Concept note: A new NDC Mitigation Action of the LULUCF Sector

Improving Road Management in the Amazon to Avoid Deforestation

Terra Indígena Cachoeira (Brasil).

DERECHO AMBIENTE Y RECURSOS NATURALES

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Improving Road Management in the Amazon to Avoid Deforestation

Carretera Federico Basadre
Foto: Diego Dourojeanni

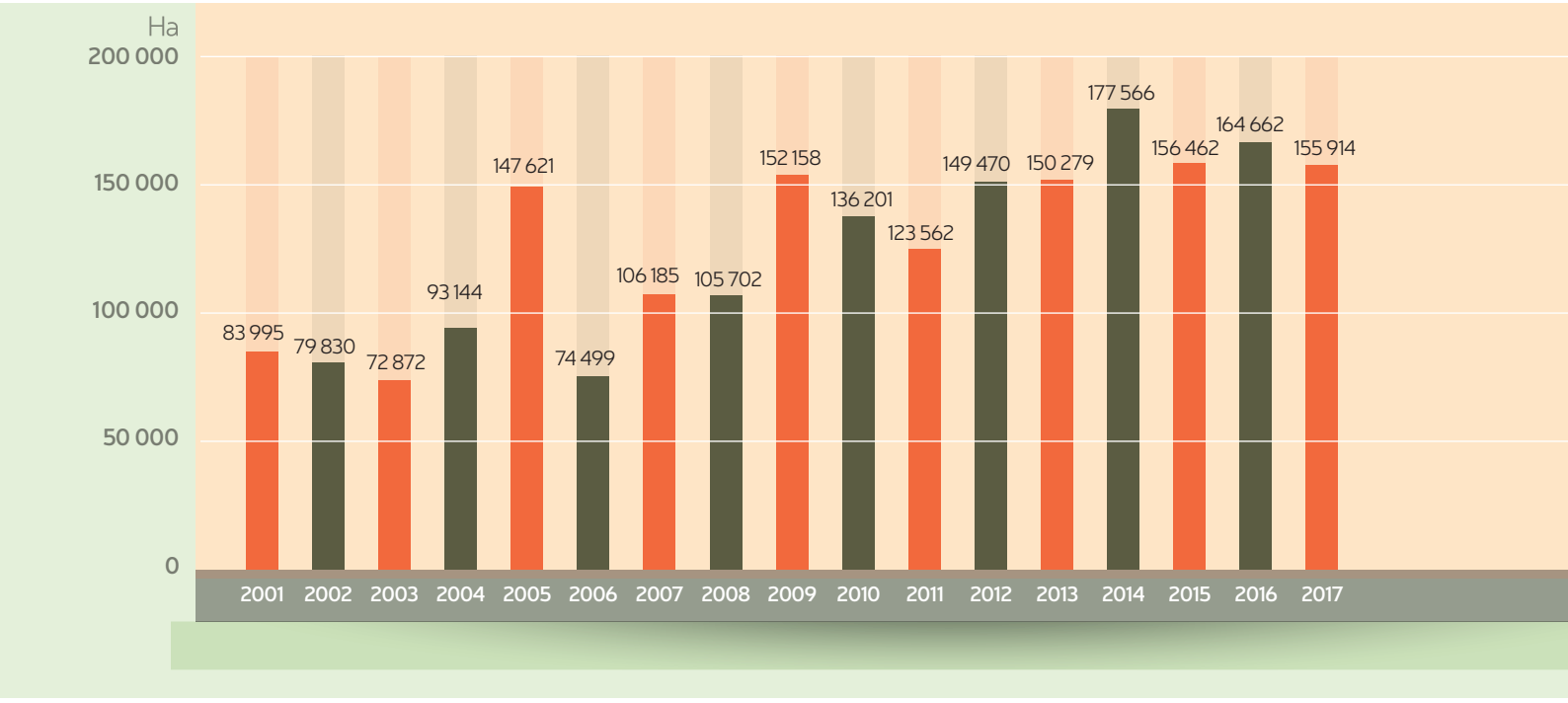
Improving Road Management in the Amazon to Avoid Deforestation

Problem 1

1.1 Deforestation in the Amazon:

According to information from the PNCBCC (2017)[1], a total of 2,130,123 ha of forests were lost in the Amazon during the period 2001-2017. In other words, an average of 125,301 ha of forests have been lost per year.

Loss of forest

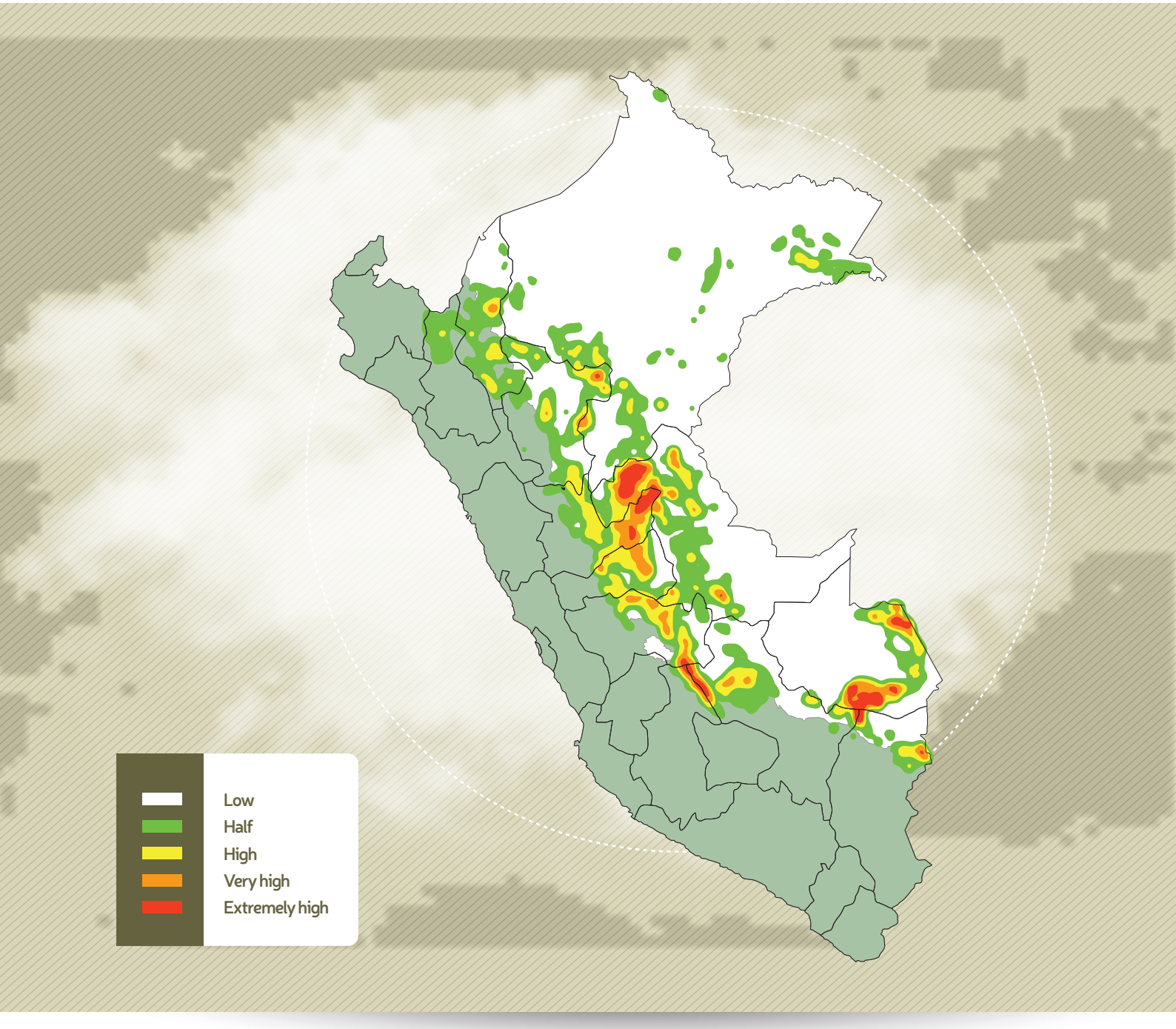


SOURCE: *http://geobosques.minam.gob.pe/geobosque/view/perdida.php+*

According to information from the last year of analysis of the PNCBCC (2017), forest losses are mainly concentrated around 3 deforestation fronts: Federico Basadre - Marginal Highway, VRAEM, Tambopata - Manu and Tahuamanu Corridor (IIRSA SUR Highway). Out of a total of 25 deforestation fronts recognized by the National Strategy on Forests and Climate Change (ENBCC for its acronym in Spanish)[2], the majority related to road and river axes (PNCB, 2015).

1. http://geobosques.minam.gob.pe/geobosque/view/perdida.php
2. PNCBCC. 2016. National Strategy on Forests and Climate Change. http://www.bosques.gob.pe/estrategia-nacional

Concentration of Forest Loss



SOURCE: *http://geobosques.minam.gob.pe/geobosque/view/perdida.php*

1.2 *Deforestation Drivers*

The ENBCC[3] identifies as the main causes of deforestation in the Amazon: a) agricultural expansion (small and large scale), b) small and medium scale cattle ranching, c) illegal and informal extractive activities and d) infrastructure expansion. In order to identify direct causes, a spatially explicit analysis was used, in which the relative contribution of each direct cause identified with the loss of

3. PNCBCC. 2016. National Strategy on Forests and Climate Change. http://www.bosques.gob.pe/estrategia-nacional

Amazonian forest (2000 – 2013 period) was considered, attributing an immediate direct cause to each final use of land identified in the deforested areas, with the exception of areas with secondary forest as final use. However, this strategy lacks the same detail -spatially explicit- to analyze the indirect causes of deforestation in the Amazon, for which only cabinet information was used.

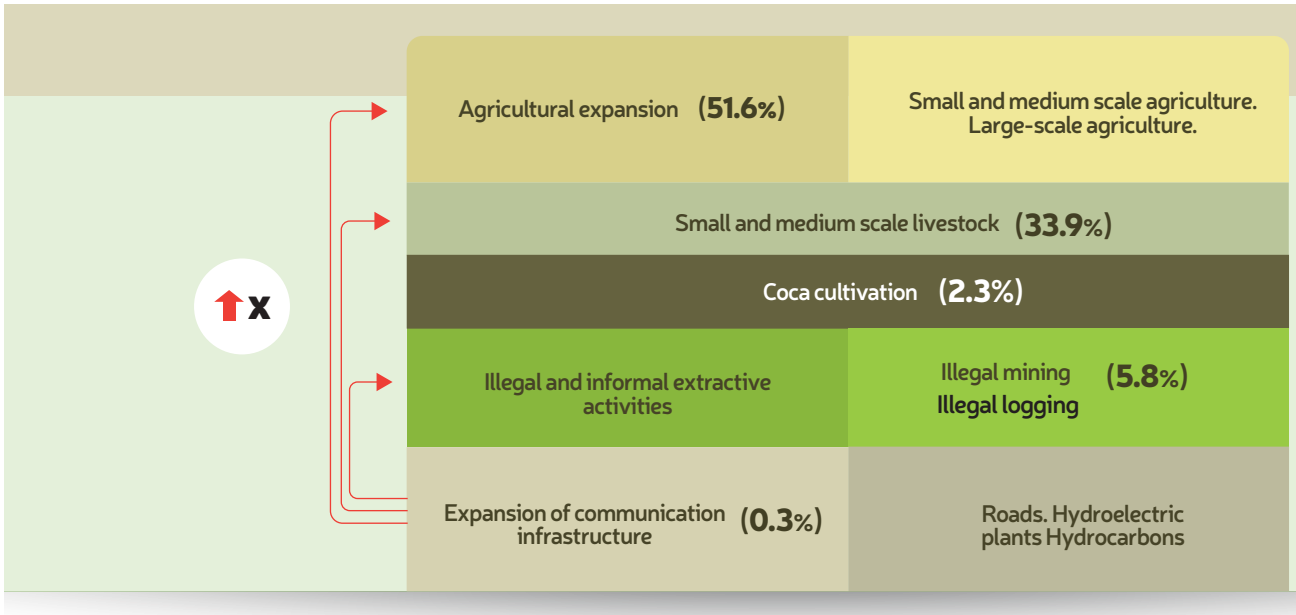
These analyses and assumptions are explained in more detail in the report "Drivers, agents and causes of deforestation in the Peruvian Amazon"[4] (PNCB 2015). This report indicates that the estimation of the contribution of the direct causes of deforestation in the Amazon could not be made in 40% of the universe of data (that is, 40% of the total deforested area in the period analyzed), since this portion corresponded to forests transformed into secondary forests, where it is indicated that its immediate causes could not be inferred, with the data existing at that time.

This same study affirms that the expansion of road infrastructure is only responsible for 0.3% of deforestation in the Amazon, thus making invisible the indirect, cumulative and synergistic impact of road infrastructure as a driving force of deforestation

The contributions of the direct causes were determined from an assignment of the final use changes of the deforested areas with their corresponding immediate direct cause. This analysis was carried out on the 25 deforestation fronts identified, where EBCC itself points out that all of them are associated with important road axes and, in some, fluvial cases; and that 86% of deforestation in the Amazon[5] is concentrated in them.

However, this same study affirms that the expansion of road infrastructure is only responsible for 0.3% of deforestation in the Amazon, thus making invisible the indirect, cumulative and synergistic impact of road infrastructure as a driving force of deforestation; since roads in the Amazon are not only access roads or of connectivity for services, but are also access roads for informal and illegal activities in our country. They are considered to be the driving force behind deforestation, since the expansion of road infrastructure exacerbates the other causes of deforestation.

Direct causes of deforestation



SOURCE: *Adapted from ENBCC. PNCB, 2016*

4. PNCB, Proyecto REDD+ MINAM y AIDER. 2015. Motores, agentes y causas de la deforestación en la Amazonia Peruana. Sistematización, patrones espaciales y cuantificación de impactos. Informe de consultoria para el Ministerio del Ambiente.
5. PNCB, Proyecto REDD+ MINAM y AIDER. 2015. Motores, agentes y causas de la deforestación en la Amazonia Peruana. Sistematización, patrones espaciales y cuantificación de impactos. Informe de consultoria para el Ministerio del Ambiente.

Correlation between deforestation fronts and road axes.

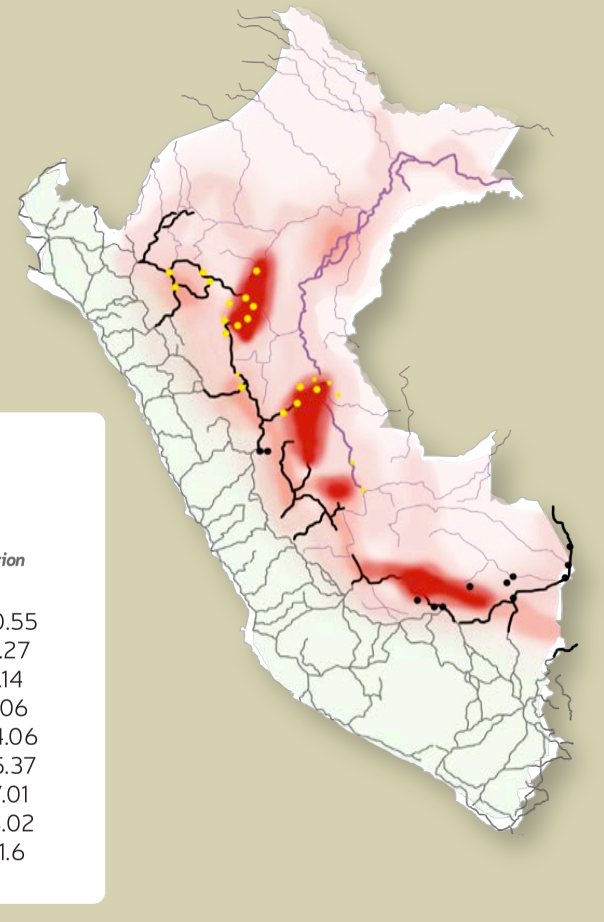
Main deforestation fronts in the Peruvian Amazon

SERFOR (2016) **"the opening of roads that is one of the most important catalysts (of deforestation)**, since they facilitate **access to previously isolated areas".** Road and river axes account for **62% of deforestation in Amazonia.**

For its part, the ENBCC highlights the existence of **12 deforestation fronts** in the Amazon, most of them **associated with road and river axes** (PNCB, 2015).

Source: PNCBCC 2016. Estrategia Nacional de Bosques y Cambio Climático

Main road axes and deforestation density



Source: FIP, 2013. http://www.minam.gob.pe /cambioclimatico/wp-content/uploads/sites/11/2014/03/PI-FIP-Peru-Vs-20062013.pdf

SOURCE: *DAR 2018*

With the analysis presented in this way, we can say that the Peruvian State lacks a formal justification to establish policies, plans or programmes to attack one of the main catalysts of deforestation in the Amazon, the roads, which facilitate access to previously isolated areas, a driver of deforestation that for the ENBCC (PNCB 2016) directly and indirectly drives 86% of deforestation in the Amazon, while the Forestry Authority (SERFOR 2016) indicates 62%[6] of it.

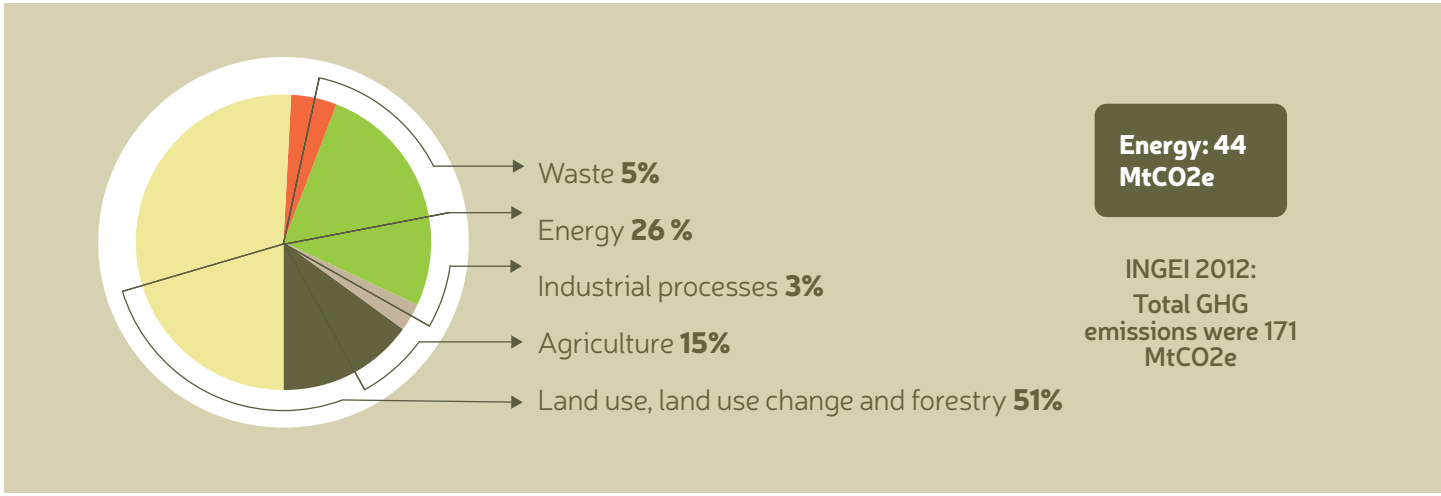
In this way, a strong limitation has been generated in the ability to link these direct and indirect causes of deforestation with a) the implementation actions for Reducing Emissions from Deforestation and Degradation (REDD+) of the EBCC, b) the strategic actions related to the mitigation objectives of the EBCC itself and c) the NDC mitigation actions in the country's LULUCF sector (DAR 2019)[7].

1.2 GHG emissions from the LULUCF sector

According to INGEI 2012[8], the total GHG emissions/removals were 171 Million Tons of carbon dioxide equivalent (MT CO2e). As shown in the graph, the main source of GHG emissions at the national level comes from the Land Use, Land Use Change and Forestry (LULUCF) sector, with 86.7 MTCO2e, representing 51% of INGEI 2012. Within this sector, the main source of emissions is the conversion of forests to other uses, i.e. deforestation, with 79.8 MTCO2e, representing 92% of the sector. The rest (8%) is due to emissions and removals from other activities included in the sector.

As shown in the graph, the main source of GHG emissions at the national level comes from the Land Use, Land Use Change and Forestry (LULUCF) sector

GHG emissions by emissions sector, according to the INGEI base year 2012.



Source: *MINAM 2016*

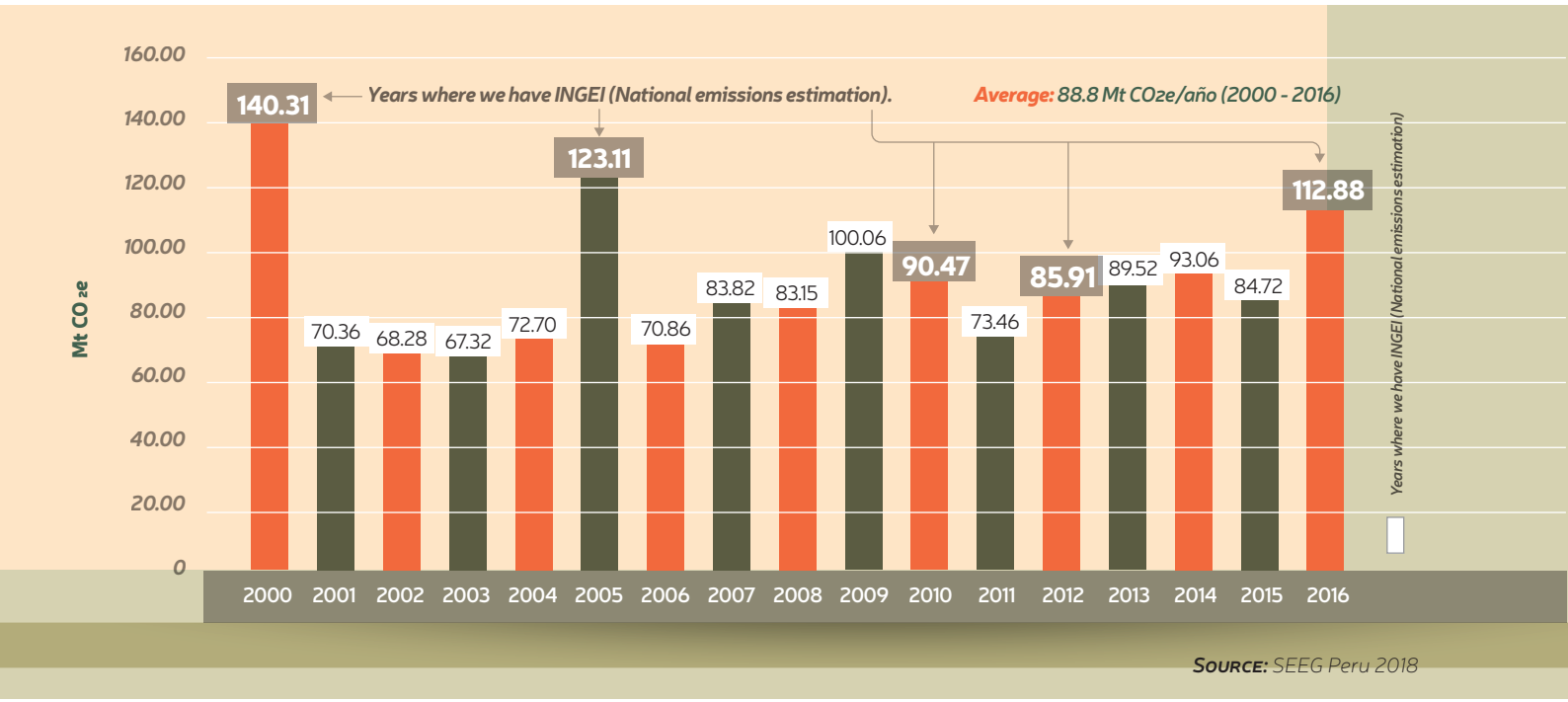
6. https://www.serfor.gob.pe/wp-content/uploads/2016/03/Interpretacion-de-la-dinamica-de-la-deforestacion-en-el-Peru-y-lecciones-aprendidas-para-reducirla-1.pdf
7. http://www.dar.org.pe/archivos/publicacion/Resumen%20ejecutivo_evaluacion_paquete%20_preparacion_redd.pdf
8. http://infocarbono.minam.gob.pe

The LULUCF sector includes emissions and removals from activities that generate:

a. changes in land use, where emissions are from the conversion of forests to other different uses such as: agriculture, pastures, human settlements, and other uses (mining, infrastructure, etc.), which represents 92% (79.8 MtCO2e) of the sector.

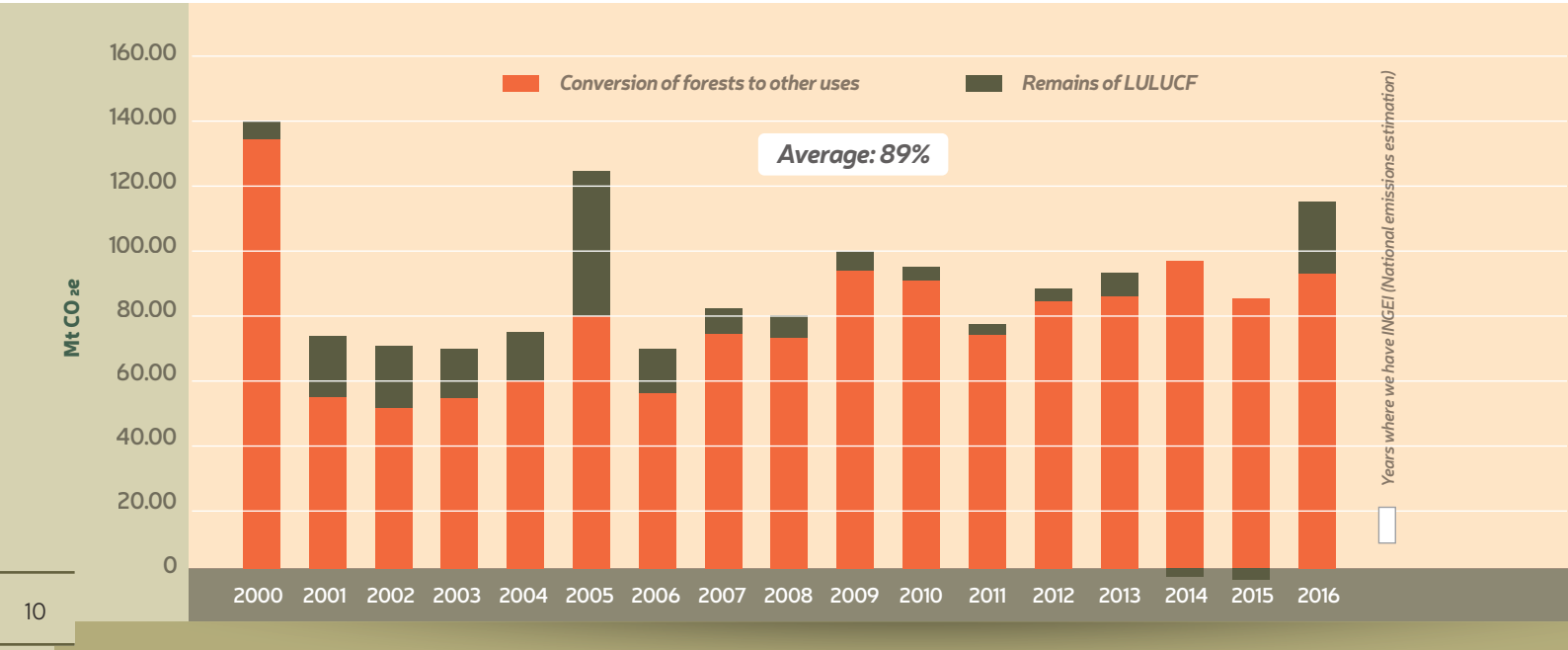
b. changes in forest biomass, which include other LULUCF activities such as firewood consumption, wood, forest fires, forest plantations (with emissions and captures) which represent the remaining 8% (6.9 MtCO2e).

Emissions dynamics of the USCUSS sector (2000 - 2016).



Source: SEEG Peru 2018

Contribution of deforestation to the emissions dynamics of the LULUCF sector (2000 - 2016).

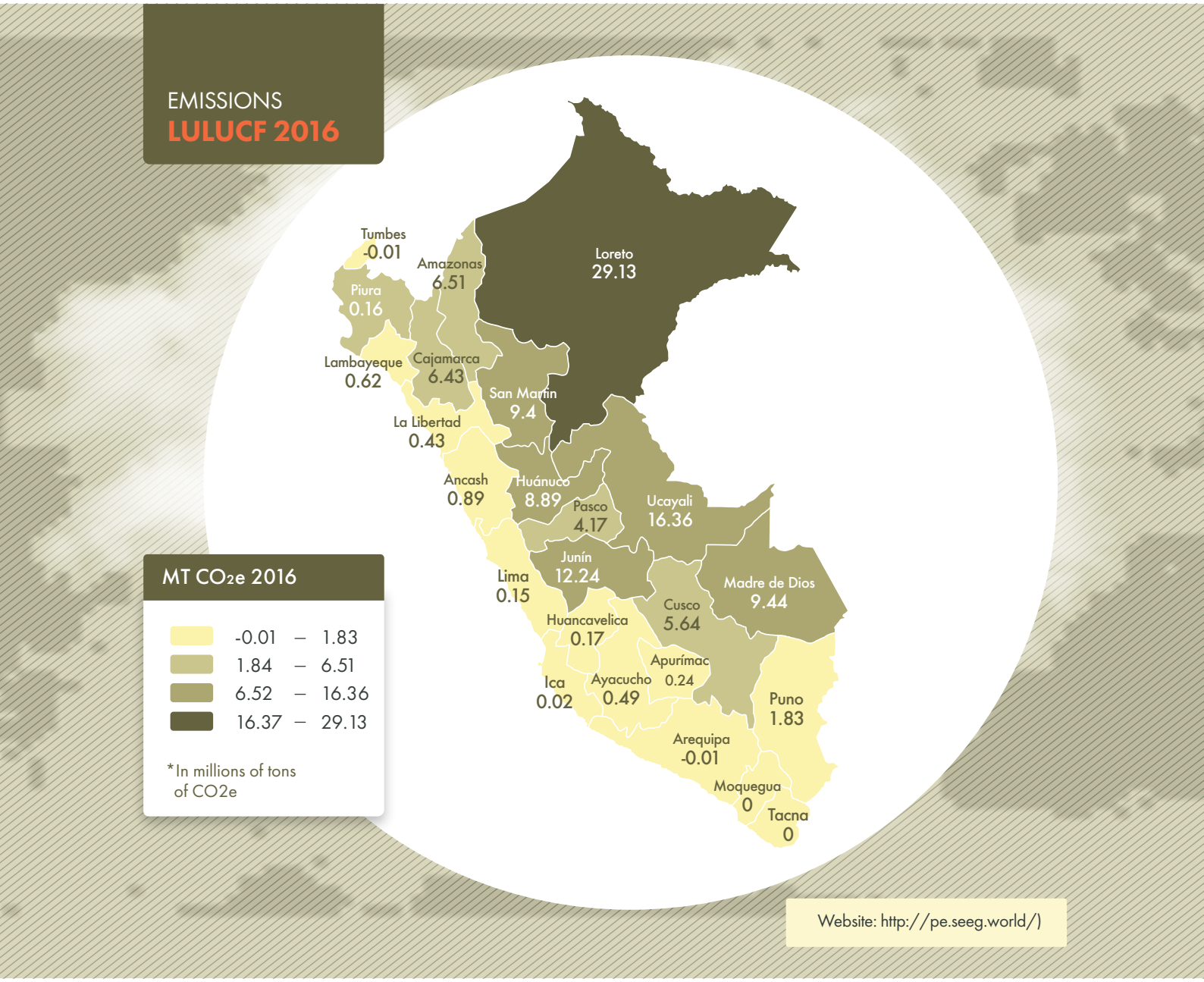


Source: SEEG Peru 2018

According to information from SEEG Peru[9], GHG Emissions Estimation System, it is estimated that on average the sector's emissions reach 88.8 MTCO2e/year, contemplating an analysis horizon between 2000 - 2016. And only in the last year of analysis (2016) the sector's emissions reached 112.8 MtCO2e of GHG emissions. Likewise, based on the same analysis period, it can be observed that on average 89%[10] of the sector's emissions were due to the conversion of forests to another use, i.e. deforestation in the last 17 years of analysis has been the main cause of the sector's emissions.

SEEG Peru, despite not being the official source of the country's GHG emissions registry, provides orderly, available and accessible information to the public, with a level of temporary and spatial detail on an annual basis at the national and regional levels, which provides effective information for decision making.

GHG emissions from the LULUCF sector by department[11]



Source: *SEEG Peru, 2018*

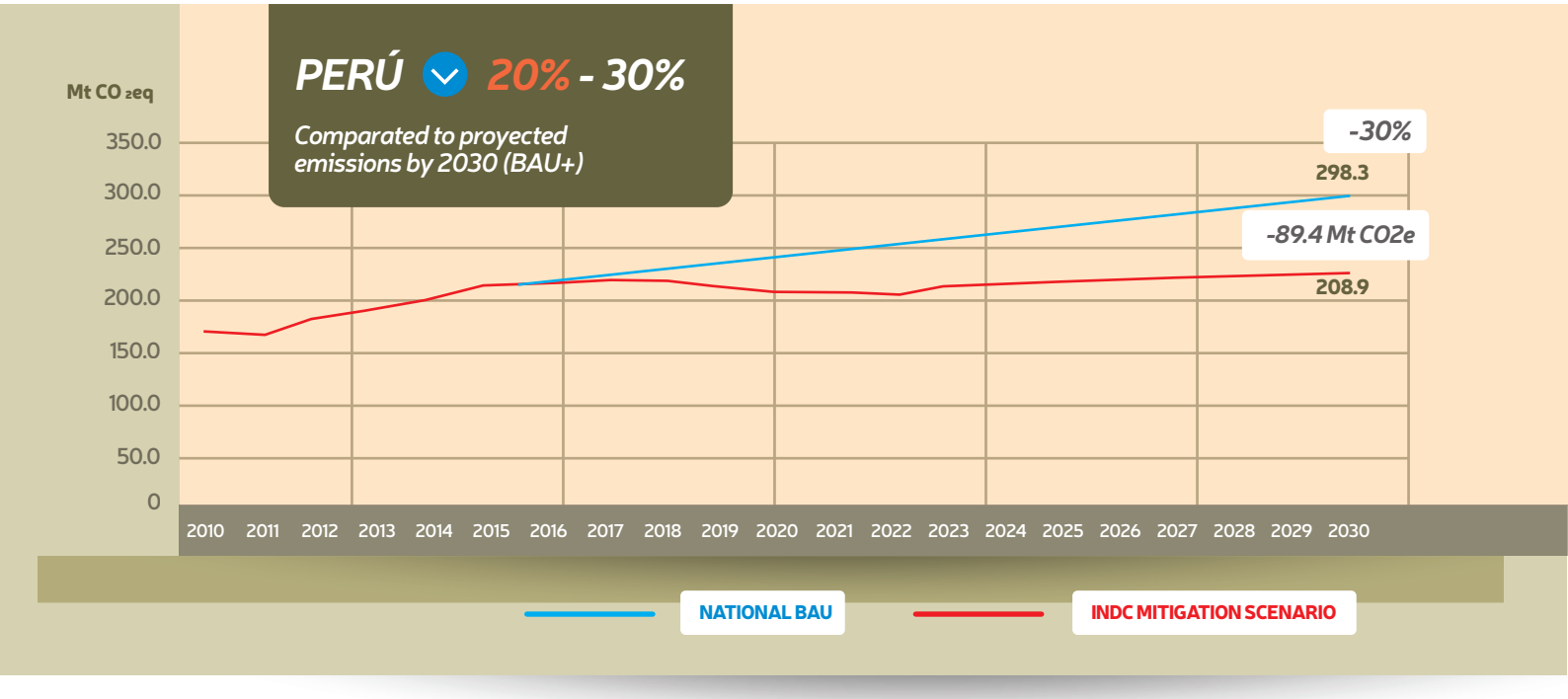
9. SEEG Perú. 2018. http://pe.seeg.world/
10. SEEG Perú. 2018. http://pe.seeg.world/
11. http://www.dar.org.pe/archivos/publicacion/Retos%20de%20la%20Gestion%20Forestal_20_marzo.pdf

1.3 *Peru's climate commitments*

The Contributions determined at the National Level (NDC) are Peru's response and commitment to climate change, through the formulation of adaptation and mitigation goals involving all sectors of the state, private sector, indigenous peoples, civil society and academia[12].

Peru's NDCs[13] envisage a 30% reduction in projected Greenhouse Gas (GHG) emissions by 2030, as part of a Business as Usual (BaU) scenario. The Peruvian State considers a reduction of 20% implemented through investments and expenditures with internal resources - public and private (unconditional proposal), and that the remaining 10% will be subject to the availability of international external financing and favourable conditions (conditional proposal), as shown in the following graph.

Peru's Nationally Determined Contribution (MINAM 2015)



This 30% reduction in GHG emissions by 2030 means to stop emitting 89.4 Mt CO2e into the atmosphere, an amount comparable to the total emissions of the LULUCF sector, according to the last INGEI base year 2012 (MINAM 2016). Based on the report of the Technical Secretariat of the Multisectorial Commission of the iNDC (PCM 2015)[14], it is important to highlight that the contribution of the LULUCF sector represents 70% of the target.

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12. Paris Agreement, ratified by Peru on 22 July 2016 and entered into force on 4 November 2016.
13. PERÚ, 2015. Contribución Prevista y Determinada a Nivel Nacional (INDC) de la República del Perú. https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Peru%20First/iNDC%20Per%C3%BA%20castellano.pdf
14. FINAL REPORT MULTISECTORIAL COMMISSION Supreme Resolution N° 129-2015-PCM. http://www.minam.gob.pe/wp-content/uploads/2015/12/Informe-T%C3%A9cnico-Final-CM-_-R-S-129-2015-PCM_Secretar%C3%ADa-T%C3%A9cnica-18-09-2015-vf.pdf

Contribution of the different sectors in the iNDC of Peru.

Sector	Total	Unconditioned Goal		Conditional Goal	
	MtCO2eq	MtCO2eq	%	MtCO2eq	%
National miltigation target	**89.4**	**59.0**	**66%**	**30.4**	**34%**
Energy	10.96	6.02	55%	4.94	45%
Transport	3.07	2.19	71%	0.88	29%
Industrial Processes		2.89	57%	2.17	43%
Agriculture		0.89	19%	3.71	81%
Forestry/LULUCF	62.88	46.62	74%	16.26	26%
Waste	2.55	1.83	72%	0.72	28%

70% Goal

Source: *Technical Secretariat of the Multisectorial Commission of the iNDC (PCM 2015)*

In order to implement the NDC, the Peruvian State created in 2016 the Multisectoral Working Group (GTM – NDC for its acronym in Spanish), whose final report, recently published in December 2018[15], defines the country's adaptation and mitigation actions, which must be updated every five years under the competence of the High Level Commission on Climate Change.

The GTM - NDC, responsible until last year for the identification, proposal of NDC actions and implementation, was made up of representatives of 13 ministers (7 implementers and 6 with transversal skills) and the president of the National Centre for Strategic Planning (CEPLAN), which may become the High Level Commission on Climate Change.

However, no direct link can be found between the current package of mitigation actions for the LULUCF sector proposed by the GTM - NDC, with one of the main drivers of deforestation, the expansion of roads.

The GTM - NDC presented its final report containing the results to guide the implementation of the country's NDC, presented to the UNFCCC in 2016. In total, the report included 91 adaptation actions and 62 climate change mitigation actions.

The report proposes 62 GHG mitigation actions[16], corresponding to five sectors of emissions defined by the global climate change governing body, the Intergovernmental Panel on Climate Change (IPCC), of which 8 actions have been proposed for the reduction of emissions of the LULUCF sector, a sector that, as we recall, is the one that would contribute the most in the commitment and the one that generates the greatest emissions at present. However, no direct link can be found between the current package of mitigation actions for the LULUCF sector proposed by the GTM - NDC, with one of the main drivers of deforestation, the expansion of roads.

15. Final Report - Multisectoral Working Group of a temporary nature in charge of generating technical information to guide the implementation of Nationally Determined Contributions (GTM-NDC). http://www.minam.gob.pe/cambioclimtico/wp-content/uploads/sites/127/2019/01/190107_Informe-final-GTM-NDC_v17dic18.pdfPA%C3%91OL.pdf

16. http://www.minam.gob.pe/cambioclimatico/ndc/

Results of the Tentative Programming of the GTM-NDC.

	GHG emissions sector						
Government	**Agriculture**	**LULUCF**	**Energy**	**Industrial processes**	**Transport**	**Desechos**	**TOTAL**
MINAGRI	6	5	?	-	-	-	11
MINAM	-	2	-	-	-	5	7
MINEM	-	?	13	-	-	-	13
MINEM / MIDIS	-	-	1	-	-	-	1
MINEM / MTC	-	-	-	-	5	-	5
MTC / MINEM	-	-	-	-	1	-	1
MTC	-	?	-	-	8	-	8
MVCS	-	-	4	-	-	4	8
PRODUCE	-	-	4	2	-	1	7
TOTAL	**6**	**7**	**22**	**2**	**14**	**10**	**61**

Source: *MINAM, December 2018*

It is also important to note that so far only MINAGRI and MINAM have submitted mitigation commitments for the LULUCF sector, proposing concrete actions that address the reduction of deforestation and their respective emissions, leaving it pending for other ministries to do the same, for example, the Ministry of Transport and Communications (MTC), the governing body of the country's road management, considered drivers of deforestation in our Amazon. That is, sectors with regulatory responsibilities and promotion of activities identified as drivers of deforestation, have not proposed actions to reduce emissions in the sector that generates more emissions in the country and whose contribution in the commitment is greater.

Mitigation actions of the LULUCF sector

MITIGATION ACTIONS

LULUCF SECTOR				
Conservation	***Reforestation and Agroforestry***	***Forest Management***	***Allocation of Rights***	***Improving road management in the Amazon to avoid deforestation***
				
1. Protected Areas Management. 2. Conservation Mechanisms at CCNN native communities.	3. Commercial Forest Plantations. 4. Plantations for restoration and/or protection purposes. 5. Agroforestry Systems,	6. Sustainable Forest Management. 7. Community Forest Management.	8. Allocation of non-categorized Land Rights in the Amazon	**Under development**
MINAM (SERNANP y PNCBCC)	**MINAGRI (SERFOR)**			

Source: *DAR 2018c*[17]

17. COP 24 Side Event of DAR – CAF, complete video available:
https://attend-emea.broadcast.skype.com/es-ES/2a6c12ad-406a-4f33-b686-f78ff5822208/988698eb-d594-4d0b-8f2c-ed918e0dd25c/player?cid=eks735juwkamyj5le63rvzeiyvxpjzpiqasqvbxfod45do3xw62a&rid=EMEA

However, thanks to the reports published throughout 2018 by DAR and other specialized institutions, through opinion articles, events[18] and workshops (DAR 2018b)[19]; in order to safeguard the forest and wildlife heritage, SERFOR has committed to develop a ninth action to fight deforestation associated with the expansion of highways in the Amazon[20].

As explained above, deforestation is the main source of GHG emissions in the country and as this is a multi-causal problem, it must be addressed with a joint commitment and work articulated with the different competent authorities of various sectors to address this problem effectively.

Impact 2

The main objective of the 9th action of the LULUCF sector is to improve the management of roads to mitigate their direct, indirect, cumulative and synergistic impacts as a driver of deforestation in the Amazon.

This action will be led by SERFOR, for which it must have the support and involvement of all those sectors responsible for planning, management, environmental auditing, as well as those responsible for its maintenance, improvement and regulation, both nationally and sub-nationally.

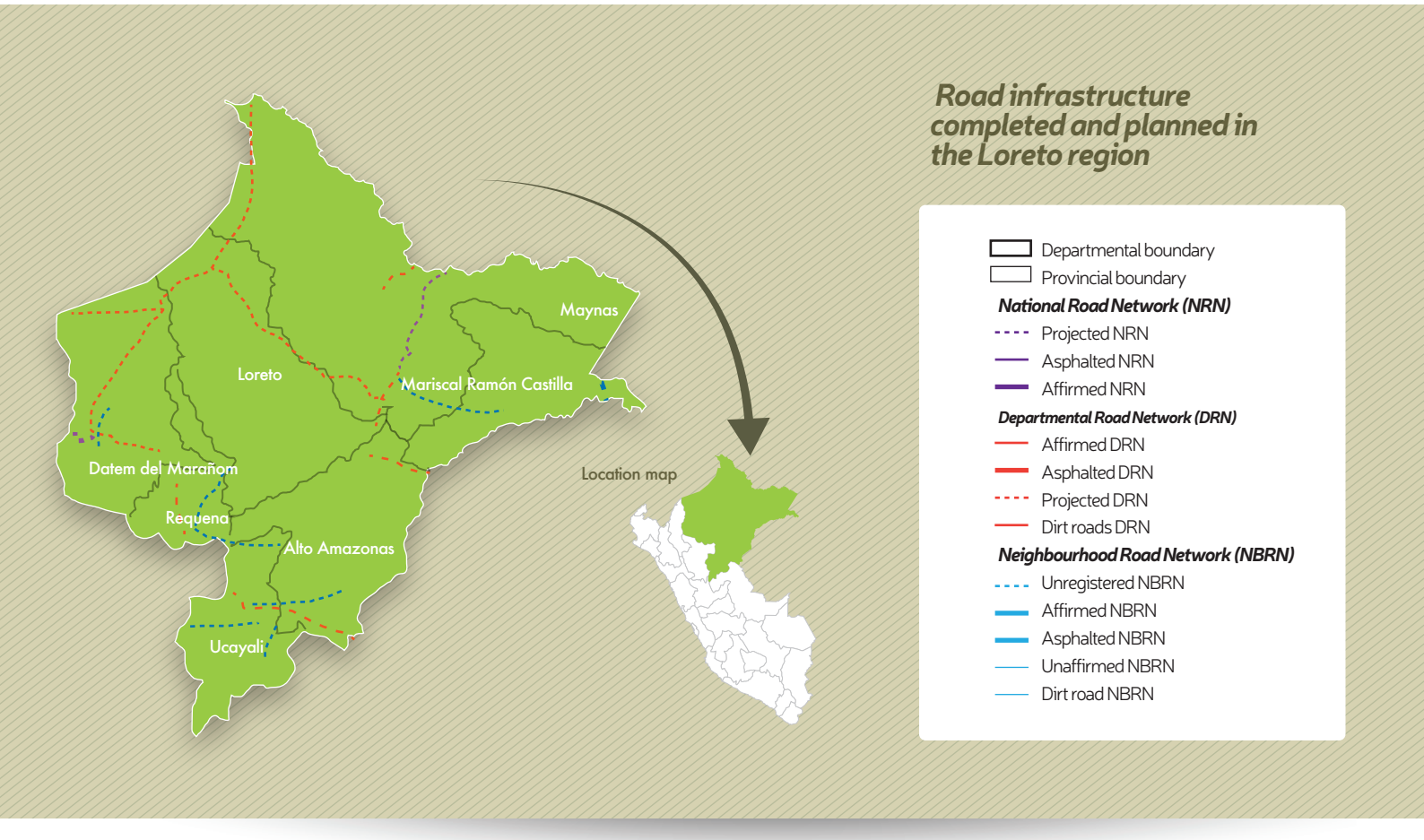
The development of this action will include: calculations of emission reduction potential; identification of co-benefits; economic and financial evaluation; identification of enabling conditions, such as regulatory, institutional and capacity arrangements, among others, which finally ensure the fulfillment of the following objectives:

a. Include criteria to reduce the impact and mitigate the direct, indirect, cumulative and synergic impacts of roads on forests, in terms of deforestation and GHG emissions in road planning.
b. Include SERFOR's participation in feasibility analyses of road infrastructure projects that affect forest heritage.
c. Include SERFOR's participation in the definition of the outlines of road infrastructure projects that affect the forest heritage, including the definition of options with lesser impact.
d. Incorporate in the Environmental Impact Studies the quantification of the direct, indirect, cumulative and synergic impacts of roads on forests, in terms of deforestation and GHG emissions. Including them in the Analysis of Risk and Vulnerability to climate change of investment projects subject to SEIA.
e. Design, propose and implement actions to mitigate the impacts of roads on forests.
f. Include mitigation programmes with a productive approach maintaining the forest intact in roads already built, as a requirement for road improvement.

As an advance, DAR has developed a preliminary analysis to estimate the direct, indirect, cumulative and synergic impacts of the road infrastructure projected for the Loreto[21] region. This analysis included the monitoring of road infrastructure projects in the region, considering the SINAC[22] categories (national, departmental and neighbourhood).

18. https://www.dar.org.pe/noticias/expertos-discutiran-cambios-que-se-vienen-en-los-estudios-de-impacto-ambiental-y-el-sistema-invierte-pe-producto-de-la-nueva-ley-de-cambio-climatico/
19. https://www.dar.org.pe/wp-content/uploads/2019/03/Relatoria-completa-final-UK-español.pdf
20. https://www.dar.org.pe/noticias/sociedad-civil-saluda-nueva-medida-anunciada-por-el-gobierno-peruano-para-luchar-contra-la-deforestacion-asociada-a-la-expansion-de-carreteras-en-la-amazonia-y-actividades-productivas-conexas/
21. http://www.dar.org.pe/archivos/publicacion/OS%20Articulo%20Carreteras_20.02.pdf
22. National Road System (Sinac for its acronym in Spanish), composed of the National Road Network, the Regional Road Network and the Neighborhood or Rural Road Network. The total length of the system is 151,564 km, 63% of this total (96,039 km) corresponds to local roads. http://documentos.bancomundial.org/curated/es/120471468145192933/Marco-de-relacionamiento-con-pueblos-ind%C3%ADgenas

Road infrastructure projects for the Loreto region



Source: *DAR, 2018*[23]

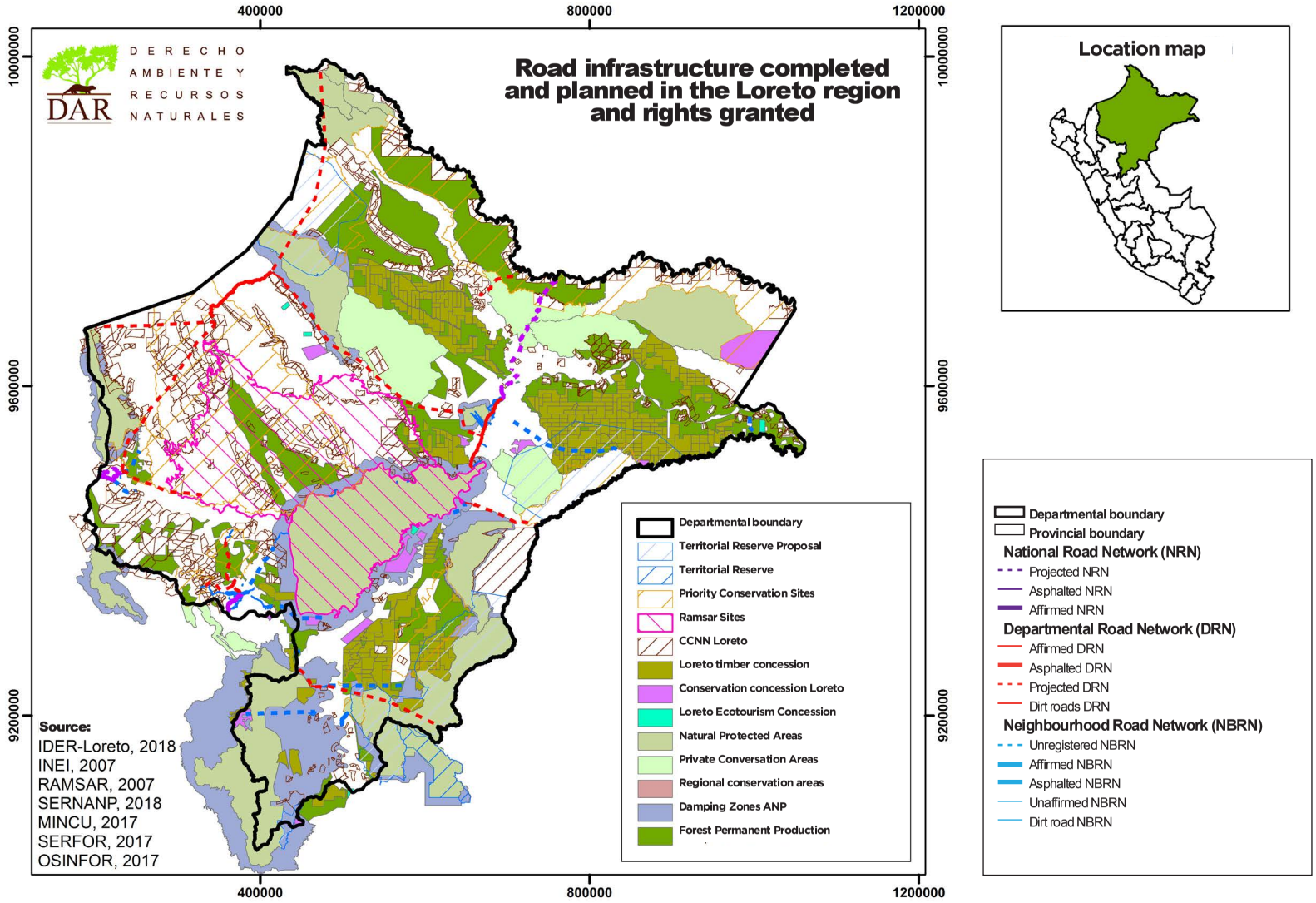
Among the findings of the analysis is that 90% of road infrastructure projects in the Loreto region, would be administered by the regional government and local governments. An important point to bear in mind, if institutional and regulatory improvements are to be implemented around infrastructure management, the involvement of subnational governments must be considered.

Type of track according to SINAC	Number of roads	Situación	Location Length (km)	
National Road Network	2	Projected	226.59	**10%**
Departmental Road Network	11	Projected	1,546.09	**65%**
Neighbourhood Network	12	Projected	584.78	**25%**
Total			***2,357.46***	

90%

Source: *IDER Loreto 2018 / http://visor.regionloreto.gob.pe/*

23. http://www.dar.org.pe/archivos/publicacion/OS%20Articulo%20Carreteras_20.02.pdf



Source: *DAR, 2018*[24].

24. http://www.dar.org.pe/archivos/publicacion/OS%20Articulo%20Carreteras_20.02.pdf

Another important point is the overlapping of road infrastructure projects with the uses and rights granted in the territory showing that these projects are being developed only with a vision of space, not territory. It has been found that 100% of road infrastructure projects in the region have some overlap over the uses and rights granted in the territory.

Additionally, from this analysis there is a first estimate of the possible impacts of these road infrastructure projects, in terms of deforestation and GHG emissions resulting not only from the right-of-way, but also considering the agricultural activities associated with the opening of highways. These preliminary analyses indicate that, if all the departmental road infrastructure projects were built, it would mean the loss of almost 22 thousand hectares of forest in one year, which would represent the emission of 10.3 million TCO2e, which in turn represents 62% of what the Loreto Region emitted during 2016.

Estimation of the possible impacts of road infrastructure projects in terms of deforestation and GHG emissions: DAR, 2018[25]

Departmental road projects	=	***loss of 21 935.13ha of fores***	=	***Emission 10.3 million t CO2e (62%)***	↑
Local road projects	=	***Loss of 8296.55 ha of forest***	=	***Emission 3.9 million tCO2e (23%)***	↑

**Not only the right of way, but also the expansion of agricultural activities associated with the opening of highways.*

Opportunities for improvement: relevant political processes

3

3.1 *Framework Law of CC and the construction of the regulation in a participative manner*

The Framework Law on Climate Change provides for the incorporation of Climate Risk and Vulnerability Analyses, as well as the identification of adaptation and mitigation actions in investment projects subject to the SEIA and INVIERTE.pe. Within the framework of the SEIA they will be included in the EIA (mandatory environmental management instrument) so that the construction of the projects are sustainable and climate-smart investments, and that they are also strategically integrated to add to the resilience of ecosystems and communities in their areas of influence. They should also propose specific mitigation and adaptation actions that contribute to our NDC compliance.

25. http://www.dar.org.pe/archivos/publicacion/OS%20Articulo%20Carreteras_20.02.pdf

3.2 *Nationally Determined Contributions (NDC) - Mitigation Actions of LULUCF Sector*

The implementation of which must be intersectoral and articulated with subnational governments for the effective reduction of deforestation. In addition, roadway designs need to be discussed with the rights granted and land uses. The definition of infrastructure projects should respond to cost/benefit analysis, taking into consideration socio-environmental criteria, including the climate change component and the security of indigenous people's territories.

3.3 *Programmes such as "Support for the rehabilitation and construction of rural roads".*

It is a Subnational Transport Support Programme, which has been implemented since 2015 and will close in 2021, starting road construction in 2019, with a total budget of US$ 600 million (US$ 50 million from WB and IDB cooperation and US$ 550 million from the public budget), has a Local Development Window Programme, run by Provías Nacional, which seeks the sustainability of rural road investment in the Transport Sector, with good results in socio-economic terms (according to academic reports and research), which is proposed as an opportunity to implement CC mitigation and adaptation programmes for road infrastructure projects, incorporating the complement of the climate change component (adaptation and mitigation).

3.4 *Funds for sustainable infrastructure:*

For example, the United Kingdom's Sustainable Infrastructure Programme (SIP/BID), with an initial capital of 177 million pounds, is specifically designed to help close its infrastructure gap and meet its NDCs, having an approach to both resilience and GHG mitigation.

As for road infrastructure in the Amazon, where most projects are local and departmental roads, difficult to finance, the role of the development bank, backed by its safeguards, governance standards and socio-environmental criteria, is critical to making possible resilient infrastructure in the Amazon, ensuring local development and cc criteria. A good opportunity for this is for example with the UK's Sustainable Infrastructure Programme Fund (SIP/BID), which is specifically designed to help close its infrastructure gap and meet its NDC, having an approach to both resilience and GHG mitigation).

3.5 *Promulgation of DS 005 -2018 MTC as a joint effort between MTC, MINAM and MINCU.*

It establishes criteria that articulates the development of road infrastructure projects and the protection of Protected Natural Areas; as well as Indigenous Territorial Reserves (PIACI for its acronym in Spanish).

A recent DAR[26] article indicates that the impact of the enactment of this norm would mean, for the Loreto Region, avoiding the generation of approximately 2.5 million tons of CO2, a figure that represents 24% of the average annual forest emissions emitted by the Region[27]. All this without mentioning the avoidance in terms of habitat fragmentation, forest degradation and the possible introduction of invasive alien species[28].

26. https://www.dar.org.pe/noticias/el-decreto-supremo-005-2018-mtc-y-los-bosques-que-se-salvaron/

27. Forest Emissions Reference Level (NREF for its acronym in Spanish) to reduce emissions from deforestation in the Peruvian Amazon.

28. Perz, S. et al. 2008. Road building, land use and climate change: prospects for environmental governance in the Amazon. Phil. Trans. R. Soc. B. 363: 1889-1895

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