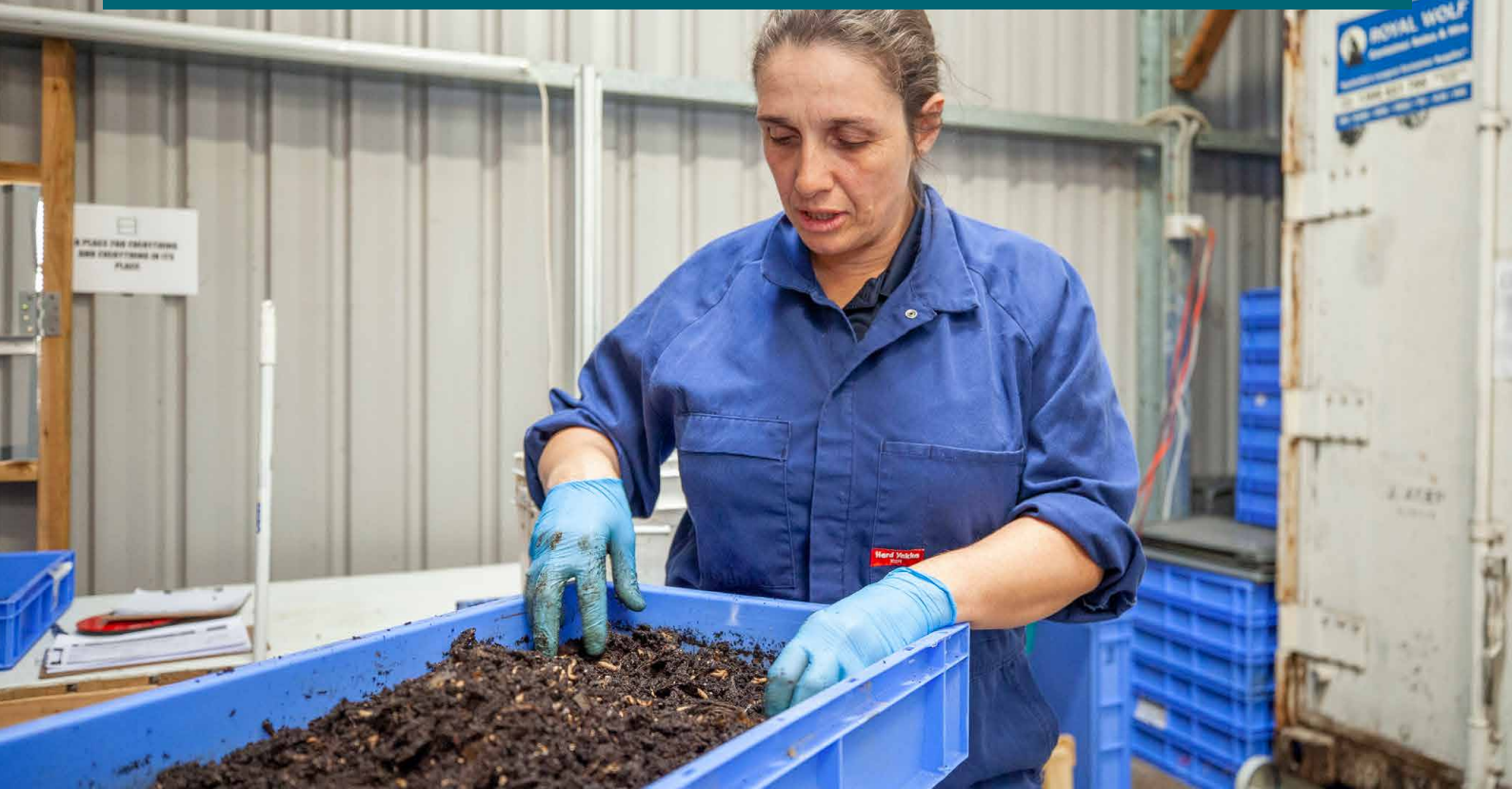


Australia: Food and Land Use



Olympia Yarger, CEO of the organisation GoTerra in Canberra, Australia. GoTerra uses robotic technology to manage food waste using insects, as well as creating high protein insect meal and valuable, nutritious soil conditioner.

Context

Australia is the most arid continent, with a highly variable climate and diverse environment. Over the past century, its ambient temperature has increased by 1-degree Celsius, and is projected to rise by a further 0.4 to 2-degrees Celsius by 2030. Agricultural land is increasingly under strain from climatic impacts, compounded by a history of intensive agriculture in a fragile environment. Although farmers have made important advances in land management, soil health is under threat. Almost 50 percent of soils in key agricultural regions are acidified, while soil carbon levels are historically low and the risk of erosion has grown with greater frequency of drought, flood and loss of ground cover. These processes threaten productivity, reduce crop choice and constrain yields.

Agriculture contributed three percent of Australia's GDP in 2018, with agricultural exports worth \$44.8 billion. As one of the world's largest exporters of beef, Australia has major impacts on other countries and industries. For instance, 1 million metric tonnes of soybean meal for animal feed was imported in 2018, a key commodity that is driving global deforestation. Australians also consumed three times the global average of meat per person a year, positioning the industry as central to both diet and economy.

Critical transitions

National government policy and analysis – including national research agency CSIRO's National Outlook 2019 – addresses all ten of the critical transitions set out in this report. Four of the key transitions include:

1

Healthy diets. The Collective for Action on Obesity has called for "concrete, comprehensive action and funding" to implement the National Obesity Strategy, as well as a "whole of society" response to tackling the "obesogenic environment". Successful pilot projects include the New South Wales government's Healthy Children's Initiative, which provides training and public education on healthy diets and exercise in schools and health centres across the state.

2

Productive and regenerative agriculture. Australia has produced pioneers of regenerative agriculture, particularly among graziers, although many practices remain hotly debated and outside the mainstream. Small-scale impact investors such as Odonata are demonstrating the power of blended finance models to support sustainable agriculture, including in Tiverton, Australia's first remnant-vegetation-only farm on volcanic plains grassland. Meat and Livestock Australia has set a 2030 carbon neutral target for the industry, with an R&D programme intended to deliver that goal. The Queensland State Government has committed to establish an AUS\$500 million fund offering additional revenue for farmers adopting practices that reduce water consumption and run-off from nutrients, sediments and chemicals, especially in the Great Barrier Reef catchment. In recent years, attitudes to the environment among regional communities have begun to shift, supported by the grassroots efforts of the non-profit, farmer-led Farmers for Climate Action.

3

Protecting and restoring nature. Australia's diverse and valuable ecosystems – from perennial and hummock grasslands to temperate, old-growth forests and the Great Barrier Reef – are at risk from infrastructure development, agricultural run-off, invasive species, natural resource extraction and climate change. Efforts are being made to protect and restore these vital ecosystems, ranging from mangrove rehabilitation to forest protection and sustainable tourism around the Great Barrier Reef. Greening Australia's Reef Aid programme works with farmers, communities and indigenous leaders to prevent agricultural runoff, rebuild eroding gullies and restore vital coastal wetlands in the Great Barrier Reef catchment. The WA Forest Alliance continues its 30-year campaign to win permanent protection for native forests in the south-west of Western Australia, while Greening Australia is working to create the country's biggest carbon sink and establish one million hectares of habitat in the Great Southern Landscapes.

4

Food loss and waste. Australia has a national strategy to halve food loss and waste, including a National Food Waste Baseline Report published in early 2019, focused on measurement, policy and innovation. It has also established the Fight Food Waste Cooperative Research Centre in Adelaide. Australia boasts a range of pioneers in reusing food waste, including GoTerra, a company that produces insect protein from food waste with minimal water requirements in shipping containers, and Yume, an online marketplace for quality surplus food.

China: Food and Land Use



Chen Li (on the left) and Li Jian (on the right) working in the Beijing Farmers Market shop in the Jin Xing Yuan residential area of Beijing, China.

Context

China is a vast country of 9.6 million square kilometres that has made great strides in feeding its population of 1.4 billion people – 18 percent of the global population – on only nine percent of the world's arable land. At the same time, it faces enormous environmental challenges related to food production, including climate change, declining arable land area, groundwater depletion, water pollution, widespread soil degradation and pollution, and over-use of chemical fertilisers and pesticides. The country's nutrition and health challenges are also growing, following its recent transition from a traditional diet high in fibre and fresh vegetables to a high-fat, high-salt and low-fibre model with rising amounts of ultra-processed and fast food. About 11 percent of the population is now diabetic and 12 percent obese. Food loss and waste is also a significant problem – consumers in big cities alone waste enough food to feed 30 million to 50 million people.

Agriculture contributed 7.2 percent of China's GDP in 2018, with total agricultural imports of about \$137 billion and exports of about \$80 billion. As the largest agricultural market in the world, China has major impacts on other countries. For instance, it is the largest importer of timber and soy (accounting for two-thirds of global soy imports) and the second-largest importer of beef, palm oil and lumber – all commodities that lead to deforestation.

In recent years, China has made progress on afforestation and "ecological zoning" to protect critical habitats, important in a megadiverse country that is home to ten percent of the planet's plant species and 14 percent of its animal species. China has also taken steps to reform agricultural subsidies. Since 2015, subsidies and preferential policies on electricity, gas, transport and tax incentives for chemical fertiliser production have been gradually reduced or cancelled, leading to a decline in chemical fertiliser use. Since 2017, pilots have been rolled out in 100 counties to replace chemical fertiliser with organic fertiliser.

Critical transitions

Each of the ten critical transitions is addressed by government policy. Priority transitions identified by FOLU China include:

1

Healthy diets. China's revised Dietary Guidelines for Chinese Residents (2016) and the Food Pagoda, a visual guide to the different food groups, provide a solid foundation for healthy diets and are widely available in schools and the health care system. Further measures are needed to limit growth in meat consumption and curb consumption of the ultra-processed foods and fast foods that are leading to rising rates of obesity, diabetes and other non-communicable diseases.

2

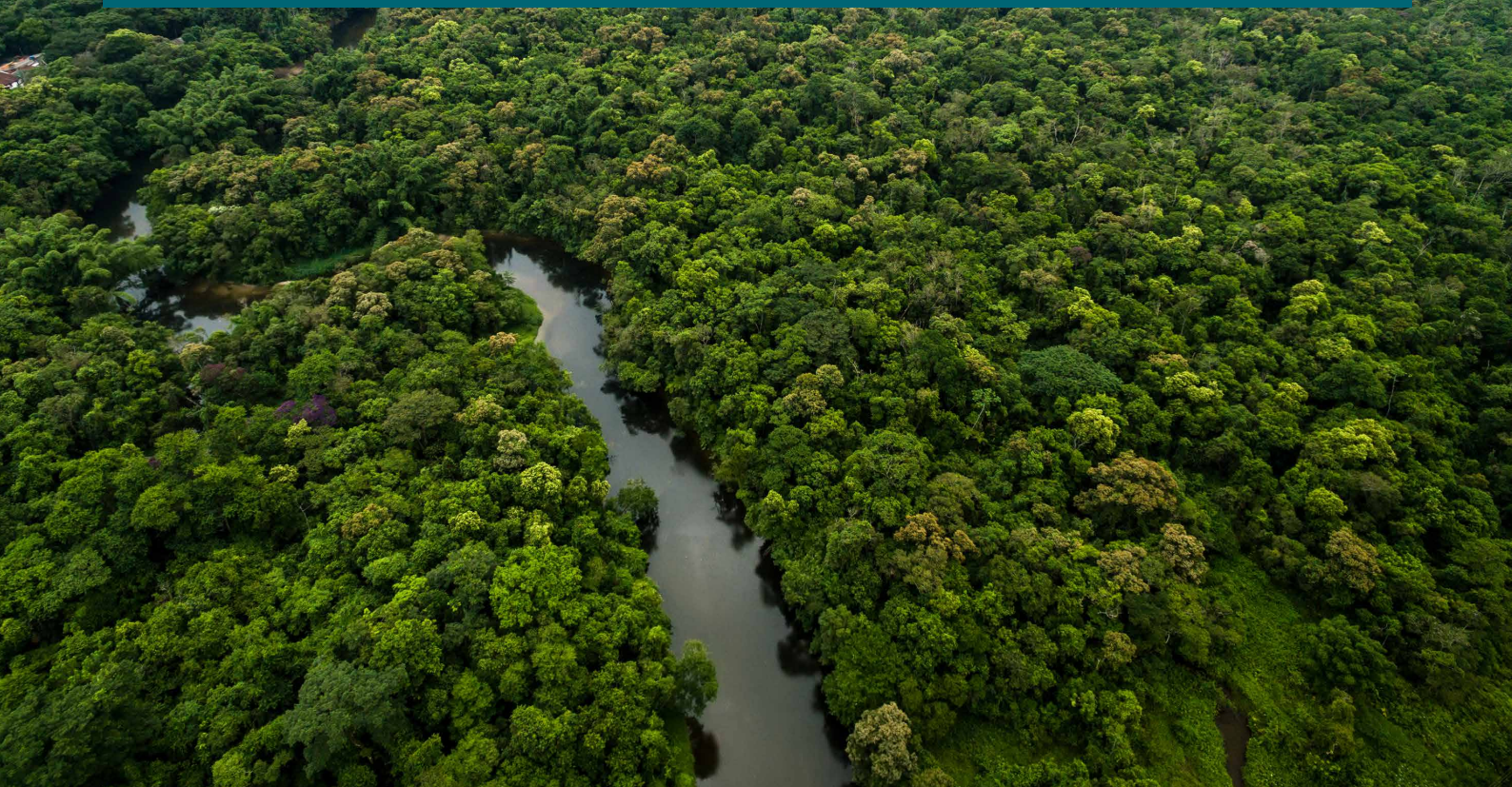
Productive and regenerative agriculture. A combination of top-down and bottom-up initiatives are contributing to the spread of productive and regenerative agriculture in China. As well as policies to curtail chemical fertiliser subsidies and promote the use of organic fertiliser, initiatives include increasing the use of crop residues, promoting crop rotations and fallowing, and establishing 40 sustainable agriculture demonstration sites around the country. At the same time, a growing number of new farmers – many of them young and college-educated – are establishing ecological farms and supplying the burgeoning domestic market for sustainably produced foods. Improved rural infrastructure, health care and educational facilities are needed to keep these new farmers in the countryside.

3

Protecting and restoring nature. China plays a pivotal role in the supply and demand dynamics for key agricultural and forest commodities that are associated with deforestation, such as soy, palm oil, beef and timber. As such, a commitment to ecologically friendly supply chains on the part of corporate and government actors, through sustainable sourcing, procurement and other measures, could make an enormous contribution to curbing deforestation around the world.

4

Food loss and waste. China has set targets of reducing annual food losses by 13 million tonnes by 2020 – a 40 percent drop compared with current levels. To achieve this target, the country has adopted measures to reduce food losses at source and from processing, circulation, transportation and consumption. For instance, by investing in advanced grain storage equipment, storage losses have already fallen by six percent compared with the national average before 2015.



Context

Colombia is the world's second-most biodiverse country, and home to a striking variety of landscapes, climates and soil types. With a population of 50 million people, the country is also characterised by great disparities of wealth between urban and rural populations. Some 27 percent of its land mass (almost 32 million hectares) is devoted to extensive cattle ranching, while only seven percent is used by other forms of agriculture (when the ideal use of its soil types would suggest the reverse). Agriculture accounted for 6.3 percent of GDP and 19 percent of the country's exports in 2017. The value produced per hectare of cultivated land is less than one-third of that produced by OECD countries. High rates of informality and inequality persist: smallholders represent 65 percent of the population and hold less than two percent of the land, while large landowners own 65 percent of the land and represent just 1 percent of the population.

Productivity rates among farmers and forestry workers are the lowest among all national industries. Colombia also has one of the highest rates of agrochemical use in Latin America, although this has not led to overall increases in agricultural production. While deforestation has risen significantly – nearly 198,000 hectares of forest were lost in 2018 – national plans to reduce deforestation and promote restoration are in place. Meanwhile, 50 percent of Colombia's national territory is marine, and the national government has declared its ambition to improve marine governance, ensure better fisheries management and raise the consumption of marine protein.

Approximately one-third of all food intended for human consumption in Colombia is lost or wasted between the farm and the fork each year. This equates to nearly \$5.4 billion in economic losses, at a time when more than half of Colombian households do not have enough food to live a healthy and active life. At the same time, rates of malnutrition and obesity cost the state at least \$1.5 billion a year in lost economic activity.

Critical transitions

Colombia's National Development Plan (2018 to 2022) addresses each of the ten critical transitions in different ways. FOLU Colombia has also developed a comprehensive Roadmap for a New Food and Land Use Economy for Colombia which speaks to the transitions, including priority actions on the following four:

1

Healthy diets. The national government has approved a new food loss and waste law that will be delivered with the support of FOLU Colombia members. An equivalent law on nutrition and food security, which proposed regulation on labelling ultra-processed food and sugar beverages to address unhealthy diets, did not pass through Congress. The FOLU Coalition is supporting the governments of Antioquia and Bogota to promote healthy diets among schoolchildren, with the aim of these approaches being adopted nationwide.

2

Productive and regenerative agriculture. The FOLU Coalition is working in partnership with regional governments, including those of Quindio and Urabá, to deliver a new vision to increase agricultural competitiveness while ensuring the adoption of more regenerative agricultural practices. It also supports public and private actors to deliver on their commitments to reduce fertiliser and pesticide use, and to expand investment in agroforestry systems including cocoa and coffee growing and silvopastoral livestock. A shift from extensive cattle-grazing systems to more productive, silvopastoral systems, using less land, would be a major contribution to transforming food and land use systems.

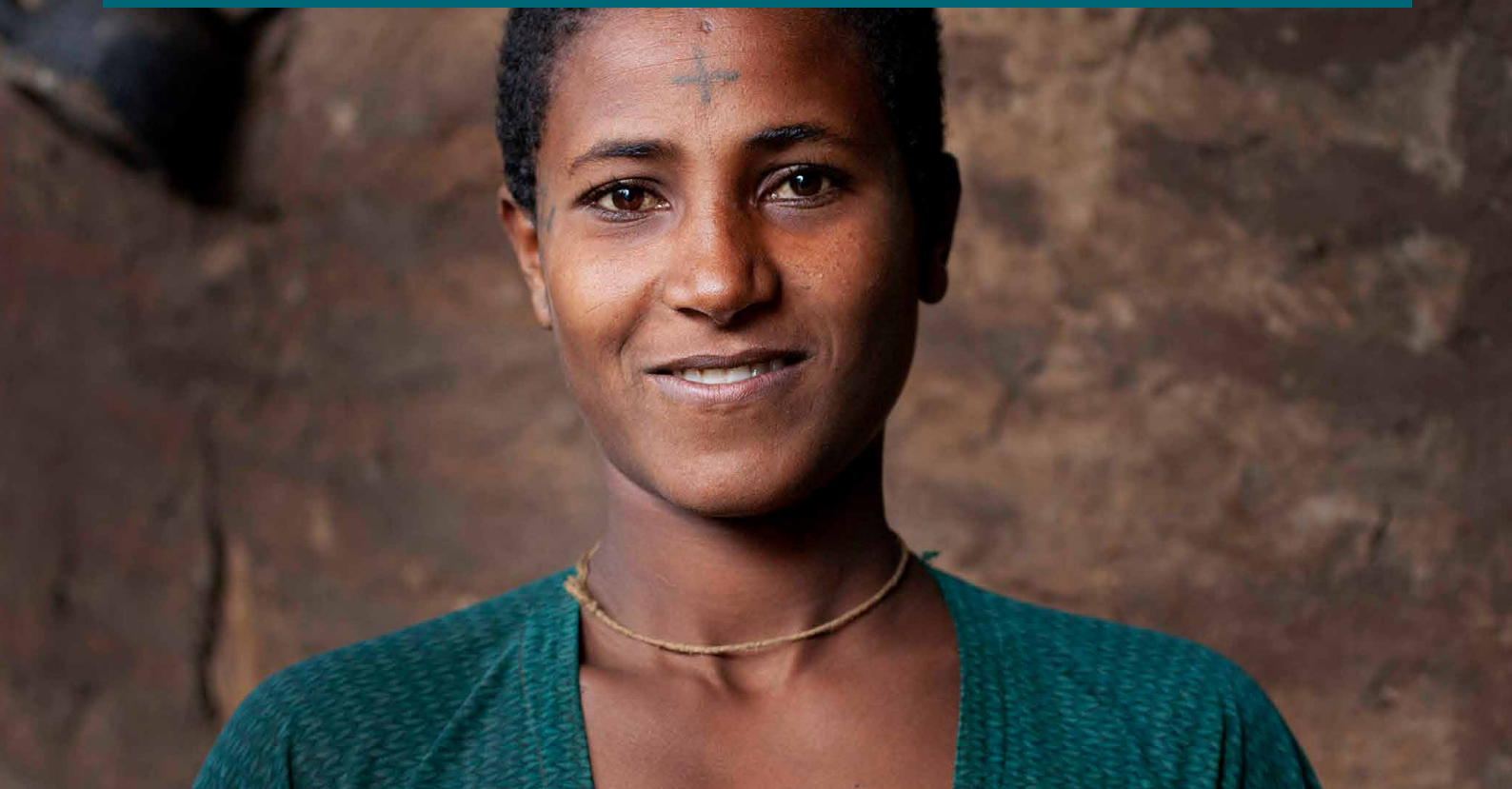
3

Protecting and restoring nature. Colombia has an ambitious national anti-deforestation strategy, which it is working hard to implement. The strategy includes strengthened policing and governance in deforestation hotspots and increased flows of finance (including from the national carbon tax) to efforts to support conservation and sustainable use of forest resources in particular territories.

4

A protected and productive ocean. Colombia has sought to broker a "regional pact for the ocean", focused on enhancing ocean governance, improving the extent and management of marine-protected areas, and supporting the transition to more sustainable fisheries models.

Ethiopia: Food and Land Use



Balaynesh Kasa farms hops at a watershed restoration and homestead development in Bahir Dar, the Amhara Region of Ethiopia. This provides her with enough income to support her family and send her four children to school.

Context

With a population of 112 million people, Ethiopia is the second-most populous nation in Africa and the fastest-growing economy in the region. Despite persistent efforts over the past half century or more by various governments to transform the country from an agriculture-based economy into a manufacturing hub, agriculture remains the most important sector, contributing to almost half of GDP, 83.9 percent of exports and 80 percent of total employment.

Food and nutrition security remain a core challenge, despite impressive economic advances. Some 29 percent of people suffer from micronutrient deficiencies. Weather-related drought remains one of the key causes of food insecurity, contributing to high rates of chronic malnutrition that cost the country 16.5 percent of GDP each year. Exacerbating this are rates of post-harvest food losses reported to range from 30 to 50 percent.

Broader economic losses attributable to land degradation associated with land use and cover change in Ethiopia are estimated to be in the order of \$4.3 billion a year. Similarly, continuing high rates of deforestation and land degradation threaten the natural resources on which many Ethiopians depend.

Critical transitions

The Ethiopian government is committed to action across nine of the ten critical transitions (excluding the ocean). Among its priorities are the following four:

1

Healthy diets. While good progress has been achieved in reducing chronic child under-nutrition in Ethiopia, levels are still high. A greater supply of and access to protein, fresh vegetables, fruits and legumes could boost diet diversity with positive health impacts for children and pregnant women in particular. Existing government and community programmes to end child malnutrition can be further scaled up. Future agricultural commercialisation and agro-processing can increase the supply of safe food including protein, fresh vegetables, fruits and legumes. Policies and incentives can be put in place to encourage the consumption of healthy food and the avoidance of unhealthy habits.

2

Productive and regenerative agriculture. Through its Agricultural Transformation Agenda, Ethiopia has embarked on a nationwide effort to commercialise smallholder farming and pursue more sustainable and regenerative agricultural practices, ensuring that the country optimises its use of land in accordance with soil type and meteorological conditions. In designated Agricultural Commercialisation Clusters, FOLU is collaborating with the Agricultural Transformation Agency to pilot models that encourage sustainable agricultural commodity production through innovative value chain alliances, and incentives that encourage sustainable resource management within agricultural landscapes. The commodities involved include barley, wheat, sesame and teff (a fine grain), and interventions include linking farmers' cooperatives to special economic zones.

3

Protecting and restoring nature. Ethiopia has been a global leader in landscape restoration, including a recently launched, massive tree planting campaign. Coupled with a renewed effort to protect remaining standing forests (and other ecosystems of value), this will provide immediate benefits to rural land users and is essential to secure viable food and land use systems for coming generations. Commercial opportunities lie in encouraging markets for sustainable wood and forest products, establishing deforestation-free coffee landscapes and value chains, and providing incentives for water-related ecosystem services.

4

Food loss and waste. The bulk of food loss and waste occurs between harvest and arrival at the processor or manufacturer. This inefficiency wastes millions of dollars every year, undermines farmers' incomes and exacerbates food and nutrition insecurity. There is so far no robust national data available on this issue, even though it is expected to become increasingly important with anticipated shifts in rural-urban demographics, diets and consumption patterns.

Ethiopia can pursue a two-step approach to make its food system more efficient. The first step is to reduce post-harvest loss for agricultural commodities prioritised under the Agricultural Transformation Agenda. Second, the country needs to measure and report loss and waste systematically across all agricultural commodities and use the data to develop national strategies and guide public and private sector commitments to action.



Workers harvesting bananas in the fields at Tandalwadi village in Jalgoan, India.

Context

India is home to about 17 percent of the world's population, 15 percent of its livestock, eight percent of its biodiversity, nine percent of its arable land, and four percent of its water resources. While India is self-sufficient in food production, 39 percent of its population is under-nourished and it ranks 103 out of 119 countries in the 2018 Global Hunger Index. Small and fragmented landholdings, poor access to credit and modern inputs, high dependence on rainfall, and inadequate processing infrastructure are key constraints. Capital investments in agriculture have a bias towards irrigated areas, with rural employment programmes being seen as the main solution to the crisis facing rainfed and dryland areas.

Climate risks to food security, livelihoods, water supply and human well-being are projected to increase with rising temperatures. Changes in rainfall patterns, along with heatwaves and reduced availability of water, could lower farm incomes by 20 to 25 percent in the coming decades.

Agriculture contributes about 17.4 percent of Gross Value Added (GVA) and 12.8 percent of total exports. Some 70 percent of rural households depend on agriculture, with 82 percent of farmers being small and marginal. Forest cover accounts for 21.5 percent of the country's area, with trees outside forests contributing a further 2.8 percent of green cover. Forests are the lifeline of at least 250 million Indians who depend on them for food, fuel, fodder and non-timber forest products. At the same time, degradation affects one-third of the land, at a cost of about 2.5 percent of GDP.

Critical transitions

All ten critical transitions are addressed in national government policy. The following four are priorities:

1

Healthy diets. To tackle lifestyle diseases, the Eat Right Movement, launched by the Food Safety and Standards Authority of India in 2017, ushered in a new food culture by nudging businesses and consumers to cut down on salt, sugar and trans-fats. The government passed a National Food Security Act in 2013 that provides legal entitlements for food and nutritional security. This includes the Midday Meal Scheme for schoolchildren, an Integrated Child Development Services scheme for expectant and lactating mothers and their infants, and a Public Distribution System to ensure food grains are available at affordable prices to poorer families.

2

Productive and regenerative agriculture. Recognising the effects of input-intensive and environmentally exploitative agricultural production, as well as the adverse impacts of climate change, the National Mission on Sustainable Agriculture has laid out the broad contours of a plan to transform agriculture. Several state governments have taken strong action in recent years to promote sustainable practices, including a Zero Budget Natural Farming programme in the state of Andhra Pradesh.

3

Protecting and restoring nature. The government has set domestic targets, including under the National Mission for Green India to restore, maintain and improve forest cover. The Forest (Conservation) Act of 1980 contains stringent provisions against diversion of forest land for non-forest purposes, but its implementation is coming into increasing conflict with infrastructure development, urbanisation, mining, power generation and shifting cultivation. The 14th Finance Commission of India has established the largest ecological fiscal transfer in the world, through horizontal tax devolution and incentives to states to protect and restore their forests.

4

Stronger rural livelihoods. Several policy measures aimed at increasing farmers' incomes, as well as reducing the cost of cultivation, have been launched by the government, including improved resource efficiency (more crop per drop), drought-resilient seeds and nutrient use, integrated pest management, promotion of agroforestry, in situ conservation of biodiversity to tackle climate change, and expansion of integrated farming systems. The National Rural Livelihoods Mission of the Union Government, for instance, is creating self-help groups to increase opportunities for women in agriculture and create livelihood opportunities in off-farm and non-farm sectors.



A farmer climbs up a palm sugar tree to collect sap at a forest in Sintang regency, West Kalimantan, Indonesia.

Context

kers and their families depend on the oil palm industry, which generates 20 percent of national export earnings (equivalent to \$17.7 billion a year), while at least seven million work on other food crops – including four million on livestock and three million in horticulture.

The ocean is responsible for eight percent of GDP. As the world's second-largest fish producer, marine-capture fisheries and aquaculture together employ seven million people and generated export earnings of \$4.1 billion in 2017. Fish contribute 52 percent of all animal-based protein in the national diet.

Climate change and natural resource degradation are likely to halve potential GDP growth, from seven percent to 3.5 percent, by 2050. The negative economic impact of peat fires in 2015 was estimated at \$16 billion. Deforestation, forest and peat fires and land use change are responsible for at least 55 percent of Indonesia's greenhouse gas emissions. Rates of deforestation declined significantly in 2017 and again in 2018 but remain high in absolute terms.

Indonesia has one of the world's highest per capita rates of food loss and waste, including of fish, reaching an estimated 300 kilograms per capita a year. This is the result of a combination of factors, including poor infrastructure and complex value chains between farm (or port) and fork.

High levels of malnutrition – up to one in three children is stunted by malnutrition – when taken together with obesity and diabetes, lead to GDP losses of on average two to three percent a year.

Critical transitions

National government policy in Indonesia addresses each of the ten critical transitions set out in the report. Of these, the following four have the highest priority:

1

Healthy diets. Ensuring a healthy and nutritious diet to reduce stunting and maternal and child mortality is one of the strongest political commitments made by President Jokowi for his second term in government. Particularly critical here will be nationwide policies to promote healthy diets in the first 1,000 days of life, through breastfeeding and qualified complementary feeding, in schools, communities and faith groups; to regulate advertising and marketing of sugary junk food and beverages, especially to children; and to increase investment in universal access to health coverage.

2

Productive and regenerative agriculture. Indonesia's agricultural value chains are characterised by high rates of smallholder poverty, soil erosion and food loss and waste. Innovations in value chains, such as the fast-growing e-commerce and app community, are causing a productivity revolution. Companies such as STOQO are enabling smallholder producers to supply fresh fruit, meat and vegetables directly to urban consumers, ensuring better incomes for producers and reduced loss and waste. Technological advances in oil palm plantations are increasing productivity, meaning that Indonesia can meet its oil palm expansion goals without further encroachment on forests.

3

Protecting and restoring nature. Indonesia has made its moratorium on expansion into primary forest and carbon-rich peatlands permanent, equating to the protection of an area of 66 million hectares, and an over 80 percent reduction in peat conversion in 2017 and 2018. Additionally, it has committed to the One Map policy it has instituted across government, which reconciles competing claims on the land from different sectors. The national government is exploring the establishment of an ecological fiscal transfer mechanism to maintain areas of high forest cover, as well as ongoing policy and financial support for peatland conservation and restoration.

4

Healthy and productive ocean. Indonesia has a national plan for its ocean, including a planned expansion of its marine-protected areas network and a commitment to ensure more sustainable fisheries management. To achieve these commitments will require political will, joined-up government and increased investment.

The Nordics: Food and Land Use



Context

The food and land use systems of the Nordic region (Denmark, Finland, Iceland, Norway and Sweden) are complex and diverse. Denmark has the largest agricultural system – covering over 60 percent of its land area and accounting for nearly one-quarter of its export value. In contrast, only three percent of Norway’s land is fit for agricultural use, whereas the country is the world’s second-largest exporter of seafood. Iceland is limited in its agricultural production by geographic conditions yet uses abundant and renewable geothermal energy to grow a wide variety of fruits and vegetables in greenhouses. Finland is one of the most heavily forested countries of the European Union, with its forestry sector accounting for over 20 percent of the country’s export revenue. Land use in Sweden ranges from the heavily forested north to intensive interspersed agriculture and a robust dairy sector.

Across the Nordic region, unhealthy diets contribute to obesity and diet-related chronic diseases that come at a high cost to the individual and public sector. Typical Nordic diets also contribute to high overall environmental impact. Recent research shows that the production of the typical Nordic diet produces 2.5 to three times the greenhouse gas emissions, and uses approximately twice the amount of cropland, as would be considered sustainable if global food system targets were scaled down to an equal per capita scale. Notwithstanding the abundance of water in the region, it also faces important water management issues, including pollution of the Baltic Sea, owing in part to run-off from agricultural inputs. Finally, the Nordic region has high levels of food waste - approximately 120 kilograms per person a year.

Critical transitions

All ten critical transitions in the global report need to be addressed in the Nordic countries. The following five are among the most pressing:

1

Healthy diets. The Nordic Nutrition Recommendations, developed by over 100 scientists, now include sustainability considerations, and feed into a whole-of-government approach intended to ensure better nutrition across the region. A regional "keyhole label" on foods is driving healthier choices, while the Wholegrain Partnership in Denmark promotes greater production and consumption of wholegrain products. Sweden and Finland have strong national programmes to offer healthy, tasty and sustainable food in schools.

2

Protecting and restoring nature. The Nordic countries are committed to the fulfilment of the Aichi biodiversity targets on biodiversity, which will require greater investment in the extent and management of protected areas on land and sea, as well as enhanced biodiversity conservation and management across the economy. The Svalbard Global Seed Vault, housed on the Norwegian island of Spitsbergen, is a globally significant effort to protect and secure the world's biological and seed diversity in perpetuity.

3

Healthy and productive ocean. Ecosystem-based approaches to marine management – including integrated management plans and spatial planning – are being developed and implemented across the region. The Nordic countries are party to the Central Arctic Ocean agreement to prevent unregulated fishing and apply precautionary conservation and management measures in the waters of the Central Arctic. They are exploring the inclusion of explicit spatial protection commitments in their fishery management plans and the adoption of strict purchasing standards governing seafood imports. And they are seeking to pivot to more sustainable aquaculture systems, given ambitious 2050 production goals and the significant environmental impacts currently caused by aquaculture.

4

Food loss and waste. Approximately 3.5 million tonnes of food are wasted each year across the Nordic region. Each country has committed to halving waste by 2030, whether through government-led initiatives, public-private partnerships or voluntary, multi-stakeholder initiatives such as Denmark's national awareness-raising campaign, "Stop Spild Af Mad".

5

Local loops and linkages. Finland's Roadmap to a Circular Economy has prioritised food and land use for action, addressing issues including transport, phosphorus, microbiome management and reductions in single-use plastic packaging. The region is also a global leader in enhancing management of boreal forests to secure greater carbon sequestration, and in the use of engineered wood as a substitute for cement and steel in buildings.

The United Kingdom: Food and Land Use



Context

Agriculture in the United Kingdom comprises 70 percent of total land area, employs 1.5 percent of the workforce and contributes 0.6 percent of GDP. Despite high levels of skills and technology, fertile soils and subsidies, farmers' incomes remain comparatively low. These low earnings, as well as high land prices and a shortage of available farmland, have discouraged young people from joining the industry. Agriculture also accounts for 11 percent of greenhouse gas emissions and is the biggest cause of wildlife loss, with a 67 percent decline in the abundance of priority species since 1970 and 13 percent of these now close to extinction.

The United Kingdom's "food production to supply" (or self-sufficiency) ratio is estimated to be 61 percent for all food in 2018 and 75 percent for indigenous types of food. Decades of policy to produce cheaper food have led to environmental degradation and spiralling ill-health. Farm gate prices remain low: of the £121 billion agri-food sector in 2017, only 8.5 percent of this (£10.2 billion) was returned to agriculture, of which about £3 billion came from public subsidy. The United Kingdom has the third-cheapest food among developed countries, but the highest rates of domestic food insecurity in Europe (a function of wealth distribution and the ability of individuals to access healthy food). Meanwhile, issues of how best to use land are often a source of contention and polarisation.

The cost of one diet-related illness – Type 2 diabetes – to the National Health Service (NHS) is nearly £10 billion a year. Costs to the NHS attributable to obesity are projected to reach £9.7 billion a year by 2050, with its wider costs to society estimated to reach £49.9 billion a year.

The case for serious, urgent and systemic reform of food and land use systems is clear. The government's commitment to a net zero greenhouse gas emissions target by 2050, as well as its draft Environment Bill, includes ambitious goals for food and land use (which the National Farmers' Union in England and Wales has accepted and brought forward to 2040). England has commissioned a year-long consultation exercise to establish a National Food Strategy, while Scotland has proposed a Good Food National Bill.

Critical transitions

Each of the ten critical transitions is addressed in diverse national policies in the United Kingdom. Four of the most vital are:

1

Healthy diets. There needs to be an urgent national effort to make UK diets healthier and more sustainable, to make healthier food cheaper and more accessible, and overcome the obesogenic environment. Leeds City administration has achieved a 6.4 percent fall in child obesity by working with pre-school children. Initiatives such as parenting classes that encourage healthy snacking, eating as a family and the importance of cooking meals from scratch have achieved a nine percent reduction in some of the city's most vulnerable neighbourhoods.

2

Productive and regenerative agriculture. The RSA Food, Farming and Countryside Commission sets out a plan for the greater adoption of regenerative farming practices, with some of these approaches also embedded in the government's draft Agriculture and Environment Bills for England. Particularly critical here will be the successful implementation of planned agricultural subsidy reform, linking payments more directly to the adoption of regenerative and environmental practices.

3

Protecting and restoring nature. The target of net zero greenhouse gas emissions by 2050 will require an ambitious effort to plant 1.5 billion more trees and to protect and restore remaining ecosystems (including forests, woodlands and peatlands). The UK Government's Environment Bill and 25 Year Environment Plan include provisions on biodiversity net gain, environmental spatial planning, conservation covenants – encouraging landowners to protect biodiversity on their land – and improved fresh water management.

4

Protected and productive marine waters. The United Kingdom needs to move towards more sustainable management of its marine fisheries and waters, including by ensuring higher levels of protection and the establishment of "no take" zones to allow the recovery of depleted ecosystems, rebuild fertility and enhance resilience. This focus should extend to the Overseas Territories, where the government's commitment to a "blue belt" of marine protected areas needs to be strengthened with finance and enforcement.