

INVESTING IN GREEN RESILIENCE

World Bank Group Korea Green Growth Trust Fund

Third Annual Korea Green Innovation Days 2016

Korean Stone Art Museum and Four Seasons Hotel

Seoul, Republic of Korea

June 2-3, 2016



WELCOME TO KOREA GREEN INNOVATION DAYS 2016

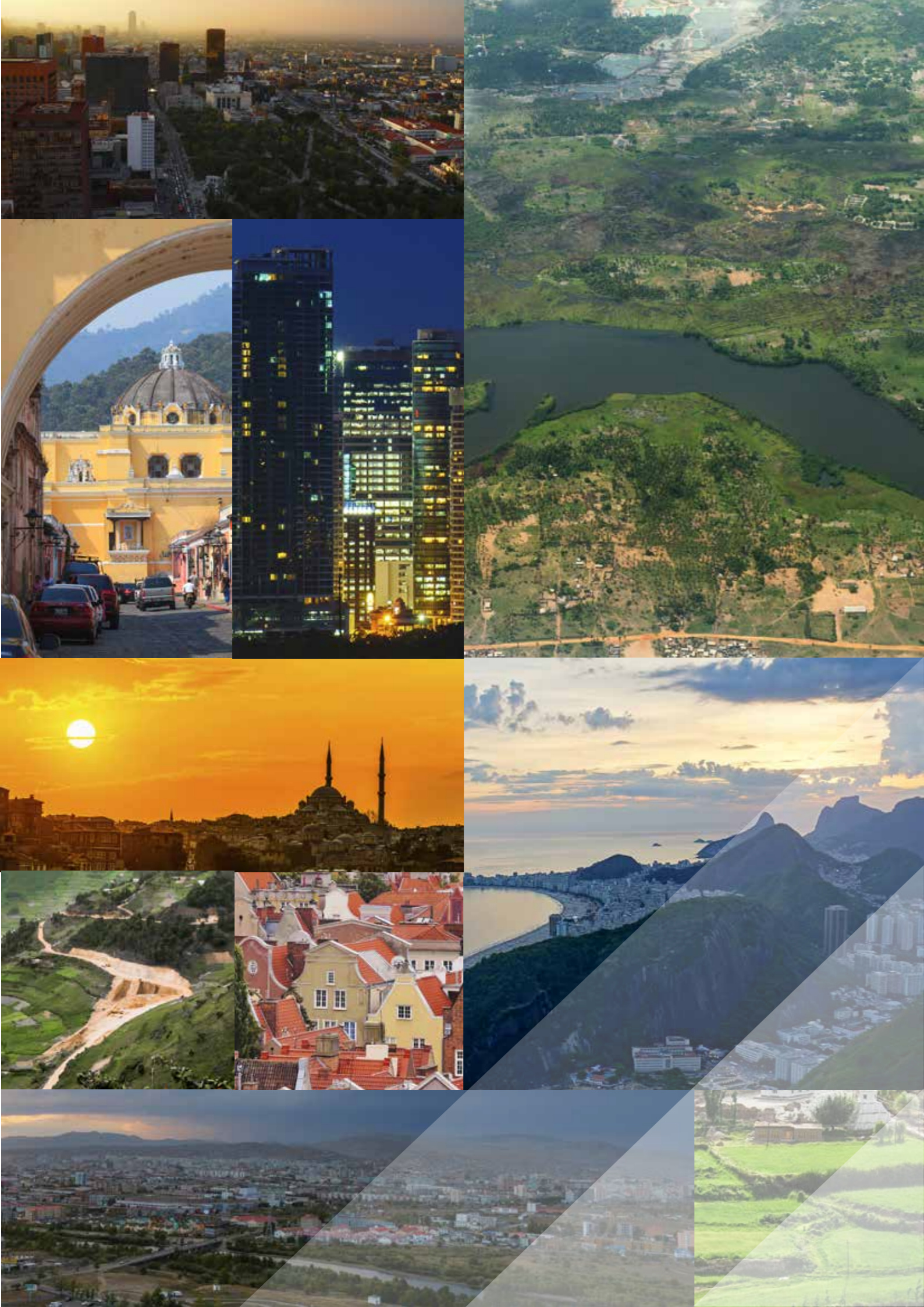


What Is Korea Green Growth Trust Fund?

The Republic of Korea (RoK) and the World Bank Group (WBG) established the Korea Green Growth Trust Fund (KGGTF) in September 2011 to support client countries shift to a green development path. Both partners shared a common goal to support countries as they reduce poverty and promote shared economic prosperity in an environmentally responsible and socially inclusive way.

KGGTF finances and facilitates the sharing of Green Growth technical know-how in an effort to support WBG, International Finance Corporation (IFC), and client country project design and investment. KGGTF's emphasis is on implementing economic pathways and solutions that integrate multi-sector needs, technological innovation, social inclusion, and Green Growth approaches. KGGTF leverages the real-world experience of policy makers and Green Growth technical practitioners to promote integrated Green Growth concepts into investment decisions.





Based on strong performance, as well as increasing demand for collaborative development implementation programs, our fund was replenished at the end of 2015 and today has grown from US\$40 million to a US\$88 million World Bank Group program through 2021.

WHAT WE DO:

1.

Fund, manage, coordinate, and monitor KGGTF-funded programs, and

2.

Aggregate, facilitate, and leverage Green Growth knowledge and learning, institutionalizing global knowledge sharing to promote sustainable economic development.

LIVE GREEN GROWTH

What Is KGID 2016 All About?

Have you been asked “what is Green Growth? Well, you’ll find all of the answers at KGID 2016 Seoul, where we will begin to discuss, share, and demonstrate possible Green Growth pathways and programs.

Korea Green Innovation Days (KGID) is the WBG’s flagship Green Growth knowledge-sharing event, organized and funded by the Korea Green Growth Trust Fund (KGGTF). KGID 2016 is our 3rd annual event, which we are excited to be presenting in the Republic of Korea.

The 3rd annual KGID 2016 is unique. We will share practical and tangible examples of multiple global partners working toward achieving sustainable development. A cadre of World Bank Group technical specialists, global decision makers from thirteen countries, RoK officials, Korean experts and practitioners in green growth and climate change will take part.

We define Green Growth as a holistic innovative approach to achieve sustainable development and address climate change issues. Moreover, Green Growth leverages technical and multi-faceted perspectives to drive smarter future growth.

Share Information and Experience

Reflections from the 2nd KGID (2015 in Seoul) and 1st KGID (2014 in DC) Events

KGID 2016 builds on the success of the inaugural KGID 2014 event and the KGID 2015 experience, in which experts and practitioners presented Green Growth implementation lessons from Korea and the WBG to about 650 WBG staff, their clients, and external participants. These events covered policy, technology, and financing angles, as well as technical exchange on specific sectors (urban, transport, ICT, environment, water, energy, macro-economy, industry, and climate change). The events significantly raised awareness and dialogue among participants and Green Growth policy makers.

What We Hope You Will Gain from the KGID 2016 Event

Many presentations and discussions will take place that will expose you to new information and experiences. Your participation, feedback, and ideas are critical. Below are just some of the possible take-aways:

① LEARNING

Learn how other countries, Korea, and WBG are sharing Green Growth technical knowledge globally. Learn about climate smart and green technologies, policies, and methods from other countries that may support your sustainable development growth plans and actions.

② MEET YOUR GLOBAL COLLEAGUES

Make new contacts that can immediately help you better implement Green Growth and climate smart actions. Build a community and continue the dialogue on green innovation and implementation, post-KGID.

614



Did you know Korea has built more than 600 new towns and industrial zones since the 1960s?

83.6

BILLION

Did you know from 2009 to 2013 Korea spent USD 83.6 billion (2% of GDP annually) on Green Growth projects?



700,000

700,000 skilled workers were involved in Korea's Cheonggyecheon restoration project in the span of two and a half years

650



Did you know 650 people attended the KGID 2014 flagship event in Washington D.C. and the KGID 2015 in Seoul?

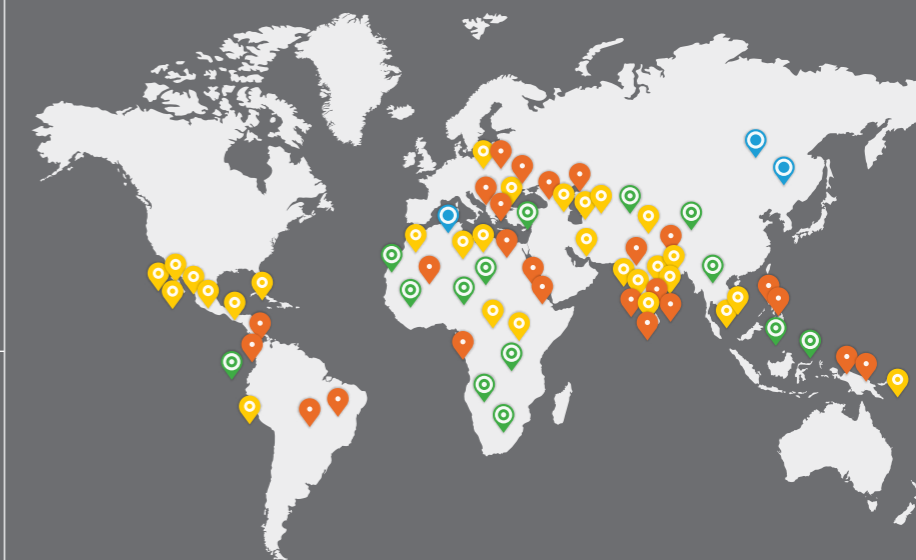
42.5

BILLION

Did you know the World Bank approved 42.5 billion USD in fiscal year FY15

80

As of 2015, the KGGTF has 80 Green Growth implementation programs worldwide.



41

MILLION

The KGGTF has allocated USD 41 million (from 2011 to 2016) for Green Growth implementation programs.

25

MILLION

And has disbursed USD 25 million from 2011-2016.

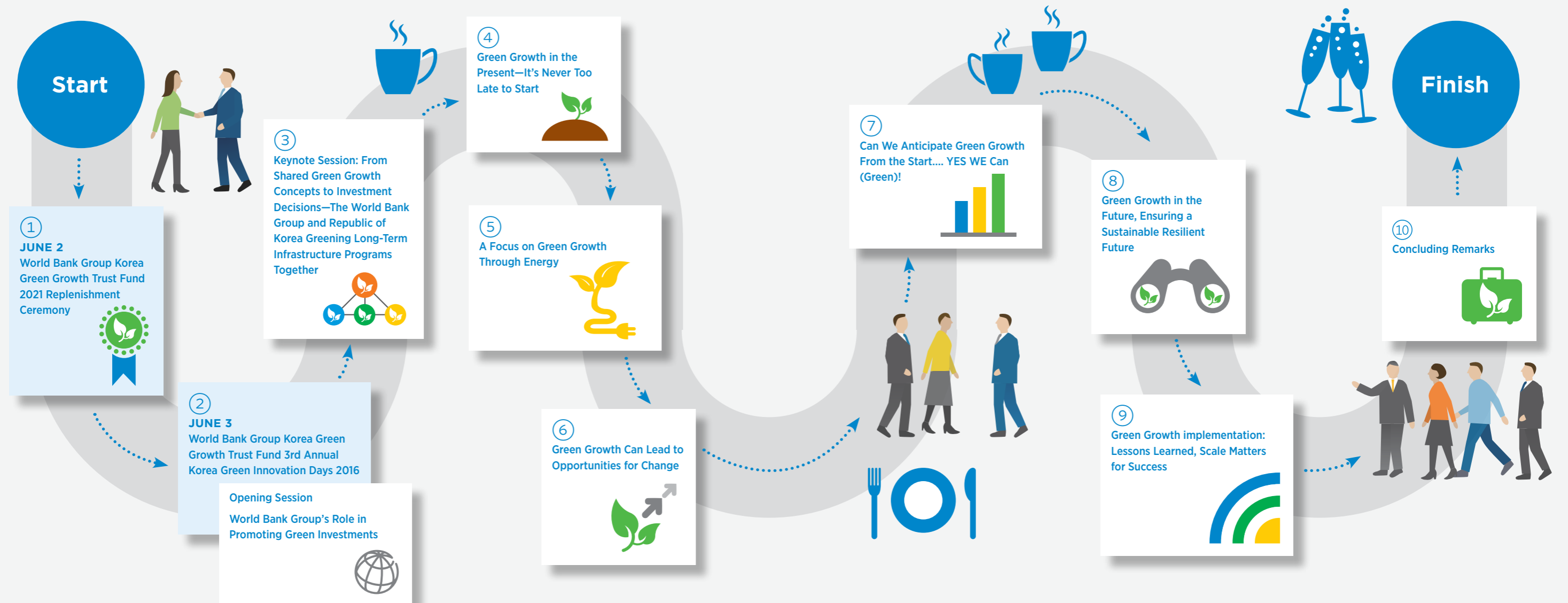


4.8

BILLION

It has also supported WBG lending operations linked to USD 4.8 billion from 2011-2016.

Sessions



Session Summary

JUNE 2

1 5:00–9:30 PM

WBG KGGTF 2021 REPLENISHMENT CEREMONY

By Invitation
Venue: Korean Stone Art Museum

JUNE 3

WBG KGGTF 3RD ANNUAL KGID 2016

2 9:00–9:40 AM

A focus on the impact and innovative partnership that has blossomed into the World Bank Group's KGGTF success:

3 9:40–10:40 AM

Governments invest billions of dollars annually in infrastructure projects in energy, water, transport, and other sectors. This is particularly true in the Republic of Korea as it implements its national Green Growth policy. These investments are critical, long-term, and will shape the course of country growth and development.

Yet deep uncertainties about future conditions pose formidable challenges to making near-term decisions that make long-term investment sense. Climate change is one such uncertainty, but it does not act in isolation. Other uncertainties, such as urban development, population growth,

technologies, or political priorities, also challenge decision-makers. In other words, the realities of a limited understanding of the world, along with a complex political economy, challenge good decision-making.

This session highlights the important progress made possible by the KGGTF to address these challenges and foster long-term Green Growth, or innovative methods and robust decision-making approach that work well no matter what the future brings.

4 10:50–11:40 AM

This is first of three sessions in KGID 2016 that frames the achievements and findings from Green Growth action and

discusses various starting points and green investment pathways.

This session highlights WBG and KGGTF engagement with clients who are leading innovative solutions to sustainable development challenges, including the use of energy and industrial Green Growth opportunities, and fostering green economic growth action lens to current sustainable development challenges.

5 11:40 AM–12:10 PM

This session sheds a light on an important sector that is central to Green Growth: Energy. Presenters from multiple supporting and implementing green energy programs will share their viewpoint on challenges and opportunities.

6 12:10–1:00 PM

This panel session highlights the importance of knowledge-sharing and capacity-building for Green Growth. Panelists will discuss their efforts and the challenges they have run into absorbing, digesting, adapting, and applying lessons learned from other countries and KGGTF programs.

7 2:10–3:10 PM

This is second of three sessions in KGID 2016 that frames the achievements and findings from Green Growth action and discusses various starting points and green investment pathways.

This session highlights WBG clients and teams that are using the benefit of hindsight as they plan new

worlds and economies. Speakers will share how as they develop new lives through new cities, Green Growth thinking is influencing design and implementation.

8 3:25–4:40 PM

This is third of three sessions in KGID 2016 that frames the achievements and findings from Green Growth action and discusses various starting points and green investment pathways.

This session highlights multi-sectorial approaches toward green development, as well the increased need to take an integrative approach that includes ICT, creativity, and a paradigm shift to ensure green economic growth into the future.

In this session the KGGTF activities highlight approaches to variable factors such as climate effects, new economic growth. So the focus of these KGGTF programs is on opportunities for jobs, innovation, and growth. They showcase Green Growth policy, technology, and action.

9 4:40–5:50 PM

This session looks at some initial lessons from the first three years of WBG's Green Growth KGGTF grant activities in terms of policy, expenditure, investment decision-making, use of and adaptation of knowledge, institutional capacity-building, and more. Key learnings include:

1. When designing Green Growth programs, scale matters. The KGGTF portfolio includes global, regional, national, and municipal activities. In this panel discussion, speakers will share how they designed their programs and how they are progressing.

2. Working across silos and scales matters, too. As we learn about Korea's success in taking action toward a Green Growth economy, a salient point emerges: inter-agency and inter-governmental communication and collaboration is critical for success.

10 5:50–6:00 PM

What have we we learned from KGID 2016? Where do we go from here? What are the key takeaways?

June 2

WORLD BANK GROUP KOREA GREEN GROWTH TRUST FUND 2021 REPLENISHMENT CEREMONY (BY INVITATION)

KOREAN STONE ART MUSEUM, SEOUL, REPUBLIC OF KOREA;
THURSDAY, JUNE 2, 2016

①



5:00 PM Optional: Pre-event Opportunity for a Guided Tour of the Museum

6:00 PM Registration at Museum Lobby

6:30 PM World Bank Group's Korea Green Innovation Days (KGID) Official Opening

MASTER OF CEREMONIES

Jie Ae Sohn

- KGGTF montage video
- Welcoming remarks: Zoubida Kherous Allaoua, Senior Regional Advisor, WBG
- Welcome address: Hong Koo Lee, Former Prime Minister of Republic of Korea

6:50 PM KGGTF Replenishment Ceremony

- KGGTF, where we are today: Eun Joo Yi, KGGTF, Climate Change Group, WBG
- Keynote speech: Ministry of Strategy and Finance, Republic of Korea

7:05 PM Intermission

7:15 PM KGGTF Special Program: Technical Partner Appreciation

VENUE

The Rooftop Garden

PRESENTERS

Eiko Wataya and Inhye Bak, KGGTF, Climate Change Group, WBG

- Agim Kukaj, Head of ICT Department, Ministry of Economic Development:
ICT Innovative and Green Growth: Investing and Scoping in Kosovo (video)
- Zhenia Viatchaninova Dalphond, ICT consultant, Transport and ICT Global Practice, WBG:
The Negawatt Challenge for Energy Efficiency in Africa (video)
- KGGP Partnership Awards

7:45 PM Reception

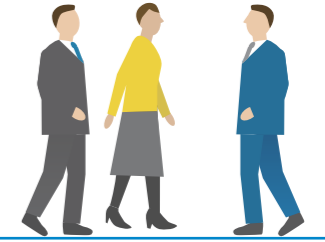
9:30 PM End of Event

June 3

WORLD BANK GROUP KOREA GREEN GROWTH TRUST FUND 3RD ANNUAL KOREA GREEN INNOVATION DAYS 2016

FOUR SEASONS HOTEL, SEOUL, REPUBLIC OF KOREA;
FRIDAY, JUNE 3, 2016

②



9:00 AM Opening Session

MASTER OF CEREMONIES

Jie Ae Sohn

- Welcome: Eun Joo Yi, KGGTF, Climate Change Group, WBG
- Opening remarks: WBG
- Keynote

9:25 AM World Bank Group's Role in Promoting Green Investments

- Eun Joo Yi, KGGTF, Climate Change Group, WBG

9:40 AM Keynote Session: From Shared Green Growth Concepts to Investment Decisions—The World Bank Group and Republic of Korea Greening Long-Term Infrastructure Programs Together

③

MODERATOR AND PRESENTER

- Julie Rozenberg, Economist, Sustainable Development Practice Group, WBG

PANELIST

- Kangsoo Kim, Director and Vice President of Department of Land and Infrastructure Policy, Korea Development Institute
- Oh Jae hak, Vice President, Korea Transport Institute
- Shomik Raj Mehndiratta, Lead Urban Transport Specialist, Transport and ICT Group, WBG

10:40 AM Coffee Break

10:50 AM Green Growth in the Present—It's Never Too Late to Start

④

MODERATOR AND PRESENTER

- Mihoon Jeong, Manager, Industrial Location and Environment Department, Korea Industrial Complex Corp.

PRESENTERS AND PANELISTS

- Dalia Sakr, Operations Officer, Clean Energy & Resource Efficiency, IFC
- Jaime Diaz, Advisor to the Executive Director, WBG



11:40 AM A Focus on Green Growth Through Energy

⑤

MODERATOR AND PANELIST

Todd Johnson, Lead Energy Specialist, Energy and Extractives Group, WBG

PANELISTS

- Ministry of Trade, Industry and Energy (MoTIE)
- Janina Andrea Franco Salazar, Senior Energy Specialist, Energy and Extractives Group, WBG
- Chilean Delegation

12:10 PM Green Growth Can Lead to Opportunities for Change

⑥

MODERATOR

Hyoung Gun Wang, Senior Economist, Urban, Rural & Social Group, WBG

PANELISTS

- Mansha Chen, Urban Specialist, Urban, Rural & Social Group, WBG
- Pyush Dogra, Senior Environmental Specialist, Environment Group, WBG
- Shrikan Baldi, Additional Chief Secretary (Finance), Government of Himachal Pradesh, Shimla, India
- Taesun Shin, General Manager at the Business Planning & Coordination Department, K-water Corp

Moderated Discussion

1:00 PM Lunch

2:10 PM Can We Anticipate Green Growth From the Start.... YES WE Can (Green)!

⑦

MODERATOR

Sang Joo Lee, Director of Overseas Construction & Development Cooperation, Ministry of Land, Infrastructure and Transport, Korea

PRESENTERS AND PANELISTS

- Kyu Hong Hwang, Research Fellow, Urban Regeneration Research Department, Korea Land and Housing Corporation
- Farouk Mollah Banna, Urban Specialist, Urban, Rural & Social Group, WBG
- Ibrahima Diagne, Director of the Coordination Unit of the National Solid Waste Management Program, Senegal
- Janvier Murenzi, Vice Mayor in Charge of Economic Development, Rubavu District, Rwanda

Moderated Discussion

3:10 PM Coffee Break

3:25 PM Green Growth in the Future, Ensuring a Sustainable Resilient Future

⑧

MODERATOR AND PRESENTER

Jean Baptiste Migraine, Disaster Risk Management Specialist, Urban, Rural & Social Group, WBG

PRESENTERS AND PANELISTS

- François Zougmore, Director of Materials and Environmental Laboratory (LAME) and Raincell partner, University of Ouagadougou, Burkina Faso
- Cheick Fanta Mady Kone, Officer in the Civil Protection General Directorate, Mali
- Dinkneh Tefera, Urban Development Specialist, Urban, Rural & Social Group, WBG
- Mathewos Asfaw, General Manager and Chief Architect Planner in the Addis Ababa City Planning Project Office, Ethiopia
- Arnab Bandyopadhyay, Lead Transport Specialist, Transport and ICT Group, WBG
- Rajesh Bhushan, Joint Secretary, Ministry of Rural Development, Government of India
Ministry Science ICT and Future Planning

Moderated Discussion

4:40 PM Green Growth Implementation: Lessons Learned, Scale Matters for Success

⑨

PRESENTER AND MODERATOR

- Carter J. Brandon, Lead Economist, Environment Group, WBG
- Andreas Kopp, Lead Transport Economist, Transport and ICT Group, WBG

PANELISTS

- Todd Johnson, Lead Energy Specialist, Energy and Extractives Group, WBG
- Kyu Hong Hwang, Research Fellow, Urban Regeneration Research Department, Korea Land and Housing Corporation
- Shashank Ojha, Senior E-Government Specialist, Transport and ICT Group, WBG

5:50 PM Concluding Remarks

⑩

- Eun Joo Yi, KGGTF, Climate Change Group, WBG

6:00 PM End of the KGID 2016

6:00 PM Cocktails and Dinner

SHARE GREEN GROWTH

Program Descriptions

ICT INNOVATIVE AND GREEN GROWTH FOR RURAL KOSOVO: INVESTING & SCOPING

COUNTRY: Kosovo

REGION: ECA

SCALE: National

SECTOR: ICT

TECHNICAL AREAS: ICT, broadband, innovation, job creation

GRANT AMOUNT: \$485,000

PARTNERS: National IT Industry Promotion Agency of Korea, European Commission

PROGRAM GOAL:

To serve as a model for programming of rollout of broadband infrastructure in rural areas and its utilization for green jobs and digital businesses

Government of Kosovo recognizes that broadband connectivity enables green growth. KGGTF's two-year program aims to provide technical assistance to help Kosovo design a rural broadband program to give access to broadband Internet for everyone in selected underserved areas. Moreover, its objective is to identify pilot opportunities to save costs and increase revenues by applying green ICT in rural areas in both the public and private sectors.



NEGAWATT CHALLENGE FOR ENERGY EFFICIENCY

COUNTRY: Ghana, Kenya

REGION: AFR

SCALE: Regional

SECTOR: ICT (Energy)

TECHNICAL AREAS: ICT, Energy Efficiency, innovation, job creation

GRANT AMOUNT: \$500,000

PARTNERS: Accra and Nairobi city authorities; utilities and energy regulators in both countries; private sector, academia and research institutions, tech innovation communities in both cities.

PROGRAM GOAL:

To pioneer an open innovation model for private and public sector engagement in the process of identification of ICT-enabled energy efficiency solutions for green growth

With rapid urbanization in Africa, public sector ability to deliver high-quality services becomes increasingly constrained. While a number of initiatives aim to expand access to energy, a significant emphasis should be placed on the efficient use of existing resources. KGGTF's two-year Negawatt Challenge initiative aims to highlight how digital technology solutions can improve energy efficiency for fast-growing cities in Ghana and Kenya. It does so through a competition and a design-thinking methodology, which provide a platform to engage local, national, and global problem-solvers in identification of local energy challenges, and build capacity of high-potential entrepreneurs to adapt lean business models and develop innovative software and hardware to respond to these challenges. Another objective is to marry indigenous knowledge with international know-how, such as the one exhibited by South Korean technology companies and public sector. After the successful kickoff of the initiative, the Negawatt Challenge was successfully scaled up in Tanzania and Brazil.

INFRASTRUCTURE RESILIENCE AND ROBUST DECISION MAKING

COUNTRY: N/A

REGION: Global

SCALE: Global

SECTOR: Climate Change

TECHNICAL AREAS: Climate resilience planning, policy decision-making

GRANT AMOUNT: \$1,150,000

PROGRAM GOAL:

To investigate new decision-making methodologies addressing climate change risks and uncertainties, and apply the methods in pilot projects

Robust Decision-Making (RDM) is a state-of-the-art method for making sound investment and planning decisions in the face of uncertainties, such as climate, economic conditions, population, technology, and regulations. Used extensively in many countries—for instance, in making water and energy investment decisions—RDM uses new analytical tools to help stakeholders understand investment options and evaluate future scenarios. Pilot programs will test and validate the decision-making tools for possible use in appropriate KGGTF-supported investment programs.

CLEANER PRODUCTION FOR COMPANIES IN THE MIDDLE EAST AND NORTH AFRICA

COUNTRY: Pakistan, Egypt

REGION: MNA

SCALE: Regional

SECTOR: Energy

TECH AREAS: Emergency infrastructure Program, energy efficiency

GRANT AMOUNT: \$304,000

PARTNERS: National Productivity Organization, Cleaner Production Institute

PROGRAM GOAL:

To help Pakistan continue its natural resource efficiency efforts and their associated cost savings

Industry in Pakistan is competing more and more with the country's agricultural and power sectors for limited water and energy resources. The country already faces a 5-gigawatt shortage and severe load shedding and blackout problems, causing factory closures and unemployment. This KGGTF-funded Green Growth implementation program would help Pakistan continue its natural resource efficiency efforts and their associated cost savings. The next phase of this ongoing program would target, investigate, and plan for cleaner production technologies for textiles, sugar, pulp and paper, and leather. If resource-efficient technologies can be put into play, manufacturers can become more resilient and better protect themselves and their employees from closures, in addition to preparing for resource shifts expected with climate change.



USING ICT TO INCREASE GREEN COMPETITIVENESS IN GUATEMALA

COUNTRY: Guatemala

REGION: LAC

SCALE: National

SECTOR: ICT

TECHNICAL AREAS: EIP, EE

GRANT AMOUNT: \$605,000

PARTNERS: National Committee for Clean Production and PRONACOM (National Agency for the Promotion of Competitiveness), KEA, KICOX

PROGRAM GOAL:

To stimulate small- and medium-sized enterprises (SMEs) to adopt clean production protocols and technologies, while improving SME competitiveness

Supporting national programs to promote efficient industries, KGGTF's two-year program in Guatemala is providing technical assistance to implement the country's energy policy. Program activities includes institutional capacity to develop strategies, policies and programs to stimulate Clean Production, promotion of clean production among productive sector that is being achieved through the support of a Voluntary Agreement on Clean Production between the government and the Association of the Chemical Industry (GREQUIM), and Information generation and opportunity analysis for investments on clean production

OPERATIONALIZING URBAN LAND MANAGEMENT TOOLS FOR GREEN, INCLUSIVE AND RESILIENT GROWTH

COUNTRY: N/A

Region: Global

SCALE: Global

SECTOR: Urban

TECHNICAL AREAS: Land readjustment, land value capture, Transit Oriented Development, flood risk management

GRANT AMOUNT: \$500,000

PARTNERS: SMG, Seoul Housing Corporation

PROGRAM GOAL:

To build and strengthen Green Growth strategic, practical, and technical know-how to improve urban land use planning, and contribute to resilient, participatory, and environmentally and socially inclusive urban growth

Urban populations are expected to double in developing countries within a generation. Tools for green land management, including land readjustment, land-market assessment, and land-based financing can help create sustainable, inclusive Green Growth, but are often costly and inaccessible.

Many developing countries are eager to implement new approaches, markets, technologies, and values for green economic growth. These new approaches can build and strengthen Green Growth strategic, practical, and technical know-how to improve urban land use planning. They can also contribute to resilient, participatory, and environmentally and socially inclusive urban growth.

This KGGTF program, through the Capacity Building for Urban Green Growth Initiative, has developed a series of e-learning programs that encourage city leaders and practitioners to operationalize innovative approaches. These programs provide specific entry points and practical tools for facilitating Green Growth, inclusiveness, and resilience and are designed to be "living courses," in which participants bring their own problem statements and then jointly create solutions. The Initiative also facilitates peer-to-peer learning through knowledge exchange workshops and virtual practitioner networks, and has developed customized learning programs in China, Mexico, and India. The initiative also makes technical assistance available to Vietnam, so that the country can pilot land readjustment approaches to redeveloping poor neighborhoods.

GREEN SMART CITY DEVELOPMENT WITH CITIZEN PARTICIPATION

COUNTRY: India, Tunisia

REGION: Global

SCALE: Global

SECTOR: Urban

TECHNICAL AREAS: e-government, cadastre, Geographical Information System

GRANT AMOUNT: \$800,000

PARTNERS: KRIHS, LH

PROGRAM GOAL:

To develop a national master plan to enable Tunisian and Mumbai authorities to access digital land information to address urban challenges

Cities face a number of challenges to green urban development, including poor land cadaster systems (a comprehensive land ownership register), poor public services and living environments, and high unemployment and poverty-related violence. These challenges call for innovative and tested urban management solutions that promote shared prosperity and reach the poorest 40 percent of citizens in the world. Following on the heels of the World Bank's e-Government program on ICT for urban management, this KGGTF program tackles city challenges. Among its goals, the two-year program will pilot ICT innovations to help authorities address urban challenges in Mumbai,

India's capital, and a city of 19 million people. The World Bank Group KGGTF-funded program provides examples for cities on how to overcome economic growth obstacles. Using South Korean experiences from Seoul, a global leader in e-government, the KGGTF will create a case study to help Tunisia acquire data for its cadastre system. The program will also share knowledge on South Korean land management to Tunisia and other developing countries. For Mumbai, KGGTF program training workshops will demonstrate best practices to government officials. The program will also study establishment of a civil participation system (CPS) for Mumbai, including piloting CPS applications for the Mumbai Municipal Corporation, whereby citizens will be able to submit information through mobile-phone-based surveys, hotlines, and user-generated maps. Applications will include community mapping for urban disaster risk management. This Green Smart City program is part of a larger effort in partnership with the 72-member World e-Government Organization of Cities and Local Governments, Seoul Metropolitan Government, and the Korea Ministry of Land, Infrastructure, and Transport.



DEVELOPMENT POLICY LOAN TO PROMOTE INCLUSIVE GREEN GROWTH AND SUSTAINABLE DEVELOPMENT IN HIMACHAL PRADESH

PROGRAM GOAL:

To create socially responsible and environmentally sustainable economic opportunities from the region's rich natural resource base.

The mountain state of Himachal Pradesh, located in Northern India, is rich in natural resources, serving as a critical, species-rich watershed for Northwest India. Dense forests cover more than 27 percent of its land area, helping define the weather in much of Northern India and acting as a carbon sink for greenhouse gases (GHGs). The state government realizes the fragility of this system and has developed ambitious and innovative sustainable development goals that move away from the manufacturing-led growth and toward natural-resource-based sources of income, specifically hydropower, tourism, and horticulture. This WBG project identified the environmental aspects of growth sectors that need the immediate attention of policymakers; redefined strategies, policies, and operational roles to address resource and environment challenges; defined institutional and policy frameworks, revitalizing capacity and skills and implementable action plans for effective results; ensured maximum public participation in management of natural resources and protection of the environment; and promoted climate resilient development and carbon neutrality. The project helped state of Himachal Pradesh to support in the improved management of its natural resources across growth engines of the economy and in turn helped to promote inclusive green growth and sustainable development.

IMPROVING SOLID WASTE SERVICE DELIVERY

COUNTRY: N/A

REGION: AFR

SCALE: Municipal

SECTOR: Urban

TECHNICAL AREAS: SWM

GRANT AMOUNT: \$600,000

Partners: N/A

PROGRAM GOAL:

To improve solid waste management in four Sub-Saharan African cities

There are several obstacles to managing municipal solid waste in Sub-Saharan Africa, including a lack of infrastructure, regulatory and legal challenges, rapid urbanization, and a scarcity of financial resources. Uncollected and untreated waste in many of the region's cities impacts human health, especially for the poor who live nearby, the environment, and local economies, and it represents a serious impediment to inclusiveness and Green Growth. By improving municipal solid waste collection, cities can create opportunity and cultivate resilience: Solid waste management can help keep drainage channels open, thus reducing their vulnerability to the anticipated frequent and intense rainfall and sea level rise that accompanies climate change. This KGGTF implementation program will foster Green Growth by identifying the solid waste investment needs of four Sub-Saharan African cities and assuring that policy makers have direct access to implementable policy recommendations, as well as support to improve solid waste management in their city.

ENHANCING GREEN ECONOMIC DEVELOPMENT IN SECONDARY CITIES IN RWANDA

COUNTRY: Rwanda

REGION: AFR

SCALE: National

SECTOR: Urban

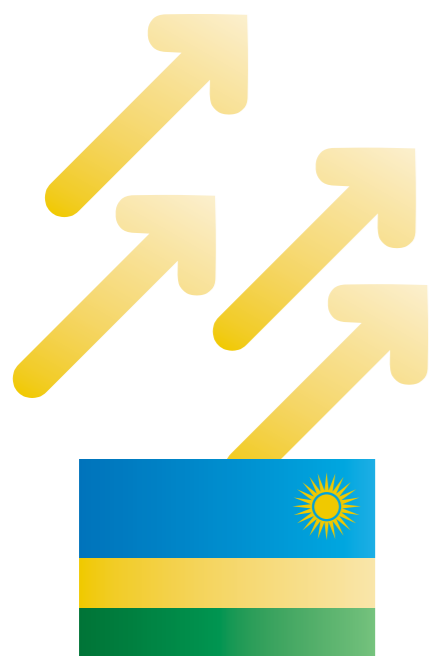
TECHNICAL AREAS: Urban development, local economic development, ICT

GRANT AMOUNT: \$650,000

PROGRAM GOAL:

To enable Rwanda to develop the Green Growth economic potential of secondary cities

The Rwandan government's 2013 Economic Development and Poverty Reduction Strategy envisions urbanization as a driver of growth. The KGGTF's multi-year program is providing technical assistance to make sure Rwanda meets its need for a network of secondary towns to absorb rural migrants. The government expects the agricultural workforce to decrease to 50 percent by 2020, and then 30 percent by 2040. At the government's request, the World Bank Group had assessed investment priorities in six target cities. The KGGTF program will, in part, support further investment prioritization.



REAL TIME URBAN FLOOD RISK MANAGEMENT AND DECISION SUPPORT TOOL BASED UPON ANALYSIS OF ATTENUATION OF CELLULAR PHONE NETWORK SIGNALS

COUNTRY: Mali

REGION: AFR

SCALE: Municipal

SECTOR: Urban

TECHNICAL AREAS: Big data, mobile technology, open source data, GIS

GRANT AMOUNT: \$495,000

Partners: Kyungpook National University, University of Ouagadougou, University of Bamako, Orange-Mali, Mali-Météo, DNH, DGPC, INSS/CNRST Burkina Faso, Urban Local Government Support Program, Sahel Disaster Resilience Program, Sahel Drought Response TA, Mainstreaming Disaster Reduction in Mali

PROGRAM GOAL:

To reduce flood risk in Mali's urban areas, particularly Bamako

Urban flood risk is increasing in African cities, often because of inadequate urban planning and building codes, uncontrolled occupation of flood-prone lowlands, and climate variability and change. Flood risk in Bamako, Mali, is a typical. At the same time, the availability of hydro-meteorological observing stations has dropped dramatically all over Africa since the 1970s. The problem is currently worsening in Mali because of security conditions. Setting innovative public-private partnerships between National Meteorological and Hydrological Services, cell phone operators, civil protection services and food security institutions would directly increase competitiveness with regards to (i) generation of data, information and services; (ii) data transmission and archiving; and (iii) service delivery to end users. Funding for this Green Growth implementation program will be used to create real-time, high-resolution rain maps based on cellular network signal attenuation. Such data can be used to model rainfall runoff and flood risk. Eventually, authorities will be able to issue response plans with more lead-time and shift habitation patterns away from flood-prone areas.

AFFORDABLE AND RESILIENT HOUSING AND URBAN LAND USE PLANNING

COUNTRY: Vanuatu

REGION: EAP

SCALE: National

SECTOR: Urban

TECHNICAL AREAS: Affordable housing, land use planning, DRM

GRANT AMOUNT: \$675,000

PROGRAM GOAL:

To establish the basis for increasing the availability of affordable serviced land and housing, particularly for the poor, and reducing the risk of urban populations to natural hazards and climate change

Vanuatu is a small island nation of 250,000 in the South Pacific and rated as the most vulnerable country in the world to natural disasters including cyclones, earthquakes, and tsunamis. The government of Vanuatu sought support in both WBG technical assistance and lending for urban land management and housing, particularly for the poor living in informal settlements that are particularly vulnerable to climate change impacts such as landslides and flooding. This program aims to establish the basis for increasing the availability of affordable serviced land and housing, particularly for the poor, and reducing the risk of urban populations to natural hazards and climate change.



TECHNICAL ASSISTANCE TO PROMOTE INTEGRATED GREEN URBAN PLANNING IN ADDIS ABABA

COUNTRY: Ethiopia

REGION: AFR

SCALE: Municipal

SECTOR: Transport

TECHNICAL AREAS: Integrated land use and transport

GRANT AMOUNT: \$1,100,000

PARTNERS: KRIHS, KOTI

PROGRAM GOAL:

To help Addis Ababa Urban Planning Institute revise and implement the city's master transportation plan

With a population of 3 million, and growing 4 percent a year, Addis Ababa faces rapid urbanization that strains its infrastructure and services and poses serious challenges to the city's development and its decade-old master plan. This program is providing technical assistance to the city's Urban Planning Institute (UPI) to help revise and implement the master plan. The program supports an international conference that builds planners' capacity by highlighting the experiences of similar cities, and paying for local and international consultants to work on master plan revisions. Bringing together the Addis Ababa and Seoul municipal administrations and the UPI and the Korean Research Institute for Human Settlements, this program also facilitates Korean Transport Institute training programs on public bus systems. Trainings are on transport strategies, and related issues for stakeholders, including the Addis Ababa Transport Branch, Roads Authority, Oromiya Roads Authority, and the Federal Ministry of Transport. The program links to the World Bank Group transport-sector support program and the urban local-government development program.

TECHNICAL ASSISTANCE TO PROMOTE SOLID WASTE MANAGEMENT AND URBAN GREENERY IN SELECTED ETHIOPIAN SECONDARY CITIES

COUNTRY: Ethiopia

REGION: AFR

SCALE: Municipal

SECTOR: Urban

TECHNICAL AREAS: SWM, landfill operation

GRANT AMOUNT: \$400,000

PARTNERS: Ministry of Urban Development of Ethiopia, Bishoftu City Administration

PROGRAM GOAL:

To make the recently completed landfill operational in Bishoftu, Ethiopia, that will help the city remain resilient, competitive, and clean

The Government of Ethiopia (GoE) has identified the management of solid waste as a national priority and is developing strategies and guidelines on integrated solid waste management systems and urban greenery. This GoE initiative is being supported by the World Bank through the Urban Local Government Development Project (ULGDPII). ULGDP is helping to strengthen the capacity of urban local governments to plan, deliver, operate and maintain priority municipal infrastructure and services including solid waste management. This program is to support undertaking assessments on the status of solid waste management and urban greenery in four secondary cities; review federal level strategy and service standard; conduct capacity building activities to improve SWM.



PROMOTING THE USE OF GREEN CONSTRUCTION TECHNOLOGY IN THE ROAD SECTOR

COUNTRY: India

REGION: SAR

SCALE: National

SECTOR: Transport

TECHNICAL AREAS: Road material, construction technology

GRANT AMOUNT: \$500,000

PARTNERS: KICT

PROGRAM GOAL:

To share knowledge about options and innovative materials based on successful examples from Korea and other countries

India has been implementing a large road infrastructure program since 2000. The KGGTF's program promotes the use of green construction technology in the road sector and addresses an urgent need for sustainable construction practices. Traditional low-productivity construction technologies use a great deal of energy and emit a great deal of greenhouse gases. This program directly contributes to a road modernization project in Rajasthan that aims to bolster the local rural economy by improving transit connectivity in remote rural areas. Mineral-rich Rajasthan state will save money and create local green jobs by building roads using its large quantities of quarry waste, along with materials such as fly ash and low-cost concrete. The program is organizing a workshop for officials from the Ministry of Road Transport and Highways, India's National Highway Authorities, National Rural Roads Development Authority, and Rajasthan's Public Works Department. The program will then pilot a selection of green options for at least 10 percent of roads that India's national program will build.

ICT APPLICATIONS TO ACHIEVE GREEN GROWTH

COUNTRY: India

REGION: SAR

SCALE: Municipal

SECTOR: ICT

TECHNICAL AREAS: Smart city diagnostic toolkit

GRANT AMOUNT: \$1,700,000

PARTNERS: Ministry of Science, ICT and Future Planning of Korea, Korea Institute of Energy Technology Evaluation Planning, National Information Society Agency of Korea, KEA, K-water, Korea Smart Card Corporation

PROGRAM GOAL:

To share knowledge for greening cities, improving quality of life, and reaching the poorest people, while optimizing energy use, reducing GHG emissions, and helping cities apply cost-saving innovations.

The ICT sector has proven to be a key in reducing carbon emissions from other sectors of the economy, such as transport or power transmission and distribution. The objective of this project is to provide a preliminary ICT assessment in the energy sectors of three Indian cities in order to facilitate the formation of smart communities and the introduction of smart technology. Project partners, including Korean technical experts, will recommend the best ICT solutions for implementing a green-growth transformation toward smart city implementation. For each city, detailed diagnosis have been conducted across five predefined sectors – energy, water, urban, transport, and ICT. Detailed project reports help city authorities understand their current readiness and the key steps required to transform.



TRAINING HUB “TRANSPORT FOR GREEN GROWTH”

COUNTRY: N/A

REGION: Global

SCALE: Global

SECTOR: Transport

TECHNICAL AREAS: Evaluation for growth and reduction of external costs

GRANT AMOUNT: \$500,000

PARTNERS: KOTI, other Multilateral Development Banks, technical staff of national transport agencies

PROGRAM GOAL:

Integration of Green Growth objectives into project evaluation

The program will use a new methodology to count the value of the reduction of GHG emissions, of reduced health costs of local air pollution and the reduction of road safety risks as project value added. It will go beyond classical (partial equilibrium) Cost Benefit Analysis in accounting for trade and agglomeration economies, the mechanisms through which transport contributes to macroeconomic development. The training will focus on multipliers in international organizations and national agencies to implement transport projects that serve green growth.

LEARN GREEN GROWTH

Feature Stories

THE NEGAWATT CHALLENGE FOR ENERGY EFFICIENCY IN AFRICA

SECTOR:
ENERGY

SCALE:
REGIONAL

COUNTRIES:
GHANA AND KENYA



CONTEXT

African economies lose 2.1 percent of their GDP as a result of power shortages annually.

With their metropolitan areas becoming some of the fastest growing urban hubs in Africa, Ghana and Kenya are facing a critical energy challenge. Rapid urbanization strains existing infrastructure and natural resources, while also putting increasing pressure on municipalities to deliver public services and support economic growth and competitiveness. In the Ghanaian capital of Accra, for example, air quality is deteriorating at the same pace that traffic congestion is increasing, and energy black outs are increasingly common.



CHALLENGES AND OPPORTUNITIES FOR GREEN ECONOMIC GROWTH

Green Growth offers competitive advantages and opportunities for economic growth and employment.

Green Growth strategies can help economies become more resilient as they work to meet demand for food production, transport,

housing, energy, and water. Energy efficiency is one of the building blocks of Green Growth. It is widely recognized as one of the most effective ways to combat climate change while meeting rising energy demand; it holds particularly great promise for rapidly growing urban centers. Countries such as Ghana and Kenya seek to reduce urban energy use through the use of innovative information and communication technology (ICT) that can improve energy efficiency by monitoring consumer behavior and prompting its positive change.



SOLUTIONS

The Negawatt Challenge builds engagement and collaboration between technology and energy communities in Ghana and Kenya through a design-thinking workshop, a series of meet-ups, an ideathon competition, a boot camp, and a business acceleration program.

This KGGTF-funded Green Growth program developed a design-thinking methodology and hosted a well-structured challenge competition to engage various stakeholders in the identification of local challenges and build capacity of high-potential entrepreneurs

“The Negawatt is all about empowering entrepreneurs to contribute to achieving Sustainable Development Goals through energy efficiency measures. Rapidly urbanizing cities in developing countries have vibrant technology hubs that are home to incredible local talent. We want to channel this creativity toward innovation at the intersection of energy and ICT”.

ANNA LERNER WORLD BANK ICT AND ENERGY SPECIALIST AND CO-TASK TEAM LEADER OF THE NEGAWATT CHALLENGE



to adapt lean business models and develop innovative products, leveraging technology to respond to these challenges.

The methodology and the competition revolve around six iterative stages. First, stakeholders are invited to a workshop to deliberate on their city's most pressing energy challenges. Energy sector stakeholders from the public and private sectors—including local government and citizen-led organizations—get together, identify major sources of energy inefficiencies, and establish the necessary data sets to aid participants in the innovation challenge. In parallel, creative and tech communities gather in a series of specialized community meet-ups to improve their knowledge of energy efficiency, green growth, and various applications of ICT

technologies. To help source valuable data sets and publish them as 'open data,' a public sector group or local organization is encouraged to carry out an open energy data readiness assessment, thus building the foundations for the emergence of data-driven solutions to the challenges.

The fourth stage in the process is the Negawatt Weekend, an "ideathon" event that engages early startups to work on their selected challenge. Upon evaluation of the startups' live pitches, judges select teams to proceed to a boot camp, dedicated to business, design, technical, and marketing aspects of product development. As an open innovation challenge, the Negawatt taps into a vast pool of innovators, many who may not otherwise have traditionally engaged in developing technical

"It's a very interesting and educational program in the sense that it brings together a number of stakeholders—private sector, public sector, and academia—to share ideas and see that responsibility for energy efficiency is not one person's job."

LYDIA E. A. SACEY-ADDY DIRECTOR OF BUDGET AND RATING OF THE ACCRA METROPOLITAN ASSEMBLY AND LEAD GOVERNMENT COUNTERPART FOR NEGAWATT CHALLENGE IN GHANA.

"Energy efficiency can play a great role in saving energy in rapidly urbanizing cities, on a household level and beyond. The Negawatt Challenge links Accra to Nairobi in the quest to address this common challenge, and aims to contribute energy-efficient interventions by engaging local startup and technology communities as entrepreneurial problem solvers. As experience in other countries shows, technologists and entrepreneurs are capable of creating lean, innovative, and inclusive approaches and tools to increase urban energy efficiency for their own communities and others."

CECILIA PARADI-GUILFORD WORLD BANK ICT INNOVATION SPECIALIST AND CO-TASK TEAM LEADER OF THE NEGAWATT CHALLENGE

energy solutions, particularly to address the development bottlenecks of their communities. These innovators are business school students, computer science specialists, mechanical engineers, and social entrepreneurship fellows, among others. In Ghana and Kenya, the majority of the Negawatt Weekend participants were university students. For many of them, this was their first opportunity to publicly participate in the development of potential solutions to their respective capital cities' pressing energy challenges.

After an intensive boot camp, two teams are awarded a chance to enter a several-months-long business acceleration program to develop their business pitch decks and further refine their solutions' prototypes. Finally, the Demo Day event determines the ultimate winner of the competition, who is then encouraged to launch their solution to market (or test it in prototype mode).

In Accra and Nairobi, the Negawatt engaged over 150 participants during the Negawatt Weekend, sourcing around 30 original

ideas. It supported eight startup teams through a boot camp and accelerated five startups over the summer of 2015. Software and hardware solutions emerged that leverage energy data analytics, cloud computing, and mobile platforms. The virtual track to the competition, occurring simultaneously, generated 23 proposals from 11 countries.



KGGTF IN ACTION

In 2013, President Park Geun-hye of South Korea put forth her signature vision to promote Green Growth through a creative economy that calls for innovative business opportunities and more jobs through the fusion of information technology, culture, and industry. This KGGTF-funded program aims to leverage South Korean and international expertise to support a nascent startup ecosystem in developing countries, with an objective of raising awareness and understanding of the concept of Green Growth. The Negawatt Challenge is a good example how this Green Growth vision could be effectively mainstreamed to senior

policymakers, organizations, and entrepreneurs in an engaging, user-centric approach. It is also a vehicle to establish mutually beneficial linkages between the RoK's public and private sectors and their peers in developing countries.

Images

<http://www.negawattchallenge.com/media/>

Photo credit: @iBizAfrica-Strathmore University

INNOVATIVE AND GREEN GROWTH FOR RURAL KOSOVO: INVESTING AND SCOPING, KOSOVO

SECTOR:
ICT

SCALE:
NATIONAL

COUNTRY:
KOSOVO



PROGRAM CONTEXT AND ISSUES

Expanding broadband Internet access in developing countries to levels seen today in developed economies can increase productivity, generating higher GDPs and creating more new jobs.

This in turn can help people out of poverty and into shared prosperity. It is also apparent that broadband Internet exerts a positive impact on fighting climate change by fueling innovative software and hardware that increase efficiency.

Kosovo could reap significant economic, environmental, and social benefits from the rollout of broadband connectivity in underserved areas. Forty-three percent of rural households in Kosovo are currently unconnected, and one-third of these households—without an all-inclusive intervention—are unlikely to be connected to the network anytime soon. These households are located in municipalities with a higher concentration of poor people.

The Government of Kosovo recognizes broadband connectivity as one of the enabling infrastructures for Green Growth and the country's transition to a digital economy. It aims to expand the reach of broadband Internet services in rural areas, where the private sector has no commercial incentives to expand network access. A proposed solution is the implementation of a rural broadband program modeled on a public-private partnership, because neither private nor public sector alone can finance such a costly investment.



PROGRAM SCOPE

The KGGTF's two-year program with Kosovo aims to increase broadband internet access by producing guidelines and a pilot program to design a rural broadband program.

Improved access to high-speed and affordable broadband Internet services in the underserved rural areas of Kosovo can serve as a platform for enabling innovation and Green Growth in the country.

Under phase I, the activity delivered feasibility studies to help the Ministry of Economic Development of Kosovo to design an inclusive and high-impact rural broadband program. Under phase II, it designed and implemented an innovative IT training pilot, called Women in Online Work (WoW), to increase help 100 women residing in two rural municipalities of Kosovo engage in green, ICT-enabled jobs offered through a global online work marketplace.



KGGTF SUPPORT, PARTNERSHIPS, AND COORDINATION

The WBG KGGTF program team will reach out to technical South Korean public institutions such as the National IT Promotion Agency, and the Korea Communications Commission, as well as international donors operating in Kosovo, including the European Commission, KfW, Helvetas International Cooperation, the Embassy of Norway, GIZ, and others.



DESIRED IMPACT

Broadband Internet deployment and demand-side activities, such as targeted IT trainings, could increase the interconnectedness of Kosovo and drive wider adoption and use of ICT. After the broadband network is deployed, there will be additional opportunities to capitalize on the newly deployed broadband connectivity by developing smart infrastructure, specifically in the areas of smart energy and water supply. Kosovo can then become more competitive in its economy, improve efficiency of system and process by use of

broadband, increase resilience of ICT system use, and decrease its environmental footprint.

This proposed activity laid the groundwork for a public investment intervention to finance a rural telecom infrastructure rollout in underserved areas, as well as the groundwork for financing pilot projects that will benefit from newly deployed broadband connectivity. This project was included in the National Economic reform document as a key intervention for the ICT sector. The World Bank and Government of Kosovo have started discussions regarding the future World Bank program in the country.



INFRASTRUCTURE RESILIENCE AND ROBUST DECISION MAKING

SECTOR:
CLIMATE CHANGE

SCALE:
GLOBAL



PROGRAM CONTEXT AND ISSUES

When designing climate-sensitive investments, the long-standing practice is to use historical weather and climate data.

Engineers use it in the design of infrastructure and buildings; the insurance industry uses it to calculate premiums and capital needs, and farmers depend on it to choose crops and schedule plantings and harvests. National governments base their assessments of energy security requirements on such data.

With the projected changes in climate, however, historical data is no longer fully applicable for planning, and, in fact, relying solely on it could result in unsustainable development programs and investments. Two problems make it impossible to provide the equivalent of historical climate data for future climates: There is a scale misfit between what can be provided by climate models and what is needed by decision-makers; and there is much uncertainty about future climate change, especially at a local scale.

Since climate models and observations cannot provide what current decision-making frameworks need, the only solution is to amend our frameworks to take this uncertainty into account. To do so, infrastructure should be designed under the assumption that it will need to cope with a larger range of climate conditions than before, and planners should

acknowledge that this range is and will remain highly uncertain. For instance, it is possible to base decisions on scenario analysis and to choose the “most robust solution” (i.e. the one that is least sensitive to future climate conditions), instead of looking for the “best” choice under one scenario.

But new methodologies need to be developed. The robust decision-making approach has been used in industrialized countries (especially in the U.S.) and pilot projects are running in Vietnam, Sri Lanka, and Peru. But this methodology is long and sometimes onerous to apply (i.e. approximately one year of work, and about USD 400,000, for a single project). Applying this method is impossible for small projects or municipalities and locations with limited resources and data.

There is thus a need to develop a toolbox of decision-making tools appropriate for different contexts and projects, and to test and validate them. There is also a need for a guidance on how to identify which methodology is most appropriate in a given context. For instance, a classical cost-benefit analysis is perfectly fine in some contexts; sometimes a more complicated methodology is required to take into account additional uncertainty). This WBG KGGTF-funded program aims to provide new decision-making methodologies and guidance and improve the resilience and sustainability of infrastructure projects.



PROGRAM SCOPE

The objective of the program is to develop and support the piloting of practical methodologies for decision-making under uncertainty for projects in the urban, water, and transport sectors. This will help to enable better integration of climate-change risks into project design and implementation, and ensure longer-term investment optimization. To this end, this KGGTF grant will support validating the applicability of these new decision-making tools in the context of development interventions.

Pilot studies cover different regions, different income level, and different types of projects (water supply and roads in Peru, urban flooding in Colombo, and hydropower in Nepal). These pilot projects include research to design more simple methodologies for smaller project, and more comprehensive methodologies for larger infrastructure projects, as well as funding for the additional analysis needed in project design to incorporate uncertainty and create more resilience. The KGGTF chose these projects based on local demand to ensure ownership and participation.



KGGTF SUPPORT, PARTNERSHIPS AND COORDINATION

The team works closely with the World Bank-hosted Global Facility for Disaster Reduction and Recovery, which already has a strong partnership and history of

collaboration with South Korea’s National Emergency Management Agency. Depending on the cases selected and methodologies developed, other partners include the Korea Research Institute for Human Settlements, Korea Environment Institute, and Korea Water Resources Corporation.



DESIRED IMPACT

a. Improved efficiency: The new methods that this program promotes for investing in Green Growth under uncertainty are designed to include many different stakeholders’ perspectives and interests in the decision-making process, and to use multiple criteria to build investment plans. This ensures efficiency in the decision-making process and of projects themselves.

b. Greater resilience: The ultimate goal of these new methodologies for decision-making under uncertainty is to design resilient investments—a key characteristic of Green Growth. The use of these tools, therefore, ensures that the projects implemented are robust, able to withstand whatever future conditions may materialize.

c. Increased competitiveness: Robust planning in transport, water, and hydropower infrastructure is necessary for economic growth. The application of these decision-making tools for screening and managing climate uncertainties and more can attract international concessional financing to the private sector, which may in turn boost economic opportunities.

SHARING SOLID WASTE MANAGEMENT KNOWLEDGE FOR GROWING AFRICAN CITIES

SECTOR:
URBAN

SCALE:
MUNICIPAL

SECTOR:
SENEGAL, MAURITANIA,
CENTRAL AFRICAN REPUBLIC,
BENIN

Q CONTEXT

Sub-Saharan Africa has the lowest rate of waste collection in the world.

Cities consume vast quantities of energy and resources, and generate huge quantity of solid waste. Of Sub-Saharan Africa's (SSA) nearly 940 million inhabitants, only 37 percent live in urban areas—very low compared to developed countries—but SSA has one of the fastest urban growth rates at over 4 percent annually. Similarly, while Africa generated only 5 percent of the world's total solid waste in 2012, this rate will grow to around 7.2 percent of the world's total by 2025—about 440,000 tons of solid waste per day—as Africa's economies grow. Cities in SSA face major challenges in collecting and treating this waste, and there has been very little focus on green solutions to these problems.

Q CHALLENGES AND OPPORTUNITIES FOR GREEN ECONOMIC GROWTH

Africa has lacked the knowledge and financial resources to solve

waste management challenges, but now African countries have access to global best-practice knowledge to improve waste management and resource mobilization at a time of fast urbanization.

Infrastructure, policies, and practices in the solid waste sector in Africa are not prepared to meet an urgent Green Growth agenda. Rapid urbanization in Sub-Saharan Africa contributes significantly to solid waste management (SWM) challenges. Financial resources for waste management and land for new landfills are scarce. Municipalities commonly spend between 20 to 50 percent of their budgets solely on SWM, but these funds provide services to less than 50 percent of citizens. With nearly 47 percent of the SSA population living on less than US\$1.25 per day, collecting revenue to support collection and treatment of waste is difficult. Cost recovery on waste management is low due to a low willingness to pay and inefficient revenue collection.

Africa's rate of waste treatment and recycling is drastically lower than in developed countries, and waste is often disposed of in



“Through the KGGTF program, we visited waste management systems in Morocco and attended presentations on waste management in Korea. We were very inspired by how they manage their waste and are planning to use these models to address our growing solid waste management challenges.”

MATY MINT HAMMADY PRESIDENT OF THE URBAN COMMUNITY OF NOUAKCHOTT, MAURITANIA

drainage channels or unsanitary dumpsites. Open burning of waste is also common. Weak institutional and financial capacity has led to the collapse of contracts with international private firms, causing waste transfer points in a number of cities to become dumpsites themselves. In coastal cities such as Saint Louis in Senegal, a large portion of trash ends up in the ocean.

✓ SOLUTION

The World Bank Group and the KGGTF understand the need to complement waste management infrastructure and equipment development with awareness and capacity building in African cities.

Improving waste management for African cities requires an approach that attacks the challenges from all angles, including appropriate infrastructure and equipment; leveraging private investment to integrate the informal sector; and reducing, recycling, and reusing more waste. This requires raising awareness about SWM issues with policy makers, as well as with the public. Most importantly, it requires building the capacity to make good SWM policies and strategies and to build SWM technical knowledge.

Y KGGTF IN ACTION

The World Bank Group is leveraging KGGTF funding and technical assistance to build the capacity of African cities to manage solid waste.

The KGGTF is helping African cities increase SWM capacity and efficiency through a two-year USD\$225,000 program to improve industrial efficiency while enhancing climate and environmental resilience. This will free up energy, natural, and fiscal resources for other areas of urban development.

The program analyzes material flows, reviews and consolidates resource-use audits, and identifies information and communication technology measures to improve SWM efficiency, and helps coordinate public and private Green Growth investments. The KGGTF is funding key knowledge and capacity building initiatives, including the creation of SWM policy papers, capacity building workshops, and study tours for technical SWM personnel.

Through the KGGTF, African cities are learning about Korea's progress toward a “zero-waste” economy, and about the critical step Korea took in the 1990s to reduce waste and increase recycling by introducing a volume-based fee system.

GREEN SMART CITY DEVELOPMENT WITH CITIZEN PARTICIPATION

SECTOR

URBAN

SCALE:

GLOBAL

COUNTRIES

INDIA, TUNISIA



CONTEXT

The world's urban areas are developing at unprecedented rates, often without Green Growth principles that would address challenges with a holistic and sustainable approach.

Most urban areas in developing countries are growing at speeds that don't allow for thoughtful land-use planning and urban management. The result: poor public services, unemployment, violence, crime, poor health, and pollution.



CHALLENGES AND OPPORTUNITIES FOR GREEN ECONOMIC GROWTH

In most developing countries, the inadequacy of land information and basic urban services pose serious constraints on what can be done, but Green Growth implementation with information and communication technology (ICT) as an enabler can help.

Land availability is a critical element in human settlements, along with basic infrastructure

“Citizen participation systems bring about participatory democracy through a simple, inexpensive, and innovative ICT solution for urban service providers and their customers. By enabling citizens to directly report and monitor the progress of their problems, the CPS supports municipal governments' efforts to make service delivery more efficient, inclusive, and transparent, thereby increasing their accountability toward citizens”

HYOUNG GUN WANG SENIOR ECONOMIST, SOUTH ASIA URBAN UNIT, WBG

provisions such as water supply, sewerage, solid waste facilities. However, without well-established and systematic cadastral (land) systems in many developing countries, sustainable economic growth and environmental protection is nearly impossible. Without citizen participation and feedback in service delivery, and urban management in general, development cannot take place peacefully and comprehensively, and with long-term inclusivity, resiliency, and Green Growth goals. ICT has proven to play a fundamental role in Green Growth implementation and citizen participation in urban management.



SOLUTIONS

ICT innovations can make the best use of critical land use information, and big data can help policy makers engage directly with citizens, civic society, and the private sector.

In this KGGTF program, major Indian and Tunisian population centers will adopt smart city ICT and big data policy innovations that Korea has successfully used to mainstream sustainable and

“If well integrated with our basic online services, the Mumbai CPS will be a practical platform for our citizens to directly engage with city officials, making those officials more responsive to citizen demands and voices.”

DR. SANJAY MUKHERJEE ADDITIONAL COMMISSIONER, MUNICIPAL CORPORATION OF GREATER MUMBAI, INDIA

inclusive urban development. Pilot programs in India and Tunisia will open up new opportunities for local governments to make the best use of critical land use information, ICT innovations, and big data to engage directly with citizens, civic society, and the private sector. In Tunisia, government officials will create a master plan that includes middle- and long-term road maps for establishing a digital land management system based on Korea's experience and policy recommendations. And in Mumbai, India, the Municipal Corporation of Greater Mumbai (MCGM) will establish a citizen participation ICT system (CPS). This CPS will enable the MCGM to receive citizens' concerns about water and wastewater services through multiple channels and send real-time feedback. The CPS will also enable dashboard big data analysis to help local policymakers and practitioners gain in-depth and timely insights on the quality of service, as well as hotspots for immediate actions.



KGGTF IN ACTION

Korea also experienced a paper-based cadastral system, until it went digital in the 1970s. All processes and procedures related to land management are now performed in a digital environment. The Seoul Metropolitan Government is a global leader in e-Governance, with ambitious plans to use big data to effectively engage with citizens and enhance quality of life in the city. By working closely with Korean counterparts, Indian and Tunisian officials will be able to improve the use of ICT innovations in land information management and urban management, applying innovative approaches and solutions through mobile technology and big data. A series of training programs for respective government officials will disseminate program outputs and related smart city best practices from Korea, creating a model for growing urban centers around the world.



SUPPORT GREEN GROWTH

Profiles

a.

ABIAS PHILIPPE MUMUHIRE



Born in northern Rwanda, Mumuhire graduated from the Kigali Institute of Technology (KIST now University of Rwanda, College of Science and Technology) in 2013. He studied architecture and became one of the first architects educated in Rwanda, joining one of the leading architectural firm in the country and region—GMK Architecture S.a.r.l. He went on to work at the department of Urban Planning and One Stop Centre of the City of Kigali, where he is working as a Neighborhood and Housing Architect. He has contributed to the elaboration of many legal instruments that help the development of Kigali and Rwanda as a whole. He has also contributed to the planning and design of many housing projects in Kigali City, and was part of the negotiation team for the Rwanda Urban Development Project—a project financed by the World Bank through a loan to the Government of Rwanda.

AGIM KUKAJ



Agim Kukaj has been Director of the Information and Communications Technology (ICT) Department of the Ministry of Economic Development of Republic of Kosovo since 2004. He is Kosovo's representative for the eSEE (Electronic South East Europe Initiative), Task Force Member for the bSEE (Broadband South East Europe Initiative), and Kosovo Focal Point in the RCPAR (Regional Centre for Public Administration Reform Initiative).

Aside from being a lead government counterpart for the World Bank's telecom trust-funded activities, Kukaj is also an active participant in projects lead by DG for Information Society and Media of the European Commission, for Monitoring South East Europe Electronic Communication Sector and Information Society Services, IPA projects, and USAID projects related to telecommunications and Information Society Development. He is also responsible for drafting and implementing the European Partnership Action Plan for Information Society and Media in Kosovo. Kukaj is electro technical engineer by training, specializing in Telecommunications and Informatics (University of Prishtina). He received his MS in Professional Studies from Rochester Institute of Technology, USA.

AKHTARUL HANEEF



Akhtarul Haneef is Deputy Secretary and Deputy Financial Adviser, Ministry of Road Transport and Highways, Government of India. His current work profile includes examining proposals received from the Road Wing, Transport Wing and Administrative Wing of the Ministry of Road Transport & Highways from the financial viewpoint, taking into consideration appropriate guidelines and instructions, and tendering advice. In a career spanning over three decades, he has worked in various capacities at the offices of Minister of States (Finance), New Delhi Municipal Council, Department of Revenue, Debt Recovery Tribunal (Delhi), Municipal Corporation of Delhi, Ministry of Food, Consumer Affairs and Public Distribution, etc. He has been guest faculty on vigilance matters to various institutes.

ALEJANDRO SILVA



Alejandro Silva is a Chemical Engineer from University of Concepción, Chile, with a Master's Degree in Advanced Chemical Process Design from the University of Manchester, England. Alejandro has experience in the areas of engineering, research, and development. Between 2011-12, he worked as Project Engineer in the Technology Development Unit at the University of Concepción in the area of energy; mainly carrying out projects and optimizations in the mining and forestry sectors. Currently, he works at the Ministry of Energy at the division of energy efficiency in charge of the Industry and Mining sector.

ALFRED MOAH



The Honorable Alfred Moah is currently the Vanuatu Government Minister of Internal Affairs charged with the oversight of Local Government Authorities, Civil Status, Labour, Electoral Commission, Police and Security, and Immigration. He holds a degree in Information Technology and Management from the University of South Pacific, Fiji.

ANDREAS KOPP



Dr. Andreas D. Kopp is a Lead Economist at the Global Practice Transport and ICT at the World Bank. His work for the World Bank focuses on transport, economic geography, and climate change. He is currently developing concepts that include wider benefits and external costs into evaluation methods for transport policies and projects. Before joining the Bank, he was Chief Economist and Head of Research at the Transport Research Center of the European Conference of Ministers of Transport and the OECD. He led research work on policy issues ranging from trade to regulation and the evaluation of infrastructure investment. Before joining the OECD, he held a professorship at the Technical University of Dresden, teaching macroeconomics and regional science. He is currently teaching at the Technical University of Munich and George Mason University in the US. He was senior researcher at the Kiel Institute for World Economics. He earned a PhD in development economics at the European University Institute in Florence and the University of Giessen, and did post-doctoral work at the Universities of Kiel and Berkeley. He was advisor to technical assistance projects of the GTZ in Southeast Asia.

ARNAB BANDYOPADHYAY



Arnab Bandyopadhyay works as a Lead Transport Specialist for the World Bank's South Asia Transport Unit. Mr. Bandyopadhyay holds a Bachelor's Degree in Civil Engineering from the University of Calcutta and a Master's Degree in Construction Management from the Indian Institute of Technology. He is currently based in the World Bank's India Country Office in New Delhi.

ASHOK KUMAR



Ashok Kumar is a Senior Highway Engineer in the Transport Sector at the World Bank, with a focus on South Asia. He is a highly qualified highway/transport engineer with more than 35 years of professional experience both within and outside the World Bank. He has worked on several international assignments and multi-country projects, and the preparation and supervision of Bank projects (involving construction of more than 25,000 kilometers of roads), including large and innovative infrastructure projects, working with low-capacity states, modernizing and capacity building of road agencies, asset management and maintenance, development of sector policies and strategies, innovative and cost-effective road designs, governance, road safety, development of construction industry, and resolving portfolio issues. Kumar has Bachelor's and Master's Degrees in Civil Engineering from The University of Roorkee, India. Furthermore, he conducted civil engineering graduate studies on Highway Engineering for Developing Countries (MS) and Highway Engineering (PhD).

b.

BLERAND STAVILECI



H.E. Blerand Stavileci is Minister of Economic Development of Republic of Kosovo. From February 2011 until December 2014, and in April-December 2010, he was Minister of Agriculture, Forestry, and Rural Development of Republic of Kosovo. Before his first ministerial appointment, His Excellency was Advisor in the Ministry of Transport and Communications of Republic of Kosovo, Vice-Chairman of the Steering Committee of the Southeast Europe Transport Observatory (SEETO) of the European Commission, and Spokesperson of the Kosovo Democratic Party. Aside from being active on the political scene and in the public sector, he has been Lecturer of Management and Information Technology at ILIRIA University. H.E. Stavileci obtained his MS in Management and Information Technology from ILIRIA University. He also completed an intensive French language and civilization course at Sorbonne University. He speaks English, French, Italian, Serbian-Croatian, and Albanian.

c.

CARTER BRANDON



Carter Brandon is the World Bank's Global Lead Economist for the Environment and Natural Resources Global Practice. His primary interests are in the linkages among the environment, welfare, and growth. Over his 20 years at the World Bank, he has held lead positions in both headquarters (Latin America and South Asia regions) and in the field (Beijing and Buenos Aires). Prior to joining the World Bank, he ran the

Development Economics Group, an economics consulting firm specializing in trade and sector policy analysis. Early in his career, he also made a documentary film on political unrest in Chiapas, Mexico, and played in the Paris Symphony. He graduated from Harvard University (BA) and Oxford University (MS and DPhil, ABD, Agricultural Economics), where he was a Rhodes Scholar.

CHEICK FANTA MADY KONE



Dr. Cheick Fanta Mady KONE, né le 08 février 1978 à Bamako, Mali. Marié et père de 02 filles. Je suis détenteur d'un Doctorat d'Etat en Médecine Générale depuis 2005, capacité en médecine d'urgence et des catastrophes à Alger (Algérie) depuis 2009 ; Expert en Gestion des Risques de catastrophes et Point Focal National de RRC au Mali depuis 2012. Coordinateur de projet pour la Réduction des Risques de Catastrophes et d'Adaptation aux Changements Climatiques 2013-2015. Co-initiateur de la FICAR (Fiche d'Identification Communale et d'Analyse des Risques), Co-expert dans l'élaboration de la Stratégie Nationale, du Plan ORSEC et de la planification des contingences. Cofondateur de Sud-Santé Magasine, Coordinateur de l'ONG Solidarité Sida, membre de la Plateforme PDNA (PosteDesaster Needs Assesment= PDNA (expert), Secrétaire Permanent de la Plateforme Nationale de RRC.

d.

DALIA SAKR



Dalia Sakr has fifteen years of professional working experience in the field of energy and resource efficiency in the Middle East and North Africa (MENA) Region. At present, she leads IFC's Resource Efficiency (REF) Program in the extended MENA region across 19 countries. This program aims to increase investments in clean technologies and support efficiency led savings in energy, water, and materials to improve the competitiveness of the private sector. As to date, REF assessments have provided to more than 50 clients in MENA (Egypt, Jordan, Lebanon, Morocco, Tunisia, and Pakistan) with an identified total investments of about \$25 million, annual economic savings of \$18 million, and annual energy consumption reductions of 400 GWh (equivalent to 50 MW power plant). Among these initiatives are: an alternative fuel usage for cement sector study in Egypt, Green Buildings Project in Lebanon, Cleaner Production Audit Analysis studies in both Egypt and Pakistan, boiler energy efficiency in Pakistan, and work on the fish canning sector in Morocco. She hold a Bachelor's Degree in Construction Engineering, a Master's Degree in Environmental Engineering from the American University in Cairo, Egypt, and a PhD in Cleaner Production, Cleaner Products, Industrial Ecology and Sustainability from the Erasmus Universiteit of Rotterdam in the Netherlands. Furthermore, She has authored and co-authored several scientific papers in leading international journals, expert reports, and a book in the areas of cleaner production, industrial ecology, environmental management systems, and environmental governance.

DINKNEH TEFERA



Dinkneh Tefera joined the Bank in 2011 as a short-term consultant and started working in the Urban and Water Unit Africa Region. He is currently working on the Second Urban Local Government Development Program (ULGDP II), a \$380 million IDA Program for Results, which is under implementation in 44 cities and nine regions of Ethiopia. He had provided implementation support for the first phase of ULGDP (US\$ 300million), which was successfully closed on December 31, 2014. He also worked on a number of initiatives, activities, and studies such as the Ethiopia Local Government revenue study, energy efficiency, disaster management and City Strength. He had also participated in the Ethiopian Urbanization Review. Dinkneh has extensive experience in Urban Development, working at different organizations for more than 15 years. Before joining the World Bank, he worked on a Urban Governance and Decentralization Program that was financed by German International Cooperation (GIZ). He has a BA in Economics and a Post Graduate Diploma in Urban Development studies.

DUNG ANH HOANG



Dung Anh Hoang is an engineer by training and has been with the Bank for 13 years. Previously he was an Associate Professor at the National University of Civil Engineering and has worked extensively with the Ministry of Transport in Vietnam. He has been the Task Team Leader for a number of projects in multi-modal transport and logistics, expressway, pilot PPP for highways, and inland waterways, which is now his main area of focus. Dung has worked in Vietnam, Myanmar, India, Thailand, and Laos.

e.

EDWARD CHARLES ANDERSON



Senior ICT Policy Specialist, WBG

f.

FAROUK BANNA



Farouk Banna is Urban Specialist in Urban and Disaster Risk Management for the Africa Region at the World Bank, where he works on solid waste management projects. Prior to this, he was Urban Specialist at the Global Urban and Resilience Unit, where he worked on investment projects and advisory services on solid waste management for World Bank clients all over the World. Prior to joining the World Bank, he worked between 2006 and 2012 as Environmental Engineer and consultant for Camp Dresser

& McKee and as Solid Waste Engineer for Orange County, North Carolina, US. He holds a Master's Degree in Environmental Engineering from North Carolina A&T State University in Greensboro, and a Master's Degree in Civil Engineering from the University of Lome, Togo.

FRANÇOIS ZOUGMORÉ



Professor François Zougmoré was born in Burkina Faso. He received a PhD in Instrumentation and Measures from the University of Grenoble, France, in 1987. Zougmoré was the Head of the Department of Physics at the University of Ouagadougou, Burkina Faso, from 1990 to 1997. He is full Professor, Instrumentation and Measures, and teaches Applied Physics at the Department of Physics, University of Ouagadougou, including classes in signal processing, optoelectronic properties of semiconducting materials, and optic fibers. He has supervised more than 10 PhD thesis projects in applied physics. Zougmoré is the Coordinator of the Research Project Raincell Africa and is responsible for the Laboratory of Materials and Environment (LAME), which he founded in 1998.

FRÉDÉRIC CAZENAVE

Radar Engineer and Raincell partner, Laboratory on Hydrological and Environmental Transfers (LTHE), French Institute for Research and Development (IRD)

h.

HALIT HOXHAJ

Political Adviser, Ministry of Economic Development of Kosovo

HONG-KOO LEE



Former Prime Minister of Republic of Korea
Dr. Lee Hong-Koo is Chairman of the board of the Seoul Forum for International Affairs. From 1994 to 1995, he served as prime minister of South Korea. Prior to that, he served twice as the deputy prime minister for unification working to improve relations between the two divided Korean states. Dr. Lee served as ambassador of South Korea to the United States (1998 to 2000), and the United Kingdom (1991 to 1993). Before entering public service, Ambassador Lee had been on the faculty of Seoul National University for 20 years, and now a professor emeritus. Ambassador Lee had been involved with a number of international leadership organizations including the Club de Madrid and the Commission on Global Governance. As the World Cup bidding Committee Chairman, he had successfully brought 2002 World Cup to Korea-Japan. Being educated at Seoul National and Emory Universities, he received a Ph.D. in political science from Yale University.

HYOUNG GUN WANG



Hyoung Gun Wang is a Senior Economist in the South Asia Urban Development Unit of the World Bank. He is currently the Task Team Leader of various knowledge products on smart cities, city e-government, affordable housing, and urban and regional development analytical work. His research interests and work programs are urbanization and urban development, smart cities and e-government, local/regional economic development, housing, GIS and spatial analysis, and economic impacts of infrastructure investment. His work programs have spanned a range of developing countries including Afghanistan, Argentina, Bangladesh, Brazil, China, Colombia, DR Congo, Egypt, Georgia, Ghana, India, Kenya, Nigeria, South Korea, Liberia, Malawi, Mexico, Mongolia, the Philippines, Russia, Rep. of Congo, Senegal, Sri Lanka, Tanzania, Tunisia, Turkey, Uganda, Vietnam, and Yemen. He worked as an Economist at the Bank of Korea (the Central Bank of Korea). He holds a PhD in Economics from Brown University.



IBRAHIMA DIAGNE



Ibrahim Diagne is the Director of the Coordination Unit of the National Solid Waste Management Program in Senegal. Prior to this, he was a Site Engineer for the consulting firm VERITAS, Coordinator of Urban Programs at AGETIP Senegal, Manager of Public Work for the city of Dakar and Technical Director for Entente CADAK—an intercommunal organization in the Dakar metropolitan area. He has extensive experience in the area of urban development and environment. He managed, among other programs, the lighting project for the city of Dakar, multiple investment and maintenance projects for the city of Dakar, the rehabilitation of the Mbeubeus dumpsite near Dakar, the construction of the solid waste transfer station in Mbao (near Dakar), the construction of the engineered landfill in Sindia in Dakar, and the coordination of national solid waste management program. Diagne is a Civil Engineer by training, specialized in building, bridge, and road construction. He also holds a specialized Master's Degree in Project Management as well as a Master of Business Administration from Paris Dauphine and Sorbonne Universities.



JAEHAK OH



Dr. Oh is Vice President and Director of National Transport Strategy Planning at The Korea Transport Institute (KOTI). During the last 20 years, he has project managed more than 60 of KOTI's transport projects. From 2006 to 2011, He was the project manager of national R&D on "Transport Connectivity and Transfer Technology Development." He has played a key role in innovating transport systems for Green Growth and formulating infrastructure policies for the Government of Korea. Since 2009, Dr. Oh has been the Research Project Manager of High-Speed Railway (KTX) economic development, which aims to promote

regional and urban development through KTX station area development. Dr. Oh obtained his PhD in transport studies at University College London in 1990. Since 1992, he has been working for KOTI, taking a one-year leave of absence during 1995 as Lecturer at the Tokyo Institute of Technology. At present, he is a SC Member of WCTR-Society and an Editorial Board Member for the WCTR Journal of Transport Policy.

JAIME ROBERTO DÍAZ PALACIOS



Jaime Díaz is Advisor from Central America to the Executive Director for Costa Rica, El Salvador, Mexico, Guatemala, Honduras, Nicaragua, Spain, and Venezuela. He obtained a Degree in Economics from Universidad Francisco Marroquín and finished first in his class. He holds a Master in Science Degree from London School of Economics and Political Sciences (LSE) in which he received distinction in Development Economics and Macroeconomics. Before joining the World Bank, he worked as Executive Director for the National Program for Competitiveness, where he implemented the National Agenda in coordination with ministers, secretaries, and private sector authorities and designed and executed programs with the Interamerican-Development Bank (IADB) and Millennium Challenge Corporation (MCC). In his academic background, Díaz worked as Economist for the National Center for Economic Research (CIEN), where he coauthored several books and conducted research in different fields, from productivity, labor, and trade to macroeconomic policy. He also held several appointments as undergraduate professor for Universidad Francisco Marroquín, Universidad Rafael Landívar, and Escuela de Gobierno, teaching political economy, econometrics, macroeconomics, and a number of seminars in economics. He was appointed teacher at LSE for the Macroeconomic Course for Undergraduates and summer school students during 2009 and 2010, for which he was distinguished by the Economic Department for his work.

JANINA FRANCO



Janina Franco is a Senior Energy Specialist in the Energy and Extractive Global Practice of the Latin America and the Caribbean Region at the World Bank. Throughout her years working at the Bank, she has worked in over 10 countries in the region, focusing mostly on access and household energy, as well as supply-and-demand-side energy efficiency. Many of her present engagements at the World Bank focus on the interphase of energy efficiency and low-carbon sustainable development. Prior to joining the Bank, she worked at The Earth Institute as an Associate Research Scholar for the Millennium Cities Initiative. Franco holds a Master's Degree in International Affairs and Urban Planning from Columbia University.

JANVIER MURENZI



Janvier Murenzi is Vice Mayor in Charge of Economic Development at Rubavu District in the Western Province of Rwanda. Before having a political career, he worked for almost 13 years at international non-government organizations focused on the health and entrepreneurship sectors as country representative. He holds a Master's Degree in Business Administration with specializations in Project Management and Monitoring and Evaluation.

JEAN BAPTISTE MIGRAINE



Disaster Risk Management Specialist, WBG

JEFFREY KAITIP JOSIAH



Jeffrey Kaitip Josiah is a Principal Physical Planning Officer at the Department of Local Authorities with the Ministry of Internal Affairs in Vanuatu, South West Pacific. Josiah currently works with the Department of Local Authorities, which sits under the Ministry of Internal Affairs—the biggest ministry in the country. In addition to the Department of Local Authorities, the Ministry also houses the Vanuatu Police Force (VPF), Vanuatu Mobile Force (VMF), Department of Immigration, Department of Labour, Electoral Office, and Civil Status Office. He holds a Master of Geographical Information Science from Curtin University, Western Australia, Australia. He received his BA in Management, with a minor in Geography, from University of the South Pacific, Suva, Fiji.

JOHN EZRA



John Ezra is currently the Senior Policy Analyst for Governance and Leadership, responsible for analyzing and coordinating government policies related to governance and leadership in Vanuatu. In 2005 to 2007, he worked for the Department of Policy, Planning, and Aid Coordination (DSPPAC) as Social Policy Analyst and then took up the position of Senior Policy Analyst at DSPPAC for more than 10 years.

Vanuatu is currently embarking on its national sustainable plan (NSDP) and Ezra has been supporting the Ministry of Justice, Judiciary and all other statutory bodies in framing policy directives, objectives, or strategies that will guide the policy development process of the Government of Vanuatu for the next 15 years.

JOHN SALONG



John Salong is Chairman of the National Housing Corporation in Vanuatu. He was the Former General Manager of VANWODS Microfinance, Inc. Salong graduated with an MBA, Hon. PA Policy and Administration degree and a Bachelor of Arts in Economics. He has worked for non-government organizations, the provincial government, and the national government for over 20 years in Vanuatu.

JONG-HYUN YOON



Jong-Hyun Yoon is a Land Administration Specialist at the World Bank with the Global Land and Geospatial Unit as a secondee from LX Korea Land and Geospatial Corp. (LX is a public entity under the Ministry of Land, Infrastructure and Transport in Korea). He has more than 12 years of professional experience in land management system development, cadastral surveying, and mapping. Yoon has been involved in several land projects in Jamaica, Turkmenistan, Tunis, and Bangladesh with the Asian Development Bank and Korea's Exim-Bank. Prior to joining the Bank, he worked at the LX as a cadastral surveyor and a

researcher on a Cadastral Reform Project and Land Administration Data Model. Recently, he was a manager at the International Cooperation Dept., which shares Korean experiences and achievements in the field of land registration with developing countries and aims to enhance cooperation with other countries and organizations such as the Netherlands, Hungary, and Bulgaria as well as FIG. He holds a Master's Degree in Geo-Information Management from Twente University (ITC), the Netherlands.

JULIE ROZENBERG



Julie Rozenberg is an Economist with the World Bank Sustainable Development Group. Her work includes Green Growth and climate change mitigation strategies and climate change adaptation and disaster risk management. She participated in the writing of two World Bank flagship reports: "Decarbonizing Development: Three Steps to a Zero Carbon Future" and "Shockwaves: Managing the Impacts of Climate Change on Poverty." She also supports World Bank teams with innovative methodologies to take long-term uncertainties into account in the preparation of projects and sectoral strategies to build resilience in World Bank client countries. Rozenberg holds an Engineering Degree from the Ecole Nationale Supérieure de Techniques Avancées and a PhD in Economics from the Ecole des Hautes Etudes en Sciences Sociales in Paris.



KANG-SOO KIM



Kang-Soo Kim currently serves as the Director and Vice President of the Department of Land and Infrastructure Policy at the Korea Development Institute (KDI). He has been a fellow at the KDI since 2006, conducting research on infrastructure development, public finance, transport planning and modeling, and PPP. Prior to becoming the Director of Department of Land and Infrastructure Policy, Kim served as the Executive Director of the Public and Private Infrastructure Investment Management Center (PIMAC) from July 2013 to March 2016. According to the National Finance Act and PPP Act, the Center is mandated to be responsible for managing and supervising efficient and transparent public and private infrastructure investment projects. Kim's infrastructure development and PPP experience also includes serving as the Director of the PPP Division of PIMAC in KDI from 2009 to 2012, the Director of the Center for Transport Infrastructure Investment, and the Director of the Center for Korea Transport Database in the Korea Transport Institute (KOTI) in 2004. Born in the Republic of Korea, Kim earned a Master of Science in Urban Planning from Seoul National University in 1995 and a PhD in Transport Studies from University of Leeds in 1998. His areas of expertise include public finance, transport planning and modeling, infrastructure investment appraisal, and public private partnership.

KIYOUNG PARK



Dr. Kiyoung Park is a Senior Hydropower Specialist at the World Bank with the hydropower unit in Water Global Practice. He is responsible for participating in global hydropower projects and supporting task teams with immediate and specific needs for technical expertise. He joined the Bank in 2016 as part of a staff exchange program between the World Bank Group and K-water. Before joining the Bank, Kiyoung worked for more than 10 years for the Water Resources Operation and Maintenance Department and five years in Planning and Water Strategy Department. Park earned his PhD from Colorado State University, US, where his focus was on sustainable river and dam engineering.

KULWINDER RAO



Kulwinder Rao is the Senior Highway Engineer and Global Lead for Fragile and Conflict Affected Countries in Transport and ICT Global Practice of the World Bank. He is a professional engineer with over 30 years of post-graduate experience. Before joining the Bank, he worked at the highest level in a road administration in India and held senior management position in the private sector. Currently, he manages the Bank's transport portfolio in Liberia and Mozambique. In the latter, he is leading the Bank team in helping the client to enhance climate resilience of transport infrastructure. He is a graduate of Punjab Engineering College, India.

KWANGHO SHIN



Kwangho Shin is a Transport Specialist at the World Bank, Transport and ICT Global Practice. Since he joined the World Bank in 2015, he has worked on several transport and railway projects in European and Central Asian countries. Prior to joining the World Bank, he worked in several sectors, including railway transport, logistics, air transport, and overseas construction at the Ministry of Land, Infrastructure, and Transport in Korea. He holds a BA in Administration from Korea University and a Master's Degree in Transport and Business Management at Imperial College London in the UK.

KYU HONG HWANG

Research Fellow, Korea Land and Housing Corporation



LISSETTE BUKI RWIYEREKA



Lisette Buki Rwiyereka is a Housing Development Senior Engineer for the Ministry of Infrastructure in Rwanda. Concerned by the development of her country, she pursued her study in Civil Engineering. She now holds a Bachelor's Degree with honors from the University of Alabama at Huntsville, USA. After her studies, she worked as a Structural Engineer for one of the most renowned architectural firm in Rwanda, GMK Architecture S.a.r.l. She was involved in the structural design and assisted on supervision of both international and national projects. In 2014, she

joined the Ministry of Infrastructure, first as an analyst in urbanization and then as a Housing Development Senior Engineer. She contributed in the elaboration of different legal and regulatory frameworks guiding urbanization in Rwanda.

LORIK FEJZULLAHU

Project Manager of Kosovo e Renewable energy project



MANSHA CHEN



Mansha Chen is an Urban Specialist at the World Bank. She works mainly on capacity building for local governments on urban planning and land management. She has developed a series of global learning programs, including Sustainable Urban Land Use Planning, Transit-Oriented Development, Integrated Urban Transport Planning, Upgrading Urban Informal Settlements, Land Readjustment, Land Market Assessment, and Land-based Financing. She has been working with key regional/national institutions in Asia and Africa on urban management capacity development programs. She is currently supporting operational projects in Vietnam on land readjustment and in Ethiopia on integrated land use and urban transport. She holds a ME/BE in Urban Planning and a BA in Economics. Prior to joining the World Bank, she was an urban planner in the Chinese Academy of Urban Planning and Design under the Ministry of Housing and Urban Rural Development.

MAPENDO TOM CHRISTIAN



Mapendo Tom Christian works as Local Infrastructure Development Specialist in Local Economic Development (LED) within the Local Administrative Entities Development Agency (LODA), a public institution under the Ministry of Local Government in Rwanda. He holds a Master's Degree in Water Resources and Environmental Management (WREM) and a Bachelor's Degree in Civil Engineering from National University of Rwanda.

Christian is an experienced engineer with 10 years of experience in the field of engineering. He has participated in different projects on water supply systems, roads construction, and buildings constructions. He has been with LODA since 2016 and is very involved in the development of local infrastructures, maintenance of local infrastructures, and assessing their feasibility studies.

Christian has been technically supporting the implementation of LED programs and development projects in Rwanda's Districts and the City of Kigali, through the assessment of feasibility studies and by ensuring the coherent distribution of local infrastructure development activities in local governments.

MATHEWOS ASFAW



Mathewos Asfaw is currently the General Manager and Chief Architect Planner in the Addis Ababa City Planning Project Office. Prior to this, he was the Founder and Managing Director of MATHEWOS Consult, a private firm engaged mainly in the preparation of urban plans, planning manuals, urban regularization, urban governance, surveying and related urban research activities. He was also the general manager of the earlier Addis Ababa Master Plan Project, which was legally adopted and has been under implementation for the last 10 years. His area of expertise covers regional and urban planning and development, local development planning and urban design, and informal settlements regularization and governance. He holds a BS in Architecture and Urban Planning from Addis Ababa University, Ethiopia, and MS in Planning Studies from Oxford Brookes University, UK.

MBAGNICK PATAR DIOUF



Mbagnick Patar Diouf is the Technical Advisor to the Senegalese Minister of Local Governance and Spatial Development. He is a project auditor and an expert in decentralization, local governance, finances, and taxation. From 2005 to 2007, he worked on the regional support project (PAR), financed by the European Union, as the expert in charge of the component on "support to central services of the government of Senegal." From 1999 to 2004, he served as the Technical Assistant of Decentralization and Local Development Project (PADDEL), financed by the French Development Agency (AFD). From 1994 to 1999, he took part in various auditing missions for projects financed by Senegal's technical and financial partners. Diouf earned a Master of Advanced Studies in the Management of Local Communities from the University of Lyon 2, France, in 1992.

MICHAŁ KWIATKOWSKI



Michał Kwiatkowski is Head of Transport Policy Unit in Department for Transport Strategy and International Cooperation in Ministry of Infrastructure and Construction of Poland. His primary interests are international transport corridors, the trans-European transport network (TEN-T), and strategic planning in transport and logistic issues. Kwiatkowski was responsible for the modification of the trans-European transport network in Poland and preparation of the Polish Transport Development Strategy by 2020 (with perspective 2030).

MI HOON JEONG



Dr. Mihoon Jeong is the manager of Korea Industrial Complex (KICOX) and in charge of international cooperation for the Green Business team. She holds a Bachelor's and a Master's Degree in Environmental Science and Engineering at Ewha Womans University. She received a PhD from Purdue University in the area of natural resource management, and studied optimization for managing adverse impacts from urbanization from the perspective of smart growth. Before she joined KICOX, she had several work experiences in the environmental field, in particular, soil and water.



NARINDER CHAUHAN



Narinder Chauhan joined the Indian Administrative Services (IAS) in 1984 and served in various capacities in the field with both the State Government of Himachal Pradesh and the Government of India's Department of Economic Affairs, Ministry of Finance. He is presently Additional Chief Secretary (Public Works Department), Government of Himachal Pradesh. The Department is involved in construction and maintenance of a 33,000 km road network, 1,765 bridges, and government buildings. In his current capacity, he is responsible for development of rural roads (both under the Ministry of Rural Development's Pradhan Mantri Gram Sadak Yojana (PMGSY) program for rural roads and funded by the state). He manages the National Highway network in the state, as well as state roads, including those funded by the World Bank. Chauhan has an LLM and an MS in Development Administration from the UK.

NSANZIMFURA DJAFARI



Nsanzimfura Djafari works as Program and Project Specialist in Local Economic Development (LED) within the Local Administrative Entities Development Agency (LODA), a public institution under the Ministry of Local Government in Rwanda. He holds an MBA in Finance and a Bachelor's Degree in Economics from the Mount Kenya University. He has been with LODA since 2012 and much involved in designing grant project proposals for different donors participating in LED policy formulation and the creation of a conducive environment for business development for local governments contributing to the building of a coherent partnership between public and private sectors in decentralized entities. Djafari has been technically supporting the implementation of LED programs and development projects in Rwanda's Districts and the City of Kigali through the elaboration of a funds distribution formula for economic development activities in local governments.



PHUONG THI MINH TRAN



Phuong Thi Minh Tran is a Senior Transport Specialist with over 16 years of experience in project development and management at the heart of the World Bank's transport initiatives in Vietnam. Prior to joining the World Bank in January 2000, she worked with the Ministry of Agriculture and Rural Development and the Ministry of Transport for 17 years. She has been promoting and guiding gender mainstreaming in the transport sector in an effort to involve ethnic women in women-led rural road maintenance through a successful pilot program of training and employment in Lao Cai, Thanh Hoa, and Quang Binh Provinces in Vietnam. She also led the surfacing trials and the research on climate resilient rural road under two rural transport

projects (2006-2014) financed by DFID, GFDRM, and WB. She has a Master's Degree in Public Policy from the National University of Singapore, a BA in Agronomy from Hanoi Agricultural University, and a BA in English from Hanoi Teachers' Training University.

PYUSH DOGRA



Pyush Dogra has been a core member of Global Practice of Environment and Natural Resource (GENDR) since 2007. He joined the Bank with 14 years of experience in public health engineering (nine years) and the hydropower sector (five years) in the mountain ecosystems of Himachal Pradesh, a Himalayan state of India. A graduate in Civil Engineering and a Post-Graduate in Environmental Engineer from IIT-Delhi, India, Dogra has applied his technical knowledge in leading the safeguards work on hydropower and water resources for the India program, and has contributed to the Bank's dialog on the core sectors of energy, water resources, agriculture, and environmental management. Through his skills and ability, Dogra has grown to become a reliable sector expert in water resources, including hydropower, watershed management, water supply and irrigation, and sustainability issues. Over the past year, he has taken a more significant role in the energy sector and on the Green Growth agenda that supports a transformational shift toward Green Growth and low-carbon growth in key sectors of the economy, including power (hydro in particular), industrial development, tourism, and rural development. Dogra has also contributed to hydro sustainability by leading a dialogue on basin-wide catchment area treatment, cumulative impact assessments, and hydro sustainability in Himachal Pradesh. He has established himself as a mountain ecosystem specialist. He also represents South Asia on the Bank's core team on Development Policy Operation in Green Growth. In addition to India, he is also currently working in Bhutan on hydro sustainability.



RADOSLAW CZAPSKI



Senior Infrastructure Specialist, WBG

RAJESH BHUSHAN



Dr. Rajesh Bhushan is an Indian Administrative Service (IAS) Officer of 1987 batch, Bihar cadre. Presently, he is Joint Secretary and Chief Vigilance Officer (CVO) in the Ministry of Rural Development, Government of India, and looks after the rural connectivity sector through Pradhan Mantri Gramin Sadak Yojana (PMGSY), a flagship program of the Government of India for providing all-weather rural connectivity. He is also Director General of National Rural Roads Development Agency (NRRDA), the apex technical agency at the national level for rural roads. PMGSY aims to strengthen rural livelihoods and remove rural poverty through provision and maintenance of all-weather connectivity to eligible

habitations in rural India. The program spends about US\$3,000 million every year through various State Rural Roads Development Agencies (SRRDAs) and State Nodal Departments and is known for quality rural road and bridge assets. Under PMGSY, 116,702 habitations have received all-weather connectivity through the construction of 477,000 km of rural roads.

RAJESH ROHATGI



Senior Transport Specialist, WBG

RAKESH KUMAR



Rakesh Kumar is Superintending Engineer (PPP) at the Ministry of Road Transport and Highways, Government of India, India. He has been working at the Ministry for the last 17 years in various capacities including at the field offices. During this period, he has been actively engaged in planning, monitoring, project preparation, technical assessment/scrutiny, as well as contract management of various National Highway Projects, including expressways, which are implemented/being implemented on BOT (Toll/Annuity), Hybrid Annuity, and EPC modes. During this time, his primary interest has been in the field of the construction of highways at international standards with the utmost safety and serviceability, and with due importance to environmental aspects. His areas of experience include road geometry improvement, road safety, and the sustainability of road infrastructure. He graduated in Civil Engineering from Nagpur University in 1995 and completed post-graduation in Environmental Engineering from University of Roorkee in 1998.

RALPH REGENVANU



Ralph Regenvanu is the Minister for Lands and Natural Resources in the Government of the Republic of Vanuatu, with responsibility for land, water, and mineral resources. Prior to his entry into politics in 2008, Regenvanu served as the director of the National Museum of Vanuatu for 11 years (1995-2006). In this role, he was one of the founding Executive Board Members of the Pacific Islands Museums Association (PIMA) and was on the International Drafting Committee of the "Convention for the Safeguarding of the Intangible Cultural Heritage," which was adopted by the General Assembly of UNESCO (the United Nations Educational Scientific and Cultural Organization) in 2003. In 2013 he was the main driver behind a major overhaul of the land laws of Vanuatu and is currently chairing the government's efforts to put in place a new national sustainable development plan.

RUPESH KUMAR SRIVASTAVA



Rupesh Kumar Srivastava is Executive Engineer (PPP) at the Ministry of Road Transport and Highways, Government of India, India. He has been working with the Ministry for the last four years and has been actively engaged in monitoring, project preparation, technical assessment/scrutiny, as well as policy formulation of various National Highway Projects, including

expressways, which are implemented/being implemented on BOT, Hybrid Annuity and EPC modes. Prior to joining the Ministry, he worked for four years as an executive in the National Thermal Power Corporation, a leading government-sector organization in the power industry. His primary interest area is promoting cost effectiveness in highway construction and enhancement of the public transport system, duly considering safety and serviceability. He graduated in Civil Engineering from the National Institute of Technology, Patna, in 2008.



SANGJOO LEE



Dr. Sangjoo Lee is Director of the Overseas Construction & Development Cooperation at the Korean Ministry of Land, Infrastructure, and Transport (MOLIT). From 2013 to 2015, he worked at the World Bank as a Senior Urban Specialist on the issues of urban development, green urban growth, and transport policy. He has worked at MOLIT for 15 years. His assignments in Korea were Director of Happiness Housing Development Division, Assistant Secretary to the President for Regional Development, Senior Deputy Director of Road Planning Division, and Senior Deputy Director of Urban and Metropolitan Transportation Division. He received a PhD in Construction Management at the University of Colorado at Boulder.

SARA SULTAN



Sara Sultan is the Knowledge & Learning Officer for the Transport & ICT Global Practice of the World Bank. She supports the Unit's management and staff, and works with units across the organization, as well as with partners and clients externally, to create and disseminate lessons learned, collaborate on joint interventions, and bring new and novel ideas to the Practice. In her six years at the Bank, she has also worked with the Finance and Private Sector Department, and the Water Global Practice. Prior to joining the Bank, Sara spent several years in the private sector, working for Deloitte and Touche. She holds a BS, in Computer Science and an MS in Organization Development & Knowledge Management. She enjoys travelling, skiing and owns and operates a photography business.

SEBASTIÁN ARROYO KLEIN



Sebastián Arroyo Klein is Electrical Engineer at the Federico Santa María Technical University, Chile, and Master in Renewable Energy at the University of Oldenburg, Germany. In 2006 Sebastian started working at the Ministry of Energy. His first tasks were related to rural electrification. Since 2013 he has been working on the development of the regulatory framework for distributed generation. He has been in charge of writing the rules and technical norms for distributed energy resources. Currently his interests are principally in distributed generation policies, involving aspects such as smart grids, value of solar, and tariffs for distribution networks with a high share of distributed energy resources.

SHASHANK OJHA



Shashank Ojha heads the ICT GP/e-Government team of the World Bank in India and is a Senior e-Government Specialist with the Transport and ICT Global Practice at the World Bank. The ICT / e-Government team is responsible for providing technical advice and funding support on ICT projects funded by the World Bank. He specializes in the areas of project finance, ICT policy and reforms and management of technology adoption projects. He has been involved in policy and advisory support to over 50 ICT/e-Government projects in India, the Middle East, and South Asia. He has also been responsible for the finance, country portfolio management, and information technology functions within the World Bank. He holds a PhD in Business Administration and is a Chartered Accountant from India. Before joining the World Bank, he worked as a Senior Management Consultant with Ernst & Young and as General Manager-Corporate Finance with National Panasonic Group.

SHOMIK RAJ MEHNDIRATTA



Shomik Raj Mehndiratta is a Lead Urban Transport Specialist in the World Bank based in Washington DC. He is working on transport and climate issues across countries in the region. He has been at the World Bank since 2002 and from 2007 to 2010 he lived and worked in China. He is co-editor and author of an edited book on Low Carbon Urban Development in China. Prior to the World Bank, he worked at CRA International, a business and economics consulting firm, based out of Boston MA. Shomik is an Indian national, and holds a PhD from the University of California at Berkeley.

SHRIKANT BALDI



Dr. Shrikant Baldi is from the India Administrative Service (IAS) 1985 batch. He is presently posted as Additional Chief Secretary (Finance & Planning) to the Government of Himachal Pradesh in India. Dr. Baldi is entrusted with the responsibility of formulation and execution of the State Government Budget. As Planning Secretary, he coordinates the achievements of Sustainable Development Goals in the State. Prior to this, he worked as Principal Secretary (Education), Rural Development and also as Secretary (Energy). He implemented the Community Led Total Sanitation in Himachal Pradesh, making Himachal a leader in sanitation in the country. As Secretary (Energy), he initiated the sustainable harnessing of hydropower through the private sector. As Member Secretary, Council for Environment, he implemented the banning of polythene carry bags in the state. He has wide experience from working more than 30 years in various capacities in the civil service. He holds PhD in Public Administration and has an MBA in Public Services from the University of Birmingham (UK). He has written papers on wide ranging subjects such as poverty alleviation, watershed management, democratic decentralization, and improving public services.

t.**TAEHYUNG KIM**

Taehyung Kim currently works as a Senior Transport Specialist in Transport & ICT Global Practice at the World Bank. Prior to joining the World Bank in 2015, he served as a research fellow at the National Transport Technology R&D Center in the Korea Transport Institute (KOTI). His research interests include traffic flow theory, traffic operation and management and intelligent transport systems (ITS). Since joining the KOTI in 2005, he has been involved in various research projects related to ITS policy and planning and ITS-related R&D. He established several ITS master plans as a project manager (PM) for various cities in Korea and also carried out several overseas feasibility studies and consulting projects in developing countries, including Vietnam, Kazakhstan, Mongolia, etc. He holds a PhD in the Department of Civil and Environmental Engineering at the University of Maryland at College Park as well as M.S. in Transportation Engineering from Hanyang University.

TAESUN SHIN

Taesun Shin has conducted a wide range of work related to water at K-water (Korea Water Resources Corporation) since 1996. He is currently working as General Manager at the Business Planning & Coordination Department, and he had worked at the Research Center for Water Policy and Economy in K-water, dealing with water-related projects, including the Water and Green Growth Project in collaboration with the Government of Korea and World Water Council from 2012. He contributed to the 7th World Water Forum as a thematic process design group coordinator of the theme 3.1.—Green Growth, Water Stewardship and Industry and session coordinator of the Asia-Pacific Regional Process: Water and Green Growth. He earned an M.B.A at the University of Birmingham in the U.K.

TATIANA PERALTA QUIROS

Consultant, WBG

TEVI M. OBED

Tevi Obed is a Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) specialist stationed in Port Vila, Vanuatu. Obed facilitates the development and implementation of World Bank DRM and CCA programs in Vanuatu and Solomon Islands and provides technical advice to the Vanuatu Government on DRR and CCA policy. He brings years of experience in community-based resource-management planning, community governance, and community-based program implementation with a Master's Degree in Public Policy and Management. He has built a strong network with local communities, NGOs, and government agencies in Vanuatu, and the region.

TODD JOHNSON

Lead Energy Specialist, WBG

Todd M. Johnson is the Energy Sector Coordinator for China and Mongolia and Lead Energy Specialist in the Energy and Extractives Global Practice of the World Bank. Since joining the World Bank in 1991, he has worked in Asia and Latin America on a range of energy and sustainability issues, including clean energy and transport development, air pollution health effects, urban energy efficiency, and global climate change. He has authored and contributed to more than thirty publications, including *China: Clear Water, Blue Skies* (1997), *The Switch to Unleaded Gasoline in Vietnam* (2002), *Low-Carbon Development for Mexico* (2010), and *China Urbanization 2040* (2014). Prior to joining the World Bank, Todd was Program Director of the Economics Education and Research Program in China, with training centers at the People's University and Fudan University. Prior to that, he was a Research Fellow at the East-West Center in Hawaii coordinating the China energy program. He has a BA in Asian Studies from the University of Wisconsin and a PhD in economics from the University of Hawaii.

V.**VINAY KUMAR**

Vinay Kumar is an Indian Administrative Service (IAS) officer from the 1999 batch, Bihar cadre. Presently, he is Secretary, Rural Works Department (RWD), Government of Bihar, Patna (since February, 2015) and Chairman, Bihar Rajya Pul Nirman Nigam Ltd., a government company mandated with the construction of roads and bridges in Bihar (since November, 2014). RWD is a relatively new department of the State Government of Bihar, created from the Rural Engineering Organization. With its own separate cadres of engineers and other technical and nontechnical employees, it is among the biggest departments of the State Government in terms of functional units, manpower, plan size, and budget. The most important goal of the Department is to provide all-weather single connectivity to every single habitation of population 250+ in 11 left-wing extremism-affected IAP districts and to those with population 500+ in the remaining 27 non-IAP districts under the central flagship scheme, called Pradhan Mantri Gram Sadak Yojana (PMGSY). As this scheme leaves out habitations with population between 250 and 499 in 27 non-IAP districts, the State Government came out with its own supplementary scheme called Mukhya Mantri Gram Sampark Yojana (MMGSY) to cover these habitations. PMGSY and MMGSY account for 88 percent of the annual plan size of Rs 80420 million (2015-16). To date, the State Government has been able to provide specified connectivity to about 60,284 habitations against a target of 108,591. Kumar is responsible for sanction, implementation, and monitoring of all schemes, formulating policies for rural connectivity, contract management, and dispute resolution, exercising financial controls, etc.

X.**XAVIER ESPINET**

Xavier Espinet is a consultant with the World Bank Sustainable Development Group. He is assisting the development of support systems that facilitate decision making of transport investments under uncertainty associated with climate. He is particularly interested in promoting Green Growth through resilient transport infrastructure. Espinet holds an Engineering Degree from the Universitat Politècnica de Catalunya and a PhD in civil systems from the University of Colorado.

y.**YE-RIN UM**

Ye-rin Um is Special Assistant to the Regional Vice President for East Asia and the Pacific. She joined the World Bank in 2011 and worked as a Financial Officer during the IDA17 replenishment negotiation process. Prior to joining the Bank, she was Senior Risk Officer at Standard Chartered Bank. She holds a Master's Degree in City and Regional Planning.

YOUNG-JIN CHOI

Young-jin Choi is a senior ICT policy specialist in the Transport and ICT Global Practice at the World Bank. His focus areas at the Bank include introducing mobile-based Intelligent Transport Systems (ITS) and fostering ICT Entrepreneurship in developing countries. Choi has previously worked in the Ministry of Science, ICT and Future Planning of the Republic of Korea, where he was administrator of the National Radio Research Agency. He once served as chief secretary to the Korean ICT minister. His experience covers ICT industry promotion, telecommunications regulation, standards and technical regulation, and radio spectrum management. He also worked at the UNESCAP where he was a team leader of the project to establish the APCICT (Asia Pacific Centre for ICT training), which aims to provide capacity building programs and share best practices with government officials from developing countries and others. Choi holds a Master's Degree in Public Policy and Administration from University of Wisconsin and Seoul National University.

Z.**ZHENIA VIATCHANINOVA DALPHOND**

Zhenia Viatchaninova Dalphond is an ICT consultant based in Montreal, Canada, specializing in project design and management, research, and communications. Since 2013, she has been working for the World Bank's Transport and ICT Global Practice, where she is engaged in telecommunications and open data technical assistance activities, mostly in Europe and Central Asia. In 2014-2016, she has been coordinating implementation of the Negawatt Challenge for Energy Efficiency, and Innovative and Green Growth for Rural Areas of Kosovo, both technical assistance activities funded through the Korean Green Growth Trust Fund. Zhenia obtained a dual Master in Public Diplomacy degree from Syracuse University in 2013, where she studied international relations and public relations as a Fulbright Fellow from Ukraine. In addition to international development, Zhenia has experience in radio journalism, public affairs and PR, and nonprofit management in Ukraine, Canada, and the US.

ZOUBIDA ALLAOUA

Zoubida Allaoua, has over 20 years of experience with the World Bank, since she joined in 1988 through the Young Professionals Program. She has since held various positions, including Economist covering West Africa, and lead Economist on India and Pakistan. In 2002, she was appointed Sector Manager, Private and Financial Sector Development for the Middle East and North Africa (MNA) Region, where she led major lending operations on banking reforms and housing finance and major analytical work, including the Flagship report on Private Sector Development in MNA: From Privilege to Competition. In May 2009, she was appointed Director for Urban and Disaster Risk Management Department (UDR), which is the global practice leading the Bank's agenda on Sustainable Urbanization, City Services, Resilience and Disaster Risk Management. During her leadership, she managed major research on managing urbanization and mainstreaming disaster and climate risks for sustainable development strategies.

In December 2013, Allaoua was appointed Acting Vice President for the Sustainable Development Network (SDN), a responsibility which she carried in addition to Managing the Urban and Disaster Risk Management Department, and also serving as Acting Director of Strategy and Operations for SDN. In this role, she led the Bank's largest network which had an active current portfolio under implementation of US\$134 billion, accounting for 69 percent of total World Bank's portfolio.

In July 2014, Allaoua was appointed Senior Regional Advisor to the East Asia and Pacific Region Vice Presidency.

PROFILE (KGGTF)

The KGGTF team of the World Bank Group would like to warmly welcome you all to the 3rd Annual Korea Green Innovation Days (KGID) 2016. We are delighted to have you here in Seoul to share your experience and to contribute to the KGID 2016.

The KGGTF team is made up of a cadre of diverse policy, operations (energy, environment, transport, urban resilience issues, and finance), project management, design, and communications experts.

DONGKWAN KANG



Dongkwan Kang is a consultant for the Korea Green Growth Trust Fund (KGGTF) at the World Bank Group. Before joining the World Bank Group, he worked at the Green Climate Fund (GCF) as an intern. He holds a Master of Green Business and

Policy degree from Korea Advanced Institute of Science and Technology (KAIST) Business School, and received his B.S in Industrial Engineering from Sung Kyun Kwan University.

EIKO WATAYA



Eiko Wataya is a Senior Knowledge Management Specialist at the Korea Green Growth Trust Fund, WBG, where she focuses on design and implementation of knowledge and learning (KL) strategies and activities, monitoring and

evaluation, and KL material production and customization for operational use. She started at the Bank in Tokyo as a program coordinator/manager. She led the operational unit to develop and implement KL programs in the areas of disaster risk management (DMR), urban, transport, and productivity improvement. She moved to the East Asia & Pacific Region DRM team to develop knowledge management strategies, lead planning, and implement regional programs. Prior to joining the Bank, she worked at Japan Bank for International Cooperation (now JICA) as Country Officer for Indonesia and Malaysia, working on urban lending projects, technical assistance, and analytical work on on-lending scheme under decentralization, microfinance, and SME development. She holds a MS in Social Policy and Planning in Developing Countries from London School of Economics and Political Science.

EUNJI SHIN



Eunji Shin is a communications consultant for the KGGTF at the World Bank. Prior to this, she worked for the Korea International Cooperation Agency (KOICA) in Ethiopia as a young professional, monitoring various social sector projects, including

climate change response. She is studying development cooperation at the Graduate School of International Studies at Ewha Womans University. She is also working as a research assistant in the Institute of Development and Human Security (IDHS) in the same school.

EUN JOO A. YI



Eun Joo A Yi, a US national, is a Senior Operations Officer serving as the Korea Green Growth Trust Fund (KGGTF) Partnership Program Coordinator and Technical Advisor. From 2010 until she began her role with the KGGTF, she worked with IFC

Advisory Services (WBG) on private sector resource efficiency and clean energy initiatives. Prior to the WBG, she lived in Norway and Russia and worked in international science diplomacy and on climate, energy, and environment issues. Yi has worked with various organizations in the private, public, and multilateral sectors, including a Norwegian engineering firm, an international secretariat working with the US EPA and State Department, and Pfizer Inc. She holds a Master of International Affairs degree from Columbia University School of International and Public Affairs

(SIPA), with concentrations in International Energy Management and Environmental Policy Studies. She received her BS in Biology, minoring in Environmental Science, from State University of New York at Stony Brook (SUNY).

IMAN HASSAN



Iman Hassan is a Resource Management (RM) Analyst on Budget, Performance Review, and Strategic Planning (BPS) supporting the budget team of the Global Practices and Cross Cutting Solutions Areas (GP/CCSAs). She provides a full

range of RM analytical services for internal and external financial resources and guides clients on related rules and policy. One of her main roles is to manage the Korea Green Growth Trust Fund financial portfolio and monitor its implementation progress toward results. Prior to joining the World Bank, Hassan worked with Daelim Industrial Company in Egypt. She holds a Master's Degree in International Commerce and Policy Studies from George Mason University, with a background in Accounting and Business Administration.

INHYE BAK



Inhye Bak is a consultant working at Korea Green Growth Trust Fund (KGGTF) at the World Bank based in Washington D.C. Since 2015, she has been working for the KGGTF on supporting World Bank Group teams to integrate Green Growth

mechanism into their project design, as well as supporting Trust Fund management. Her primary interests are climate resilience development, especially focusing on the environment and energy sectors. Prior to joining the Bank, she participated in a feasibility study on the development of an integrated solar system in Mozambique, funded by Korea International Cooperation Agency (KOICA). Bak holds a Master's Degree in Green Policy and Green Finance (dual track) from Korea Advanced Institute of Science and Technology (KAIST) and a BA in Political Science and International Relations and Climate Change Science from Korea University.

JIE-AE SOHN



Jie-Ae Sohn is a senior communications consultant with the Korea Green Growth Trust Fund. She is also an invited professor specializing in international communications at Ewha Womans University's Graduate School of International

Studies. She was CEO of Arirang TV and Radio from 2011 to 2014, becoming Korea's first female head of a major broadcasting station. Prior to this, she served as the overseas public affairs secretary for former President Lee Myong Bak, whose administration pioneered the area of global Green Growth. Her earlier career was in international journalism. She was CNN's Seoul correspondent and bureau chief from 1995 to 2010, covering both South and North Korea, and reported for global media outlets like the New York Times and Bloomberg. She is based in Seoul, and married, with three daughters.

JOANNE M. KIM



Joanne Kim is a research assistant at the Korea Green Growth Trust Fund (KGGTF), working out of the World Bank in Washington D.C. She has been with the KGGTF since 2013, supporting the team with communications, program management, and

knowledge management. She is specialized in public management and socio-economic policy. She studied economics at the University of California at Berkeley, and is currently pursuing a Masters Degree in Public Policy at Georgetown University.

JOHN HOSUNG LEE



John Hosung Lee is a consultant specialized in the urban and transport sectors. He works at the Korea Green Growth Trust Fund (KGGTF) at the World Bank in Washington D.C. He has been with the World Bank since 2012, working on bank activities

that aim to solve urban problems through governance, planning, use of ICT and promotion of private sector development. Prior to the Bank, Lee worked at Korea Research Institute for Human Settlements (KRIHS) and a management consulting firm in Korea. He studied architecture at Korea University in Seoul and urban planning at Columbia University in New York City.

TAKAYO MUROGA FREDERICKS



Takayo Muroga Fredericks is a graphic designer in the San Francisco Bay Area. After graduating Yale University School of Art with a Masters degree in Graphic Design, she joined the international design consultancy, Pentagram. She has recently

started her own practice and works on a wide range of projects from corporate identities to exhibits and printed material. Her client list includes Google, San Francisco Symphony, Stanford University, UCSF Medical Center, and many others. Her awards and recognitions include the Bradbury Thompson Memorial Prize, Graphis Design Annual, The One Club, and Print Magazine.

TASHA EICHENSEHER



Tasha Eichenseher is a communications consultant who helps NGOs bring their work to a broader audience through storytelling. With a Master's Degree in Environmental Management from the Yale School of Forestry and Environmental Studies,

Eichenseher works primarily with clients specialized in environment, science, and sustainable development. She comes to the World Bank Group and KGGTF with more than a decade of writing, editing, and website production experience at national media outlets—including National Geographic News, Discover magazine, and Environment & Energy Publishing.

