Emerging Market Consumers and Deforestation
Risks and Opportunities of growing demand for soft commodities in China and beyond

Tropical Forest Alliance 2020

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Foreword

The Tropical Forest Alliance 2020 (TFA 2020) is a global partnership that brings together governments, the private sector, and civil society organizations to reduce the tropical deforestation associated with the sourcing of commodities such as palm oil, soy, beef, and paper and pulp.

The challenge to end tropical deforestation is at a critical juncture. On the positive side, the Paris Climate Conference COP21 led to a number of ambitious forest-related pledges from governments, donors and private-sector companies. The 2016 New York Declaration on Forests (NYDF) Progress Assessment Report notes that efforts to eliminate deforestation from agricultural supply chains are increasing (although the report notes that very few companies commit to zero deforestation across their operations), and the membership of TFA 2020 continues to grow.

TFA 2020’s past work demonstrates that several sub-national governments have begun to develop ambitious programmes to reduce deforestation across their jurisdiction. The research identified 61 such programmes, which are fairly evenly distributed across Africa, Latin America and Asia. More than half (34) of these jurisdictions are potentially relevant to the mandate of TFA 2020 as they are operating in tropical forest regions and produce relevant commodities (such as palm oil, pulp, cattle, soy, cocoa and coffee).

While all this is encouraging, it will not be sufficient to significantly reduce deforestation unless major emerging markets are engaged in eliminating deforestation from commodity supply chains. This includes both major importers (such as China and India) and major producers that are also significant consumers (such as Brazil and India). A strong fact base to inspire robust action on greening supply chains in emerging markets is still missing.

This research aims to contribute to filling this gap by assessing the importance of emerging markets for reducing deforestation based on their current and future commodity demand; the degree to which we are starting to see increasing sustainability awareness and concerns over deforestation in these markets; and what it would take to improve the sustainability of supply chains in one key emerging market – China.

We are grateful for the advice and input of many experts in academia, government, not-for-profit organizations and industry who provided invaluable guidance, suggestions and advice, including: Marco Albani, Petra Tanos (TFA 2020); Dietmar Grimm, Rose Niu, Lucy Yu (Paulson Institute); David Aikman, Sha Song (World Economic Forum); Tan Lin (Hopefull Group); Xiankun Lu (IEDECO Geneva); Eric Swanson (Supply Change); Jin Zhonghao, Xin Yu (WWF); Liu Denggao (Sustainable Soy Trade Platform); Li Luyi, Li Yidi (Forest Steward Council); Jin Zhonghao, Xin Yu (WWF); Liu Denggao (Sustainable Soy Trade Platform); Li Luyi, Li Yidi (Forest Steward Council); Neal Carlin (British Embassy in Beijing); Ingvild Andreassen (Norwegian Embassy); Larissa Maria, Jean Carlo Cury (Embassy of Brazil); Isabel Nepstad (Solidaridad China); Jim Harkness; Zhang Jianpin (MOFCOM China); and Zhang Junzuo (InFIT). Thank you to AlphaBeta for providing the analytical support for this research.
Executive summary

Findings at a glance

- Major emerging market importers (China and India) and major emerging market producer-consumers (Brazil and Indonesia) together account for around 40% of global demand for four deforestation-linked commodities (soy, beef, palm oil and wood products) and their share is set to increase further by 2025.

- Three main trends will influence future commodity demand from emerging markets: growth in the consuming class, domestic production and regulatory interventions.

- A “business-as-usual” (BAU) approach to commodity sourcing in emerging markets could lead to significant deforestation. While there is significant uncertainty associated with deforestation rates linked to these commodities, it is estimated that deforestation linked to China’s and India’s imports of these four commodities, and the domestic consumption of Indonesia and Brazil, could increase by 16% from today’s levels. This is a conservative estimate as it only accounts for immediate post-conversion deforestation, and represents the equivalent land area of Jamaica being deforested annually.

- Deforestation could also lead to food security concerns in emerging markets (with rising dependence on food imports), risks to firm competitiveness and potentially undermining major projects such as Belt and Road.

- There is anecdotal evidence suggesting that governments, consumers and producers in emerging markets are increasingly interested in sustainably sourced products. For example, the official translation of China’s Five-Year Plan 2016-2020 includes three times as many (from 27 to 81) sustainability-related terms as the previous Five-Year Plan. A large-scale global survey reveals that 34% of Brazilian consumers, 44% of Chinese consumers and 50% of Indian consumers surveyed “actively look for information on product sustainability”. However, participants at a workshop in China said they believe that consumer concern for environmental sustainability of products is still very nascent, and issues such as food safety are far more prominent in decision-making.

- China could potentially reduce its environmental footprint of commodity sourcing by 55% versus a BAU scenario in 2025

- Several barriers prevent change towards sustainable sourcing in China, ranging from the additional cost of complying with sustainability standards, a lack of consumer willingness to pay for sustainable products, a lack of clear sustainability standards, and challenges associated with the traceability of supply chains to ensure compliance with sustainability standards.

- Tackling the barriers will require a multistakeholder approach. Participants at a workshop in Beijing in May 2018 highlighted the vital role of governments in developing guidelines and a definition of “sustainable sourcing”. Other participants highlighted the role of the financial sector in developing more sophisticated risk models that take account of unsustainable sourcing approaches and provide incentives for more sustainable efforts. There is also a clear need for industry to take the lead by establishing joint industry commitments related to sustainability. The Chinese Sustainable Meat Declaration is a promising example in this regard. Finally, there is also a clear role for civil society in helping to educate consumers about the importance of sustainability and help importers build their capabilities on sustainable sourcing. For example, organizations such as WWF have had a promising impact by using celebrities to promote sustainability in pulp and paper in China.

Emerging markets, with their rapidly growing consumer class, play a crucial role in the global effort to remove deforestation from palm oil, beef, soy, and pulp and paper. The fight against tropical deforestation would gain significant momentum if major emerging market importers, such as India and China, and major emerging market producer-consumers, such as Indonesia and Brazil, were to buy more commodities from sustainable sources.

This document presents new, compelling estimates on how the current and future demand for commodities in emerging markets might spur deforestation. While this consumption growth would represent tremendous progress in socio-economic development in these countries, it could spell an environmental disaster if not supported by sustainable sourcing of goods. Not only that, it could pose significant challenges to food security and firm competitiveness in these emerging markets.

The results reinforce the importance of engaging these countries to achieve change. The report takes a detailed look at the situation in China given the country’s importance for the global commodity demand outlook.


Key findings

Tackling the tropical deforestation challenge requires engaging emerging markets

The rise of middle-class consumers is set to ratchet up demand for commodities in emerging markets. Four commodities – soy, beef, palm oil and wood products – are important drivers of tropical deforestation, and emerging markets are a significant source of demand for these commodities. Major emerging market importers (China and India) and major emerging market producer-consumers (Brazil and Indonesia) together account for around 40% of global demand for some of these commodities, and their share will increase further by 2025. If the focus is just on imported demand (as opposed to total commodity demand) then China’s and India’s importance to global supply chains would be even more apparent. For example, the share of global raw soybean imports that end up in China and India is expected to increase from 62% today to 67% in 2025.

In absolute terms, China’s and India’s imports, combined with Brazil’s and Indonesia’s domestic consumption of deforestation-related commodities, could rise by 43% to 264 million metric tons (equivalent to 37% of global production) in the decade through 2025.

A business-as-usual (BAU) trajectory to emerging market commodity sourcing could create a large environmental footprint, and issues to food security and broader concerns

The forecast growth in the middle class indicates that, if commodity consumption continues as it always has, significant deforestation awaits. As such, there is an urgency to raise awareness of the deforestation issue in emerging markets and advocate for a mindset change towards more sustainable commodity sourcing.

AlphaBeta's analysis indicates that current Chinese and Indian import demand for soy, palm oil and beef, combined with domestic consumption from Brazil and Indonesia, contributed to approximately 855,000 hectares of deforestation in 2015. This is equivalent to 11% of the estimated 7.6 million hectares of forest area lost annually according to the Food and Agriculture Organization.

There is significant uncertainty associated with deforestation rates linked to these commodities, as deforestation rates vary by commodity and over time. As such, forecasts depend crucially on estimates of expected yield growth and changes in sourcing patterns.

To provide an estimate of the future potential deforestation impact of emerging market demand in these commodities, we have assumed that historical yield growth rates continue and that deforestation rates and sourcing destinations remain unchanged from present levels. When these assumptions are combined with the earlier forecasts on commodity demand, AlphaBeta estimates that deforestation could intensify by 16% by 2025, meaning a tropical area equivalent to the country of Jamaica would be cleared of trees each year. This is a conservative estimate of the potential deforestation impact as it only focuses on immediate post-conversion land loss, that is, it excludes indirect causes (e.g. forest fires) and continued deforestation of land that had already been converted from the rainforest.

Emerging markets are increasingly interested in sustainably sourced products

There is anecdotal evidence suggesting that governments, consumers and producers in emerging markets are increasingly interested in sustainably sourced products. For example, the official translation of China’s Five-Year Plan 2016-2020 includes three times as many (from 27 to 81) sustainability-related terms as the previous Five-Year Plan.

There has also been a rise in the number of sustainability-related conferences in emerging markets – in China, 11 such events have been confirmed for 2018, and seven in India. A large-scale global survey from 2014 reveals that 34% of Brazilian consumers, 44% of Chinese consumers and 50% of Indian consumers surveyed “actively look for information on product sustainability”.

However, participants at a workshop in China believe that consumer concern for environmental sustainability of products is still very nascent, and issues such as food safety are far more prominent in decision-making.
Deep dive on China

China could potentially reduce its environmental footprint of commodity sourcing by 55% versus a BAU scenario in 2025

Our research explored the potential for China to shift to a more sustainable commodity sourcing approach. There are two broad opportunities.

First, improving yields on existing lands in countries where China sources its commodities could reduce the amount of new land required to meet future demand. Based on case studies in the major sourcing countries for China in each of the three commodities, we estimate the potential to increase yields at a faster rate per annum than under BAU through technology transfer, capital investment and capacity-building could reduce land deforestation attributed to China by 15% by 2025.

Second, production could be shifted to less environmentally sensitive land, including increased use of degraded land or already deforested lands. This could potentially reduce the land requirements by a further 40%.

Making this happen requires addressing two main types of barriers

Barriers that could prevent the shift to sustainable sourcing in China can be grouped into two broad categories:

- **Incentive barriers**: Conditions that may discourage actors from pursuing a deforestation-free commodity supply
- **Implementation barriers**: Conditions that may prevent the implementation of deforestation-free sourcing even when actors have the incentive to do so

These barriers vary by commodity. For example, in the case of soy, the major barriers are the speed at which sustainable soy supply can be ramped up. In beef, the major barriers are primarily price-related, as sustainably raised beef can often retail with a 50% price premium in supermarkets, leading to concern that Chinese consumers will stick to the more affordable non-sustainable beef. Lastly, for palm oil, compliance costs that farmers pay to sustainable certification programmes can be up to 10% of the market price of palm oil, thus removing incentives for farmers to be certified.

The good news is that these barriers are solvable. Participants at a workshop organized in Beijing in May 2018 highlighted that tackling the barriers will require a multistakeholder approach:

- **Government**: Government could establish guidelines for sustainable sourcing and a definition of what is meant by sustainable. Ideally, these guidelines would be mandatory but, even if voluntary, participants said they believe it could make a big difference if there is cooperation between government and industry. Another opportunity is to include sustainability guidelines in potential future free trade agreements.

- **Industry**: There are several opportunities for industry to take the lead in addressing these barriers.
  - There is a need for new financing models that explicitly incorporate supply chain risk related to sustainability issues. At present, participants highlighted that few banks in emerging markets are incorporating sustainability issues into their risk management approaches. At the more ambitious end, there could be opportunities for linking interest payments to sustainability performance, such as is being done in the Wilmar and ING initiative.
  - Industry players could establish joint industry commitments related to sustainability. The Chinese Sustainable Meat Declaration was highlighted as one promising example in this regard.
  - There is a need for industry to help develop solutions to improve the traceability of supply chains. Existing methods often face challenges related to factors such as blending of materials at the port, but emerging technologies hold the promise to overcome these issues.

- **Civil society**: There is also a clear role for civil society in helping to educate consumers about the importance of sustainability and help importers build their capabilities on sustainable sourcing. For example, organizations, such as the World Wildlife Fund (WWF), have made an impact by using celebrities to promote sustainability in pulp and paper in China.

Finally, there is also a need for governments industry, and civil society, to come together to work with key jurisdictions with relevant commodities and help them to ramp up potential supply to meet the needs of key emerging markets such as China.
1. The importance of emerging markets to deforestation-free supply chains

Given the growth of the consuming class in emerging markets, ensuring that commodity sourcing occurs in a sustainable way will be crucial to reducing global deforestation. This chapter presents new evidence on the importance of emerging markets for the current and future demand for deforestation-linked commodities.

**Tackling the tropical deforestation challenge requires engaging emerging markets**

The rise of middle-class consumers is set to ratchet up demand for commodities in emerging markets. For example, trade in China has grown 83-fold in the past 40 years. Consumer spending as a share of the country’s total GDP is expected to surge from around 36% in the years since 2008 (in real terms) to 49% by 2030; 70% of that consumption growth could come from just 10 city clusters, including Shanghai and Beijing.

Meanwhile, in India, the food market could double in size from 2014 to 2020, fuelled by rapid urban population growth. It took nearly 40 years, from 1971 to 2008, for India’s urban population to rise by nearly 230 million. However, it will take only half that time to add the next 250 million, with 590 million people projected to live in cities by 2030.

By 2025, India could be the second-largest consumer market in the world, behind China. Indonesia also has a rapidly growing consuming class, with growth to 2030 in the consuming class only expected to be surpassed by China and India. Similar to India, much of the growth in Indonesia will come from small middleweight cities, defined as having between 150,000 to 2 million inhabitants, which are forecast to increase their share of GDP to 37% in 2030 (from 31% in 2012). Food and beverage expenditure is forecast to grow at a rapid 5.2% to 2030.

Four commodities – soy, beef, palm oil, and paper and wood products – are important drivers of tropical deforestation, and a large bulk of the demand for these commodities is derived from emerging markets. Major emerging market importers (China and India) and market producer-consumers (Brazil and Indonesia) together account for up 40% of global demand for some of these commodities. This share is expected to increase further by 2025 (see Figure 1).

**Figure 1: Major emerging market importers and producer-consumers account for a large share of global commodity demand**

<table>
<thead>
<tr>
<th>Commodity</th>
<th>2015 Share</th>
<th>2025 Share</th>
<th>CAGR 2016-25 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soy</td>
<td>100</td>
<td>100</td>
<td>29</td>
</tr>
<tr>
<td>Beef</td>
<td>100</td>
<td>100</td>
<td>14</td>
</tr>
<tr>
<td>Pulp &amp; Paper</td>
<td>100</td>
<td>100</td>
<td>7</td>
</tr>
<tr>
<td>Palm oil</td>
<td>100</td>
<td>100</td>
<td>27</td>
</tr>
</tbody>
</table>

1 Developing countries who import a large share of globally produced commodities to meet domestic demand. This is limited to China and India as the two biggest emerging market importers across the four commodities. This includes only their imported demand (i.e. excludes domestic demand satisfied by local production).

2 Developing countries who are a major exporters of key commodities in the global supply chain which also have strong domestic demand for the same commodities they export. This is limited to Brazil and Indonesia as two of the major emerging producer-consumer markets across the four commodities, focusing on their domestic demand volumes (excluding domestic demand satisfied by imports).

3 Other is the remaining volume of commodity demand coming from other countries (and including the local production of China and India). Source: USDA; FAO; AlphaBeta analysis.
If the focus were just on imported demand, as opposed to total commodity demand, then the footprint of emerging market importers – like China and India – would be even more apparent. In the decade to 2025, China and India are expected to make up half of the global imports of pulp and paper. This figure is even higher for soy. The share of global raw soybean imports that ends up in China is forecast to increase to 67% by 2025 (see Figure 2).

In absolute terms, demand from these emerging market importers and producers could rise by 43% to 264 million metric tons (equivalent to 37% of global production) in the decade through 2025 (see Figure 3).

Figure 2: China and India represent around 67 percent of global trade in some commodities today, and likely to increase further by 2025

Share of global imports in 2015 and 2025

Percent

Source: USDA; FAO; AlphaBeta analysis

Figure 3: Demand from four key emerging markets for deforestation-linked commodities could increase by 43 percent by 2025

Global demand from Brazil, China, India and Indonesia for soybean, beef, pulp & paper, and palm oil

Million metric tons

Source: USDA; FAO; AlphaBeta analysis

1 Global demand from these four key emerging markets is calculated by adding China and India’s import demand together with Brazil and Indonesia’s domestic demand (excl. imports)
To better understand the drivers of this demand, it is useful to trace the trade flows of these four deforestation-linked commodities (see Figure 4):\(^7\)

- **Soy.** Brazil is the world’s second-largest producer of soy behind the United States, accounting for roughly 31% of global production. Currently, 44% of production is dedicated to domestic consumption, driven by the use of soy as a feedstock for cattle, and regulatory requirements for blending soy-based biofuels into biodiesel. Approximately 45% of soy exported from Brazil is bound for China. In contrast, the total volume of soybean imports to India – around 0.1 million metric tons – is relatively small, as the country prohibits the import of genetically modified soybeans and imposes high tariffs on soybean imports generally.

- **Beef.** Brazil is also the world’s second-largest producer of beef behind the United States, accounting for 16% of global production. Brazil has the fifth-highest per capita beef consumption in the world, and 82% of Brazilian beef production is consumed locally. Due to China’s own sizable beef production, the overall import volume of beef remains small – less than 0.1 million metric tons in 2015 (over half of China’s beef imports came from either Brazil or Argentina). However, growth in consumer demand for meat is expected to outstrip domestic production over the next decade and spur beef imports, particularly if Chinese consumers become more discerning about the origin of their beef. India does not import any beef for religious reasons.

- **Pulp and paper.** China is the largest foreign demand source for pulp and paper from Brazil and Indonesia. China’s share of total pulp and paper imports alone could rise significantly to account for 48% of the world’s total imports in 2025. This sharp increase is being driven by a fall in the domestic production of pulp due to government-mandated closures of pulp and paper mills combined with the higher demand for paper products used in packaging of goods sold through China’s rapidly growing e-commerce industry.\(^16,20\)

- **Palm oil.** Palm oil is neither produced domestically in China nor in India. All palm oil demand from China and India (30% of global imports) were met through imports from Indonesia and Malaysia in 2015. Indonesia is the world’s largest producer of palm oil, accounting for 54% of global production. While 25% of palm oil produced is consumed locally, India and China account for 17 and 11% of Indonesia’s total palm oil production demand respectively.

Three main trends influence future commodity demand from emerging markets

Three key trends will influence commodity demand from emerging markets over the coming decade:

1. **Growing consuming class.** The definition of what constitutes a “middle class” or “consuming class” is wide but, regardless of what definition is used, the research is clear: the scale of consumer growth in emerging markets over the next 10 to 15 years will be unprecedented. McKinsey Global Institute forecasts the global consuming class to swell to 2.6 billion people by 2025, with 72% of the total coming from emerging markets.\(^21,22\)

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**Figure 4:** A large share of deforestation-linked commodities are directed towards domestic consumption or imports to China and India

### Destination of Soy, Beef, Pulp and Palm Oil production by region

<table>
<thead>
<tr>
<th>Soy</th>
<th>Beef</th>
<th>Pulp for Paper</th>
<th>Palm Oil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazil</td>
<td>97%</td>
<td>2%</td>
<td>17.5%</td>
</tr>
<tr>
<td>EU28</td>
<td>3%</td>
<td>10%</td>
<td>15%</td>
</tr>
<tr>
<td>Southeast Asia</td>
<td>1%</td>
<td>6%</td>
<td>20%</td>
</tr>
<tr>
<td>China</td>
<td>0%</td>
<td>6%</td>
<td>31%</td>
</tr>
<tr>
<td>Others</td>
<td>0%</td>
<td>0%</td>
<td>2%</td>
</tr>
<tr>
<td>Domestic</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>India</td>
<td>0%</td>
<td>0%</td>
<td>31%</td>
</tr>
</tbody>
</table>

1 Does not account re-exports, significant amounts of beef is sent to Hong Kong and Egypt which does not match its domestic consumption.

Source: FAO STAT; UN Comtrade; USDA GAIN reports; AlphaBeta analysis
Emerging economies – including China, India, other Asian countries and Africa – are projected to account for 35% of the future increase in food demand, as population growth in these countries will coincide with a dietary shift. This dietary shift could lead to an increase in some commodities and a decrease in the consumption of others. Increasing disposable income could spur a shift from consuming pork and chicken to beef. For example, the annual consumption of beef in China remains relatively lower (4.1 kg/capita) compared to other meats, like pork (30.8 kg/capita) and chicken (12.3 kg/capita).

However, experts interviewed for this report agree that beef consumption will increase in the years to come – particularly in the larger, more developed cities. Increased beef consumption and production would also result in higher derived demand for soy – which is used as a main constituent of animal feed.

On the other hand, consumer preference for healthy food choices could lead to a decrease in consumption of palm oil. Chinese demand for palm oil imports is expected to stagnate as other vegetable oils become increasingly available at competitive prices.

2. Domestic production. Rising environmental constraints could curb domestic commodity production (particularly in China and India) and place greater emphasis on imports. For example, more than 40% of arable land in China and India has been degraded due to climate change, pollution or topsoil erosion. The phenomenal growth of cities in developing countries adds to the challenge, consuming an estimated 2 million hectares of arable land per year and making it more difficult to secure food supply from domestic production.

Moreover, some countries are reducing their domestic production due to their increasing confidence in ensuring food security through food imports. For example, China plans to reduce farmland for planting maize by 3.3 million hectares from 2016 to 2020 as it looks to meet domestic demand through imports instead. Additionally, farms in emerging markets often lack access to the latest technologies and have inadequate agronomic practices, although this has the potential to change quickly given the strong focus in China and India at present on adopting international technology and enhancing farming practices.

3. Regulatory interventions. Regulations, from farming subsidies to import restrictions, could also influence commodity imports. Import tariffs could make domestically produced goods more competitive; changes in tariff schedules also influence producers to switch crops. For example, Indian demand for palm oil is expected to increase because of a reduction in palm oil tariffs to meet increasing vegetable oil consumption – which has been growing at 6% annually. A further example of the impact of regulatory interventions relates to the recent trade friction between the United States and China, which could see significantly higher tariffs imposed by China on US soybean imports in retaliation to other US trade measures.
2. The challenges facing emerging markets in commodity supply chains

The rapid growth in commodity demand from emerging markets could pose challenges to sustainability. To illustrate the potential challenges associated with a BAU trajectory of demand for deforestation-linked commodities, we focus on the emerging markets from chapter one, given their importance in the global commodity market.

This chapter shows that not only would a BAU approach to commodity sourcing create large environmental impacts globally, it could also create significant concerns for countries, from issues related to food security, firm competitiveness and broader government interests.

A BAU approach to commodity demand in emerging markets could lead to significant deforestation and a range of broader concerns.

The forecast growth in the middle class indicates current consumption levels could lead to a significant increase in deforestation. As such, there is an urgency to raise awareness of the deforestation issue in emerging markets and advocate for a change to more sustainable commodity sourcing.

AlphaBeta’s analysis indicates that Chinese and Indian import demand for soy, palm oil and beef, combined with domestic consumption from Brazil and Indonesia, contributed to approximately 855,000 hectares of deforestation in 2015. This is equivalent to 11% of the estimated 7.6 million hectares of forest area lost annually, according to the Food and Agriculture Organization (FAO).

There is significant uncertainty associated with forecast deforestation rates linked to these commodities as deforestation rates vary significantly by commodity due to variance in harvesting and maturity period. Forecasts also depend crucially on estimates of expected yield growth and changes in sourcing patterns.

To provide an estimate of the future deforestation impact of emerging market demand in these commodities, the analysis assumed that historical yield growth rates, deforestation rates (i.e. the percentage of deforested land that is attributed to the production of a commodity in a country) and sourcing destinations remain unchanged from present levels. When these assumptions were combined with the earlier forecasts on commodity demand, it is estimated that deforestation

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**Figure 5:** Increased emerging market demand could result in approximately 990,000 hectares in annual deforestation in 2025 alone

Deforestation caused by key emerging market demand in 2015 and 2025¹

<table>
<thead>
<tr>
<th>Year</th>
<th>Soy</th>
<th>Beef</th>
<th>Palm Oil</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>65</td>
<td>615</td>
<td>175</td>
<td>955</td>
</tr>
<tr>
<td>2025</td>
<td>105</td>
<td>650</td>
<td>235</td>
<td>990</td>
</tr>
</tbody>
</table>

¹ Deforestation was based on three factors: (1) Import demand for the product from China and India; domestic demand (excl. imports) for the product from Brazil and Indonesia; (2) Improvements in yield rates per crop (based on historical data) to calculate the forecasted deforestation; and (3) The current deforestation rates associated with land production requirements in a given crop in a given country. The analysis only examines the immediate post-conversion land use change and not the indirect effects (i.e., land that is already cleared that is then converted to agriculture production). Deforestation rate was rounded to the nearest 5,000 hectares.

Source: Gibbs et al. (2015); FAO STAT; OECD-FAS; USDA GAIN reports; AlphaBeta analysis
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could intensify by 16% by 2025. Approximately 990,000 hectares (a tropical area equivalent to Jamaica) could be cleared of forests each year by 2025 (see Figure 5). This is a conservative estimate of the potential deforestation impact as it was restricted to immediate post-conversion land losses, and excluded indirect causes (e.g. forest fires) and previously deforested land.36

The forecast growth in deforestation is slower than the forecast growth in commodity imports (16% versus 43%, see Figure 3). Apart from different measurement units (Figure 3 measures demand in metric tons, which tends to give greater weight to soy and less weight to beef, the latter having much greater deforestation impact), the reason for this is a general decline in deforestation associated with sourcing these commodities across most markets (primarily due to yield improvements).37

Aside from a larger environmental footprint, a BAU approach introduces three risks that are of primary concern to most governments, namely, risks to food security, the competitiveness of firms, and other geopolitical and economic priorities, like the Belt and Road initiative:

1. Risks to food security. Food security refers to the availability and safety of food for the population. There is a strong link between sustainable approaches and long-term food security. Research from the China Council for International Cooperation on Environment and Development (CCICED) suggests that long-term access to resources depends on how sustainably those resources are managed today. This is particularly important for China – where food and social security are seen as the primary objectives of the Chinese government.36

As the Chinese government reduces the amount of land available for agriculture, the burden of meeting the domestic demand for key commodities shifts to international supply chains, thus making the issue of ensuring food security through sustainable supply chains an issue of national importance.39 For example, at present, 90% of China’s soy demand and all of its palm oil demand are met through imports.40 This dependency could increase even further; AlphaBeta research shows that, by 2025, imports for soy, beef and palm oil in India and China could expand by up to 94% for some commodities (see Figure 6).

2. Risks to firm competitiveness. Companies are under scrutiny as consumers (in both emerging and developed markets) increasingly demand sustainably sourced products, governments introduce new sustainability standards, and technology improves the traceability and transparency of supply chains. All these trends could create operational, regulatory and reputational risks for companies.

Companies with a poor sustainability record already face the risk of being shut out of markets – particularly as companies in other regions take steps to improve their sustainability credentials. For example, the Norwegian Pension Fund has begun to divest from companies associated with unsustainable palm oil production and has introduced new guidelines to exclude investment in companies whose activities entail unacceptable greenhouse gas emissions.41

Figure 6: China and India’s dependency on imports for soy, beef, pulp, and palm oil for meeting local demand could increase further by 2025

Source: FAO STAT; OECD-FAS; USDA GAIN reports; AlphaBeta analysis
In another example, 81% of companies in agricultural production globally and 41% in the food retailing sector surveyed by CDP (formerly the Carbon Disclosure Project) said the effects of deforestation had “generated a substantive change in operations, revenue or expenditure” in regard to sustainability risk within commodity supply chains over the last five years through 2016.42

In the case of China, 64 Chinese firms are signatories to the Sustainable Meat Declaration, which aims to develop practices that “conserve nature and resources by avoiding land degradation, deforestation and conversion of natural vegetation in the livestock production and feed value chains.”43 The declaration coupled with the implementation of more stringent industry standards could be a risk to non-signatory firms if they are not prepared to meet these new guidelines in the future.

3. Risks to broader government interests. China, India, Brazil and Indonesia are publicly supporting a new global sustainability agenda, for example by signing the UN Sustainable Development Goals (SDGs) and the Paris Agreement. Their support for these initiatives has bolstered their “soft power” at a time when the US announced it would withdraw from the Paris climate accord.

A lack of commitment could erode this power. For example, China consumed about 20% of non-renewable energy resources, 23% of major agricultural crops and 40% of base metals in 2010. A lack of effort on their part could undermine their influence on the subject.44 Additionally, a lack of sustainable production could jeopardize other major projects in these countries, including the Belt and Road initiative which aims to build value chains to serve 60% of the world’s population. There have also been recent attempts by the Chinese government to “green” the initiative through issuing of green bonds for infrastructure development, and it will be important that supply chains for commodities taking advantage of this infrastructure are similarly sustainable.45
3. The potential for reducing deforestation associated with China’s commodity sourcing

In the last chapter, a BAU trajectory in emerging markets commodity sourcing was shown to create large negative impacts on the environment, as well as concerns for governments across a range of issues.

In this chapter, we explore the opportunity for a major importer of forest-risk commodities – China – to shift to deforestation-free sourcing. Our analysis shows the potential for China to reduce the environmental footprint by up to 67% from the BAU scenario by 2025.

There is increasing government, company and consumer interest in sustainably sourced products in China (and other emerging markets)

There is anecdotal evidence suggesting that governments, consumers and producers in China (as well as other key emerging markets) are increasingly interested in sustainably sourced products. For example, the official translation of China’s Five-Year Plan 2016-2020 includes three times as many (from 27 to 81) sustainability-related terms as the previous Five-Year Plan (see Figure 7). There has also been a rise in the number of sustainability-related conferences in emerging markets – in China, 11 such events have been confirmed for 2018, and seven in India.

Governments in emerging markets have taken strong steps to improve implementation and oversight of sustainable development. China, for instance, has established 43 government departments to speed up the implementation of the SDGs by 2030.

Promising efforts are underway to support the development of sustainable supply chains in commodity producing countries, including the Sustainable Soy Trade Platform, the Chinese Sustainable Meat Declaration and China’s Timber Legality Verification System:

- **Sustainable Soy Trade Platform**. The Paulson Institute, the Nature Conservancy, Solidaridad-China, and the WWF are working with the Chinese government, soy importers, retailers and financiers to promote legal, environmentally sustainable production of soy in South America. The platform aims to

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**Figure 7: Sustainability awareness in emerging markets is gaining traction**

<table>
<thead>
<tr>
<th>Media</th>
<th>Online mentions of sustainable sourcing between 2015 – 2016¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>113,000</td>
</tr>
<tr>
<td>India</td>
<td>49,200</td>
</tr>
<tr>
<td>China</td>
<td>44,700</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conferences</th>
<th>Number of major conferences on sustainability confirmed for 2018²</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>11</td>
</tr>
<tr>
<td>India</td>
<td>7</td>
</tr>
<tr>
<td>USA</td>
<td>7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Government</th>
<th>Mentions of “sustainable” or “green” in official translations of China’s five-year plans</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011-15</td>
<td>27</td>
</tr>
<tr>
<td>2016-20</td>
<td>81</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Consumers</th>
<th>Share of consumers who “actively look for information on product sustainability”³ (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>50</td>
</tr>
<tr>
<td>China</td>
<td>44</td>
</tr>
<tr>
<td>USA</td>
<td>14</td>
</tr>
</tbody>
</table>

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¹ Online mentions include phrases such as: “sustainability”, “sourcing”, and “environment” ² Major conferences include those with global attendance, public- and private sector participation, and at least one session on sustainable land use and development ³ Accenture & UN Global Impact (2014).The Consumer Study: From Marketing to Mattering: The UN Global Compact-Accenture CEO Study on Sustainability Source: Accenture & United Nations Global Compact; Google; Conference Alerts; national government sources; AlphaBeta analysis
stimulate Chinese demand for responsibly produced soy, starting with compliance to Brazil’s “Forest Code”.

- **Chinese Sustainable Meat Declaration.** The WWF, together with the Chinese Meat Association (CMA) and Chinese businesses have committed to promoting sustainable meat production, trade and consumption. Aside from improving traceability and reducing pollution, the CMA has deforestation goals included in the declaration, with 64 companies pledging to “conserve nature and resources by avoiding land degradation, deforestation and conversion of natural vegetation in the livestock production and feed value chains”. Moreover, there are no large Chinese companies that have made traceable commitments to sustainable sourcing that can be tracked by independent organizations like SupplyChange.org.

- **China’s Timber Legality Verification System (CTLVS).** CTLVS is a system that will regulate the legality of timber and timber products in China. The standard sets the requirements for legality at the forest management level and throughout the chain of custody. These forest management requirements cover company registration, payment of taxes, compliance with national laws and regulations, tenure rights, harvesting permits and forest management plans.

Despite this progress, sustainability concerns have not been fully embedded in decision-making for consumers or producers. This could create significant future challenges given the scale of forecast demand likely to come from these markets. For example, nearly 60% of 167 major Chinese brands surveyed by the Corporate Information Transparency Index, a system for evaluating a brand’s green supply chain practices, were found to have made no substantive progress towards addressing pollution problems in their supply chains.

Moreover, there are no large Chinese companies that have made traceable commitments to sustainable sourcing that can be tracked by independent organizations like SupplyChange.org.

**China could potentially reduce its environmental footprint of commodity sourcing by 55% versus a BAU scenario in 2025**

As explored earlier, the increasing demand from emerging markets, particularly China, could have a profound impact on deforestation. Our research found that the potential for China to shift to a more sustainable commodity sourcing approach by 2025 could reduce overall deforestation related to its demand by 55% (see Figure 8). The assumptions used in this modelling can be found in the Appendix. There are two broad opportunities:

1. **Yield improvements.** Improving production yields in countries where China sources its commodities could reduce the total amount of land required for production. Based on case studies in the major sourcing countries across different commodities, AlphaBeta estimates that there is a potential to increase yields at a faster rate per annum than under BAU through sustainable intensification techniques, conservation agriculture, technology transfers, investments in capital equipment and capacity-building. This could reduce land deforestation attributed to Chinese demand by 15% by 2025.

**Figure 8: Yield improvements and land reallocation could save up to 55 percent of China-driven deforestation in 2025**

![Figure 8: Yield improvements and land reallocation could save up to 55 percent of China-driven deforestation in 2025](image)

1. **2025 harvest area (BAU) was calculated based on historical yield growth improvements; Yield improvement scenarios was calculated by applying the compounded annual growth rate of yield improvements that sustainable approaches - based on yield in 2016 i.e. This was 20 percent for commercial farms and 60 percent for small holders. We the based the potential land savings based on the difference (i.e., the delta) in land use multiplied with the likelihood that will be deforested. See Appendix for methodology and assumptions. 2 Land reallocation was calculated based on the total amount of degraded land that is present in the country at the given point of analysis, multiplied by the recovery and asset realization rates of rehabilitation. The rehabilitated land is subdivided into its constituent commodities based upon present-day shares of land used to produce the respective commodity. The derived respective commodity land use requirements are then multiplied by the share of commodities that is exported and sent to China. See Appendix for methodology and assumptions.**

Source: AlphaBeta analysis
2. **Land reallocation.** Production could also be shifted to less environmentally sensitive land, including encouraging production on previously degraded land. This could further reduce the total land required for production and reduce overall deforestation attributed to Chinese demand by 40%. The potential to reduce deforestation through land reallocation is particularly high due to the large availability of degraded land in many major producing countries. To illustrate, a recent study on tropical forest regions found that over 125 million hectares of land are available for forest-friendly agricultural expansion globally – especially in Brazil and Indonesia.52

**Sustainability opportunities vary by commodity**

The opportunity for China to reduce deforestation associated with these commodities varies (see Figure 9). For instance, the opportunity for China to reduce deforestation through yield improvement varies between 6% (for beef) to 27% (for palm oil). This reflects the varying levels of productivity in key producer countries, as well as the feasibility of improvement given the capital requirements associated with some of the productivity levers.53

The opportunity for China to reduce deforestation through land reallocation varies between 29% and 48%. This opportunity is affected by the total land used by the commodity, and the incentives to engage in land reallocation due to its capital-intensive nature. The following section looks at these commodities in detail:

- **Soy.** In the case of soy, yield improvements could potentially reduce the impact of deforestation associated with soy production by around 10%. This is because the average yield of farmers from China’s main sourcing partner, Brazil, is high and hence the improvement potential may be more limited (compared to countries where productivity is lower). Brazilian soy farmers trail behind production yields in the United States by only 10%.54

Utilizing land previously used for cattle production also poses a large opportunity for farmers in Brazil and Argentina – particularly given the amount of degraded land that is available. For example, a McKinsey & Company study found that there were over 100 million hectares of degraded land in Brazil that could potentially be used for agricultural production and other economic activities.55

- **Beef.** Cattle ranchers in Latin America, while producing a large amount of the beef consumed in the world today, lag developed Western economies in the key metrics of heads of cow per hectare and meat per cow.56 Research from The Nature Conservancy and Agrosuisse indicate that sustainable cattle intensification techniques will be able to drastically improve cattle yield by over three times current levels within a 12-year period.57 This could potentially eliminate a large amount of land required for cattle production.

However, while this appears promising, previous TFA 2020 research indicates that the realizable opportunity of these techniques is only around 10%-20% of the

**Figure 9:** The potential reduction in deforestation associated with a sustainable approach varies by commodity
technical potential, due to the high capital expense and farm-size requirements (compared to 20%-40% for other commodities).  

- **Palm oil.** According to research conducted by McKinsey & Company, adopting sustainable practices in palm oil could see yield increases of up to 60% for smallholder farms and up to 20% for commercial farms. This potential is particularly large in Indonesia, which is China’s largest supplier of palm oil given the large number of smallholder farmers where productivity levels are often relatively low (over 41% of palm oil is produced by smallholders).  

If such improvements are achieved, Indonesia could reduce the overall area required for palm cultivation while still meeting global demand. Land reallocation could be another area to significantly reduce deforestation. The World Resource Institute (WRI) has estimated that Indonesia has over 6 million hectares of degraded land potentially available for palm oil production.
4. Making it happen

There are several barriers that could prevent this shift to sustainable sourcing in China, and their importance varies by commodity. However, none of these barriers are insurmountable. Participants at the Beijing workshop in May 2018 highlighted that addressing these barriers will require a multistakeholder approach.

Making this happen requires addressing two main types of barriers:

1. Incentive barriers: Conditions that may discourage actors from pursuing a deforestation-free commodity supply.

2. Implementation barriers: Conditions that may prevent the implementation of deforestation-free sourcing even with actors with the incentive to do so.

While the Chinese government has reiterated its commitment to greening transnational supply chains in its Five-Year Plan for 2016-2020, there remain several challenges to realize sustainable production for these commodities (see Figure 11):

Soybean

- Incentive barriers. Members of China’s Soybean Industry Association have made commitments to sustainable soy imports from Brazil.62 There also appears to be a progressive consumer mentality; a survey found that over 70% of Chinese consumers are willing to pay a 10% premium for sustainably produced products.63 However, studies have shown that the additional cost for farmers to produce sustainable soybean certified by the Round Table on Responsible Soy (RTRS) is between $3 and $4 per metric ton. This is a sizeable cost impact given that profit margins in China are slim, with processing costs having to be less than $20 per metric ton to remain profitable.64 Furthermore, while consumers may indicate their willingness to pay a premium for sustainably sourced products, this is not reflected in product demand. For example, only one-half of RTRS certified soy was sold as of 2014.65

- Implementation barriers. The relative concentration of soy importers in China supports an easier switch to sustainable sourcing – three operators account for almost one-third of domestic sales.66 However, it is important to note that, while the RTRS certification programme and standard food safety measures exist, there are no requirements or oversight mechanisms in place for importers to verify that the soy procured is sustainable, or for the government to support enforcement.67 Soy also faces issues of traceability as blending occurs prior to export to ensure a consistent amount of protein in each shipment. This makes it difficult to identify whether all the beans in each shipment were sourced sustainably.

Beef

- Incentive barriers. The China Meat Declaration in 2017 signalled a strong interest by the private sector to shift its behaviour and address deforestation associated with beef production. However, a concern for sustainably produced beef is its high price. Sustainably produced beef can potentially cost $2.50 more per pound than regular beef. While consumers in developed markets appear to be willing to pay the added premium, it is uncertain whether Chinese consumers are willing to absorb this.68 Expert interviews have indicated that while the Chinese government has initiated policies aimed at reducing the impact of deforestation from Chinese consumption, they have not been very effective. For example, the dietary guidelines launched by China to reduce the consumption of meat faced a strong backlash on Chinese social media as consumers felt it was an inhibition of their “freedom of consumption”. Furthermore, workshop participants highlighted that Chinese consumers are more concerned at present with food safety and healthy food, and less concerned with the environmental sustainability of beef products.

- Implementation barriers. Similar to soy, the relative concentration of beef importers in China can also make the switch to sustainable sourcing potentially easier, given that just three operators account for around 17% of domestic sales.69 Even though the technological requirements to improve the productivity of pasture- or grass-fed beef are easily scalable, it normally takes an additional year for pasture- or grass-fed cattle to reach slaughter weight (compared to using antibiotics, growth hormones and feedlots).

Palm oil

- Incentive barriers. The China Retail Sustainable Consumption Platform (CRSCP), founded by the UNDP and the China Chain Store and Franchise Association, has been working with the Roundtable on Sustainable Palm Oil (RSPO) to promote awareness in the use of sustainable palm oil in consumer products.70 While there
### Figure 10: Barriers to sustainable sourcing

<table>
<thead>
<tr>
<th>Incentive barriers</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government prioritisation</td>
<td>Lack of interest to develop regulatory structures to support implementation (e.g., lack of relevant standards or protocols)</td>
</tr>
<tr>
<td>Information failures</td>
<td>Actors are not adequately informed of the true nature of the benefits and costs of the opportunity and its impact</td>
</tr>
<tr>
<td>Consumer sentiment</td>
<td>Consumer attitudes toward deforestation-free commodities are benign – focusing on other issues like safety and healthy food</td>
</tr>
<tr>
<td>Cost</td>
<td>Higher costs relative to the “business-as-usual” (non-sustainable) option – particularly as a result of slim profit margins</td>
</tr>
<tr>
<td>Low perceived benefit</td>
<td>Consumers are unwilling to pay a premium for sustainably sourced products</td>
</tr>
<tr>
<td>Entrenched behavior</td>
<td>Significant change in behavior required for actors to pursue deforestation-free commodity supply</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Implementation barriers</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buyer fragmentation</td>
<td>Fragmented buyer landscape (i.e., large number of small buyers) can make it difficult to develop a coordinated industry response</td>
</tr>
<tr>
<td>Supply constraints</td>
<td>Lack of total supply in deforestation-free jurisdictions to meet necessary demand</td>
</tr>
<tr>
<td>Logistics</td>
<td>Existing supply chains are unable to support channeling of supply from key markets to demand centers (e.g., infrastructure gaps)</td>
</tr>
<tr>
<td>Technological readiness</td>
<td>Dependent on unproven technologies, or technologies not yet used at commercial/industrial scale</td>
</tr>
<tr>
<td>Traceability</td>
<td>Gaps in traceability and disclosure systems as most crops are not single-origin (i.e., coming from one jurisdiction)</td>
</tr>
</tbody>
</table>

Source: AlphaBeta analysis

### Conditions which may discourage actors to pursue deforestation-free commodity supply

### Conditions which may prevent the implementation of deforestation-free sourcing even with actors with the incentive to do so

---

### Figure 11: Barriers to China’s sustainable sourcing by commodity

#### Source: AlphaBeta analysis
are significant benefits for producers in terms of resource usage, community relations, staffing requirements, market access and access to capital, cost remains a substantial barrier. For example, compliance costs for RSPO certification can range from $12 to $65 per hectare, with smallholders facing costs representing over one-tenth of the market price of palm oil in 2017.\(^7\) The price premium appears to be significant in offsetting this; for example, in 2016, the premium for sustainable over conventional palm oil jumped from $25 to $30–$35 per metric ton. However, there remain issues of awareness and downstream demand for these products – especially since palm oil is used as an ingredient for products and rarely sold directly to consumers.\(^7\)

- **Implementation barriers.** Sustainable palm oil still makes up a small share of production in major producer countries such as Indonesia and Malaysia, comprising around 19% of all production. While these governments are ramping up their own palm oil certification programmes (e.g. granting export priority and incentives for certified producers), few producers have made the switch, and regulatory oversight remains difficult.\(^7\)

**Pulp and paper**

- **Incentive barriers.** The pulp and paper sector has received significant support in recent years. One such initiative is China’s Timber Legality Verification Standard, which will regulate the legality of timber and timber products harvested domestically and abroad. Companies that comply with the standard will be given a timber legality verification label by the industry associations that they can use on their timber products.\(^7\) The standard will be introduced through two national associations that encompass over 80% of China’s importers and exporters of timber and timber products.\(^7\)

- **Implementation barriers.** Even though forest certification schemes appear to be unprofitable, programmes like the China Timber Legality Verification Scheme have influenced the actions of Chinese companies. For example, the voluntary sourcing guidelines that were introduced in Guyana, Gabon and Myanmar have enjoyed success in shaping the behaviour of Chinese enterprises to practice sustainable silviculture.\(^7\) The relative concentration of pulp and paper processors in China also makes the switch to sustainable sourcing potentially easier if a strong business case can be made to these operators. The top five operators account for one-half of domestic processing (see Figure 12).

A number of potential ideas could help address these barriers

The good news is that these barriers are solvable. Participants at a workshop in Beijing in May 2018 highlighted that tackling the barriers will require a multistakeholder approach:

- **Government.** Government could establish guidelines for sustainable sourcing and a definition of what is meant by sustainable. Ideally, these policies would be mandatory, but even if voluntary, it could make a significant

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**Figure 12: A small set of companies may be crucial to engage to enhance supply chain sustainability**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Soy</th>
<th>Beef</th>
<th>Pulp for Paper</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>YiHai Kerry</td>
<td>Haoyue</td>
<td>Nine Dragons Paper</td>
</tr>
<tr>
<td>2</td>
<td>COFCO</td>
<td>Hondo</td>
<td>Asia Pulp &amp; Paper</td>
</tr>
<tr>
<td>3</td>
<td>Jiusan Group</td>
<td>Yisai</td>
<td>Chenming Group</td>
</tr>
<tr>
<td>4</td>
<td>SINOGRAIN</td>
<td>Dazhuangyuan</td>
<td>Shandong Sun Paper</td>
</tr>
<tr>
<td>5</td>
<td>Bohai</td>
<td>Kerch</td>
<td>Lee &amp; Man</td>
</tr>
<tr>
<td>6</td>
<td>Bunge</td>
<td>Foresun Group</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Cargill</td>
<td>Fucheng</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>CHINATEX</td>
<td>Huamu Angus</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Huifu</td>
<td>Oriental Flag</td>
<td>N/A</td>
</tr>
<tr>
<td>10</td>
<td>Dreyfus</td>
<td>ZhuoChen</td>
<td>N/A</td>
</tr>
</tbody>
</table>

1 Percent of domestic volume processed.
Source: WWF; TFT; AlphaBeta analysis
difference if there is cooperation between government and industry – as seen in the application of the guidelines as part of the China Timber Legality Verification Scheme. There are promising signs that the government is taking a more visible lead to further promote environmental issues. For example, China’s recent trade agreements with Switzerland and South Korea both included dedicated chapters on environmental provisions.  

Industry. There are several opportunities for industry to take the lead in addressing these barriers. First, there is a need for new financing models that explicitly incorporate supply chain risk related to sustainability issues. At present, very few Chinese banks are members of major sustainability finance initiatives such as the Banking Environment Initiative. At the more ambitious end, there could be opportunities for linking interest payments to sustainability performance. One such example is a financing arrangement between Wilmar and ING (see Figure 13). This is an area that has not received sufficient attention to date as much of the past work focused on compliance (and deterring unsustainable activities), but not necessarily on incentivizing shifts to sustainable production (which are related, but different concepts).

Similarly, financiers could include principles from FAO’s “Responsible Investments in Agriculture and Food Systems” initiative as part of the lending requirement. These principles aim to promote responsible investment in agriculture and food systems – including conserving and managing natural resources, supporting inclusive and transparent government structure, and inclusive economic development. Second, industry players could establish joint industry commitments related to sustainability. The Chinese Sustainable Meat Declaration was highlighted as one promising example in this regard.

Third, there is a need for industry to help develop solutions to improve the traceability of supply chains. Existing methods often face challenges related to factors such as blending of materials at the port, but emerging technologies hold the promise to overcome these issues.  

Civil society. There is also a clear role for civil society in helping to educate consumers about the importance of sustainability and help importers build their capabilities on sustainable sourcing. This could include programmes to improve public understanding of sustainable labels, such as Forest Stewardship Council’s FSC labelling. Non-government organizations could also work with major e-commerce players like Alibaba and JD to influence large groups of consumers through various e-commerce platforms.

Finally, there is a need for governments, industry and civil society to come together to work with key jurisdictions with relevant commodities and help them to ramp up potential supply to meet the needs of key emerging markets, such as China. The current volume of supply

Figure 13: Financial institutions can support the development of products to incentivise the adoption of sustainable approaches

Wilmar and ING: Pegging interest rate to sustainability performance

Summary

- In November 2017, Wilmar, the world’s largest processor of palm and lauric oils partnered with Dutch bank, ING, to peg the interest rate of its credit facility to its sustainability performance.
- In this arrangement, certain performance milestones involving environmental, social and governance (ESG) indicators are met, the interest rate for part of the loan will be reduced for the following year.
- Some of these indicators include programs for biodiversity and to reduce greenhouse gas emissions. They also include standards on the scope and quality of social supplier standards.
- Wilmar’s progress will be tracked by a third party - Sustainalytics.
- ING has worked with eight other clients in Europe - including a chocolate and cocoa producer and a health technology company - on similar sustainability improvement loans.

Best practices:

- Start small. Only a portion of the credit facility will be based on this pegged interest rate – creating a good business case for both parties
- Build on past successes. ING has worked with other firms on similar products, using the learnings from those deals to develop Wilmar’s credit facility

Source: Literature review; AlphaBeta analysis
coming from jurisdictions with sustainable development plans in place is still relatively small compared to emerging market demand (see Figure 14). TFA 2020 members could work with key jurisdictions with relevant commodities and help them ramp up potential quantity and quality of supply to meet China needs. This could include a network to support connections between these jurisdictions and Chinese buyers, which could also address issues such as traceability and disclosure.

The shift to sustainable sourcing of commodities will not be easy in China. However, with the right level of collaboration across government, industry and civil society, there are large potential benefits for China in terms of environmental sustainability, resource security and soft power.

Figure 14: Supply from jurisdictions with sustainable production plans would need to ramp up significantly to meet emerging market demand to enhance supply chain sustainability

1 Supply from the 34 jurisdictions with sustainable production plans.
2 Pulp & paper is excluded from analysis as there is limited data on the share of pulp that is sustainably produced
Source: AlphaBeta and TFA 2020 (2017), Understanding the role of jurisdictional approaches to deforestation-free supply chains; FAO STAT; USDA
Appendix: Methodology

Below is an overview of the methodology and key assumptions used in the calculations in this report.

Methodology and data: Emerging market demand

To provide an accurate view of the historic and forecast demand of emerging markets, a range of datasets from national and global institutions was used.

Historical demand

The databases of the United States Department of Agriculture (USDA) and Food and Agriculture Organization of the United Nations (FAO) were leveraged to provide the historical trade data on commodity demand. These agencies were selected as they provided the most comprehensive public datasets on the four commodities analysed in this report.

Table 1: Inputs and sources for historical trade data

<table>
<thead>
<tr>
<th>Area</th>
<th>Commodity</th>
<th>Source and approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demand (in million metric tons)</td>
<td>Soy</td>
<td>USDA Foreign Agriculture Service</td>
</tr>
<tr>
<td></td>
<td>Beef (incl. veal)</td>
<td>USDA Foreign Agriculture Service</td>
</tr>
<tr>
<td></td>
<td>Palm oil</td>
<td>USDA Foreign Agriculture Service</td>
</tr>
<tr>
<td></td>
<td>Pulp and paper</td>
<td>FAO Statistics</td>
</tr>
</tbody>
</table>

2025 estimated demand

To estimate what the demand and traded volumes of each commodity will be in 2025, the OECD-FAO Agricultural Outlook 2017-2026 was utilized to provide 10-year CAGRs, which could be applied to the historical datasets from the USDA and FAO (see Table 1) to estimate the 2025 levels of demand. For simplicity, the trade flow composition (i.e. where each country imports from and volume as a percentage share of total imports) is held constant at the 2015 level.

Media searches

A variety of methods were used to gauge the amount of sustainability awareness in emerging markets, as well as what the ongoing trends were. A scan using internet search engines was conducted using a Boolean string: (“sustainability” AND “sourcing” location: country); with the time periods being: 1/11/16-31/10/17 and 1/11/15-31/10/16.

Additionally, manual checks on government department websites were used to determine which ones are involved in the implementation of the 2030 Sustainable Development Goals Agenda.

Lastly, websites such as Conference Alerts and Global Forest Watch provided information on how many conferences on sustainable development were held in each country, as well as how many international agreements have been signed by countries.

Methodology and data: Supply chain challenges

In the context of this report, “deforestation” is measured as the immediate post-conversion change (i.e. lands being deforested for conversion into pastures or farmland) in land use, attributable to each product by remote sensing (i.e. satellite- or aircraft-based sensor technologies) or another direct study. This means indirect causes (e.g. forest fires) and continued deforestation of land that had already been converted from rainforest were excluded.

Historical deforestation in tropical jurisdictions

Historical annual deforestation data for each commodity in each country was extracted from a report by the USDA. This report collected and standardized deforestation data from a variety of sources, which includes government sources such as the Brazilian INPE PRODES project and other well-regarded research papers on the topic such as Henders et al (2015).
Deforestation attributed to pulp and paper was not calculated due to uncertainties with regard to where the commodity is sourced from.

**2025 estimated deforestation in tropical jurisdictions**

To estimate what the potential deforestation in tropical jurisdictions could be in 2025, we calculated the historical yield rates of the respective commodities by comparing a country’s total production against its total area harvested. This allowed us to estimate the probable yields for each crop in each tropical jurisdiction. Combining the estimated 2025 commodity yields with the 2025 estimated local production values provides the likely amount of land needed to generate the required production.

To estimate the 2025 deforestation attributable to each commodity in each jurisdiction, the 2025 land use requirements are compared against the 2015 requirements, and the share of deforestation that is attributable to each commodity at the 2015 level is held constant.
Emerging Market Consumers and Deforestation

**Figure 15:** General approach to calculate deforestation prevented in 2025 for China only

1. **Deforestation prevented for demand from China only (2025)**
   - Deforestation through land crop/cattle production for China in 2025
   - Deforestation prevented through yield improvements
   - Deforestation prevented through using degraded land

Source: AlphaBeta analysis

**Figure 16:** Modelling approach for deforestation prevented through yield improvements in 2025

1. Deforestation prevented through yield improvement (2025)
   - Land required for China (BAU)
   - Land required for China (post-improvements)
   - Likelihood of deforestation
   - Realisable opportunity

- **A** Land required for China (BAU)
  - Scenario was calculated based on the expected production of the country (in Million Metric Tonnes) – based on FAO-OECD estimates, divided by the historical growth of crop/cattle productivity (i.e. Tonnes/ha)

- **B** Land required for China (post-improvements)
  - Scenario was calculated based on the on the expected production from the country divided by the improved crop/cattle productivity. This was calculated based on a McKinsey report, *Reducing deforestation: The land-use revolution*, which estimates this to be 20-30% for commercial farms and 40-60% for smallholders. For cattle, this was estimated based on *The Nature Conservancy’s, Costs, Benefits and Challenges of Sustainable Livestock Intensification in a Major Deforestation Frontier in the Brazilian Amazon*, which estimates yield improvements at ~300%

- **C** Likelihood of deforestation
  - This proportion (in percentage terms) was calculated based on the 2015 deforestation attributed to the given crop/product (e.g., if deforestation attributed to the crop was 10,000 ha and the land under production was 100,000 ha, the proportion is 10%)

- **D** Realisable opportunity
  - This was calculated based on previous TFA 2020/AlphaBeta work, *Better Growth with Forests: Cattle*. Apply to 10-20% of cattle-intensive agricultural land. *Crop (commercial)*. Assuming that 20-40% of large-scale land area for Brazil and 10-30% for all other countries would lead to yield improvements. *Crop (smallholder)*. Yield improvements applied to 10-20% of the smallholder farms.

Source: AlphaBeta analysis
Methodology and data: Sustainability scenario

This section discusses the approach used to size the impact of the sustainability scenario (including yield improvements and land use reallocation) if enacted in a tropical jurisdiction in which China sources a large share of its import demand.

Deforestation prevented through sustainable approaches

Deforestation prevented from sustainable approaches being adopted in China was calculated based on the deforestation that could be averted through the adoption of yield improvements and land reallocation versus “business-as-usual” (BAU) production estimates (see Figure 15).

Deforestation prevented through yield improvements.

A range of publicly available research was used to assess the potential for improvement (see Figure 16). Yield improvements were determined based on two factors: yield improvement potential through sustainable approaches and the realizable opportunity based on AlphaBeta’s previous work with TFA 2020.

Deforestation prevented through using degraded land.

The total degraded land that was available was calculated based on the total amount of degraded land in the country which was available for the specific crop and the realisable opportunity that this degraded land could be rehabilitated for agriculture (see Figure 17).

Figure 17: Modelling approach for deforestation prevented through using degraded land in 2025

<table>
<thead>
<tr>
<th>2. Deforestation prevented through land reallocation (2025)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong> Total available degraded land for crop/ cattle</td>
</tr>
<tr>
<td>Based on desk research to identify the total amount of degraded land available in the country for the crop (in some cases, where the degraded land available for the crop was unavailable, the number was extrapolated based on total degraded land multiplied by percentage agriculture land to total land).</td>
</tr>
<tr>
<td><strong>B</strong> Likelihood to restore degraded land</td>
</tr>
<tr>
<td>This was calculated based on previous TFA 2020/AlphaBeta work, Better Growth with Forests which suggest it is possible to restore 80% of land suffering low to moderate levels of degradation; and 60% in the case of severe to very severe degradation.</td>
</tr>
<tr>
<td><strong>C</strong> Realisable opportunity</td>
</tr>
<tr>
<td>This was calculated based on previous TFA 2020/AlphaBeta work, Better Growth with Forests which suggests that the opportunity would be between 2-10% based on how degraded the land was.</td>
</tr>
<tr>
<td><strong>D</strong> Share attributed to China</td>
</tr>
<tr>
<td>This was calculated based on the export flows from the producing country to China (after deducting domestic consumption).</td>
</tr>
</tbody>
</table>

Source: AlphaBeta analysis
Emerging Market Consumers and Deforestation

1 TFA 2020, Jurisdictional approaches to deforestation-free production offer a significant opportunity for the TFA 2020 agenda, in TFA 2020 Annual Report 2017.

2 Based on World Bank income classifications: “low-income” economies are defined as those with a GNI per capita, of $1,005 or less in 2016; “lower middle-income” economies are those with a GNI per capita between $1,006 and $3,955; “upper middle-income” economies are those with a GNI per capita between $3,956 and $12,235; “high-income” economies are those with a GNI per capita of $12,236 or more.

3 Note: This is just the imported share of China’s and India’s demand in these commodities. It excludes domestic demand satisfied by local production.

4 Deforestation linked to pulp and paper has not been sized due to lack of available data on deforestation associated with production.


6 See the Appendix for further details on the methodology.

7 Sustainability conferences taken into account include those with global attendance, public- and private-sector participation, and at least one session on sustainable land use and development. See Conference Alerts (2017), Available at: https://conferencealerts.com/topic-listing.php?page=1&ipp=All&topic=sustainable%20development


9 McKinsey Global Institute (June 2016), Capturing China’s $5 trillion productivity opportunity.

10 Boston Consulting Group (December 2015), Re-imagining FMCG in India.


13 Consuming class defined as individuals with an annual net income of above $3,600 at 2005 purchasing power parity (PPP).


15 Based on World Bank income classifications: “low-income” economies are defined as those with a GNI per capita, of $1,005 or less in 2016; “lower middle-income” economies are those with a GNI per capita between $1,006 and $3,955; “upper middle-income” economies are those with a GNI per capita between $3,956 and $12,235; “high-income” economies are those with a GNI per capita of $12,236 or more.

16 Note: This is just the imported share of China and India’s demand in these commodities. It excludes domestic demand satisfied by local production.

17 Note: a lack of supply chain information means that we are unable to show the sourcing patterns for pulp and paper by country.

18 Soy in this instance only refers to soybean and not its other derivatives including soy meal, oil, etc.


21 Based on a definition that anyone who spends $10 or more daily at 2005 PPP levels is part of the “global consuming class”. McKinsey Global Institute (2012), Urban world: Cities and the rise of the consuming class. Available at: https://www.mckinsey.com/global-themes/urbanization/urban-world-cities-and-the-rise-of-the-consuming-class

22 Other forecasts echo the analysis for large growth in the middle class, notably the OECD forecasting an increase of 3 billion people in the middle class, and the Asian Development Bank forecasting a growth of 1 billion more middle class people in Asia. Available at: https://www.oecd.org/dev/44457738.pdf and https://www.adb.org/publications/key-indicators-asia-and-pacific-2010 respectively.


24 OECD (2017), Meat consumption: Beef and veal / Pork meat / Poultry meat / Sheep meat. Available at: https://data.oecd.org/agroutput/meat-consumption.html

25 Comments by participants from various non-government organizations (e.g., Paulson Institute, Solidaridad), government representatives, think-tanks, and experts during a workshop organized by the Paulson Institute, World Economic Forum and TFA 2020 in Beijing on 11 May 2018.


27 AlphaBeta and BSDC (2016), Valuing the SDG prize in Food and Agriculture. Available at: http://www.alphabeta.com/valuing-the-sdg-prize-in-food-and-agriculture
Robust Demand for Oilseeds Continues to Outpace Growth

For example, China’s farm yield averages 1.79 tons per hectare compared to an average farm yield of 2.9 ton/ha in the US. This could leave Chinese farms struggling to keep up with domestic demand, which could spur imports. See: USDA (2017), “China’s Robust Demand for Oilseeds Continues to Outpace Growth in Domestic Production”. Available at: https://gain.fas.usda.gov/Recent%20GAIN%20Publications/Oilseeds%20and%20Products%20Annual_Beijing_China%20-%20%20Peoples%20Republic%20of_3-16-2017.pdf

For instance, China encouraged the continued import of palm oil over other oils, when the government raised import tariffs for both crude and refined vegetable oils by 5% in 2015, while lowering the import duty for palm oil by 5% in 2016. USDA (2017), India: Oilseeds and Products Annual. Available at: https://www.fas.usda.gov/data/india-oilseeds-and-products-annual-1


Deforestation linked to pulp and paper has not been sized due to lack of available data on deforestation associated with production.

Food and Agriculture Organization of the United Nations (2015), Global Forest Resources Assessment 2015 How are the world’s forests changing? Second edition.

See Appendix for full methodology.

Note: Our BAU scenario holds the share of import source countries for China and India and the deforestation associated with additional land requirements in each country/crop to today’s levels. As such, it is only the improvements in yields for each crop that influence land requirements and deforestation impacts.

Comments by participants from various non-governmental organizations (e.g. Paulson Institute, Solidaridad), government representatives, think tanks and experts during a workshop organized by the Paulson Institute, World Economic Forum and TFA 2020 in Beijing on 11 May 2018.


See the NYDF Progress Assessment. Available at: http://forestdeclaration.org/summary/


EU FLEG (2017), Introduction to China’s Timber Legality Verification System. Available at: http://www.euflegt.efi.int/publications/introduction-to-china-s-timber-legality-verification-system


64 Comments by participants from various non-government organizations (e.g., Paulson Institute, Solidaridad), government representatives, think-tanks, and experts during a workshop organized by the Paulson Institute, World Economic Forum and TFA 2020 in Beijing on 11 May 2018.
66 WF (2017), Detailed analysis of the soy and beef supply chain and trade flows in China.
67 WWF (2017), Detailed analysis of the soy and beef supply chain and trade flows in China.
69 WWF (2017), Detailed analysis of the soy and beef supply chain and trade flows in China.
71 World Wide Fund for Nature (2012), Profitability and sustainability in palm oil production. Available at: https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=wb&cd=1&cad=rja&uact=8&ved=0ahUKEwiU6rWUyquXAhVlN8KHEVTREIUQFgmmMAAU&usg=AOnV9ygVtGhV34bnvXAhVlYOY3KH-VTR6iuGFnmmMAAU&sig2=urTHt69eT_H6VqR6u0jKlQ&ust=1578753596820000
72 “Will there really be enough sustainable palm oil for the whole market?”. Mongabay, 7 February 2017. Available at: https://news.mongabay.com/2017/02/will-there-really-be-enough-sustainable-palm-oil-for-the-whole-market/
75 Ibid.
76 Ibid.
77 International Centre for Trade and Sustainable Development (2017), China’s evolving approach to environmental and labour provisions in regional trade agreements. Available at: https://www.ictsd.org/opinion/china-3
78 Food and Agriculture Organization (2014), Principles for Responsible Investment in Agriculture and Food Systems. Available at: http://www.fao.org/3/a-au866e.pdf
84 USDA (2017), International Trade and Deforestation.
86 INPE Observacao da Terra. Accessible at: http://www.obt.inpe.br/obt/assuntos/programas/amazonia/prodes
87 Centro de Sensoriamento Remoto. Accessible at: http://siscom.ibama.gov.br/
88 Spere et al. (2016), Land-Use Change Affects Water Recycling in Brazil’s Last Agricultural Frontier
89 Gunarso et al (2013), Oil Palm and Land Use Change in Indonesia, Malaysia and Papua New Guinea
The Tropical Forest Alliance 2020 is a dedicated platform for public-private cooperation, working to help organizations achieve their deforestation-free commitments. The mission of TFA 2020 is to help producers, traders and buyers of forest risk commodities achieve their commitments to deforestation free supply chains. TFA 2020 is funded by the governments of Norway, the Netherlands and the United Kingdom and is hosted at the World Economic Forum. It fosters cross-sector collaboration and involves more than 140 partners working across Latin America, Africa, and South East Asia.

The World Economic Forum, committed to improving the state of the world, is the International Organization for Public-Private Cooperation. The Forum engages the foremost political, business and other leaders of society to shape global, regional and industry agendas.