

Article

Agroecology to Promote Just Sustainability Transitions: Analysis of a Civil Society Network in the Rwenzori Region, Western Uganda

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Abstract: Agroecology is gaining ground within the debate on how to address systemic social and environmental problems in agriculture. However, it remains marginalized in agricultural research and development plans around the world. This paper analyzes agroecology as a socio-technical niche in Uganda, where its emergence in part can be seen as an unintended consequence of neoliberalist development. The case studied is a civil society network that links farmer groups and non-governmental organizations across different levels. Through the analytical lens of regime dimensions, we find that agroecology is practiced as a smallholder-centric approach that champions collective action, locally appropriate technologies, participatory methods in research and extension, and calls for more active state guidance of agricultural change along specific principles. However, two major concerns are raised; the niche converges with the dominant discourse around commercialization, and policy advocacy is hampered by the apolitical history of NGOs and an increasingly tense political climate. These two areas are critical for agroecology to contribute to just sustainability transitions, and civil society organizations with strong links to smallholder farmers need to be included in the growing scholarly debate both to inform it and to receive guidance from it. Transition frameworks can help facilitate the development of viable institutional designs and explicitly transformative strategies, but we also point towards the need for engagement with theories on civil society collective action and political mobilization.

Keywords: agroecology; just transitions; agricultural development; Uganda; civil society; transformative potential

1. Introduction and Aim

As part of the ambitions of the United Nations to “*end hunger, achieve food security and improved nutrition, and promote sustainable agriculture*”, the Sustainable Development Goals (SDGs) of the United Nations emphasize the need for significantly increasing productivity and incomes among smallholder farmers around the world. Simultaneously, it is also acknowledged that food production systems must maintain healthy ecosystems and genetic diversity, not least given the impacts of climate change [1]. Agricultural development in sub-Saharan Africa is of central importance, as levels of food insecurity and rural poverty remain high in many countries and food production systems face multiple and interconnected challenges such as declining soil fertility, climate change and high pressure on land [2]. Many African governments and development actors have placed renewed emphasis on agricultural modernization in recent years [3]. This is the case in Uganda, where aspirations to support agricultural development in the form of modern technology transfer and increased market-orientation

are a core part of the broader “poverty eradication” agenda [4]. Uganda experienced significant poverty reduction during the 1990s partly thanks to socio-economic improvements among smallholder farmers. More recently, however, attention has shifted towards an approach that favors larger land holders [5,6]. Critics of this approach point to detrimental effects on both smallholders and the environment [7]. Such critique echoes global concerns about unsustainable and inequitable outcomes of agricultural modernization that have prompted calls for “paradigm shift” and “rethinking agriculture” [8–10] and the search for more desirable alternatives [11].

One alternative that is gaining ground is agroecology, an approach that utilizes ecological principles in the design and management of farming systems to make them productive, resilient and sustainable [12,13]. Agroecology is “*knowledge intensive (rather than capital intensive), tends toward small, highly diversified farms, and emphasizes the ability of local communities to generate and scale-up innovations through farmer-to-farmer research and extension approaches*” [14]. Despite documented social and environmental benefits, agroecology remains marginalized in agricultural research and development both globally and within Uganda [12,15,16]. To help agroecology break its binds, it is therefore imperative to better understand what a development strategy based on agroecology entails, its structural impediments and possibilities for transformation, and such understanding must be contextually situated [17].

Agricultural development has long been thought of as an interaction between technological and institutional change at multiple societal levels [18,19]. Theories of socio-technical transition were developed to aid analysis of such processes, and can help widen the vibrant but enclosed conversation around contemporary agrarian transformations [20]. *Change* in socio-technical systems (technologies and surrounding institutions) tends to be incremental and path-dependent, but *transitions* are examples of deep structural change in society or a societal subsystem [21]. Scholars commonly conceptualize transition as resulting from interacting processes at three levels, signifying different degrees of structuration [22]: regime (“rules” embedded in institutions and physical structures), landscape (an ideational and structural backdrop that normally changes slowly) and niche (protected space that can foster novel socio-technical configurations) [23]. Over the past decade, transition research has become particularly preoccupied with how socio-technical systems in areas like agriculture, energy, transport, water, and waste can be guided towards sustainability [24–26]. An important part is understanding how novel technologies and practices can grow and transform regimes with which they are intrinsically at odds [27]. The field has also shown a “*healthy capacity for intellectual flexing and stretching*” both substantially and geographically [28], and there is a growing number of studies set in sub-Saharan Africa [29–32]. This kind of stretching can improve applicability and rigor, but theoretical origins may have led to certain non-universal assumptions about institutional and material factors that need to be taken into consideration, since transitions are geographical processes [33].

However, many more studies concentrating on different themes are still needed in order to gain a robust understanding of the usefulness of socio-technical transitions in the Global South. The aim of this study is to understand the transformative potential of agroecology as a niche development in Ugandan agriculture, and identify key impediments for realizing this potential. We situate this as part of the broader search for just sustainability transitions in the Global South [31] due to the imperative to guide interventions in agriculture towards accounting for both environmental and socio-economic concerns. As the empirical basis, we use a case study of a civil society network promoting agroecology across seven districts in the Rwenzori region in the western part of the country. To conceptualize more precisely what an agroecological transition entails in Uganda and the resulting points of tension with the more dominant modernization model, our analysis focuses on existing practices and their rationales of those involved in the network. We conclude by highlighting emerging strategies for niche empowerment [34].

The paper is structured as follows: Section 2 positions agroecology within the growing literature on sustainability transitions in the Global South, and outlines current conditions for agricultural transition in Uganda. In Section 3, we introduce the case study and methods, and explain the

conceptual framework used. Section 4 presents the case study analysis, and in the concluding section we discuss the prospects of agroecology as a transformative niche concept in agricultural development in Uganda and similar political and economic settings, along with some theoretical insights.

2. Just Agricultural Transitions

2.1. Sustainability Transitions and Agricultural Development

Recent years have seen a growing dialogue between literature on development and sustainability transitions, where scholars aim to better understand the complex interactions between the two. This is welcomed, as the former has often neglected environmental challenges while the latter has had a technocratic bias related to its roots in OECD countries [31]. Transition scholars emphasize opportunities for alternative pathways towards improved social and economic well-being that do not replicate the rapidly increasing pressure on ecological systems of historical modernization processes [35]. In some ways, non-industrialized countries can provide fertile ground for novel (potentially sustainable) solutions due to lower degrees of lock-in, especially in rural areas [36]. However, there are also significant challenges such as preoccupation with economic growth rates, high rates of urbanization and population growth, and prevalence of technology transfer from industrialized countries [24]. Of course, there are large differences between regions and countries, including e.g., democratic institutions and levels of economic liberalization [32,37]. However, Swilling et al. [31] propose “just transitions” as a generally relevant focus for transition studies in the Global South. This concept refers to transitions characterized by “*dual commitment to human well-being (e.g., income, education and health) and sustainability (e.g., decarbonization, resource efficiency and ecosystem restoration)*”. Rather than pitting economic and environmental objectives against each other in the context of structural transformation processes, this idea poses that the goals of developmental welfarism and sustainability transition can be combined. The role of the state is of major importance in just transitions, something that should be kept in mind for the present case seeing as Uganda is a far cry from a “developmental state” [5].

Global agriculture plays a major role both as a source of livelihood (especially for the rural poor) and as a cause of environmental degradation [38]. As such, agriculture is of obvious importance in the search for just transitions. In 2009, the International Assessment of Agricultural Knowledge, Science and Technology for Development [10] described agriculture as being at a “crossroads”. Global food systems widely fail to meet social objectives (e.g., food security, rural livelihoods) and cause severe environmental problems (e.g., soil degradation, climate change, biodiversity loss); however, there also are divergent views and competing interests when identifying pathways forward. An emerging corporate-environmental food regime seeks to make industrial agri-food systems “greener” through mechanisms like certification schemes, but there are also more radical alternatives like agroecology [39,40]. Like all socio-technical systems, agricultural change is shaped by the interests of powerful actors, making it important to closely observe how innovations emerge, get absorbed and co-opted, or help create new regimes with potential to be more sustainable and just [20].

2.2. Transitions Towards Agroecology

A growing number of scholars, civil society organizations and intergovernmental organizations frame agroecology as key to sustainable and just agricultural development [8,15,41]. As a science that combines agronomy with ecology and (often) traditional knowledge, agroecology provides a basis for a radical systemic critique of modern agriculture, and for developing alternatives [42,43]. Agroecology means going beyond the “input substitution” model sometimes associated with organic agriculture, to confronting deeper structural problems of monoculture commodity production [44,45]. A central feature of agroecology is the use of ecological processes and interactions that contribute to resilience, soil fertility and supportive ecosystem services, in ways that reduce or even eliminate the need for external inputs. This kind of logic is also found within other approaches, in agronomy often referred

to as “ecological intensification” [46,47]. However, ecological intensification is often applied *within* the context of conventional agriculture as a way to achieve improved resource efficiency and reduced environmental impact, while agroecology proponents tend to call for more drastic changes, including political interventions against the economic forces that incentivize specialization [45,48]. To exemplify some key characteristics, Table 1 contrasts agroecology with specialized industrial agriculture.

Table 1. Key characteristics of specialized industrial agriculture and agroecology, adapted from IPES-Food [12].

Specialized Industrial Agriculture	Agroecology
Crop monocultures at farm/landscape level; concentrated animal feeding operations	Temporally and spatially diversified farming systems at plot, farm and landscape level
Genetically uniform varieties/breeds	Wider range of locally adapted varieties/breeds
Segregated product chains (e.g., feed production separate from animal rearing)	Integration of product types (e.g., mixed crop-livestock-tree systems)
Highly mechanized, labor-saving systems	Relatively labor-intensive systems
Single/limited number product output	Multiple product output
Intensive use of external inputs	Low use of external inputs
Large volumes of homogenous products, long value chains	Wide range of less homogenous products, short value chains

Shifting from specialized industrial farming to agroecology requires substantially new ways of practicing, researching and governing agriculture [46]. In Europe, agroecology has become a buzzword in recent years, but this does not automatically mean that such a shift is underway. In many cases, agroecology and related practices (like local food networks) become marginalized by mainstream institutions (e.g., research, education, markets, regulation), or very selectively incorporated into existing regimes [40,49,50]. Altieri et al. warn that agroecology is now “*at a crossroads, facing a major struggle over its possible cooptation*” [45] by large mainstream institutions that treat agroecology as a way to incrementally improve the resource efficiency of industrial agriculture but remove its political and social dimensions. In other words, agroecology can get conflated with more narrow notions of ecological intensification [46].

This is an equally relevant concern in places dominated by low-input mixed farming systems, which provide a different starting point for agroecological transition [12]. Agroecology proponents are sometimes accused of idealizing “peasant” agriculture [51,52], but many see it as particularly relevant for improving smallholder farming systems [15,53]. According to De Schutter [15], agroecology as a development approach can raise productivity on small farms, reduce rural poverty, improve nutrition, and contribute to climate change adaptation. But also here, there is a risk that agroecology gets “co-opted” by the depoliticized and technocratic discourse of “sustainable intensification” and subsumed under the corporate-led push for a “New Green Revolution” [14]. Countering this requires a holistic promotion of agroecology at state level, which in turn often calls for strong social movements [17]. Agroecology is indeed strongly associated with social movements in some places, particularly in Latin America [14,42]. However, Holt Giménez and Shattuck [54] find that agroecology proponents in much of the world—especially non-governmental organizations (NGOs) and academics—have been largely focused on developing practical alternatives *within* existing economic and political structures.

In Africa, NGOs such as the civil society network Participatory Ecological Land Use Management (PELUM) have promoted agroecology projects since the 1980s [14]. A recent collection of 33 case studies of research and development projects documents the “*success of agroecological agriculture*” across Africa [55]. But despite these success stories, agroecology remains marginal in terms of official agricultural development plans and funding in the Global South [14] and so also in Uganda [7,16].

2.3. Conditions for Agroecological Transition in Uganda

Ugandan agriculture is a diverse patchwork of different production systems, a result of ecological and cultural heterogeneity coupled with an uneven process of agricultural development both during and after colonial rule. Mixed smallholder farming coexists with pastoralism and large-scale plantation agriculture. As a colonial territory, Uganda was governed as a peasant economy through a system of local elites, dominated by particular ethnic groups. Agricultural production was largely done by indigenous smallholders, encouraged by the colonial administration to produce export-strategic commodities like coffee, cotton, and tea [56]. At the time of independence in 1964, agriculture in much of the country (including the study region) was relatively commercialized [57] and farmers had developed an extensive cooperative system to counter economic exploitation [58]. Political and economic turmoil in the 1970s and 1980s, however, made farmers turn away from traditional cash crop production, especially government-controlled export markets, and instead towards domestic and/or informal markets or subsistence production [59,60]. As the country stabilized after 1986, the heavily indebted government implemented rapid economic liberalization as part of the structural adjustment programs dictated by the IMF and the World Bank. This put an end to the state's active engagement in agriculture through institutions like marketing boards and extension services [61] and contributed to the collapse of the cooperative system, already weakened by the conflicts [62,63]. According to Nabuguzi [59], a combination of high inflation, taxation, devaluation, and inadequate transport services and processing facilities incentivized farmers to move yet further into parallel markets. The vacuum left by the state in terms of rural service delivery, meanwhile, primarily became filled by donors and civil society organizations [61,64].

Ugandan agriculture today is dominated by semi-subsistence smallholder farming [65] characterized by simple technologies (e.g., hand-hoes) and low levels of external inputs (often referred to as "organic by default") in the production of different food and cash crops. Several forms of land tenure exist but a majority of smallholders access land through customary tenure, with an average holding size of 1.1 hectare according to the 2008/09 census [66]. Access to formal credit is low and smallholders' market participation is constrained by poor infrastructure and lack of market information and processing. Large farms (over 5 hectares) only account for about 4% of holdings, and tend to produce less per acre than smallholdings, contrary to popular belief in the country [6]. This is despite the fact that large farms have advantages in terms of procuring credit, infrastructure development, value-adding opportunities, and capacity to hire labor and purchase inputs. A vast majority of the country's fertilizer use, for example, occurs on large farms and estates [67].

Recent years have seen a shift in the government's discourse towards a more ambitious development agenda, which not coincidentally mirrors a similar shift amongst international financial institutions and donors [5]. Rather than poverty reduction the government emphasizes "structural transformation" and, recognizing the role of agriculture, agricultural modernization through commercialization and technological change features centrally [4,68–71]. However, according to Kiiza [72], this new developmentalism comes "in the old wineskin of neoliberalism" where the state's role remains limited to providing a "conducive environment" for private-sector investment. Public investment in agriculture has been particularly low, especially when it comes to the kind that targets smallholder farmers [5]. Budgetary allocations to agriculture have dropped as low as 3% of public expenditure in recent years, compared to the 10% that the government pledged by signing the 2003 Maputo declaration [73]. According to a 2011 World Bank policy note, the strategy of providing inputs and targeting a small number of large farmers is ineffective, economically distortive and expensive [6]. It disregards the interests of smallholders by favoring agribusiness, investors, and large-scale plantation systems (thus also neglecting environmental concerns associated with conventional agriculture) [7]. Interestingly, there are some areas where the state has taken an increasingly interventionist approach in recent years, most notably agricultural extension. However, this seems more likely to be motivated by a need to mobilize votes than by a growing commitment to agricultural development [74,75].

According to Berkhout et al. [76], socio-technical regimes in late-industrializing countries are often less stable than in more advanced economies. Although this is a rather blunt generalization, it does seem to apply here. Agriculture is in a state of transition, albeit not *agroecological* transition [7]. It is not only a question of *what kind* of agricultural modernization that is sought, but also *how*. The past decades' neoliberal approach to development, which in many regards still prevails, is highly problematic if active state support is necessary not only for agroecology [77] but for just transitions at large [31]. But as an unintended and perhaps inevitable consequence, the arena of agricultural development is today filled with a wide range of non-state actors who do not necessarily operate under the same "field logics" [78] as the state. There are no guarantees, of course, that such actors represent radical ideas or novel practices; indeed, Ugandan civil society has often been described as compliant and service delivery oriented [79]. But actors who champion agroecological approaches in agricultural extension and development in Uganda do exist, even if they are few and face many structural impediments [16]. The remainder of this paper analyzes a case study of civil society organizations that build their approach to smallholder agricultural development on agroecology, starting off with a description of the case and how we approached it methodologically and theoretically.

3. Methodology and Conceptual Framework

3.1. The Case Study

The geographical setting for this study is the Rwenzori region of western Uganda, comprised of the seven districts of Kabarole, Kasese, Bundibugyo, Ntoroko, Kyenjojo, Kyegegwa, Kamwenge located in and around the Rwenzori mountain range. Agriculture is a crucial economic activity in this region but faces multiple challenges; it puts pressure on fragile ecological systems, and faces increasing competition from other land uses. The region is an important water catchment area [80] and a "biodiversity hotspot" of interest for both conservation and tourism, but also hosts some of Uganda's "land degradation hotspots" in hilly areas prone to soil erosion and landslides [81,82]. Roughly 70% of the region's approximate 2.5 million inhabitants reside in rural areas [83] with agriculture as the main livelihood [80]. Small-scale farming dominates as holding sizes in the western region are the smallest in the country at 0.8 hectares on average [66], growing a variety of food crops (such as bananas, potatoes, maize and beans) and cash crops (such as coffee, cocoa and cotton). Large-scale agriculture is mainly found in the form of tea plantations. Favorable climatic conditions and fertile soils create high agricultural potential [84] but problems of food insecurity and low dietary diversity remain, as in much of Uganda [85]. Primary challenges cited by farmers in the study were poor infrastructure, and lack of transportation and processing equipment, forcing them to sell surplus locally or to traders at low prices. Factors that hamper production include climate unpredictability, erosion, intensified pest pressures, lack of extension services and poor quality seeds.

A regional network consisting of local non-governmental organizations (NGOs), community-based organizations (CBOs) and faith-based organizations has operated in the Rwenzori region since 2000 under the banner of "sustainable agriculture" and "farmer empowerment". The network was selected as a case study because of its explicit commitment to agroecological approaches and its organizational structure that spans from local to national level. The network has grown from four to roughly 50 organizations working with over 130 smallholder farmer groups. It is a member of two national civil society organizations: PELUM Uganda and NOGAMU (National Organic Agricultural Movement of Uganda). The network's main activities include: (1) training farmers in production practices, agri-business and marketing, (2) strengthening member organizations' capacities in service delivery and advocacy, (3) conducting research on sustainable methods to enhance productivity in smallholder farming systems, and (4) engaging in advocacy and lobbying. Like most of Uganda's NGOs the network is funded by foreign donors, mainly European NGOs.

Fieldwork was conducted during eight weeks in 2015 and three weeks in 2016, using a mixed-method approach. The main research activities and methods are shown in Table 2.

Table 2. Overview of data generation methods including researcher activities, methods employed and participants that partook in the research on NGO interventions, farmer group initiatives and agricultural practices in the Rwenzori region of western Uganda.

Activity	Methods	No. of Participants
Network staff interviews	Repeated semi-structured interviews, informal talks, observation	6
Farmer group visits	Focus group discussions Semi-structured interviews Narrative walks	41
Member organization workshops	Focus group discussions Participatory exercises (analysis of strengths, weaknesses, opportunities, threats (SWOT exercise), advocacy strategy exercise)	32
Additional informant interviews	Semi-structured interviews with researchers, local government, national CSO partners	7
Advocacy training workshop	Participant observation and informal talks (MOs, network staff, national partners, donor representative)	~40

The three farmer groups were selected to reflect typical farming systems for the region (mixed food/cash smallholder farms) but also differing conditions in terms of ecological conditions and market access. Farmers of both genders were interviewed in groups and individually, assisted by an interpreter. To elicit richer information, we combined interviews with “narrative walks” [86] around homesteads where farmers explained their practices, assets, and enterprises. Member organizations were included through participatory workshops in three districts, and an advocacy training workshop held for MOs by the network provided an opportunity for participant observation and informal talks. The research also involved interviews with network staff members, supplemented with reading of organizational documentation. Finally, external informant interviews, policy documents and civil society reports contributed to triangulation and case contextualization.

3.2. Analytical Concept Use

The literature around socio-technical transitions is vast and contains many different conceptual tools for analyzing transitions, beyond the heuristic multi-level perspective. By iteratively moving between this literature and our empirical material, we identified two analytical concepts as particularly relevant: regime dimensions [87] and niche empowerment [34]. Our focus is therefore on the niche and niche-regime interaction; landscape dynamics are not addressed in depth, to keep the study focused.

For analyzing the socio-technical configuration represented by agroecology—not just the specific agricultural practices, but also the overall logic and institutional arrangements necessary for supporting those practices—we found guidance in Geels’ [87] notion of *regime dimensions*. These were modified somewhat to fit the research context, resulting in six dimensions: guiding principles, practices/technologies, knowledge, market relations, policy and culture. Applying regime dimensions to a niche-level phenomenon might seem contradictory; however, the point was to anticipate regime level implications of scaling up the niche, inspired by Sengers’ and Raven’s [23] contrasting of potential transportation regimes. Smith [88] also uses this framework in a way that underlines its usefulness in making explicit the composition of regimes and contrasting alternative ones. Instead, he refers to it as *socio-technical dimensions*, which perhaps would have been more intuitive for this study, but that term is used rather inconsistently in academic literature.

Work on *niche empowerment* informed our analysis of niche upscaling strategies. Unless they grow, niche developments remain marginalized and have limited impact [89]. However, this growth can occur in very different ways. Writing on agroecology as a niche in agricultural research, Levidow et al. [49]

suggest that agroecology can either conform to the dominant regime or help transform it, depending on the “specific empowerment strategies” used. This comes from the idea that niche developments can grow in two major ways: by becoming more competitive by conforming to the existing regime, or through influencing the regime so that it becomes more favorable to the niche [34]. We were particularly interested in the latter, which requires niche actors to “translate” their ideas into mainstream settings rather than just replicating projects or attracting more participants [90]. However, there is often pressure to prioritize narrow economic, technological and organizational criteria, causing a tendency to conform [34]. An instructive example is that of organic agriculture, which in Europe emerged as a radical niche but grew mainly through standardization, thus conforming to the mainstream agri-food regime [91,92]. Similar tendencies have already been reported regarding agroecology [40,45]. Thus, it is not only the transformative *potential* of novel practices and technologies that matter; the strategies used for scaling them up are equally important. Tendencies to conform must be understood and countered if broader transformation is the objective.

4. Analysis: Agroecology as a Prospective Socio-Technical Regime in Uganda

4.1. The Emergence of an Agroecological Niche

The network of actors studied here began as a handful of small community development organizations that sought to meet urgent local needs for rural services like agricultural extension, input provision, infrastructure and microcredit. By forming a regional network and linking up with national civil society networks, these organizations, and through them individual farmer groups, could more effectively mobilize external resources. As such, they can be understood as having been part of the rise of civil society actors and donors, who filled a gap left by the state in terms of rural service delivery [61]. As the network grew, a number of constraints to scaling up their approach became apparent: unfavorable market conditions, knowledge and research gaps, and eventually also problems related to the policy environment. This spurred an expansion in focus from agricultural practices to marketing arrangements, research projects, and eventually advocacy. But what is it that they seek to scale up, and what are the constraints more specifically? We analyze this by looking at the case through the lenses of regime dimensions and niche empowerment.

4.1.1. Guiding Principles

There are three important principles that guide network activities. First, agricultural development should be centered on the rights, needs and constraints of *poor smallholder farmers*. The network uses a discourse of “farmer empowerment” and “rights-based approaches”, mixed with the instrumental logic that the majority of farmers are poor smallholders, thus development efforts are more effective when targeting this group. Second, agriculture is invariably embedded within, and interacts with, a local *social and ecological context*. Solutions must be “locally appropriate” to be effective and sustainable, meaning that farmers themselves must play a role in developing them. Third, farms are *agroecosystems* where ecology provides the primary knowledge basis for enhancing productivity and sustainability of the system as a whole (i.e., understanding of the different system components and their interaction). This leads to emphasis on agrobiodiversity at farm and landscape level, nutrient cycling and avoidance of non-biodegradable chemicals.

4.1.2. Practices and Technologies

The niche seeks to promote “locally appropriate” methods for enhancing productivity and incomes. It follows from this that the practices used by different farmers and groups vary (see Figure 1); however, the general focus lies on efficient and innovative utilization of locally available resources. For example, farmers are trained in soil conservation methods (e.g., livestock integration, composting, legume intercropping, mulching, contouring) and pest control (e.g., crop rotation, natural enemies, pest repelling plants, or of substances like urine, hot peppers, Tagetes, ash) that do not require purchase

of external inputs. Enabling production system improvements despite limited access to capital and land is a key rationale for the promotion and adoption of agroecological practices. For example, organic soil management is generally more affordable than relying on synthetic fertilizer. Planting multipurpose trees requires little land but provides a range of benefits like income, nutrition, firewood, shading, soil stabilization, nitrogen fixation and pollination. However, the practices do sometimes require more labor, for example weed management. In such cases, trainers must devote more effort to explaining the rationale of alternative practices, such as long-term effects on soil quality. There are also exceptions to the principle of minimal capital investment, when farmers can make collective investments and share the benefits. This includes for example water harvesting tanks, storage facilities, value-adding equipment and livestock.



Figure 1. Prioritized practices varied among the farmer groups in Uganda, along with their different challenges: (a) collective water harvesting to combat drought (group 1); (b) contouring and tree planting to deter erosion (group 2); and (c) sack gardens (shown), kitchen gardens and pig raising to address limited land (group 3).

The network claims to be committed to *sustainable* practices. Asked to elaborate on this, the director stated that “*actually our definition of sustainable agriculture is organic agriculture*” and there is an ambition to get more farmers certified through different schemes. The strategic plan states the approach as sustainable agriculture with emphasis on organic agriculture, defined in a text co-written with donors as a “*non-chemical approach combined with the conscious use of agro-ecological methods and practices, not to be confused with traditional farming*”. A staff member explained that the focus on organic agriculture had emerged due to collaboration with donors and national partners who use this term. However, it would be inaccurate to claim that organic farming is promoted strictly, seen for example in lobbying for fertilizer access (see Section 4.1.6). A staff member remarked that organic agriculture “*is not a religion*”—if soils are exhausted, it might be an appropriate short-term solution.

Furthermore, agroecological practices are not equated with *traditional* farming. Some practices, like composting, are based on traditional practices that for various reasons have declined in prevalence. In other cases, traditional practices are disseminated to new settings, an example being contouring. This might be needed because people have migrated (or been displaced), or because socio-environmental conditions have changed (e.g., climate, pest pressures, land availability). The network also embraces novel practices and technologies like improved seeds, new crops (such as fruit crops that are suited to the local climate, fetch good prices and provide important nutrients) and small-scale irrigation. For example, they had received improved cassava varieties from the national research institute, which trainers and farmers test for local suitability and appropriate management before wider propagation. Conflicts with conventional methods are often associated with the way that “*modern*” solutions are uncritically disseminated. For example, member organizations in Bundibugyo expressed concern about exotic cattle breeds being distributed by extension services without regard for local climatic and cultural factors (while in other districts, this might be appropriate). Cattle in this regard not only provide livelihoods but also bear cultural significance, which is insufficiently considered. Some technologies are resisted more categorically, for example, certain types of pesticides and genetically

modified organisms (GMOs), which have been debated in the nation's parliament for years. Arguments include environmental and health impacts, but again, economic aspects are central. GMOs are feared to make farmers dependent on seed companies and crops that require expensive inputs, and in both cases there is concern about losing important export markets.

4.1.3. Knowledge

The approach to knowledge generation and dissemination is based on the view that farmers themselves are uniquely positioned to develop the contextual knowledge necessary for sustainable agriculture. This leads to promotion of farmer-to-farmer dissemination, autonomous experimentation and participatory research approaches. A central approach is the "farmer family learning group" method, an adaptation of farmer field schools that places emphasis on on-farm experimentation and whole-household participation [93]. However, as implied above, niche actors also recognize the role of scientific research including modern plant breeding. Staff members noted for example that there is a need for agricultural researchers to help farmers deal with climate change and novel pests. The network is frequently in contact with research institutes present in the area, such as National Agricultural Research Organisation (NARO) branches and local universities, to use facilities, consult researchers or even apply for joint projects. Interviews with NARO researchers showed that civil society organizations like SA are appreciated for their role in disseminating knowledge, which research institutes often lack funds for.

Where are the tensions, then? These are rather subtle, but can be seen in the principles and structures that guide and constrain different organizations' work. From the perspective of agroecology, one issue is that research tends to be structured along the lines of different commodities, discouraging research on integrated systems. Not enough research begins from the vantage point of resource-constrained smallholders. It, instead, begins from an "ideal" condition and fails to systematically include smallholder farmers in the process. Furthermore, limited attention is given to alternatives like organic practices. Some interviewees pointed to privately funded research as a contributor to the problem. A common example mentioned was that multinational corporations and foreign private foundations fund research on GMOs in Uganda, which is confirmed by several other studies [94,95].

Agricultural extension is another important aspect within the realm of knowledge. The national agricultural extension system (i.e., NAADS) is an important institution in the regime, accounting for a significant share of the total sector budget [96]. As mentioned, NAADS has gone through multiple transformations in recent years, where the latest one placed the Ugandan army in charge of distributing inputs, monitoring uptake and ensuring implementation of government policy. This was coupled with a significant increase in NAADS funding, but there has been speculation that the motive may be to divert state resources to the military itself, rather than addressing inefficiency [97]. This is beyond the scope of our analysis, but is a reminder of the political complexity surrounding agricultural development. Network staff and members acknowledged that the extension system had suffered from inefficiency and corruption, but the fact that military personnel are placed in key positions after a few weeks of training is seen as problematic because it reduces agricultural extension to simple technology transfer and reduces the likelihood of locally adapted solutions.

4.1.4. Market Relations

The slow pace of economic improvements for farmer groups, despite increases in productivity, has led to the network paying increased attention to marketing. The stance on market relations is pragmatic; opportunities are sought where they can be found within the existing system. While one staff member mentioned the importance of local and regional food systems, e.g., linking farmer groups with nearby businesses and schools, this is not an explicit strategy. Some farmers are already linked to global value chains, and accessing high value export markets (e.g., for organic coffee, cocoa, vanilla) is seen as an important economic strategy. Efforts are focused on the farmer level, particularly to

overcome problems of market access and low prices through collective marketing (e.g., adding the dimension of marketing associations to farmer groups) and value-adding activities (e.g., hulling coffee, drying fruit). Because the groups are already established and no additional capital investment is required, joint marketing has quickly been embraced by farmer groups. A recently initiated longer-term ambition is for the network to form a member-owned trading company to further improve smallholder farmers' market position, and reduce the dependency on donors. This can be seen as part of a broader attempt at reviving agricultural cooperatives in Uganda, which actors like PELUM are advocating at the national level. Another approach that is being explored is Participatory Guarantee Systems (PSG) that can secure better prices without farmers having to join expensive certification schemes. However, this is at a very early stage and challenges are faced in terms of demand.

Market relations are where niche actors' approaches show the most similarity to the dominant modernization pathway. There is a shared emphasis on commercialization, and the main critique from niche actors was that the government isn't doing enough to enable smallholder farmers participation in commercialization. The government too has pointed out farmer group formation as central to agricultural transformation because it facilitates access to credit, marketing and value addition [98]. There has also been some interest in cooperative revival from the government [99], although the extent to which this will actually be supported is uncertain; many research participants expressed concern that strong farmer organizations can be seen as politically threatening.

4.1.5. Policies

The network's ambitions to engage in policy advocacy are relatively recent, but growing. National level policy advocacy is led by the larger CSOs of which the network is a member, although there are also efforts to spur regional and local level initiatives (due to Uganda's decentralized government structure, many decisions are taken at lower levels). At national level, a high priority is higher budgetary allocations for agriculture, especially for agricultural extension, research and infrastructure, and also to enable local-level implementation of existing environmental and land use policies. These have to do with holding the state accountable to their already expressed commitments, rather than changing policy. Inquiring further into what the network and member organizations would like to see on the advocacy agenda, and into past engagement in a number of policy areas, gave indications regarding the desired policy environment (Table 3). In contrast to the government's framing of its role in terms of providing a "conducive environment" for private investment [71], niche actors call for more active state involvement to protect the rights and interests of smallholder farmers, and for stricter regulation of biotechnology and agrochemicals.

Most policy positions can clearly be traced back to the guiding principles outlined in Section 4.1.1. However, given the commitment to organic farming, one noteworthy issue is advocacy for improved fertilizer access. As shown in Section 4.1.2, fertilizer is somewhat of a grey area for niche actors; its use is sometimes deemed acceptable even if alternatives are preferred. Other technologies, such as GMOs, are perceived as more categorically at odds with agroecology. It should be noted, however, that the question of GMOs, like many others listed above, was rarely brought up during research activities with local community organizations or farmers. Lack of knowledge about existing policy frameworks, partly due to literacy and language barriers, means that CSOs engaged in policy advocacy must find other ways to assess what is in smallholder farmers' interests than simply asking them what changes they wish to see. One exception is the stance against spraying of DDT (dichlorodiphenyl-trichloroethane, used to combat malaria) which was spearheaded by farmer groups (see Section 4.2).

Table 3. Overview of agricultural policy areas that niche actors in Uganda have engaged in or wish to see activities in, indicating the type of policy environment perceived as favorable to agroecological transition.

Policy Area	Changes Sought
Budgetary allocations	Increased spending on agriculture, particularly research/extension and rural infrastructure (e.g., irrigation schemes)
Land	Safeguarding of smallholders' land access and tenure security
Market/fiscal interventions	Support for development of organic farming (standards, certification) Facilitate smallholders' access to fertilizer Stimulate cooperative revival Harmonization of agricultural taxes to avoid double taxation
Regulation of technology	Prohibition or strict regulation of genetically modified organisms (GMOs) Protection of indigenous seed (safeguarding farmers' rights to save seeds, establishment of seed banks) Banning of DDT
Agricultural research and extension	Reorganization of NAADS towards a more participatory model Increased recruitment and funding for agricultural advisory services Involvement of civil society actors in NAADS project design and implementation Increased funding for research on organic farming systems

4.1.6. Culture

"Culture" is difficult to analyze because this broad and ambiguous term is vaguely conceptualized in the transition literature. Smith [88] contrasts the culture of conventional and organic food as "profit and convenience" vs. "sustainable food", which are very similar to the respective guiding principles. Sengers and Raven [23] distinguish between three types of transport regime cultures: "modern individualized", "traditional" and "modern planned". Following this logic, we tentatively contrast the status quo (semi-subsistence smallholder production, traditional practices, agrarian society) with modern industrial agriculture (export-oriented commodity production, modern scientific agronomy/biotechnology, de-agrarianized society), and finally agroecology (mixed production mainly for local/regional consumption, hybrid between scientific agronomy and traditional knowledge, semi-agrarian society). This is inferred from the above analysis, rather than explicitly expressed by participants, and clearly requires more deliberation.

4.2. Transforming or Conforming Niche?

Although it is clear that agroecology has transformative potential in Ugandan agriculture, such potential can be lost as niches grow [49,91]. "Upscaling" has thus far occurred in terms of size, signaling that these actors have been successful in meeting farmers' needs (thus attracting more participants) and in aligning with donors' interests (thus securing the financial resources needed to grow). But they have also expanded its range of activities in two ways that bring the niche in closer contact with regime level processes: marketing and advocacy. What does this mean in terms of contributing to transformation?

As suggested, efforts here are largely conforming. This does not make them trivial; the strategies employed (e.g., encouraging marketing associations, small-scale processing) have clearly improved farmer groups' market access and terms of market participation. The cooperative ambition, if pursued, holds significant potential for further improvements according to previous research [100]. However, structures beyond the producer level are not explicitly discussed or challenged. For example, little differentiation is made between opportunities at local, domestic and export markets, and communicating the benefits of agroecology to distant consumers is perceived as a challenge that requires solutions like certification.

The arena of policy advocacy, meanwhile, is one where more transformative ambitions are taking shape. In Section 4.1.5 we outlined the issues viewed as relevant; here we will focus on the process

and its challenges. At the time of fieldwork, a project had recently been launched in collaboration with NOGAMU and donors aiming to strengthen advocacy capacity of the network, at all levels. Staff members described gradually realizing the complexity of this task, and challenges existing at multiple levels. All farmer groups expressed that working together in groups has made them better equipped to approach leaders with concerns and requests. However, many remain hesitant due to fear of being ignored, perceived as “demanding”, or not knowing who to address. Member organizations, meanwhile, have predominantly engaged in service provision in the past and do not see themselves as “political” and many were unsure what advocacy actually involves. Engaging in policy advocacy clearly requires these organizations to rethink their roles and develop entirely new capacities.

Representatives for national partners recognized this as a general challenge for Ugandan NGOs, many of whom are largely apolitical. Another serious concern is the deteriorating political climate, experienced especially in conjunction with contentious issues like land rights and GMOs. There is a growing pressure on NGOs to avoid being perceived as “political” or “confrontational”, as they fear consequences like deregistration, harassment and arrest, not least in light of the recently passed NGO Act that enables tighter control of civil society. Although community development organizations and smallholder farmers rarely engage on such issues themselves at this point, the consequences trickle down. The network’s aspirations to empower members and farmer groups to mobilize locally have been hampered by a sense of caution and a need to thoroughly assess the risks.

Despite these challenges, there have been some instances of local-level advocacy in recent years. Most notable is a campaign against the government’s use of DDT to control malaria, led by organic cocoa growers. The main motivation was fear of negative economic consequences (losing buyers). Some protesters were arrested, but ultimately they achieved their goal (spraying was halted in the district). Other examples include farmer groups pressuring local governments to improve roads, and objecting to wasteful use of the district’s extension funding. Although these occurrences have been relatively isolated and ephemeral, rather than part of a more coordinated long-term effort, they demonstrate the possibility of mobilization even under adverse conditions.

5. Concluding Discussion: Agroecology as a Transformative Niche for Just Agricultural Transition in Uganda?

In theory, agroecology has significant potential to contribute to just agricultural transitions, which are characterized by dual commitment to human well-being and environmental sustainability. However, novel ideas and practices with potential to radically transform socio-technical systems often fail to do so [101]. In Uganda, the dominant approach to agricultural development currently falls short of facilitating agroecological transition. This has multiple intersecting causes; on the one hand, existing institutions and persistent ideas about what constitutes “modern” agriculture favor conventional technologies [16]. At the same time, the state’s persistently neoliberal approach to development [63] results in slow progress on agricultural modernization, while paving the way for private actors whose primary interests do not necessarily lie in poverty reduction, smallholders’ land rights, or practices that reduce the demand for agro-inputs [7]. But as Fuenfschilling and Truffer [78] remind transition scholars, all regimes have cracks and contradictions [78]. By hollowing out the state’s rural service provision, neoliberal reforms have also resulted in a prominent role for civil society organizations. These organizations represent a wide range of different approaches and ideologies, inevitably shaped by an equally wide range of donors, which has enabled agroecology to enter the Ugandan agricultural development arena (it has also done so through donor-funded educational programs [16]). This is a very different mechanism for niche emergence than the deliberate creation of “protective space” that often features in the literature, but our case is hardly unique (see Acheampong et al. [32] on innovation in Ghana’s water sector). It also creates entirely different conditions for niche upscaling compared to “developmental” states [31,37]. Even if devolution of responsibilities to non-state actors created space for niche emergence in this particular instance, just transitions inevitably call for this set-up to

be challenged. Is this occurring? Is agroecology being practiced and employed in a manner that makes it relevant from the perspective of just transitions?

We approached these questions through a case study, and by doing so we do not mean to suggest that it constitutes some ideal representation of agroecology. However, as a relatively rare example of actually existing agroecology in Uganda, we view it as a critical case. Agroecology here constitutes an explicitly smallholder-centric approach that enables farmers to improve their production systems in ways that require little capital input, and which take as the starting point local environmental and socio-economic conditions. To support this, participatory methods in research and extension are emphasized, but without questioning the importance of formal scientific research. Collective action is also a central component, not only for farmer-to-farmer learning, which is well-established in agroecology [44], but equally for overcoming constraints to investment and marketing. Less prominent (but growing) is recognition of more *political* forms of collective action, including farmers' own advocacy. While environmental concerns form part of the agroecological rationale and discourse, above all it attracts attention as a more inclusive model of agricultural development (both in terms of productivity and market participation). On the one hand, this framing can make a compelling argument in appeals for recognition and support, as it resonates with the dominant modernization discourse. On the other hand, many important concerns from the perspective of just agricultural transition (such as redistributive demands and structural market reforms) are vague or absent, something that appears to be common in contexts where agroecology has a primarily academic or NGO-based history [102].

Agroecology would not be a niche with transformative potential unless it was somehow in tension with an existing socio-technical regime or competing transition pathways. The agroecological niche is most obviously competing against conventional modernization, and although tensions rooted in incompatible ideas and practices can be teased out analytically, they are not always apparent in the daily activities of individual actors. This may change, but so far efforts to scale up the niche have been limited, and agricultural modernization is not pursued as forcefully as government discourse suggests. Niche actors do not necessarily experience mainstream public institutions as "wealthy incumbent regime organizations" [103] against which they are struggling. The way that both niche and regime actors scramble for resources (but largely from different sources) enables them to coexist, and even pragmatically cooperate. On the upside, this offers opportunities for niche actors to anchor their practices and ideas at regime level, a necessary step towards transition [90]. On the downside, space to coexist has meant that niche actors have not had incentives to strongly articulate their agenda, which may open up for co-optation when coming into contact with the mainstream. Such concerns are well-grounded [45], but confining agroecology to "islands of success" as has been common [17] is not conducive to transition. Instead, focus should be on deliberating what constitutes an agroecological transition, where compromises can be made, and where they cannot.

For scholars and practitioners interested in agroecological transition in Uganda and the Global South more generally, our analysis points to two important areas of inquiry: questions of *what*, and questions of *who*. As for the first, following from the above, we argue that the notion of an "agroecological regime" within developing economies warrants further attention. This refers to the institutional designs in regards to knowledge, markets and policies which favor agroecology under *changing* socio-economic conditions. In the case, we see agroecological practices being adopted and promoted in part due to *lack* of conventional options. Incentive structures must be developed that make those practices *remain* appealing as farmers' options expand. The regime dimensions framework is a useful analytical tool. Like all frameworks it has limitations and shortcomings. It offers analytical breadth more so than depth and there is ambiguity regarding some dimensions, particularly "culture". That said, in the words of Geels [22], we found it to be a valuable "heuristic device" for guiding attention to pertinent issues. One such issue is the question of market relations. Here the niche makes no explicit attempt to diverge from the dominant modernization pathway, which is noteworthy. A highly critical stance on markets and trade is often taken within food sovereignty and agroecology

movements, albeit a rather vague one [51,104], which seems to translate into lack of alternatives on the ground. As the scholarly debate on these questions moves forward, efforts should be made to systematically include actors such as those studied here. Their insights from working closely with smallholder farmers are valuable, and in turn, they could get guidance on how to explore alternative marketing arrangements—such as the regionally “embedded agri-food eco-economies” that Horlings and Marsden [105] argue are necessary for a real green revolution—and participate in ongoing domestic debates like those on cooperative revival.

Second, alongside identifying institutional arrangements, the study raises equally important questions about *who* can put in motion just transitions in different settings. In our case, this takes us to a discussion about collective action within civil society. We must not assume that NGOs or other civil society organizations will readily fulfill the role of transformative change agents; “civil society” is a vague and contested term [106] and it is important to engage with the critical literature around it. In many places including Uganda [79,107] a combination of state and donor practices have long pushed civil society in a direction of “NGO-ization”. In such situations, Bank et al. [108] argue, many organizations engage in “a limited set of agendas biased toward service-delivery and “democracy promotion” instead of the deep-rooted transformation of politics, social relations, markets, and technology”. Today, an increasingly suspicious and restrictive political climate for NGOs further reinforces this [109,110]. Together these factors undoubtedly create challenging conditions for civil society actors to bring about just agricultural transitions, which makes it all the more important to pay close attention when ambitions to do so nonetheless start to grow. A key question is therefore how NGOs, farmer organizations and alliances between the two can mobilize and build political pressure for just agricultural transitions.

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