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PRELIMINARY
SUMMARY

LIVING AMAZON

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Deforestation Fronts in the Amazon Region: Current Situation and Future Trends

a preliminary summary



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DEFORESTATION FRONTS IN THE AMAZON REGION:
CURRENT SITUATION AND FUTURE TRENDS - *A PRELIMINARY SUMMARY*

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INTRODUCTION

This preliminary summary highlights some of the preliminary findings of the ‘Deforestation Fronts in the Amazon Region: Current Situation and Future Trends’ report, part of the LAI’s ‘State of the Amazon’ report series. The summary describes the change in the dynamics of deforestation across the Amazon region over the period 2001-2012, namely a significant decline in the rate of deforestation in the Brazilian Amazon but increasing rates of deforestation in the Andean Amazon countries.

The Amazon is a complex natural region, comprised by an array of interdependent ecosystems (what happens in some of its parts affects the others), and hugely important in terms of the ecosystem services it provides, including ecological processes, biodiversity and cultural diversity.

However, it is a region at a crossroads: although this region is still in a relatively well-conserved and well-protected condition (one of best well-protected amongst the most important natural areas on Earth), it is also under increasing degradation pressure.

Therefore, either it is heading towards a large-scale, irreversible ecological disaster with profound regional and global implications, or, if there is sufficient political will, it can take an alternative route to sustainable development in harmony with nature, retaining its crucial ecosystem services for the South American continent and the world. The direction it takes depend on the policies and strategies adopted by the countries that share this unique natural region.

The report uses forest cover data generated by Global Forest Change 2013¹ supported by the University of Maryland, additional complementary data from PRODES (INPE, 2013) for Brazil, and literature reviews. The geographic scope is the Amazon Biome, defined as the area covered predominantly by dense moist tropical forest, with relatively small inclusion of savannas, floodplain forests, grasslands, swamps bamboos and palm forest. The Biome encompasses 6.7 million km² and is shares by eight countries: Brazil, Bolivia, Peru, Ecuador, Colombia, Venezuela, Guyana and Suriname, and the overseas territory of French Guiana.



¹ M. C. Hansen,*, P. V. Potapov, R. Moore, M. Hancher, S. A. Turubanova, A. Tyukavina¹, D. Thau, S. V. Stehman, S. J. Goetz⁴, T. R. Loveland, A. Kommareddy, A. Egorov, L. Chini¹, C. O. Justice, J. R. G. Townshend (2013) High-Resolution Global Maps of 21st-Century Forest Cover Change. *Science* 15 November 2013: Vol. 342 no. 6160 pp. 850-853 DOI: 10.1126/science.1244693



Figure 1 – Deforestation fronts in Amazon Biome in 2012.

MAIN RESULTS

a) Amazon deforestation is shifting towards the Amazon-Andean countries: during the period 2001-2012, Brazil was responsible on average for 75% of deforested area in the Amazon biome, followed by Peru (8%), Bolivia (7%), Colombia (6%) and Ecuador (1%). Venezuela, Guyana, Suriname and French Guiana total is 3%. This means that Brazil, Bolivia and Peru account for 90% of deforestation in the Amazon during the 12 years period.

The first period (2001-2006) has a slightly higher cumulative deforestation area (62,5%) than the second period (2007-2012) (Figure 2). This decline is due principally to the sharp reduction in deforestation in the Brazilian Amazon region, which by 2012 had fallen to less than 1/5 of its 2004-2005 levels (from over 25,000 km² to less than 5,000 km²).

However, the gains obtained in Brazil have been partially offset by the increased rate of deforestation in the Andean Amazon countries. While in 2001 Brazil's deforestation represented 81% of total deforestation in the Biome, in 2012 it had dropped to 44% (Figure 3). However, in total surface area, this still amounts to vast areas of forest loss. Moreover, the Brazilian case, despite being the most important result globally, might have tackled the easier part, needing now a good revision to continue curbing the deforestation.

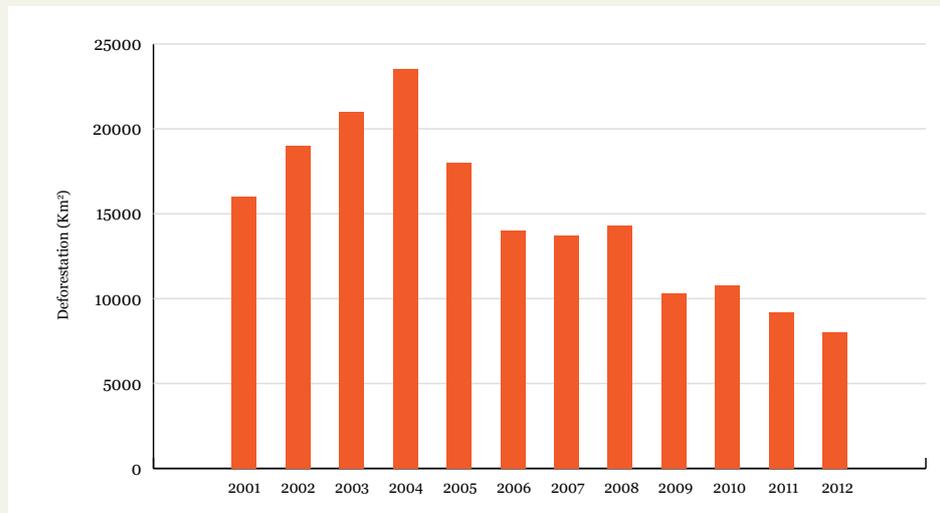


Figure 2 – Total deforestation in Amazon Biome 2001-2012

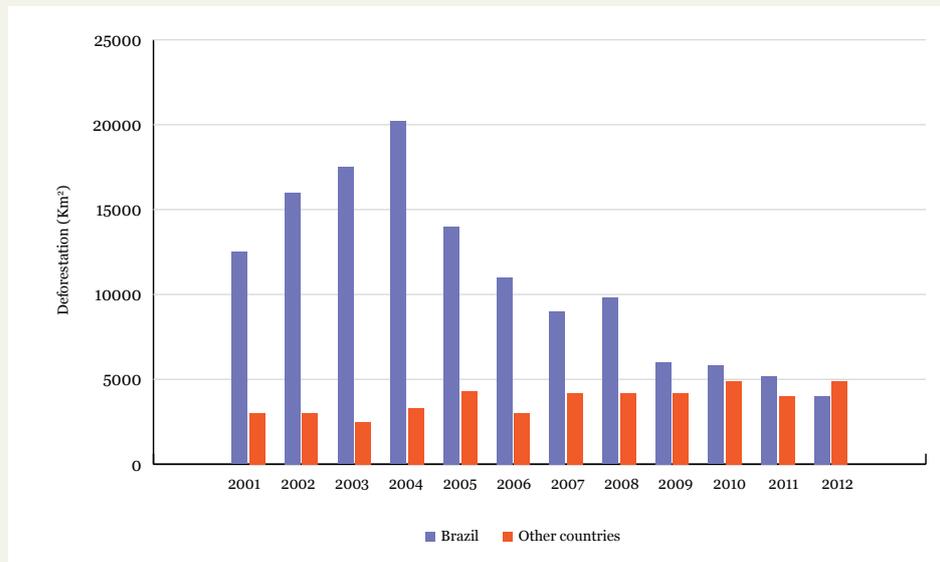


Figure 3 – Contribution of Brazil and other countries to total deforestation in the Amazon Biome from 2001-2012.

b) We identify 25 active deforestation fronts in the Amazon regions

(Table 1 - Annex) of Brazil, Bolivia, Peru, Colombia and Ecuador and their respective underlying causes and determining drivers of forest loss (number 1 to 25 in Figure 1). There are 9 deforestation fronts with increased deforestation trends (1 in Brazil, 3 in Ecuador, 3 in Peru and 2 in Bolivia), 8 additional fronts with decreased deforestation trends (6 in Brazil and 2 in Bolivia) and 8 fronts with fairly steady deforestation rates (4 in Brazil, 1 in Peru and 3 in Colombia).

c) Among them, there are three large-scale cross border deforestation fronts, two of which appear to be heading to reduced deforestation rates (Brazil/Bolivia and Brazil/Peru/Bolivia) and one other with a fairly steady rate (Colombia/Ecuador/Peru):

- The border between the Brazilian state of Rondonia and Bolivia (number 9);
 - The western Amazon region connecting Brazil, Peru and Bolivia along the Interoceanic Highway (number 10);
 - The tri-national border between Peru, Colombia and Ecuador along the Putumayo river (number 23).
- *Northern Rondônia state (Brazil) and Northeastern Bolivia* (front # 9): colonization began with the construction of a Brazilian road, connecting the Brazilian states of Rondonia and Mato Grosso with the industrial south of the country. On the Brazilian side of the border deforestation is caused predominantly by colonist farmers, resulting in the well-known 'fishbone' settlement pattern. The trend in this front is of reduced deforestation. However, the analysis of cumulative deforestation shows that this is the third most extensive deforestation front in the Amazon over the past 12 years, with a cumulative deforested area of 16,053 km² and an average annual deforestation rate of 1,337 km²/yr during the period.
 - *Acre state (Brazil), Cobija (Bolivia) and Puerto Maldonado (Peru)* (front # 10): road infrastructure development has been the main underlying cause of deforestation in this cross border area of Brazil, Bolivia and Peru, with cattle ranching and spontaneous colonization as determining drivers. This front has a relatively stable reduction rate of deforestation, which peaked in 2005, and currently has a cumulative deforested area of 8.552 km² (average annual deforestation about 500 km²/yr).
 - *Putumayo (Peru, Ecuador, Colombia), Caqueta (Colombia) and San Pedro (Ecuador) North* (front # 23): the area located along the river Putumayo forms part of a larger deforestation front, which continues across the border into Ecuadorian and Peruvian territory. Settlements (vicinity of the rivers Caguan, Orteguzaza, Caquetá and Putumayo), development of access roads in the sub-Andean foothills and oil exploration have been the main underlying causes of deforestation in this cross border area, with slash and burn agriculture; illicit crops and cattle ranching as determining drivers. This front has the highest cumulative deforestation in Colombia and Ecuador (7,349 km²), and an average annual deforestation of 612 km²/year. Deforestation is variable between years and the trend is stable around the average.
 - Beside those 25 active deforestation fronts, there are three more considered to be consolidated fronts where further deforestation is limited within existing areas rather than expansion into new areas. These consolidated areas are largely located in the Arc of Deforestation in Brazil (A, B and C in Figure 1), which spreads

from eastern Pará state to the centre of Rondonia passing through northern Mato Grosso which experienced the accelerated rates of deforestation witnessed over the previous decade.

- Deforestation in the Amazon is increasingly a global affair and is driven mostly by global factors that have become incorporated into regional and national development plans. The drivers are essentially the same in nature across the Amazon (Table 1 - Annex), but different in their importance in each case. It is also important to mention that there are interaction among those drivers, such as, for instance, plantations and roads, or cattle ranching and land speculation, dams and roads, etc

FUTURE TRENDS OF DEFORESTATION

We studied the occurrence of different threats in each of the deforestation front analyzed, (such as presence of roads, oil and gas exploration, extraction activities, mining, hydroelectric dams and fires). The fronts showing the greatest deforestation rates are areas with more roads, showing a strong correlation between deforestation and the presence of roads and projections of new roads. Similar results have been predicted for the Amazon region in the “Amazon Under Pressure” report².

Most of the 25 deforestation fronts identified show a tendency for increased or steady deforestation, diffusing the deforestation in the region, in contrast with the historic expanding Brazil’s so-called “arc of deforestation”. This diffusion goes westwards towards the Amazon-Andean slopes. Another broad front is developing in the upper reaches of the Amazon basin in Peru, Colombia and Ecuador, and a third front in establishing itself in the region north of Manaus.

Besides, there probably is more border crosscutting driving elements, close to the border and far from them, such as the increase of cattle ranching and soy plantations in Bolivia, going towards the Amazon, and linked to the Brazilian markets. Also, started with banks and a group of country governments, the South American energy and transport integration is a key element related to the deforestation pattern. Similar approach could be mentioned by hydropower dams in other countries related to the Brazilian markets (consumption, funding, building capacity). Oil in the Andean-Amazon countries also responds to broader demands. This is the other side of the interdependence of the Amazon parts, related to the deforestation drivers, linked internationally, including to finance sector.

Although this assessment only analysed the data of the years 2001-2012, considering the bibliography, the systematic Brazilian deforestation data and doing some non-rigorous extrapolation, we find that something at the scale of 25 to 30% of the Amazon forest could be gone by 2030. Another similar area is going to be probably in not so good conservation standards due to several forest degradation processes. Some scientific assessments consider that 30-40% of deforestation and forest degradation could dangerously approach to a possible turning point which could lead the Amazon to a further degradation cycle. Considering the vital role of the Amazon in the rainfall regime of the continent and the crucial global climate importance of avoiding its carbon to be emitted.



² RAISG. 2012. Amazonía bajo presión. www.raisg.socioambiental.org

CONCLUSIONS

Although over the last decade there has been an important reduction in the rate of deforestation across parts of the Amazon region, deforestation and forest degradation in the region continues at an alarming rate. This picture leaves little room for optimism in the longer term, with rates of deforestation increasing in some countries and new roads being opened up in hitherto unaffected areas.

Brazil continues to be responsible for about 50% of deforestation in the Amazon, although the rate of deforestation in the last decade has declined significantly. On the other hand, **there is a general trend for deforestation to increase in the Andean Amazon countries**, with Bolivia and Peru showing marked tendencies to increase, more so if we consider not the absolute figures (in hectares or so), but in relative terms to their own share of the Amazon.

Combating deforestation in the region is no longer the task of isolated national policies; it is essential to have integrated policies and an articulated action that seeks to value the standing forest throughout the biome. There are some cross-border deforestation fronts such as the deforestation taking place in the northwest of Brazil and the northeast of Bolivia, or along the frontier between Peru and Colombia, or on the triple frontier of Brazil, Peru and Bolivia, all of which are driven by actions that are entirely uncoordinated among the countries.

Furthermore, the Amazon functions as a single ecological unit and has a complex system of interactions between its highly inter-dependent parts; destabilising one part has impacts on other parts. Amazon deforestation is no longer an issue for individual countries to tackle in isolation from other countries. **Many drivers are global, and impacts that appear to be localised are felt in other parts of the biome, and often well beyond its boundaries**, as such the role of the Amazon forest keeping moist air moving, leading to rainfall in mainland areas, distant from the oceans³.

Although many drivers of deforestation across the Amazon region share common characteristics, the relative importance and the specific nature of these drivers varies both within and between countries. The direct drivers of deforestation are predominantly extensive cattle ranching, land speculation and large-scale mechanized agriculture (mainly soybeans), and complemented to a lesser extent the illicit crops and small scale subsistence farming. The following factors, also significant, have both direct and indirect impacts on deforestation: oil and natural gas exploration; construction of hydroelectric dams, roads, mining and other major infrastructure development projects. **More important than separating the drivers, is the understanding of the relationship among them and the multiplication effects of their combination.** Access, particularly through road development, is identified as the single most important underlying factor leading to deforestation and is related to most of, if not all, the other drivers.

3 Nobre, A. 2014. El Futuro Climático de la Amazonía. Informe de Evaluación para la Articulación Regional Amazónica

The strong correlation between the location of deforestation fronts and the presence of existing roads or projections of new roads suggests that **in the near future we can expect to see isolated deforestation fronts becoming connected along major infrastructure development routes**. These fronts will then become axis of deforestation unless there is a drastic change in policy or a collapse in global commodity prices.

The process of occupation of the Amazon decades ago were motivated by governments considering the region an “empty” space to be developed and to realize the region’s productive potential. By now, and in another scale and impact, this process is strongly connected with international markets (agro-commodities, energy (oil and hydropower), minerals, etc.).

RECOMMENDATIONS

A key objective of WWF’s Living Amazon Initiative (LAI) is that *“By 2020, governments of five Amazon countries develop “zero net deforestation” national action plans based on an Amazon-wide regional vision, while relevant private sector and finance institutions adopt robust environmental and social safeguards in their lending policies and create new financial incentives to scale up sustainable forest economy practices”*.

In order to achieve this objective, WWF, through its Living Amazon Initiative (LAI), and with partners and other stakeholders, proposes to the governments, private and finance sector to make that decision makers at regional, national and subnational levels in government, civil society, and the private sector embrace and operationalize the following recommendations for the Amazon Biome:

1. **Amazon governments to design and implement ‘zero net deforestation’ national plans** that take account an Amazon regional vision and specific contexts and characteristics of each deforestation front. National amazon governments to show strong political will to make changes and sustain this position in a long term, possibly through the national programmes to avoid and control deforestation, integrated cross-sectorially and among Amazon countries. Weak or absent political will can reverse or dismantle the positive impacts of effective governance frameworks and incentive structures to control deforestation.
2. **Amazon governments to generate and disseminate information on deforestation, with support of scientific institutions, and to create awareness in the region as a whole and at the specific country level.**
3. **Amazon and other governments to review how incentive mechanisms can contribute to the reduction in the rate of deforestation** by avoiding the current perverse incentives that promotes activities that cause or are related to deforestation and by promoting economic incentives for investments in more sustainable productive activities.



AMAZON GOVERNMENTS TO DESIGN AND IMPLEMENT ‘ZERO NET DEFORESTATION’ NATIONAL PLANS

**AMAZON GOVERNMENTS
AND OTHER
ORGANISATIONS TO
FACILITATE CROSS BORDER
DIALOGUE**

4. **Amazon and other governments and finance and private sector to promote and actually do the sustainable forest management and use of other ecosystems**, including research to raise their value, and recognising the indigenous peoples and local communities rights, as a way to promote sustainable development and give value to the standing forests and free flowing rivers.
5. **Finance sector (including private, public and multilateral development banks) and private sector to open themselves to dialogues** with the civil society organizations, local communities, scientific institutions and governments to ensure that new appropriate measures are taken to safeguard investments in terms of their potential social and environmental impacts.
6. **Amazon governments and other organisations to facilitate cross border dialogue** between national and subnational governments, and finance and private sectors, as well as scientific institutions, local communities and civil society organizations, based on the exchange of experiences and lessons learned in halting deforestation.
7. **Establish and support the establishment of different types of conservation spaces or mechanisms**, including indigenous territories, protected areas, sustainable development reserves co-managed with local communities and other community conserved areas. All integrated with national and subnational land-use and sustainable development plans.
8. Amazon governments **recognise indigenous peoples and local communities rights and work with them** to improve their management and wise use of their lands and to publicise their important role in conservation (ecosystem services, biodiversity, carbon storage, water, etc).





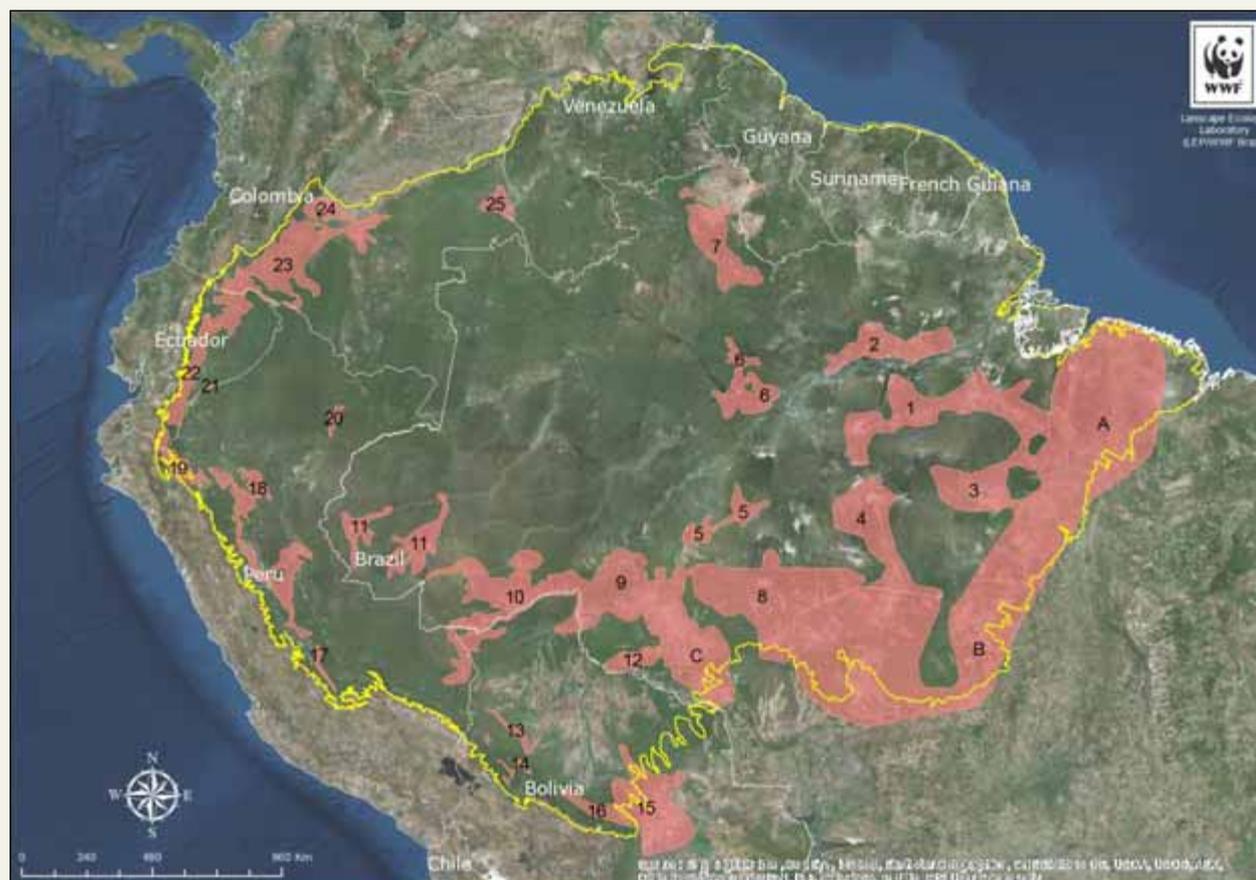
Montanhas do Tumucumaqu  National Park, Amapa state, Brazil



ANNEX I

Table 1. Deforestation fronts in the Amazon Biome (2001-2012).

↑ Increasing ↓ Decreasing →↔ Steady



N	Country	Deforestation Fronts	Deforestation (2001 – 2012)	Average def km ² /yr	Underlying Causes	Determining Drivers	Trend
1	Brazil	Transamazonica Leste - BR-163 Norte	13.954	1.163	Colonization policy Infrastructure Development - Belo Horizonte Dam and BR 163 Highway High commodity prices	Soya bean expansion in areas of better access Cattle ranching in areas of poorer access Colonization with expansion of cocoa production	→↔
2	Brazil	Terra Santa - Oriximiná - Prainha	3.266	272	Infrastructure Development Colonization policy	Colonization Extensive cattle ranching	↓
3	Brazil	Pará Centro-Sul	10.704	892	Infrastructure development Weak control of illegal logging Colonization policy	Extensive cattle ranching Small farmer settlement	↓
4	Brazil	BR - 163 - Centro	7.447	621	High commodity prices Weak control of illegal logging	Soya bean and extensive cattle ranching Informal gold mining	→↔

N	Country	Deforestation Fronts	Deforestation (2001 – 2012)	Average def km ² /yr	Underlying Causes	Determining Drivers	Trend
5	Brazil	Transamazônica Centro	2.013	168	Colonization policy Infrastructure Development	Cattle ranching Cocoa production on small farms	↔
6	Brazil	Manaus - Presidente Figueiredo	1.884	157	Colonization policy Infrastructure development - Balbina Dam Illegal logging	Small farmer agricultural development Cattle ranching	↑
7	Brazil	Boa Vista, Caracaraí e Rorainópolis	3.413	284	Colonization policy Infrastructure development - Perimetral Norte Road	Large scale rice production Small farmer development	↓
8	Brazil	Mato Grosso Noroeste	14.549	1.212	High commodity prices Fiscal policy favours large farm sector Technological development Infrastructure development	Expansion of commercial soya production Large scale cattle ranching	↓
9	Bolivia/ Brazil	Rondonia Norte	16.053	1.338	Infrastructure development - roads Colonization policy; logging	Farming Cattle ranching	↓
10	Brazil/ Peru/ Bolivia	Acre Sul Puerto Maldonado	8.552	713	Infrastructure development - Interoceanic Highway	Cattle ranching Spontaneous colonization (Bolivia and Peru)	↓
11	Brazil	Acre Amazonas	1.846	154	Road infrastructure, Colonization policy	Medium scale farming Small scale cattle production	↔
12	Brazil	Rondonia Oeste	3.395	283	Road infrastructure; Agricultural expansion policies	Medium scale farming Small scale cattle production	↓
13	Bolivia	Yucumo – Iximamas	471	39	Colonization policy Infrastructure development	Promotion of a sugar refinery	↑
14	Bolivia	Coroico, Caranavi, Guanay e Palos Blancos	183	15	Cash crops production	Slash and burn agricultura	↓
15	Bolivia	Santa Cruz de la Sierra	11.188	932	Agricultural expansion policies Infrastructure development - roads Colonization policies	Extensive commercial crops and cattle production Slash and burn agriculture	↑
16	Bolivia	Chapare	1.698	142	Colonization policy Agriculture policy, oil exploitation; logging	Small-medium scale farming (coca; bananas, fruits); cattle ranching; logging	↑
17	Peru	Route 18C - Huanuco and Ucayali			Infrastructure development - roads and gas pipeline	Food crops, slash and burn agriculture; small scale cattle ranching and oil palm production	↑
18	Peru	Carr. Marginal de la selva e Carr. F. Basadre	5.843	487	Colonization policy Infrastructure development - roads Mining	Small-medium scale farming (coca, banana, palm hearts); cattle ranching	↑
19	Peru	Carretera 5N - Amazonas	262	22	Infrastructure development - roads and hydroelectric projects predict	Farming, illicit coca production	↔
20	Peru	Loreto Iquitos Rio Marañón	183	15	Infrastructure development - roads Colonization policy	Slash and burn agriculture; cattle ranching; palm oil plantations	↑
21	Ecuador	Puerto Morona	11	1	Infrastructure development - access to waterway Morona – Marañón – Amazonas; oil exploration; mining	Farming, illegal logging	↑
22	Ecuador	Carretera E45	430	36	Infrastructure development - road Ruta Marginal de la Selva	Farming; small scale cattle ranching; logging	↑
23	Colombia/ Ecuador	Altos Rios, Putumayo, Caqueta e San Pedro - Sucumbios - Orellana - Nueva Loja	7.349	612	Opening up of oil exploration; on routes; spontaneous colonization	Farming; palm oil plantation	↔

N	Country	Deforestation Fronts	Deforestation (2001 – 2012)	Average def km ² /yr	Underlying Causes	Determining Drivers	Trend
24	Colombia	Rio Puerto Rico, S. José de Guaviare y Calamar	1.899	158	Colonization policy; Infrastructure development-road access in the sub-Andean foothill; oil exploration	Slash and burn agriculture; illicit crops; cattle ranching	↔
25	Colombia	Rio Baixo, Rio Guaviare	42	4	Major center of activities of the Revolutionary Armed Forces of Colombia (FARC)	Agriculture	↔
A	Brazil	Pará Leste	42.012	3.501	Colonization policy; Infrastructure development-roads	Cattle ranching; mining	↓
B	Brazil	Mato Grosso Central	46.702	3.892	Colonization policy and spontaneous colonization	Cattle ranching; mechanized agriculture	↓
C	Brazil	Rondonia Central	7.970	664	Colonization policy; infrastructure development	Selective logging, cattle ranching, soya production	↓





DEFORESTATION FRONTS IN THE AMAZON REGION: CURRENT SITUATION AND FUTURE TRENDS

A PRELIMINARY SUMMARY

6.7

million square kilometres is the area of the Amazon Biome

9

countries share the Amazon biome (Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, Suriname, Venezuela and France through its overseas territory French Guyana)



90-140

billion metric tonnes of carbon stored in the Amazon rainforests

25

Active deforestation fronts in the Amazon region



Why we are here

To stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature.

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