LETTER

The end of gunpoint conservation: forest disturbance after the Colombian peace agreement

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Abstract

In November 2016, after 52 years of armed conflict, the Colombian government and the primary rebel group, the FARC (Fuerzas Armadas Revolucionarias de Colombia) reached a peace agreement. The agreement incorporated three changes to institutions governing forest land occupation and use: (a) the demobilization of FARC from forested places, (2) the future distribution of legal land titles and new road construction into forests, and (3) the eradication of illicit crops. However, we document unprecedented rates of forest disturbance in the months following the peace agreement in biodiversity hotspots across the country. Are the declaration of peace and the increased rates of forest disturbance related? Here, we present the first systematic assessment of the impact of the Colombian peace agreement on forest disturbance. Focusing on the Andes-Amazon Transition Belt (AATB), we used automated satellite image disturbance detection methods and ethnographic data to quantify and interpret forest cover change from 2010 to 2018 that span wartime, peace negotiation, and post-peace agreement stages. Our findings indicate that during the post-peace agreement period (2017–2018), the area of forest disturbance increased by 50% (about 238,000 ha) across the AATB in comparison with the four-year peace negotiation stage (2013–2016); these changes reflect the end of FARC-led gunpoint conservation in the region. Forest disturbance also spread deeper into the Amazon watershed and increased in area by 187% within the AATB’s protected areas. We find that following the peace agreement and the withdrawal of FARC, key actors (viz. drug cartels, large landowners, campesinos and dissidents) with expectations of favorable land tenure policies swept into the region; this led to increases in large-scale cattle ranching, coca cultivation dispersal, and speculative illegal land markets each of which contributed to the widespread forest disturbance that we mapped. The rapid increase in forest disturbance occurred despite the interest of the international community in promoting forest conservation initiatives in the AATB and Colombia’s existing conservation and land titling frameworks for public lands. Our findings underscore the need for conservation strategies sensitive to rapid institutional and demographic changes in the course of the peace agreement to prevent forests from becoming an unexpected casualty of premature and unstable peace.

1. Introduction

Awareness of the various ways in which armed conflict can affect forest conservation has increased in recent years. Armed conflict can lead to forest protection and recovery in areas contested by warring parties while in other contexts, conflict may yield the destruction of forest ecosystems (i.e. ecocide) (Le Billon 2001, McNeely 2003, Hanson and Machlis 2008, Butsic et al 2015). As many studies have documented forest cover change during communal, intra-state, and inter-state conflicts (Stevens et al 2011, Gorsevski et al 2012,
Wilson and Wilson 2013, Nackoney et al 2014, Butsic et al 2015, Gbanie et al 2018, Sung et al 2019, Yin et al 2019), the idiosyncratic and diverse effects of conflict on forest cover have become well-defined (Ordway 2015, Baumann and Kuehmerle 2016, Hansson 2018, Grima and Singh 2019, Landholm et al 2019). However, much less is known about forest cover change processes following the cessation of conflict or the signing of a peace agreement between warring factions.

In Colombia, the signing of a peace agreement in November 2016 brought an end to the 52 year-long (1964–2016) conflict between the FARC (Fuerzas Armadas Revolucionarias de Colombia) rebel group and the Colombian government. To understand how forest cover changed during the conflict, we partition the Colombian conflict into stages: wartime, negotiation, and post-peace agreement. During wartime (1964–2013), forests and conflict processes of territorial control, resource use, and occupation were inextricably linked (Morales 2017). FARC territorial control included institutions around forest land use commonly characterized as ‘gunpoint conservation’ (Álvarez 2003). FARC intentionally reduced forest resource extraction through the use of land mines to deter access (Bejarano Hernández 2010), placing a limit on the area of forested land that could be cleared for agricultural purposes (Aguilar et al 2015, Calle 2018) and prohibited hunting and fishing using explosives (Duran 2009). Non-compliance with these rules lead to public disapproval, the imposition of fines and even execution (Duran 2009). On the other hand, FARC’s presence unintentionally reduced pressure on forests, agricultural expansion, settlement establishment, and petroleum extraction by creating de facto ‘off-limits’ zones that were not accessible by government or companies (i.e. hydrocarbon developers) (Rodriguez Garavito et al 2017). However, FARC participated in land expansion, roads construction, and coca cultivation negatively impacted forests (Rodriguez Garavito et al 2017). FARC and other para-military forces also contributed to displacement and land grabbing linked to drug-trafficking, which also degraded forests (Salgar and Cárdenas 2017). Consequently, forests underwent complex cycles of conversion, abandonment, and unplanned preservation resulting in a mixture of deforestation, regeneration and intact forests.

The search for peace in Colombian had three big attempts for negotiation, but all of them failed (1982, 1991, 1998) (Turriago Rojas 2016). Strong military actions from Colombian army between 2002 and 2010 pushed FARC towards peripheral lands, weakening its hold over forested lands (Suárez-Jaramillo 2018). A new wave of negotiations during 2013–2016 was characterized by intermittent cease-fires and a gradual decline of armed confrontations between the Colombian army and FARC (UNOCD 2017). After four years of negotiations, a final peace agreement, called ‘the End-of-Conflict and the Construction of Long-term Peace,’ was signed between the Colombian government and FARC (Government of Colombia 2016).

The agreement included three central points that have a direct impact on forests. First, the comprehensive rural reform stipulates the distribution of 10 million ha of vacant lands (mainly forest and pastures) controlled by the State to communities: 3 million ha are to be freely distributed and 7 million ha are to be legally titled to families already living on the land. Further, roads are to be constructed to guarantee these communities access to the lands. Second, the solution to the problem of illicit drugs such as coca (used to produce cocaine) requires a transition from illicit crops to legal crops. This point is included in the agreement through the National Comprehensive Crop Substitution Program (PNIS). Finally, the end of conflict entails the total demobilization and the disarmament of FARC. FARC abandoned its controlled territories in February 2017 and completely disarmed in July 2017 (KROC Institute 2019). With the demobilization broadly completed (88% of completion) (KROC Institute 2019), it remains unknown to what extent forest cover has been impacted by the cessation of the decades-long armed conflict and the resulting changes in land use institutions, most notably the end of gunpoint conservation process in formerly FARC-controlled territories.

The gunpoint effect on conservation has been documented in many countries in which the forests tend to remain stable across time (Kim 1997, Fjeldså et al 2005, Enaruvbe et al 2019) due to the presence of rebel or non-state actors, and their explicit rules about conservation (Harding 2011). The end of gunpoint rules open opportunities for rural small-land-owner development as well as large-scale extractivist development projects, e.g. oil extraction and industrial agriculture, that previously were impossible during wartime (Brottem and Unruh 2009). This led to the hypothesis that the cessation of conflict and the new role of the institutional framework in Colombia would result in an accelerated increase in forest disturbance.

The aim of this study is to provide the first assessment of the consequences for regional forest conservation of institutional changes in the post-peace agreement stage. To do so, we (1) quantified the rate, extent, and pattern of forest disturbance using a near-real-time change detection algorithm and all available Landsat satellite imagery (2001–2018), and (2) identified and explained forest disturbance processes with localized ethnographic observations (2016–2018). This paper makes three foundational contributions to our understanding of relationships between conflict, peace processes and forest dynamics. First, we examine how the incomplete realization of the peace agreement has encouraged different actors to exploit uncertainties around land use institutions, incorporating new rules about how forests are accessed, occupied and used. Second, we identify the specific...
transformations that yield forest disturbance during the negotiation and post-peace agreement stages. Third, we use this knowledge to interpret spatio-temporal patterns of forest disturbance. Rather than previous studies that use coarse scales such as MODIS-250 m or annual Landsat composites (Etter et al 2006, Sánchez-Cuervo and Aide 2013, Bautista Cespedes 2018, Murad and Pearse 2018) or rely on secondary sources such as Global Forest Watch (Hansen et al 2013, Castro-Nunez et al 2017, Clerici et al 2018, Hoffmann et al 2018, Salazar et al 2018), we document forest disturbance at 30 m spatial and 16 d temporal resolutions; this supports localized measurement of forest dynamics at the pace of the implementation of the peace agreement.

2. Armed conflict in the Andes-Amazon transition belt

The specific effects of institutional change under the post-peace agreement on forest disturbance in Colombia can only be understood within the historical context of agricultural colonization and agrarian policies. The Colombian conflict has its origin in agrarian struggles during the twentieth century in which large landowners with political influence over land and agricultural policies (Van Ausdal 2009, Richani 2012) sought to defend landholdings against landless campesinos (Canavire-Bacarreza et al 2018). FARC was formed in 1964 by a group of campesinos, supported by the Communist Party. FARC was looking for agrarian reform and for the defense of campesinos against violence by landowners and the State alike, and they formed a stronghold of control in the Andes-Amazon Transition Belt (AATB) more specifically in the department of Putumayo and Protected Areas (PAs) (Rodriguez Garavito et al 2017, Canavire-Bacarreza et al 2018) (figure 1). A full physical description of the study area and land cover map can be found in the supplementary material (SP), available online at stacks.iop.org/ERL/15/034033/mmedia.

Since 1980, FARC established rules governing land uses such as fishing, wood extraction, hunting, coca, and tourism. This rules allowed for harvesting 1–2 hectares of forest per year in each farm and forced campesinos to preserve the 30% of their farms as forests (Ruiz Serna 2003). Other FARC-imposed rules supported the preservation of riparian forests and the planting of trees after logging, both of which aided in regulating the process of land colonization (Ruiz Serna 2003). However, these rules also allowed for forests to be used by FARC as a refuge against military attacks.

FARC’s gunpoint conservation was present across FARC-controlled territories—mostly within and
surrounding PAs in the AATB, which are vital for the migration and diversification of species (Clerici et al. 2018) and serve as natural corridors connecting Andean ecosystems. After decades of conflict, during negotiation stage lasting 4 years (2013–2016), FARC encouraged coca cultivation as a way to improve negotiating power vis-à-vis the government (UNOCDC 2017), elevating the strategic importance of the peace agreement. With FARC demobilization since 2017, FARC dissidents, and non-state actors (e.g. drug cartels, paramilitary and outsider investors) have stipulated informal rules about where and how forest lands are used. Under new rules, for instance, people could clear up to 60% of their farms with clear-cuts $>7$ ha, and not gradually as before (Calle 2018).

3. Methods

3.1. Mapping forest disturbances

A total of 2517, level 1 terrain-corrected Landsat surface reflectance images (Collection 1) corresponding to 10 WRS-2 tiles during 2000–2018 were used for this analysis. Near-real-time disturbances were captured using BFAST Monitor method (Verbesselt et al. 2010). We used the Tasseled Cap wetness index, which combined all Landsat spectral bands and provided a consistent disturbance detection performance across different forest types in tropical regions (Schultz et al. 2016). The time-series was separated into a historical period (2000–2009), and a monitoring period (2010–2018). The monitoring period was selected to identify disturbances before the beginning of the negotiation stage (2013–2016). Forest disturbance patches were accumulated for each conflict stage to calculate patch metrics, rate, and extent. More details about sampling, accuracy assessment and implementation in SP.

3.2. Ethnographic data collection

To interpret the patterns of spatiotemporal forest disturbance in territories firmly held by FARC, we drew on ethnographic research exclusively in Putumayo municipalities of: Puerto Guzmán, Puerto Leguízamo and Puerto Asís. We supplemented ethnographic data with information from previous studies, government and non-government reports on five PAs–Cordillera de Los Picachos, Tinigua, Sierra de la Macarena, Chiribiquete, and La Paya. In-depth, semi-structured interviews and participant observation were conducted in a two-year ethnographic study on the interactions between forest disturbance and post-peace agreement in Putumayo (Van Dexter and Visseren-Hamakers 2019). Ethnographic data were collected during participant observation with rural farmers in Putumayo between 2016 and 2018. Interviewees were selected through a purposive sampling given their engagement in agricultural, administrative activities, and local projects that influence land use. Semi-structured interviews ($n = 80$) were implemented with farmers and community leaders (54), government officials (6), rural social organizations (13), and agricultural producer associations (7). Interviews included questions focused on shifting institutions, land access and land use in forests during the post-peace agreement. The data were then classified to identify direct causes of forest disturbance.

4. Results

4.1. Forest disturbance in the AATB

Forest disturbance detection in the AATB through the full study period of 2000–2018 determined that 12 484 630 ± 189 160 ha (95% confidence interval) of forest remained stable and 735 678 ± 190 088 ha of forest were disturbed, corresponding to 74% and 4.4% of the AATB, respectively (table SP1). Across conflict stages, during wartime (2000–2012) we detected 181 622 ± 5384 ha (1% of the AATB) of forest disturbance, during negotiations (2013–2016) 316 505 ± 123261 ha (1.9%), and during post-peace agreement (2017–2018) 237 954 ± 61443 ha (1.4%). Forest disturbance was more evident in 2014 and 2015–2016. The monthly pattern of disturbance is bimodal, with most loss in August and January–March, which coincides with the dry season and favorable conditions for logging and forest clearing by setting fires (figure 2). User’s accuracy for each forest disturbance year ranged from 79% to 99% and producer’s accuracies from 69% to 99%. Temporally, sub-annual disturbance detection dates were accurate in 69% of observed change using a window of 3 months, while the rest of the observations coincided between 3–12 months (figure 3). Please visit the website: https://murillop.users.earthengine.app/view/amazoncol.

The increase in forest disturbance during the post-peace agreement is more evident in PAs than within Putumayo. First, PAs under FARC control experienced more disturbance within their boundaries compared to the 5 km buffer region surrounding them (figure 4). This is evident in Tinigua and Picachos national parks, which had, respectively, 50% and 19% more disturbance within them than outside their borders. Within PAs, the mean disturbance patch size increased from 2.6 ha ($\sigma$ = 3.2 ha) during wartime to 4.5 ha ($\sigma$ = 9.9 ha) during negotiations and 7.5 ha ($\sigma$ = 16 ha) during the post-peace agreement. Second, disturbance expanded deeper into the Amazon forests and municipalities in Putumayo. For instance, Puerto Guzmán has seen the most disturbed area with the largest patches 4.8 ha, ($\sigma$ = 11.56 ha) followed by Puerto Leguízamo 4.3 ha ($\sigma$ = 11.39 ha). On the other hand, Puerto Asís patch sizes remain stable 1.56 ha, ($\sigma$ = 2.2 ha) across conflict stages; this is highly associated with coca cultivation. More detail about patch size metrics is available in SP (table SP2).
4.2. Local perceptions of forest disturbance

FARC’s demobilization triggered processes of agricultural substitution from coca to cattle and incidents of land grabbing. In Putumayo, interviewees reported an increase of coca, cattle ranching and land grabbing during the post-peace agreement (table 1). In general, changes resulted from shifting governance. The end of gunpoint conservation process is evident, according to a social leader from Puerto Guzman, ‘Nobody entered the jungle because the guerrilla existed, they did not let people enter because the jungle was useful for them, but as the guerrillas left the campesinos are entering the jungle—which is owned by no one—knocking down trees to make farms for cattle ranching.’ The absence of either state or FARC authorities has permitted people to acquire and deforest land undeterred. ‘Here is no authority, there is no guerrilla control, there is no control of anyone, whoever desires can go and knock down 100 hectares and nobody says anything.’ In this context, coca remains as a source of income and cattle ranching.

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**Figure 2.** Accumulated disturbances during wartime, negotiation, and post-peace agreement stages, (% of total) normalized by duration of each stage. (A) Each black dot in the triangular graphic corresponds to a hexagonal grid cell. Colors show the distribution across time: Blue represents a wartime stage-dominated disturbance; yellow represents negotiation stage-dominated disturbance; and red indicates the majority of disturbance occurred in the post-peace agreement stage. The gray color represents the disturbance mostly occurred between two main stages. On the map, black lines indicate the borders of PAs and municipalities, while green lines denote FARC control in 2013 obtained from Wade (2018). White hexagons indicate that no disturbances were detected from 2010 to 2018. (B) Temporal profile of disturbances mapped across the AATB.

**Figure 3.** Subannual temporal validation. Temporal detection is better during the first months of the years (A). Most of the disturbed sampled pixels are well-captured during a three-months window (B).
...every day more and more forest is being lost; they start with the cattle and see it as a good line of ranching begins when people leave the coca. After coca threats and bribes are used to buy silence. Our 5.1. Forest disturbance regime shift

Some factors contribute to the different disturbance rates between PAs and Putumayo. In PAs, the governance vacuum left after FARC’s official withdrawal from strongholds (Picachos-Tinigua-Macarena) has been filled by dissidents and non-state actors who have intensified disturbance. In Putumayo and deeper into the Amazon watershed, campesinos and non-state actors moved into areas that were previously off-limits by FARC mandate and cleared forests to start farms (e.g. cattle ranching) and speculatively acquire land. This process is not new; campesinos are constantly displaced from their lands through legal or violent mechanisms, pushing them towards the agricultural frontier (Gómez et al. 2015). What differs now is that many different actors are simultaneously moving more aggressively in this expansion than during previous stages of the conflict. This expansion is also fueled by a broader narco-economy chain remaining in the AATB. The frequent transition forest-coca-cattle ranching is followed by processes of land accumulation in which the land provides economic incentives for different non-state actors.

These findings have broad implications for current policies associated with forest conservation in Colombia’s new agricultural frontier. Colombia’s National Development Plan 2018–2022 reinforces the need for State presence (Government of Colombia 2018a). It states that the transition to ‘licit’ agricultural production will be enforced through police and military interventions, resulting in the ‘militarization’ of forests through the creation of ‘Strategic Zones of Comprehensive Intervention’ (Government of Colombia 2018b). For example, the military campaign ‘Artemisa’ has focused on PAs, but not in the agricultural frontier limits in which large deforested patches are mostly occurring. Artemisa criminalizes small farmers within PAs rather than addressing the fact that larger deforested patches are outside of PAs and that behind these forest clearings are often outsider investors and non-state actors. These recent plans, the slow process for land distribution, and poor agricultural assistance...
for campesinos and ex-combatants, as well as the potential changes in transitional justice laws have motivated some FARC leaders to go back to war. Hence, a new unstable stage of the Colombian conflict has arrived with the potential for unforeseen consequences to people and forests in the coming years.

5.2. Fragmentation inside the AATB’s protected areas

The rate of forest disturbance in PAs was relatively low historically (Etter et al. 2008). Deforestation pressure increased in the 2000s (Achard et al. 2002) with two peaks of deforestation within PAs in 2004 and 2007 (Hansen et al. 2013, Murillo-Sandoval et al. 2017). After FARC’s withdrawal in 2017, a large peak of disturbance was evident in 2018 (figure 5). The retreat of FARC drove a shift in the institutional framework for governing forests. Actors have ceased following forest conservation rules imposed and enforced by FARC. Although FARC withdrawal represents the biggest institutional change, other points in the agreement are also connected with this increase in disturbance.

The agreement incorporated aspects such as the distribution and legalization of land and the construction of roads (Government of Colombia 2016). These aspects generated expectations about new access to land and resources, especially in campesino reserve zones adjacent to PAs, which prompted people to expand forest clearing. While this expansion is illegal (De Pourcq et al. 2018) and it is impossible to obtain legal land titles within PAs (MADR 1977), why were they deforesting there? Disturbances within PAs could be explained by a protracted, iterative dispute between different actors about historical occupation and land tenure rights, exacerbated after the peace agreement was signed (Gómez et al. 2015, Morales 2017).

First, land distribution inequality has long been a cause of the Colombian conflict (Escobar 2006), but delivering legal titles through the agreement has opened opportunities for resolving this problem by; helping campesinos and ex-combatants to obtain land legally. Nevertheless, outside investors also see opportunities to obtain and capitalize land (Marx 1991). Investors in illegal land markets expect rent or profits on the capital they used for forest clearing, in which formal land tenure is never intended (Richani 2012). Formal tenure is less important than the rules and mechanisms used to manage and obtain economic benefits from land (Ostrom and Nagn德拉 2006). Since FARC withdrawal, the illegal land markets have boosted, similarly as peace processes with paramilitaries (Nussio and Howe 2012) in which actors recover their initial forest clearing investment by raising cattle or growing coca within a few years.

Second, the construction of roads, a well-known driver of deforestation worldwide (Barber et al. 2014), is stipulated within the agreement to connect former FARC territories with central markets. Opening access to the areas also increases speculation for commercializing land and motives actors to expand the agricultural frontier established in 2018 (see roads map in the SP) (Salgar and Cárdenas 2017, UNOCDC 2017). Land speculation has been a key feature of the capitalism accumulation model in Colombia (Richani 2012), but what differs now is the magnitude of speculation and the collective impact of FARC withdrawal with the unstable initial implementation of the peace agreement. The deeply rooted history of land grabbing and poor institutional protections on forests generate a disturbance pattern inside PAs with patches that are on average three times larger than during the wartime stage.

An outcome of the land speculation is the alarming forest fragmentation in Picachos, Tinigua, and Macarena. Campesinos claim they have been living within PAs before their creation, which gives them the right to live there. This generates constant disagreements with local environmental agencies for controlling human encroachment. Picachos’ foothills have been mostly transformed into pastures (Murillo-Sandoval et al. 2018), the south of Macarena—vital for connecting the Andes–Amazon biomes—is fragmented, and Tinigua is divided into two blocks, a north block (intact forest) and south block (highly fragmented).
Macarena and Tinigua are still a refuge of FARC’s dissidents (Alvarez Vanegas et al 2018). The north part of Tinigua remains highly preserved given that it is a constant mobility corridor for them. However, in the southern, new human encroachment has been encouraged by dissidents and other actors with money for clearing thousands of hectares.

Forest disturbance within PAs is affecting the inner buffer zones of historically preserved PAs such as Chiribiquete and La Paya. This indicates the existence of non-state actors clearing large portions of forests. While this abrupt expansion has operated in plain view of authorities responsible for enforcing the law (or under their indulgence), the high fragmentation in certain places will likely result in PAs’ future de facto zoning as mixed-land use or private land tenure. The shift in the institutional framework for forest governance is aggressively promoting forest disturbance, which is corroborated by larger patch sizes during the post-peace agreement stage.

5.3. Forest disturbance dynamics in Putumayo

In contrast to the abrupt increase of disturbance within PAs after the peace agreement, municipalities in Putumayo showed peaks of disturbance since as early as the negotiation stage (figure 7). In Putumayo, land grabbing is linked to coca cultivation and cattle ranching as a mean of land accumulation (Van Dexter and Visseren-Hamakers 2019). These processes are linked with agreement points such as coca eradication and land distribution. First, the peace agreement incorporated the end of illicit crops through mechanisms of crop substitution and coca eradication (PNIS) and the provision of technical assistance to farmers for developing agricultural production (Ramírez 2019). Given delays in PNIS’ implementation and the technical assistance, some farmers continue to cultivate coca until a viable alternative is realized. Simultaneously, armed groups, including FARC dissidents and non-state actors (e.g. paramilitary and drug trafficking structures), are threatening farmers to continue cultivation and are killing social leaders (International
Coca cultivation area prone to be extended into patches associated with disturbance has increased across conflict stages, in Puerto Asís patch sizes remained stable, having this area prone to be extended into patches associated with coca cultivation (figure 8(a)).

Second, the expectation of land distribution has accelerated land grabs through coca cultivation and conversion to cattle ranching as a strategy of land accumulation and money laundering by non-state actors (Van Dexter and Visseren-Hamakers 2019). Cattle ranching is the most viable transition after coca, particularly in areas with low accessibility and the absence of markets for other agricultural products. This process is connected to farmers from within the municipality and neighboring departments, but also to those with access to capital who are paying farmers to work on their behalf. As a consequence, Puerto Guzman and Puerto Leguízamo recorded new larger patches consistent with this conversion pattern far away from the agricultural frontier (figures 8(b) and (c)). This process is reinforced by the recent completion of roads in Puerto Guzman and by some farmers that used payments received for the eradication of coca to begin cattle ranching.

Some limitations need mentioning. First, our intention is not to outline a statistical test for the concept of institutional framework shift leading forest disturbance, which is going more beyond the scope of this paper. Instead, we point out that it is a concept useful to explain the current state of forest using a suitable spatiotemporal scale and ethnographic data. Quantitative methods such as matching (Baumann et al 2012), event coincidence analysis (Schleussner et al 2016) and panel regression (Yin et al 2019) have shown potential to identify specific mechanisms in other conflict-related areas. Second, our analysis focuses exclusively on disturbance (deforestation or degradation), rather than specific land cover or agents of forest change. However, the spatial detail presented here could be used to infer the presence of large-scale changes (i.e. pasture expansion) and small patches associated with coca cultivation. Furthermore, a longer reconstruction of annual land use maps (1988–2018) has been created and a manuscript is currently under preparation.

6. Conclusions

We combined high-resolution time series analysis and ethnographic research to explain forest disturbance in the AATB. Our findings are important for several reasons. First, from a practical point of view, society can see the negative consequences on forests conservation, as the peace agreement did not consider forests to be a central factor during the peacemaking process. Second, we found a rapid increase of disturbance across the whole AATB particularly within PAs that were under FARC control, but also deeper into the intact Amazon forest. Larger patch sizes are evident across the whole AATB during the post-peace agreement stage than in previous stages, whereas smaller patches are located in historical areas cultivated with coca.

This new forest disturbance regime can be explained by the changing rules about land use after FARC’s demobilization, the future expectation of legal land titles and road construction. These processes occur along the ongoing problem of narco-trafficking, which is strongly linked to land grabbing and illegal land markets that convert forest to coca and cattle ranching as a medium of land accumulation. The outcomes of these processes on forests coincide with the collapse of the institutional framework during this early stage of the Colombian post-peace agreement. This case highlights that the future of the AATB depends on stable governance structures that attend to the interests of local actors. These findings underscore the need for local conservation strategies that are sensitive to institutional and demographic shifts, in order to prevent the Andes–Amazon forest connectivity disappearing after just a short shot of peace.
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Data availability statement

A website has been created for this manuscript: https://murillop.users.earthengine.app/view/amazoncol. The data that support the findings of this study are available upon request from the authors.

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