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Using the Adaptive Cycle to Revisit the War–Peace Trajectory in Colombia

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Abstract

This paper focuses on a comprehensive historical analysis of Colombia's war and peace trajectory from 1964 to 2023. We use a resilience thinking approach and the adaptive cycle conceptualization of change to analyze this trajectory, based on qualitative and quantitative information on violence, political and social interaction processes, and deforestation, including a statistical analysis of actor dynamics to identify nonlinear phase transitions. As a result, we propose a new narrative: namely, that war is the regular regime, and peace is the collapse of this regime, initiating a process of reorganization and regrowth. This narrative holds for the period between 1964 and 2000, but in the early 2000s, the system was transformed. Actors and their interactions have changed, and a new system has emerged. Secondly, we observe that the increase in violence between 1995 and 2001 coincided with a clear national trend of rising deforestation. However, since 2002, deforestation has remained high while violence has declined, challenging simple causal assumptions. These findings caution against interpreting deforestation dynamics solely through national-scale or post-agreement perspectives. Our results show that peace in Colombia has been fragile and partial, and instead of marking a definitive transition, the post-agreement period reveals a reconfiguration of armed conflict. This complexity underscores the need for future research that considers regional patterns and actor-specific dynamics in forest governance during conflict transitions.

Keywords: adaptive cycle; resilience; social-ecological systems; war; peace; Colombia

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1. Introduction

Colombia has experienced decades of armed conflict and has undertaken numerous peace processes since the 1980s, though only a few have been successful. Prominent examples include the peace agreement with the M-19 in the 1990s, the Justice and Peace Law (Law 975 of 2005) addressing paramilitary groups, and the 2016 accord with the now-defunct FARC. Numerous authors have studied the chronic war in this country, analyzing the social [1–9], political [1,2,8,10–16], economic [13,14,17], and ecological [18–25] aspects. The civil war in Colombia is one of the world's most enduring conflicts. It has evolved with the general context of the country [8,13,14,26], becoming an essential part of the socio-ecological landscape.

Conflicts in Colombia have historically stemmed from the concentration of land—considered the sole source of wealth during colonial and post-colonial times—which has led to the displacement of rural populations since that era [9]. This foundation of

inequality and conflict between landowners and peasant communities has given rise to various armed groups since 1940 [9,27]. Following the conclusion of the Thousand Days War in the early 20th century, the first war of the century in Colombia was "La Violencia" (1940–1970), a bipartisan conflict over inequality and land distribution that ended with the formation of the National Front [1,10,13,14,28]. This was followed by the Counterinsurgency War (1970–2016), a conflict between some factions of the elite and peasant-based insurgencies [8,10,13,14]. In conclusion, as noted by Gutierrez Sanin [10], Colombia experienced two major cycles of political violence during the 20th century: "La Violencia" (1940–1970) and the Counterinsurgency War (1970–2016).

Richani [13–15] analyzed the self-perpetuation of the Colombian war from the end of the 1960s to 2012. He showed that the conflict was linked to the convergence of three conditions: (i) the failure of institutions to arbitrate conflicts, (ii) the establishment of a "positive political economy" that makes the condition of war the best available option for different parties, and (iii) a balance of force that resulted in what he calls a "comfortable impasse". In his view, this comfortable impasse started to become uncomfortable in the early 2000s following the implementation of Plan Colombia, which could explain why peace negotiations finally were successful during Santos' government (2010–2018). This author also pointed to the institutional failure to resolve land conflicts as the genesis of the war system and land accumulation/grabbing dynamics during the conflict.

This paper focuses on a comprehensive historical analysis of Colombia's war and peace trajectory from 1964 to 2023, the period after "La Violencia" that includes the Counterinsurgency War, and the various peace agreements. Our central research question is as follows: how can the trajectory of Colombia's armed conflict be interpreted through the lens of the adaptive cycle, and what does this perspective reveal about the system's long-term resilience and transformation? We use a resilience thinking approach and the adaptive cycle conceptualization of change [29] to analyze this trajectory. Resilience thinking applied to social and ecological systems (SES) orients the understanding of system change toward the analysis of trajectories of change through different phases of the system. Resilience is considered to be an ongoing process, rather than the capacity and time taken for recovery to a stable equilibrium state. Resilience is the capacity of a system to absorb disturbance and reorganize while changing to essentially retain the same function, structure and feedbacks, and therefore, identity; the capacity to change to maintain the same identity, i.e., resilience, is a dynamic concept focusing on how to persist with change [30,31], and how to evolve with change.

Framed by this ontological view of resilience, the adaptive cycle is a conceptual model that proposes an archetypical trajectory among different transition phases between states of a system. Its main assumption is that for a given set of components and interactions, the system will go through a cyclical trajectory, passing through periods of growth, collapse, and reorganization. For us, the system is said to be resilient as long as it follows this trajectory cyclically, because the roles of the components and the interactions remain the same and produce the same succession of phases. Transformation (a change in composition and interactions) can break this cyclical trajectory [32,33]. In our research, transformation is not a transition from one state of the system to another state of the system. Transformation involves fundamental change, which, in the context of sustainability, requires radical, systemic shifts in values and beliefs, patterns of social behavior, and multilevel governance and management regimes [34,35]. For researchers working on SES, this concept is related to the concept of transformability, defined by Walker and Salt [36] as "the capacity to create a fundamentally new system (including new state variables, excluding one or more existing state variables, and usually operating at different scales) when ecological, economic, and/or social conditions make the existing system untenable" [36] (p1654). In this context, we

hypothesize that the Colombian armed conflict itself constitutes a resilient regime—stable and adaptive, but undesirable—from a socio-ecological perspective. This regime has demonstrated the capacity to reorganize and persist through different historical phases, despite repeated peace efforts.

Resilience thinking (and, in particular, SES resilience) has in later years been increasingly used as a lens for understanding the complex dynamics between conflict and peace. The value of this approach is that resilience thinking brings to light existing cross-scale interactions, feedback, and emergent properties that are typical of complex systems. In this paper, we test the usefulness of the adaptive cycle conceptualization of change to analyze the resilience of the system. Complementing Richani's and Gutiérrez Sanin's rich analysis of the processes at stake, we propose to use the adaptive cycle to describe the resilient trajectory between war and peace in Colombia, using its institutionalization as an indicator of social and political processes. The adaptive cycle provides an analytical framework to follow Colombia's SES through sequential phases and its iterative growth, collapse, and reconstruction periods. The purpose is to examine how interactions between different components move (and potentially still move) the system across different phases, and how these interactions produce a resilient war–peace trajectory.

First, applying the adaptive cycle model contributes to the communication and potential development of the counterintuitive idea that war can be the general regime and peace the collapse of this regime. Second, it contributes to the communication of the explanatory pattern of interactions (such as those explained by Richani) that underlie the emergence of this trajectory. Third, the application of this model can help identify areas where new information and data are needed by highlighting knowledge gaps. The application of the model offers the possibility to link different pieces of knowledge, such as knowledge of social and political conflicts and knowledge of ecological dynamics. Regarding ecological dynamics, we have chosen to focus on deforestation. Forests have always been a crucial component of the Colombian economy and have played a significant role in land conflicts among various groups. They have served, for instance, as a refuge for some since the period known as "La Violencia" [4,37], while simultaneously being targeted for land accumulation by others [9,21,38]. Recently, forests have also been utilized as a strategy by the State to control territories through armed forces [39]. We use the adaptive cycle to identify how much of the data and knowledge available on deforestation can be linked with social and political processes within the resilient system trajectory, adopting a structured interpretative approach in which the adaptive cycle serves as a heuristic—not predictive—framework.

In this paper, we first review the literature on resilience, war–peace, and the adaptive cycle. We then use the adaptive cycle to analyze the war cycles in Colombia since 1964, using qualitative and quantitative information on social interaction processes, violence, and deforestation. The discussion of these results is divided into two parts. In the first part, we propose a new narrative for some conflictual situations: namely, that war is the regular regime, and peace is the collapse of this regime; then, the war regime will reorganize and regrow. The second part of the discussion is dedicated to the relationship between the phases of the last iteration of the adaptive cycle and the deforestation process (data are available only for this last iteration). In conclusion, we discuss the fact that, according to our analysis, Colombia's system went through two cycles of war/peace between 1964 and 2001 before a radical transformation in the early 2000s, from which a new system emerged. This new system needs to be observed with different lenses from the previous ones.

2. Literature Review on the Analytical Framework

In this section, we look at the literature on resilience and the adaptive cycle applied to violence, war, and peace trajectories.

2.1. The Adaptive Cycle

Since the seminal work of C.S. Holling, the resilience of social and ecological systems is considered an ongoing process rather than a recovery to a stable equilibrium state [40]. The adaptive cycle model is a central feature of resilience theory [29]. The adaptive cycle model (Figure 1) is a powerful and valuable model for system dynamics that includes four phases: exploitation (r), conservation (K), release (Ω), and reorganization (α). As presented in the introduction, resilience is the capacity of a system to absorb disturbance and reorganize while changing. Conceptualized with the adaptive cycle model, resilience is not the system's recovery process to an equilibrium state, but rather how a system repeatedly transitions between different phases, maintaining its function, i.e., how it circulates on this cycle.

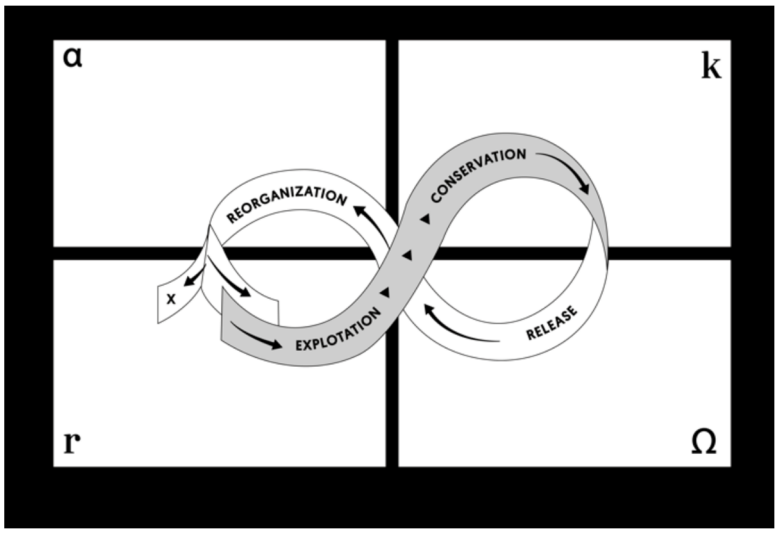


Figure 1. The adaptive cycle model. An adaptive cycle that alternates between long periods of aggregation and transformation of resources and shorter periods that create opportunities for innovation is proposed as a fundamental unit for understanding complex systems, from cells to ecosystems to societies. For ecosystem and social-ecological system dynamics that can be represented by an adaptive cycle, four distinct phases have been identified: 1. growth or exploitation (r); 2. conservation (K); 3. collapse or release (omega); 4. reorganization (alpha).

The adaptive cycle exhibits two major phases (or transitions). The first, often referred to as the fore-loop, from r to K, is the slow, incremental phase of growth and accumulation. The second, referred to as the back-loop, from Omega to Alpha, is the rapid phase of reorganization leading to renewal. During the slow sequence from exploitation to conservation, connectedness, potential increase, and capital of nutrients and biomass (in ecosystems) are slowly accumulated and sequestered. Competitive processes lead to a few species becoming dominant. While the accumulated capital is sequestered for the growing, maturing ecosystem, it also represents a gradual increase in the potential for other kinds of ecosystems and futures. For an economic or social system, the accumulating potential could also be from the skills, networks of human relationships, and mutual trust that are incrementally developed and tested during the progression from r to K. Those also represent a potential that is developed and used in one setting, that could be available in transformed ones (https://www.resalliance.org/adaptive-cycle) (accessed on 15 August 2025).

To benefit from the use of the adaptive cycle model, the meaning of two axes, namely potential and connectedness, must be clear. The definition of the connectedness axis (*X*-axis) is stable across the different papers using the adaptive cycle. The connectedness axis represents the degree of connectivity of different elements or components within a system.

Systems located on the right side of this axis have strong connections between their components, while those on the left have weaker or more fragmented connections [31,41–43].

There is much more variation in the interpretation of the *Y*-axis, which is named the potential axis. During the growing phase, the system increases its capacity for change and adaptation; therefore, this increases the potential for other futures. After the growth period, during the conservation phase, the system is stuck in a rigid state. The potential has reached a plateau. For Sundstrom and Allen [44], system potential is concerned with the range of options available for future responses of the system; in ecosystems, this can mean an accumulation of nutrients, resources, biomass, and diversity that provide a broad range of options for the future behavior of the system in response to change. In an ecological context, the number of resources accumulated in biomass and nutrients is regarded as "system potential," "setting the number of alternative options for the future", and as "ecosystem capital" [45]. More precisely, the notion of capital is associated with aspects of biological diversity and system functioning. Beyond ecological systems, Simmie and Martin [40] used the adaptive cycle in a regional economic context; the potential (of accumulated resources) would include the competences of individual firms, the skills of local workers, institutional forms and arrangements, and physical and soft infrastructure (such as business and work cultures). For Pelling and Navarrete [33], the potential axis is how much agency of social capital (behavior and action allowed by social capital) is diffused (at the bottom of the axis) or organized (at the top of the axis). It is important to clarify that we do not consider violence per se as an indicator of system potential. Instead, we use the organization of violence—through stable coalitions, institutionalized behavior, and reinforced actor interactions—as a proxy of potential. In this framework, potential refers to the degree of consolidation of social capital around dominant structures, not the raw intensity of violent events.

To summarize, at the bottom of the *Y*-axis (potential) and in the growing phase, the system is flexible and has a high capacity to adapt. Resources are available and ready to be assembled in different ways. During the growth phase, the potential for different futures increases. At the top of the axis, during the conservation phase, resources are assembled in rigidified assemblages. It is important to remember that when a system is transformed [35,36], the structures and dynamics within a particular cycle are broken down, and a new (different) cycle emerges with its own properties, feedback, and regimes.

2.2. Resilience, Adaptive Cycle, and War/Peace

The literature that bridges resilience, the adaptive cycle, and war/peace is divided into four groups of documents.

The first set of papers on resilience and war/peace uses frameworks that differ from the adaptive cycle. This research mainly focuses on psychological resilience in war zones, community resilience, post-traumatic growth, conflict resolution, and peacebuilding [46–50]. Among those papers, we highlight the contribution of De Coning [51] and Juncos [52], who approach the issue of war and peace with the complexity lens and the associated uncertainty dimension. De Coning [51] proposes an adaptive peace-building approach that recognizes that conflict is a normal and necessary element of change, and it is important to support the ability to manage the process of change in such a way that violent conflict is avoided.

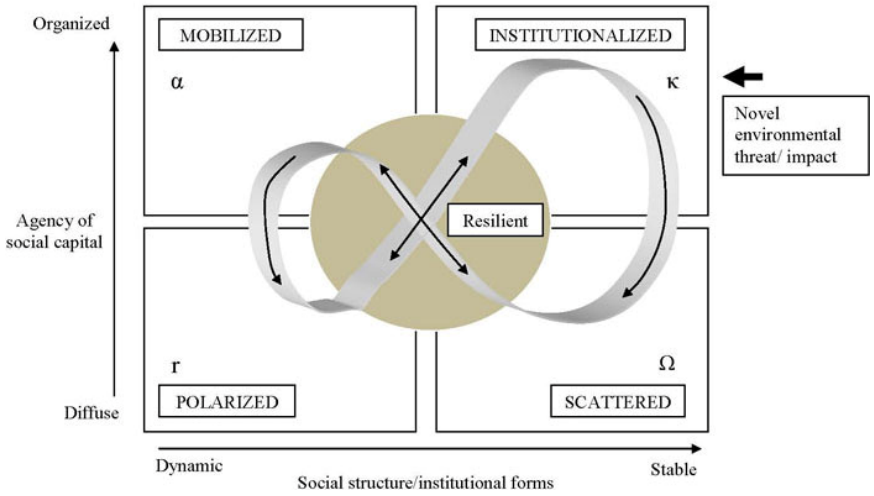
A second body of research uses the adaptive cycle to describe trajectories (mainly of territories) and elaborate on power issues and tensions (not violence) among groups of actors [33,45,46,53–55]. Carpenter [46] looks at patterns of resilience, which can take three general forms: (i) maintaining or strengthening existing functional frameworks with positive benefits for cooperation and risk mitigation, (ii) preparation for anticipated

events, and (iii) resistance to patterns of fragility or reform of the conditions driving fragility through resistance to new institutions that threaten essential elements of social capital. Jiménez et al. [54] conducted a historical analysis of the Xochimilco social-ecological system, assessing how it has gone through phases of the adaptive cycle. They identified critical elements of the system's historically maintained resilience and the main drivers of system change. They concluded that a historical adaptive cycle assessment could lead to a new examination of unresolved questions regarding governance and power struggles. Antoni et al. [53] applied the adaptive cycle model to examine historic spatiotemporal changes in one of the largest communal regions (ejido) in the northernmost extension of the tropical forest biome in Mexico. They concluded that using this model to understand system dynamics and phase changes helps to identify social and ecological resilience characteristics and unexplored windows of opportunity to guide the transformation of system states out of social-ecological traps. Pelling and Navarrete [33] place power at the heart of the analysis and question the transformational qualities of social systems facing climate change. In their view, the resilience lens successfully highlights internal contradictions, i.e., the contradiction of the structures of power or institutions, that maintain the rigidity and hinder the flexibility of social relations in existing governance regimes and development pathways. This generates a set of reinforcing institutions and actions supporting the status quo while undermining long-term flexibility and equitable and sustainable development. The conceptual interpretation of the adaptive cycle by Pelling and Manuel-Navarrete, which we will adopt, is presented in Box 1 and Table 1.

Table 1. The adaptive cycle states and transition: social agency and structural qualities.

Adaptive Cycle Phase	Agency of Social Capital (Action and Behavior)	Social Structure (Discourse and Institutions)
Institutionalized (K)	Agency reinforces and is aligned to dominant social structures and institutions. Alternative behavior is marginalized or excluded.	Cohesive structure legitimates prevalent social behavior. Alternative discourses and associated institutions are marginalized or excluded.
Transition	Likelihood of transition to a new state is influenced by cultural norms determining the limits of risk and loss tolerance and denial, institutional resistance to change, and capacity to cope with risk and loss.	
Scattered (Ω)	Diffused and diverse, social capital and behavior can break away from normalized routines and positions. A space for alternatives to emerge or be formed.	Established institutions and discourse are seen to have failed in providing security or explaining risk. While these structures are still in place they are no longer reinforced by social agency, initiating a crisis in structural reproduction.
Transition	New constellations of values emerge and compete for discursive dominance.	
Mobilized (α)	Social capital hardens around discrete value positions and specific coalitions of interest emerge.	Contradictory and supportive discourses and institutions coexist in overlapping emergent regimes.
Transition	Historical and political contexts shape the speed of movement from a focus on the building of internal cohesion for diverse social groups and their associated institutions and discourses to mobilization and competition between competing values and behavior.	
Polarized (r)	Competition between alternative social groups is overt. New hierarchies or non-hierarchies arise.	Fewer, but more forcefully argued differences in
Transition	Negotiation or imposition of a new risk social contract.	

Box 1. Interpretation of the adaptive cycle for social and political systems [33].



The cycle can be considered to start with a state of highly institutionalized stability (K), in which dominant social structures and social agency are well aligned and reinforcing. If a new pressure is large enough to cause shock, then while established social structures of legitimation, domination, and signification formally remain, social behavior may begin to de-link, until the affected components of the system are contained and dominant institutions reassert themselves, or under pressure, they become scattered (Ω). Scatter turns into mobilization (α) when diffused social action generates its internal structure or is massaged into doing so externally. Interest groups form as bonding capital draws the like-minded together (organized social capital). Groups vary in their tolerance of existing structures and may live out alternative forms, such as post-disaster community organization established as a break from centralized governance. Polarization (r) marks a firming up of social capital positions and coalition building so that differences become fewer but more marked. This results in diffused social capital and dynamic social relations with contradictory institutions potentially coexisting and an increased likelihood of conflict and backsliding towards scatter. If new institutions are built that better suit the values and risk preferences of emergent, dominant social actors, again under the influence of external/higher scales of power and interest, a new phase of institutionalization (K) is established, offering a new equilibrium between agency and structure symbolized in a new risk social contract, and indicated by changes in the application of technology as well as social organization, legislation, or policy.

Thirdly, Olsson and Moore [56] provided a perspective grounded in resilience theory, combined with peacebuilding and transformative justice studies. They explore the critical transitional phase between war and peace, emphasizing that moving from conflict to peace is not guaranteed, as changes can also lead to unsustainable or unjust outcomes. By combining insights from resilience theory with peacebuilding and transformative justice, they identify three key roles of hybrid justice approaches during this phase: managing backlash dynamics, enhancing capacities for navigating cross-scale conflict, and responding to additional crises.

Finally, the only contributions we found that demonstrated articulate resilience, the adaptive cycle, and war/peace are those of Johansson [57,58] who introduced the idea of peace beyond the absence of war as a plateau between war and peace states, and argued that one crucial contribution of a resilience perspective is to provide an alternative to a stability perspective [58]. He discussed three crucial implications of resilience thinking for peace and conflict studies. First, multiple equilibria mean that just as resilience keeps a society peaceful, it can also maintain a conflictual state. Second, SES resilience means that, rather than returning from a crisis to a previous state, a crisis can be considered as an opportunity to learn, develop, and move forward. Third, resilience thinking requires a different understanding of conflict termination [58]. In another paper about conflict in Liberia, Johansson [57] stated that in a resilience framework, not only can peace become self-sustaining, but so can conflict. Violence begets violence. If, therefore, a social system can exist in a regime of primarily peaceful feedback or a regime of primarily conflictual feedback—and, consequently, that conflict can be resilient to attempts at

peacemaking—then the same fundamental perception of social dynamics can be used to understand not only peace, but both peace and conflict.

3. Materials and Methods

According to Gutierrez Sanin [10], Colombia has had two major cycles of political violence: "La Violencia" (1940–early 1960s) and the Counterinsurgency War (mid-1960s–2016). We looked at the period between 1964 and 2023, covering the second cycle of violence. We used two primary sets of information, one on violence—the number of victims of massacres—and the other on deforestation. From the massacre dataset, we extracted a third and essential set of information: the illegal armed actors responsible for these events. This actor-based dataset forms the foundation of our phase classification, as it allows us to trace the emergence, disappearance, and transformation of armed groups throughout the conflict. While actor dynamics define the system's evolution and phase assignment, massacre data are not used to delimit transitions. Instead, they are interpreted as complementary indicators of how violence is organized or transformed within each phase, depending on the strategic behavior of armed groups. In addition to these three datasets, the study also relied on secondary information. A total of 83 documents were reviewed, of which 59 were related to the historical, social, political, and economic context of the war in Colombia (38 were journal articles, 16 books, two blogs, one official conflict web page, and one master's thesis), and 24 were related to deforestation in the country (22 were journal articles, one book, and one report from an official institution on deforestation). Among these references, we paid particular attention to Richani's comprehensive analysis of the perpetuation of the conflict between the beginning of the Counterinsurgency War and the years preceding the signing of the 2016 Peace Agreement [13,14].

Our analysis builds on (i) the narrative grounded in Gutierrez Sanin and Richani's contributions that there is a cycle of war and peace in Colombia where war is the usual regime and peace a transition period towards a new period of war, and (ii) the use of the adaptive cycle model in social sciences as interpreted by Pelling and Navarrete (Box 1 and Table 1). In this study, the adaptive cycle is applied as a heuristic framework to interpret patterns of socio-political transformation during the Colombian armed conflict. To sum up, our approach began with the construction of a historical and political narrative based on secondary sources and the existing literature. This methodological choice aligns with previous studies that have applied the adaptive cycle framework to social systems, such as De Balanzó and Rodriguez-Planas' analysis of urban change in Barcelona, where phase identification was grounded in historical interpretation rather than quantitative thresholds [59]. This narrative is then complemented with quantitative data to evaluate whether observable patterns in the armed conflict aligned with the phases proposed by the adaptive cycle model.

First, we describe our narrative. In our analysis, like in all uses of the adaptive cycle, the *X*-axis represents connectedness, which is the strength of the bonds between the different actors of the system. The *Y*-axis is an indicator of the potential of the system. At the bottom of the *Y*-axis, fragile and innovative organizations are ready to compete for power and territorial control. For Pelling and Navarette, the agency of social capital is diffused. They will engage in violent interactions to gain power and territorial control, being in competition but reinforcing each other through the conflict, which allows for the increase in accumulation (of power and territorial control). At the top of the *Y*-axis, agency reinforces and is aligned with dominant social structures and institutions. Alternative behavior is marginalized or excluded (Table 1). The system becomes rigid, and the interactions do not allow an increase in territorial control and power anymore.

Our analysis is mainly qualitative and relies on information on the actors that drive the trajectory of the system, their agency, and their interactions. In addition, we have gathered data that could strengthen the qualitative analysis. To identify the phases of the adaptive cycle (r, K, Ω, α) throughout Colombia's war–peace trajectory, we applied a structured interpretative method based on consistent qualitative indicators. The identification was grounded in patterns observed in the literature and triangulated with historical evidence.

Specifically, we used the following interpretation of the adaptive cycle phases:

- Exploitation (r): Rapid emergence of new armed actors or coalitions, fragmentation, and fluid actor dynamics; opportunistic violence and initial territorial expansion.
- Conservation (K): Stabilization of dominant groups, institutionalization of violence, limited emergence of new actors, and high connectivity in actor networks.
- Collapse (Ω): Breakdown of dominant regimes due to delegitimization or strategic defeat; increasing unpredictability; fragmentation and demobilization.
- Reorganization (α): Formation of new actor constellations, formal negotiations or reintegration programs, weak but emerging forms of order.

While the analysis remains interpretative, these criteria provide a replicable logic for phase assignment across time segments. Each phase transition is grounded in the contextual analysis of actor dynamics and, when possible, substantiated by primary indicators such as massacre frequency and victim counts. These quantitative trends are not treated as direct proxies of system potential, but are instead interpreted in light of how violence becomes organized or disorganized throughout the different phases.

The quantitative series used to support the qualitative analysis include the following: (i) the number of massacres, (ii) the number of victims in massacres, and (iii) the identification of actors responsible for each event. All data were taken from official sources provided by the Colombian Historical Memory Center for the period 1964–2023. We assume that violence in general, and more precisely, the number of massacres, is an indicator of the fight for power and territorial control [60–62]. As stated by Pelling and Navarrete, there is "a firming up of social capital positions and coalition building such that differences become fewer but more marked" [33] (p. 2). The assumption is that massacres in Colombia reflect changes in the strategies of territorial control and the evolving connectivity between armed actors, State forces, and civilians. Rather than defining conflict phases, massacres express the system's potential—understood as the capacity of actors to exercise domination through violence—within each phase of the adaptive cycle.

Massacre is defined as the intentional killing of four or more defenseless individuals, characterized by a public display of violence and a pronounced power asymmetry between the armed actor and the civilian population, with no direct interaction between opposing armed groups. This form of violence is distinct in its performative nature, intended not only to inflict harm but also to communicate control and dominance over unarmed communities [63]. These acts serve as tools for paramilitaries and guerrillas to instill terror, disrupt communities, and reshape social alliances. For paramilitary groups, massacres were central to consolidating control over territories, often involving public brutality to deter collaboration with guerrillas and to assert dominance. Paramilitaries' collaboration with certain factions of the *Fuerzas Públicas* (Military and Police) amplified their impact, enabling them to operate with impunity, reinforcing cycles of violence and control. Guerrilla groups also engaged in massacres to maintain their influence in contested territories and to counter paramilitary advances. By promoting forced displacement and severing community ties, massacres transformed social dynamics and reinforced control through fear. Thus, massacres capture how armed groups use violence not only as a means of territorial control, but also as a method of manipulating social structures and asserting dominance across complex networks of power and influence [62].

To analyze these dynamics, we used data from the Centro Nacional de Memoria Histórica (CNMH), particularly the Basta Ya report and the updated databases of the Observatorio de Memoria y Conflicto (OMC). The database documents violent events related to the armed conflict and includes direct victims, excluding displacement [64]. The original cutoff date for these databases was 1958, justified by both historical and methodological reasons, including the availability and consistency of sources. However, recent updates have extended the dataset back to 1944 by incorporating regional press articles, private archives, and official documents [65]. Despite these efforts, experts have pointed out significant limitations in the documentation of earlier periods, suggesting that the coverage before 1958 remains incomplete and less reliable. For this reason, our analysis primarily considers events from 1960 onward, corresponding to the emergence of guerrilla groups. While the Colombian State has also participated in such events, both legally and illegally, it was not included in the analysis as it is not considered an emerging group resulting from the conflict. The focus remains on illegal armed actors, specifically responsible for massacres (see Appendix A), as their presence or absence enables the characterization of the different phases of the cycle.

As previously described, we apply the adaptive cycle as a heuristic framework to interpret socio-political transformations. To explore whether statistically significant transitions align with the phases identified through actor dynamics, we implemented the PELT algorithm with a radial basis function (RBF) cost model to detect structural changes in the annual count of illegal armed actors (Appendix B). These breakpoints were not used to validate the interpretive narrative, but rather to reinforce its internal coherence and provide additional insight into transitions in system potential, as understood through the lens of the adaptive cycle. The analysis was conducted using the *ruptures* package in Python 3.12.11, which enables the integration of kernel-based cost functions [66]. This approach enables detection of shifts not only in mean or variance but also in more intricate distributional dynamics. We did not apply this method to massacre data, as we consider massacres not to be determinants of systemic change, but rather expressions of the system's potential. While the organization and transformation of armed actors define the system's trajectory, massacres can support the analysis of the strategies through which armed actors exercise territorial control and reshape social structures, depending on the configuration of the system at a given time.

Regarding deforestation, we relied on the dataset produced by the Joint Research Centre (JRC) of the European Commission, which provides annual estimates of forest cover change for Amazonian countries since 1990. We chose this source because Colombia's official data, produced by the national environmental institute (IDEAM), only offers consistent annual figures from 2013 onward. Although this temporal gap excludes the first 26 years of our conflict analysis (1964–1990), no other consistent annual data source exists for that period. We recognize this limitation and do not treat deforestation as a fully integrated variable in our model. Rather, it is used as a secondary exploratory element to qualitatively examine whether, after 1990, patterns of forest loss coincided with the phases of the adaptive cycle derived from actor dynamics and conflict. We do not infer causality or statistical correlation. Instead, deforestation is discussed as a possible manifestation of changes in the system's socio-ecological potential.

4. Results

Analyzing the armed conflict under this model, we complement the works of Gutierrez Sanin [10] and Richani [13–15], arguing that within the Counterinsurgency War, two cycles of conflict occurred between 1964 and the present, and after 2001, there was a transformation in the system, reflected in the change in actors and their practices.

The profiles of the different actors involved in the interactions are presented in Table 2. From these results, as well as the historical analysis, we separate the trajectory of war and peace in Colombia into two cycles composed of different phases. A key aspect of this analysis is its focus on the main actors involved in massacres. While it is acknowledged that other actors engaged in different forms of violence, such as kidnappings and extortion, they are only briefly mentioned in our analysis. The assessment of connectivity among actors is specifically centered on the number of actors and their involvement in massacres, which translates to the strength of the violent bonds among these actors. In addition to this qualitative interpretation, Figures 2 and 3 present the number of massacres and the number of victims in massacres since 1964.

Table 2. Actors considered in the analysis and their profiles. Years of participation in massacres correspond to when the group was referred in the database (Centro de Memoria Histórica, 2020).

Actor	Years of Participation in Massacres	Description
Bandolerismos	1930–1960	Bandoleros emerged under the patronage of political elites who engaged regional political leaders, or gamonales, to enforce their political, ideological, and economic interests. Over time, these regional leaders evolved into political bandits, eventually degenerating into criminal banditry by the late 1960s. However, this form of banditry had an antithesis: social banditry, which was also created and led by actors with a liberal orientation [62].
		Guerrilla Groups
Communist Guerilla	1964	Colombian guerrilla groups emerged in the 1960s in response to unresolved agrarian issues and a history of addressing conflicts through violence. Their formation also stemmed from shortcomings of the National Front's efforts to end bipartisan violence and was influenced by the rise in insurgent movements during the Cold War, inspired by the Cuban Revolution. In the database, for this year, the perpetrator of some massacres was listed as "Communist Guerrilla," likely reflecting an inability to identify the specific group responsible [62].
Popular Militias	1992	They were identified in the massacre database, but there is no historical record of them.
Fuerzas Armadas Revolucionarias de Colombia -FARC-	1965–2016	Official FARC narratives link their emergence to military attacks on "independent republics" (1964–1966). Other accounts attribute their origins to the assassination of Jacobo Prías Alape (Charro Negro) by liberal guerrillas and their response to military operations reclaiming territory, which also impacted liberal guerrillas and conservative bands. The Marquetalia attack (May 1964), framed as State aggression against rural communities, marked their transition into a guerrilla organization [62,67].
Ejército de Liberación Nacinal -ELN-	1962–currently	Around the founding of the FARC (1965), the ELN (1962) and EPL (1967) emerged. These groups united radicalized urban youth inspired by the Cuban and Chinese revolutions with former gaitanista guerrillas from rural areas, all opposing the political restrictions of the National Front. The Cuban Revolution and the rise in youth as political actors globally fueled this movement [62].
EPL	1967–1991	

Table 2. *Cont.*

Actor	Years of Participation in Massacres	Description
EPL Dissidences	1992–2000	Other guerrilla groups have emerged as dissidents from the FARC, ELN, EPL, and M-19, some during the armed conflict and others following the demobilization of these organizations. Examples from the first category include the Socialist Renewal Current (Corriente de Renovación Socialista) and the Guevarist Revolutionary Army (Ejército Revolucionario Guevarista) as ELN dissidents, as well as the Ricardo Franco Front, a dissident faction of the FARC. In the second category are the EPL dissidents who rejected the 1991 peace accords and the Jaime Bateman Cayón Movement, formed as an M-19 dissident group after its demobilization in 1990 [62].
FARC Dissidences	1992	
ELN Dissidences	1992–1997	
Quintin Lame Coordinadora	1985–1990	The Quintín Lame Armed Movement, an Indigenous self-defense group from northern Cauca, emerged in the 1980s, inspired by the historical figure Quintín Lame, a leader of the early 20th-century Indigenous movement. Comprising 80 Indigenous members, the group took up arms against the State, which had abandoned and stigmatized them, local landowners who used mercenaries to suppress their land reclamation efforts, and guerrilla groups attempting to force their recruitment. Despite their intentions to protect their communities, the movement ultimately became entangled in external conflicts, leaving their territory vulnerable and drawing their people into the very war they sought to avoid [62].
Coordinadora Nacional Guerrillera Simón Bolívar	1987–1990	The Simón Bolívar Guerrilla Coordinating Body, which unified all guerrilla groups at the time [62].
		Paramilitary groups
Muerte a Secuestradores -MAS-	1981–1989	At the start of the 1980s (December 1981), leaflets dropped from an airplane over Cali's Pascual Guerrero Stadium announced the creation of Death to Kidnappers (MAS). This organization was established by a coalition of drug traffickers in response to the M-19 guerrilla group's kidnapping of Martha Nieves Ochoa, sister of Jorge Luis, Juan David, and Fabio Ochoa, prominent members of the Medellín Cartel [62].
Autodefensas Campesinas del Magdalena Medio	1985–2005	In the late 1980s, tensions between the national government and the military escalated, coinciding with the rapid transformation of self-defense groups into paramilitary forces. These groups unleashed brutal violence against civilians through massacres and targeted killings. During this period, paramilitary groups consolidated in Magdalena Medio and expanded to other regions: Córdoba under Fidel Castaño, Cesar led by the Prada brothers, the Sierra Nevada de Santa Marta under Hernán Giraldo and the Rojas family, Casanare under the Buitrago family, and the eastern plains and Putumayo with armed groups serving drug trafficking interests [62].
Autodefensas de Hernán Giraldo	1986–2000	
Autodefensas Campesinas del Casanare (Buitragueños)	1989–2003	
Bloque Central Bolivar	1991–2005	
Los Tangueros	1988–1991	
Autodefensas Campesinas del Sur del Cesar	1991–1998	

Table 2. *Cont.*

Actor	Years of Participation in Massacres	Description
Autodefensas Unidas de Colombia -AUC-	1996–2006	One key reason for the resurgence of paramilitarism in Colombia was the government's re-establishment of a legal framework for self-defense groups through the Private Surveillance and Security Cooperatives (Decree 356 of 1994), known as "Convivir." These cooperatives were approved under lenient criteria, allowing groups with questionable human rights records or ties to drug trafficking to operate. Additionally, paramilitarism experienced internal reorganization, which helped overcome stagnation from the early 1990s caused by internal disputes and efforts against Pablo Escobar. This restructuring led to a nationwide consolidation of paramilitary forces. In 1995, the Peasant Self-Defense Forces of Córdoba and Urabá (ACCU) were formed, and in 1997, leaders from nine different paramilitary groups convened to establish the United Self-Defense Forces of Colombia (AUC), a unified political-military organization with a shared command structure, aimed at anti-subversive actions under the banner of self-defense [62].
Autodefensas Campesinas del Vichada	1997–1998	
Autodefensas Campesinas de Cordoba y Urabá -ACCU-	1994–2000	
Bloque Metro	2001	In retaliation for the FARC's offensive in the Nudo del Paramillo, the United Self-Defense Forces of Colombia (AUC) broke the agreed-upon Christmas truce and launched a campaign of massacres, targeted assassinations, and forced displacements nationwide, particularly affecting regions such as Bajo Putumayo and the departments of Bolívar, Sucre, Magdalena, and Antioquia. This violence included the Playón de Orozco massacre in El Piñón, Magdalena, in January 1999. At the beginning of this period, the AUC's paramilitary structure consisted of five combat blocs, thirteen affiliated organizations, and a mobile training school. The Western Bloc of the AUC operated in southwestern Colombia, covering Córdoba, Antioquia, Chocó, Caldas, and Risaralda. The Northern Bloc coordinated the Caribbean coast fronts, while the Llanero Bloc oversaw fronts in Ariari, Guaviare, and the piedmont plains. The Metro Bloc managed fronts across southeastern, western, eastern, and northeastern Antioquia, all under the AUC General Staff based in the Nudo del Paramillo, in Córdoba [62].
Unidentified Paramilitary Group		Paramilitary actions were not always carried out by organized illegal armed groups. In many instances, these actions were clandestinely conducted by radical sectors within the Armed Forces or through contract killings driven by opportunistic and functional alliances among various economic, political, and military actors. These collaborations did not necessarily aim to establish permanent groups or command structures [62].
Organized Crime	1994	Organized crime in Colombia grew rapidly in the 1970s, driven by the rising demand for cocaine in the United States. Criminal groups acted as intermediaries for shipments from Peru and Bolivia to North America [68]. In the analyzed database, organized crime is reported only for this year, indicating the lack of precise identification or specific affiliation of the group responsible for the reported massacre.

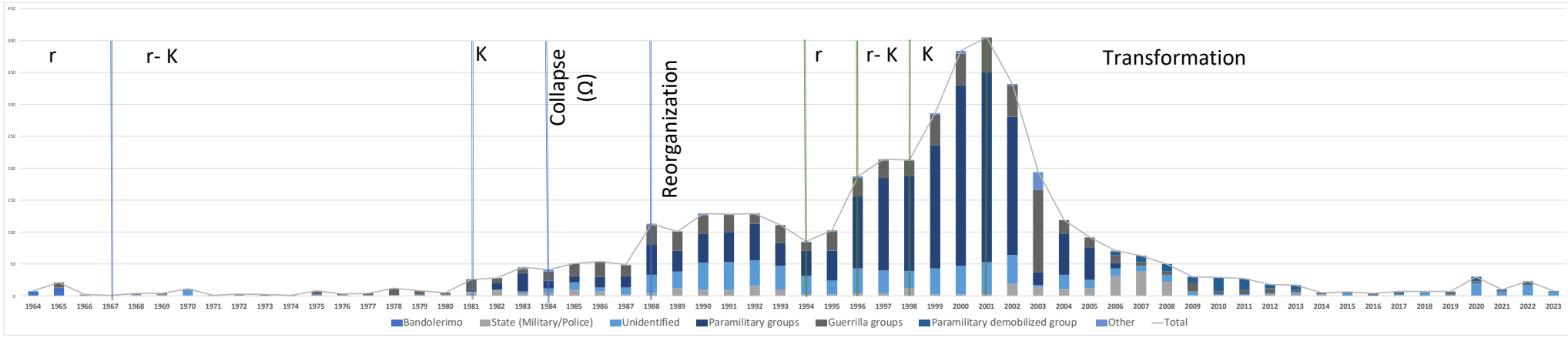


Figure 2. Massacres in Colombia since 1964: Number of Massacre Cases by Armed Group, Aggregated by Affiliation. Source: Centro de Memoria Histórica.

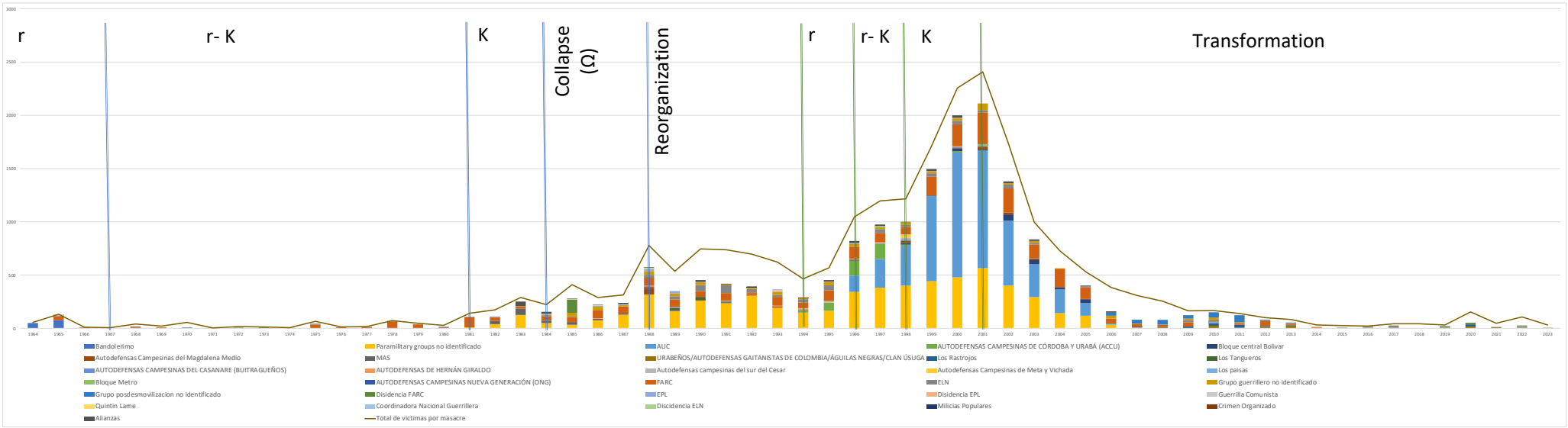


Figure 3. Massacres in Colombia since 1964: Number of Victims by Armed Group, Disaggregated Specific Groups. Source: Centro de Memoria Histórica. The gap between the sum of massacres attributed to the armed groups shown and the national total is explained by two factors: (1) state security forces are excluded from the actor-level analysis, and (2) a share of massacres recorded by the Centro de Memoria Histórica have no identified perpetrator.

As detailed in the Materials and Methods section, we applied a change point detection technique (PELT algorithm with RBF cost function) to evaluate whether statistically significant ruptures in the presence of armed actors aligned with the qualitatively defined phases (Appendix B). This analysis identified four key rupture years: 1983, 1988, 2003 and 2013. These dates correspond to moments of inflection in the system's trajectory.

It is important to clarify that these breakpoints support, but do not determine, the identification of phases in our model. As stated in the methodology section, phase assignment was conducted through a structured interpretative analysis of actor emergence, consolidation, and decline, grounded in political and historical context. The statistical results are used here to reinforce the internal coherence of this interpretative logic and to validate the plausibility of the identified transitions. We deliberately excluded the breakpoint identified in 2013, as our framework assumes the closure of the second cycle by 2003.

4.1. First Cycle in the Counterinsurgency War: 1964–1995

The first Counterinsurgency War began in 1964; this cycle lasted almost 30 years, until 1995. The adaptive cycle phases of the first Counterinsurgency War cycle (Figures 2 and 3) are described below. The actors and their interactions during the phases of the cycle are described in Appendix A. The initial phases until 1980 are mainly described through a historical analysis, as the number of massacres was low.

4.1.1. Exploitation (r) (1964–1967)

Four main actors were part of this phase:

The bandolerismo: the bandoleros emerged under the influence of political elites who used regional political bosses, or gamonales, to strengthen their political, ideological, and economic interests.

Three guerrilla groups: FARC-EP (Fuerzas Armadas Revolucionarias de Colombia—Ejército del Pueblo) and ELN (Ejército de Liberación Nacional) [1,9,13,14,27,69,70], and the Guerilla Comunista.

Locally, families from Antioquia and the coast established marimba routes to transport marijuana by sea, with the involvement of traditional smugglers and emerald prospectors. Violent rivalries, such as the one between the Cárdenas and Valdeblánquez families in La Guajira, marked the initial phase of the drug trade [71].

This was the beginning of a period of opportunistic violence aimed at gaining control over territory and drug production. Colombia was the number one producer of marijuana, supplying the exploding demand in the USA, and started to serve as a link to transport cocaine from Southern American country producers to Northern American country consumers [68]. A small number of massacres were reported during this phase, with the majority attributed to Bandolerismo. The FARC and ELN also participated, though to a lesser extent. Referring to adaptive cycle words and meanings, this was a moment of low potential and low connectivity: groups do not generate much output and are loosely connected.

4.1.2. Transition Between Exploitation (r) and Conservation (K) (1968–1980)

The actors during this phase are the same as those who were active in the previous phase (1964–1967). However, Bandolerismo disappears during this period, and new actors emerge, adopting different violent practices. From 1969 onwards, pressure for the implementation of agrarian reform increased [7,72]. Land invasions started in October 1971 and intensified [14]. Despite this, land redistribution was stopped in 1972 under the Chicoral Pact, and political forces composed of cattle ranchers, rice and banana growers, large landowners, and large-scale agricultural exploitation were supported [73]. Adding to popular discontent, an electoral fraud occurred in 1970, triggering the creation of the

M-19 guerrilla group [2,74,75]. Although M-19 did not participate in massacres during this period, as reported in our database, its political significance and symbolic actions justify its inclusion in the historical account.

In the 1970s, the country's relationship with drug trafficking was consolidated through the Medellín and Cali cartels, which gradually turned Colombia into the world's leading producer and exporter of cocaine [71,73]. At the end of the 1970s, different strong actors consolidated their positions; the production of the system as a whole was effective (for products, money, and power), and the very violent ties were strong and structured the conflicts.

In terms of the adaptive cycle, the connectedness is high, and the potential is high. In Pelling and Navarrete's words, "If new institutions are built that better suit the values and risk preferences of emergent, dominant social actors, again under the influence of external/higher scales of power and interest, a new of phase of institutionalization (κ) is established offering a new equilibrium between agency and structure symbolized in a new risk social contract, and indicated by changes in the application of technological as well as social organization, legislation, or policy" [33] (p. 3).

4.1.3. Late Conservation (K) Phase (1981–1983)

The total number of main actors remained the same, and their violent interactions increased, structuring an established conflict. At the end of the 1970s, there was an increase in kidnappings, cattle rustling, extortion by the guerrillas, and death (Figures 2 and 3). This led to Muerte a Secuestradores (MAS)—Death to Kidnappers—which was considered the first large-scale manifestation of paramilitarism. Dozens of guerilla electoral fraud leaders (mainly from M19 created after 1970) were tortured and left unconscious in front of newspaper offices in Medellín with signs on their chests saying: "I am from the M-19 (guerilla). I am a kidnapper." The "social cleansings," as a strategy to control guerrillas by the paramilitary, gradually became subversion control mechanisms [2,76–78].

At the end of the 1970s, the different actors consolidated their positions; their strong, violent connections generated large outputs; the production of the system as a whole was high (for products, territorial control, and power); and their violent ties were strong, structuring the conflicts. Although this phase is marked by the consolidation of existing actors, the emergence of two new ones—Muerte a Secuestradores (MAS) in 1982 and an unidentified paramilitary group in 1981—did not alter the structural configuration of the conflict. Instead, these actors reinforced existing patterns of violent control and contributed to the growing rigidity of the system. In terms of the adaptive cycle, this was a period of high rigidity and high connectedness. However, as explained below, social and political processes undermined this situation and led to a collapse. As power and profit could no longer be increased, the situation changed.

4.1.4. Collapse/Release (Ω) Phase (1984–1987)

The collapse/release phase, a peace process materialized by the Corinto Agreements, began in 1984. However, this collapse phase was initiated in 1983 (there was an overlap between the late conservation phase and the collapse/release phase). New actors emerged (nine actors instead of four during previous phases). This overlap illustrates how rigid systems may have begun to unravel even before fully losing structural cohesion. In 1982, the guerrillas were recognized for the first time as political actors and were invited to demobilize, which indicates a peace process [70,73,79,80]. During this phase, the government and the guerrillas reached ceasefire agreements, negotiations were opened on the country's major problems, and major political reforms were proposed [80]. In 1983, as evidenced by the statistical analysis, there was a significant shift in the presence of armed actors.

This period marked the expansion of drug trafficking and the increasing involvement of paramilitary groups, including the emergence of new formations such as the Autodefensas Campesinas del Magdalena and the faction led by Hernán Giraldo. In parallel, political dynamics also evolved; in 1984, the Corinto Agreements between the national government and guerrilla groups began to be negotiated, and the Coordinadora Nacional Guerrillera (CNG, or National Guerrilla Coordinating Committee) was formed to bring together various guerrilla organizations under a unified platform. By 1985, the indigenous guerrilla group Quintín Lame had also joined the CNG, further illustrating the reconfiguration of the armed landscape during this transition period [62,70,81].

The drug cartels also grew stronger and engaged in a war for power among themselves and against the government and the guerrillas. In this unstable social and political context, after five years of negotiation through the Corinto Agreements, some guerrilla groups agreed to sign the agreement; among them were M-19, most of EPL, and Quintín Lame [70]. However, a part of the FARC did not agree with the peace process, and dissident groups emerged. Also, during this period of peace efforts, drug trafficking and paramilitary groups expanded their involvement in massacres. New paramilitary groups, such as the Autodefensas Campesinas del Magdalena and those led by Hernán Giraldo, emerged [62]. While guerrilla groups had dominated previous phases of the conflict, this collapse period marks a turning point in which paramilitary forces began to gain territorial and strategic dominance, increasingly shaping the dynamics of violence.

According to the adaptive cycle model, the collapse phase is a period of release of energy, the rigidity is decreased, and a lot of free energy is available for the reorganization that will follow. This is a chaotic phase, during which novelty emerges, which, in this case, translates into the creation of new actors in unstructured assemblages.

4.1.5. Reorganization (α) Phases (1988–1994)

The transition between the collapse and reorganization phases of the war was characterized by institutional, legal, and political weakness, and a significant increase in the number of victims and massacres in 1988, followed by stabilization at a high level (Figures 2 and 3), and the emergence and disappearance of various actors. Importantly, the year 1988 also marks a statistically significant rupture in the dynamics of the armed conflict, as identified through the PELT algorithm applied to the annual count of illegal armed actors. This statistical breakpoint reinforces the interpretation of 1988 as the beginning of a new phase in the adaptive cycle.

We counted eighteen main actors instead of nine participating in the violent interactions. These include EPL dissidents, ELN dissidents, FARC dissidents (which disappeared), Popular Militias (which also disappeared), Autodefensas Campesinas del Casanare (Buitragueños), Los Tangueros (which disappeared), Bloque Central Bolívar, Autodefensas Campesinas de Córdoba y Urabá (ACCU), Autodefensas Campesinas del Sur del Cesar, and Organized Crime (which disappeared). But various actors also disappeared during this phase. The simultaneous emergence and disappearance of some actors during this phase highlighted the system's ongoing reorganization. This shift in actors is reflected in the fluctuating nature of violence during this period. Nevertheless, the overall number of massacres remained at a high level, and they were primarily carried out by paramilitary groups and unidentified armed factions.

Since the mid-1980s, there has been a significant displacement of rural and peasant populations due to the war [9]. This has been an essential factor in the worsening of the conflict and made it possible for the State to be captured at the local level by paramilitary groups that were created and guerrilla groups, as they fought to gain control over areas and territories rich in natural resources and public revenues [21,82,83]. President Cesar

Gaviria initiated peace talks in 1991 with the guerrillas who had not signed the Corinto Agreements, but these talks produced no positive results [70]. Despite legislative and institutional achievements and the demobilization of some armed groups, other guerrillas continued to fight, the paramilitaries gained power, and drug trafficking was crucial in financing the war [76,78]. Following the adaptive cycle model, the reorganization phase follows a phase of release and explosion of energy. Ancient actors disappear, and new actors emerge, leading to a new structure that will develop its potential.

4.2. Second Cycle in the Counterinsurgency War: 1995–2023

This cycle has lasted 29 years to date. In the late 1990s, the country suffered one of its longest and deepest sociopolitical crises. During this period, negotiations with insurgent movements were undertaken that produced a radical change in society's attitude toward armed groups. During the early 2000s, a focus was placed on the demobilization of paramilitary groups under the administrations of Álvaro Uribe Vélez [11,84–86].

4.2.1. Exploitation Phase (r) 1995–1996

The exploitation phase of the second cycle of the Counterinsurgency War started in 1995 with the empowerment of the paramilitaries through massacres and territorial control (see Figures 2 and 3). After the unstable phase of reorganization and transition between the first and second cycles of counterinsurgency warfare, this phase witnessed a decrease in the number of actors, a renewed increase in massacres, and the consolidation of new paramilitary groups, including the formation of the AUC in 1995: the most powerful paramilitary group in Colombia's history. The newly formed paramilitary blocs operated in loosely coordinated ways, reflecting the fluid dynamics and opportunistic violence typical of the exploitation phase. In contrast, the guerrillas were reduced to the FARC, the ELN, and the dissident EPL and ELN. Moreover, drug trafficking became one of the main financiers of the war in Colombia [14,15]. The growing influence of drug trafficking provided the financial means for rapid paramilitary expansion and territorial penetration. According to the adaptive cycle model, at the beginning of the second cycle, the number of actors has decreased, and the potential has not been developed yet.

4.2.2. Transition Between the Exploitation (r) and Conservation (K) Phases (1997–1998)

The transition between the exploitation and conservation phases was a period during which conflicting actors consolidated their strengths, increased their power, and expanded territorial control. However, the system gradually rigidified, becoming less diverse and flexible. A key element of this consolidation was the strengthening of the Cooperatives for Surveillance and Private Security for Agrarian Defense (CONVIVIR), which served as a political framework for approximately 400 paramilitary groups across the country [11,14,15,78,87]. By providing a legal and political cover for paramilitary expansion, CONVIVIR contributed to the formalization and entrenchment of these groups.

During this phase, the drug traffickers gained considerable power and territorial control, permeating the country's different armed and political groups. The main difference from the previous cycle is the significant increase in massacres overall, particularly those carried out by paramilitary groups (Figures 2 and 3). According to the adaptive cycle model, these groups consolidated their power, expanded their violent networks, and enhanced their potential. This transition also marks a shift away from innovation and toward control, as dominant actors began closing off alternative trajectories through violent consolidation.

4.2.3. Late Conservation Phase (K) (1999–2001)

New peace dialogs led by President Andres Pastrana with the guerrillas were unsuccessful. On the contrary, Colombians were losing confidence in this strategy to improve the

political and social environment in the country [81]. Thus, while the guerrillas participated in the failed peace processes, the paramilitaries gained territorial control through massacres (Figures 2 and 3). At the same time, FARC strengthened itself to respond to paramilitary harassment, which was reflected by the growth in the size of its troops [88]. Violence was at its maximum, reflecting the intensive fight for power, money, and territorial control among a smaller number of groups who had reached their potential.

No new armed actors emerged during this phase, and the conflict became increasingly dominated by a limited number of powerful organizations. This period illustrates a highly rigid system, where dominant actors had solidified control, leaving little room for alternative political or territorial configurations. This corresponds to the peak productivity and connectivity characteristics of the conservation (K) phase.

4.2.4. System Transformation (2001–2023)

The peace process was imposed by the State. After a period of mainly paramilitary control and an intensified war, Álvaro Uribe Vélez was elected president. He broke off peace talks with the guerrillas and said he would reestablish State control. He thus consolidated his policy called Democratic Security, in which he declared war on insurgent groups and strengthened the country's security organs, recovering State control of some territories [62,89–91]. This president, who was very popular in the country for having a firm hand with the guerrillas, promoted a process of demobilization of the paramilitary groups through the Santa Fe de Ralito Agreement of 2003. This process resulted in a significant decrease in the number of massacres and deaths in the country (see Figures 2 and 3). As for the adaptive cycle model, actors disappeared and lost their territorial control (potential), social agency was diffused (Table 1), and the connections between opponents had been released (the massacres decreased).

During this period, the system underwent a significant transformation, with the disappearance of paramilitary groups between 2003 and 2007. The statistical analysis identified 2003 as a key inflection point in the transformation of the socio-ecological system. The system had been transformed in the sense that the interactions were not the same as during the 1964–2003 period. The opponents did not interact through violent massacres anymore. In 2016, with paramilitary groups disbanded and guerrilla activity largely controlled by the State, a peace agreement was signed between the FARC and the government [15,92]. Initiated during José Manuel Santos's presidency, the agreement represented a significant step toward consolidating peace. However, Santos held a referendum to secure public support for the agreement, but the majority voted "No," reflecting the widespread skepticism and opposition among Colombians [93]. This rejection contributed to the election of a right-wing president, Ivan Duque, who deprioritized the peace process during the 2018–2022 administration [9,93].

In 2022, President Gustavo Petro revived the Paz Total (Total Peace) agenda, linking it to efforts to reduce deforestation and address the evolving nature of conflict [94,95]. The main goal of the "Paz Total" initiative is to mitigate the humanitarian impact of violence caused by the various armed groups still active in the country. These groups represent a complex mix of criminal organizations, such as the Clan del Golfo, as well as politically motivated actors like the National Liberation Army (ELN) and two dissident factions of the Revolutionary Armed Forces of Colombia (FARC). However, all these groups are now deeply intertwined with illegal economies and revenues that sustain their operations [95]. The ELN and two dissident factions of the Revolutionary Armed Forces of Colombia (FARC) are the only remaining actors in the counterinsurgency war. The new system is characterized by reduced political motivations and a greater emphasis on territorial control tied to narco-trafficking and organized crime [96–99]. Although massacres briefly increased

in 2019, the overall number of massacres and victims has steadily declined since 2003 (see Figures 2 and 3). In adaptive cycle terms, the system's transformation reflects a shift from political insurgency to fragmented criminal governance, rather than the establishment of a new social order.

4.3. Deforestation Trajectory

The evolution of deforestation can only be analyzed during the second cycle of the Counterinsurgency War described in this paper. Annual deforestation data for Colombia has only been published since the beginning of the 1990s by the Joint Research Center. Identifying the relationship between violence and deforestation at the national scale presents limitations, as not all actors are equally present or employ the same military strategies [18–21,37]. Therefore, it is crucial to incorporate temporal and spatial windows to obtain more robust results [21]. Nevertheless, what can be observed at the national level is that when the second cycle began, confronted with the fragile results of property redistribution, the government approved Law 160 of 1994, which promoted access to land for agrarian workers and attempted to improve the peasant population's income and quality of life [100]. Through this law, the government encouraged the colonization of new lands and, thus, favored the titling of uncultivated land without affecting fertile land suitable for agriculture on unproductive large estates, of which many were held by drug traffickers [73]. We do not aim to establish a causal or statistical relationship between conflict and deforestation. Rather, we use deforestation as an exploratory indicator of land-use transformation that may interact with socio-political processes in Colombia's war–peace trajectory. This qualitative approach acknowledges the complexity and spatial heterogeneity of the phenomena involved.

Deforestation increased from 1995 to 2001 (Figure 4) during the r-K phase, and the paramilitary groups were the ones gaining territorial control. Paramilitary groups often employed a specific modus operandi to secure dominance over valuable territories. Initially, violence and intimidation were used to force the displacement of local populations. Once the land was vacated, it was acquired at significantly low prices, paving the way for both legal and illegal investments. This process frequently resulted in the development of coca cultivation, mineral extraction, or some oil palm agriculture, illustrating the direct link between territorial control by paramilitary groups and deforestation [21]. During the same period, and despite Law 160 of 1994, land concentration increased [100]. The continuous expansion of large properties has been propelled by the influx of narcodollars and land speculation at the expense of "colonos" and small property peasants [13,14].

A decrease in deforestation occurred after 2001, but variations remain between 2004 and 2010, when guerrilla groups were the main war actors. Between 2010 and 2014, deforestation in Colombia increased, particularly during the ceasefire period initiated as part of the peace negotiations between the Colombian government and the FARC. Since 2014, deforestation has decreased with some remaining variations.

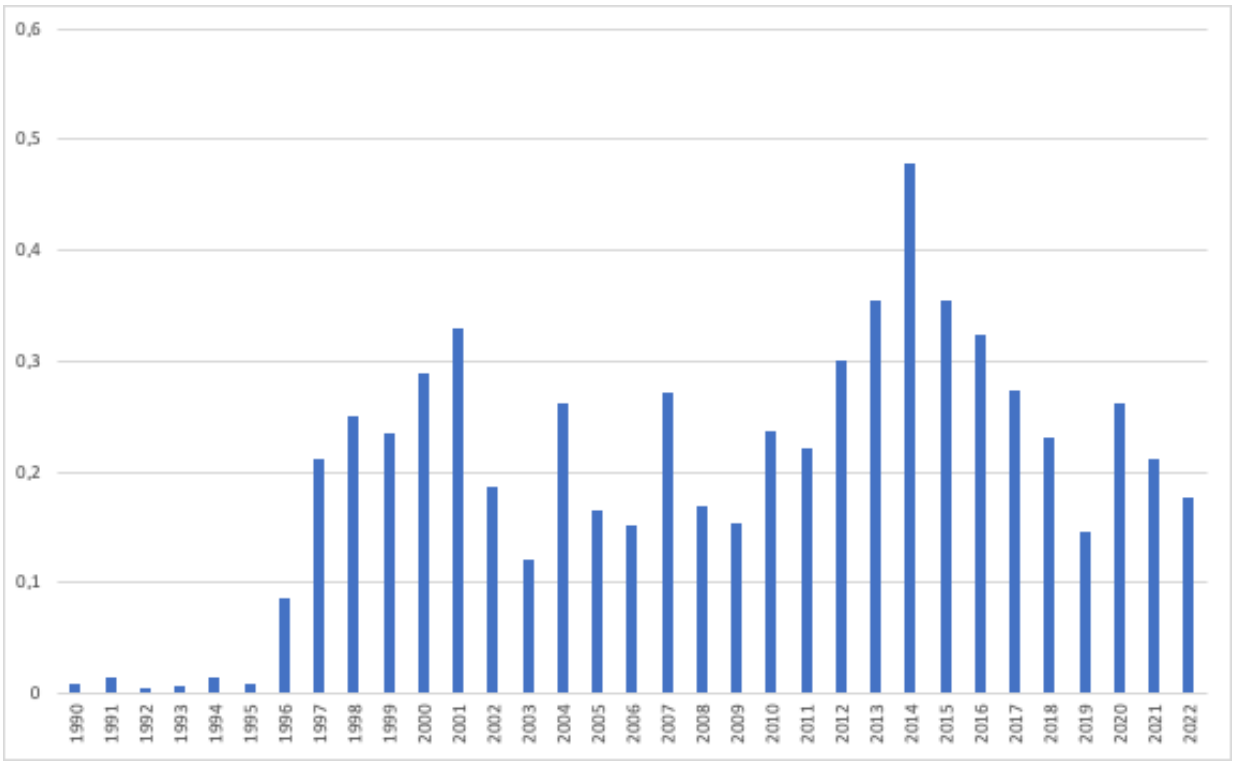


Figure 4. Total deforestation (direct or after degradation) Mha between 1990 and 2022. Source: https://forobs.jrc.ec.europa.eu/TMF/data (accessed on 27 September 2023). Graph created by the authors.

5. Discussion

We derive two discussions from applying the adaptive cycle to Colombia's history since 1967. First, we discuss a narrative for Colombia that could be applied in other areas plagued by violence: namely, that war can be understood as the regular regime and peace as the collapse of this regular regime. This involves going beyond the issue of the perpetuation of some conflicts, which has already been well analyzed by several authors, such as Richani [13,14], and the issue of the war cycle being linked to a formal peace process, as analyzed by Gutierrez Sanin [10]. While these authors approach the conflict from political economy and institutional perspectives, our analysis of resilience is based on the use of the adaptive cycle model. The objective was not to find the best model that fits the data, but rather to see if the use of this model can help to highlight the systemic and patterned nature of these processes, situating them within a broader socio-ecological logic of resilience. This approach helps identify the importance of actor strategies and their role in sustaining the system's violent potential. This suggests the need for adaptive indicators capable of capturing transformations in actor behavior and governance mechanisms, thereby offering a more nuanced understanding of the war–peace trajectory in socio-ecological systems like Colombia's. Second, we connect the cyclical pattern of war and peace to the ecological dimension, looking at the possible relationship between the different phases of the cycle and the deforestation process.

5.1. War as a Regular Regime, Peace as a Collapse of This Regime

Our analysis is mainly based on the qualitative description of the trajectory of interactions among different groups. This analysis is supported by the observation of massacres and the intensity of violence, which provide quantitative indicators for territorial control. We propose a generic systemic model of a war–peace trajectory, where war is the regular

regime disrupted by peace, which is the collapse/release phase. The actors and groups change, but the pattern is generic (Figure 5).

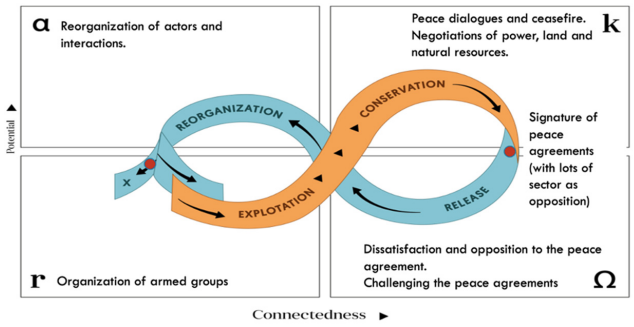


Figure 5. Adaptive Cycle Model for the Analysis of War and Peace. Starting from the exploitation (r) phase, groups of actors engage in violent interactions for increased capital. In this case, the capital is territorial control. As long as this capital increases, the groups fight to capture this capital (r-K phase). The strength of the groups and the intensity of their (violent) connections grow with the institutionalized conflict. The agency of social capital (in Pelling and Navarette's words) increases. After a while, during the late conservation phase, the capital (potential) no longer increases and the interactions among the actors crystallize in a rigidity trap. The potential does not increase anymore, and the war regime does not generate additional capital. This is the time for a peace process, which is a collapse of the war regime. However, this peace process is challenged by a high level of opposition and low legitimacy among the actors involved. New energy is released during the collapse phase, and during the reorganization phase, new actors emerge and engage in new violence for territorial control. The actors change and they set or reset their connections, but the violence remains. This leads to the re-emergence of new armed actors during the reorganization phase. Once reorganized, a new growth phase starts for the control of the capital. Actors consolidate and establish connections through territorial control, often marked by massacres.

Looking at this generic pattern with the concrete case of Colombia, we found two cycles before the system was transformed. The State conducted the peace process in two different ways. In the first case, this was through the recognition of guerrillas and a peace agreement with them. In the second case, the victory of the paramilitaries was endorsed by the State, which in turn demobilized them. However, violence remains during the reorganization phase. This is why, in 1988, the violence did not decrease, but rather increased after the collapse phase.

Rettberg and Dupont [101] identified the need to better understand the full complexity of peace processes; signing a peace treaty is not the end of the process. The goal is to keep the peace. These authors identified six key factors in implementing peace: politics and institutions, international factors, security or military reform, economic factors, civil society and popular support, and transitional justice. They concluded, as do we and Johansson [58], that the period following the signing of a peace agreement is marked by uncertainty, intense changes, and the political and social tensions this entails. In Colombia, this was the case in 1988 and 2002. This supports the idea proposed in this paper of understanding peace as a disturbance, and resilience thinking can contribute to the understanding of these dynamics.

The adaptive cycle model allows researchers to analyze nonlinear historical trajectories. Our analysis of war/peace cycles in Colombia using the adaptive cycle model allows us to propose a narrative on resilience that is in line with Johansson's contribution: war and violence can be the usual regime of a system for a given period, with peace being a collapse of this usual regime, i.e., war and peace can coexist in the same system, generating multiple equilibria. Our analysis also supports the idea that a crisis can be an opportunity to learn and move forward. To understand the transitions between peace and war, it is necessary to understand the social dynamics of both. In this paper, as discussed below, we also

show the importance of including ecological dynamics because, in cases such as Colombia, access to and control of resources maintain the connectivity of groups. It is thus important to understand the connectivity within the groups of the different actors, and between the actors and the ecological system. The two cycles that we identified can contribute to understanding both the political trajectory in Colombia and the country's deforestation trajectory. After the second cycle of war, we observe a transformation in which armed actors change, along with their relationship with violence and forests.

Our analysis through the adaptive cycle model also enables us to take a different look at the current post-peace agreement period. As in the early 1960s, violence has not completely disappeared, but it has stabilized at a much lower level than that recorded in the 1980s or 1990s during the late conservation phase of the two cycles. Our analysis of the Colombia war–peace trajectory indicates that the key phase of the trajectory is the reorganization phase. Between 1988 and 1994, during the reorganization phase, the system was not transformed, in the sense that it did not become another system. The reorganization led to the same type of actors and interactions among actors. The system was trapped in a dynamic lock-in situation, also called maladaptive or undesirable resilience [102,103].

After 2001, we interpret the system as having transformed, and not as a collapse. According to Walker et al. [31], transformation is defined as the capacity to create a fundamentally new system when ecological, economic, or social (including political) conditions make the existing system untenable. In our analysis, the traditional war regime—characterized by dominance of guerrilla and paramilitary groups—begins to dissolve, giving way to new configurations involving organized crime, fragmented State control, and hybrid governance forms. Although a few new actors emerged, their number and influence were limited, which does not align with a classical collapse scenario. Instead, this phase reflects a shift toward a restructured regime, in which violence persists but follows new logics, and where massacres are no longer a dominant tactic.

5.2. War/Peace and Deforestation

The relationship between war and deforestation is not linear, though it is direct; war affects forests, but the impact varies depending on the circumstances. Our analysis is based on the premise that forests are not passive backdrops to conflict, but dynamic elements that interact with actor strategies and land-use decisions. However, we recognize the limits of the available data and treat the relationship between war and deforestation at the national scale as indicative rather than explanatory. To fully grasp this relationship, it is crucial to analyze it over time and consider the actors involved. Since colonial times, forests have been valued for their fertile soils and precious woods, making deforestation a common strategy to control territories [104], a phenomenon also observed in other countries, often referred to as "deforest to control" [105]. Historically, in Colombia, forests have been associated with Black and Indigenous communities, who relied on them for their livelihoods and used them as places of refuge: particularly the escaped enslaved Africans known as cimarrones [106]. In the 20th century, during "La Violencia," forests became hiding places for emerging guerrilla groups [4], and later, for those that consolidated during the 1960s [37]. Over time, forests provided land not only for displaced populations expanding the agricultural frontier but also for large landowners who controlled territories through extensive cattle ranching, a practice that originated in colonial times. Moreover, coca cultivation—an essential source of funding for several armed groups—became widespread in forested areas [14,25,107–109].

In Colombia, where 51% of the national territory is covered by forests [110] and where armed groups have exercised varying degrees of territorial control, it is essential to examine their presence by region and over time. Thus, national-scale data does not exhibit a clear trend between war and deforestation, as these factors are closely tied to context-

specific variables. War and public policies have greatly influenced forest transformations in Colombia [111]. Some studies argue that deforestation in conflict zones increased during and after the peace process due to new migrations [112], while others suggest that deforestation patterns are linked to the expansion of the agricultural frontier [113,114]. In some cases, extractive economic activities have promoted deforestation in areas previously affected by conflict [24]. One study even found a correlation between increased paramilitary activity and higher deforestation rates [21]. In brief, forests have served as both a source of sustenance and shelter for those who live there and as valuable land for those seeking to control territories.

Our analysis indicates that, at the national level, the increase in violence observed between 1995 and 2001 coincides with a clear upward trend in deforestation. According to Fergusson et al. [21], this could be explained by the paramilitary control that Colombia was experiencing at that time and its territorial control strategy at the expense of the forests. After 2001, this pattern became more ambiguous: the continuous decrease in violence does not correspond to a consistent deforestation trend. This disconnection highlights the complexity of socio-environmental dynamics in Colombia and the limitations of interpreting such relationships through a linear or causal lens. For instance, between 2010 and 2014, there was an increase in deforestation while the massacres were very low. This disconnection also suggests that deforestation trends may respond to regionally specific configurations of territorial control and actor strategies, which require finer-scale analysis to be fully understood.

Our findings also advise caution in interpreting deforestation patterns exclusively through national-scale or post-agreement lenses. Several recent studies (e.g., [19,20,24,38]) have assumed peace as a singular event—the signing of the 2016 agreement—while our results suggest that peace in Colombia has been a fragile, incomplete process. Rather than a definitive transition, the period following the peace agreement reflects a reconfiguration of armed conflict. National-scale data often obscure this complexity, and we advocate for future analyses to engage with regional and actor-specific dynamics in forest governance during conflict transitions.

For a deeper analysis, several authors have expressed the need to generate studies of resilience at different scales to understand problems on the national scale. The community and individual scales play a key role in understanding the patterns found in a system at higher scales. Actions thus need to be analyzed from the individual scale, using social and environmental psychology [47,50,115]. In Colombia, Rueda et al. [116] showed contrasting impacts of the intrinsic and extrinsic motivations of farmers on self-reported deforestation in El Carano (Caquetá), a region with high deforestation levels. More studies need to be conducted on deforestation on these scales, relying on concepts such as place attachment, which seeks to understand forest conservation behavior [117–123].

Moreover, it is important to recognize that this study does not examine other complementary explanatory frameworks—such as the role of peace accords, international cooperation, or state-building programs—which may also shape the socio-ecological dynamics observed. While our focus is on systemic configurations and actor transitions, future research should explore how formal political processes and international interventions interact with resilience mechanisms and transformations. This would allow for a more comprehensive understanding of change processes in Colombia's socio-ecological systems, especially when analyzed on multiple spatial and institutional scales. We also acknowledge that a deeper disaggregation of the Colombian State—considering changes in its military strategies and political leadership across administrations—could enrich the analysis. However, doing so would require a symmetrical examination of similar shifts within non-State armed groups, which falls beyond the scope of this paper.

6. Conclusions

Colombia went through a long period of war in the 20th century, interrupted by short periods of peace. War and violence were resilient, as undesirable resilience [102,103] locked in undesirable (for some) trajectories, despite peace-making efforts and agreements.

The analysis of the adaptive cycle leads to the conclusion that after the 1984–1987 peace process, the system reorganization led to the same configuration as before the peace process. Actors and their interactions remained the same, and we witnessed another loop of the same phases. In the reorganization phase, what is observed is not a complete transition to peace, but rather the emergence of new actors who are dissatisfied with the peace process. These actors, often nonconformists by the terms or implementation of peace agreements, reengage with violence to pursue their objectives. Rather than a consolidation of peace, this phase marks a resurgence of conflict, with these new groups seeking territorial control, power, or influence, which in turn perpetuates the cycle of violence. This shift highlights the complexity of post-conflict scenarios, where the end of one phase of armed conflict does not necessarily signal the resolution of underlying issues, but rather may give rise to new forms of violence driven by different actors. The "war interrupted by peace" model was resilient. On the contrary, the peace process in the early 2000s led to a transformation of the system. Actors and their interactions have changed, and a new system has emerged.

Moreover, the analysis of the relationship between deforestation data and the cycles of war and peace remains ambiguous. The complex variation in deforestation after 2001 calls for further research on different scales. Our findings suggest that peace in Colombia has not been a definitive rupture but rather a series of attempted transitions between phases, but it has not transformed the system. This challenges common narratives that link forest loss directly to post-conflict conditions. We argue that national-scale analyses may miss the complexity of these dynamics and should be complemented by spatially disaggregated studies that consider the socio-ecological specificities of each region. Future research should consider the adaptive nature of armed governance and how it interacts with forest landscapes through different phases of conflict and transition.

The lessons of resilience analysis through the adaptive cycle are meaningful for the observations and interventions in Colombia. The present situation should not be observed through the same lenses as those that were relevant between 1964 and 2000. The current reorganization phase differs from previous ones due to changes in armed actors, strategies, and conflict dynamics. Efforts like the 2016 peace agreement with the FARC and increased attention to environmental issues, such as deforestation, reflect evolving priorities. New indicators of tensions should be used. A concept such as adaptive peacebuilding [124], which frames the efforts for sustainable peace, could not be held before 2000 (as war was the dominant regime) but can now be relevant. While progress has been made, achieving long-term peace requires institutional strength, economic reforms, and integrated environmental strategies.

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Abbreviations

The following abbreviations are used in this manuscript:

CNG	Coordinadora Nacional Guerrillera
CONVIVIR	Cooperativas de Vigilancia y Seguridad Privada para la Defensa Agraria
ELN	Ejército de Liberación Nacional
EPL	Ejército Popular de Liberación
FARC	Fuerzas Armadas Revolucionarias de Colombia
IDEAM	Instituto de Hidrología, Meteorología y Estudios Ambientales de Colombia
JRC	Joint Research Centre
SES	Social-Ecological System

Appendix A

Table A1. Phases Dynamics of War/Peace Adaptive Cycle between 1964 and 2023.

War Cycle	Cycle Phase	Total Number of Actors	Name of Actors	Phase Dynimics
First Counterinsurgency War Cycle (1964–1995)	Exploitation (r) (1964–1967)	4	Bandolerismo Guerrilla Comunista, FARC, ELN	During this phase, three new actors emerge in the aftermath of La Violencia. At the onset of the exploitation phase, Bandolerismo—a remnant of La Violencia—becomes the primary actor in the conflict. During this period, the FARC and ELN guerrillas consolidate. A small number of massacres are reported during this phase, with the majority attributed to Bandolerismo. The FARC and ELN also participate, though to a lesser extent.
	Transition between exploitation (r) and conservation (K) (1968–1980)	4	Bandolerismo FARC ELN EPL	During this phase, actors consolidate their existence and their bonds while one actor, a remnant of the previous war, disappears. Banditry ceases to exist as an actor, while guerrilla groups such as the FARC, ELN, and EPL strengthen their positions.
	Late conservation (K) phase (1981–1983)	4	FARC ELN EPL MAS (paramilitary)	At the end of the exploitation phase, massacres show a significant increase, accompanied by the emergence of one new perpetrator group: in response to the violence generated by guerrilla groups, the paramilitary organization Muerte a los Secuestradores (Death to Kidnappers, MAS) emerged. During this phase, actors are interconnected through acts of violence. Both the number of massacres and the involvement of various actors rise.

Table A1. *Cont.*

War Cycle	Cycle Phase	Total Number of Actors	Name of Actors	Phase Dynimics
First Counterinsurgency War Cycle (1964–1995)	Collapse/release (Ω) phase (1984–1987)	9	FARC ELN EPL FARC dissidences, Quintin Lame, Coordinadora Nacional Guerrillera MAS : Autodefensas Campesinas del Magdalena, Medio Autodefensas de Hernán Giraldo	During this period of peace efforts, drug trafficking and paramilitary groups expanded their involvement in massacres. Dissidents from the Farc emerged, indigenous guerilla Quintin Lame and una coordination nacional de la guerilla was also created New paramilitary groups, such as the Autodefensas Campesinas del Magdalena and those led by Hernán Giraldo, emerged. During this phase, the number of massacres and victims slightly increased. The penalties were distributed in all groups, showing that no group was dominant.
Transition between first cycle and second cycle	Reorganization (α) phases (1988–1994)	18	FARC ELN EPL Quintin Lame Coordinadora Nacional Guerrillera New: EPL Dissidences ELN Dissidences FARC Dissidences Milicias Populares MAS— Autodefensas Campesinas del Magdalena Medio Autodefensas de Hernán Giraldo New: Autodefensas Campesinas del Casanare (Buitragueños) Los Tangueros (disappears) Bloque Central Bolivar Autodefensas Campesinas de Cordoba y Urabá (ACCU) Autodefensas Campesinas del Sur del Cesar Crimen Organizado	During the reorganization phase, there is a significant but unstable increase in massacres, accompanied by a reorganization of the actors involved. On one hand, several guerrilla groups, such as the M19, EPL, Quintín Lame, parts of the FARC, and the ELN, were demobilized. On the other hand, new paramilitary groups emerged, including the Tangueros, the Autodefensas Campesinas del Casanare, the Autodefensas Campesinas del Magdalena Medio, the Autodefensas Campesinas del Sur del Cesar, and the Autodefensas Campesinas de Córdoba y Urabá. Additionally, some structures of the FARC and the ELN persisted, while a dissidence of the EPL was formed. Other actors, such as the Popular Militias, the Tangueros, and Organized Crime, also appeared and disappeared during this phase. This shift in actors is reflected in the fluctuating nature of violence during this period. Nevertheless, the overall number of massacres continued to rise.

Table A1. *Cont.*

War Cycle	Cycle Phase	Total Number of Actors	Name of Actors	Phase Dynimics
Second cycle of the Counterinsurgency War (1995–present)	Exploitation phase (r) (1995–1996)	**11**	FARC ELN EPL Dissidences ELN Dissidences Autodefensas Campesinas del Magdalena Medio Autodefensas de Hernán Giraldo Autodefensas Campesinas del Casanare (Buitragueños) Bloque Central Bolivar Autodefensas Campesinas de Cordoba y Urabá (ACCU) Autodefensas Campesinas del Sur del Cesar New: Autodefensas Unidas de Colombia -AUC-	This phase witnessed a renewed increase in massacres and the consolidation of new paramilitary groups, including the formation of the AUC in 1995. In contrast, the guerrillas were reduced to the FARC, the ELN, the EPL and the dissidents from ELN and EPL.
	Transition between the exploitation (r) and conservation (K) phases (1997–1998)	12	FARC ELN EPL Dissidences ELN Dissidences) Autodefensas Campesinas del Magdalena Medio Autodefensas de Hernán Giraldo Autodefensas Campesinas del Casanare (Buitragueños) Bloque Central Bolivar Autodefensas Campesinas de Cordoba y Urabá (ACCU) Autodefensas Campesinas del Sur del Cesar Autodefensas Unidas de Colombia—AUC- New: Autodefensas Campesinas de Meta y Vichada (disappears)	In this phase, there is a notable increase in massacres carried out by paramilitary groups. During this period, two paramilitary groups disbanded.

Table A1. *Cont.*

War Cycle	Cycle Phase	Total Number of Actors	Name of Actors	Phase Dynimics
Second cycle of the Counterinsurgency War (1995–present)	Late conservation phase (K) (1999–2001)	10	FARC ELN EPL Dissidences (disappears) Autodefensas Campesinas del Magdalena Medio Autodefensas de Hernán Giraldo Autodefensas Campesinas del Casanare (Buitragueños) Bloque Central Bolivar Autodefensas Campesinas de Cordoba y Urabá (ACCU) Autodefensas Unidas de Colombia—AUC- New: Bloque Metro	During this phase, the increase in massacres is exponential.
	System transformation (2001–2023)	8	FARC ELN Autodefensas Campesinas del Magdalena Medio Autodefensas de Hernán Giraldo Autodefensas Campesinas del Casanare (Buitragueños) Bloque Central Bolivar Autodefensas Campesinas de Cordoba y Urabá (ACCU) Autodefensas Unidas de Colombia—AUC-	During the early collapse phase, massacres decrease, and the disappearance of paramilitary groups begins. Álvaro Uribe initiated a demobilization process for the paramilitary groups through the Santa Fe de Ralito Agreement of 2003. This is immediately followed by system transformation.

Table A1. *Cont.*

War Cycle	Cycle Phase	Total Number of Actors	Name of Actors	Phase Dynimics
Second cycle of the Counterinsurgency War (1995–present)		14	FARC (disappears) ELN New: FARC Dissidences Autodefensas Campesinas del Magdalena Medio Autodefensas de Hernán Giraldo Autodefensas Campesinas del Casanare (Buitragueños) (disappears) Bloque Central Bolivar Autodefensas Campesinas de Cordoba y Urabá (ACCU) Autodefensas Unidas de Colombia -AUC- (disappears) New: Urabeños Rastrojo Los paisas ONG Grupos desmobilizados	The system underwent a transformation, with paramilitary groups disappearing between 2003 and 2007. Following this, there was instability among the actors, as paramilitary dissidents reorganized into organized crime groups. In this context, with the paramilitary groups disbanded and guerrilla activity largely controlled by the State, a peace agreement was signed in 2016 between the FARC and the government. As a result, only the ELN and dissident groups remained from the previous cycle. These dissident groups are primarily linked to narcotrafficking and organized crime, and their violent practices are no longer primarily massacres—although massacres did increase again in 2019. However, the key conclusion is that the counterinsurgency war ended, giving way to a new conflict with distinct characteristics: less political in nature and driven by a net interest in territorial control linked to narcotrafficking and organized crime.

Appendix B

Table A2. Annual presence and emergence of armed actors (1964–2023).

Year	Adaptive Cycle Phase	Armed Actors Identified	Total Actors	New Actors
1963		Bandolerimo	1	0
1964	Exploitation (r) (1964–1967)	Bandolerimo	1	0
1965	Exploitation (r) (1964–1967)	Bandolerimo Guerrilla Comunista FARC ELN	4	3
1966	Exploitation (r) (1964–1967)	Bandolerimo FARC	2	0
1967	Exploitation (r) (1964–1967)		0	0
1968	Transition between exploitation (r) and conservation (K) (1968–1980)	FARC ELN	2	0
1969	Transition between exploitation (r) and conservation (K) (1968–1980)	FARC	1	0
1970	Transition between exploitation (r) and conservation (K) (1968–1980)	Bandolerimo ELN	2	0
1971	Transition between exploitation (r) and conservation (K) (1968–1980)	ELN	1	0

Table A2. *Cont.*

Year	Adaptive Cycle Phase	Armed Actors Identified	Total Actors	New Actors
1972	Transition between exploitation (r) and conservation (K) (1968–1980)	ELN	1	0
1973	Transition between exploitation (r) and conservation (K) (1968–1980)	ELN	1	0
1974	Transition between exploitation (r) and conservation (K) (1968–1980)	Grupo guerrillero no identificado	1	0
1975	Transition between exploitation (r) and conservation (K) (1968–1980)	FARC ELN	2	0
1976	Transition between exploitation (r) and conservation (K) (1968–1980)	FARC	1	0
1977	Transition between exploitation (r) and conservation (K) (1968–1980)	FARC ELN	2	0
1978	Transition between exploitation (r) and conservation (K) (1968–1980)	FARC ELN	2	0
1979	Transition between exploitation (r) and conservation (K) (1968–1980)	FARC	1	0
1980	Transition between exploitation (r) and conservation (K) (1968–1980)	FARC EPL	2	1
1981	Late conservation (K) phase (1981–1983)	Paramilitary groups no identificado FARC ELN	3	1
1982	Late conservation (K) phase (1981–1983)	MAS FARC EPL	3	1
1983	Late conservation (K) phase (1981–1983)	MAS FARC	2	0
1984	Collapse/release (Ω) phase (1984– 1987)	MAS FARC ELN EPL	4	0
1985	Collapse/release (Ω) phase (1984–1987)	Autodefensas Campesinas del Magdalena Medio MAS FARC ELN Disidencia FARC Quintin Lame	5	3
1986	Collapse/release (Ω) phase (1984–1987)	Autodefensas Campesinas del Magdalena Medio MAS Autodefensas de Hernán Giraldo FARC EPL Quintin Lame	6	0
1987	Collapse/release (Ω) phase (1984–1987)	MAS FARC ELN EPL Coordinadora Nacional Guerrillera	5	1

Table A2. *Cont.*

Year	Adaptive Cycle Phase	Armed Actors Identified	Total Actors	New Actors
1988	Transition between the release (Ω) and the reorganization (α) phases (1988–1994)	Los Tangueros Autodefensas Campesinas del Magdalena Medio MAS Autodefensas de Hernán Giraldo FARC ELN EPL Quintin Lame	8	1
1989	Transition between the release (Ω) and the reorganization (α) phases (1988–1994)	Los Tangueros MAS Autodefensas Campesinas del Casanare (Buitragueños) FARC ELN EPL	6	1
1990	Transition between the release (Ω) and the reorganization (α) phases (1988–1994)	Los Tangueros Autodefensas Campesinas del Magdalena Medio FARC ELN EPL	5	0
1991	Transition between the release (Ω) and the reorganization (α) phases (1988–1994)	Los Tangueros Bloque central Bolivar Autodefensas Campesinas del Magdalena Medio Autodefensas Campesinas del sur del Cesar FARC	5	1
1992	Transition between the release (Ω) and the reorganization (α) phases (1988–1994)	Autodefensas Campesinas del Magdalena Medio Autodefensas de Hernán Giraldo FARC ELN Disidencia EPL Milicias Populares	6	3
1993	Transition between the release (Ω) and the reorganization (α) phases (1988–1994)	Autodefensas Campesinas del Magdalena Medio Autodefensas de Hernán Giraldo FARC ELN Disidencia EPL Coordinadora Nacional Guerrillera	6	0
1994	Transition between the release (Ω) and the reorganization (α) phases (1988–1994)	Autodefensas Campesinas de Córdoba Y Urabá (ACCU) Autodefensas Campesinas del Magdalena Medio Autodefensas de Hernán Giraldo Autodefensas Campesinas del sur del Cesar FARC ELN Crimen Organizado	7	2

Table A2. *Cont.*

Year	Adaptive Cycle Phase	Armed Actors Identified	Total Actors	New Actors
1995	Exploitation phase (r) 1995–1996	Autodefensas Campesinas de Cordoba y Urabá (ACCU) Autodefensas de Hernán Giraldo FARC ELN Disidencia EPL	6	0
1996	Exploitation phase (r) 1995–1996	AUC Autodefensas Campesinas de Cordoba y Urabá (ACCU) Bloque central Bolivar Autodefensas Campesinas del Magdalena Medio Autodefensas Campesinas del sur del Cesar FARC ELN EPL	8	1
1997	Transition between the exploitation (r) and conservation (K) phases (1997–1998)	AUC Autodefensas Campesinas de Cordoba y Urabá (ACCU) Autodefensas Campesinas del Casanare (Buitragueños) Autodefensas de Hernán Giraldo Autodefensas Campesinas de Meta y Vichada FARC Disidencia ELN	7	1
1998	Transition between the exploitation (r) and conservation (K) phases (1997–1998)	AUC Autodefensas Campesinas de Cordoba y Urabá (ACCU) Bloque central Bolivar Autodefensas Campesinas del Magdalena Medio Autodefensas Campesinas del Casanare (Buitragueños) Autodefensas Campesinas de Meta y Vichada Autodefensas Campesinas del sur del Cesar FARC ELN	9	0
1999	Late conservation phase (K) (1999–2001)	AUC Bloque central Bolivar FARC ELN Disidencia EPL	5	0

Table A2. *Cont.*

Year	Adaptive Cycle Phase	Armed Actors Identified	Total Actors	New Actors
2000	Late conservation phase (K) (1999–2001)	AUC Autodefensas Campesinas de Córdoba Y Urabá (ACCU) Bloque central Bolivar Autodefensas Campesinas del Magdalena Medio AUTODEFENSAS CAMPESINAS DEL CASANARE (BUITRAGUEÑOS) Autodefensas de Hernán Giraldo FARC ELN Disidencia EPL	9	0
2001	Late conservation phase (K) (1999–2001)	AUC Bloque central Bolivar Autodefensas Campesinas del Magdalena Medio AUTODEFENSAS CAMPESINAS DEL CASANARE (BUITRAGUEÑOS) Bloque Metro FARC ELN	8	0
2002	Transformation	AUC Bloque central Bolivar Autodefensas Campesinas del Magdalena Medio FARC ELN	5	0
2003	Transformation	AUC Bloque central Bolivar Autodefensas Campesinas del Magdalena Medio Autodefensas Campesinas del Casanare (Buitragueños) FARC ELN	6	0
2004	Transformation	AUC Bloque central Bolivar Autodefensas Campesinas del Magdalena Medio FARC Grupo guerrillero no identificado	5	1
2005	Transformation	AUC Bloque central Bolivar Autodefensas Campesinas del Magdalena Medio FARC ELN	5	0
2006	Transformation	AUC FARC Grupo posdesmovilizacion no identificado	3	1

Table A2. *Cont.*

Year	Adaptive Cycle Phase	Armed Actors Identified	Total Actors	New Actors
2007	Transformation	Urabeños/Autodefensas Gaitanistas de Colombia/Águilas Negras/Clan Úsuga Los Rastrojos Autodefensas Campesinas Nueva Generación (ONG) FARC	4	3
2008	Transformation	Urabeños/Autodefensas Gaitanistas de Colombia/Águilas Negras/Clan Úsuga Los Rastrojos FARC ELN	4	0
2009	Transformation	Los Rastrojos FARC ELN	3	0
2010	Transformation	Urabeños/Autodefensas Gaitanistas de Colombia/Águilas Negras/Clan Úsuga Los Rastrojos Los Paisas FARC ELN	5	0
2011	Transformation	Urabeños/Autodefensas Gaitanistas de Colombia/Águilas Negras/Clan Úsuga Los Rastrojos FARC ELN	4	0
2012	Transformation	Urabeños/Autodefensas Gaitanistas de Colombia/Águilas Negras/Clan Úsuga Los Rastrojos FARC	3	0
2013	Transformation	Urabeños/Autodefensas Gaitanistas de Colombia/Águilas Negras/Clan Úsuga Los Rastrojos FARC ELN	4	0
2014	Transformation	Urabeños/Autodefensas Gaitanistas de Colombia/Águilas Negras/Clan Úsuga FARC	2	0
2015	Transformation	Urabeños/Autodefensas Gaitanistas de Colombia/Águilas Negras/Clan Úsuga	1	0
2016	Transformation	Urabeños/Autodefensas Gaitanistas de Colombia/Águilas Negras/Clan Úsuga ELN	2	0

Table A2. *Cont.*

Year	Adaptive Cycle Phase	Armed Actors Identified	Total Actors	New Actors
2017	Transformation	Urabeños/Autodefensas Gaitanistas de Colombia/Águilas Negras/Clan Úsuga ELN	2	0
2018	Transformation		0	0
2019	Transformation	Urabeños/Autodefensas Gaitanistas de Colombia/Águilas Negras/Clan Úsuga ELN Disidencia FARC EPL	4	1
2020	Transformation	Urabeños/Autodefensas Gaitanistas de Colombia/Águilas Negras/Clan Úsuga Los Rastrosjos Disidencias FARC	3	0
2021	Transformation	Urabeños/Autodefensas Gaitanistas de Colombia/Águilas Negras/Clan Úsuga ELN	2	0
2022	Transformation	Urabeños/Autodefensas Gaitanistas de Colombia/Águilas Negras/Clan Úsuga ELN Disidencia FARC	3	0
2023	Transformation	Disidencia FARC	1	0

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