A "COMMODITY-FIRST" APPROACH TO IDENTIFYING LANDSCAPES FOR PRIVATE SECTOR ENGAGEMENT

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KEY DEFINITIONS

COMMODITY-FIRST APPROACH

This refers to the approach taken in this research, which first identifies key current production areas within tropical forest geographies and then deforestation levels and jurisdictional activity in each of the key production areas.

JURISDICTIONAL APPROACH

A jurisdictional approach aims to reconcile competing social, economic and environmental objectives, and takes place at a scale that matches the administrative boundaries of sub-national or national governments.

These approaches can be civil society, government or private sector led and the focus is on helping tropical forest-rich regions adopt sustainable production approaches rather than simply ensuring sustainable sourcing approaches in the supply chains of large companies.

FOREST-RISK COMMODITIES

This refers to commodities that are particularly susceptible to deforestation. For the scope of this analysis, six commodities are established as forest-risk: cocoa, coffee, cattle, soybean, palm oil and wood pulp.

COMMODITY-DRIVEN DEFORESTATION HOTSPOTS

Landscapes that are important both from a commodity production standpoint and as a result of this production also a significant contributor to global deforestation.

SUB-NATIONAL REGIONS

The first administrative division of a country, that can be a province or state depending on the country. For the purpose of this research, sub-national regions are often referred to as simply "regions".

CONTENTS




EXECUTIVE SUMMARY

This report presents a "commodity-first" lens to identifying key landscapes where supply chain companies can make critical interventions to tackle deforestation.

The report understands that supply chain actors will likely only engage with geographies in their direct supply chain. It therefore focuses on commodity production and utilises recent data on drivers of deforestation to identify landscapes where deforestation is high, driven largely by the expansion of forest-risk commodities.

TAKING STOCK OF GLOBAL DEFORESTATION AND PRIVATE SECTOR ENGAGEMENT

- Engagement by the private sector on combating deforestation has been increasing, yet deforestation has still risen to record highs. Many Consumer Goods Forum (CGF) companies and other private sector actors have stepped up supply chain action (e.g. certification for sustainable sourcing).

  There are at least 471 companies with deforestation commitments linked to either coffee, cocoa, soy or pulp and paper. Despite this, the global annual deforestation rate has increased by 8 percent year-on-year from 2010 to 2017 , with 2016 and 2017 being record years.

- Transformative impact will require commodity supply chain companies to broaden their efforts to complement individual supply chain action by engaging in jurisdictional approaches. Companies have been focused on individual supply chain action and advanced sustainable production, but this appears to have had limited impact on overall deforestation rates.

  Some leading companies now recognise that to address deforestation, they also need to engage more deeply, broadly, and support jurisdictional leadership in key supply regions.

- To support such broader private sector engagement, TFA has commissioned a "commodity-first" analysis to identify important landscapes. In order to catalyse private sector action, civil society will need to align closer with private sector priorities, i.e. with landscapes of key significance to production. To coordinate efforts effectively, civil society will have to narrow its focus of how and where to engage supply side actors i.e. where commodity production is high and as a result of which deforestation is high.

ENSURING PRIVATE SECTOR RELEVANCE THROUGH A "COMMODITY-FIRST" APPROACH TO IDENTIFYING IMPORTANT LANDSCAPES

- Across Africa, Asia Pacific and Latin America, commodity production is the largest driver of deforestation. Between 2010 and 2015, 82 percent of cumulative deforestation in regions with tropical forest countries was driven by agricultural activity. Of this, 45 percent was commodity driven and another 37 percent was caused by shifting agriculture, which is likely to have a strong commodity component (e.g. cocoa).

- Global commodity production of key forest-risk commodities is remarkably concentrated at both the national and sub-national levels. The top five producing tropical forest countries account for between 54 percent and 93 percent of global production of key commodities except for cattle and wood pulp production. This is also true at a sub-national level, where the top 10 producing regions (across the top five producing countries for each commodity) account for 40 percent to 65 percent of global production.

- Amongst the top producing countries, commodity production is the primary driver of deforestation. In seven of the top 18 commodity producing countries, more than half of total national deforestation is driven by forest-risk commodities. In six of the 18 countries, shifting agriculture drives more than half of total national deforestation (versus other drivers such as forestry, urbanisation and wildfire).

- Over a dozen landscapes are of particular importance given commodity production levels and deforestation driven by commodity production. Amongst the top producing countries, 14 landscapes exhibit particularly high rates of deforestation with much of this driven by commodity production. Collectively, these 14 landscapes account for 32 percent of the total deforestation across Africa, Asia Pacific and Latin America between 2010 and 2017.

- While major changes to the list of these key landscapes are unlikely, there are a handful of emerging producers that could require particular attention. Looking at the top five commodity producing countries in 2030 based on historical growth, Peru could emerge for cocoa, Kenya for cattle, Honduras for coffee and Guatemala for palm oil.

DRIVING PRIVATE SECTOR ENGAGEMENT IN JURISDICTIONAL APPROACHES

- A relative lack of jurisdictional approaches in landscapes relevant from a "commodity-first" perspective could create challenges for deeper private sector engagement. Out of ~95 currently active jurisdictional approaches, only 20 are in the top commodity producing regions. Further, for key commodities, 90 percent of top producing regions do not have an active jurisdictional approach in place. For example, out of the top 10 producing regions for soybean, 9 regions do not have a jurisdictional approach in place.

- TFA is working closely with major firms across the commodity supply chain and civil society to refocus jurisdictional activity and to develop new partnership approaches in "commodity-first" landscapes. Consistent with this commodity-first approach, TFA is working with the Consumer Goods Forum (CGF) and other platforms in the commodity supply chain to accelerate progress in a select number of key producing regions. This "commodity-first" approach is one of several possible ways in which landscape selection could be conducted.

INTRODUCTION

The Tropical Forest Alliance (TFA) is a global partnership that brings together governments, the private sector and civil society organisations to reduce the tropical deforestation associated with the sourcing of commodities such as cocoa, coffee, cattle, palm oil, soybean and wood pulp.

The challenge to end tropical deforestation is at a critical juncture. For more than 10 years, considerable effort has gone into jurisdictional approaches to combat deforestation at the sub-national level in many countries. These approaches have largely focused on building capabilities for the REDD+ (Reducing Emissions from Deforestation and forest Degradation) programmes under the United Nations Framework Convention on Climate Change (UNFCCC), in anticipation of future carbon finance flows. In parallel, many Consumer Goods Forum (CGF) companies and other private sector actors have stepped up supply chain action (e.g. certification for sustainable sourcing).

Leading supply chain companies now recognise that to address deforestation, they will also need to engage more deeply, broadly, and support jurisdictional leadership. Expectations are high that further supply chain action and the associated demand for sustainable commodities could accelerate jurisdictional approaches. However, little research has been done to understand the synergies of these two approaches.

In this lies a key challenge, jurisdictional approaches are often driven by civil society actors and do not necessarily align with the private sector priority sourcing landscapes. Jurisdictional approaches often face difficulty in building a business case for private sector engagement. Thus, a strong overlap with private sector relevance is crucial to drive private sector engagement in jurisdictional approaches. Yet, to date, there is an information gap around the key regions of strategic importance for commodity sourcing supply chain companies, their linkage to deforestation and their overlap with active jurisdictional approaches.

This research seeks to address the information gap by taking a "commodity-first"[1] approach to identify commodity-driven deforestation hotspots that are relevant for private sector. Understanding that supply chain actors will likely only engage with geographies in their direct supply chain whereas a

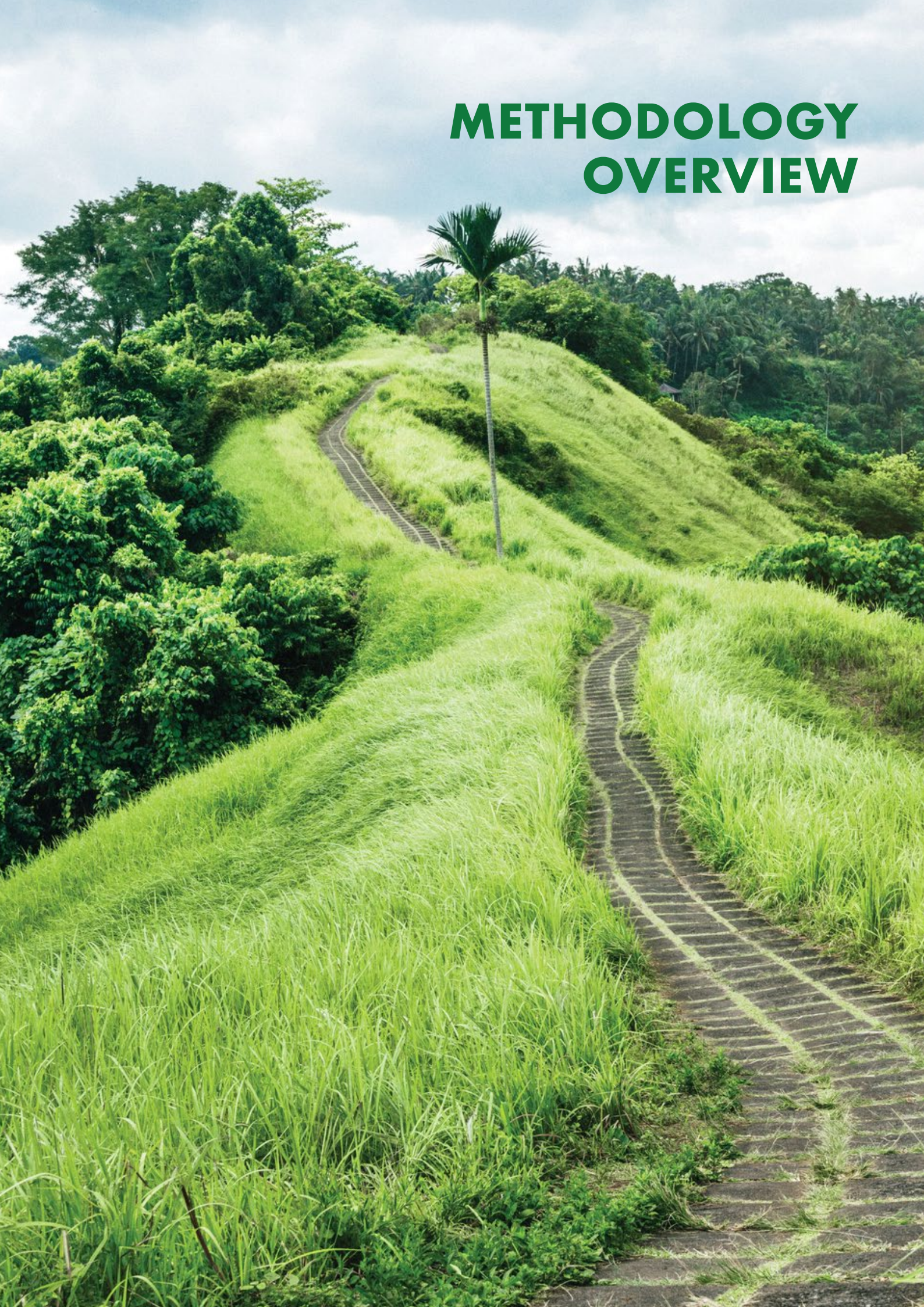
"commodity-first" approach focuses on commodity production first. The analysis then utilises recent data on the drivers of deforestation to identify landscapes where high levels of production have led to high levels of deforestation. It hence provides an additional lens to identify key landscapes where supply chain companies can make truly critical interventions to tackle deforestation. As such, it is complementary and seeks to build bridges between existing supply chain action from private sector and the methods deployed by civil society actors to prioritise regions to focus their efforts.

This report was prepared by TFA with analytical support from AlphaBeta, a strategy and economics consulting firm. All information in this report is derived from AlphaBeta analysis using publicly available data. Where information has been obtained from third-party sources, this is clearly referenced.

TFA is further grateful for the advice and input of many experts in academia, government, not-for-profit organisations and industry who provided invaluable guidance, suggestions, and advice including: Joseph Lumumba (TFA Africa), Erwin Widodo, Janne Siregar (TFA SE Asia), Fabiola Zerbini (TFA Latin America); Nick Martell Bundock (Cargill); John Buchanan, David Mclaughlin, Jessica Furmanski (Conservation International); Neil Scotland and Victoria Wiafe Duah (Department for International Development); Silvia Irawan (Earth Innovation Institute); Christopher Meyer, Katie Anderson, Matt Lyon (Environmental Defense Fund); Simone Bauch (Global Canopy); Gita Syahrani (LDKL Green Districts Platform); Daan Wensing (IDH); John Watts (INOBU); Kevin Rabinovitch, David Pendlington (Mars International); Leonardo Fleck (Moore Foundation); Jonathan Horrell (Mondelez); Hege Ragnhildstveit, Arild Skedsmo (Norway's International Climate and Forest Initiative); Ruth Nussbaum, Abraham Baffoe, Surin Suksuwan, Daniel Arancibia, Sophie Highman (ProForest); Toby Gardner (Stockholm Environment Institute); Morten Rosse (SystemIQ); Greg Fishbein, David Cleary (The Nature Conservancy); Charles O'Malley (United Nations Development Programme); Marc Sadler, Roy Parizat (World Bank); Craig Hanson, Lauren Williams, Frances Seymour (World Resources Institute), Mikaela Weisse, Caroline Winchester (World Resources Institute- Global Forest Watch); Lloyd Gamble, Akiva Fishman (World Wide Fund for Nature).

1 See methodology in Box 1

METHODOLOGY OVERVIEW



BOX 1 SCOPE OF ANALYSIS

This box provides a brief overview of the methodology. A more detailed description of the analysis, calculations and sources of data is provided in the Appendix. Tropical deforestation is a well-researched topic with leading academics developing valuable insights on a regular basis and active civil society participation.

There also exists an extensive body of literature looking at the maturity of different jurisdictional approaches, including previous work by the TFA. As a result, existing research has largely focused on tropical forest regions with existing jurisdictional approaches only (i.e. excluding regions without jurisdictional approaches). Few efforts have been made to understand the issue of deforestation from a private sector relevant lens that specifically focuses on commodity production, regardless of the presence of jurisdictional approaches.

The methodology aims to address this gap by taking a "commodity-first" approach which first identifies key current production areas for six selected forest-risk commodities – cocoa, cattle, coffee, palm oil, soybean and wood pulp – within tropical forest geographies. The approach then establishes deforestation levels and jurisdictional activity in these areas – if any. The key data sources leveraged are national commodity production data from the Food and Agriculture Organisation of the United Nations STAT database (FAO), sub-national production data from national statistics offices, national and sub-national tree-cover loss data provided by the Global Forest Watch (GFW), data on drivers from Curtis et al. 2018[2], and the broader civil society literature on jurisdictional approaches.

In addition to taking a commodity-first approach, this research also consolidates findings from different sub-fields by reviewing and combining insights from the wealth of jurisdictional studies available and leverages the latest advances in deforestation data collection.

WHAT THIS ANALYSIS IS?

- A "commodity-first" view of global deforestation. A quantitative and data-driven analysis of the key current commodity-driven deforestation hotspots that aims to complement, but in no way replace, the large body of literature available.
- An indicative and non-exhaustive list of key commodity-driven deforestation hotspots. The analysis provides an indicative and non-exhaustive list of current commodity-driven deforestation hotspots of relevance for TFA engagement.
- A replicable approach. A transparent, easily replicable and modifiable approach for private sector, civil society and governments to assess the importance of regions or landscapes for global commodity production and the linked impact on deforestation.

WHAT THIS ANALYSIS IS NOT?

- A definitive list of priority regions. The commodity lens is just one of the many important factors that determine whether a region or landscape should be deemed a priority in the global fight against deforestation. The research by no means attempts to have a definitive opinion on what these regions should be, but aims to provide a new perspective which has received limited attention to date.
- Forecast of future deforestation. This analysis does not provide insights into future levels of production or deforestation, or the future significance of current hotspots to both global commodity production or deforestation.

Our "commodity first" approach consists of four steps to identify commodity-driven deforestation hotspots:

- Step 1: Identify major national commodity sourcing locations for forest-risk commodities - cocoa, cattle, coffee, palm oil, soybean and wood pulp - amongst tropical forest countries according to their importance for global production.
- Step 2: For the largest country-commodity combinations (e.g. soybean production in Brazil), understand major sub-national production regions at a first level of administration (i.e. state or province depending on country).
- Step 3: For the national and sub-national regions, understand the deforestation levels over the last decade and verify whether deforestation was indeed driven by commodity production as opposed to other drivers.
- Step 4: Amongst this set of national and sub-national locations, the regions with the largest cumulative deforestation to date that has been mostly driven by commodity production were identified – these regions are termed as commodity-driven deforestation hotspots.

The steps are covered in Chapter 2, while Chapter 1 provides a background on the broader context.

2 Curtis et al. (2018), "Classifying drivers of global forest loss", Science, Available at: https://science.sciencemag.org/content/361/6407/1108.editor-summary

1. TAKING STOCK OF GLOBAL DEFORESTATION & PRIVATE SECTOR ENGAGEMENT

In the last decade, supply chain companies have increasingly realised that sustainable sourcing and production are crucial to address not only changing consumer preferences and demand, but also to manage risks in their supply chains. Many Consumer Goods Forum (CGF) companies and other private sector actors have stepped up supply chain action (e.g. certification for sustainable sourcing), and there are at least 471 companies with deforestation commitments linked to palm, cattle, soy, and timber and pulp.

However, despite these efforts the global annual deforestation rate has increased by 8 percent year-on-year from 2010-2017, with 2016 and 2017 being record years. This increase is happening across all regions in tropical forest countries worldwide, with the fastest increase recorded in Africa.

Transformative impact will require commodity supply chain companies to broaden their efforts to complement individual supply chain action by engaging in jurisdictional approaches.

CROSS-COMMODITY ZERO-DEFORESTATION COMMITMENTS	COMMODITY SPECIFIC
• The terms for zero deforestation have been used interchangeably. However, they can be defined as: • **Zero gross deforestation** means an end to the conversion of all existing forestland, without considering offsetting gains in forest cover • **Zero net deforestation** means no change to the total forested area of the geographic unit, but permits new forests to compensate for converted forest • **Zero illegal deforestation** means no deforestation that is not governmentally sanctioned or that violates any applicable legal instruments • **Zero deforestation** (alternatively, 'no deforestation' or 'deforestation-free') is more ambiguous as it can be gross, net or illegal • Examples:	• Forest protection policies for specific commodities. For example: • No deforestation commitments related to palm oil • Sustainable sourcing with regards to beef • Examples:

SOURCE: Forrest 500; AlphaBeta analysis

EXHIBIT 1: THE MAJORITY OF COMPANY WIDE COMMITMENTS ASSESSED IN THE FOREST 500 INDEX ARE AROUND ZERO-DEFORESTATION OR COMMODITY SPECIFIC POLICIES

It is important to acknowledge the positive trends in the global effort to curb deforestation. Not only has there been an increasing effort by civil society and local governments, bringing forth some very promising new initiatives (e.g. Cocoa & Forests Initiative), but also private sector action has seen a positive uptake. Yet, at the same time, deforestation on a global scale is worse than it has ever been before driven by underlying trends such as population growth (in particular in urban regions) and a growing consuming class.

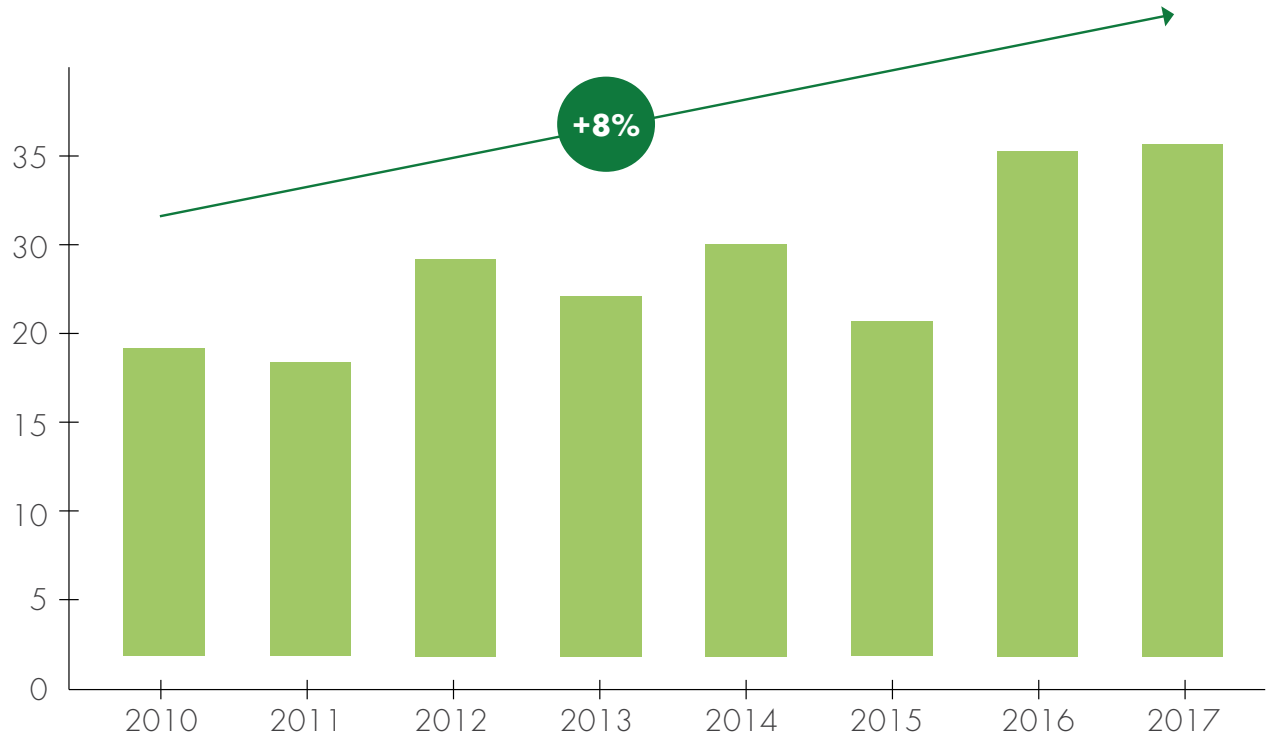
These trends generate increased demand for food driving more commodity production which in turn is putting pressure on forest landscapes. In this chapter we examine these trends that set the backdrop for the need for a "commodity-first" approach for TFA.

ENGAGEMENT BY PRIVATE SECTOR ON COMBATING DEFORESTATION IS INCREASING

Supply chain companies globally are seeing the value in moving towards sustainable sourcing and production. This is both a result of changing consumer demand, as well as an effort to reduce risk in their supply chains. According to Supply Change, an initiative by Forest Trends, 471 out of over 800 tracked companies have made deforestation commitments linked to palm, cattle, soy, and timber and pulp sourcing.[3] Similarly, The Forest 500, a project by Global Canopy, assesses companies and financial institutions relevant to the global forest risk commodity supply chains. The project ranks these companies on indicators such as overarching cross-commodity zero deforestation commitments, commodity-specific policies, scope

3 Supply Change & Ceres (2018), Zooming In: Companies, Commodities, & Traceability Commitments that count, 2018. Available at: https://www.forest-trends.org/wp-content/uploads/2018/04/doc_5748.pdf & www.Supply-Change.org

Tree cover loss (2010-17)[1]
Millions of hectares



1. For canopy cover greater than 10%
SOURCE: Global Forest Watch Database; AlphaBeta analysis

EXHIBIT 2: DESPITE ALL THE COMMITMENTS AND SIGNIFICANT EFFORTS BY SUPPLY CHAIN ACTORS, 2016-17 WERE RECORD YEARS FOR FOREST LOSS

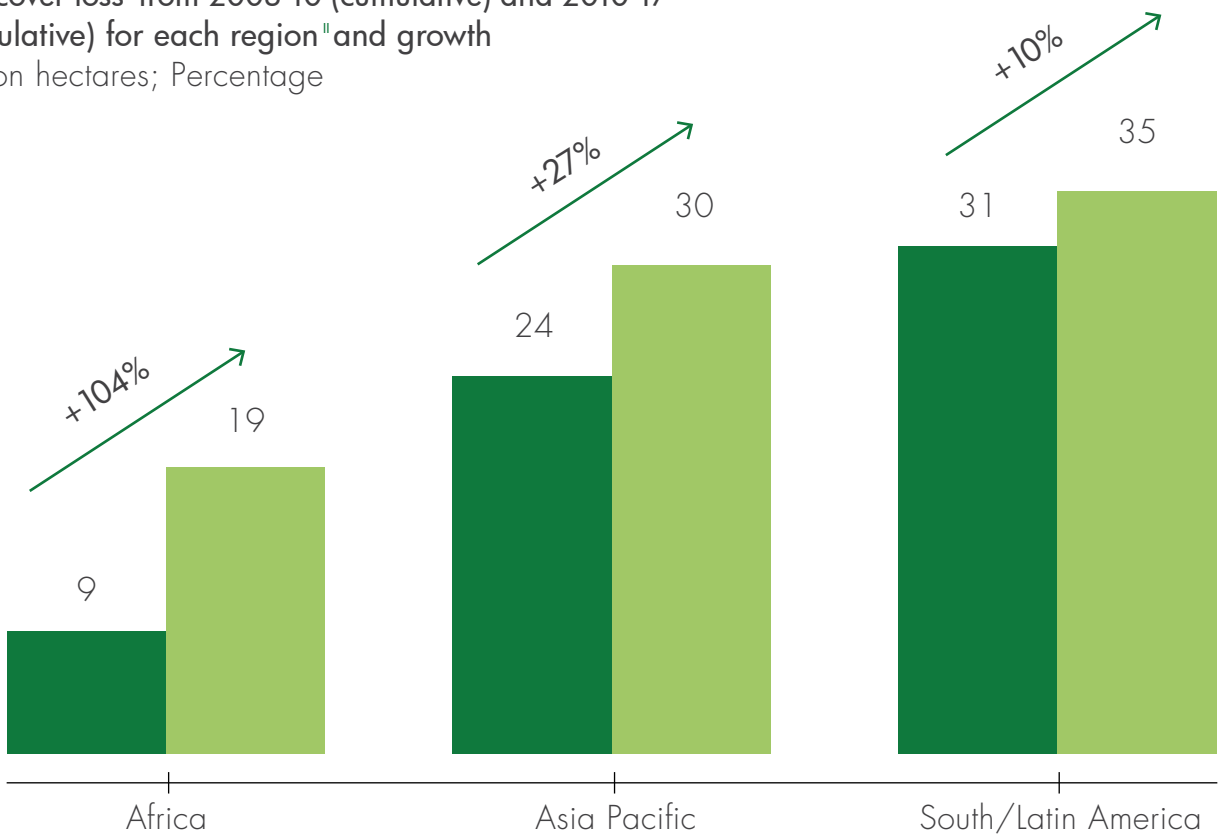
of commitments, whether progress is reported transparently and implementation. Forest 500 tracks 350 companies with the greatest influence within global forest-risk commodity (FRC) supply chains, including commodity producers, processors, manufacturers and/or retailers as well as key investors, lenders and 150 financial institutions exposed to forest-risk commodity supply chains.

According to Forest 500, the number of companies with corporate commitments increased by 14 percent from 2014 to 2018.[4] The majority of commitments across major companies are around zero-deforestation or specific to key commodities, (see EXHIBIT 1). Yet, despite increasing efforts, deforestation is at record highs. While the increasing activism by civil society, private sector and governments is praiseworthy, global deforestation is in fact increasing. According to data on tree cover loss provided by Global Forest Watch (GFW), 2016 and 2017 were record years for deforestation (see EXHIBIT 2). Geospatial data shows that annual deforestation rate globally has been increasing by 8 percent annually. Looking at these trends in regions with tropical forest countries, not only has deforestation been growing fastest in Africa, Asia Pacific has also been experiencing a sharp increase (see EXHIBIT 3).

There are a number of underlying trends that are driving this rise in deforestation such as population growth (in particular urban population growth) as well as an increasing global consuming class. For example, between 2012 and 2018, global

4 Forest 500 (2018), Forest 500 Annual Report 2018: The Countdown to 2020. Available at: https://forest500.org/sites/default/files/related-documents/forest500_annualreport2018_0.pdf

Tree cover loss[I] from 2003-10 (cumulative) and 2010-17 (cumulative) for each region[II] and growth
Million hectares; Percentage



I. Tree cover loss is for the dominant forest base in 2000 (for 2003-10) and 2010 (for 2010-17) (Tree cover is classified as low medium and high canopy cover; with 10-25% as low canopy cover, 25-50% as medium canopy cover, and higher than 50% as high canopy cover;

II. Deforestation in the Arab states is negligible, amounting for 0.1% of total deforestation and is hence not on the chart

SOURCE: GFW Database, AlphaBeta analysis

EXHIBIT 3: AFRICA HAS EXPERIENCED THE FASTEST GROWTH IN DEFORESTATION AMONGST REGIONS WITH TROPICAL FOREST COUNTRIES

population increased by 500 million, and global urban population rose from 53 percent of total population to 56 percent.[5] These trends drive demand for commodities and, by extension, demand for production and, as Chapter 2 shows, deforestation.

SHIFTING THE TIDE ON GLOBAL DEFORESTATION WILL REQUIRE PRIVATE SECTOR COMPANIES TO ENGAGE MORE BROADLY IN JURISDICTIONAL APPROACHES.

It is clear that ongoing efforts and even steady increases in private sector commitments are not enough to reduce deforestation rates. One reason for this is that companies have largely been focused on individual supply chain action. There is consensus amongst key stakeholders that to address deforestation, the private sector will also need to engage more deeply, broadly, and support jurisdictional leadership to complement existing individual supply chain action.

In this lies a key challenge, jurisdictional approaches are often driven by civil society actors with differing degrees of engagement and ownership by government, and do not necessarily align with private sector priority sourcing landscapes. Another challenge with jurisdictional approaches is also often the difficulty in building a business case for private sector engagement. In order to support private sector in this transition to engagement in jurisdictional approaches, TFA is proposing a "commodity-first" lens that aims to ensure a strong overlap with private sector relevance.

5 UN World Urbanisation Prospects (2018).
Reported at: https://ourworldindata.org/urbanization

2. ENSURING PRIVATE SECTOR RELEVANCE
THROUGH A "COMMODITY-FIRST" APPROACH TO IDENTIFYING IMPORTANT LANDSCAPES

Latest geospatial data points to commodity production being the largest driver of deforestation in tropical forest relevant regions, accounting for 45 percent. Production for the six key forest-risk commodities analysed – cocoa, cattle, coffee, palm oil, soybean and wood pulp – in these regions is strongly concentrated.

The top five commodity producing tropical forest countries account for more than half of global production for each of the key commodities except for cattle and wood pulp production. Stepping this down to the sub-national level highlights that the top 10 producing regions alone in these countries account for 40 percent to 65 percent of production. Amongst these top producing countries, commodity production is the primary driver of deforestation, and over a dozen landscapes emerge as of particular importance given commodity production levels and deforestation driven by commodity production.

These landscapes account for 32 percent of total deforestation across Africa, Asia Pacific and Latin America between 2010 and 2017.

However, while major changes to the list of these key landscapes are unlikely, there are a handful of emerging producers that could require particular attention.

Companies that rely on forest-risk commodities are only likely to be able to meaningfully engage in action to push sustainable production in geographies that are relevant for their supply chains, i.e. where significant production is happening. This also means that the geographies relevant to the private sector may very well differ from the geographies simply showing the largest levels of deforestation.

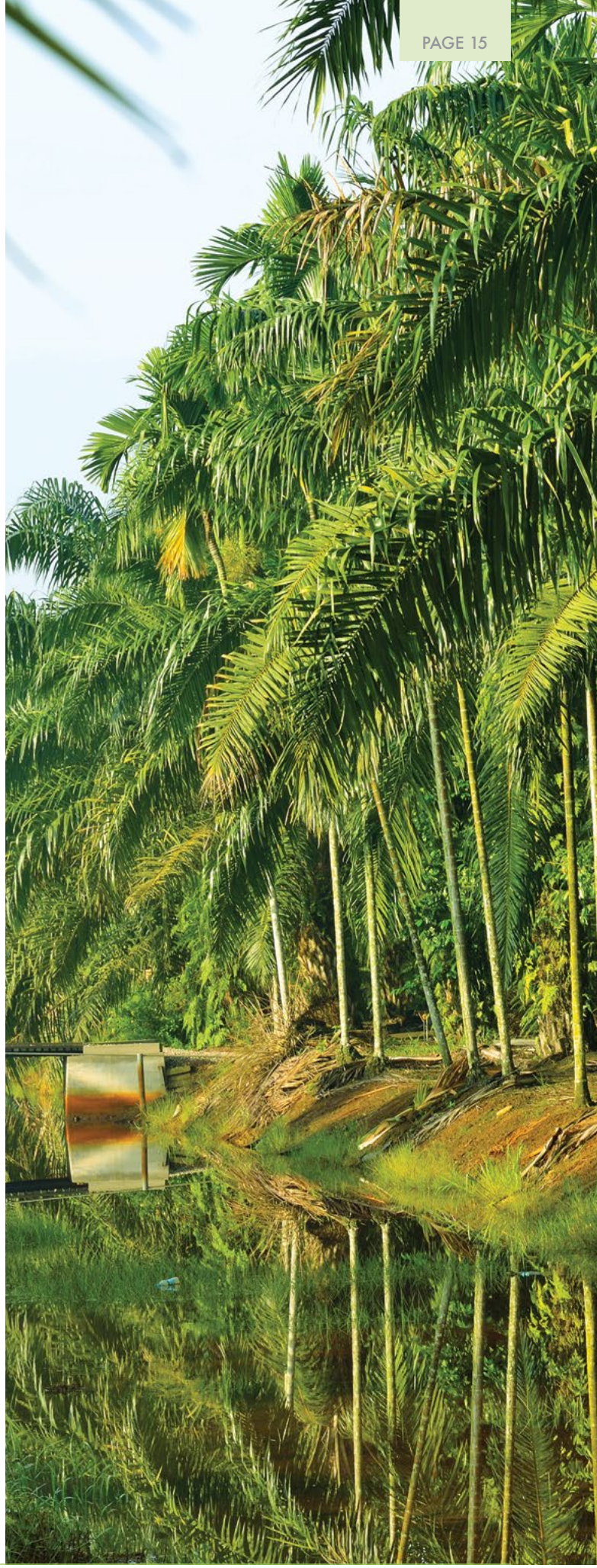
To support broader private sector engagement, TFA is urging a narrower, "commodity-first" focus to identify important landscapes that align closer with private sector priorities. As a first step, this involves understanding how commodity production and deforestation are linked, and whether a such an approach is valid.

ACROSS AFRICA, ASIA PACIFIC AND LATIN AMERICA, COMMODITY PRODUCTION IS THE LARGEST DRIVER OF DEFORESTATION

In order to understand the impact that commodity production – as opposed to other factors such as urbanisation – has on global deforestation, it is crucial to first understand what drives deforestation. GFW, based on the latest geospatial analysis,[6] has identified five key drivers of deforestation which can be broadly classified into the following: urbanisation, wildfire, forestry, shifting agriculture and commodity-driven deforestation (see EXHIBIT 4).[7]

Research by the GFW finds that across the tropical forest relevant regions, namely Africa, Asia Pacific and Latin America, the majority of deforestation from 2010-15 was caused by commodity production and other agricultural activities, (see EXHIBIT 5). While 45 percent of deforestation in these three regions is classified as commodity-driven, an additional 37 percent is driven by shifting agriculture.[8]

That is, 30 million and 25 million hectares of deforestation, respectively.[9] In other words, an area equivalent to the size of the Philippines was deforested to cultivate commodity crops from 2010 to 2015. Looking at the data on shifting agriculture more closely, it becomes apparent that commodities cultivated on small-scale forestland such as cocoa

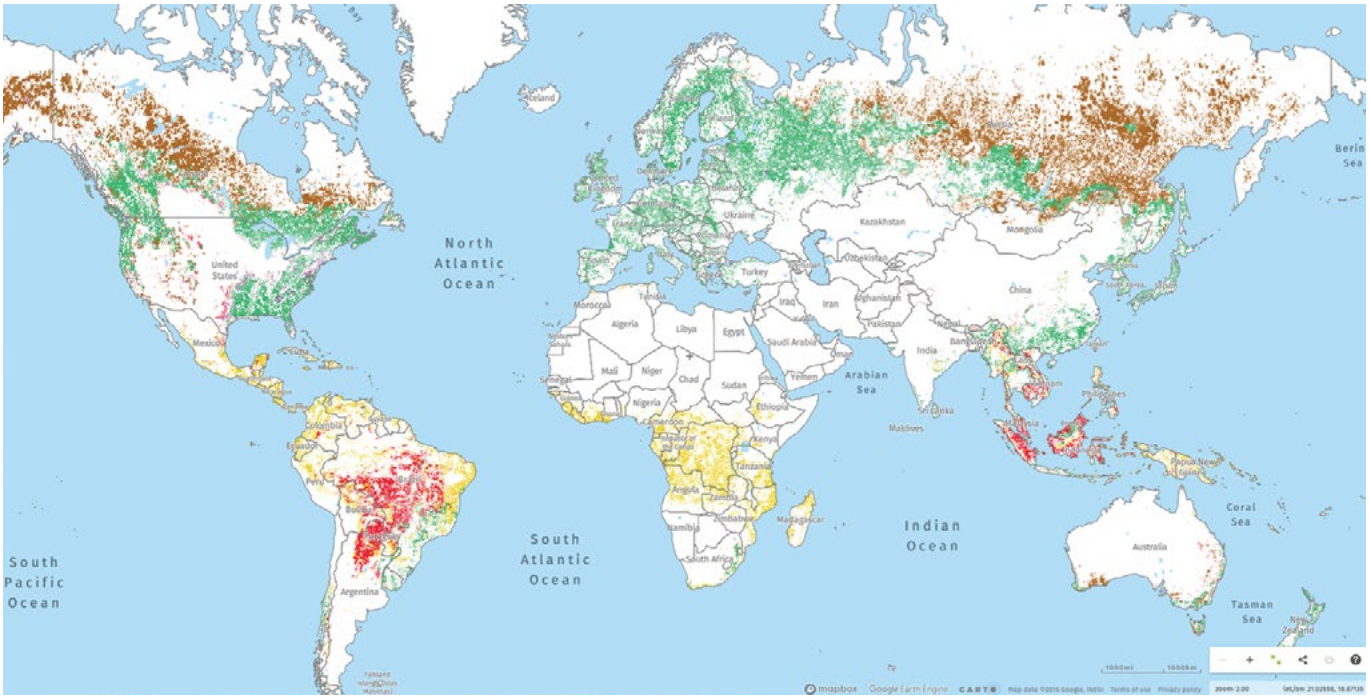


6 Curtis et al. (2018), "Classifying drivers of global forest loss", Science, Available at: https://science.sciencemag.org/content/361/6407/1108.editor-summary

7 Global Forest Watch Dashboard [GWF]. Available at: https://www.globalforestwatch.org/dashboards/global

8 Pacific Standard (2018), "A New Study Reveals Global Drivers of Deforestation". Available at: https://psmag.com/environment/whats-driving-global-deforestation

9 Global Forest Watch Dashboard [GFW]. Available at: https://www.globalforestwatch.org/dashboards/global



Displaying Tree cover loss by dominant driver with 30% canopy density

- Commodity driven deforestation
- Shifting agriculture
- Forestry
- Wildfire
- Urbanization

SOURCE: Map taken from Global Forest Watch Dashboard; Curtis, P.G., C.M. Slay, N.L. Harris, A. Tyukavina, and M.C. Hansen. 2018. "Classifying Drivers of Global Forest Loss." Science.

EXHIBIT 4: LATEST DATA FROM CURTIS ET AL. 2018, PROVIDED BY THE GLOBAL FOREST WATCH, PROVIDES A GLOBAL PICTURE OF DRIVERS OF DEFORESTATION

are accounting for a large proportion of this 37 percent, with most of African deforestation, for example, being classified as shifting agriculture.

FOR KEY FOREST-RISK COMMODITIES, PRODUCTION IS CONCENTRATED IN FEW KEY REGIONS.

To establish relevance for private sector companies active in the commodity supply chain, this research aims to identify the locations with the biggest footprint in global production, i.e. the regions of largest impact and likely strategic significance for global supply chains.

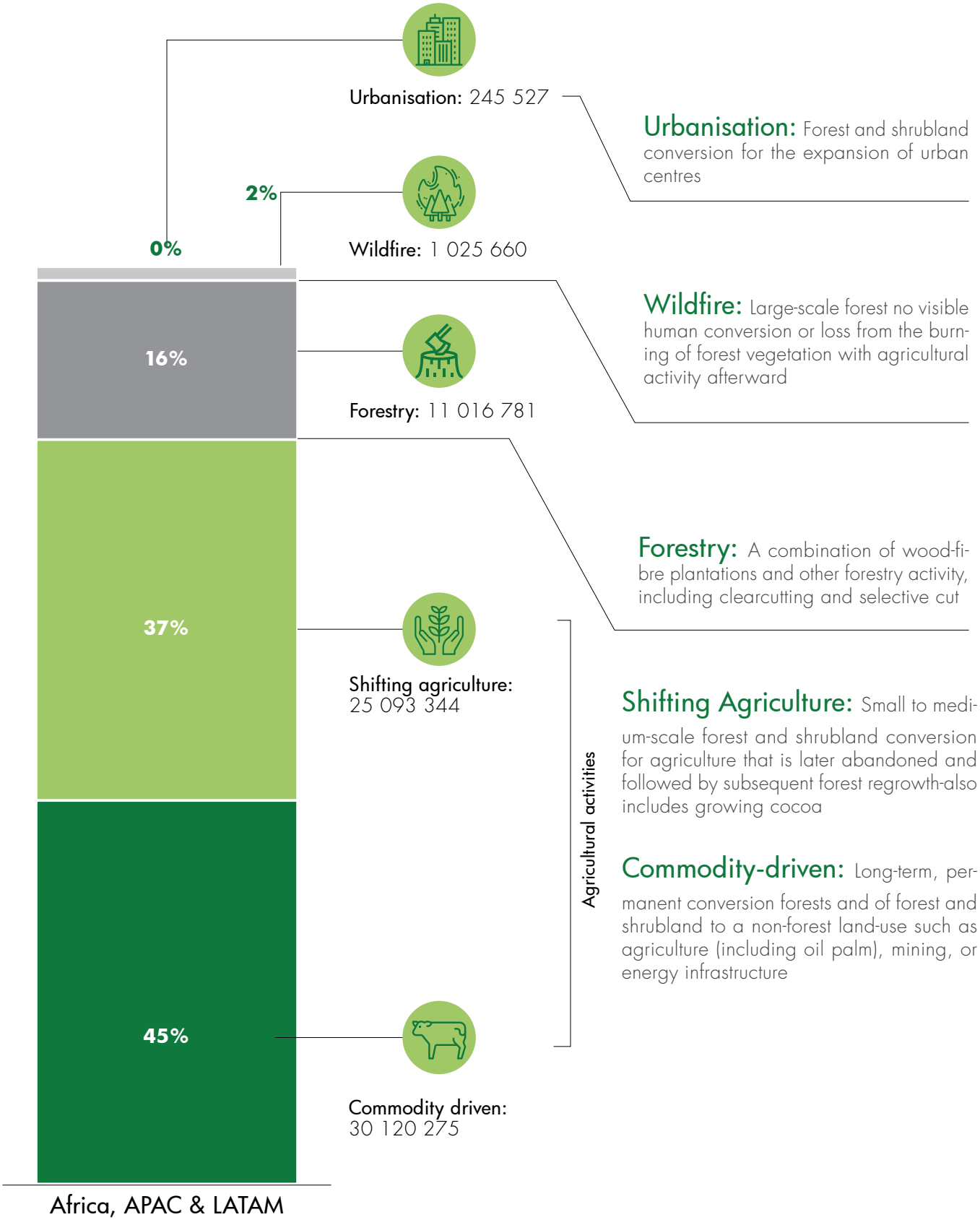
For the selected six forest-risk commodities – cocoa, cattle, coffee, palm oil, soybean and wood pulp – key producing tropical forest countries were identified using data provided by the Food and Agriculture Organization of the United Nations (FAO).[10]

The majority of the production is concentrated in a few key geographies across Africa, Asia and Latin America. More than 50 percent of global production of four commodities, except cattle and wood pulp, is concentrated in five tropical forest countries, and in the case of palm oil, the number reaches 93 percent (see EXHIBIT 6). Cote d'Ivoire leads cocoa production, supplying 33 percent of the world's cocoa demand and producing half a million tonnes more than the second highest producer, Ghana. The majority of the world's largest chocolate companies source their cocoa beans from these regions in Western Africa.[11]

10 Only tropical forest countries were included in the research; Food and Agriculture Organisation of the United Nations STAT database [FAO]. Available at: http://www.fao.org/faostat/en/#data/QC

11 Mighty Earth (2018), Chocolate's Dark Secrets. Available at: https://www.mightyearth.org/wp-content/uploads/2017/09/chocolates_dark_secret_english_web.pdf

Drivers of deforestation from 2010- 15 in tropical forest relevant regions, Africa, APAC and LATAM (cumulative)
Percentage



Urbanisation: Forest and shrubland conversion for the expansion of urban centres

Wildfire: Large-scale forest no visible human conversion or loss from the burning of forest vegetation with agricultural activity afterward

Forestry: A combination of wood-fibre plantations and other forestry activity, including clearcutting and selective cut

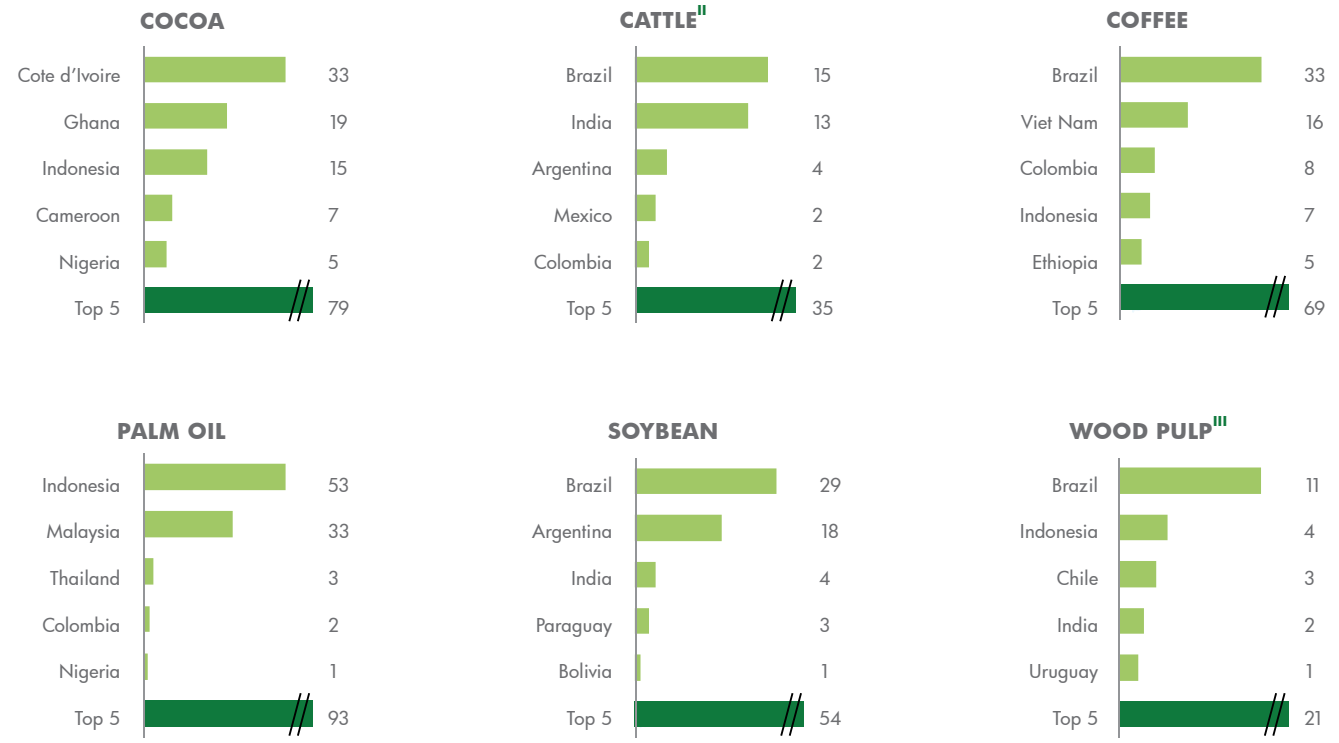
Shifting Agriculture: Small to medium-scale forest and shrubland conversion for agriculture that is later abandoned and followed by subsequent forest regrowth-also includes growing cocoa

Commodity-driven: Long-term, permanent conversion forests and of forest and shrubland to a non-forest land-use such as agriculture (including oil palm), mining, or energy infrastructure

SOURCE: GFW Database, AlphaBeta analysis

EXHIBIT 5: COMMODITY PRODUCTION IS THE LARGEST DRIVER OF DEFORESTATION, AMOUNTING TO 45% OF TOTAL DEFORESTATION IN AFRICA, APAC AND LATAM

Top 5 producing countries by commodity, globally in 2016 (% of global production volume)[I]



I. Includes TFA- relevant top commodity producing countries; key excluded countries include the USA, China, Canada, Japan, Finland and Russia.

II. Due lack of data disaggregation at the subnational level, where we are unable to distinguish between bovine heads for dairy or r beef production, we have reported total bovine stocks at the national level as well. It should be noted that the two types can require significantly different intervention approaches.

III. Wood pulp data is from 2017.

SOURCE: FAO; AlphaBeta analysis

EXHIBIT 6: MORE THAN 50% OF TOTAL GLOBAL PRODUCTION OF 4 OUT OF 6 KEY COMMODITIES OCCURS IN 5 TROPICAL COUNTRIES

Similarly, Brazil leads coffee production, supplying 33 percent of the world's coffee, such that often up to 90 percent of the coffee in an espresso blend is from Brazil.[12] Palm oil production is primarily concentrated in Asia, with more than 85 percent being supplied by Indonesia and Malaysia. After the United States, Brazil is the second largest soybean producer, accounting for around 30 percent of the world's total supply.[13]

Production for cattle and wood pulp is relatively dispersed as some of the largest producers of the two commodities are non-tropical forest countries (excluded from analysis). For example, the United States is a large producer of cattle and wood pulp, while Canada and some of the Nordic countries are other large producers of wood pulp.

Some countries are responsible for the majority of global production of more than one commodity. For example, Brazil is the largest tropical country producing cattle, coffee, soybean and wood pulp. Indonesia is one of the top five producers of cocoa, coffee, palm oil and wood pulp.

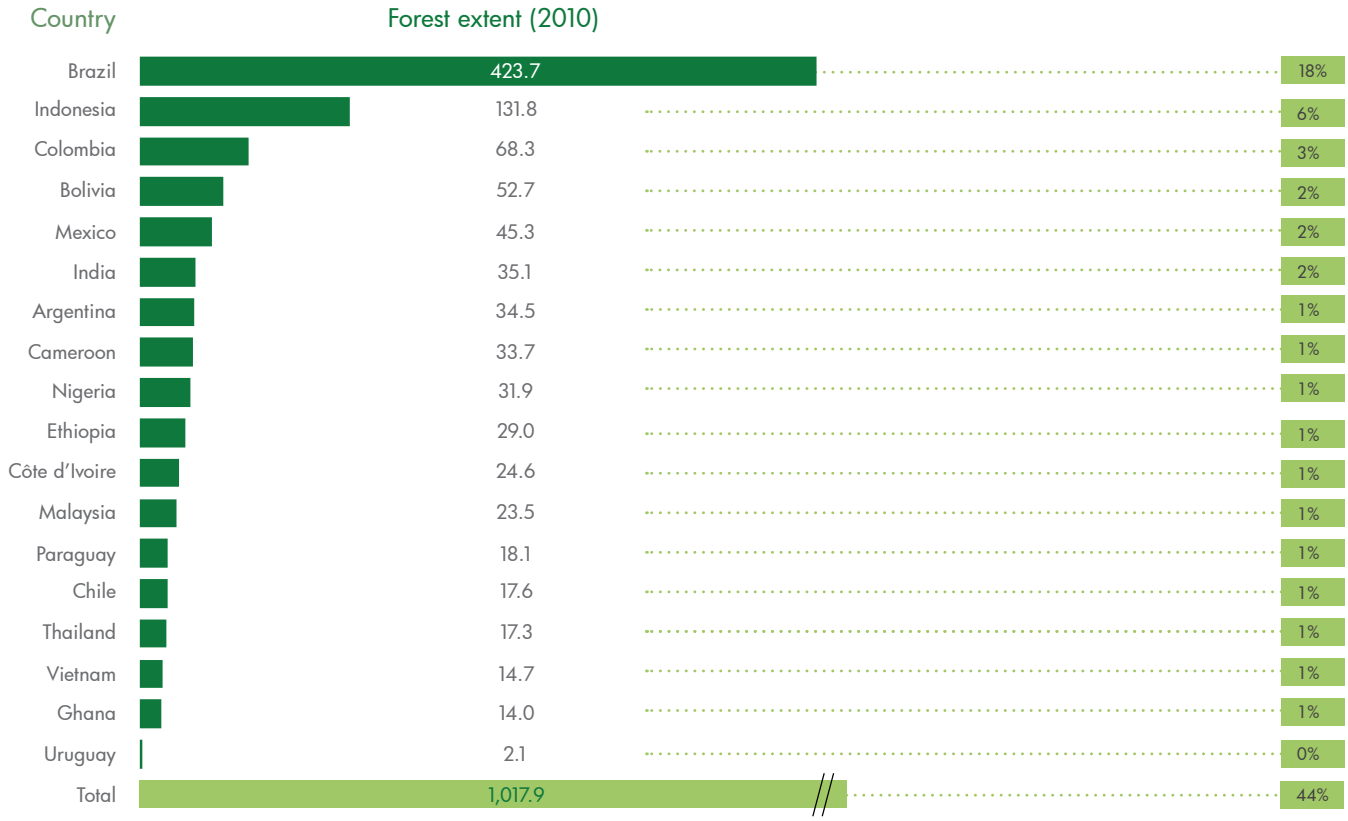
These countries are clearly important with regards to commodity production, in addition to deforestation. These countries also hold significant importance for the world's remaining stock of forests.

Up-to-date data of remaining forests across countries globally is not readily available but latest data (2010) on forest extent provided by the GFW suggests that the top 18 producing countries accounted for one third of global forest extent as

12 Espresso and Coffee guide, "Brazilian coffee beans". Available at: https://espressocoffee-guide.com/gourmet-coffee/coffees-of-the-americas/brazil-coffee

13 Not included, as the scope of analysis covers tropical forest countries only

Total forest[I] extent for the to 18 producing countries, 2010
Millions of hectare



I. For canopy cover greater than 10%;
II. These include South/Latin America, Asia and Pacific and Africa
SOURCE: Global Forest Watch Database; AlphaBeta analysis

EXHIBIT 7: FOREST EXTENT IN THE TOP 18 PRODUCING COUNTRIES ACCOUNTED FOR 44% OF TOTAL FOREST EXTENT IN AFRICA, APAC & LATAM IN 2010

well as 44 percent of forest extent across regions with tropical forests – Africa, Asia Pacific and Latin America (see EXHIBIT 7).[14]

Brazil and Indonesia alone accounted for more than 50 percent of total forests across the 18 top producing countries in 2010. To match the level of geographical granularity that would be informative for the procurement and sourcing departments of private sector companies to engage in action for sustainable production, the commodity production analysis was extended to sub-national regions. The top producing regions for the top five producing countries for each of the six commodities were identified by leveraging sub-national statistics databases, academic papers and other primary and secondary sources. Consistent with the country level findings, cattle and wood pulp have relatively dispersed production whereas the other four commodities show highly concentrated patterns of production, such that the top 10 regions account for 40 percent to around 65 percent of total production (see EXHIBIT 8). Bas-Sassandra (Cote d'Ivoire) alone accounts for around 14 percent of the world's cocoa production, which is almost as much as Indonesia's total cocoa production.

Similarly, Riau's (Indonesia) palm oil production is four times the amount produced by Thailand. The top two coffee producing regions, Minas Gerais and Espirito Santo (Brazil), supply more than one-fourth of the world's coffee beans, more than the combined coffee bean supply of Vietnam and Colombia. Mato Grosso's (Brazil) soybean supply

14 Global Forest Watch Dashboard [GFW]. Available at: https://www.globalforestwatch.org/dashboards/global

Global top 10 producing regions by commodity in 2016 (% of global production)[I]

COCOA		
1	Bas-Sassandra (CDI)	13.8%
2	Western (GHA)	11.5%
3	Gôh-Djiboua (CDI)	6.6%
4	Central Sulawesi (IDN)	3.0%
5	Sassandra Marahoue (CDI)	3.0%
6	Ashanti (GHA)	2.9%
7	South West (CMR)	2.8%
8	Southeast Sulawesi (IDN)	2.5%
9	South Sulawesi (IDN)	2.4%
10	Centre (CMR)	2.4%
Top 10 total		51.0%

CATTLE		
1	Mato Grosso (BRA)	2.1%
2	Minas Gerais (BRA)	1.7%
3	Mato Grosso do Sul (BRA)	1.6%
4	Goiás (BRA)	1.5%
5	Pará (BRA)	1.3%
6	Madhya Pradesh (IND)	1.3%
7	Uttar Pradesh (IND)	1.3%
8	Buenos Aires (ARG)	1.2%
9	West Bengal (IND)	1.1%
10	Maharashtra (IND)	1.0%
Top 10 total		14.1%

COFFEE		
1	Minas Gerais (BRA)	20.5%
2	Santo (BRA)	6.5%
3	Lam Dong (VNM)	4.4%
4	Dak Lak (VNM)	4.4%
5	Dak Nong (VNM)	3.3%
6	Oronomia (ETH)	3.1%
7	Sao Paulo (BRA)	3.0%
8	Gia Lai (VNM)	2.4%
9	SNNPR (ETH)	1.8%
10	Huila (COL)	1.4%
Top 10 total		50.8%

PALM OIL		
1	Riau (IDN)	12.6%
2	Sabah (MYS)	9.5%
3	North Sumatra (IDN)	8.5%
4	Sarawak (MYS)	6.1%
5	Central Kalimantan (IDN)	5.9%
6	Johor (MYS)	5.2%
7	South Sumatra (IDN)	5.1%
8	Pahang (MYS)	4.9%
9	West Kalimantan (IDN)	3.3%
10	Perak (MYS)	3.3%
Top 10 total		64.5%

SOYBEAN		
1	Mato Grosso (BRA)	8.1%
2	Córdoba (ARG)	5.1%
3	Rio Grande do Sul (BRA)	4.8%
4	Buenos Aires (ARG)	4.7%
5	Paraná (BRA)	4.3%
6	Santa Fe (ARG)	4.2%
7	Goiás (BRA)	2.8%
8	Madhya Pradesh (IND)	2.4%
9	Mato Grosso do Sul (BRA)	2.2%
10	Bahia (BRA)	1.4%
Top 10 total		40.0%

WOOD PULP[II]		
1	Riau (IDN)	2.3%
2	Bío-Bío (CHL)	2.0%
3	Gôh-Djiboua (CDI)	1.9%
4	São Paulo (BRA)	1.8%
5	Mato Grosso do Sul (BRA)	1.6%
6	Bahia (BRA)	1.6%
7	Santa Catarina (BRA)	1.0%
8	Jambi (IDN)	0.8%
9	Minas Gerais (BRA)	0.8%
10	Rio Grande do Sul (BRA)	0.6%
Top 10 total		14.3%

I. Within the top 5 producing countries for that commodity. Where 2016 sub-national data was not available or not reconcilable with FAO statistics, relative production shares of national totals were used.

II. Country-level wood pulp production data is from 2017.

SOURCE: FAO; National Statistics Offices and Ministry data; USDA; GCF; Press search; AlphaBeta analysis

EXHIBIT 8: **THE TOP 10 PRODUCING REGIONS (WITHIN THE TOP PRODUCING COUNTRIES) ACCOUNT FOR AROUND HALF OF GLOBAL PRODUCTION, EXCEPT CATTLE & WOOD PULP**

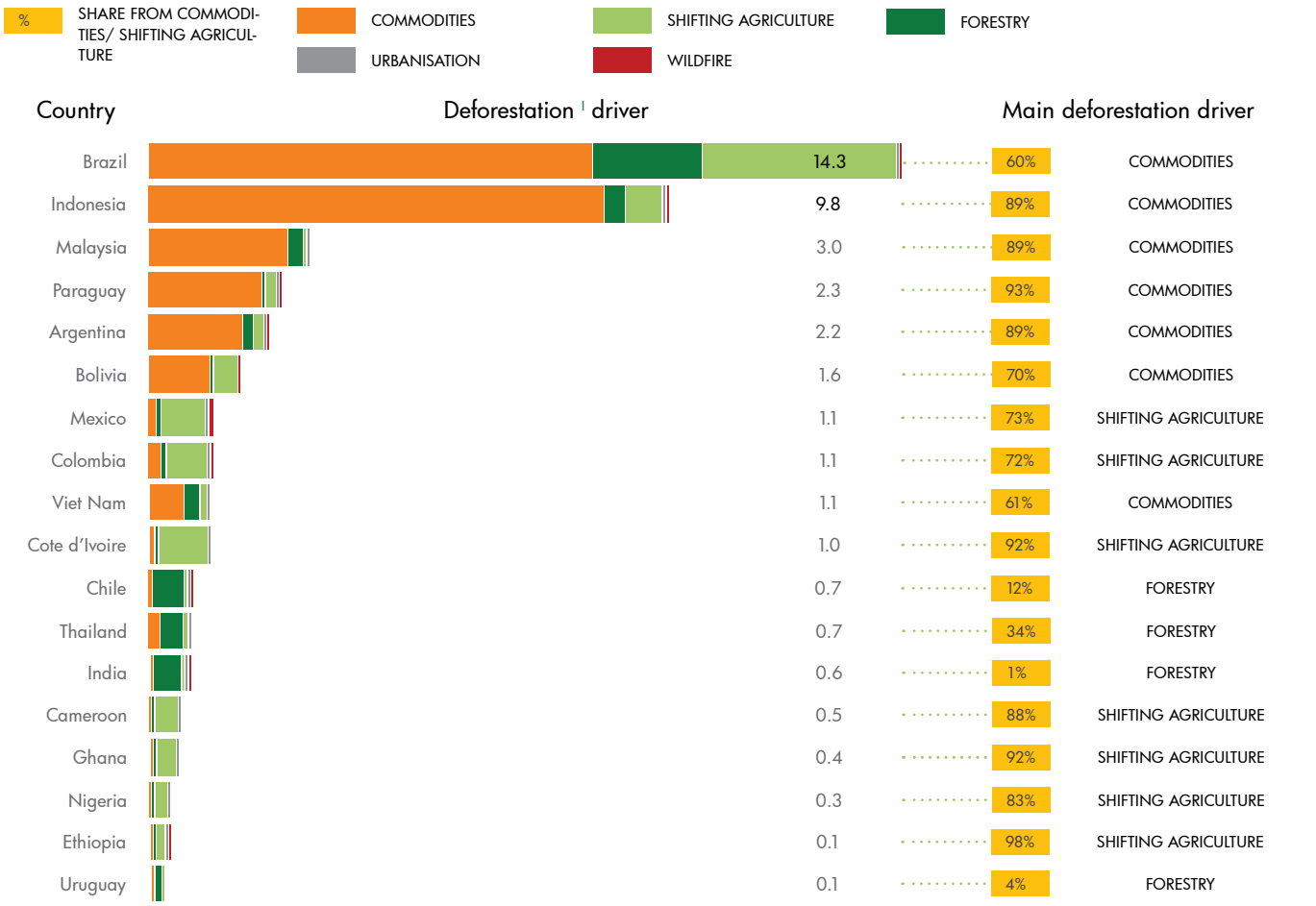
is greater than the soybean supply of India, Paraguay and Bolivia combined. Some key sub-national regions overlap across commodities, leading to a list of 47 top commodity producing regions. For example, Mato Grosso is a top producer of both soybean and cattle, and Riau is a top producer for both palm oil and wood pulp.

WITHIN THE TOP PRODUCING COUNTRIES, COMMODITY PRODUCTION IS THE PRIMARY DRIVER OF DEFORESTATION

In seven out of the 18 top producing countries, more than 50 percent of total national deforestation is linked to commodity production, in some cases reaching as high as 93 percent (see EXHIBIT 9). 60 percent of Brazil's deforestation, 89 percent of Indonesia and Malaysia's deforestation, and 93 percent of Paraguay's deforestation is linked to commodity production.

Additionally, it is also observed that the overall commodity-driven deforestation may have in fact been understated. For example,the share of commodity linked deforestation in many of the cocoa producing regions in Africa appears to be fairly low. This is due to the fact that cocoa linked deforestation is often classified under shifting agriculture

Top 18 regions for deforestation by driver from 2010-15, cumulative.
(Million hectares and %)



I. Deforestation is defined as loss of tree cover of canopy cover greater than 10

SOURCE: FAO; National Statistics Offices and Ministry data; USDA; GCF; Press search; GFW; AlphaBeta analysis

EXHIBIT 9: WITHIN THE TOP 18 PRODUCERS, DEFORESTATION IS PRIMARILY DRIVEN BY COMMODITY PRODUCTION IN 7 COUNTRIES AND BY SHIFTING AGRICULTURE IN 7 COUNTRIES

(as opposed to commodity-driven deforestation), due to the prevalence of small-scale farming practices in cocoa cultivation.[15] Globally, around 90 percent of cocoa is grown in small scale farms of 2 to 5 hectares and only five percent is cultivated in large farms of 40 hectares or more.[16]

In line with the objective of providing a more granular view of how commodity production is driving deforestation, the analysis was extended to the sub-national level. It is important to note that unlike for the national level data, due to limited data availability, data on deforestation by driver is likely to face issues of robustness if broken down at a sub-national level. On aggregate, higher commodity production is generally correlated with higher deforestation but there are outliers (see EXHIBIT 10). There are multiple reasons why this is could be the case. One is that individual regions may show more deforestation than the production of one commodity suggests because multiple commodities are grown in the region.

Unfortunately, the data available to us does not allow us to ascertain the proportion of deforestation driven by each commodity. Further, deviation from the correlation can be caused by non-forest-risk commodities having a larger impact in some

15 Based on one on interviews with GFW representatives.

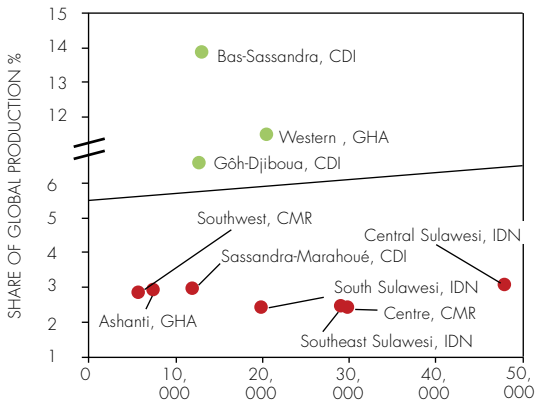
16 Make Chocolate fair, "Cocoa in a nutshell". Available at: https://makechocolatefair.org/issues/cocoa-production-nutshell

Global top 10 producing regions by commodity in 2016; Annual deforestation from 2010-17[II]

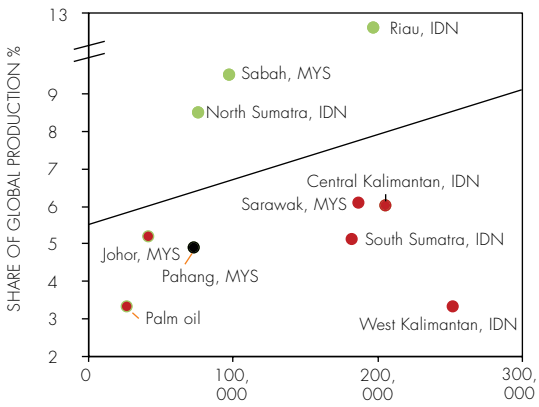
Regions with lower deforestation than expected given commodity production

Regions with higher deforestation than expected given commodity production

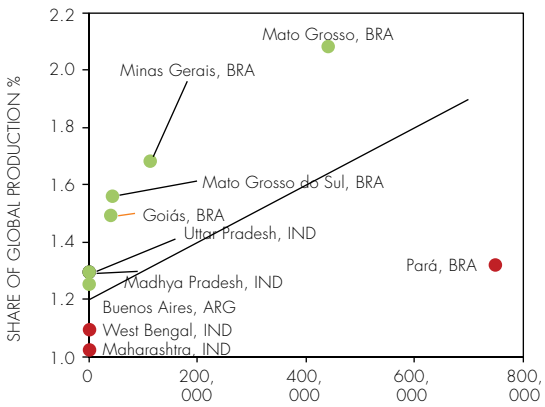
COCOA



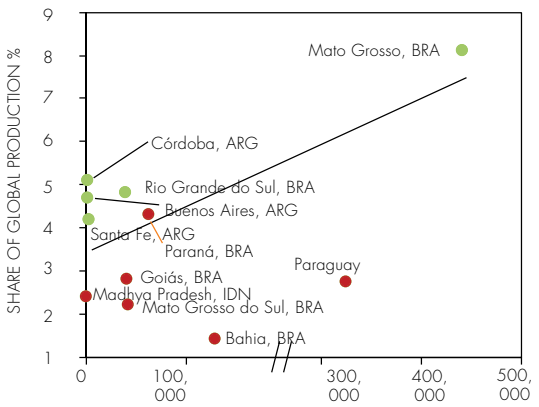
PALM OIL



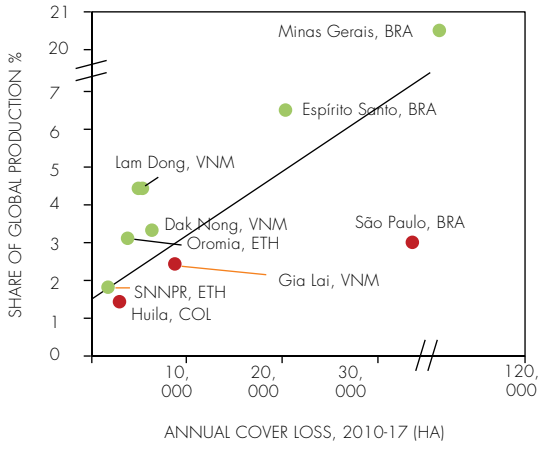
CATTLE



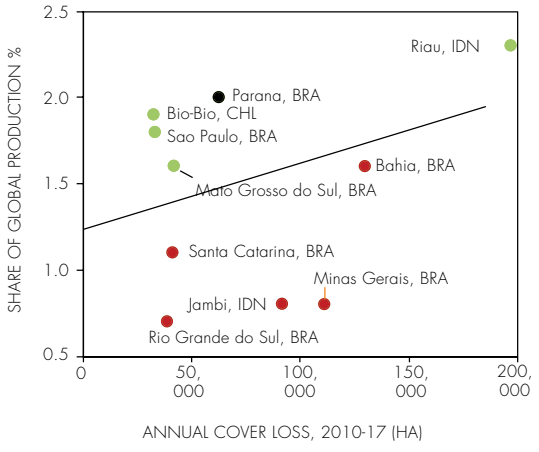
SOYBEAN



COFFEE



WOOD PULP

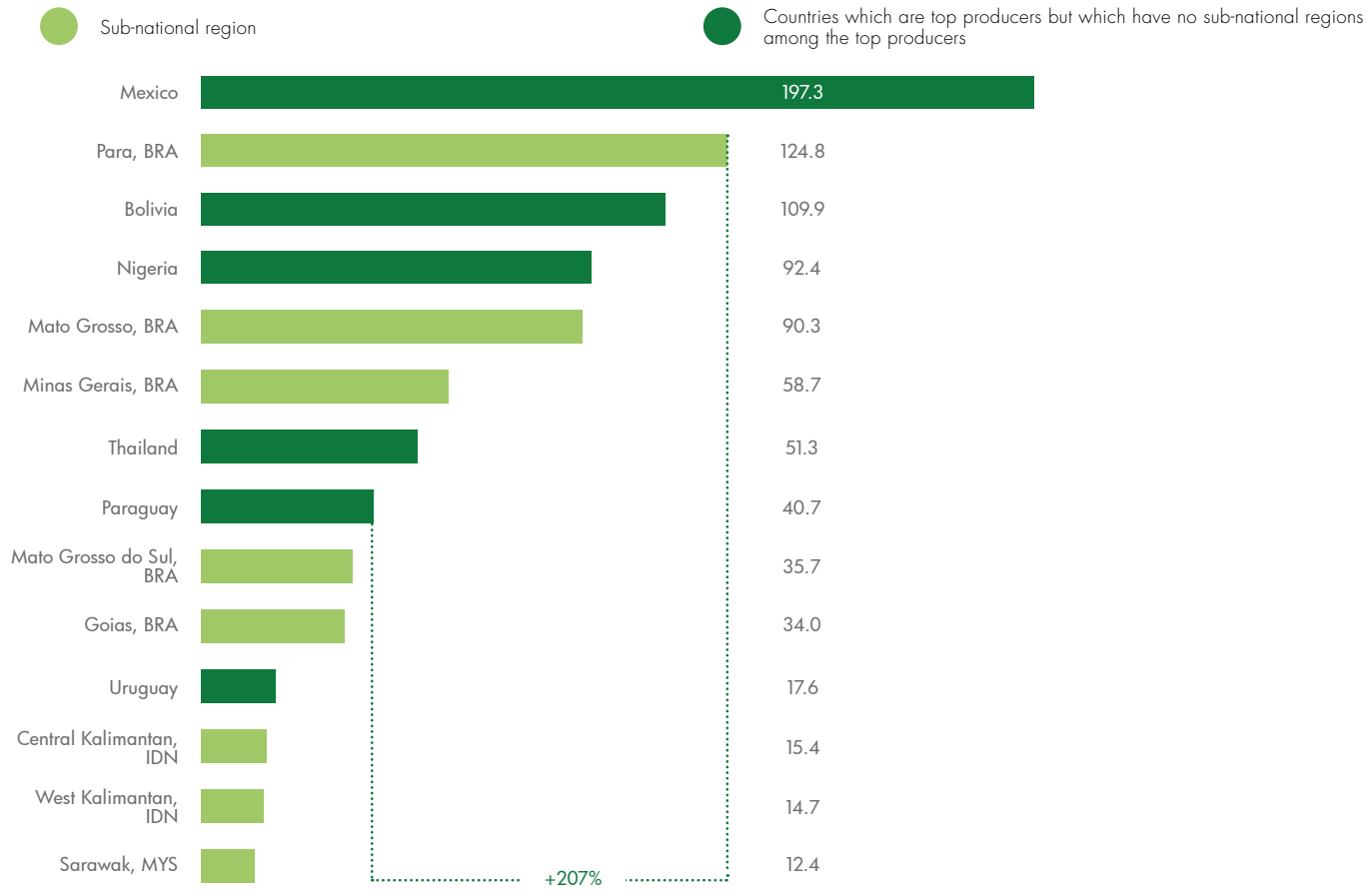


II. We define deforestation as area of tree cover lost for the one type of percent canopy cover occupying the largest land mass for each region; GFW data. Deforestation stats presented are for total deforestation, i.e. including, but not limited to commodity.

SOURCE: FAO; National Statistics Offices and Ministry data; USDA; GCF; Press search; GFW; AlphaBeta analysis

EXHIBIT 10: WHILE HIGHER COMMODITY PRODUCTION GENERALLY CORRELATES WITH HIGHER DEFORESTATION, THERE ARE EXCEPTIONS

Top commodity producing regions by geographical size
Millions of hectares



SOURCE: Literature review, GFW data; AlphaBeta analysis

EXHIBIT 11: THE SIZE OF COMMODITY PRODUCING REGIONS VARIES SIGNIFICANTLY – SOME STATES IN BRAZIL HAVE LARGER LAND MASS THAN ENTIRE COUNTRIES

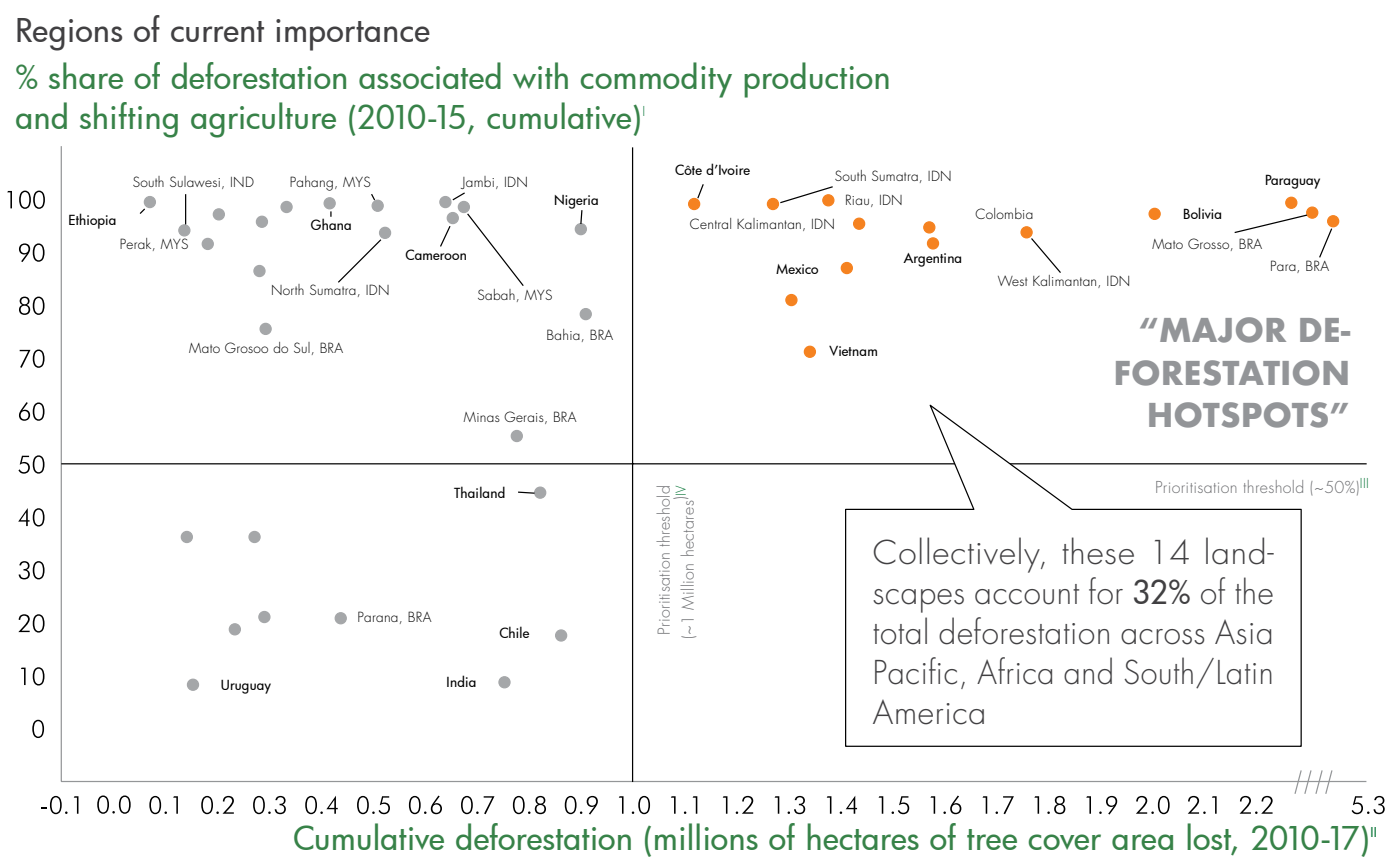
regions. On the flip side, regions may show less deforestation than production suggests because certain commodity production is already shifting to degraded land such as pasture land, rather than encroaching on forests.

OVER A DOZEN LANDSCAPES ARE OF PARTICULAR IMPORTANCE GIVEN COMMODITY PRODUCTION LEVELS AND DEFORESTATION DRIVEN BY COMMODITY PRODUCTION

In order to understand which of these top producing, and therefore likely private sector-relevant, landscapes may be most important from a commodity-driven perspective, it is necessary to consider both the total level of deforestation and the contribution that commodity production makes to deforestation rates. A key challenge arises, however, when looking at the list of top producing countries in terms of the respective size of countries. While Brazil and Indonesia dominate the list of contributors to total deforestation, this is largely due to their relative size.

The size of commodity producing regions within top producing countries can vary significantly, with some states in Brazil having larger land mass than whole countries (see EXHIBIT 11).

As a result, one can choose to disaggregate these larger countries into their top-producing sub-national regions. When analysing this new list of top producers according to the share of deforestation driven by commodities and cumulative



I. With regards to commodity-driven deforestation, the data is obtained at 10 x 10 kilometer grid and is thus not as robust or g ranular as the tree cover loss data; We have added the % share of deforestation driven by commodity production and shifting agriculture;

II. We define deforestation as area of tree cover lost for the one type of percent canopy cover occupying the largest land mass for each region; Deforestation stats presented on the x axis are for total deforestation, i.e. including, but not limited to commodity-driven deforestation;

III. The prioritisation threshold for the y axis is set at 50% to maintain a conservative approach, and only prioritise regions with more than 50% commodity-driven deforestation;

IV. The prioritisation threshold for the x axis was s elected basis the average of all data points on the chart SOURCE: GFW database; AlphaBeta analysis

EXHIBIT 12: 14 LANDSCAPES STAND OUT AS LARGE CONTRIBUTORS TO GLOBAL DEFORESTATION WHERE COMMODITY PRODUCTION AND SHIFTING AGRICULTURE APPEAR TO BE THE KEY DRIVERS

deforestation from 2010 to 17, over a dozen landscapes emerge as commodity-driven deforestation hotspots of potential relevance to private sector (see EXHIBIT 12).

Collectively, these 14 hotspots accounted for 32 percent of the total deforestation across Africa, Asia Pacific and Latin America between 2010 and 2017. Among them are well established landscapes such as Mato Grosso and Para in Brazil; West and Central Kalimantan, South Sumatra and Riau in Indonesia; Malaysia and Colombia.

However, the "commodity-first" approach also highlights a few countries that have received less attention to date such as Paraguay, Bolivia, Argentina, Vietnam, Mexico and Côte d'Ivoire. It therefore provides a complementary tool for civil society actors, alongside a range of other factors, to understand where they may want to focus their efforts, in particular if private sector engagement is crucial for success.

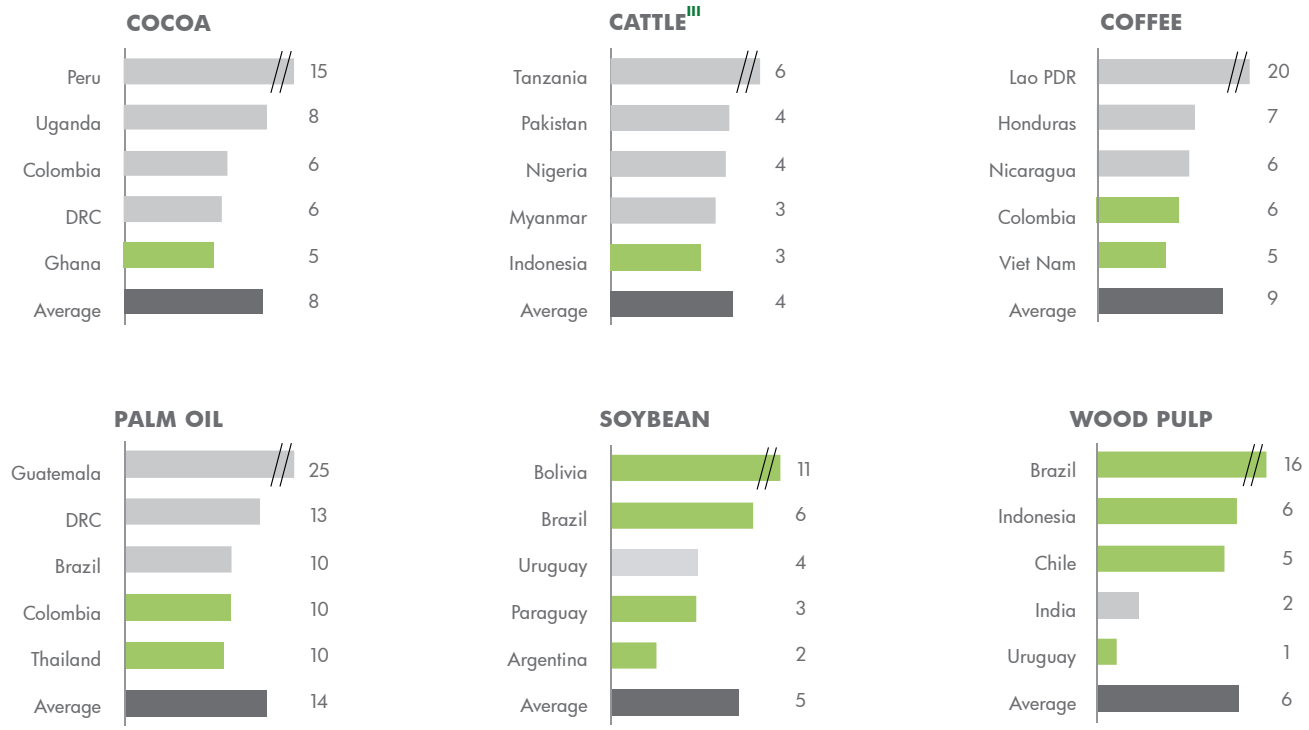
THERE ARE A HANDFUL OF EMERGING PRODUCERS THAT COULD REQUIRE PARTICULAR ATTENTION

While global production of these key commodities is relatively concentrated in certain geographies today, there are a handful of emerging producers that could require particular attention.

It is crucial to not only look at where deforestation is happening today, but also to try and understand where it is going and where the arising threats to

Top 5 fastest growing countries[I] with regards to production by commodity, globally (CAGR of production from 2010-16[II])

Overlap with current top producers



I. Includes TFA-relevant top commodity producing countries; key excluded countries include the USA, China, Canada, Japan, Finland and Russia.
II. Data for palm oil is for 2010-14 and for wood pulp is 2011-17

III. Due to lack of data, we are unable to distinguish between cattle production for dairy or beef production. It should be noted that the two types can require significantly different intervention approaches. SOURCE: FAO; AlphaBeta analysis

EXHIBIT 13: THE CURRENT TOP PRODUCERS OF DEFORESTATION-LINKED COMMODITIES MAY NOT BE THE FASTEST GROWING

forests may be in the future. To do so we looked at historical growth rates of production data provided by the FAO across tropical forest countries. The data shows that the fastest growing countries with regards to production of the six commodities differ from the current list of 18 top producing countries (see EXHIBIT 13).

However, there is some degree of overlap between the fastest growing countries and the countries with current largest volume of production, implying that these overlapping countries are likely to remain important in the future as well.

For example, four out of the five countries for soybean and wood pulp production are consistent across the two lists. There is less overlap for the

Top 5 producing countries by commodity, globally in 2030
(forecasted based on 2011-16 CAGR)[I]

2030 Rank	COCAO	2016 Rank
1	Ghana	2
2	Cote d'Ivoire	1
3	Peru	8
4	Indonesia	3
5	Cameroon	4

Peru could replace Nigeria

2030 Rank	CATTLE	2016 Rank
1	Brazil	2
2	India	1
3	Argentina	8
4	Mexico	3
5	Kenya	4

Kenya could replace Colombia

2030 Rank	COFFEE	2016 Rank
1	Brazil	1
2	Vietnam	2
3	Colombia[II]	3
4	Ethiopia	5
5	Honduras	6

Honduras could replace Indonesia

2030 Rank	PALM OIL	2016 Rank
1	Indonesia	1
2	Malaysia	2
3	Guatemala	8
4	Colombia	4
5	Thailand	3

Guatemala could replace Nigeria

2030 Rank	SOYBEAN	2016 Rank
1	Brazil	1
2	Argentina	2
3	India	3
4	Paraguay	4
5	Bolivia	5

2030 Rank	WOOD PULP	2016 Rank
1	Brazil	2
2	India	1
3	Indonesia	8
4	Chile	3
5	Uruguay	4

I. Wood pulp CAGR is from 2012-17;
II. Used 2014-16 CAGR to remove outliers.

SOURCE: FAO; AlphaBeta analysis

EXHIBIT 14: **WHILE FOR THE MOST PART THE TOP 5 LARGEST PRODUCING REGIONS ARE NOT EXPECTED TO CHANGE, SOME NEW COUNTRIES ARE ADDED TO THE LIST**

other commodities, for example, Ghana is the only overlapping country for cocoa production, Thailand and Colombia for palm oil production, and Vietnam and Colombia for coffee production. Further, many of the fastest growing regions are small in size. So, while major changes to the list of these key landscapes are unlikely, looking at the top 5 commodity producing countries in 2030 based on historical growth, one could see the emergence of some new top producers (See EXHIBIT 14).

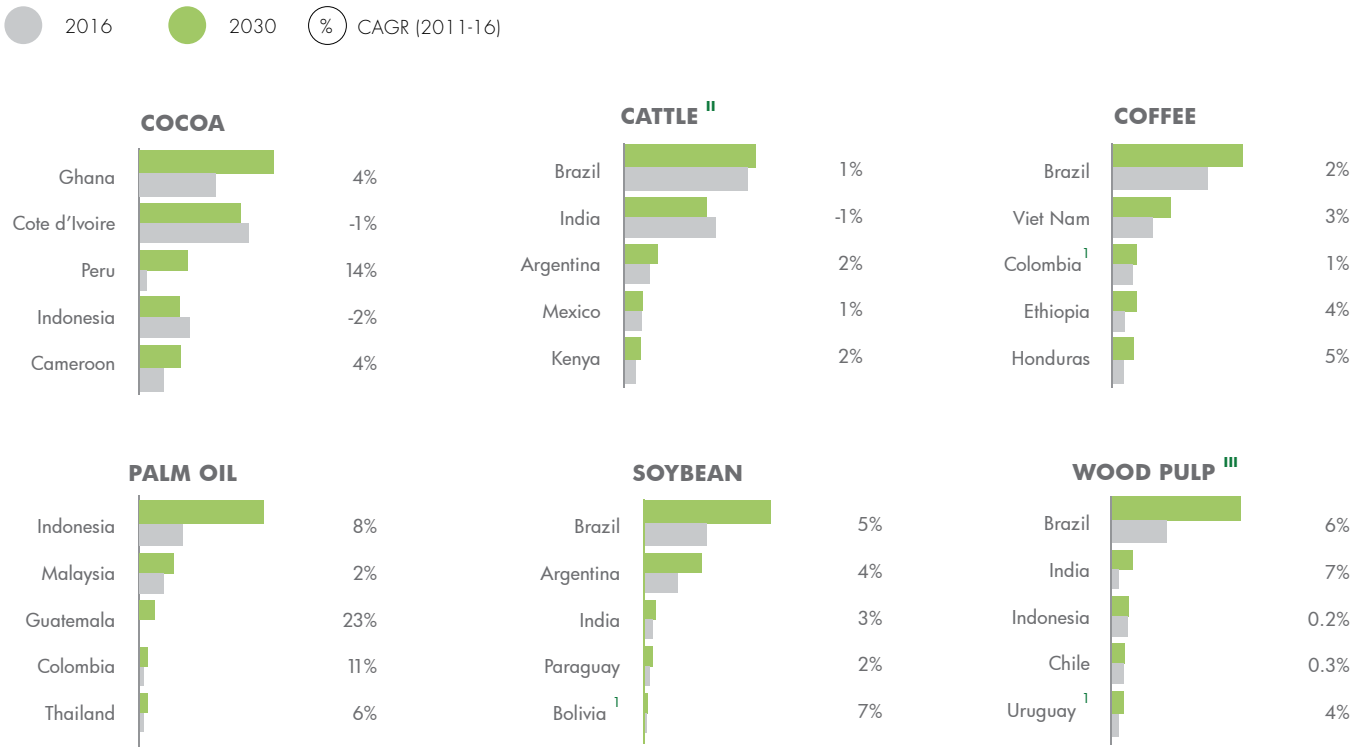
Peru could emerge to replace Nigeria for cocoa, Kenya to replace Colombia for cattle, and Honduras to replace Indonesia for coffee and Guatemala to replace Nigeria for palm oil. To understand how these emerging producer regions align with future forest-risk frontiers, some preliminary analysis was conducted leveraging data from the WWF, GFW and University of Maryland, however, these findings are too preliminary to be included here.

Looking at the relative volumes produced by these top producing countries today as compared to 2030, there is little change to the distribution of production (see EXHIBIT 15).

The exception is cocoa, where Ghana and Peru could possibly see very large increases to their share of production based on historic growth rates. In particular Peru, which is a relatively small producer of cocoa today as compared to the top 5 producers, is of key importance for deforestation today.

Top 5 producing countries by commodity, 2030 [I]

Relative scale (by commodity), measured in tonnes



I. Used 2014-16 CAGR to remove outliers; Wood pulp is 2015-17;
II. Cattle data is in terms of number of heads; VII. Wood pup is 2012-17, except for Uruguay refer to footnote 1;

III. Projected based on historical CAGR SOURCE: FAO; AlphaBeta analysis

EXHIBIT 15: PRODUCTION DISTRIBUTION AMONGST TOP FOREST-RISK COMMODITY PRODUCERS IS UNLIKELY TO SEE MAJOR CHANGES, WITH THE EXCEPTION OF COCOA

While not one of the top 5 producers currently, Peru's cumulative deforestation rates from 2010 to 17 added up to 1.5 million hectares with 77 percent of this being driven by shifting agriculture. Ranked on total deforestation this would place it just behind Bolivia and above Mexico and Colombia (see EXHIBIT 9).

It should be noted that many current top producing regions have experienced alarming rates of land conversion due to deforestation, and in some cases the degradation has reached a stage where forests cannot be utilised further, meaning historical production trends may no longer be able to be maintained. Hence, historical growth rates are not likely to be truly accurate predictors of future growth.

3. CATALYSING PRIVATE SECTOR ENGAGEMENT IN JURISDICTIONAL APPROACHES

The commodity-first approach aims to understand the issue of deforestation from a private sector-relevant lens that specifically focuses on commodity production levels, regardless of the presence of jurisdictional approaches.

A key challenge is that jurisdictional approaches are often driven by civil society and do not necessarily align with private sector-relevant landscapes. This also largely holds true for the landscapes identified through a commodity first approach. Of ~95 currently active jurisdictional approaches, only 19 are in the top commodity producing regions. For some commodities, such as soybean, up to 90 percent of top producing regions do not have active jurisdictional approaches.

Consistent with this commodity-first approach, TFA is starting to work with its partners to accelerate progress specifically in the producing regions most relevant to the business community, in particular members of the Consumer Goods Forum (CGF).

17 Earth Innovation Institute [EII] Website. Available at: https://earthinnovation.org/2015/12/mato-grosso-produce-conserve-include-3/

18 Global Climate Force Task Force Database [GCF]. Available at: http://www.gcftask-force-database.org/StateOverview/brazil.para

19 Global Climate Force Task Force Database [GCF]. Available at: http://www.gcftask-force-database.org/StateOverview/Indonesia.west_kalimantan

20 BioCarbon Fund programme details. Available at: https://www.biocarbonfund-isfl.org/isfl-indonesia-program-jambi-province

21 Roundtable on Sustainable Palm Oil [RSPO] (2017), "Impact update report". Available at: https://rspo.org/toc/RSPO-Impact-Update-Report-2017_221117.pdf

Chapters 1 and 2 aim to address the question of "where" there may be a case for private sector firms to increase their engagement in promoting sustainable commodity production at jurisdictional scale. However, an equally important question is to understand "how" companies may engage in these regions. Ideally, there exist active jurisdictional approaches that can be leveraged to help private sector beyond their own supply chain, but in some regions the emphasis may be more around what private sector can do to catalyse the formation of jurisdictional approaches to drive change.

A CURRENT LACK OF JURISDICTIONAL APPROACHES IN LANDSCAPES RELEVANT FROM A COMMODITY-FIRST PERSPECTIVE COULD BE A CHALLENGE FOR PRIVATE SECTOR ENGAGEMENT

Private companies can choose to engage in a region independently through traditional action in their own supply chains (e.g. preferential sourcing), partnerships, or jurisdictional approaches. In particular, jurisdictional approaches are considered crucial for tackling deforestation.

First, they can help to mainstream sustainability in the forest regions, as opposed to creating "an oasis of green in a desert of deforestation" where sustainability efforts are undermined by leakage from continued deforestation elsewhere. Second, jurisdictional approaches have the greatest potential for long-term impact by seeking to reconcile competing social, economic, and environmental objectives. By engaging local institutions, it also maximises the likelihood that policy procedures and governance will be directed towards a long-term solution.

Finally, jurisdictional approaches provide the opportunity to create replicable examples of success to inspire change elsewhere, helping to scale up potential impact. However, as mentioned in the Introduction, a key challenge with jurisdictional approaches is that business cases for private sector engagement have yet to be fully developed. Thus, the strong overlap with private sector relevance is key to catalyse private sector engagement in jurisdictional approaches.

BOX 2
ACTIVE JURISDICTIONAL APPROACHES

There are 8 overlapping regions that are relevant to the private sector and have active jurisdictional approaches.

Mato Grosso and Para in Brazil, West Kalimantan and Jambi in Indonesia and Sabah in Malaysia have jurisdictional frameworks in place and have started implementing initiatives. For example, Mato Grosso's Governor launched the Produce, Conserve and Include strategy in 2015, which was presented in COP 21. The strategy aims to integrate existing policies and build on prior success to reduce deforestation. It also provides incentives for farmers and local governments to encourage sustainable land use.[17] In Para, the regional government launched a public-private partnership, the Green Municipalities programme, to combat deforestation in the state and strengthen sustainable rural production through strategic environmental and other goals.[18]

IDH – The Sustainable Trade Initiative launched the Production, Protection and Inclusion (PPI) Compact in West Kalimantan. It is an agreement between public, private, community, and civil society stakeholders to enhance the sustainability and productivity of land.[19] The BioCarbon fund launched a landscape approach in Jambi to improve landscape management and reduce emissions, while promoting alternative livelihoods and engaging more effectively with the private sector to enhance productivity.[20] Sabah's state government has committed to the jurisdiction-wide certification of palm oil for sustainable sourcing according to the standards set by the Roundtable on Sustainable Palm Oil (RSPO).[21]

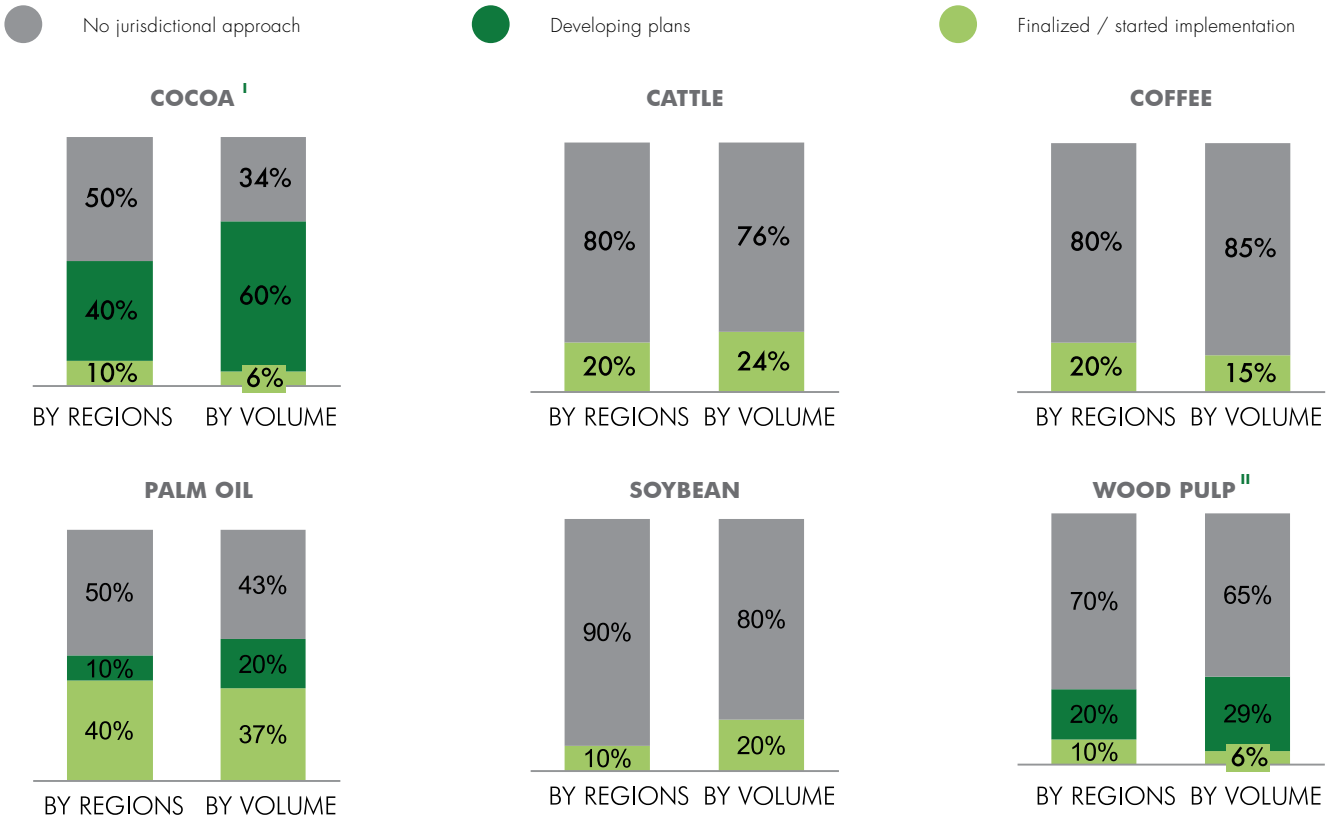
Other jurisdictional approaches are still in the pilot phase. For example, in South Sumatra, the Musi Banyuasin district is working towards RSPO certification as a pilot under the jurisdictional certification process by 2020.[22] Similarly, in Central Kalimantan, the government has committed to developing a jurisdictional approach for sustainable production of palm oil. A pilot initiative for the Seruyan district was launched to ensure for sustainable production according to RSPO certification.[23] LTKL (The Green Regency Initiative) is being developed in the Siak district of Riau. The key goals include protecting conservation areas, tree planting programmes, building on existing initiatives around RSPO. However, the concept is still in the development phase and the initiative is expected to grow into a larger jurisdiction approach.[24]

22 The Sustainable Trade Initiative [IDH] (2017), Indonesia Landscape Factsheet. Available at: https://www.idhsustainabletrade.com/uploaded/2018/01/Indonesia-Factsheet-small-updated-07112017.pdf

23 Roundtable on Sustainable Palm Oil (2015), "Central Kalimantan Announces Jurisdictional Certification for Sustainable Palm Oil". Available at: https://www.rspo.org/news-and-events/news/central-kalimantan-announces-jurisdictional-certification-for-sustainable-palm-oil

24 Rainforest Alliance (2016), "Implementation of Musim Mas Sustainable Palm Oil Policy". Available at: https://www.rainforest-alliance.org/business/wp-content/uploads/2018/10/2016-Diagnostic-Report-on-Riau-20Oct17.pdf

Presence of jurisdictional approach by top producing regions and their volume of production; Percent



I. Within the cocoa producing regions: For Cote d'Ivoire, the jurisdictional approach is for 5 district-level regions, of which 3 fall under Bas-Sassandra; In Ghana, the jurisdictional Ghana Cocoa Forest REDD+ Programme covers 5 regions of which 2 are Western and Ashanti; In Cameroon, the jurisdiction emission reduction program in South Cameroon is spread across 7 departments, 2 of which fall within the Centre province

II. .Within the wood pulp producing regions: Chile's jurisdiction emission reduction program is for 5 disricts, one of which is Bio-Bio.

SOURCE: FAO; National Statistics Offices and Ministry data; USDA; GCF; Press search; GFW; AlphaBeta analysis

EXHIBIT 16: FOR SOME COMMODITIES, UP TO 90% OF TOP PRODUCING REGIONS DO NOT HAVE JURISDICTIONAL APPROACHES IN PLACE

Combining the review of existing literature on jurisdictional approaches with the top commodity producing regions, it is observed that there is a disconnect between regions with existing jurisdictional approaches and regions that are relevant to the private sector. Exhibit 16 maps out the jurisdictional approaches for the top producing regions by commodity. The two bar charts for each commodity reflect the presence and status of jurisdictional approaches for the top producing regions by number of regions and by volume of production. For some commodities, such as soybean, up to 90 percent of top producing regions do not have active jurisdictional approaches. For others such as cattle and coffee this number is 80 percent, 70 percent for wood pulp and 50 percent for cocoa and palm oil. Further, of ~95 currently active jurisdictional approaches identified by reviewing the key literature, only 19 are in the top commodity producing regions, and another 2 are in the fastest growing commodity producing regions (see EXHIBIT 17). Details of some active jurisdictional approaches are presented in Box 2. It is thus important to accelerate private sector engagement in overlapping regions (i.e. those that are relevant to private sector with active jurisdictional approaches); this can entail increasing private sector participation in regions with mature and helping develop the plans in regions with less mature jurisdictional approaches. Additionally, it will also be beneficial to engage relevant civil society parties to develop jurisdictional approaches in private sector-relevant regions without an active jurisdictional approach.

TOP COMMODITY PRODUCING REGIONS WITH JURISDICTIONAL APPROACHES

- Bas-Sasandra, CDI (Belier, Wider Tai forest, Gbokle, Nawa, San Pedro)
- Centre, CMR (Nyong et So'o Nyong et Mfoumou)
- Ashanti, GHA
- Brong Ahafo, GHA
- Central Kalimantan, IDN
- West Kalimantan, IDN
- Jambi, IDN
- Riau, IDN
- Papua, IDN
- South Sumatra, IDN
- Central Highlands, VNM (Includes Dak Lak, Dak Nong, Lam Dong)
- Mato Grosso, BRA
- Para, BRA
- Bio-Bio, CHL

I. Based on review of IDH Sustainable trade landscape, Forest carbon partnership and Government Climate Force task.

II. 2. Several of the 9 jurisdictional approaches in Africa operate at a district level for Bas-Sassandra and Central region in Cameroon and are therefore distributed across 4 top commodity producing regions, only.

SOURCE: Literature review; AlphaBeta analysis

EXHIBIT 17: OF ~95 CURRENTLY ACTIVE JURISDICTIONAL APPROACHES, ONLY 20 ARE IN THE TOP COMMODITY PRODUCING REGIONS

TFA IS STARTING TO WORK CLOSELY WITH ITS PARTNERS IN THE JURISDICTIONS MOST RELEVANT TO COMMODITY SUPPLY CHAINS TO CATALYSE TRANSFORMATION AT SCALE

The TFA exists to serve the broader forests and commodities community and to encourage collective over individual action. The TFA's objective for jurisdictional leadership is to catalyse deeper private sector engagement in key jurisdictions, with the ultimate goal of realising land use transformation at scale and to spur more sustainable investment in landscapes globally. At the global level, TFA and its partners will raise awareness of jurisdictional approaches in the business community, build a coalition of the willing, and identify effective pathways for private sector engagement at jurisdictional scale. At the local level, TFA and partners will mobilise collaborative action in select jurisdictions. Based on input from the broader community (in particular TFA Regional Committees) and supported by the findings of this study, TFA has begun identifying jurisdictions where the Alliance has the greatest potential for reducing commodity-driven deforestation in the near term. The commodity-first approach therefore serves as one - but is by no means the only - approach for this identification process.

However, by homing in on jurisdictions that are critical commodity production landscapes while ensuring there is existing interest and support from government and business – the first of which include Mato Grosso and Riau – TFA seeks to identify pathways for replication at the local and global level. In the yet to be selected flagship jurisdictions, TFA intends to use its position as a neutral platform hosted by the World Economic Forum to serve as a catalytic convener to accelerate progress and to crowd in the support from the broader forest and commodities community. By convening key stakeholders, mapping existing efforts, identifying gaps and creating space for best practice sharing across jurisdictions, the TFA seeks to catalyse collaboration, support partnerships and bring in new actors to realise transformation at scale.

APPENDIX: DATA SOURCES, METHODOLOGY AND KEY CHALLENGES

The research uses a commodity-first approach by identifying key current production areas for six selected forest-risk commodities – cocoa, cattle, coffee, palm oil, soybean and wood pulp – within tropical forest geographies. The approach then establishes deforestation levels and jurisdictional activity in these areas.

In addition to taking a commodity-first approach, this research also consolidates findings from different sub-fields by reviewing and combining insights from the wealth of jurisdictional studies available, and leverages the latest advances in deforestation data collection. The appendix is divided into four sections - data sources, methodology, key challenges and solutions, and jurisdictional approaches.

DATA SOURCES

Different sources of data were leveraged to develop the commodity-first approach. The table below lists detailed sources for all data points used in the analysis:

DATA	RELEVANT CHAPTERS	METRICS	SOURCES
STEP 1: National level commodity production	Chapter 2	Percent of total global commodity production (2016)[25]	Food and Agricultural Organisation (FAO) statistics database[26]
STEP 2: Sub-national level commodity production	Chapter 2	Percent of total global commodity production (2016)[27]	National Statistics Office database and yearbooks, USDA, TRASE, Commodity cooperative statistics, Commodity specific research papers, and other press search[28]
STEP 3: Drivers of deforestation	Chapter 2	Hectares of deforestation by driver of deforestation at a national and sub-national level: commodity-driven deforestation, forestry, shifting agriculture, urbanisation and wildfire (2010-15)	Global Forest Watch dashboard[29]
STEP 4: Deforestation levels	Chapter 2	Cumulative loss of forest in hectares for sub-national regions (2010-17)	Global Forest Watch dashboard[30]

25 Wood pulp data is for 2017

26 FAO data. Available at: http://www.fao.org/faostat/en/#data

27 Wood pulp data is for 2017

28 Detailed sources available upon request.

29 Global Forest Watch Dashboard – However, this data is only available at a national level online, for sub-national level data, the AlphaBeta team liaised with GFW experts to obtain raw data. National level data available at: https://www.globalforestwatch.org/dashboards/global

30 Global Forest Watch Dashboard. Available at: https://www.globalforestwatch.org/dashboards/global

METHODOLOGY

Top commodity producing sub-national regions for each of the six forest-risk commodities were identified. These regions were then tested for commodity-driven deforestation and absolute deforestation levels to identify top commodity-driven deforestation hotspots.

STEP 1: NATIONAL LEVEL COMMODITY PRODUCTION.

The first step involved identifying major national commodity sourcing locations for forest-risk commodities - cocoa, cattle, coffee, palm oil, soybean and wood pulp using the FAO database. The latest available data was then filtered to include only tropical forest relevant countries. "Tropical forest relevant" countries were defined as countries in Africa, Asia Pacific (with the key exceptions of East and Central Asia as well as Australia) and Latin America.[31] The top five tropical forest producing countries were then identified for each of the six commodities, leading to a list of 18 countries (there were some overlaps across commodities).

STEP 2: SUB-NATIONAL LEVEL COMMODITY PRODUCTION

As a next step, for the five top producing tropical forest countries by commodity identified in Step 1, major sub-national production regions were identified at the first level of administration (i.e. state or province, depending on country). Unlike national production, this sub-national production data was not available through a single source or platform. Hence, data gathering required leveraging other secondary data sources for each individual country-commodity combination. In order to maintain consistency, the latest proportional split at a sub-national level was applied to the country totals from FAO (Step 1).

This subnational split for each country-commodity combination was then multiplied with the country's share of global production to derive top 10 sub-national regions at a global level for each commodity. The list across the six commodities consisted of 47 sub-national regions, due to regional overlaps with regards to commodity production.

31 For definitions of Africa, Asia Pacific and Latin America we follow Country Classifications by the UN.

As explained in Chapter 2, due to the relatively large sizes of Brazil and Indonesia as compared to other countries in the sample, the observations for these countries were replaced with their top producing regions. For Brazil these were 11 regions and for Indonesia these were 9 regions (see Exhibit 8).

STEP 3: DRIVERS OF DEFORESTATION.

For these 16 national and 20 sub-national landscapes, the deforestation drivers were determined using Global Forest Watch's database (GFW). As the first step, sub-national producers identified in Step 2 were standardised to the nomenclature used by GFW. Second, for each of the 36 landscapes, drivers of deforestation were determined.

The drivers included the amount of forest loss (in hectares) associated with commodity-driven deforestation, shifting agriculture, forestry, wildfire and urbanisation from 2010-15. Regions with a share of commodity-driven deforestation greater than 50 percent of total deforestation were identified as regions with commodity-driven deforestation.

STEP 4: DEFORESTATION LEVELS.

Cumulative loss of forests (in hectares) from 2010-17 for the 36 landscapes was identified using Global Forest Watch's database (GFW). The data is available on a year-on-year basis for different levels of canopy cover (>10 percent, >15 percent, >20 percent, >25 percent, >30 percent, >50 percent, >75 percent). As the first step, the data was manipulated to categorise the different levels of forest cover as low, medium and high.

Forests with 10 percent to 25 percent canopy cover, were termed as low forest cover, 25 percent to 50 percent were termed as medium forest cover and greater that 50 percent were termed as high forest cover. In order to control for annual variation, the loss of forest data was then combined from 2010 to 2017 for each forest cover category to represent cumulative loss. Next, the

dominant forest cover (low, medium or high) for each region was determined. This dominant forest cover was also taken as the relevant forest cover for each region.

All deforestation results presented used the dominant forest cover relevant for the particular region. This was to ensure that analysis was conducted on majority of the landscape's forest, irrespective of type of forests.

Conclusion: Identifying commodity-driven deforestation hotspots. The 36 landscapes were then mapped against two key criteria, share of commodity-driven deforestation (Step 3) and cumulative loss of forest from 2010-17 (Step 4). The regions that were in the top right quadrant of **EXHIBIT 12** (Chapter 2) were classified as commodity-driven deforestation hotspots. This comprised a list of 14 regions, where the share of commodity-driven deforestation (y axis) is higher than 50 percent, and the cumulative loss of forests from 2010-17 (x axis) is more than the priority threshold. This priority threshold was selected basis the first natural gap in the sub-national data.

KEY CHALLENGES AND SOLUTIONS

While the analysis provides a list of commodity-deforestation hotspots to engage in, this list is indicative and non-exhaustive. This section provides details of key challenges related to data and methodology, as well as potential solutions for each. Below is an overview of the key data related challenges:

- The dataset does not include remaining forest cover. Due to lack of data availability, the analysis is only restricted to cumulative loss of forests and does not include insights on remaining forest cover, which could be a powerful data point in determining key priority regions.

Understanding the remaining forest cover across regions could further refine the top deforestation hotspots. To this end, an on-going study by the University of Maryland aims to understand primary forest cover and remaining forests for some key tropical forest countries.[32] When published, the data from this research could be used to understand remaining forest cover for the sub-national commodity producing regions.

32 Environment Research Letters (2018), Ongoing primary forest loss in Brazil, Democratic Republic of the Congo, and Indonesia. Available at: https://iopscience.iop.org/article/10.1088/1748-9326/aacd1c/pdf

- The dataset has some limitations in terms of robustness and granularity. While the different datasets used are good indicators of commodity production, forest loss and commodity driven deforestation, they have their limitations in terms of robustness and granularity.

The tree cover loss data uses Landsat satellite images to map annual tree cover loss at a 30 × 30 metre resolution. While the measurement grid is fairly granular, the definition of "tree-cover loss" does not directly translate into "deforestation". Hence the use of the term "deforestation" should be viewed with caution. Tree cover loss includes change in both natural and planted forest and is not restricted to human drivers only. With regards to drivers of deforestation, the data is obtained at 10 x 10 kilometre grid and is thus not as robust or granular as the tree cover loss data. The findings from this commodity driven data are thus only indicative and not definitive. Additionally, much of the commodity-related deforestation that exists in Africa was classified as shifting agriculture and forestry.[33] Hence, it is important to note that while the data presented by the different sources are extremely valuable, it needs to be interpreted with caution and validated with on-ground experiences.

Besides data related challenges, there are some limitations to the current methodology, explained below:

- Lack of a fully sub-national lens. As private sector companies are likely to source at a sub-national level, the granularity of the analysis provided may not be sufficient for some stakeholders. While the robustness of data is a key concern when moving to a sub-national level, the analysis outlined above can be replicated at a sub-national level across the 47 top producing regions outlined in **EXHIBIT 8** in Chapter 2. **EXHIBIT 18** shows the results of this analysis.

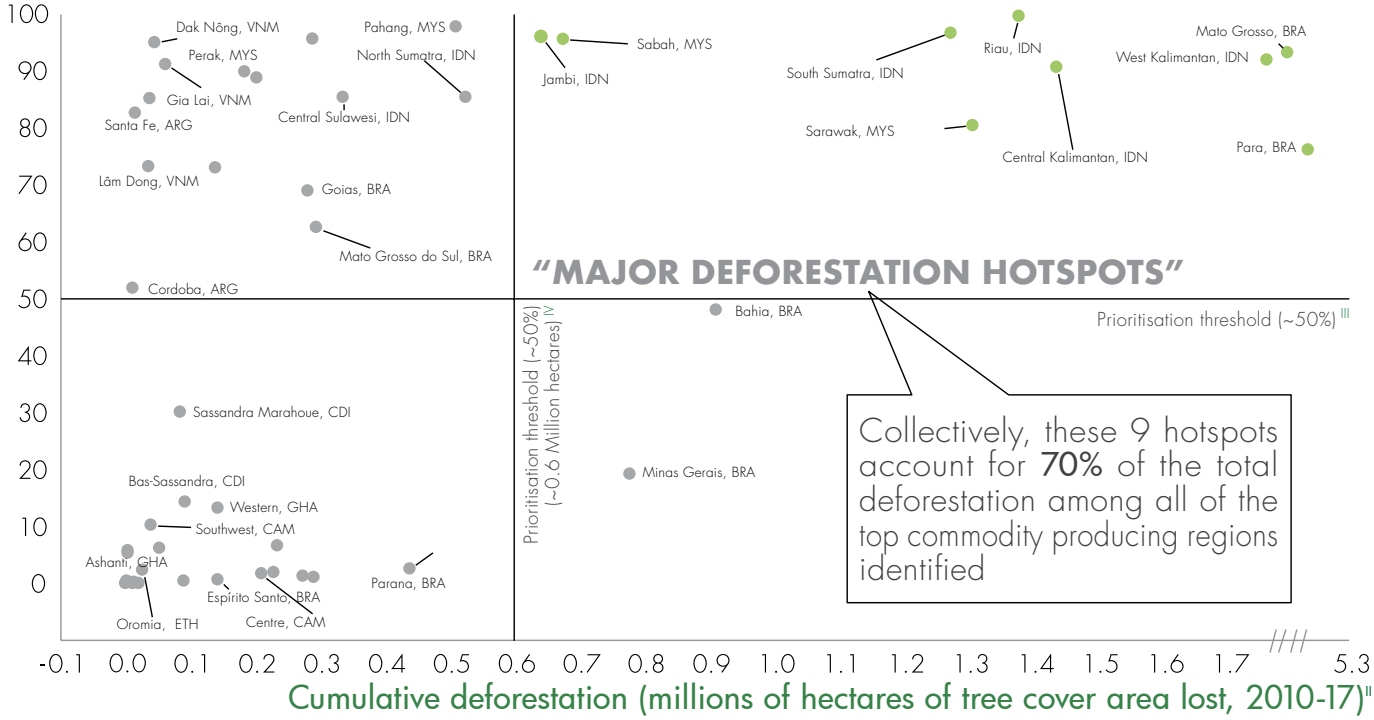
- Larger countries and sub-national regions are prioritised, and the analysis may not include smaller countries and regions with increasing deforestation. First, smaller sub-national regions with increasing deforestation often get overshadowed by the larger regions. Out of the identified

33 GFW expert

Regions of current importance

Potential priority regions

Commodity driven deforestation at a sub-national level (2010-15, cumulative)[I]



I. With regards to commodity-driven deforestation, the data is obtained at 10 x 10 kilometer grid and is thus not as robust or granular as the tree cover loss data;

II. We define deforestation as area of tree cover lost for the one type of percent canopy cover occupying the largest land mass for each region; Deforestation stats presented on the x axis are for total deforestation, i.e. including, but not limited to commodity-driven deforestation;

III. The prioritisation threshold for the y axis is set at 50% to maintain a conservative approach, and only prioritise regions with more than 50% commodity-driven deforestation;

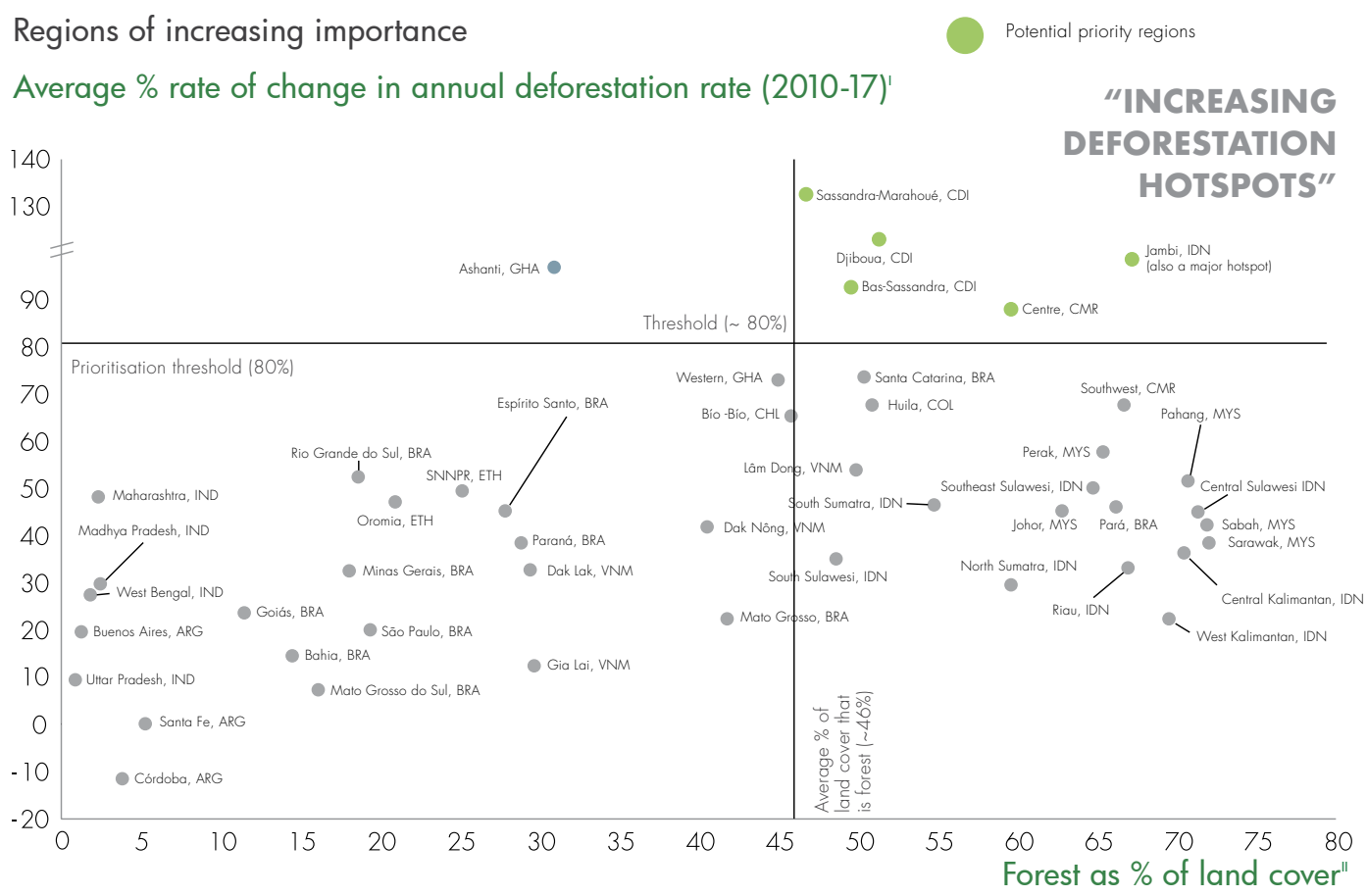
IV. The prioritisation threshold for the x axis was selected basis the first natural gap in the sub-national data

SOURCE: GFW database; AlphaBeta analysis

EXHIBIT 18: AT A SUB-NATIONAL LEVEL, 9 REGIONS STAND OUT AS LARGE CONTRIBUTORS TO GLOBAL DEFORESTATION WHERE COMMODITY PRODUCTION APPEARS TO BE THE KEY DRIVER

18 top producing countries (identified in Step 1), six countries – Bolivia, Mexico, Nigeria, Paraguay, Thailand and Uruguay – are not represented amongst the top producing sub-national regions. To address this shortcoming, the largest countries, Brazil and Indonesia, were broken down into their top producing regions to offer a fairer comparison. Second, some key regions with relatively lower levels of deforestation but rapidly increasing absolute tree cover loss, are not covered under the current analysis. One possible solution would be to identify "increasing deforestation hotspots" (see EXHIBIT 19). This refers to smaller regions with increasing deforestation. A size agnostic prioritisation can be conducted, analysing rate of increase of deforestation and remaining forest cover. However, as discussed under key data related challenges, the data for remaining forest cover is not available and instead, forest extent as a percentage of total land area can be used as a proxy for remaining forest cover. However, it is important to note, that the latest available data for forest extent is for 2010.

- The research does not include an assessment of future deforestation hotspots. The scope of the analysis is limited to current deforestation hotspots only and does not identify regions which are likely to become important in the



I. Represents the average of the year-on-year change in percentage terms in deforestation from 2010 to 2017. Deforestation stats presented are for total deforestation, i.e. including, but not limited to commodity-driven deforestation;

II. Represents the forest extent as a percentage of total land area.

SOURCE: Literature review; AlphaBeta analysis

EXHIBIT 19: AMONG THE CURRENT TOP PRODUCING COUNTRIES, CERTAIN REGIONS STAND OUT IN TERMS OF INCREASING DEFORESTATION

future, in terms of commodity production and deforestation. While there are several efforts by a variety of organisations looking at this issue, one method to address this challenge could be to identify "future deforestation hotspots" by leveraging the information on fastest growing commodity producing countries (see EXHIBIT 13 in Chapter 2).

For these countries, sub-national producing regions can be identified using the same method as Step 2 in the current analysis. These sub-national regions could then be compared with the long-list of emerging deforestation hotspots and high future risk landscapes identified by WWF deforestation fronts, GFW 'Places to watch', University of Maryland database, to name a few.[34]

- The methodology focuses only on the impact of deforestation in terms of size and several other factors such as the quality of forest lost are not considered. Some other key factors determining how important or high-quality forests lost are deemed are not considered in the prioritisation exercise, for example, carbon stocks, existing biodiversity and vegetation, quality of forest cover.

Similarly, the prioritisation does not consider factors that influence the likelihood of success or impact on combating deforestation such as, for example, the ability to engage stakeholders on the ground. Hence, the commodity-first approach is just another lens to identify key regions to engage in, but it should be used in conjunction with other analyses in the field.

34 WWF (2018), Living Forests Report. Available at: http://wwf.panda.org/our_work/forests/forest_publications_news_and_reports/living_forests_report; Environment Research Letters (2018), Ongoing primary forest loss in Brazil, Democratic Republic of the Congo, and Indonesia. Available at: https://iopscience.iop.org/article/10.1088/1748-9326/aacd1c/pdf GFW, Places to Watch. Available at: https://blog.globalforestwatch.org/places-to-watch

35 Governor's Climate and Forests Task Force Database. Available at: http://www.gcftaskforce-database.org

36 Earth Innovation Institute (2018), The state of jurisdictional sustainability. Available at: https://earthinnovation.org/state-of-jurisdictional-sustainability

37 IDH (2016), Landscapes in Indonesia that IDH supports: Aceh, South Sumatra & West

JURISDICTIONAL APPROACHES

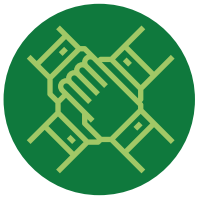
Existing jurisdictional approaches for the 47 sub-national regions were identified in order to understand potential for private sector engagement. This section describes the key sources used for the jurisdictional approach analyses. The key sources leveraged include:

GOVERNOR'S CLIMATE AND FORESTS TASK FORCE DATABASE (GCF-TF).

GCF-TF was launched in 2008 when nine governors from Brazil, Indonesia and the United States signed a memorandum of understanding on climate and forest cooperation. The task force was designed to accelerate jurisdictional approaches. Currently the GCF has 38 members and includes jurisdictions from 10 countries.[35]

EARTH INNOVATION INSTITUTE (EII).

EII along with GCF and Center for International Forestry Research (CIFOR) conducted a comprehensive study to evaluate progress of jurisdictional approaches across different regions.[36]



IDH – THE SUSTAINABLE TRADE INITIATIVE.

Supported by multiple European governments and institutional donors, IDH convenes different stakeholders in public private partnerships. In 2016, IDH shifted its focus away from segregated commodity supply chain to landscape and jurisdictional approaches to address sustainability.[37]

FOREST CARBON PARTNERSHIP FACILITY (FCPF): READINESS FUND, CARBON FUND REPORT.

The FCPF's Readiness and Carbon Fund provide funding for different countries in order to incentivise the deployment and delivery of REDD+ emission reduction programmes. Some of the carbon fund's emissions reduction programmes have adopted a jurisdictional wide approach to engage different stakeholders.[38]

UN-REDD PROGRAMMES.

The UN-REDD platform was launched in 2008 to support nationally led REDD+ processes to reduce forest emissions and enhance carbon stocks in forests. Many participating countries have adopted jurisdictional wide approaches with regards to deforestation to meet national REDD+ targets.[39]

WWF JURISDICTIONAL PROGRAMME.

In 2017, WWF published a report on tackling deforestation through a jurisdictional approach. The report provided detailed case studies on existing jurisdictional programmes along with key learnings in terms of political leadership, participatory design, sustainable financing, private sector role, storytelling and expectation management.[40]

Kalimantan. Available at: https://www.idhsustainabletrade.com/news/3765

38 Forest Carbon Partnership Facility (2018), Annual report. Available at: https://www.forestcarbonpartnership.org/sites/fcp/files/FCPF%20Annual%20Report%202018%20FINAL%20VERSION-compressed%20under%2020%20MB.pdf

39 UN-REDD Website. Available at: https://www.un-redd.org/how-we-work

40 WWF (2017), Tackling Deforestation Through A Jurisdictional Approach. Available at: https://d2ouvy59p0dg6k.cloudfront.net/downloads/wwf_jurisdictional_approaches_fullpaper_web_1.pdf

APPENDIX: HOTSPOTS DEEP-DIVES

The section explores the 14 hotspots[41] identified in Chapter 2, in further detail:

ARGENTINA It was the second largest producer of soybean, accounting for 18 percent of global production in 2016. Additionally, Argentina was also the third largest producer of cattle, accounting for 4 percent of global production in 2016. Of its total land area, around 12 percent consisted of forests in 2010. Argentina was responsible for 3 percent of the deforestation caused by the top producing countries between 2010-17, around 1.6 million hectares. Soybean has high relevance for Argentina in terms of trade with China. Argentina was the third largest exporter of soybean globally, with majority of the soybeans being imported by China.[42]

BOLIVIA It was the fifth largest producer of soybean, accounting for 1 percent of global production in 2016, but production has grown at a rapid pace of 11 percent between 2010-16. Of Bolivia's total land area, around 48 percent consisted of forests in 2010. It was also responsible for 4 percent of deforestation caused by the top producing countries between 2010-17, around 2 million hectares. Soybean is an extremely important crop for Bolivia; it accounted for 3 percent of the country's GDP and 10 percent of total exports, led to employment of 45,000 workers and generated 65,000 indirect jobs in 2015.[43]

COLOMBIA It was the third largest producer of coffee, fourth largest producer of palm oil, and fifth largest producer of cattle in 2016. It accounted for 8 percent of global coffee production and 2 percent of palm oil and cattle production in 2016. Colombia produces more palm oil than any other country in Latin America. Palm oil generated exports increased by 48 percent between 2016-17 and were mostly exported to European countries.[44] Of its total land area, around 60 percent consisted of forests in 2010. Columbia accounted for 3 percent of the total deforestation caused by top producers between 2010-17, around 1.6 million hectares.

COTE D'IVOIRE It was the largest producer of cocoa in 2016 and accounted for 33 percent of total global production. It is a key region in terms of cocoa exports, around 30 percent of the world's cocoa exports are from Cote d'Ivoire. Besides cocoa, the country has also experienced rapid growth in rubber production, 16 percent between 2010-16. Of Cote d'Ivoire's total land area, around 76 percent consisted of forests in 2010. Cote d'Ivoire accounted for 2 percent of the total deforestation caused by top producers between 2010-17, around 1.1 million hectares.

41 The description of production ranking in the section does not include high income, non-tropical forest countries

42 World's Top Exports (2019), "Soya Beans Exports by Country". Available at: http://www.worldstopexports.com/soya-beans-exports-country; The Observatory of Economic Complexity database. Available at: https://atlas.media.mit.edu/en

43 USDA Foreign Agricultural service (2015), Bolivia Soybean Update. Available at: https://gain.fas.usda.gov/Recent%20GAIN%20Publications/Bolivian%20Soybean%20Update_Lima_Bolivia_4-13-2015.pdf

44 Mongabay (2018), "How Colombia became Latin America's palm oil powerhouse". Available at: https://news.mongabay.com/2018/05/how-colombia-became-latin-americas-palm-oil-powerhouse

MALAYSIA It was the second largest producer of palm oil in 2016 and accounted for more than one-third of global palm oil production and around 30 percent of the worlds palm oil exports.[45] It was also the fifth largest rubber producer, contributing 5 to global production. Of Malaysia's total land area, around 71 percent consisted of forests in 2010. As a result of high commodity production, deforestation in Malaysia made up 7 percent of the total deforestation caused by the top producing countries between 2010-17, around 3.5 million hectares.

SARAWAK, MALAYSIA Sarawak is the fourth largest producer of palm oil globally (6.1 percent) and had around 1.3 million hectares of palm oil plantations in 2017 (second largest in Malaysia).[46] Sarawak accounts for the highest cumulative deforestation from 2010-17 in Malaysia, amounting to 1.3 million hectares, almost double that of the second highest region, Sabah.

MEXICO Mexico was in the top 5 producers for cattle in 2016 and contributed 2 percent to global production. Besides cattle, the country has also experienced rapid growth in rubber production, 10 percent between 2010-16. Of its total land area, around 23 percent consisted of forests in 2010. Mexico also accounted for 3 percent of total deforestation caused by the top producers between 2010-17, around 1.4 million hectares.

PARAGUAY It was a top producer of soybean and contributed 3 percent to global production in 2016. Of its total land area, around 45 percent consisted of forests in 2010. Paraguay had the fourth highest deforestation out of the top producers, amounting to 4 percent of the total for top producers between 2010-17, around 2.3 million hectares.

VIETNAM It was the second largest producer of coffee and third largest producer of rubber, and contributed 16 percent and 8 percent to global production, respectively in 2016. Vietnam was the second largest exporter of coffee, around 8 percent of total. Of its total land area, around 44 percent consisted of forests in 2010. It contributed 3 percent of the total deforestation by top producers between 2010-17, around 1.3 million hectares.

PARA, BRAZIL Para is the fifth largest producer of cattle globally (1.3 percent). The majority of Brazil's beef was exported to Hong Kong and Mainland China in 2017, 24 percent and 15 percent of Brazil's exports respectively. Para is the second largest state in Brazil, and around 69 percent of its land consisted of forests in 2010. Cumulative deforestation in Para from 2010-17 was equivalent to the land size of Costa Rica, that is, around 5 million hectares.

45 ITC Trade map. Available at: https://www.trademap.org/Country_SelProduct.aspx

46 Malaysia Palm Oil Board [MPOB] (2017), Oil Palm Planted Area 2017. Available at: http://bepi.mpob.gov.my/images/area/2017/Area_summary.pdf

47 United States Department of Agriculture [USDA] (2018), Soybean Transportation Guide: Brazil 2017. Available at: https://www.ams.usda.gov/sites/default/files/media/Brazil-Guide2017.pdf

48 Earth Innovation Institute [EII] Website. Available at: https://earthinnovation.org/our-work/regional-initiatives/indonesia/central-kalimantan

MATO GROSSO, BRAZIL Globally, Mato Grosso is the largest producer of cattle and one of the largest producers of soybean, 2 percent and 8 percent respectively. It was Brazil's largest exporting state in 2017 for both soybean and beef, responsible for 26 percent and 17 percent of exports, respectively.[47] Mato Grosso is the third largest state in Brazil, and around 48 percent of its land consisted of forests in 2010. Even though, Mato Grosso has been the focus of a number of deforestation reduction related efforts, its cumulative deforestation between 2010-17 was the second largest in Brazil, amounting to more than 3 million hectares.

WEST KALIMANTAN, INDONESIA West Kalimantan is one of the top 10 producers of palm oil globally, around 3 percent. It is the second largest province in Indonesia, and around 74 percent of its land consisted of forests in 2010. While there are a number of partnerships and ongoing initiatives in the region, cumulative deforestation in West Kalimantan is still the largest in Indonesia, amounting to almost 1.8 million hectares.

CENTRAL KALIMANTAN, INDONESIA Central Kalimantan is the fifth largest producer of palm oil globally, around 6 percent. Palm oil production contributes almost 30 percent to the region's Gross Domestic Product and generated more than 165,000 jobs.[48] Central Kalimantan is the second largest province in Indonesia and around 75 percent of its land consisted of forests in 2010. The cumulative deforestation between 2010-17 was the third largest in Indonesia, around 1.5 million hectares.

RIAU, INDONESIA Riau is the largest producer of palm oil globally one of the largest producers of wood pulp, around 13 percent and 2 percent respectively. Of its total land area, around 74 percent consisted of forests in 2010. Cumulative deforestation in Riau between 2010-17 reached around 1.4 million hectares and was deemed to be one of regions with the fastest rate of forest cover decline, that is 42 percent decline from 1992 to 2010.[49]

SOUTH SUMATRA, INDONESIA South Sumatra is one of the top 10 producers of palm oil globally, around 5 percent. It is the third largest province in Indonesia, and 63 percent of its land consisted of forests in 2010. The Sumatran region in Indonesia experienced one the largest decline in forest cover, 51 percent between 2016 and 2017, with the largest reduction witnessed in South Sumatra, Jambi and Central Kalimantan.[50] Cumulative deforestation in South Sumatra was more than 1.3 million hectares from 2010-17.

49 Jikalahari (2018), "The Real Evidence of Deforestation in Riau Province". Available at: http://jikalahari.or.id/opini/the-real-evidence-of-deforestation-in-riau-province

50 World Resources Institute [WRI] (2018), Indonesia's Deforestation Dropped 60 Percent in 2017, but there's more to Do. Available at: https://www.wri.org/blog/2018/08/indonesias-deforestation-dropped-60-percent-2017-theres-more-do

The Tropical Forest Alliance (TFA) is a global public private partnership driven by an external consortium aiming to enable zero net deforestation in four global commodity supply chains (palm oil, beef, soy, and pulp and paper), while improving livelihoods of smallholder farmers.

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World Economic Forum
91–93 route de la Capite
CH-1223 Cologny/Geneva
Switzerland
Tel.: +41 (0) 22 869 1212
Fax: +41 (0) 22 786 2744
contact@weforum.org
www.weforum.org

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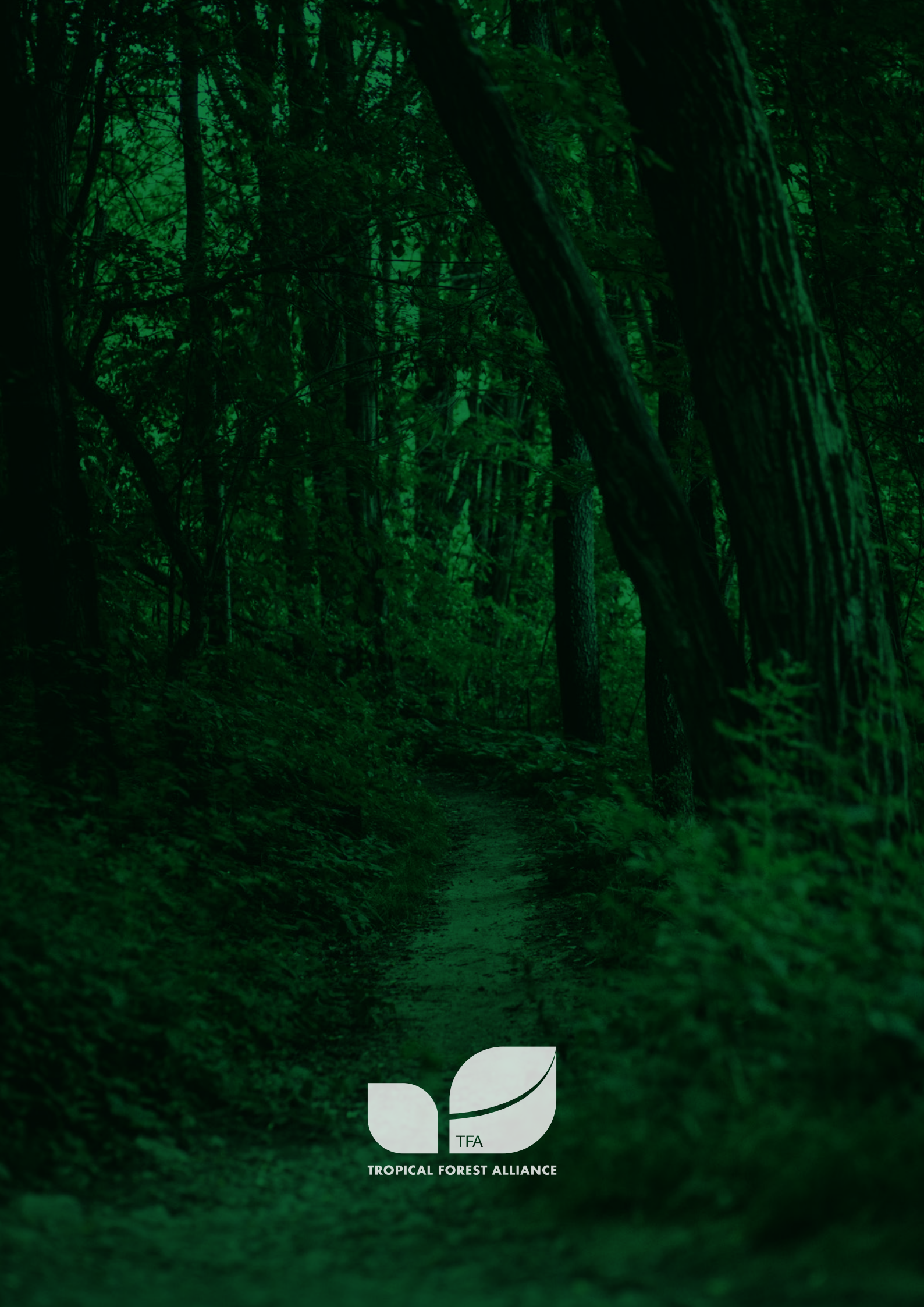
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