

Agroecology as a grassroots approach for environmental peacebuilding

Strengthening social cohesion and resilience in post-conflict settings with community-based natural resource management

In the Colombian Andes, farming communities face complex challenges involving conflict, climate change, peacebuilding and rural reconstruction. Organized around agroecology, farmers generate associativity processes, self-managed extension work and popular education pedagogies. This strengthens the social fabric of these communities and enhances their adaptive capacities, enabling them to persist in the context of adversity.

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Abstract

This study investigates the potential of community-based agroecology in post-war scenarios for fostering social cohesion and community resilience; considered to be two key components of peacebuilding. Based on a systematization of experiences, we analyze the work of seven farmer-led educational initiatives, so-called Agroecology Peasant Schools (Spanish: *Escuelas Campesinas de Agroecología, ECAs*), in three different regions of the Colombian Andes – Cauca, Valle del Cauca, and Coffee Axis. Using interviews and focus groups, we integrate the perceptions of 82 stakeholders from regional agroecology networks. The results illustrate the contexts in which ECAs emerge and demonstrate how the associative processes they advance strengthen the social fabric, enhance the capacities of farmers in agroecological management and support the socio-economic recovery of rural areas. Based on our results, we maintain that, by fostering shared identities and collective capabilities of farmers, ECAs strengthen social cohesion and community resilience and thereby contribute to the building of “positive peace” from a grassroots level. By scrutinizing local initiatives,

this study generates insights for guiding contextualized peacebuilding programs, based on local needs and aspirations.

Keywords

agroecology, Colombia, environmental peacebuilding, peasant schools, resilience, social cohesion

Social cohesion and community resilience are considered key elements for the socio-economic recovery of areas affected by violent conflict, regarding their potential to conceptualize pathways for restoring the shattered social fabric and enhancing local capacities (Brown and Zahar 2015, Van Metre and Calder 2016, Juncos and Joseph 2020, Jewett et al. 2021). *Social cohesion* is a characteristic of society referring to the presence of strong social bonds measured by levels of trust, norms of reciprocity, and associative processes stemming from civil society aimed at diminishing social breaches (Berkman and Kawachi 2000, p. 175). *Community resilience* relates to the capacities of a group to endure shocks and maintain its basic functions in response to uncertainty (Longstaff et al. 2010, Van Metre and Calder 2016, Ahedo 2020) while adapting and transforming through self-organiza-

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tion, innovation and cooperation (Folke 2016, Sietz and Feola 2016). Social cohesion and community resilience are closely intertwined and denote the need to improve the livelihood prospects of vulnerable communities by considering stakeholders' necessities, and aspirations (Longstaff et al. 2010, Sietz and Feola 2016, Cox and Sisk 2017).

While considering these notions, we argue that, as a society becomes more cohesive, there is a greater likelihood of peaceful social dynamics, and vice versa. Thus, in a cohesive society, community members are more likely to socialize information and arrive at a consensus over a proposed plan of action, for example, for reconstructing rural areas and preserving the environment, relating directly to the capacity of a society to maintain the conditions for sustainable resource use (Canal Albán et al. 2010). Accordingly, we suggest that the more cohesive a community is, the more capable it is to endure adversity and recover from shocks induced by socio-political, economic, and environmental changes, thus, the more resilient it becomes.

Moreover, we state that social cohesion and community resilience are preconditions of environmental peacebuilding. The concept of environmental peacebuilding rests on the assumption that the sustainable management of resources and biocultural landscapes can incentivize trustbuilding and collaboration, rather than competition and violence (Dresse et al. 2016). Furthermore, environmental peacebuilding acknowledges the need to enable economic development while ensuring resource sustainability, and to build institutions that support peaceful social dynamics through education and dialogue of knowledge. Hence, the promotion of sustainable resource use is acknowledged as a strategy for enabling the socio-economic recovery of post-war environments (Jensen and Lonergan 2012) as it can enhance cooperation among local stakeholders, thereby opening pathways for sustainable peace (UNEP 2015, Sharifi et al. 2021). This relates to the notion of "positive peace" advanced by Galtung (1969), which proposes that not only an absence of violence is sufficient for peace, but rather that social justice needs to be reinforced.

According to Johnson et al.'s (2021) review on environmental peacebuilding, peace consists of four dimensions, namely, absence of violence, substantial integration (mostly on the state/institutional level), capabilities, and shared identity. The latter two are "the two dimensions that most frequently contributed to positive peacebuilding outcomes" (Johnson et al. 2021, p. 14) within bottom-up environmental peacebuilding projects (Johnson et al., p. 12). In this context, community-based natural resources management approaches, aimed at empowering local communities while ensuring the integration of local aspirations, customary practices, and knowledge systems (Delgado-Serrano et al. 2015), emerge as a suitable way to govern rural landscapes in post-war environments.

Conceptual framework and research questions

Our hypothesis is that social cohesion and community resilience are enhanced in community-based natural resources management initiatives, and that they contribute to environmental peacebuilding by fostering the two peace dimensions, namely *capabilities* and *shared identity*. To evaluate this hypothesis, this study presents a qualitative analysis of community-based natural resources management initiatives funded upon agroecology based on empirical data retrieved from case studies across the Colombian Andes. Agroecology has gained momentum in Latin America as a grassroots strategy to enhance food security, mitigate climate change and improve rural livelihoods by applying and promoting sustainable farming practices that go in line with local traditions and aspirations (Acevedo-Osorio 2018). Agroecological management enables to obtain simultaneous benefits from conservation and production (Acevedo and Angarita 2018) and can assist the socio-ecological transformation of food systems (Altieri and Toledo 2011, Gliessman 2016).

In seeking to assess the potentialities of agroecology as grassroots strategy for fostering socio-ecological recovery of post-conflict environments, we analyze our results in two steps: first, the two concepts of social cohesion and community resilience are operationalized by theoretically identified indicators from literature (cf. table 2, p. 41, and 3, p. 42, additional information in the online supplement, appendix 1¹). Subsequently, we establish their connections to environmental peacebuilding (table 4, p. 43, and online supplement, appendix 1¹) via contributions to capabilities and shared identity. By means of a systematization of experiences (Chavez-Tafur 2006), we examine the work of seven so-called Agroecology Peasant Schools (Spanish: *Escuelas Campesinas de Agroecología, ECAs*), which constitute systems of solidarity and community support, formed by groups of campesinos², that is, farmers organized around agroecological education processes. To this end, the study answers the following research questions: 1. In what contexts do ECAs emerge as community-based processes for socio-ecological transformation? 2. How do ECAs contribute to strengthening social cohesion and community resilience, and thus to building positive peace in post-conflict settings?

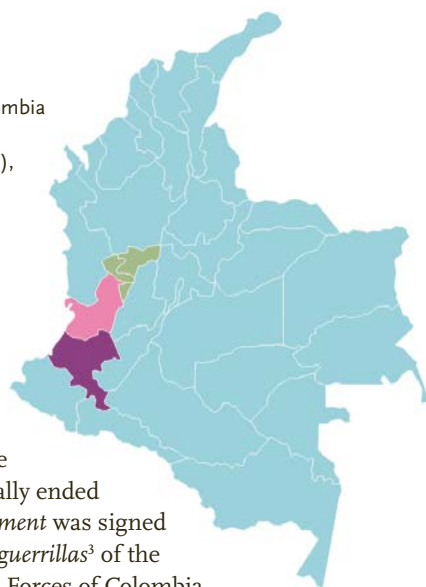
Contextual background: Colombia in post-conflict times

For nearly six decades, Colombia has been immersed in a civil war that induced complex land-related issues and conflict legacies that perpetuate the impoverishment and marginalization of rural populations (McNeish 2018). The conditions of conflict in Colombia are engendered through differing economic interests and the proliferation of illegal actors involved in illicit crop production and extractivist land use activities, which have long interfered with the governmental, legal, and economic spheres and generated a framework of legislative corruption (Acevedo-

1 The online supplement is available at <https://www.oekom.de/gaia-supplements>.

2 *Campesinos* can be understood as those who work the land (Spanish: *el campo*), that is, small-scale farmers, who might identify as peasants, indigenous or Afro descendants. We use the English word "peasant" as a translation.

FIGURE 1: Map of Colombia showing selected study areas: Coffee Axis (green), (Departments of) Valle del Cauca (pink) and Cauca (purple). <https://www.visme.co>.



Osorio 2018). Despite conflict having officially ended since the *Peace Agreement* was signed in 2016 between the *guerrillas*³ of the Revolutionary Armed Forces of Colombia (FARC) and the Colombian State, the remnants of war in the current so-called post-conflict era are far from being solved. The peace process, however, renews interest in rural issues and features the countryside as potential scenario for building sustainable peace while tackling some of the root causes of the conflict, such as social and political exclusion, unequal access to resources and little economic development (Graser et al. 2020).

Field methods and data analysis

Empirical research took place between August and December of 2018 in three regions of the Colombian Andes: Cauca, Valle del Cauca, and the Coffee Axis (figure 1). Case study ECAs (out-

lined in table 1 and online supplement, appendix 4¹) were identified across the three study areas through a literature review and were selected based on the criterion of being involved in collective agroecology transformation processes. Overall, twelve ECAs were visited and, after consideration of available data, seven have finally been selected.

We applied mixed ethnographic field methods by conducting 32 interviews (online supplement, appendix 5¹) and eight focus group discussions (online supplement, appendix 6¹), which integrate the voices of 82 participants of regional agroecology networks. Interviewees were selected with help of gatekeepers, based on their roles and contributions, and categorized accordingly into academic experts ($N=4$), rural leaders ($N=12$), school facilitators ($N=11$), rural promoters ($N=7$) and affiliated farmers ($N=48$). Interviews included different stakeholder groups, were conducted in Spanish, and recorded based upon prior consent of interviewees, each lasting one to two hours.

Primary qualitative data were transcribed and analyzed using MAXQDA software. We applied the LEISA systematization methodology (Chavez-Tafur 2006), which enabled us to operationalize a large set of data and assess the work of ECAs based on the conceptual interrelation. In the data analysis step, the empirical data were related to the concepts of social cohesion and community resilience via the associated indicators identified in the literature. Secondary data were also integrated through the analysis of documentary evidence, including ECAs' internal reports, discussion papers and other documents retrieved in conferences and events.

³ *Guerrilla*: self-organized military formation that advances or imposes a political, economic and social system on a territory.

TABLE 1: Overview of selected Agroecology Peasant Schools (ECAs) and interviews (cf. also online supplement, appendix 4¹). FGD: focus group discussion, N : number of participants.

STUDY AREA	ECAS	LOCATION	FOUNDED IN	BENEFICIARIES	INTERVIEWS	N
Cauca	CIMA (FUNDECIMA)	Popayán	1985	15,000 farmers affiliated to 50 organizations	2 semi-structured interviews 1 FGD with affiliated farmers and rural leaders	9
	COSURCA	Popayán	1993	630 direct and 1,240 indirect beneficiaries	5 semi-structured interviews and 1 FGD with facilitators/promoters	15
Valle del Cauca	ECAs de Tuluá	Tuluá	2006	800 families linked through 35 rural associations	5 semi-structured interviews 1 FGD with farmers and rural leaders	11
	IMCA	Guadalajara de Buga	1962	3,500 farmers in 18 municipalities	2 semi-structured interviews with experts and school facilitators 3 FGD with farmers/promoters	18
Coffee Axis	ASPROINCA	Riosucio, Caldas	1995	450 families	7 semi-structured interviews and 2 FGD with farmers, school facilitators, and promoters	12
	Surcos Comunitarios	Pereira, Risaralda	1996	153 families	5 semi-structured interviews 1 FGD with farmers and leaders	9
	La Bella	La Bella, Risaralda	2014	5 public basic education schools serving 7 villages	8 semi-structured interviews with rural leaders and school facilitators	8

BOX 1: Cauca: socio-economic setting and description of case studies

Cauca is historically among the departments most affected by conflict, which relates to illicit land uses, cultural intersection, as well as disputes over land and water. Rural livelihoods are often linked to mining, illegal logging, and drug production. The high incidence of coca cultivation, whose profitability cannot be reached by other crops, poses difficulties for agroecological processes, and has resulted in aerial fumigations carried out by the state as an attempt to eradicate illicit coca plantations, thereby having severe impacts on the environment.

CIMA – FUNDECIMA

(Comit de Integración del Macizo Colombiano/Committee for the Integration of the Orographic Star of Colombia) – (Fundación CIMA Foundation)

Created in 1985 for defending indigenous territories and natural resources from extractivism in Cauca.

Components:

1. reference farms and schools
2. nurseries
3. direct marketing platform
4. investment fund
5. *Plan for Life, Water and Dignity* (integration, management of common goods)
6. *Coca Plant Dignification Program* (alternatives to illicit production)
7. communal watershed/mining monitoring boards

Achievements: CIMA has orchestrated national strikes and blockades for stopping coffee to be sold under production price. CIMA helped attain legal recognition of three Peasant Reserves. Maintains a working investment fund.

Challenges: CIMA is portrayed as a radical group and its leaders face threats of assassinations.

COSURCA

(Cooperativa del Sur del Cauca)

Founded in 1993 for improving associative processes and profitability of organizations.

Components:

1. EXPOCOSURCA – technical accompaniment in the production of goods for fair trade markets
2. craftsmanship school for recovering traditional peasant trades
3. farmers' markets and direct marketing
4. *Gender, Youth and Minorities Program*
5. UNICAMINOS – formal educational process

Achievements: COSURCA has helped strengthen profitability of associations through technical assistance in the production of organic coffee, sugar, and cocoa and linkage to export markets. Established museums of historical memory.

Challenges: Assassination rates of rural leaders in Cauca are among the highest in Colombia and threaten permanence of organizations.

Results**Contexts in which ECAs emerge**

By analyzing the contextual information of each school (cf. online supplement, appendix 2¹), we find that ECAs arise amid a complex combination of socio-political, economic, and environmental crises as grassroots processes of community support and resistance to territorial conflict. Conflict legacies relate to the widespread incidence of illicit crops and to the violence generated by paramilitary fronts, FARC dissidents, and criminal groups, who have sought to exert control over land and resources. Meanwhile conflicts relate mainly to extractivist land uses that put environmental pressure on resources, such as mining, forestry, and agro-industry. Typically, ECAs emerge in the struggle for rural permanence as community-based responses to mitigate effects of violence, forced displacement and threats to public health associated to the permanent exposure to a suffocating environment induced by agrochemicals used on adjacent farms. They also consolidate collective processes of land recovery or rural reconstruction after natural disasters. In boxes 1 to 3 (box 2 and 3, p. 40) we outline the case studies in each study area and the socio-economic settings in which they operate.

Contributions of ECAs

The contexts of imminent violence and peasant vulnerability in which ECAs emerge give rise to grassroots counter movements in which farmer communities struggle to defend their territorial sovereignty rights. The farmer-centered pedagogies advanced in agroecology and implemented by ECAs at the community level

promote associative and educational processes and contribute to the improvement of social cohesion (table 2, p. 41) and community resilience (table 3, p. 42) of farmer communities. The results shown in table 2 and 3 support our hypothesis that social cohesion and community resilience are strengthened in community-based natural resources management initiatives. Table 4 (p. 43) outlines the contributions of ECAs to environmental peacebuilding. Social cohesion, community resilience and environmental peacebuilding are interrelated and some indicators and activities for one are also indicators and activities for the other, as the tables show.

Social cohesion

ECAs strengthen *social cohesion* (table 2) by promoting *participation, solidarity and community support*. ECAs encourage participation of farmers in deliberating territorial development plans, in so-called *Planes de Vida* (La Bella, IMCA, CIMA) (table 4), and in the creation of solidary and farmer markets (Tuluá). They also promote community support by means of self-managed micro-finance schemes, so-called rotatory funds (table 4), in which members jointly pool resources for financing activities and acquiring communal farm infrastructure. Successful examples are advanced by CIMA and IMCA, while Surcos and ASPROINCA, struggled to maintain a functional fund as members were often unable to pay back their loans. Moreover, ECAs encourage farmers to problematize their realities, *organize and engage in collective action* as means to *promote equity and social justice*. As farmers become aware of shared environmental challenges, they gain a collective sense of purpose to defend their territories and sover-

BOX 2: Valle del Cauca: socio-economic setting and description of case studies

Valle del Cauca is characterized by extensive fertile lowlands suitable for monoculture cultivations. Here, the production of sugarcane and timber constitute the dominating land uses since colonial times. Agro-industrial sugar cane plantations, mainly destined to the production of soft drinks and confectionery, apply *green revolution* technologies and toxic agrochemicals. Moreover, through the expansion of forest plantations, agro-industrial farming and urbanization, the region has seen a rapid conversion of primary forests into other land uses.

IMCA

(*Instituto Mayor Campesino/Major Peasant Institute*)

First ECA in the country. Founded in 1962 as an organization of unionized farmers.

Components:

1. cooperativist schools
2. solidary economies
3. fair trade marketing
4. rotatory fund (joint resource pool for financing activities and infrastructure)

Achievements: IMCA co-created the National Farmer University, the Movement for Agroecology in Latin America and the Caribbean (MAELA), created a regional committee for food security, and promotes the creation of seed saving networks.

Challenges: IMCA's affiliated farmers operate in a highly toxic agro-environment dominated by sugarcane monocultures.

ECAs DE TULUÁ

(*Escuelas Campesinas de Tuluá/Peasant Schools and Market Network of Tuluá*)

Founded in 2006 for creating agroecology markets in public spaces of Valle del Cauca.

Components:

1. agroecology school
2. solidary markets
3. rotatory fund (joint resource pool)
4. seed recovery workshops
5. technical assistance on agroecology

Achievements: ECAs de Tuluá encourages producers to engage in the creation of a regional agroecology market network and short value chains. It facilitates participatory certification, rotatory funds, and the recovery of native seeds.

Challenges: By focusing on economic processes, the educational processes have been neglected.

eighty rights (table 3). A clear example is the *paro* (strike) of 1990 organized by communities of Cauca with support of CIMA and other associations, in which farmers blocked the Panamerican highway for nearly a month for impeding low-priced coffee to leave the country. The strike enabled negotiations with the state, yet such activities are depicted as radical by the state to justify the repression against social movements. Awareness about common environmental threats, as well as sentiments of rootedness, are

utilized by ECAs for strengthening *shared identities and sense of belonging*. Farmers involved in all ECAs recognize that shared territorial identities – that is, peasant, indigenous, or afro – continue to be a key resource for confronting the violent order.

Community resilience

The farmer-centered pedagogies embodied in ECAs enhance resilience of farmer communities (table 3). By practicing agro-

BOX 3: Coffee Axis: socio-economic setting and description of case studies

The Coffee Axis currently experiences complex territorial dynamics that combine a history of conflict and dispossession induced by armed violence, with a rapidly changing rurality. Violence was severe in the 1990s, when the territory was under strong influence of the Revolutionary Armed Forces of Colombia (FARC) and the National Army. Farmers experienced invasion and appropriation of their properties. Today, the Coffee Axis has become a new horizon for land investment for forestry, mining and agro-industrial activities, and rural properties partly due to tourism and money laundry, representing major threats of farmer displacement.

LA BELLA

Created in 2014 as a primary school adopting agroecology in its curriculum.

Components:

1. primary and secondary schools
2. parents school
3. participatory-action research
4. recovery of historical memory
5. community-led development plans

Achievements: La Bella is aligned to the national education system and has become a reference project that carries out teacher trainings in other regions.

Challenges: Toxic agro-environment nearby has severe repercussions on the health of children and peasant families.

SURCOS COMUNITARIOS

(*Common Furrows*)

Created in 1996 as a communal support system during violent times.

Components:

1. weekly *mingas* (traditional voluntary work for community projects)
2. seed conservation trainings
3. participatory organic certification
4. medicinal plants workshops

Achievements: Surcos fosters alliances between rural and urban workers' unions, establishes communal seed banks and promotes the documentation of ethnobotanical knowledge.

Challenges: Surcos has no external support and struggles financially. Rotatory fund has failed.

ASPROINCA

(*Asociación de Productores Indígenas y Campesinos/ Association of Indigenous and Peasant Producers*)

Started in 1995 as land redistribution process of indigenous land.

Components:

1. participatory property planning
2. ecological valuation and monitoring
3. training and extension
4. rotatory fund (joint resource pool for activities and infrastructure)

Achievements: ASPROINCA has helped create four Indigenous Reserves, promotes community-led water management, seed banks, and low-cost energy innovations.

Challenges: Struggles financially and its rotatory fund has failed due to members dropouts.

TABLE 2: Contributions of Agroecology Peasant Schools (ECAs) to social cohesion (cf. online supplement, appendix 3'). FGD: focus group discussion (cf. online supplement, appendix 6').

SOCIAL COHESION INDICATORS	ACTIVITIES	CASE STUDIES
community participation	collective rural reconstruction, e. g., recovery committees after conflict and disasters for rebuilding villages collectively, resistance strategies	all ECAs
	accompaniment in crises, e. g., family support	IMCA, Surcos, CIMA, ASPROINCA
	network of peasant organizations, e. g., for promoting agroecological farming and marketing for peasant produce across territories	all ECAs
	mediation, e. g., participatory management, periodic meetings, conflict-resolution mechanisms	all ECAs
shared identities and sense of belonging	fostering shared Identity: "The greatest assets we have are the identity shared by the group, the roots in the territory, our peasant traditions and the social cause" (Community Leader, FGD CIMA)	all ECAs
	recovery of historical memory, e. g., in practices, schools of peasant trades and museums of conflict	IMCA, COSURCA, CIMA, Surcos, La Bella
	(re)valorization of traditional knowledge, e. g., by emphasizing local farming practices which have proven to be sustainable over time	all ECAs
	<i>Buen Vivir</i> , i. e., good living, Andean notion referring to living in harmony with the environment and promoting dignified livelihoods and sovereignty	La Bella, Surcos, CIMA, IMCA, ASPROINCA
promoting equity and social justice	inclusion, e. g., minority programs, no discrimination in assemblies	all ECAs
	gender equality	IMCA, ASPROINCA, Surcos
	social justice, e. g., collective action for the defense of territories and land redistribution, fair-trade schemes and participatory quality assurance systems for organic marketing	all ECAs
solidarity and community support	<i>minga</i> and pooling of resources: "We help each other with whatever is needed on our farms, so that the community member does not feel so down with so much work and little economic retribution. By helping each other we earn our lunch and have access to this educational and exchange space" (Carmen – FGD Surcos)	all ECAs
	solidary economies, e. g., establishment of solidary market networks to promote the economy and welfare of family farmers	IMCA, Tuluá, COSURCA, CIMA, ASPROINCA
	advice and support: "In times of conflict, we shared experiences and information to defend ourselves from violence" (FGD Surcos)	IMCA, Surcos, CIMA
social organization and collective action	promoting reforms, e. g., implementing <i>Zonas de Reserva Campesina</i> (Peasant Reserve Areas)	CIMA, ASPROINCA
	social mobilization (strikes, road blockades, ...) for justice for the peasants and territorial peace, e. g., to improve the price of sugarcane and coffee	CIMA, IMCA, COSURCA, Surcos
	political participation, e. g., via <i>Juntas de Acción Comunal</i> (Community Action Boards) as organizational tools to promote political participation of farmers	CIMA, La Bella, IMCA, Tuluá, ASPROINCA

ecology, farmers acquire skills that enable them to recover from shocks and crises, carry out processes of socio-ecological transformation, while adapting to uncertainty and climatic changes and exercising resistance for defending their territories. By generating associativity and educational processes, ECAs help improve collective capacities of farmer communities. Results show how ECAs contribute to the socio-economic recovery of peasant territories by generating economic alternatives, for example, substitution of illicit crops through organic production and linkage to markets. ECAs also help recover and revalorize traditional

knowledge, for example, through schools of trades and museums of historical memory (COSURCA). ECAs also encourage *adaptation* through the promotion of farm diversification for meeting market demands (Tuluá, IMCA, COSURCA), and through the co-creation of low-cost agroecological innovations and processes that help reduce dependency on external inputs. Through the promotion of sustainable farming alternatives, ECAs enable a broader socio-ecological *transformation* and reorganization of peasant territories, which in most cases were affected by armed violence. Finally, ECAs instigate intentional social processes of

TABLE 3: Contributions of Agroecology Peasant Schools (ECAs) to community resilience (cf. online supplement, appendix 3').

COMMUNITY RESILIENCE INDICATORS	ACTIVITIES	CASE STUDIES
recovery	socio-ecological reconstruction, e. g., revitalizing the biocultural landscape, restoring the physical space and infrastructure and reviving peasant identities and sentiments of rootedness	all ECAs
	recovering traditional knowledge, re-valuating the knowledge and practices of peasants, indigenous peoples and Afro-descendants for reinventing new forms of ecological and socially sustainable production	all ECAs
	generating economic alternatives, e. g., to illicit crops	CIMA, COSURCA, IMCA, Tuluá
adaptation	agroecological innovation, e. g., revalorizing ancestral knowledge for developing locally appropriate practices while integrating technological advancements	all ECAs
	diversification, e. g., ensuring diversity of products in markets and preventing competition through coordinated production planning among members, thereby adapting to local culture, agroecological quality standards and market cycles	Tuluá, IMCA, COSURICA
	social learning, e. g., enabling collective processes of socio-ecological transformation and adaptation	all ECAs
transformation	socio-ecological restoration by means of agroecological management	all ECAs
	reorganizing peasant territories and economies, e. g., by repairing common infrastructure, creating marketing channels for peasant produce, and proposing the use of public spaces for holding agroecological markets sovereignty rights, e. g., food security takes precedence over sale of crops	all ECAs
resistance	social mobilization/resistance as tools to enter in negotiations with the State	CIMA, IMCA, COSURCA
	defending farmers' sovereignty rights over peasant and indigenous territories by utilizing agroecological education as strategy of re-peasantization	all ECAs

resistance through the recognition of a common interest – the defense of the territories. Defending natural resources from *extractivism* was highlighted by the politicized organization CIMA, which strives to increase sovereignty of farmer communities over their territories by successfully advancing Peasant Reserves as legal territorial entities, much like existing Indigenous Reserves.

Environmental peacebuilding

ECAs encourage the construction of sustainable positive peace at the grassroots level. They do this as they support *economic development* of marginal rural areas while ensuring *resource sustainability* (table 4). This is achieved through the provision of extension work, incubation, and marketing services for agroecological producers. ECAs such as COSURCA, IMCA and Tuluá set an emphasis on strengthening economic processes for ensuring economic viability of agroecology, improving self-sufficiency of farmers organizations, and allowing long-term engagement with rural communities. However, as explained by facilitators of Tuluá, the downside of having an economic emphasis is that the educational work that characterizes ECAs tends to be weakened. When adopting agroecology, farmers must (re)learn ecological farming methods, acquire practical skills and device locally suited innovations. In these regards, its adoption relies on the educational processes carried out by ECAs, which might occur implicitly while doing collective work in *mingas* (table 2) (Surcos), as

capacity building (COSURCA), or as formal education (La Bella, IMCA). In either of these formats, a *dialogue of knowledge* occurs between ancestral, socio-technical, practical, or/and scientific knowledge. It is through the generation of educational spaces, where constant interactions among farmers occur, that ECAs help *build trust and cooperation*. Similarly, the work of ECAs helps improve the organizational climate of farmer associations, for example, through mediation, intracultural dialogue, and periodic meetings (COSURCA, ASPROINCA). Lastly, ECAs activities help *build institutions at the community level* as they promote participatory mechanisms for decision-making, for example, through community action boards, and foster community engagement, for example, through collective action. In this manner, ECAs instigate the sustainable and inclusive recovery of rural areas, hence, contribute to building environmental peace from the grassroots level.

Discussion

Shared identities and capabilities

Funded upon our results, we maintain that the activities carried out by ECAs strengthen *social cohesion* and *community resilience*, considered key aspects of peacebuilding (Van Metre and Calder 2016, Jewett et al. 2021, Johnson et al. 2021). As illustrated above,

TABLE 4: Contributions of Agroecology Peasant Schools (ECAs) to environmental peacebuilding (cf. online supplement, appendix 3').

ENVIRONM. PEACEBUILD. INDICATORS	ACTIVITIES	CASE STUDIES
economic development	extension work for making the agri-environmental process economically viable and sustainable, e. g., by establishing market linkages for improving profitability, enabling self-determination and reducing dependencies on external resources	CIMA, IMCA
	incubation of productive projects, e. g., farmer organizations, in collaboration with universities, are supported in their marketing activities	IMCA, COSURCA
	market development, e. g., creating market linkages (peasant markets in public spaces/ universities, promotion of peasant products, e-commerce initiatives)	CIMA, COSURCA, Tuluá
	energy security, e. g., via low-cost biogas plants	ASPROINCA
	self-sufficiency, e. g., improving autonomy through extension and marketing services, and self-managed microfinance schemes	COSURCA, IMCA, CIMA
building trust and cooperation	enabling interactions, e. g., in form of assemblies, fairs, knowledge exchange, markets, cultural events	all ECAs
	conflict mediation, e. g., intraorganizational and intercultural dialogue for maintaining a prosperous climate	COSURCA, CIMA, IMCA
	(re)building the social fabric by promoting dialogue, diversity and fraternity,	COSURCA, IMCA
	community-based financing	ASPROINCA, Surcos, IMCA, CIMA
	pooling resources, e. g., machinery sharing, creating rotatory funds in which members pool their financial means	Tuluá, ASPROINCA, COSURCA, CIMA
linking social struggles, e. g., via alliances between labor and peasant movements, awareness-raising work on food sovereignty within agribusiness	Surcos	
resource sustainability	sustainable land use in line with local traditions and aspirations	all ECAs
	nature conservation, e. g., forest rehabilitation, seed/biodiversity conservation and (re)introduction of native species	all ECAs
	development plans: <i>Planes de Vida</i> , i. e., proposals for Sustainable Regional Development	IMCA, CIMA, La Bella
	<i>Zonas de Reserva Campesina</i> (Peasant Reserves) as legal tools to promote sustainability and sovereignty rights of farmers over their territories	CIMA, ASPROINCA
education and dialogue of knowledge	re-peasantization, e. g., educational models suitable for recovering peasant knowledge, revitalizing rural culture and ensuring permanence of the youth	all ECAs
	dialogue of knowledge, i. e., revalorizing ancestral knowledge in dialogue with technological advances	all ECAs
	capacity building and technical assistance, i. e., demonstration farms, trainings (seed saving, marketing) and workshops on traditional peasant trades	all ECAs
	institutional recognition of educational processes within the national educational system	COSURCA, La Bella, IMCA, CIMA
building institutions	<i>Juntas de Acción Comunal</i> (Community Action Boards) promoting collective ownership and community management of resources, collective action for demanding land restitution	ASPROINCA, Surcos, CIMA, La Bella, IMCA
	fostering strategic alliances with other social organizations as a strategic resource to confront violence during times of conflict	CIMA, IMCA, COSURCA, La Bella
	linkage to public and private entities, i. e., to state institutions for advancing supporting policies, or raising financial support	IMCA, COSURCA, La Bella

ECAs advance agroecology in the need to mitigate the effects of conflict, defend their territories against multiple threats of dispossession and protect the environment. Through the recognition of shared environmental threats, that is, *shared identities* (Johnson et al. 2021), farmers gain an immense sense of pur-

pose for collaborating and advancing sustainability projects (Rosset and Martínez-Torres 2016, Tittonell et al. 2021). These conditions strengthen social cohesion within a group and instigate social learning processes, which encourage farmers to reflect and re-signify their environment (Divinsky 2019). In this sense,

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shared identities and sentiments of territorial rootedness are utilized by ECAs for (re)building a vital social fabric capable of transforming post war environments (Conca and Beevers 2018).

Further, ECAs pedagogies help improve collective capacities of farmers and strengthen thereby *community resilience* for enduring shocks while adapting and transforming through self-organization, innovation, and cooperation (Folke 2016, Sietz and Feola 2016). Contrary to conventional rural education approaches, the farmer-to-farmer pedagogies (Holt-Gimnez 2006) of ECAs turn the spotlight on farmers as holders of agricultural knowledge and enable a *dialogue* between ancestral knowledge and scientific advances (Lederach 2017). Thus, farmers are not recipients of knowledge but rather co-creators, experts, and teachers. This relates to the idea that peace revolves around *community empowerment* – specifically, the ability to participate equitably in natural resource management, livelihood improvement, and environmental protection (Anderson et al. 2020, Tiltonell 2021). Our findings support Colombian investigative efforts by Acevedo-Osorio (2018), Lederach (2017) and Ahedo (2020), who evidence how agroecology enhances family agriculture in the context of crises and conflict. They also support those in other regions demonstrating how agroecology fosters “traditions of reciprocity” thereby creating a foundation for bottom-up peacebuilding in Zimbabwe (McAllister and Wright 2019, p. 6). Based on this study, we support that agroecology constitutes an auspicious paradigm for sustainable post-war recovery that ensures participation of rural communities.

Sustainability assessment

Despite their contributions, ECAs face numerous challenges for ensuring long-term permanence. The main reasons why ECAs perish are due to economic struggles and political repression. Profitability is hard to achieve autonomously while dependency on external funds, for example development aid, often results in the loss of sovereignty over processes. Those ECAs that achieve economic viability are often linked to small government subsidies, for example from vocational training entities, have established alliances with political organizations and universities, or focus on export value chains that provide a more stable revenue stream. In addition, rural leaders face stark political repression related to the state-led derogation of environmental activism, which elucidates the power structures in place.

Power and political implications

Stakeholders perceive the Colombian government to be the main actor grabbing rural territories and inducing displacement. This is attributed to multiple factors, such as inefficiencies in land tenure systems and policies that define common land as “barren” and enable the state to claim it. Interviews also revealed that the entry of multinationals, that is, forestry, agro-industrial, and mining companies, converges with paramilitary deployments to repress strategic sites for social movements. In a setting of state-driven dispossession and repression, farmers remain powerless against more influential actors shaping the post-war land use

order. We recommend examining in more detail the power structures that exist between communities and other actors on the territories when carrying out conflict sensitive analysis, as disregard of these structures can reinforce them and contribute to conflict and societal fragmentation.

Conclusions and policy recommendations

This study is the result of an extensive systematization work that analyzed ECAs on the Colombian Andes based on indicators of environmental peacebuilding, social cohesion, and resilience. It gives insights about the challenges that farmer communities face in the current post-conflict scenario and summarizes grassroots initiatives that emerge in response to crises. Our findings demonstrate that, as farmers participate in agroecological educational processes, they engage in a continuous dialogue that leads to consensus and collaboration for pursuing collective objectives and entering new development trajectories. Our results help us maintain that the associative processes advanced by ECAs foster shared identities and collective capabilities of farmers, which strengthen social cohesion and resilience among community members, and thereby contribute to building positive peace from a grassroots level. We emphasize the need to further investigate agroecology experiences in close collaboration with communities for developing targeted development programming based on learnings from experiences on the ground.

The vast potentialities of community-based agroecology can only be set in motion if it is scaled from farm to institutional levels. As the power of grassroots organizations remains limited and they cannot generate broad societal change on their own, their efforts must be recognized and supported by the state. For this, it is crucial that the state acknowledges the fundamental role of family farmers, and the different collective organization forms they preserve, in the reconstruction of the countryside. The state must ensure the provision of extension services, including accompaniment, technical assistance, and financial support to farmers, especially those linked to agroecological production. Absence of violence as one precondition of peace must be fostered by the state: communities must be protected; the power of extractivist corporations should be limited, and indigenous knowledge and practices need to be valued. Only then the proposals advanced by ECAs, which can enable the productive permanence of farmers in rural areas, and thus a more sustainable use of the land, can be sustained over time within peaceful social dynamics.

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