

CONSULTATION DRAFT

# Achieving Global Green Transformation: Report Summary

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Global Green Growth Institute  
Jeongdong Building 19F  
21-15 Jeongdong-gil  
Jung-gu, Seoul 04518  
Republic of Korea

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## About this report

Achieving Global Green Transformation is a GGGI flagship report highlighting the economic foundations of green growth, the results of GGGI's Green Growth Index, and key approaches for developing green growth policies and plans and for implementing and financing scalable projects and programs in energy, landscapes, water and sanitation, and cities.

This publication presents a Consultation Draft of the Report Summary of the proposed forthcoming GGGI report, Achieving Global Green Transformation. GGGI plans for the Consultation Draft of the full report to include the following elements:

### Report Summary

#### Part I. A Global Mandate for Green Development

Chapter 1. The Promise of Green Growth

Chapter 2. The Green Growth Economy: A Pathway to Prosperity

#### Part II. Green Growth in Action

Chapter 3: Achieving National Ambitions and Taking Aim at Global Challenges

Chapter 4: Achieving Green Energy Transformation

Chapter 5. Safeguarding Natural Capital and Sustaining Landscapes

Chapter 6. Delivering Sustainable Water and Sanitation

Chapter 7. Attaining Green Cities

#### Part III. Quantifying Green Growth: The Green Growth Index

Chapter 8. Measuring Green Growth Performance

Chapter 9: Green Growth Index – 2019 Results

Chapter 10: Green Growth Index – Trends in Green Growth



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# Catalyzing a Global Green Transformation



## Catalyzing a Global Green Transformation

This century will bear witness to a profound global transformation—and there are critical choices in determining what direction that transformation will take. Across the world, countries are starting to rethink their options for long-term prosperity given rising concerns about the global environment, the need to sustain and protect their domestic environment and natural capital, and the desire to promote strong inclusive social development. As they increasingly recognize that conventional, resource-intensive economic growth can undermine their resource base and social progress, countries are increasingly turning to green growth as their best option for long-term sustainability, social well-being, and economic prosperity.

Global economic output is approaching a staggering USD 100 trillion per year,<sup>1</sup> and year on year the world continues to see remarkable advances in science, medicine, engineering, technology, and global connectivity. Yet global economic growth and technological advances have not meant progress across the board. Even as 1.1 billion people have been lifted out of extreme poverty since 1990, about 740 million people, 10% of the world population, still live on less than USD 1.90 per day (2011 PPP).<sup>2</sup> Environmental conditions are worsening across the world and in some cases have become severe. Global extinction is accelerating<sup>3</sup> and the effects of the

## Embracing Green Growth

Green growth is the optimal choice for our future. Green growth is no longer a new concept, and an increasing number of countries have been taking steps to adopt green growth as the primary—and essential—model of national development for the long-term.

The Global Green Growth Institute (GGGI) defines green growth as a development approach that seeks to deliver economic growth that is both environmentally sustainable and socially inclusive.<sup>5</sup> GGGI's definition emphasizes that economic growth is of central importance for development and reducing poverty, and that achieving environmental sustainability and social inclusion are equally important and necessary to ensure that economic development is sustainable over the long term.<sup>6</sup>

With this report, GGGI explains the economic foundations of green growth, and, through the Green Growth Index, explains the key metrics and indicators for measuring green growth performance—essential policy tools to help decision-makers better understand and apply the principles of green growth.

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*“Green Growth is the optimal choice for our future”*

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The report further expands on key approaches

for developing green growth policies and plans, and for implementing and financing scalable projects and programs in energy, landscapes, water and sanitation, and cities.

coming climate emergency are now being felt. The last four years have been the hottest on record globally with stronger and more deadly heatwaves, wildfires, droughts, floods, and tropical cyclones, as well as accelerated melting of polar ice, glaciers, and permafrost.<sup>4</sup> Within this century, a growing number of global environmental risks affecting food, health, livelihoods, energy, and security will undermine the very viability of national economies and societies.

Many countries are already taking serious action towards a green transformation—across their economies and industries, in cities and rural areas, and at the international level in adopting the 2030 Agenda's 17 Sustainable Development Goals (SDGs), the Paris Agreement

on climate change, and other measures. But much more needs to be done. With green growth, countries are now working towards a new, green

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*“Countries are now working towards a new, green transformation that can lead to a brighter, more prosperous, and sustainable future.”*

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transformation that can lead to a brighter, more prosperous, and sustainable future.

Underlying the concept of the green growth economy and the Green Growth Index, green growth consists of four fundamental dimensions:

- **efficient and sustainable use of resources**, including energy, water, land, and materials;
- **protection of natural capital** and recognition of the limits of Earth system processes;<sup>7</sup>
- **green economic opportunities** for investment, trade, employment, and innovation; and
- **inclusive growth** which ensures access to basic services and resources, health and safety, social equality, and social protection.<sup>8</sup>

The following 10 priorities are critical for the successful transition to a green growth model of development, based on the direct and growing experience of low- and middle-income countries around the world which have been pursuing green growth with the support of GGGI and its partners.

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# Key Priorities for Green Growth



# 01

Shifting away from and replacing the conventional, resource-intensive model of economic growth with green growth is crucial for ensuring greater long-term economic prosperity and social well-being. Green growth also provides important leapfrogging opportunities for low- and middle-income countries to adopt modern, green, and efficient systems, technologies, and practices.

The prevailing model of economic growth is simply unsustainable over the long term. It incentivizes the exploitation of natural resources and ecosystem services, fails to consider the adverse global impacts of economic activities, and places inadequate attention on social equity, gender equality, inclusiveness, and economic opportunities for future generations. Exploiting the world's natural capital, ecosystems, and entire Earth system processes beyond their limits undermines economic performance over time. At the global scale, current national pledges for reducing emissions are still likely to lead to a warming of 2.5-3.0°C and a reduction in economic output by as much as 15-25% by 2100 relative to a world with no warming beyond 2000-2010 levels.<sup>9</sup> There are already innumerable cases where failure in environmental stewardship has weakened, or even decimated, local economies, such as oil spills,<sup>10</sup> the collapse of fisheries,<sup>11</sup> the high health impacts and reduced output resulting from severe air pollution,<sup>12</sup> and the impacts of plastic pollution to tourism-dependent economies.<sup>13</sup> The leading measure of economic performance, gross domestic product (GDP), accounts only for economic transactions without differentiating between activities that positively or negatively affect planetary prosperity and human well-being.

At its core, the concept of green growth aims to achieve long-term economic growth, prosperity, and inclusive social development and well-being while maintaining the integrity of natural capital, ecosystems, and Earth system processes. So long as natural resources and ecosystem services are used sustainably as inputs (flows) and natural capital (stocks) in the economic system, economic growth and social development can continue long into the future.

The key to ensuring long-term prosperity, and avoiding a decline in economic growth and social well-being, is to progressively decouple economic growth from the use of natural capital while continuing to promote socially inclusive development. This basic concept is illustrated in Figures A and B. Decoupling requires a concerted effort to adopt the right policy interventions, technologies, and financing, and increase capacity and collaboration.<sup>14</sup> The degree of decoupling needed depends on the situation in each country and the type of natural capital involved. That said, globally, a number of heavily overexploited forms of natural capital, ecosystems, and Earth system processes already require significant attention to ensure long-term recovery and sustainability.

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*“The key to ensuring long-term prosperity... is to progressively decouple economic growth from the use of natural capital while continuing to promote socially inclusive development.”*

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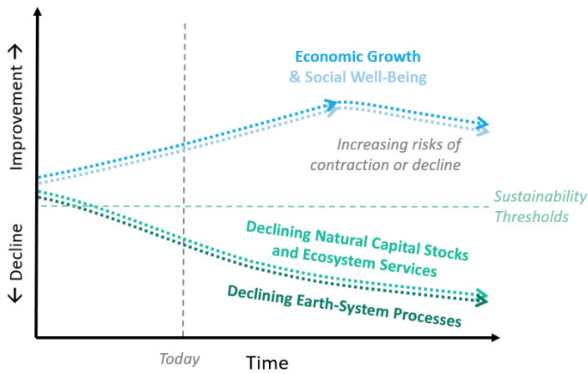


Figure A. Continual decline of natural capital and Earth system processes increases risks of contraction or decline of economic growth and social well-being.

Whereas in the past advanced economies were able to develop quickly during an era of abundant natural resources and high planetary capacity to absorb pollution and waste, today's consumption levels push natural resources and the planet's capacity to their limits. Many low- and middle-income countries do not have the same option to "pollute now and clean up later." Early adoption of green growth presents an opportunity for these countries to leapfrog and mobilize investments in sustainable infrastructure, avoid infrastructure lock-in, and achieve higher overall socio-economic development. While there is an increasing body of evidence on the strengths of the green growth economy, finding the optimum level of economic growth while ensuring protection and efficient use of natural capital is of course a complex process requiring further research, discussion, and debate.

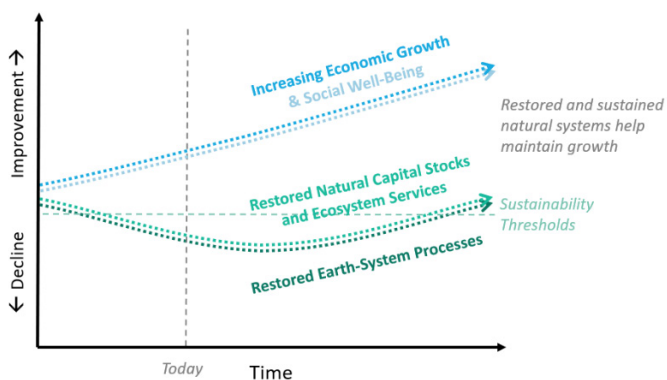


Figure B. Decoupling socioeconomic development from natural capital and Earth system processes allows for increasing economic growth and social well-being.

One GGGI Member, **Costa Rica**, presents a compelling example of what a country can achieve in decoupling economic growth from certain environmental impacts. Between 1960 and 2014, while Costa Rica's national GDP increased 100-fold from about USD 500 million to USD 50.6 billion, its national carbon dioxide (CO<sub>2</sub>) emissions grew at only about one seventh that rate, from about 0.5 to 7.8 million tons of CO<sub>2</sub>. Similarly, between 1990 and 2014, forest area grew by more than 4% even as economic growth accelerated in that period.<sup>15</sup>

## 02

**National and subnational green growth strategies, policies, and plans provide an essential foundation for long-term economic and social development, for achieving the SDGs, and for scaling up green business models, financing, and investment.**

National and sub-national green growth strategies, policies, and plans enable countries to identify key opportunities to significantly improve their long-term economic performance, social development, and environmental and natural resource sustainability. A growing number of developed and developing countries around the world have been using these strategies and plans to shift to greener pathways, such as **Ethiopia, Denmark, the Republic of Korea, Rwanda, United Arab Emirates (UAE), the United Kingdom, and Viet Nam.**

These overarching strategies and plans set the stage for fully transforming conventional economies into green economies, providing structured pathways to make economies stronger, more productive, efficient, and resilient, as well as to improve social well-being, protect biodiversity, and ensure good stewardship of natural capital. These strategies can set important targets for national development objectives, such as the national adoption of renewable energy as part of the energy mix. Strategies can also lay the groundwork for the transition to green business models and for identifying important green investment opportunities.

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*“Green growth strategies, policies, and plans... provide structured pathways to make economies stronger, more productive, efficient, and resilient.”*

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Cross-sectoral and holistic economic planning and policymaking has helped to engage government, private sector, and non-governmental and civil society actors at all stages of what GGGI calls the “value chain”—planning, policy adoption, and mobilizing investment and financing. Indeed, business opportunities for green investment are already significant in some sectors and are expected to grow. Green growth strategies and investments must transcend urban and rural divides, and drive agendas which sustain green and resilient rural areas alongside resource efficient cities. These strategies must also consider that the world is becoming increasingly urban, with 68% of all people expected to live in urban areas by 2050,<sup>16</sup> many of whom are moving to smaller cities which lack capacity for planning and implementation.

Much more needs to be done to support this transition in order to avoid repeating mistakes of the past and to make use of new technologies and capture green financial flows. In particular, developing countries are counting on green finance as a key component of the green growth transition and for achieving climate ambitions, such as the USD 100 billion in funding pledged by 2020 by developed countries through key financial mechanisms like the Green Climate Fund (GCF). GGGI works to structure investment projects and mobilize green and climate finance commitments for many of its Members, and mobilized more than USD 1 billion in commitments for green investment projects during 2017-2018. GGGI aims to raise a cumulative total of USD 16 billion in green finance commitments to support its Members by 2030.<sup>17</sup> —

## 03

The green transformation must be just, fair, and inclusive. Achieving greater social equity and equality can increase economic productivity, and green growth solutions are expected to generate more new green jobs than the conventional “brown” jobs that will be lost in the transition.

The unprecedented economic expansion of the past 50 years has not benefitted everyone, despite a remarkable reduction in extreme poverty from 36% of the global population in 1990 to 10% in 2015. Achievements in alleviating extreme poverty, measured as people living below USD 1.90 per day, have slowed as the poorest have become harder to reach, often living in rural areas and in countries with violent conflicts and weak institutions, and which are vulnerable to the effects of climate change.<sup>18</sup> A multidimensional definition of poverty that better reflects experienced poverty shows that 23.1% of the world population is in fact poor, and two-thirds of the poor live in middle-income countries.<sup>19</sup>

A socially inclusive green growth transition must strive to increase equity within and between countries and across generations, while also striving for full gender equality, supporting the most vulnerable populations, and seizing opportunities to transition workforces into millions of new green jobs. Poverty reduction, gender equality, and social inclusion are critical elements of the new green growth economy and are embedded in international climate and SDG commitments. Gender equality and women’s empowerment serve to accelerate achievements across all 17 SDGs and are integral to environmental sustainability,<sup>20</sup> yet women worldwide have fewer economic opportunities and less political representation than men and currently only contribute 37% of global GDP. While macro-economic policies typically have been gender-blind, gender inequality comes at a high cost. Full gender equality could add USD 28 trillion, or 26%, to global annual GDP by 2025.<sup>21</sup>

Decent and better-quality jobs should grow in a well-managed transition,<sup>22</sup> and investing in green growth in low- and middle-income countries offers much greater employment opportunities compared with the current

economic model.<sup>23</sup> For example, investing in low-carbon development is projected to generate over 65 million additional jobs globally by 2030<sup>24</sup> while another study estimates that investing in sustainable agriculture and land use could generate around 80 million jobs by 2030, of which around 70% would be in Africa, India, and developing Asia.<sup>25</sup> Analysis by GGGI indicates that by meeting its NDC renewable electricity targets, **Mexico** could generate around 72% more jobs compared to business-as-usual by 2030.<sup>26</sup> Similarly, **Fiji**, under its most ambitious long-term low emission development scenario, could generate twice as many new jobs by 2050 in electricity, transport, and forestry sectors compared to business-as-usual.<sup>27</sup>

Generating and maintaining public support is also an important part of the green transition and is essential to avoid public opposition. A people-centric approach, where decisions are made with societal and not necessarily economic interests in mind, can build public support and political will to undertake transformational green policy changes. It is important to recognize and reward local communities and indigenous people in managing and safeguarding natural resources, as well as in ensuring access to resources that help sustain livelihoods. One GGGI Member, **Colombia**, mobilized investments under the government’s Amazon Vision Program for indigenous peoples’ organizations to implement projects that achieve environmental and local economic outcomes. Compensation packages, off-set schemes, and other measures can address concerns that arise as policy reforms affect the poor, women, and other groups disproportionately. **Indonesia** successfully demonstrated this when it launched assistance programs for poor households to offset the impacts of rolling back fuel subsidies, demonstrating better poverty alleviation outcomes than continuing to rely on fuel subsidies that also benefit the rich.<sup>28</sup> —

# 04

The transition to green growth serves as a critical, central vehicle for countries to achieve Paris Agreement commitments to limit atmospheric warming and achieve net-zero emissions globally by mid-century. Solving the climate crisis will not be possible without initiating a rapid and immediate green economic transformation.

The global climate emergency is one of the defining challenges of our time. Many see it as the single greatest threat to global food security, biodiversity, ecosystems, and coastal cities and communities around the world. The longer countries wait to take significant action, the worse the impacts are expected to be, and the response will be all the more challenging.<sup>29</sup>

In order to limit global warming to well below 2.0°C, total emissions must be reduced to net-zero by the year 2050 or earlier, and “rapid and far-reaching transitions” must be initiated in energy, land, urban transport and buildings, and industrial systems.<sup>30,31</sup> This requires all countries to take immediate action to raise ambitions, adopt rigorous and meaningful emission reduction targets, and pursue financing and investment in low- or zero-emissions renewable energy, energy efficiency, transportation, green buildings, sustainable agriculture, zero-deforestation commodities, and waste management, as well as deeper investment in forests, mangroves, and other carbon sinks.

Nationally Determined Contributions (NDCs) can support this in the near-term and Long-Term Low Emission Development Strategies (LT-LEDS) to mid-century by employing increasingly ambitious, practical, and implementable targets and measures that can be linked to public and private financing and green growth objectives. These important policy measures should be built on solid foundations of governance, institutional and human capacity, and measurement, reporting, and verification (MRV) systems. GGGI has supported more than 15 of its Member countries in revising their NDCs, developing long-term strategies, developing MRV systems, and exploring opportunities for emissions trading.

There are multifold benefits to taking climate action. Policies that favor cleaner energy can be used to significantly increase access to energy for those who lack it. Efforts to green the world’s transportation systems, which currently consume more

than half of all liquid fossil fuels, can improve urban mobility and productivity. A similar global transformation in land use is needed to implement sustainable and circular business models, protecting and efficiently using natural resource stocks and ecosystem services that reverse land and soil degradation, avert biodiversity loss, and increase food security.

Achieving zero-emissions targets is technologically feasible and technologies for renewable energy, battery storage, electrification of cars, buses, and bicycles, zero-carbon and zero-waste industrial parks, passive houses and buildings, and nature-based carbon

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*“Achieving zero-emissions targets is technologically feasible and green technologies... are increasingly commercially viable.”*

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sequestration are increasingly commercially viable. Fiji’s LEDS, which GGGI supported, provides a roadmap for achieving rapid decarbonization within 20 years and net-negative emissions starting in 2042 with domestic and international financing, all while pursuing an ambitious 4% annual GDP growth rate. —

## 05

**Embracing sustainable energy and scaling back the use of fossil fuels—or replacing them altogether—is an urgent priority for green growth and addressing the climate emergency.**

Sustainable energy is central to a green transformation. Energy production and energy use account for around two-thirds of global greenhouse gas (GHG) emissions and are the largest single source of emissions,<sup>32</sup> as well as significant contributors to local air pollution. Energy is also central to socially inclusive development, as nearly 1 billion people still lacked access to electricity as of 2017, mostly in rural areas in developing Asia and Sub-Saharan Africa,<sup>33</sup> while 2.7 billion people still rely on cooking fuels like wood, charcoal, coal, and kerosene.<sup>34</sup>

The sustainable energy disruption is in full swing. Countries have an opportunity to seize the dynamic changes underway in energy markets, as renewable energy, particularly solar and wind, are becoming the cheapest forms of power generation in many countries. **India** cancelled all new planned coal fired power plants in 2017 when solar energy became cheaper than coal. **Viet Nam**, which plans to build 25 additional coal-fired power plants in the post-2020 period, surprisingly installed more than 4 GW of solar photovoltaic (PV) systems as of mid-2019, more than four times its target for 2020.<sup>35</sup> Increasing energy efficiency is among the most commercially viable and promising measures to address climate change, and investments in many cases pay for themselves. Electric mobility is also rapidly becoming the most attractive form of transportation, with electric two-wheelers from scooters to bicycles to motorbikes leading the way, with electric cars and buses not far behind. In **India**, 630,000 electric three-wheelers were sold in 2018-2019, outselling fossil fuel models by more than 100,000. And the deployment of new, decentralized sustainable energy systems offers communities new access to electricity and the chance to enhance economic opportunities and social development without having to wait for grid connections.

Stronger policy, planning, and regulatory frameworks are needed to increase adoption of and investment in clean energy. GGGI is currently offering that support to countries like **Cambodia, Ethiopia, Fiji, Guyana, Indonesia, Lao PDR, Mongolia, Nepal, Senegal, Vanuatu, and Viet Nam**. Renewable

energy, energy efficiency, and rural electrification action plans and roadmaps are necessary for setting and achieving national targets. Appropriate policies and regulations help establish an attractive environment for public and private investments needed to speed up the pace towards green growth. Enabling policies, incentives, standards, and labeling can mitigate investment risk and offer much-needed certainty required for investments to flow. In a wide number of countries, the high cost of diesel-based electricity generation and corresponding high costs for end-users underscores the value of increasing the share of renewable energy in the electricity mix.

**Guyana** has catalyzed private sector engagement in scaling up renewable energy with GGGI support through its Urban Solar Energy Program, identifying ways to remove regulatory barriers and creating a pipeline of distributed roof-top solar installations to contribute 6% of the country's total installed electricity generation capacity. The initiative has successfully engaged the local business community, which is interested in the expected long-term cost savings.

Strong political commitment remains critical for phasing out fossil fuel-based power generation. Countries should align their power development plans with NDC targets, increase the role of renewables in the electricity mix, and reduce fossil fuels in the power sector. But many countries rich in coal resources, such as the largest economies of Southeast Asia, are still subsidizing coal-based electricity generation and planning significant expansion of polluting coal capacity. Governments have a key role to play by ending fossil fuel subsidies, including the use of subsidized electricity rates, and investing in sustainable energy infrastructure. Transformation of energy systems requires appropriate medium-to-long-term planning for generation, distribution, and transmission infrastructure and grid integration of variable and intermittent resources. **Fiji**, for example, is investing directly in utility-scale solar, while **Mongolia** is working to restructure its regulations to increase renewable energy generation and storage capacity, improve air quality, and reduce dependence on imported electricity. —

# 06

## Reversing land degradation and the decline of ecosystem and biodiversity through nature-based solutions, innovative business models, and full accounting for natural capital strengthens food security and brings opportunities for a sustainable bioeconomy.

All societies, economies—and all life—depend on nature. The vast majority of natural capital and the flow of ecosystem services that drive economies is found in agricultural lands, forests, grasslands, waterways, wetlands, and coastal and marine areas. These landscapes support biodiversity and many economies depend on the resilience and productivity of these ecosystems. Yet, more needs to be done to properly account for and understand the cost of degradation and biodiversity loss to ensure that economic policies and business decisions consider the protection and efficient use of natural capital. Enabling policy and investment frameworks should work to incentivize restoration and ensure the continued flow of benefits from natural capital to productive sectors and service-based industries, including replacing subsidies and tax breaks that promote degradation and depletion. Such measures can simultaneously reduce GHG emissions, increase

*“Healthy land and waterways result in more productive and sustainable yields of crops, commodities, livestock, and fish, and are more resilient to the impacts of climate change.”*

resilience, and enhance productivity in food, forests, water, and fisheries.

Taking a landscapes approach to effectively manage and use natural capital efficiently in these areas can allow policymakers and investors to better understand the impacts and risks associated with economic activities to enhance economic, social, climate, and environmental outcomes. Healthy land and waterways result in more productive and sustainable yields of crops, commodities, livestock, and fish, and are more resilient to the impacts of climate change. Biodiversity-rich landscapes enhance opportunities for the production and sale of

value-added goods from the bioeconomy, increase job opportunities, and help to build local economies. A bioeconomy approach could potentially increase value in food and agriculture systems by USD 2.3 trillion, with forest ecosystem services themselves worth USD 365 billion by 2030.<sup>36</sup>

For countries to achieve these outcomes, it is necessary to focus on long-term gains and ensure transparency in financial and economic activities that can support investments with landscape-wide impacts. This includes introducing green business models and new governance structures. GGGI's support in **Indonesia** for the establishment of Forest Management Units (FMU), a critical vehicle for improved forest management and supporting REDD+,<sup>37</sup> has shown that a comprehensive landscapes approach can promote resource optimization in timber harvesting and the production of non-timber forest products, as well as livelihoods and economic growth. Partly due to efforts within FMUs, East Kalimantan Province has already seen moderate to high emissions reductions from decreased deforestation and forest degradation during 2016-2018. The Province will implement the first sub-national, jurisdictional REDD+ program in Indonesia, which aims to achieve an emissions reduction of 86.3 million tons CO<sub>2</sub>e during 2020-2024 under the Emission Reductions Program of the World Bank's Forest Carbon Partnership Facility (FCPF). —

## 07

The success of the green growth transition depends on smarter, cleaner, and more efficient and productive ways of managing water resources, including advancing more sustainable irrigation practices and improved wastewater management and sanitation.

Water is a fundamental part of the green growth transition and is essential for life on earth. A healthy water resource base underpins poverty reduction, economic growth, and environmental sustainability. To support the green transformation within the water sector, decentralized approaches are proving to be attractive alternatives to conventional water services. For example, solar irrigation promotes sustainable food production while also being an efficient and cost-effective alternative to traditional, energy-intensive flood irrigation systems that are often water inefficient and create major drainage issues. The case of **Mozambique** shows that solar irrigation can be commercially attractive for medium-sized farms, with the potential to produce a 15-20% return on investment.

As an alternative to expanding centralized wastewater services, decentralized approaches are yielding new successes in increasing access to wastewater treatment and sanitation while ensuring buy-in from local communities, more manageable operation and maintenance costs, and reduced pollution burdens on freshwater resources. With support from GGGI, **Nepal** and **Senegal** are now working on incorporating sanitation into their planning frameworks, and GGGI's experience in **Laos** and **Cambodia** shows that decentralized solutions are considerably cheaper and quicker to implement in comparison to conventional centralized systems. For example, in **Laos**, where it is considered too expensive to construct centralized wastewater treatment systems before 2040,<sup>38</sup> it will cost only USD 20 per person to provide decentralized connections to sanitation services.<sup>39</sup>

However, while new developments in the water sector are increasingly technology-driven, the impediments to their successful implementation are often financial, institutional, legal, and social in nature. That is why a large part of GGGI's efforts around green investments are targeted towards developing green business models and mobilizing green finance. For example, GGGI has been part of efforts to build the

capacity of the municipal governments of Siem Reap, Battambang, and Kep in **Cambodia** to develop viable business models in sanitation projects in collaboration with the local business communities.

Private financing is crucial to achieve SDG goals in sustainable wastewater and sanitation service delivery, and GGGI's experience with the provision of wastewater treatment services in **Jordan** illustrates how public-private partnerships can effectively balance financial sustainability with social equity in the provision of these services.

Blended finance is often required to make these investments attractive to financiers, such as leveraging climate

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*“A healthy water resource base underpins poverty reduction, economic growth, and environmental sustainability.”*

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financing to support project contributions to achieve NDC targets, reduce greenhouse gas emissions, and make sanitation infrastructure more climate-resilient. —

# 08

Cities are central to the global sustainability agenda and green growth transition, and smart, integrated urban planning, infrastructure, and mobility solutions are a core part of this transition.

The world's cities are the driving force behind national and global economies and have a critical role to play in supporting global sustainability, as well as the realization of green growth pathways. Urban areas are increasingly seen as responsible for driving national and global wealth but face an urgent need to address their own sustainability challenges and various adverse external impacts they have on natural resources, ecosystems, and the planet. Cities thus have a key role to play in the realization of the climate change agenda, including the Paris Agreement, and linking renewed green city planning to climate finance provides a significant opportunity for change.

For cities to successfully achieve green transformations, it is imperative to mainstream the concept of green growth into urban planning, management, and finance at the sub-national level. New policies and plans are needed to improve urban planning and climate resilience, strengthen municipal financing, improve municipal services, use resources and materials more efficiently, make public spaces and land use greener, and use smart and ICT-enabled solutions. GGGI has worked with line ministries and municipal governments to develop green city plans and frameworks in **Nepal, Senegal, Rwanda, and Cambodia** as well as delivered training materials and project origination linked to climate finance and bilateral assistance.

An enabling environment, including a strong and predictable policy framework and robust institutional capabilities, is key for developing sustainable infrastructure. To ensure sustainability in the long term, environmental and social sustainability criteria need to be systematically incorporated in all investment and project planning as well as in government procurement processes. Close and well-coordinated collaboration between different actors—such as national and local governments, development banks, and the private sector—is essential to develop innovative financing mechanisms and to demonstrate the bankability of such projects and their potential to support green city development.<sup>40</sup> **Senegal**, for example, has established

a green, sustainable, smart, and resilient cities platform with GGGI's support, bringing together representatives from the national and local government, the private sector, academia, as well as international agencies and the private sector.

Promoting sustainable mobility is a key priority to advance decarbonization efforts—including adopting electric and other clean vehicles, reducing congestion, making public transportation systems more integrated and efficient, and supporting non-motorized transportation (NMT) solutions including mixed-use urban planning that provides for safe and accessible public spaces.<sup>41</sup> A key policy priority for local governments is to encourage a modal shift towards cleaner transportation and incorporate key externalities (air pollution-related economic and health impacts) into the cost-benefit analyses of city-level projects.<sup>42</sup> Urban transportation is directly linked to outdoor air pollution, one of the world's leading health concerns causing approximately 7 million premature deaths annually,<sup>43</sup> and costing around 1% of global GDP or about USD 2.6 trillion annually.<sup>44</sup>

Smarter planning can also enable electrification of the transportation sector, particularly as electric vehicle sales grow—reaching more than 2 million in 2018 from a few thousand in 2010, and expected to rise to 57% of all passenger vehicle sales by 2040.<sup>45</sup> In **Jordan**, GGGI is supporting alternatives to individual vehicles altogether by providing the government with evidence-based recommendations on how to achieve a gradual shift towards privately-owned electric vehicles, considering socioeconomic benefits, and helping the government replace the diesel-based public transport fleets, particularly buses, with electric vehicles. —



## 09

Cities are at the forefront of “greening the infrastructure gap” and supporting the transition to circular economies, and thus play a key role in the global green transformation.

To succeed, the green transition must include a focus on the significant potential for greening infrastructure and construction, particularly in cities. An estimated 75% of the building stock in developing countries in Africa and Asia will be built between 2010 and 2060.<sup>46</sup> Globally, cities account for 67-76% of energy use and 71-76% of GHG emissions,<sup>47</sup> and about one-third of global energy consumption is from the buildings sector, largely due to rapidly increasing air conditioning use.<sup>48,49</sup> Although significant major infrastructure has been developed over recent years, a lack of basic infrastructure in many parts of the world, particularly in Africa and Asia, remains a leading global challenge. To green the infrastructure gap, GGGI has successfully supported **Rwanda** in developing Green Building Minimum Compliance Guidelines, which are mandatory and applicable for upcoming large-scale commercial buildings, office buildings, public buildings, hotels, hospitals, and schools. This illustrates the importance of standards and regulations in avoiding unsustainable infrastructure lock-in in developing countries.

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*“The world’s cities are the driving force behind national and global economies and have a critical role to play in supporting global sustainability.”*

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Stronger emphasis on mainstreaming resource efficiency and the development of more circular economies is also needed. Urban economic and demographic growth has fueled development and driven the rise in income levels, and as a result consumption patterns are rapidly shifting, even in smaller and remote urban areas. Yet little more than 10% of global waste is recycled—and cities remain far too dependent upon centralized systems and landfills, with concomitant negative

impacts on urban health, ecosystems, and GHG emissions. The extraction of construction materials grew by a factor of almost 34 during the 20<sup>th</sup> century.<sup>50</sup> The Organisation for Economic Cooperation and Development (OECD) reports that materials use will increase from 79 gigatons in 2011 to about 167 gigatons in 2060 under business-as-usual conditions, and more than half of all GHG emissions, expected to be about 50 Gt CO<sub>2</sub>e by 2060, are related in some way to materials management.<sup>51</sup> With a finite amount of natural resources, there is a sense of urgency to focus on resource efficiency, especially in response to rapid and increasing urbanization.

GGGI has undertaken waste-to-resource assessments in **Rwanda, Lao PDR, Jordan, Peru, Fiji, and Cambodia** to develop business cases for cities wanting to break free from the economic and environmental costs of business-as-usual waste management. The City of Kampala, **Uganda**, has successfully adopted the country’s first national urban solid waste management policy, with GGGI support, which underscores the importance of mainstreaming resource efficiency in urban environments. In **Peru**, GGGI is supporting the City of Lima, which lacks waste management infrastructure and only recycles 3% of its waste, to explore innovations to its waste management systems, such as incentives for household waste separation and treating waste as a resource by using organic waste in agriculture and to generate electricity. —

# 10

**Green technology disruptions and smart solutions present critical opportunities to transform economic sectors, advance social and environmental objectives, and deliver key services.**

A growing number of technology disruptions are poised to help accelerate the green agenda to further the goals of sustainable materials use and improved delivery of energy, mobility, waste management, and other services. The world is already seeing a significant market shift towards renewable energy, which now provides about 26.5% of all electricity globally,<sup>52</sup> and the start of what promises to be a major shift towards electric vehicles. Governments should not miss the opportunities these increasingly cost-competitive technologies present and should use policy and regulatory frameworks to transfer investment away from conventional systems and towards solar PV and wind, new energy storage, smart grids, and electric mobility.

Innovations in storage technology are achieving cost reductions, increasing grid stability, and paving the way for higher penetration of variable renewable energy sources, like wind and solar. With GGGI support, **Mongolia** is building capacity in energy storage technologies and Guyana is introducing smart meters and systems for expanding solar PV. GGGI's support is also helping countries like **Mongolia, Fiji, Indonesia, Thailand,** and **Vanuatu** to adopt the use of energy efficient equipment as well as energy management tools and systems to monitor and control the energy consumption profile, analyze the feasibility of energy efficiency investments, and achieve significant energy savings in industrial, commercial, and residential sectors.

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*“A growing number of technology disruptions are poised to help accelerate the green agenda”*

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In transportation, disruptive ideas and technologies—such as mobility as a service, autonomous driving, and cooperative intelligent transportation systems (C-ITS)—have the potential to revolutionize the sector and reshape the way we travel, drive, and deliver goods and services. These disruptions also have the promise of boosting economies and creating new jobs. As such, long-term strategic planning and investments in such disruptions need to be considered alongside the implementation of demonstration projects in the near term.

Similarly, important efforts are underway to integrate smart, innovative, and green approaches into urban sustainability agendas to support more efficient, affordable, and effective services for all. Integrated “Smart+Green” communication and information systems can link people to more effective and responsive services or use Big Data and Artificial Intelligence to improve transportation networks.

Disruptive ideas around decentralized solutions ensure broader access to services that are cheaper and can be implemented sooner. In sanitation, shifting away from centrally collected and treated wastewater systems to a circular economic approach can include converting wastewater and treated sludge into a valuable resource for reuse, such as is happening in **Cambodia** and **Lao PDR** with the support of GGGI. Solar irrigation is similarly disrupting agriculture in countries like **Uganda** and **Mozambique**, by eliminating diesel fuel use and reducing costs for local farmers. —



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# Introducing the Green Growth Index

## The Green Growth Index

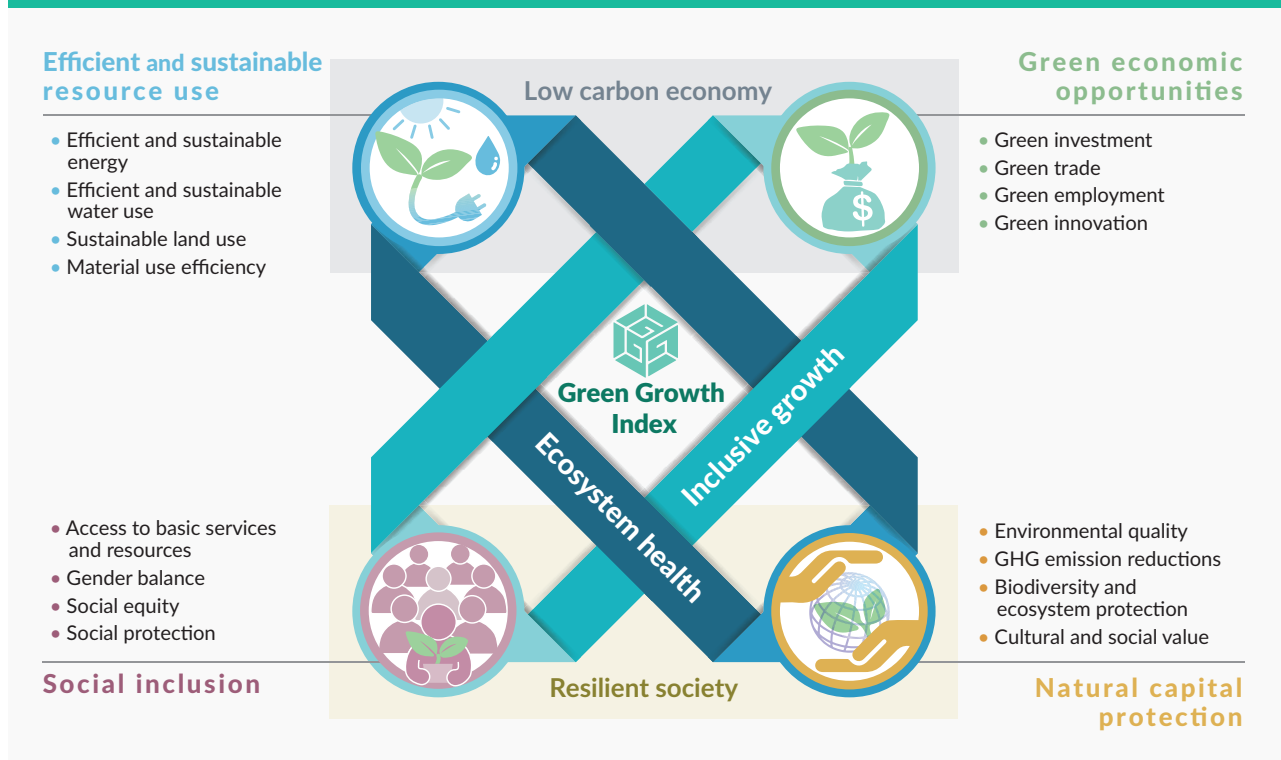
Ensuring the world’s progress towards a green transformation requires comprehensive measurement and tracking systems. With this report, GGGI is presenting a new platform for measuring and tracking the green growth performance of countries worldwide through the Green Growth Index. In line with GGGI’s mission, GGGI developed the Index with the primary aim of providing a concept-driven and evidence-based tool to assess the impacts of green growth policy implementation and investments in countries and to compare their performance with peers in their respective regions and over time. The Index is intended to raise awareness and help sustain the momentum for green growth by measuring, tracking, benchmarking, and communicating the green growth performance of countries.

The 2019 Green Growth Index measures the performance of 115 countries across the four dimensions of green growth using 36 indicators. These indicators were identified based on their relevance to the objectives of green growth and the availability of high-quality data from international sources as well as their role in tracking the implementation of goals and targets reflected in the SDGs, the Paris Climate Change Agreement,

and the Aichi Biodiversity Targets. The Index benchmarks green growth performance against these goals and targets. This is the first composite index on green growth that directly integrates sustainability metrics and assesses performance through comparison of the current state with target values for each of the component indicators.

This Index also reflects a highly participatory global initiative, engaging experts worldwide and using a balanced and unbiased set of metrics and indicators that provide the essential foundation of what “green growth” stands for. The Index and its underlying indicators are a product of more than two years of intensive and constructive consultations with more than 300 experts globally. Recognizing the complexity and multi-dimensionality of the green growth concept, GGGI consulted with experts from various disciplines, international organizations, government agencies, non-profit institutions, academia, and other stakeholders to ensure strong relevance, applicability, and robustness of the metrics used to measure green growth performance.

Figure C Conceptual framework for the Green Growth Index



## Green Growth Index Results

The results of the Index indicate that no countries included in the Index have reached “very high” results towards achieving key sustainability targets. About 20% of the countries have achieved “high” performance, making good progress towards reaching targets, although all of these countries are located in Europe. More than half of the 115 countries have achieved moderate progress, while about 31% demonstrate low green

growth performance, signifying considerable opportunities to push the green growth agenda further and improve natural capital protection and use, green economic opportunities, and social inclusion. (See Figure D.) The top-ranking countries of each region are **Denmark** in Europe, **Singapore** in Asia, the **Dominican Republic** in the Americas, **New Zealand** in Oceania, and **Botswana** in Africa. (See Table A.)

Figure D. Global Map of Green Growth Index Results

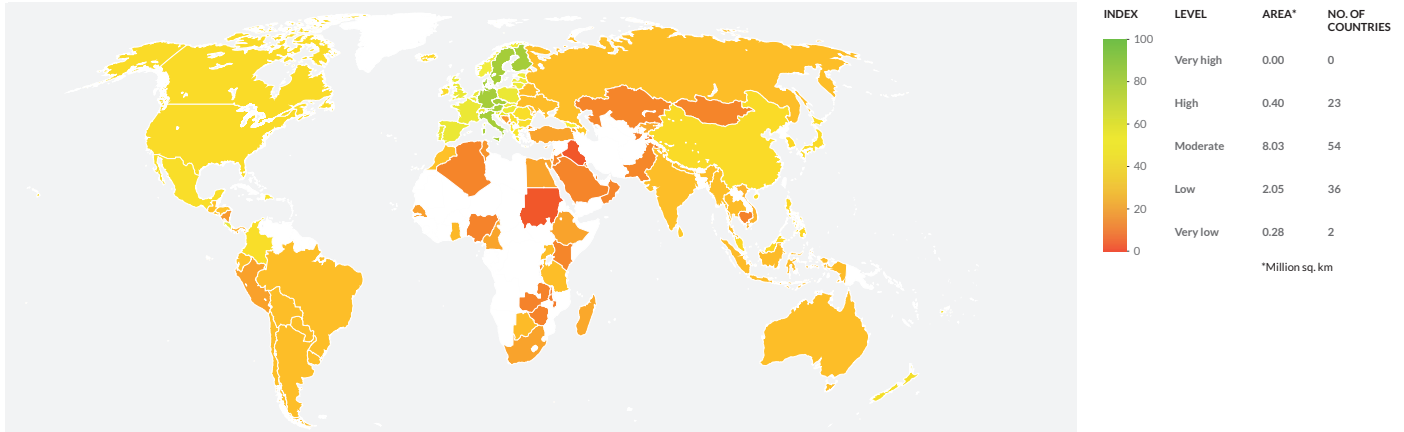


Table A. Green Growth Index Scores and Ranks by Region (top 10 per region)

	Dimensions				Green Growth Index		
	Resource Efficiency	Natural Capital Protection	Green Economic Opportunities	Social Inclusion	Scores	Performance Level	Regional Rank
<b>Africa</b>							
Botswana	64.48	77.53	14.23	62.32	45.88	Moderate	1
Tanzania	41.32	75.61	33.81	36.51	44.32	Moderate	2
Mauritius	46.28	61.02	14.81	78.97	42.63	Moderate	3
Morocco	27.93	74.82	28.68	54.98	42.61	Moderate	4
Ghana	38.27	72.36	23.36	50.06	42.42	Moderate	5
Uganda	47.04	75.70	27.10	29.18	40.96	Moderate	6
Tunisia	19.18	59.16	29.66	67.89	38.88	Low	7
Senegal	32.14	71.39	22.71	40.73	38.17	Low	8
Ethiopia	37.72	70.31	26.05	28.56	37.48	Low	9
Egypt	17.37	48.22	38.51	56.51	36.74	Low	10
<b>The Americas</b>							
Dominican Rep.	55.89	81.28	31.56	64.30	55.10	Moderate	1
United States	38.88	62.61	44.14	80.44	54.22	Moderate	2
Canada	46.90	55.24	38.68	85.13	54.04	Moderate	3
El Salvador	42.96	66.84	44.84	65.76	53.94	Moderate	4
Mexico	37.70	77.36	40.70	65.03	52.71	Moderate	5
Colombia	42.18	75.72	32.37	64.25	50.77	Moderate	6
Costa Rica	50.99	73.11	23.50	75.01	50.63	Moderate	7
Brazil	40.91	74.32	30.98	65.41	49.82	Moderate	8
Ecuador	44.22	74.81	25.06	68.78	48.87	Moderate	9
Guatemala	52.46	73.20	23.56	52.90	46.77	Moderate	10
<b>Asia</b>							
Singapore	51.20	63.21	42.88	84.00	58.43	Moderate	1
Malaysia	43.54	70.29	51.03	62.45	55.88	Moderate	2
Philippines	46.48	70.62	48.34	59.96	55.54	Moderate	3
Georgia	50.00	72.46	37.19	70.17	55.45	Moderate	4
China	34.49	70.15	55.41	70.32	55.41	Moderate	5
Korea Republic	34.48	61.09	54.06	76.41	54.31	Moderate	6
Japan	41.39	73.53	33.23	83.23	53.86	Moderate	7
Sri Lanka	60.97	69.67	33.42	54.49	52.74	Moderate	8
India	34.58	63.24	40.31	48.95	45.58	Moderate	9
Azerbaijan	32.31	64.14	29.33	67.35	44.98	Moderate	10
<b>Europe</b>							
Denmark	75.50	72.52	63.84	92.07	75.32	High	1
Sweden	75.79	77.26	57.96	93.70	75.09	High	2
Austria	71.57	79.56	52.27	91.92	72.32	High	3
Finland	67.36	72.25	58.86	92.23	71.69	High	4
Czechia	63.04	78.40	61.85	84.48	71.29	High	5
Italy	58.31	83.15	57.63	87.01	70.22	High	6
Germany	55.02	81.52	60.55	88.65	70.04	High	7
Estonia	62.02	69.31	59.12	86.66	68.50	High	8
Latvia	72.05	74.43	49.40	81.87	68.24	High	9
Slovakia	61.57	83.35	49.51	82.21	67.60	High	10
<b>Oceania</b>							
New Zealand	48.23	64.84	26.83	88.29	52.17	Moderate	1
Australia	50.96	47.09	25.77	85.08	47.89	Moderate	2
Fiji	61.06	70.95	18.49	53.38	45.48	Moderate	3

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## ABOUT THE GLOBAL GREEN GROWTH INSTITUTE

The Global Green Growth Institute was founded to support and promote a model of economic growth known as “green growth”, which targets key aspects of economic performance such as poverty reduction, job creation, social inclusion and environmental sustainability.

Headquartered in Seoul, Republic of Korea, GGGI also has representation in a number of partner countries.

Member Countries: Australia, Cambodia, Costa Rica, Denmark, Ethiopia, Fiji, Guyana, Hungary, Indonesia, Jordan, Kiribati, Republic of Korea, Mexico, Mongolia, Norway, Papua New Guinea, Paraguay, Philippines, Qatar, Rwanda, Senegal, Thailand, United Arab Emirates, United Kingdom, Vanuatu, Vietnam

Operations: Cambodia, China, Colombia, Ethiopia, Fiji, India, Indonesia, Jordan, Laos, Mexico, Mongolia, Morocco, Mozambique, Myanmar, Nepal, Peru, Philippines, Rwanda, Senegal, Thailand, Uganda, United Arab Emirates, Vanuatu, Vietnam



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