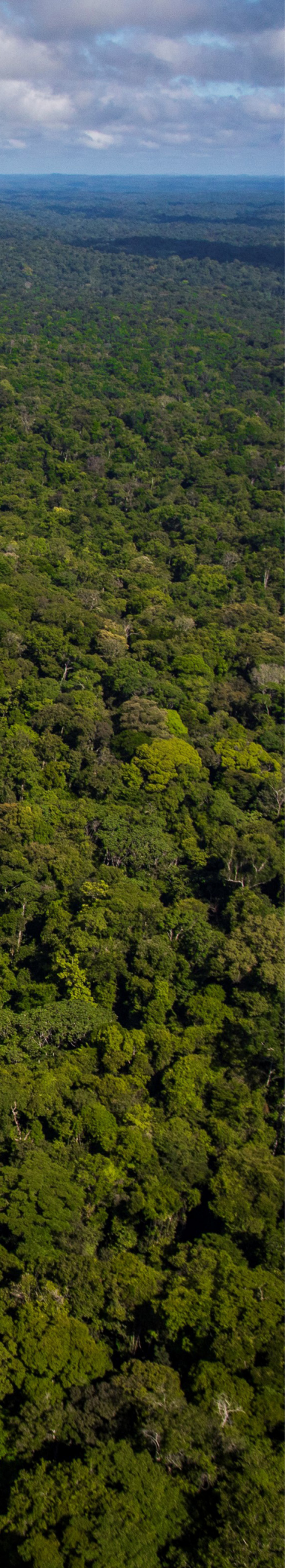
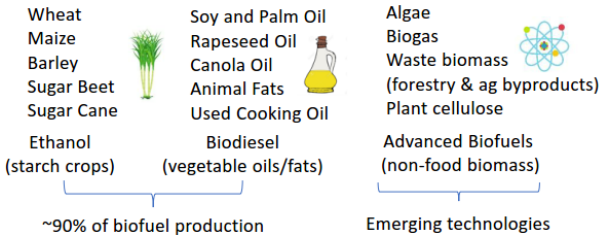


Commodity Market Intelligence Update No. 5

Trends in Food Commodities and Bioenergy

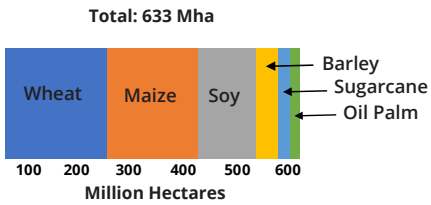
The world's growing energy requirements are driving demand for crops that risk encroaching on valuable ecosystems. Bioenergy, including fuels made from food commodities, provide half of all renewable energy use and are expected to lead growth in renewables over other sources like solar, wind, and hydropower. With nearly 40% of the planet's landmass currently used for agriculture and food systems already facing a tipping point, rising bioenergy demand could place additional pressure on the world's frontiers of land conversion, including biodiverse and carbon-rich forests, grasslands, peatlands and other critical habitats.

Figure 1
Types of Biofuels



Note: Ethanol is primarily used in gasoline-power vehicles, while biodiesel is used in diesel-powered engines like trucks and planes.

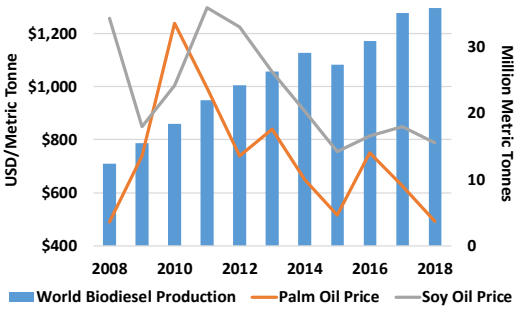
Figure 2
Major World Crops by Area



Source: FAOSTAT, most recent harvested area for all uses, including food, feed, and fuel. Portion of area dedicated to fuel varies by crop.

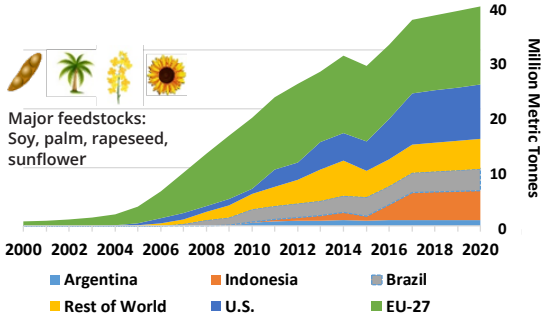
As emphasis on renewable energy grows, future land use for agriculture will be driven by the competing demands of food and fuel. Bioenergy could require as much as 1.8 billion hectares of land by 2050, with crops already covering over 600 million hectares of land facing increasing demand as energy sources (Figures 1 and 2 above). Consumption of biodiesel has doubled in a decade as vegetable oil prices have declined, with growing utilization among soy and palm oil producing countries able to use local feedstocks (Figures 3 and 4 below). Ethanol crops like maize, wheat, and sugar also face escalating demand from unprecedented car ownership, while demand for the crops as food may simultaneously rise a third by 2050.

Figure 3
Biodiesel Production & Vegetable Oil Prices



Global production of biodiesel is growing rapidly, with soy and palm oils providing inexpensive and widely used feedstocks.
Source: IMF, U.S. EIA. Excludes ethanol

Figure 4
Largest Biodiesel Consuming Countries



Biodiesel feedstocks are often sourced domestically; Brazil, Argentina, and the U.S. primarily use soy oil, while Indonesia uses palm oil.
Source: U.S. EIA. Excludes ethanol. Years 2019 and 2020 are forecasts.

These trends are increasing awareness of indirect land use change, where crops grown for fuel displace crops grown for food, potentially raising lifecycle emissions of biofuels from deforestation and habitat conversion and adding a new ramification for countries, companies, and consumers seeking to reduce their carbon footprint by transitioning to renewable fuels. Land use concerns are already beginning to frame energy policies, including the E.U.'s move to potentially phase out the use of palm oil biodiesel. However, any shift away from a single energy crop is likely to result in higher demand for others, including soy, maize, wheat, and sugarcane, each with their own environmental tradeoffs. The growth of bioenergy is entwining transportation, responsible for 14% of global greenhouse gas emissions, with the agriculture, responsible for a further 24% of emissions. Ensuring bioenergy does not contribute to the loss of the world's forests will be vital as alternatives to fossil fuels gain ground in powering the global economy.

Commodity Market Intelligence Update is a publication of the Good Growth Partnership's **Responsible Demand** Project. Topics covered in *Intelligence Updates* do not necessarily reflect the activities of the Good Growth Partnership.

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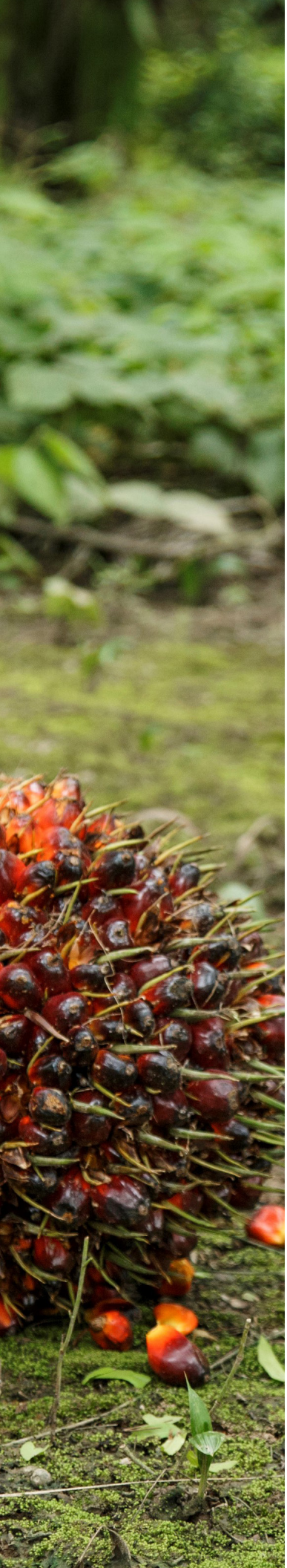
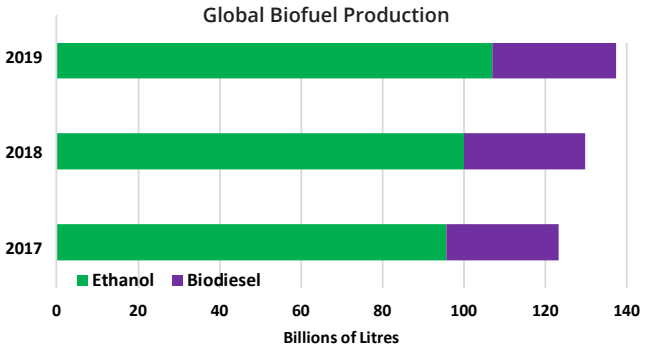


Spotlight on Energy Crops

Biofuels are intended to contribute to mitigating climate change by delivering lower net greenhouse gas emissions than fossil fuels, forming part of a broader transition to renewable energy.

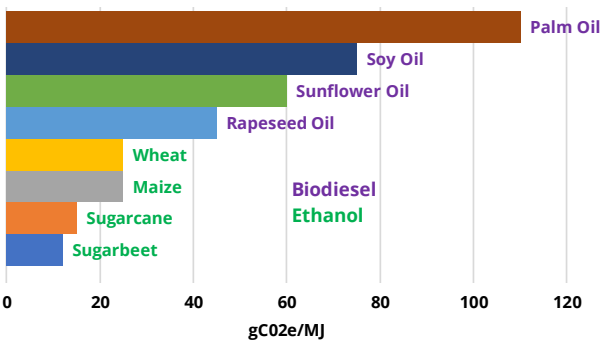
However, with production of crop-based fuels like ethanol and biodiesel growing 5% a year, a debate is emerging about which types of biofuels are best positioned to help decarbonize the global energy system, and what new technologies and investments may be needed.



Source: FO Licht via Bloomberg Intelligence. Year 2019 is a forecast.

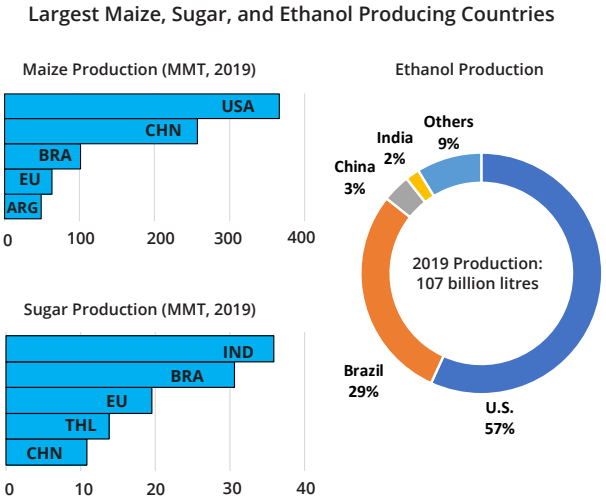
Central is the growing discourse on indirect land use change, a difficult-to-measure estimation of how cultivation of fuel crops displace crops grown for food and feed, potentially expanding agricultural land into areas with high carbon stocks like tropical forests, peat, wetlands, and grasslands.

Estimates indicate that vegetable oil crops like soy and palm oils (which constitute 55% of biodiesel production) have the highest risk of emissions from indirect land use change. The current classification of ethanol crops like wheat, maize, and sugarcane, as "low risk" biofuel feedstocks may push regulators and producers to emphasize them as the global shift to renewable energy continues.



Source: Adapted from Malins 2019. Average of iLUC emissions from four studies. gC02e/MJ is grams of C02 emitted per mega joule of energy produced.

Demand for ethanol (75% of which is currently produced from maize and sugar) is expected to rise nearly 20% in the next decade. While Brazil and the U.S. will continue to lead global production, other maize and sugar producing countries, including India, China, Thailand, and Argentina, may be incentivized to increase production to supply the growing market.

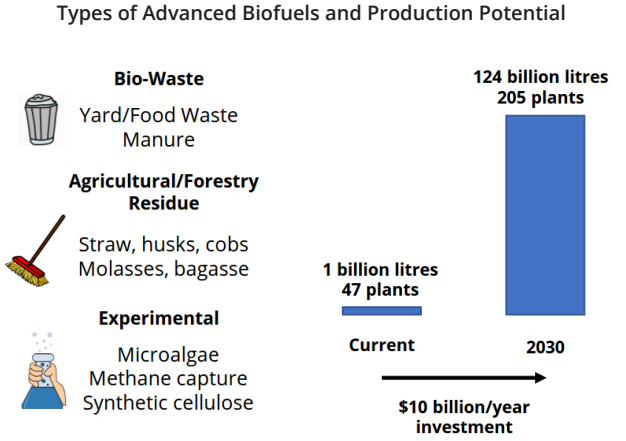


Source: Bloomberg Intelligence, USDA. MMT is million metric tonnes, 2019 estimates.

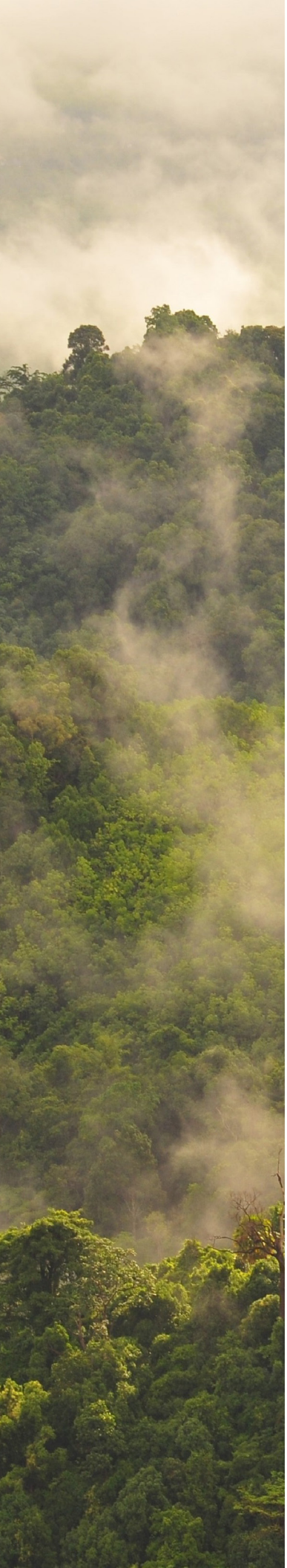
Companies are also strategically responding to these trends. Anticipating biofuels gaining importance over oil and gas in the global energy mix, BP is merging its ethanol operations with agricultural trading giant Bunge, forming the world's third largest sugarcane processor. Faced with saturation in the U.S., other companies, including ADM, are betting on markets with rising renewable energy goals like China and India to support future ethanol demand.

At least $27 trillion of investment is needed by 2050 to support a full transition to renewable energy. Large-scale investment and commercial-ization of advanced biofuels made from non-food feedstocks provide an emerging opportunity to de-link bioenergy from land use change, ensuring its growth does not come at the expense of high conservation value ecosystems.

Currently, high production costs, low market access, and a lack of downstream infrastructure present opportunities for government, business, international organizations and NGOs to enhance capacity to mainstream advanced biofuels as part of a global shift to renewable energy.



Source: IRENA Renewable Energy Roadmap



Bioenergy Platforms

	Membership	Mission	Current Initiatives
IRENA International Renewable Energy Agency	160 governments	Support bioenergy through policy advice, knowledge sharing and technology transfer	Technology pathways and investment needs for global energy transformation by 2050
biofuture platform Kickstarting a global, advanced bioeconomy	20 governments	Policy dialogue among large biofuel producing and consuming countries	Promotion of crop biofuels at COP, annual convening of policymakers, industry, and researchers in São Paulo
ETIP Bioenergy European Technology and Innovation Platform	EU research organizations, private sector, government	R&D supporting the development of low carbon technologies in Europe	Applied research and testing of advanced biofuels in Europe

New Tools for Sustainable Commodity Supply Chains

Accountability Framework

14 international and regional civil society partners have launched the Accountability Framework Initiative (AFi) to accelerate progress and improve accountability related to ethical supply chain commitments. The AFi provides a set of common definitions, norm and guidance for establishing, implementing and monitoring supply chain commitments in agriculture and forestry, including a global consensus on what is a forest or natural ecosystem, and what constitutes deforestation or ecosystem conversion.

By providing a unified direction on how to deliver ethical supply chains, the AFi will help companies, governments, civil society, and producers halt deforestation, protect natural ecosystems, respect human rights, and support livelihoods across countries and commodities supply chains.

evidensia
informing action for a sustainable future

With rising commitments by government and business to tackle sustainability challenges, the need for understanding what approaches work where, why and how is growing. To meet this critical need, ISEAL Alliance, Rainforest Alliance, and WWF have launched Evidensia, an interactive platform to access and interpret credible research on the sustainability impacts and effectiveness of supply chain initiatives, tools, standards, and certifications.

Evidensia synthesizes findings from reports, documents, images, infographics, video, and audio into visual summaries, maps, and knowledge matrices to help users interpret and understand evidence and evidence gaps on a host of sustainability issues. Users can filter research by approaches and tools, issues and outcomes, sectors, products, countries, regions, Sustainable Development Goals, and more to help inform policy actions and build sustainable supply chains based on clear, evidence-based understanding.

GLOBAL FOREST WATCH PRO

In partnership with the private sector, Global Forest Watch has launched GFW Pro, a new made-for-business tool to analyze and manage deforestation risks in commodity supply chains. By translating GFW's geospatial data into custom dashboards, GFW Pro enables financial institutions, commodity producers, and consumer goods companies to easily monitor risks, prioritize engagement with suppliers, and demonstrate compliance with sustainability commitments and policies, without requiring specialized staff or systems.

GFW Pro features the ability for users to securely upload locations of farms, production facilities, or entire investment portfolios to monitor deforestation risks in near real-time. Users can also map and assess supply chain risks from 1,800 palm oil mills across major palm oil producing countries. GFW Pro's forest monitoring power be can applied to any agricultural commodity, anywhere in the world.

Commodity Market Intelligence Updates examine demand trends and emerging issues in forest-risk agricultural commodity supply chains. For more information, contact Owen Hauck at owen.hauck@wwfus.org.