecology were increasing in more recent NDC submissions, I searched for “agro” in all Second NDCs submitted as of the date of this investigation.

Results

This analysis found that of the 192 countries that have submitted NDCs as parties to the Paris Agreement, only 11 countries include agroecology in their current NDCs (*Table 1, Figure 1*). Several other countries reference conservation agriculture, sustainable agriculture, and Climate Smart Agriculture. Some incorporate elements of agroecology in their NDCs’ discussions of agriculture, including nutrient cycling, soil building, and enhancing on-farm diversity. Agroforestry in particular is well-represented in NDCs, but doesn’t have the same political associations as agroecology (Futemma, 2020).

Leippert, et. al. (2020) found 17 countries that mentioned agroecology in their NDCs, though this search found only 11 countries with current NDC submissions directly referencing agroecology. Interestingly, the first NDC submissions of Nigeria, Honduras, Congo, and Rwanda, which are now archived, mentioned agroecology as a practice to promote soil and resource conservation, but their updated NDCs do not mention agroecology. Leippert, et. al. (2020) also noted Afghanistan, Tunisia, Gambia, and Seychelles included agroecology in their NDCs, but this analysis found these countries to reference organic or conservation agriculture, rather than

agroecology specifically. Several countries have First NDC submissions that are now archived and replaced by Updated NDC submissions that serve as the country’s actual commitments (Table 2, Figure 2). Of the 11 countries that have submitted Second NDCs as of this writing, none of them included agroecology. However, none of these countries were ones that referenced agroecology in their First NDC submissions.

On a national and sub-national level, 44 countries have specific policies promoting agroecology (Table 3, Figure 3). However, only 4 of these countries - Uruguay, Venezuela, Mexico, and Burundi - feature agroecology in their NDCs and have policies that support agroecology within the country (Table 4, Figure 4). These countries are poised to demonstrate the inherent climate solutions offered by an agricultural policy transition towards agroecology.

Table 1: Countries with Agroecology in NDCs - (11)

Cambodia	Central African Federation	Mexico	Côte d'Ivoire
Venezuela	Uruguay	Togo	Burundi
Comoros	Chad	Democratic Republic of Congo (DRC)	

Figure 1: Countries with Agroecology in NDCs

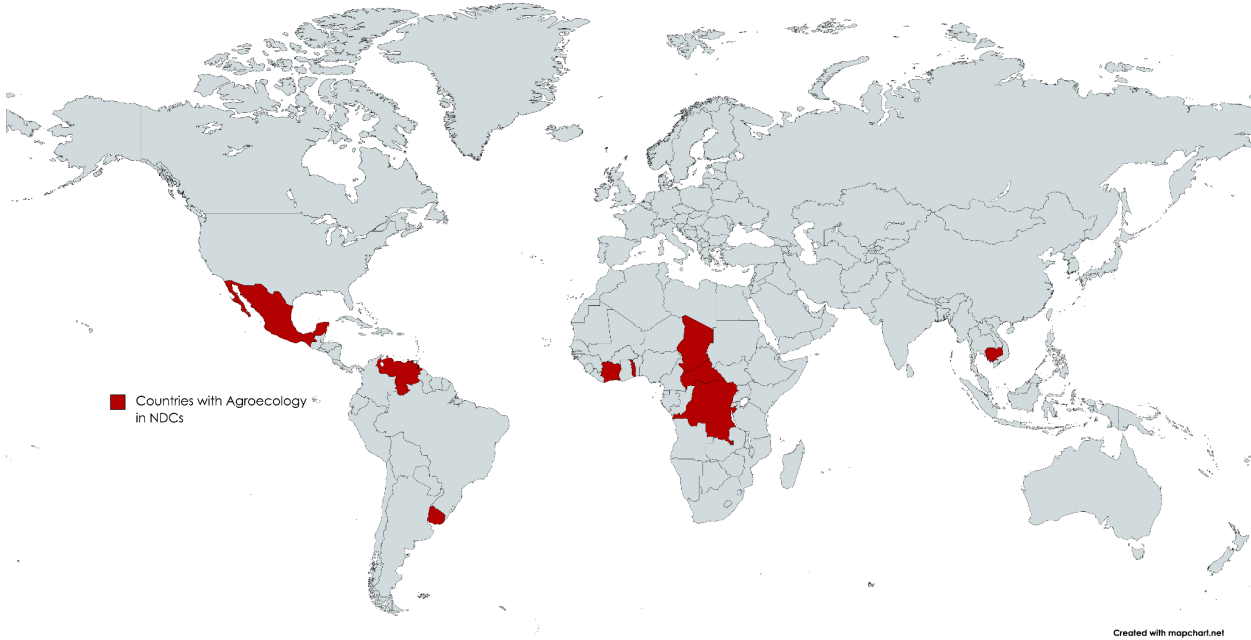


Table 2: Countries with Agroecology in Archived NDC Submissions - (4)

Honduras	Nigeria	Rwanda	Congo
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Figure 2: Countries with Agroecology in Archived NDC Submissions



Table 3: Countries with National or Sub-National Agroecology Policies - (44)

Italy	Brazil	Costa Rica	Switzerland
Inner Mongolia	Norway	Rwanda	Tajikistan
Micronesia	Denmark	Romania	N.Macedonia
S. Africa	Austria	Peru	El Salvador
Mexico	Moldova	Belarus	Jamaica
Bulgaria	Finland	Lesotho	Albania
Tunisia	Turkey	Burundi	India

France	Uruguay	Argentina	UK
Portugal	Venezuela	Bolivia	Honduras
Cuba	Nicaragua	Ecuador	Belgium
Senegal	Solomon Islands	Zimbabwe	Spain

Figure 3: Countries with National or Sub-National Agroecology Policies

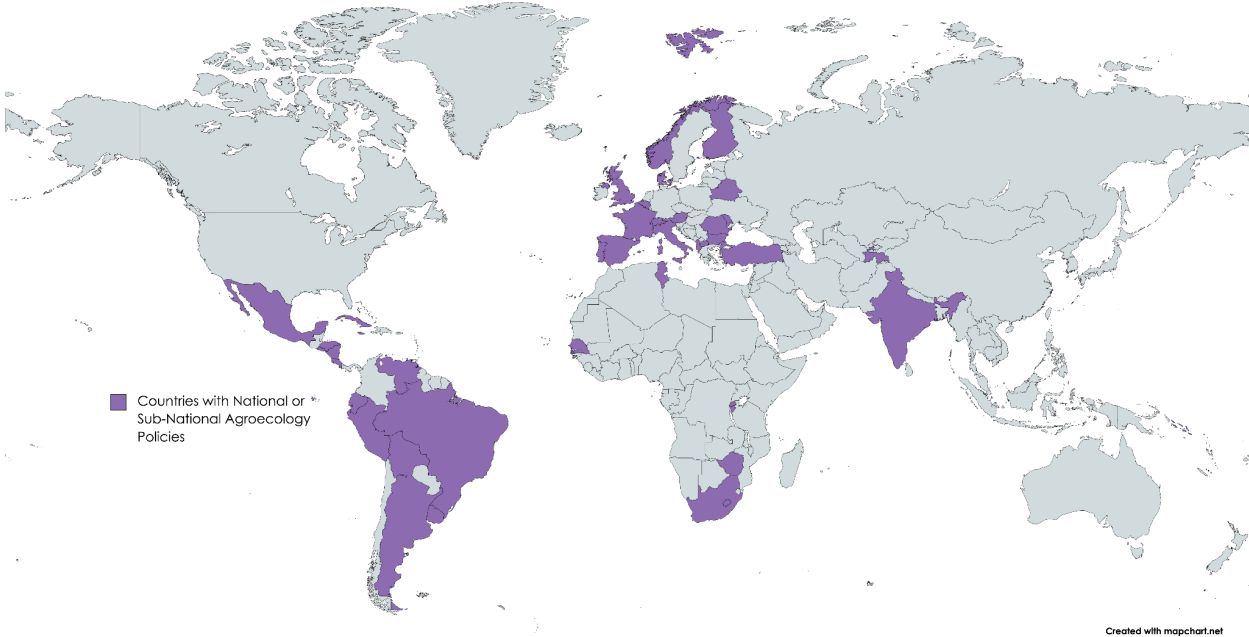


Table 4: Countries with Agroecology in NDCs and National, Regional, or Sub-National Policies - (4)

Uruguay	Venezuela	Mexico	Burundi
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Figure 4: Countries with Agroecology in NDCs and National, Regional, or Sub-National Policies



Discussion

Geographic Distribution and Case Studies of Agroecology Policy Integration in NDCs

In Mexico, Uruguay, Burundi, and Venezuela, there is some alignment between the NDCs and existing national and sub-national policies. In Uruguay, agroecology has a long history - its first use in a publication came from the Association of Agricultural Engineers of Uruguay in 1939, and this conceptual framework has been used in the ensuing decades by many sectors of policy making including farmer-led groups, academia, civil society, and government ministries (Gazzano and Gomez Parazzoli, 2017). Uruguay’s Climate Change Unit is housed within the Ministry of Housing, Land Use Planning and the Environment, which also includes the National Environment Department (Nunan, et. al., 2012), which points to the likelihood that agricultural and climate policies are coming from a somewhat integrated policy context. Uruguay’s NDC

highlights the preparation of a National Agroecology Plan that will promote agroecological production systems to enhance climate resilience.¹ Integration of agroecology within relevant policy creation contexts in Uruguay, including within government ministries, likely contributed to its presence in the country's NDCs.

Venezuela's NDC explicitly describes national goals of promoting agroecology, featuring specific plans for scaling up agroecology, including the creation of an agricultural university specifically focused on agroecological production.² Venezuela has a long history of promoting agroecology and sustainable agriculture within the country, with 33 separate articles in its constitution relating to sustainable agriculture (Herrera, et. al., 2017). The Bolivarian University of Venezuela has a degree program in agroecology with 9 campuses and numerous *ambientes* or university-affiliated community-based agroecology projects throughout the country - as of 2016, over 1,000 agroecological technicians had graduated from the program (Domené-Painenao and Herrera, 2019). Venezuela also engaged in a process of land reform, granting tenure to small farmers focused on sustainable production and food security rather than export production (Lavelle, 2014). Venezuela's government and existing national policies supporting agroecology likely contributed to its promotion in its NDCs.

In Mexico, the movement towards agroecology also has a long history including large-scale land reform movements, robust farmers cooperatives, and peasant to peasant educational and resource sharing movements (Toledo and Barrerra-Basols, 2017). Many of the scientific tenets of agroecology were inspired by the traditional indigenous farming systems in Mexico (Astier, et. al., 2017). Mexico's NDC mentions agroecology as a key feature of the country's agricultural climate commitments, including the use of traditional knowledge and community resource sharing, as well as the holistic agronomic practices represented by

¹ Uruguay's First NDC (2017) - https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Uruguay%20First/Uruguay_First%20Nationally%20Determined%20Contribution.pdf

² Venezuela's First NDC (2018) - <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Venezuela%20First/Primera%20%20NDC%20Venezuela.pdf>

agroecology.³ Interestingly, Mexico’s updated First NDC submission references agroecology much more explicitly than its archived 2016 submission.⁴

Burundi’s NDC expressly defines the intention to develop “agro-ecological approaches” to agriculture, including soil fertility management through composting and addition of manures, and soil and water conservation.⁵ On a national level, the President of Burundi created the Ministry of Environment, Agriculture, and Livestock in 2018, which helped foster the development of cohesive natural resource management policy priorities.⁶ While not expressly focused on agroecology, the Ministry is focused on supporting traditional farming and resource management systems including the “agro-sylvo-zootechnical” sector by supporting traditional livestock breeding and facilitating horizontal knowledge transfer systems for farmers and other resource managers.

Other countries that mention agroecology in their NDCs include Cambodia, which lists agroecology as an important adaptation action in the agricultural sector in its Updated First NDC,⁷ and the Central African Federation, which situates agroecology in terms of knowledge sharing and technology transfer needed to achieve widespread adoption.⁸ Comoros’ NDC uses conservation agriculture and agroecology interchangeably, and notes that technology transfer to foster widespread adoption of agroecology is necessary.⁹ Chad explicitly defines the need to develop an agroecological approach to agriculture, including practices such as soil conservation,

³ Mexico’s First NDC (2021, Updated) -

<https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Mexico%20First/NDC-Esp-30Dic.pdf>

⁴ Mexico’s First NDC (2016, Archived) -

<https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Mexico%20First/MEXICO%20INDC%2003.30.2015.pdf>

⁵ Burundi’s First NDC (2018) -

https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Burundi%20First/Burundi_INDC-english%20version.pdf

⁶ Burundi’s DECREE N°1001 ON THE ORGANISATION OF THE MINISTRY OF THE ENVIRONMENT, AGRICULTURE, AND LIVESTOCK (2018) -

<http://extwprlegs1.fao.org/docs/pdf/Bur1798231.pdf>

⁷ Cambodia’s First NDC (2020, Updated) -

https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Central%20African%20Republic%20First/INDC_R%C3%A9publique%20Centrafricaine_EN.pdf

⁸ Central African Federation’s First NDC (2016) -

https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Central%20African%20Republic%20First/INDC_R%C3%A9publique%20Centrafricaine_EN.pdf

⁹ Comoros’ First NDC (2016) -

https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Comoros%20First/INDC_Comores_Version_Francaise.pdf

use of manure and compost, and agroforestry.¹⁰ DRC's NDC submission states the need to create an enabling environment for climate change adaptation through the implementation of agroecological farming practices.¹¹ Côte d'Ivoire's NDC highlights agroecology as a practice that can help with soil fertility improvement and conservation.¹² Togo's commitment to agroecology in its NDC is less defined, mentioning only the use of "good agro-ecological practices."¹³ However, these countries do not appear to have significant national or sub-national policies in place to support the widespread integration and implementation of agroecological principles and practices into the agricultural sector at this time.

4 countries - Rwanda, Honduras, Congo, and Nigeria - included agroecology in their first NDC submissions that were later archived, and the Updated First NDCs do not reference agroecology. Honduras has a long history of organizing to scale up agroecology in the country, but the national government has historically not been very responsive to grassroots movements for social and economic justice, including efforts to enshrine support for agroecology in national policies (Giraldo and McCune, 2019). The military coup and removal of President Manuel Zelaya in 2009 cemented this trend, and national policies in Honduras continue to support input-intensive and commodity-based agricultural systems (Escoto and Brescia, 2017).

Rwanda's First NDC submission in 2016 explicitly mentioned agroecology, and the country's 2018 National Agricultural Policy emphasizes agroecology-informed practices including agroforestry, soil and water conservation, and watershed restoration (Ashley, 2020). However, its updated submission of the First NDC in 2020 omits the term and the associated practices. This may be due to the influence of the dominant agricultural policy trajectory over the past several decades, represented by the Crop Intensification Project (CIP), which is largely focused on high input agricultural production (Clay and King, 2019).

¹⁰ Chad's First NDC (2017) - <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Chad%20First/CPDN%20TCHAD%20Version%20officielle%2028%20sept%202015.pdf>

¹¹ DRC's First NDC (2017) - <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Democratic%20Republic%20of%20the%20Congo%20First/CPDN%20-%20R%C3%A9p%20D%C3%A9m%20du%20Congo.pdf>

¹² Côte d'Ivoire's First NDC (2016) - https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/C%C3%B4te%20d%27Ivoire%20First/INDC_CI_22092015.pdf

¹³ Togo's First NDC (2017) - https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Togo%20First/INDC%20Togo_english%20version.pdf

Nigeria's first NDC submission from 2017 described farmers using agroecological methods to increase climate resilience of farming systems, in direct contrast to high input agricultural systems.¹⁴ However, its updated submission in 2021 does not include this description, and instead focuses on Climate Smart Agriculture (CSA).¹⁵ Many policies in Nigeria support high-input agricultural systems, and the prevalence of agroecological farming is relatively low, though there are efforts on behalf of some farmers' groups and extension agents to scale up agroecology in the country (Emeana, et. al., 2019). Congo's First NDC submission (now archived) in 2017 called for agriculture to "resolutely" move in the direction of agroecology.¹⁶ Its Updated First NDC submitted in 2021 omits agroecology and instead refers to "climate-intelligent" agriculture.¹⁷ Congo's main agricultural policies are based on strengthening agricultural exports and input-intensive agriculture (Nzaou-Kongo, 2021).

It appears that in Honduras, Rwanda, Nigeria, and Congo, there were some efforts to remove agroecology from the NDCs in between the submission of the First NDCs and the Updated First NDCs, potentially to replace the more politically associated term of agroecology with those like CSA that are more benign but are assumed to engender somewhat similar practices (Taylor, 2018). However, CSA is loosely defined, and while it may incorporate some agronomic principles of agroecology, it also promotes other practices, such as use of herbicides and other pesticides, patented seeds, and large-scale monoculture production that make it more favorable in maintaining the current dominant agricultural policy framework in many countries (Pimbert, 2015). In contrast, agroecology is expressly focused on promoting food sovereignty, which entails ensuring social and economic justice and political agency for farmers and other resource managers (Anderson, et. al., 2015). Policies that support the fullness of the aims of the agroecology movement represent a significant departure from "business as usual" agricultural policies, and therefore may have more barriers to implementation (Dumont, et. al., 2021).

¹⁴ Nigeria's First NDC (2017, Archived) - https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Nigeria%20First/Approved%20Nigeria%27s%20INDC_271115.pdf

¹⁵ Nigeria's Updated First NDC (2021) - <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Nigeria%20First/NIGERIA%202021%20NDC-FINAL.pdf>

¹⁶ Congo's First NDC (2017, Archived) - https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Congo%20First/NDC_Congo_RAPPORT.pdf

¹⁷ Congo's Updated First NDC (2021) - https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Congo%20First/CDN_Congo.pdf

Agroecology in National and Sub-National Policies

13 of the 44 countries with agroecology represented in national or sub-national policies are in Latin America, pointing to robust organizing and policy creation mechanisms for agroecology at the local/national levels in these countries (Sabourin, et. al., 2018). Agroecology has a long tradition of representation in many Latin American countries, having arisen as a counterpoint to intensive and extractive agricultural systems that have become common in the region over the last several decades (Altieri and Nicholls, 2017). But this policy interest and support for agroecology does not appear to have translated into international climate policy agreements for every country, even those with strong national and sub-national policies supporting agroecology like Cuba and Brazil, which do not include agroecology in their NDCs. This could be related to historical asymmetries between civil society and peasant movements, which are particularly strong in Latin America, being left out or underrepresented in the international climate negotiations that led to the Paris Agreement (Mauelshagen and Lopez-Rivera, 2020).

In Brazil, robust sub-national and national organizing around agroecology has resulted in numerous state and federal policies supporting agroecology (Milhorance, et. al., 2020). Brazil has a long history of agroecological and “alternative” agricultural systems being promoted throughout the country on various scales (da Costa, et. al., 2017). Of the 81 entries found under the search for national and sub-national policies featuring agroecology in the FAO’s AgroecologyLex database, 43 are from Brazil. In an analysis of the ways that NDCs are incorporating sub-national governments as intrinsic parts of implementing the NDCs, Brazil is featured as one that includes sub-national governments as critical to achieving both adaptation and mitigation goals (Barletti, et. al., 2018). However, despite the presence of numerous national and sub-national policies supporting agroecology, Brazil also heavily promotes and subsidizes large-scale intensive agricultural systems, and these policies are often at odds with those policies supporting agroecology (Candiotto, 2018). Perhaps owing to the large emphasis on intensive agriculture in many national and sub-national policies, Brazil’s NDC does not include agroecology as part of its climate policy commitments.

Similar movements promoting agroecology and embedding its principles and practices in national and sub-national policies have taken place in several other Latin American countries

including in Nicaragua and Cuba (Val, et. al., 2019). Nicaragua passed the Agroecological Promotion and Production Law in 2011, and Cuba features a National Program of Urban, Suburban, and Family Agriculture that is based on agroecological principles (Murguia Gonzalez, et. al., 2020). El Salvador has several well-organized agroecological farmers groups that have sought to create national public policies, and whose failures provide an opportunity to understand how agroecology, with its particular emphasis on social and economic justice, is difficult to create enduring policies around in many contexts (Murguia Gonzalez, et. al., 2020).

In Africa, a few countries have national or sub-national policies supporting agroecology or elements of agroecology, including Zimbabwe and Senegal. In Senegal, the Comité National de Concertation des Ruraux du Sénégal (CNCR), a network of small farmers and pastoralists, was instrumental in facilitating the country's adoption of the 2004 "Agro-Sylvo-Pastoral" Law, which strengthens the rights of agroecological producers (Bottazzi and Boillat, 2021). In Zimbabwe, recent land reform policies have strengthened the rights of small-scale producers, and though they aren't specifically related to agroecology (Cliffe, et. al., 2011), farmer-led movements in the country around agroecology are also ongoing (McAllister and Wright, 2019). However, neither of these countries feature agroecology in their NDCs, and this analysis found that most NDCs from African countries mention CSA as their main focus of climate-related agricultural policy. An analysis of policy coherence between NDCs and national development agendas in southern Africa found that in most cases, the NDCs were created to satisfy the needs of the international commitments, and developed without significant input from national or sub-national policymakers or other stakeholders (England, et. al., 2018).

In India, the government of the populous state of Andhra Pradesh has committed to scaling up Climate Resilient Natural Farming, which includes a focus on healthy soils, limiting use of synthetic pesticides and fertilizers, biodiversity-enhancing farming systems, landscape regeneration, and farmer-led organizing and knowledge-dissemination systems, all of which align closely with the principles of agroecology (FAO, 2020). However, this approach to agriculture is still far from mainstream, with around 5% of farmers nationwide utilizing these practices (Gupta, et. al., 2021). India also passed the National Agroforestry Policy in 2014, which offers some support for agroecologically-aligned farming practices (Chavan, et. al., 2015). Despite some representation at the sub-national policy level, India's NDCs are oriented towards more intensive agriculture systems (Amjath-Babu, et. al., 2020).

Several countries in the EU have national or sub-national policies that promote agroecology, but their NDCs were submitted under the umbrella of the EU as a whole, and agroecology is not mentioned in the EU NDCs.¹⁸ France passed a law in 2014 that describes agroecology as a suite of farming practices that minimize environmental impact, and also identifies the need to preserve family farming and relocalize food production (Ajates Gonzales, et. al., 2018). Austria has the highest share of organic agriculture in the EU, and several regional and sub-national policy initiatives to support knowledge sharing between farmers and distribution of agroecological products (Katzlinger, 2020). Several municipalities in Spain have recently adopted policies supporting agroecology, including Valencia, Madrid, and Barcelona, but these have yet to be formalized at the state or national level (Taboada, et. al., 2020). However, the Common Agricultural Policy (CAP) adopted by the EU heavily favors high-input production models, which are at odds with national policies designed to promote smaller-scale, more agroecologically-oriented farming systems (Wezel, et. al., 2018).

Though several countries have policies that support agroecology or elements of agroecology, their distribution, scale, scope, and implementation is uneven. In places where robust national and sub-national policies exist, integration with international climate commitments are still relatively rare. Examining the means by which policy change can occur to scale up the widespread adoption of agroecology as a means of responding to climate change is therefore necessary.

Path Dependency, Leverage Points, and Agroecology Policy Integration

Current institutions and policies in almost all parts of the world continue to heavily favor and promote non-agroecological agricultural practices, (McMichael, 2013), and this trend may also be playing out in climate change-related agricultural policies because these policies and the agricultural systems that they enable are highly entrenched (Röhring and Gailing, 2012). According to Johnson (2018), the Paris Agreement itself creates an enabling environment for the persistence of the existing intensive agricultural policy model because of its focus on promoting “technological solutions” to address climate change. Agroecology, on the other hand, is not heavily reliant on outside inputs or technological approaches, though it doesn’t

¹⁸ EU’s Updated First NDC (2020) - https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/European%20Union%20First/EU_NDC_Submission_December%202020.pdf

categorically exclude them (Johnson, 2018). Instead, agroecology's focus on resource enhancement and recycling, knowledge sharing, and biodiversity enhancement will require different types of policies to implement in a comprehensive manner to achieve its multifaceted goals (Dumont, et. al., 2021). It appears that in most countries, even those with robust national or sub-national policies supporting agroecology, path dependency effects maintaining and supporting high-input agricultural systems are well-represented in international climate commitments.

Policies supporting resource-intensive agricultural systems are present on multiple scales throughout the food system, including in academic research agendas, seed and technology ownership, and crop distribution, marketing, and subsidy opportunities (Holt-Giménez, 2019). The structural "lock-in" of these intersecting policies make scaling up agroecology difficult, but policies that create an enabling environment for agroecology, including funding research and education on agroecology and developing markets suited to agroecologically-produced items can help in the transition (Giraldo and Rosset, 2018). Where agroecology has successfully scaled up, including in those countries that now boast robust national or sub-national agroecology policies, a series of conditions and drivers were in place to enable the scaling up of agroecology within larger policy frameworks, including the existence of effective agricultural practices, favorable markets, social organization and educational opportunities, as well as crises that precipitated a search for alternatives (Mier y Terán Giménez Cacho, et. al., 2018).

The fact that crises and their aftermath have been one of the factors leading to the creation and adoption of robust agroecology policies is important for understanding potential policy futures for inclusion of agroecology in climate change policies. Crises, including the civil war and associated economic disruption leading to the Campesino a Campesino Movement in Nicaragua, the US embargo against Cuba and the fall of the Soviet Union leading to widespread prominence of agroecological farming, and volatility of coffee prices resulting in the strengthening the movement toward cooperative, agroecologically-oriented production models in Chiapas, Mexico, led people towards agroecology rather than towards further iterations of high-input agricultural systems (Mier y Terán Giménez Cacho, et. al., 2018). The patterns represented by these examples speak to the ways that the underlying principles engendered by agroecology are viewed as a viable alternative to those processes and policies that are leading to the crises they experience.

That these crises resulted in a relatively rapid reorganization of policy priorities is indicative of the Punctuated Equilibrium Theory of policy change as defined by Baumgartner, et. al. (2014). Within this framework of understanding policy shifts, destabilizing events lead to major changes over a short period of time, differentiating significantly from the more normal, incremental policy making process (True, et. al., 2019). In terms of crises informing policy transformation, climate change certainly represents a moment of punctuated equilibrium that necessitates bold, creative, and comprehensive action, and the Paris Agreement represents the result of years of negotiation around the best way for countries to meaningfully address a multifaceted and long-term challenge (Klein, et. al., 2017).

As a policy document, the Paris Agreement represents a novel approach to international policy cooperation through the voluntary, bottom-up nature of the NDCs (Bultheel, et. al., 2016). The NDC framework is based on a “ratcheting” mechanism, by which countries update, adapt, and increase their greenhouse gas emissions reductions and related climate policy commitments every 5 years through the Global Stock Take (GST), the first of which will occur in 2023 (Milkoreit and Haapala, 2019). This structure provides more flexibility for each country in coming up with commitments based on feedback from constituents and their national context (Zaman, 2018). Policies made with built-in mechanisms for remaining responsive and relevant are more durable over the long-term, which hopefully translates into long-lasting climate policies (Koski and Workman, 2021). By building this mechanism of ever-increasing ambition of nationally determined climate commitments into the Paris Agreement, there is a greater likelihood that signatories will be able to achieve the targets they’ve created themselves, rather than through a top-down process of enforcing emissions targets (Termeer, et. al., 2017).

However, there is wide variation in format, scope, and ambition of the NDCs between different countries, which would be helped by normalizing the format and content of the NDCs in order to make effective comparisons and policy recommendations (King and Van Den Bergh, 2019). In addition, it is necessary that each country create and maintain a viable Measurement, Reporting, and Verification (MRV) system that will facilitate comprehensive accounting of emissions (Holz and Ngwadla, 2016). At this time, it is clear that the most recent analysis of NDCs demonstrates that national commitments are falling short of emissions reductions goals, and more ambitious and implementable policies are necessary to achieve the goals of the Paris Agreement (Streck, 2020). And, the specific means by which this ratchet mechanism works in

terms of ensuring either implementation or compliance is not detailed within the Agreement itself, leaving some question about what procedures are in place if climate commitments are not sufficiently ambitious (Van Asselt, 2016). Nonetheless, the design of the NDCs and the GST processes provide a unique means through which national-level policy processes can inform international climate policy commitments (Hermwille, et. al., 2019). The intention of the Paris Agreement is to facilitate robust national climate dialogue and policy creation which in turn forms the basis of strong and implementable international climate commitments.

Given the trend of countries changing the language and focus of the NDCs in updated submissions to exclude agroecology (in the case of Honduras, Congo, Nigeria, and Rwanda), and strengthen the language of including agroecology (in the case of Mexico), there appears to be some flexibility in these submissions, and also room for various policy actors to insert updates in ways that reflect their changing interests. This aligns with the findings of Leinaweaver and Thomson (2021), who identify distinct political positions presented throughout various NDC submissions. Though it is not clear why agroecology was omitted from these updated First NDCs, it could be that most NDC submissions represent the belief that incremental policy change will lead to hoped-for climate outcomes, instead of advocating for the comprehensive system-wide transformation which agroecology represents (Jernnäs and Linnér, 2019).

This makes it even more important that stakeholders promoting agroecology policies on a national level find ways to engage in the creation of future NDCs as countries continue the process of enhancing their climate ambition and commitments. Veiga and Garcia (2020) posit that the NDCs play the role of a “transmission belt” between national and international policymaking in that they can act as drivers of policy change on both levels. Since the NDC process represents a unique context of national-international policymaking (Hermwille, et. al., 2019), there are several leverage points for agroecological stakeholders to engage in national policymaking that can in turn influence NDCs, including NDC development, NDC adoption and submission, and NDC implementation (*see Figure 5 below*).

Leverage Points for Agroecology Stakeholder Engagement in the NDC Process

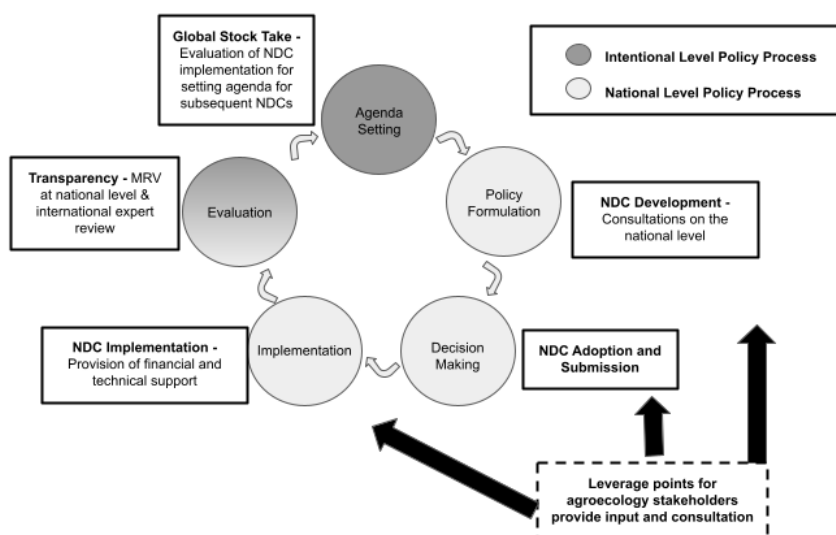


Figure 5: Leverage Points for Agroecology Stakeholder Engagement in the NDC Process (adapted from Hermwille, et. al., 2019).

Leverage points are those places in a system or process where interventions could lead to substantial transformations (Meadows, 2008). These leverage points exist within dynamic social, political, and cultural contexts that vary considerably between countries, but understanding their role in laying the groundwork for potentially transformative policies is critical in the era of climate change policymaking (Linnér and Wibeck, 2021). Leverage points for agroecology stakeholders will likely also vary by country depending on policy cycles already in place, but parallel policy processes around climate change can be instructive for understanding how stakeholder input can transform policy narratives (Upadhaya, et. al., 2018).

In all contexts in which agroecology has risen to national policy prominence, a variety of policy entrepreneurs, including from academia, civil society, farmers' networks, governmental employees, and elected officials have been instrumental in advancing agroecology policies (Giambartolomei, et. al., 2021). In countries like Uruguay and Venezuela, where agroecology is present in both NDCs and national and sub-national policies, cohesion amongst government ministries and other policymakers in climate change-related agricultural policies laid the groundwork for integrated national and international commitments. In countries with robust national and sub-national policies supporting agroecology like Brazil and Cuba, identifying the

avenues by which consultation between policy actors working on NDC development and those working on national and sub-national policies can occur to better integrate agroecology into future NDC submissions.

However, there remains a question about whether policies that promote agroecology are conforming to existing policy narratives by offering more ecologically beneficial agricultural practices in the context of existing agricultural systems, or whether they are acting in a more comprehensive way to reshape relationships to food, land, economies, and sociopolitical relationships (Levidow, et. al., 2014). Some argue that agroecology may be better suited to remain outside of formal policy contexts, because it is unlikely that the full spectrum of what the concept offers in terms of socioeconomic reforms will be adopted by state governments (Murguia Gonzales, et. al., 2020). When it comes to integration points between agroecology and climate policy, it is also important to consider whether and how policies designed to specifically address greenhouse gas emissions, like the NDCs, overlap with cross-sectoral policies aimed at addressing other environmental and development issues (Adelle and Russel, 2013). Because agroecology has the potential to holistically address challenges associated with food production, meeting Sustainable Development Goals, and adapting to climate change, it seems like a natural fit for incorporating into climate change-related policy frameworks, but its system-transforming approach may be what is keeping it from widespread adoption (Giraldo and Rosset, 2017). Nonetheless, it is precisely this scale of transformation that many argue is necessary to comprehensively mitigate, adapt, and respond to climate change (Fedele, et. al., 2019).

Scaling Up Agroecology

When it comes to agricultural climate change policy, in many of the case studies outlined above, significant organizing around disseminating, promoting, and implementing agroecological practices resulted in the eventual creation of national and sub-national policies, pointing to the importance of such bottom-up efforts in supporting the transition to agroecology (Bui, et. al, 2016). Even where agroecology is not currently present or prominent in national or sub-national policies, organizing to promote agroecology is ongoing in many countries - La Via Campesina, the movement dedicated to advancing adoption of agroecology operates regional agroecology training schools in Paraguay, Nicaragua, Indonesia, India, and

plans to develop others in Mozambique, Zimbabwe, Niger, and Mali (Rosset and Martínez-Torres, 2012).

Where agroecology has been successfully integrated and scaled up into national and sub-national policies, it has been as a result of multifaceted educational, economic, and political organizing, and further agroecological innovations will require similar political engagement (Treyer, 2020). Some of the most salient types of policy instruments that can foster the scaling up of agroecology include those that ensure access to markets and stabilize land and resource tenure, as well as those that enforce strong environmental regulations and provide agroecologically-aligned subsidies (Le Coq, et. al., 2019).

However, as public policies promoting agroecology are put into place, it is important that they strengthen both the technical practices as well as the the horizontally-oriented resource and knowledge sharing aspects of agroecology, as there are concerns that agroecology could be watered down into representing those features (generally the technical or productive aspects) that may be more politically easy to integrate into existing policy frameworks (Giraldo and McCune, 2019). Scaling up agroecology calls for recreating all levels of the food system from production to consumption, and policies enacted to support this transition must reflect that deep transformation (Gaitán-Cremaschi, et. al., 2019). As noted by the countries that already have agroecology policies in place at the national and sub-national levels, these policy making efforts should include building alliances between farmers and non-farmers, urban and rural stakeholders, civil society organizations, academia, and government agencies (Oteros-Rozas, et. al. 2019). It is in this way that the movement toward agroecology can contend with, and even transform the dominant paradigm of agricultural policies that favor high-input, export-oriented production (Anderson, et. al., 2019).

A transition away from conventional agriculture towards agroecology has the potential to stabilize greenhouse gas emissions and the worst effects of climate change, while also contributing to a nutritious and secure food supply, and though the transition will be challenging, this multifaceted transition is necessary to meet the needs of future populations living with the effects of climate change (Bombelli, et. al., 2019). The scope of ambition in remaking the food system rivals the challenges associated with meeting the goals of the Paris Agreement, and because the current NDCs are not sufficient to meet the 2°C warming goal,

they must become more both more ambitious and implementable through aligning with similarly ambitious and transformative national policies (Pauw and Klein, 2020).

Conclusion

Although agroecology is not well-represented in NDCs at this time, there is great potential for national and sub-national policy actors to scale up engagement in the NDC creation process and ensure the inclusion of agroecology in further iterations of the NDCs. Countries that have existing national or sub-national policies supporting agroecology are especially poised to take meaningful action to position agroecology as a standard of agricultural policy within international climate agreements. Identifying the processes that led to agroecology policy creation in those countries where agroecology policies have been adopted is critical to understand, as it has largely been through popular movements, networks, and coalitions of farmers, academia, NGOs, and certain sectors of government, as well as intersections with crises where ‘business as usual’ agricultural approaches were seen to not be working, which have brought about significant policy changes on the national and sub-national levels. These processes have helped to accelerate the adoption of agroecologically-aligned policies, and further integration between these nationally-implemented policies and the NDCs will be necessary to continue to scale up agroecology as a meaningful approach to food system transformation and climate change adaptation and mitigation.

The national/international policy cycle embedded in the Paris Agreement is especially important for countries that have existing national and sub-national agroecology policies, as there is great potential for encouraging the inclusion of agroecology in future NDCs as a means of harmonizing national and international climate-related policies. As governments continue to develop ways of increasing climate ambition through the GST starting in 2023, there remain ample opportunities for including agroecology in the NDCs as a way to strengthen and improve climate commitments. Though several countries have policies that support agroecology or elements of agroecology, their distribution, scale, scope, and implementation is uneven. In places where robust national and sub-national policies exist, integration with international climate commitments are still relatively rare.

Examining the means by which policy change can occur to scale up the widespread adoption of agroecology as a means of responding to climate change and meeting other SDGs is

necessary. In countries where these movements have been ongoing for decades, including Uruguay, Mexico, and Venezuela, agroecology is considered an integral part of both agricultural policy and NDCs. However, in other countries like Cuba, Brazil, and Nicaragua, where agroecology is also strongly represented at the national and sub-national level, there is less integration of agroecology at the level of international climate commitments. Agroecology stakeholders in these countries are well-positioned to engage in the process of NDC creation and implementation as a means to scale up agroecology by putting forward truly transformative policies as part of their climate commitments. Identifying the leverage points for agroecology stakeholders to engage in and consult on embedding systems-transforming agroecology policies as anchors of domestic and international climate policies will enable the movement towards a just, regenerative, and equitable future for all.

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