



KIRIBATI

SELECTED ISSUES

June 2023

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KIRIBATI

SELECTED ISSUES

March 31, 2023

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CLIMATE CHANGE IN KIRIBATI: THE WAY FORWARD¹

Climate change represents a threat to many small island developing states like Kiribati. This note summarizes the main ways in which climate change may negatively affect the economy of Kiribati. It then shows how Kiribati may cope with these negative effects by implementing adaptation projects, as well as by contributing to global mitigation efforts. Finally, the note describes some issues related to climate finance and how authorities of Kiribati may direct their efforts in the most productive way to ensure that climate-related projects obtain the proper financial backing and are carried out to fruition in a timely fashion.

A. Introduction

1. **The negative effects of climate change threaten the future of the world economy.**

According to the latest Intergovernmental Panel on Climate Change AR-6 Report (IPCC, 2022), the negative effects of anthropogenic climate change have already started to materialize across the globe. The global average temperature will almost certainly rise to 1.5 degree Celsius above pre-industrial levels in the coming decades, even if the world economy were to implement policies to aggressively reduce carbon emissions starting from today. Accordingly, the risk of runaway climate change, which most scientists predict to occur if the global average temperature were to increase to and above 2 degrees Celsius above pre-industrial levels, is deemed very high.

2. Against this backdrop, small island developing states (SIDS) are in a precarious position. This is because their location and geographic features make them vulnerable to climate induced disasters like tidal inundation, tropical cyclones, droughts, and heatwaves. In addition, economies of SIDS are often heavily dependent on natural resources, for instance groundwater and fisheries, which could be negatively affected by some of these novel natural processes associated to climate change like sea level rise. Finally, the size and current development of their economies hinder efforts both to adapt and to recover from natural disasters.

3. Global changes in weather patterns may lead to a host of hazards for Kiribati, albeit a great deal of uncertainty remains in model-based projections of risk. A rising global average temperature naturally leads to more frequent occurrence of dangerous heatwaves, including marine heatwaves—periods of abnormally high sea temperature—which intensify and lead to severely negative effects on marine ecosystems within Kiribati’s exclusive economic zone. Droughts on the atolls of Kiribati are primarily meteorological, meaning that they reflect a prolonged lack of rainfall and thus require projections of future precipitation patterns. Finally, inundation and windspeed damage from storms, while historically not affecting Kiribati as harshly as other SIDS, are tightly linked to future evolution of tropical cyclone tracks, a field in which more research is needed.

¹ Prepared by Michele Fornino (STA), Anh Thi Ngoc Nguyen (APD), Cristian Alonso, and Joel Kilpatrick (both FAD). The note benefitted from inputs and discussions with Natalija Novta (APD).

4. Sea level rise (SLR) has already impacted Kiribati islands through territory loss and forced relocation. Residents of the village of Tebunginako, in the island of Abaiang, Northern Gilbert Islands, have already been forcibly relocated, after SLR, erosion, and salinization rendered it uninhabitable. More generally, many of the low-lying islands of Kiribati are predicted to be submerged due to the naturally low elevation of the coastal areas on almost all islands as melting ice sheets lead to higher average sea levels over the coming decades.

5. Climate hazards have the potential to disrupt crucial natural resources in Kiribati. Freshwater lenses, soils, and fisheries are the most critical natural resources for the economy of Kiribati. Thickness of freshwater lenses and soil enrichment depend heavily on natural rainfall on the atolls and will thus follow future rainfall patterns. Moreover, saltwater intrusion could pose additional challenges, as lenses are depleted during prolonged periods of scarce rainfall, which are increasingly frequent, and permanent damage is inflicted on groundwaters by saline contamination. SLR and ocean acidification also have the potential to inflict heavy damage to ecosystems. More frequent coastal inundation may lead not only to direct infrastructure damage, given that the high point on most of Kiribati's atolls is at or below 4 meters, but also to decline and eventual loss of cultivatable lands and permanent destruction of ecosystems as wildlife will be unable to survive. In addition, ocean acidification may disrupt coral reef replenishment and in turn lead to extinction of marine species that constitute the bulk of fishing activity. Moreover, climate change is projected to lead to migration of tuna stocks outside of current exclusive economic zones of some Pacific Islands.²

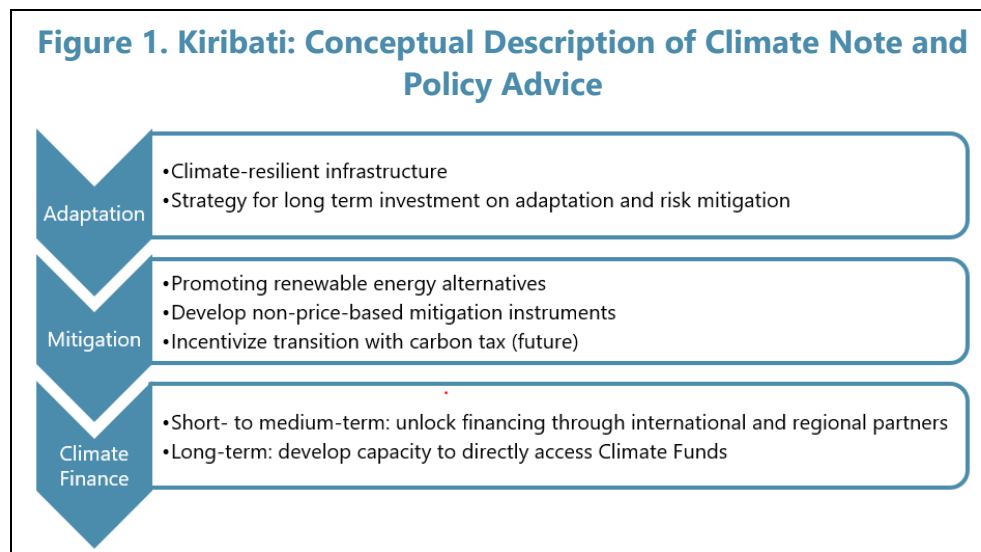
6. Damages may also affect economic and social outcomes, both directly and indirectly. The agricultural sector of Kiribati could be disrupted primarily by water scarcity and more frequent extreme weather events and heatwaves. Moreover, crop diversity is limited given the low fertility of the soil, making adaptation more challenging. Social outcomes, including poverty, inequality, gender disparity, social peace, and health, could further be deteriorated by an intensification of adverse climate events. Indeed, research has shown that poorer strata of the population, as well as women and children, stand to bear the brunt of climate change (WB, 2016). Health outcomes, already negatively impacted by the COVID-19 pandemic, could see further deterioration by the more frequent occurrence of droughts or depletion of freshwater resources by saltwater intrusion.

7. International cooperation is critical to help Kiribati address its challenges from climate change. As pointed out in the speech of Kiribati's President at the 2022 United Nations Climate Change Conference (COP27), the cost of maintaining the livelihoods in Kiribati in the face of climate change already exceeds its means. Therefore, international cooperation not only on full implementation of the Paris Agreement, but also on financial support—either through bilateral/multilateral funding mechanisms or through climate funds—is crucial to help Kiribati cope with existential climate threats.

8. Meanwhile, the nation should continue to undertake effort to mitigate climate impact, which is the main consideration of this paper. To safeguard the future of their nation, Kiribati

² While there may be an increased presence of tuna in Kiribati according to some projections (Pacific Community, 2018, and Brouwer et al., 2019), there is still uncertainty regarding tuna stock displacement due to climate change.

should undertake both adaptation and mitigation efforts by drawing to the maximum extent on available climate finance resources. The next sections will detail some of the adaptation and mitigation efforts, highlighting the key projects and challenges faced by the authorities. The conceptual scheme of this paper is presented in Figure 1.



B. Adaptation

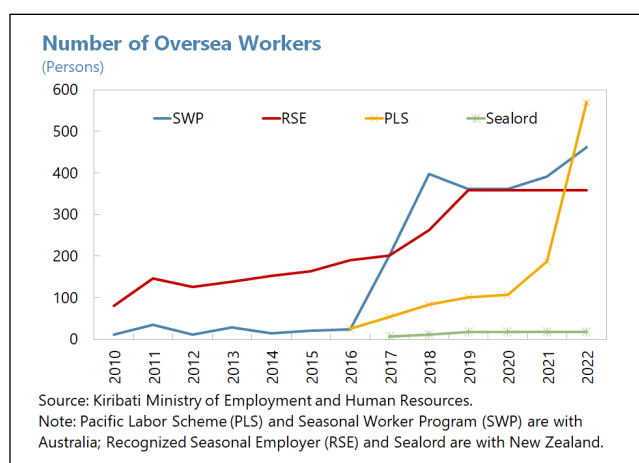
9. Kiribati has been working actively on climate adaptation, which is crucial given its vulnerability to climate change. Initial attempts were made in the early 1990s, when the government requested scientific advice on SLR. The first climate project—the US Country Study Programme developing a country profile for Kiribati—was conducted in 1995 (Republic of Kiribati, 2015). Since then, the government has issued several adaptation policies, plans and agreements such as the 2012 National Disaster Risk Management Plan, the 2013 National Communication under the United Nations Framework Convention on Climate Change, the Nationally Determined Contributions (NDCs) 2016 and the revised NDCs 2022, the 2018 Kiribati Climate Change Policy, the Disaster Risk Management and Climate Change Act 2019, and the 2021 New Environment Act.

10. These key policies have been translated into action aimed at improving infrastructure. The 2019 report from the Global Commission on Adaptation (GCA, 2019) highlights five key adaptation focus areas that give outstanding cost-benefit ratios once all relevant impacts are considered, including early warning systems, resilient infrastructure, protecting dryland agriculture crop production, mangrove planting, and making water resources management more resilient. In Kiribati, projects to monitor and improve water pipe leakage and water distribution services have been being carried out in Tarawa, including a water desalination plant being built to secure sustainable fresh water supply. Mangrove planting and coastal protection infrastructure such as seawalls help protect coastlines from seawater intrusion and inundation as well as help reduce

coastal erosion.³ Physical infrastructure of roads, runways, causeways, bridges, ports, berths, and public buildings have been reconstructed and rehabilitated to be more resilient to the negative effects of climate change. In parallel, efforts were made to monitor the ecosystem, enhance food security through agriculture training programs, and strengthen community awareness of healthy lifestyles (nutrition, sports and exercise, sanitation, and hygiene), environment protection, and climate change and disaster risks management. With the new Environment Act of 2021 focusing on 5 areas, including climate change and environmental data and spatial planning, further progress may be achieved provided that regulations, including effective and efficient enforcement and implementation, are put in place in a timely manner.

11. Labor mobility is one of the climate adaptation areas under the government focus. The risks of permanent inundation is recognized as a key long-term challenge by the Government of Kiribati (GoK, 2014). The 2015 Kiribati Household Survey revealed that 94 percent of households had been impacted by natural hazards within the 10 years preceding the survey, 75 percent of

households saw the need of migration for one or more family members if sea levels continued to rise, and climate change was the second main reason of migration after work (Voigt-Graf and Kagan, 2017).⁴ Migration from outer islands to Tarawa, partially due to climate impact and poor infrastructure, results in high population density and unemployment in the main island. As such, labor migration serves as an important strategy for temporary migration and job creation in response to both rapidly growing population and climate change threats to livelihoods and job security at home while also help generate remittances. Efforts have been made to increase the number and size of labor schemes, mainly with New Zealand and Australia (text chart).⁵ If carefully designed to prevent brain-drain impact of skilled workers, these policies could be beneficial by reducing unemployment and providing I-Kiribati with better opportunities abroad.



12. The country also works on environmental data to improve climate forecasts. Access to credible and up-to-date environmental data is often very limited in Kiribati, creating sustaintial data

³ Mangroves, along with seagrass, can also help mitigate part of the greenhouse gas emissions as they serve as a carbon sink.

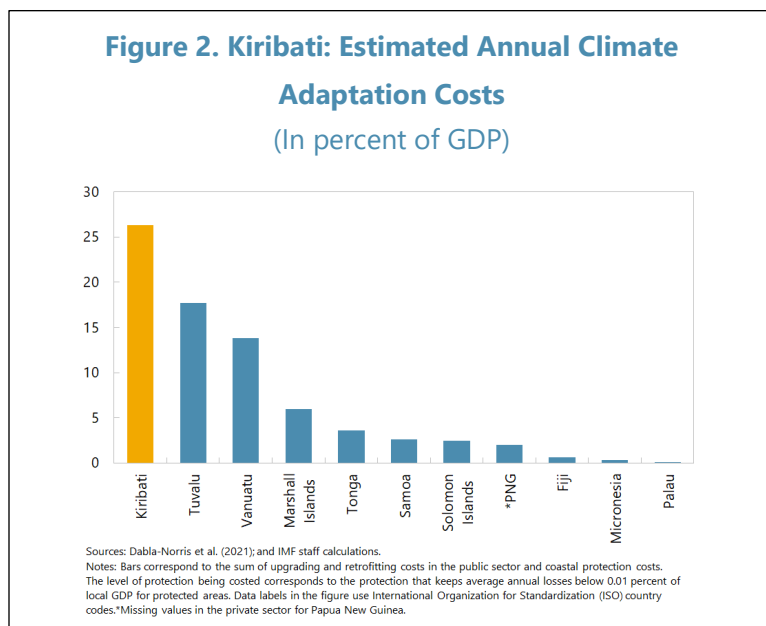
⁴ The survey also revealed that 9 percent of people reported to have attempted to migrate but failed, and only 1.3 percent of people had migrated for more than 3 months in the past 10 years.

⁵ The Government of New Zealand has recently raised the cap on their Recognized Seasonal Employer (RSE) scheme by about 3,000 workers for the 2022/23 season for all Pacific Islands, a significant increase from the 16,000 workers in the previous year. Kiribati also has the Pacific Access Category, a permanent visa scheme with New Zealand with an annual cap of 75 slots. In October 2022, the Government of Australia launched the Pacific Engagement Visa to provide permanent migration to allow up to 3,000 individuals from Pacific countries to Australia. The Pacific Australia Labor Mobility (PALM) scheme is also being reformed and will subsume pre-existing visa schemes.

gap and making it challenging to forecast climate change and its impacts as well as to build relevant long-term planning in response to the climate change. Efforts have been proposed to ensure that the entire Pacific region gets access to improved information systems and infrastructure that can be used to more accurately predict the occurrence and severity of natural disasters, such as tropical cyclones. One such project is the Climate Information and Early Warning Systems, One Pacific Programme, submitted as a concept note in December 2021 at the Green Climate Fund by the Secretariat of the Pacific Regional Environment Program. This is a concerted effort across 14 Pacific SIDS, including Kiribati, to gather and apply critical hydrologic and meteorological information. The objective is to provide reliable, trusted early warnings about climate change hazards and technical advice that will allow local, vulnerable communities to plan for and undertake effective adaptation interventions (GCF, 2021).

13. Climate change will keep posing challenges and require further efforts from Kiribati.

World Bank (2017) estimated that adaptation costs exclusively for coastal protection in Kiribati—protecting the low-lying atolls from rising sea level through sea dike construction and port upgrade—could reach US\$54 million (equivalent to 11 percent of GDP per year) in the 2040s.⁶ Additionally, Dabla-Norris et al. (2021) uses a model-based estimation to show that Kiribati would need to invest more than 25 percent of its GDP annually to upgrade and retrofit its infrastructure with the objective to contain annual expected losses to below 1 percent of GDP, a higher number than other Pacific Islands countries (Figure 2). These estimates give a sense of the scale of the challenge in terms of financing these climate investments.⁷ Thus, while it is important that the government secure enough financing resources for climate adaptation, which is highly relevant for achieving a greener post-COVID recovery, Kiribati needs to adopt a strategic approach in incorporating adaptation costs in its medium- and long-term fiscal planning by first ensuring fiscal space from general budget, along with continuing seeking support from development partners for stronger institutional and financial capacity.



⁶ According to DGIZ et al. (2020), Kiribati accessed about AU\$76.5 million of external funding during 2011–2018, of which 46.4 percent was used for climate adaptation. This was equivalent to an annual average of 1.69 percent of 2018 GDP.

⁷ A full assessment of the environmental impact, maintenance, and sustainability of these infrastructures in the long term, which are yet to be included in these estimates, will further raise costs.

C. Mitigation

14. Although being one of the smallest emitters in the world, Kiribati pledged ambitious reductions of greenhouse gas (GHG) emissions in the Nationally Determined Contributions of the Paris Agreement. The country currently emits about 79 kilotons of CO₂ per year, or 0.68 tons per capita, which is a marked increase from 0.32 tons of CO₂ in 1990, but still very low (WRI, 2021). Nonetheless, under the principle of common but differentiated responsibilities, all countries are expected to contribute to the global efforts to mitigate climate change in accordance with their capacity. Indeed, Kiribati has committed to reducing emissions by 8.0 percent by 2030 compared to a business-as-usual (BAU) projection (Republic of Kiribati, 2022). On the condition of receiving international support, the commitment becomes significantly more ambitious, up to a reduction of 23.8 percent against the 2030 BAU projection.

15. Introducing renewable energy is one of the most effective ways to achieve emissions reductions for Kiribati. Solar panels were first installed since 1990s. However, development stagnated due to high cost of maintenance—only 0.35 percent of total power generation nationwide in 2017 was from solar energy (GoK, 2021). In its Development Plan 2020-2023, the government embraces an ambitious goal of being a “100-percent solar-powered country by 2036” by developing a centralization of solar power system, both in outer islands and in South Tarawa.

- **The outer islands** have no on-grid power systems, except for Kiritimati islands. The main power supply is from private diesel generators. Since early 1990s, Kiribati has developed solar energy with the installation of off-grid solar panels in the outer islands, which was then enhanced in 2005 under funding from development partners such as European Union and Taiwan Province of China. This led to significant results. In 2019, over 70 percent of households in Central Gilbert relied on solar panel electricity for lightning (KNSO, 2021). The numbers were also high for other groups of outer islands: Southern Gilbert, 49 percent; Line and Phoenix Islands, 35 percent; and Northern Gilbert, 15 percent.⁸ In 2021, the Promoting Outer Island Development through the Integrated Energy Roadmap (POIDIER), a climate mitigation project funded by the Global Environment Facility (GEF) trust fund, was launched to enhance renewable energy and energy efficiency targets in outer islands. When completed, the project is anticipated to install and distribute “high-quality solar grid system at globally competitive costs” for the outer islands, as well as creating a demo of electricity revenue and billing system to facilitate financial sustainability and secure maintenance cost (MISE, 2021).
- **South Tarawa:** Electricity in the capital South Tarawa is produced using diesel generators and transmitted to the main grid for consumption. In 2019, 88 percent of household in South Tarawa used on-grid electricity, while the use of electricity from solar panel was only 2 percent (KNSO, 2021). Accordingly, about 50 percent of the country’s total imported fuel in 2019 was used for the main-grid power generation (GoK, 2021). The Kiribati Grid Connected Solar Photovoltaic (PV) Project started in 2012, with the help of grants from the GEF and Australian government, had jumpstarted the power system and increased the share of renewable energy in the main grid to

⁸ The lower shares of solar electricity in Phoenix Islands and Northern Gilbert islands reflect their ability to access to on-grid electricity in Kiritimati Islands and South Tarawa, respectively.

9 percent when the project finished in 2018. Another on-going project—the South Tarawa Renewable Energy Project (STREP), funded by the Asian Development Bank (ADB), Strategic Climate Fund, and Government of New Zealand—is expected to further increase the share to 44 percent in 2024 after completion.

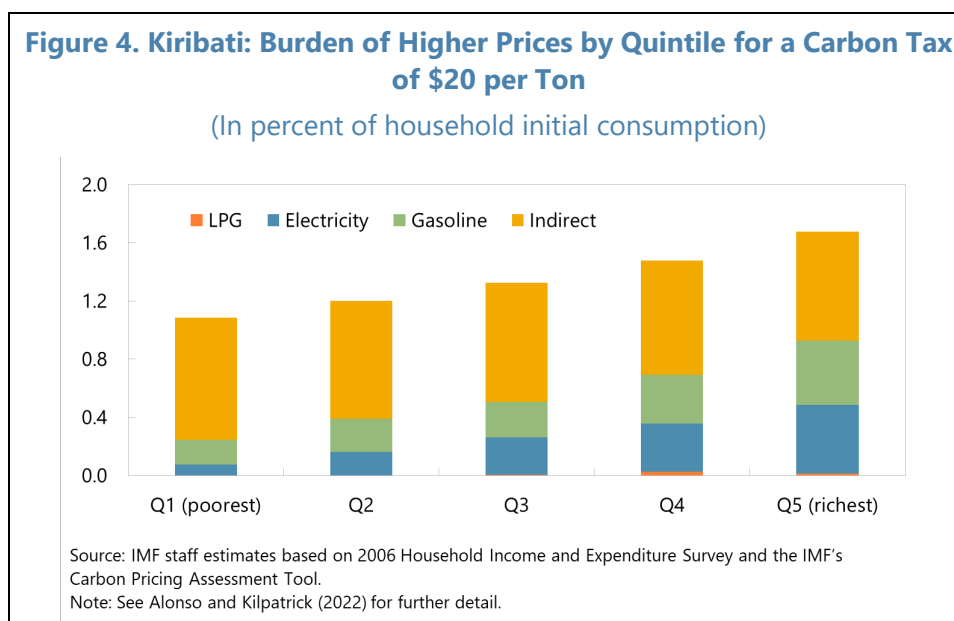
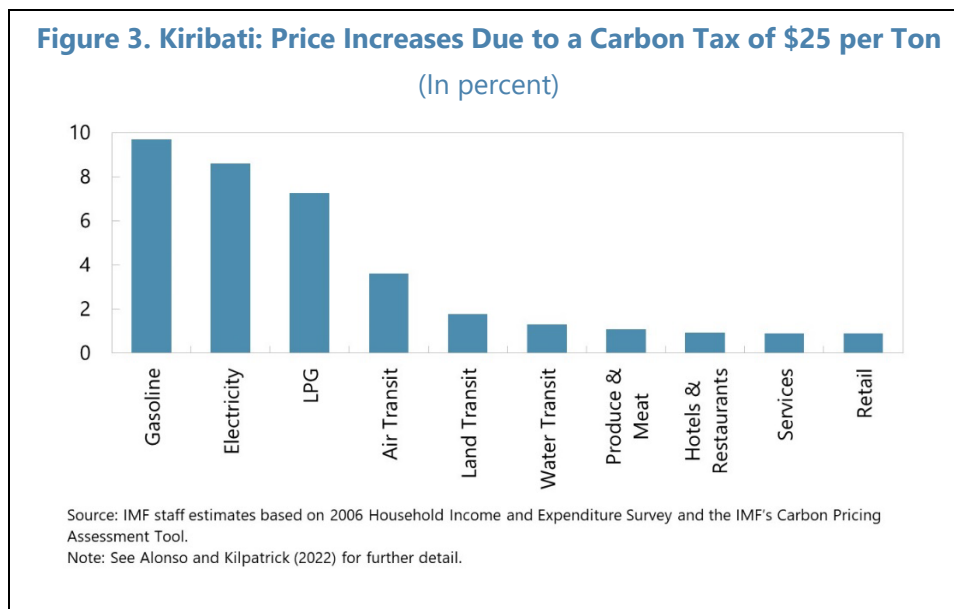
16. Besides renewable energy, other non-price-based instruments can be deployed for climate mitigation. In general, instruments that have been applied in other countries include CO₂ intensity standards set for industries, fuel economy requirements such as CO₂ per kilometer, or emissions targets for new buildings. The Kiribati NDC Investment Plan 2021 have identified two primary mitigation options in transport and energy efficiency sectors. This is expected to be done by promoting bicycle and electric vehicle initiatives, introducing low carbon mini-container and cargo ship, and increase capacity in design and construct low energy buildings through thermal insulation retrofits. In addition, while Kiribati does not have any specific emission target for buildings, it is constructing a “climate resilient and low carbon water supply infrastructure”—a water desalination plan transforming sea water to fresh water enough for the need of at least 95 percent of South Tarawa’s population. The energy consumption of this building will be self-supplied from a newly installed 2,500-kilowatt solar photovoltaic system.

17. Once renewable energy is installed and made available to firms and households, Kiribati’s mitigation efforts could be strengthened through a carbon tax. A carbon tax is a fee imposed on the burning of fossil fuels (e.g., natural gas, coal, oil) based on how much carbon dioxide or carbon dioxide equivalent of gas is released into the atmosphere from each fuel. It is easy to administer because it can be collected “upstream,” at the point of extraction or, in the case of Kiribati, at the point of importation into the country. The carbon tax would then be passed along the supply chain so that firms and households internalize the cost that burning fossil fuels has for the environment, incentivizing the shift to a low-carbon economy. Crucially, for it to achieve the intended goal of reducing emissions, alternatives to fossil fuel burning must be available to firms and households, which is why this tool should be considered for future use.

18. A carbon tax of US\$25 per ton would increase prices of energy goods and indirectly raise the price of other goods (Figure 3). Parry et al. (2021) advise a carbon tax of \$25 per ton for low-income emerging market economies as part of an international carbon price floor. In this case, the price of gasoline and electricity would increase by 9.7 and 8.6 percent, respectively. And the price of liquefied petroleum gas (LPG) would rise by 7.3 percent. Other carbon-intensive goods, such as transit, would also become more expensive as the higher price of energy goods is passed through the supply chain.

19. The burden of the carbon tax would fall mostly on the richest households as energy goods are disproportionately consumed by households in the richest quintiles. On average, households in the richest quintile spend 6 times more on electricity and 2.5 times more on gasoline than households in the poorest quintile (in percent of household consumption). Thus, the carbon tax would imply a loss equivalent to 1.7 percent of household initial consumption for the richest quintile, but of only 1.1 percent for the poorest quintile (Figure 4). The loss of labor income for workers in the

energy sector would similarly be shouldered mostly by the richest, but this loss would be small due to the lack of extractive activities in Kiribati.



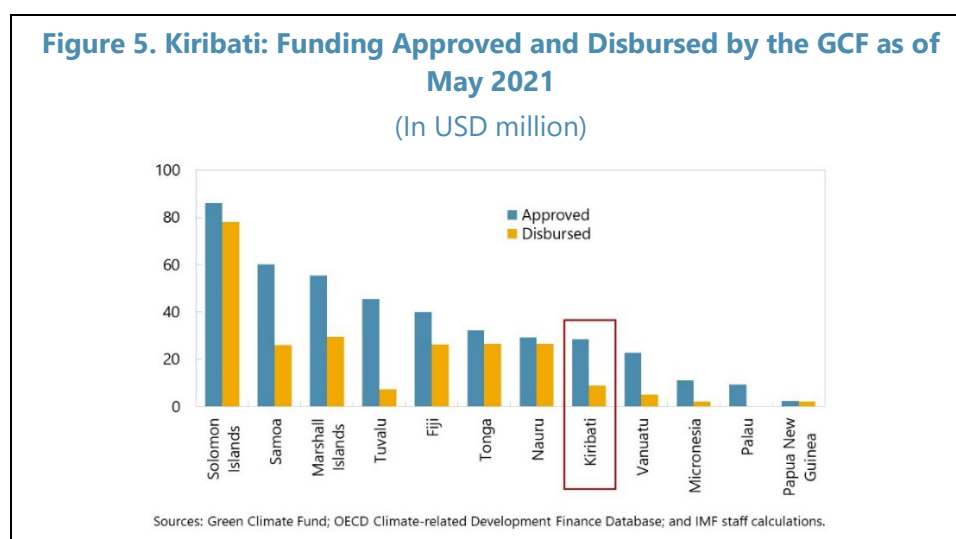
20. Resources raised by the carbon tax would be about 0.35 percent of GDP. These resources could be partly used to protect the most vulnerable from the increase in prices. For example, using proxy-means testing to target a uniform cash transfer to the poorest two quintiles would cost only a fifth of the resources raised by the carbon tax and ensure that this group is no worse off on average. This would leave the authorities with significant resources to finance investments in education and health needed to achieve the 2030 Sustainable Development Goals

(IMF, 2021) and to continue adapting to climate change by building resilient infrastructure. These investments would not only increase productivity but deliver sustainable and inclusive growth.

D. Climate Finance

21. Given Kiribati’s limited ability to internally generate resources for long-term climate change mitigation and adaptation investments, leveraging climate finance is critical. As discussed in previous sections of the note, the scale of the financing required for climate investments is very large and may exceed 11 percent of GDP annually in 2040. Fouad et al. (2021) detail how the Government of Kiribati (GoK) may access funding for climate projects, including through bilateral donations from foreign governments, multilateral development banks (MDBs), and climate funds (CFs). The latter two often involve a CF (such as the Green Climate Fund, GCF, or the Adaptation Fund, AF) partnering with an Accredited Entity (AE). AEs may be either MDBs such as the Asian Development Bank (ADB) and the World Bank (WB), or regional institutions such as the Secretariat of the Pacific Regional Environment Programme (SPREP) and Pacific Islands Forum Secretariat (PIFS).

22. Approved funding for climate projects has only covered a small fraction of the total estimated investment needs, with actual disbursements at significantly lower levels. In 2016, the GoK established the Climate Finance Division within the Ministry of Finance and Economic Development, with the aim to build the necessary infrastructure to access climate funds. The Ministry of Finance and Economic Development has been designated as the national entity managing the climate projects to be co-funded with the help of international AEs and CFs.⁹ As shown in Figure 5, the gap between approved and disbursed GCF funding for Kiribati is wide and in line with that experienced by other Pacific island countries (PICs).



⁹ According to the website of the KCFD, the MFED is the National Designated Authority (NDA) to the Green Climate Fund (GCF), the Focal Point to the Climate Investment Funds (CIF), the Designated Authority to the Adaptation Fund (AF), and more recently the Operational Focal Point for the Global Environmental Facility (GEF).

23. The main challenges in access to CFs are the procedures required to secure and disburse climate funding. The process of obtaining Direct Access (DA) status, which helps directly assessing climate fundings, requires fulfilling hundreds of criteria on Fiduciary Standards, Transparency and Accountability, compliance with Anti-Money Laundering/Combating Financing of Terrorism (AML/CFT) requirements, Environmental and Social Safeguards (ESS) and Gender Policy issues. These stringent requirements on Public Financial Management (PFM) and Public Investment Management (PIM), can make it overwhelmingly complicated and time-consuming for PICs, including Kiribati, to obtain direct access status at any of the largest CFs (Dabla-Norris et al., 2021). Moreover, the experience of peer nations in the PIC group shows that the effort may not be reflected in expanded funding access.¹⁰ In addition, even if the status was granted, each project would need significant background work to ensure, among other things, that proper cost-benefit analysis is undertaken, and progress measured using quantitative indicators. This may entail significant ongoing expenses to ensure that projects are indeed brought to fruition. While helpful to ensure the effective use of funds, the stringent criteria and requirements required by CFs might have adverse effect due to high compliance cost, especially for countries with relatively severe institutional and human resource capacity constraints like Kiribati, and should be streamlined (Dabla-Norris et al., 2021).

24. In the short-term, GoK should seek to obtain funding either through bilateral or AE financing. Kiribati should take a strategic, comprehensive, and coordinated view of how best to direct climate proposals to bilateral or multilateral sources. Specifically for multilateral sources, while MDBs are under a lot of pressure to coordinate climate projects, they are better equipped to navigate the complex requirements of CFs to ensure a higher likelihood that large climate projects are approved for financing and successfully implemented. Experience of PICs suggests that regional institutions are relatively more successful at obtaining funding for projects of smaller size and scope. The experience garnered by working with bilateral donors and AEs could serve as the steppingstone for future efforts to gain direct access status at CFs.

25. In fact, Kiribati has been following this strategy and effectively leveraging on bilateral support and AEs for climate funding. Kiribati has been receiving external grants from bilateral donors, especially from Australia, the EU, Japan, and New Zealand, for its infrastructure projects. It also receives funding support from MDBs, with the ADB and the WB the two largest donors. The South Tarawa Water Supply Project is the example of a multilateral-funded project approved in the last few years with contributions from the GCF.¹¹ This medium-scale project is based on a three-way

¹⁰ An example is the recent experience of the Fiji Development Bank, which obtained DA at the GCF in 2017 for projects up to US\$10 million, and of the Cook Islands Ministry of Finance and Economic Management, which obtained DA at the GCF in 2018 for projects up to US\$50 million. As of end-May 2021, only one project of the Fiji Development Bank has been approved, but no disbursements have been made. For more details, see the discussion in Dabla-Norris et al. (2021).

¹¹ The focus of this project is both on adaptation and on mitigation, with a view to provide inhabitants of Tarawa with safe and clean drinking water by means of desalination and by powering the plant with solar panels. This infrastructure will not only enhance the resilience of Kiribati to climate-change induced depletion of its underground water resources, but also lower carbon emissions because residents will no longer have to boil water to make it potable.

arrangement between the ADB's Asian Development Fund acting as the AE, the WB, and the GCF. The first disbursement occurred in February 2021, and the project has faced some delays because of the COVID-19 pandemic and the border closures. Delays in disbursements from the GCF seem to continue as of the first quarter of 2023, and the GoK should continue its close cooperation with the partners to ensure the project is implemented.

26. Going forward, embedding climate projects in a coherent national strategy, improving capacity, and coordinating with other PICs is important to unlock climate financing. In the medium to long term, a national strategy on climate would benefit Kiribati by reducing the time needed to produce concept notes for submission at AEs, and by clarifying the roles and responsibilities of all branches of governments. This should streamline decision making within GoK and reduce the time between inception and implementation of climate projects. PFM/PIM capacity building is an area where all PICs struggle, and the IMF has been actively aiding these efforts especially through its Pacific Financial Technical Assistance Center (PFTAC). Refocusing these efforts in the areas targeted by CFs' PFM requirements, such as audit and control frameworks, may be a good way to ensure better climate finance access for Kiribati in the medium term. Finally, Kiribati may benefit from expanded collaboration with other PICs in the fora of SPREP and PIFS, with a view to coordinate efforts with nations that face similar challenges in terms of climate adaptation and mitigation needs and possibly gain from economies of scale in the preparation of concept notes and applications.

E. Conclusion

27. Kiribati is among the nations most exposed to the risks posed by a changing climate. Climate change may lead to new and intensified natural hazards, even though significant uncertainty remains in model-based projections of risk and localized effects from climate change are hard to predict with confidence. Sea level rise has impacted Kiribati islands through territory loss and forced relocation and is predicted to further endanger communities scattered across the atolls. Crucial natural resources such as fisheries and freshwater lenses, on which Kiribati is heavily dependent, are also endangered directly by climate change.

28. Adaptation and mitigation projects are crucial to protect and increase the resilience of the economy of Kiribati. Adaptation efforts have been undertaken for decades but will have to be scaled up to ensure viability of public infrastructure and protection of natural resources. Despite contributing almost nothing to global greenhouse gas emissions, Kiribati has made ambitious pledges to decarbonize its economy. Measures like solar panels installation, environmental standards, and regulatory requirements, and possibly carbon taxes are instruments that could be considered to implement these plans.

29. Leveraging climate finance effectively is critical to ensure Kiribati implements climate projects. Given the size of its economy and the scale of the challenge, Kiribati needs external support to finance mitigation and adaptation investments. To date, approved bilateral and multilateral funds have covered a small fraction of the total estimated investment needs, with actual disbursements at significantly lower levels. In the short-term, the GoK should seek to obtain funding

either through bilateral or multilateral donors. In the medium to long term, the GoK should embed climate projects in a coherent national strategy, continue improving PFM/PIM capacity, and coordinate with other PICs to undertake joint regional projects.

30. Above all, international cooperation is crucial to help Kiribati overcome climate threats. The impact of climate change is far beyond the ability of any countries to cope with it alone, not to mention small atoll islands like Kiribati. The Paris Agreement needs to be fully implemented as soon as possible to mitigate climate risks globally. In parallel, Kiribati is also in need of international cooperation for financial support to fund climate adaptation and mitigation activities. To make progress in this direction, CFs should consider streamlining accreditation requirements given their high compliance cost for countries (especially small and fragile countries) and prioritize requirements in areas where strong capacity will significantly strengthen financial safeguards (Dabla-Norris et al., 2021).

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UNLOCKING GROWTH POTENTIAL IN KIRIBATI: TAKING STOCK OF STRUCTURAL REFORMS¹

With great geographical challenges and high climate change risks, implementing structural reforms is critical for Kiribati to boost growth and income in the near future. Based on a growth model, the paper estimates that comprehensive structural reforms could help increase the long-term growth of the country from slightly above 2 percent to 4 percent and significantly reduce poverty. It has also taken stock of the government's recent structural reform efforts to provide an insight on the government's key focus areas, and what more could have been done to help further promote growth and income in Kiribati.

A. Introduction

1. Geographic challenges pose great difficulties for Kiribati to achieve high economic growth. The country faces persistent challenges due to its remoteness, large geographical dispersion, small size, and environmental fragility. They have resulted not only in high cost of infrastructure and public service delivery, but also in high cost of production and thus underdevelopment of the private sector. Economic growth in Kiribati has increased over time but has significantly lagged other Pacific Islands and low-income countries (Figure 1, upper left panel). Economic growth could barely keep in pace with the increase of the population, resulting in a stagnant growth of real GDP per capita (Figure 1, upper right panel). In 2019, before the onset of the COVID-19 pandemic, Kiribati's real GDP per capita was almost unchanged at 99.5 percent of its level 30 years ago.

2. The other key feature of Kiribati is the dominant role of the public sector. In fact, Kiribati has one of the highest government expenditure-to-GDP ratio in the world during 2015-19, significantly higher than most of the PICs as well as the global average (Figure 1, lower left panel). This high public spending is backed by government revenues from fishing license fees, tax revenues, investment income, and development aid flows.

3. To boost growth and incomes, Kiribati will need to embark on a comprehensive structural reform agenda with focus on diversification, private sector, and inclusive development. Especially, structural reforms to stimulate private sector development will be key since the role of the public sector will need to be reduced after the pandemic to reduce fiscal risk (Figure 1, lower right panel). Against this backdrop, a holistic reform agenda to revamp the private sector, including economic diversification through new product lines and quality upgrades—especially for relatively comparative advantage products such as copra production and tuna processing—and improvement in business environment, is crucial for sustainable economic development going forward. Above all, upgrading basic infrastructure such as transportation, electricity, water, and internet will be crucial to facilitate improvement in economic activities and diversification.

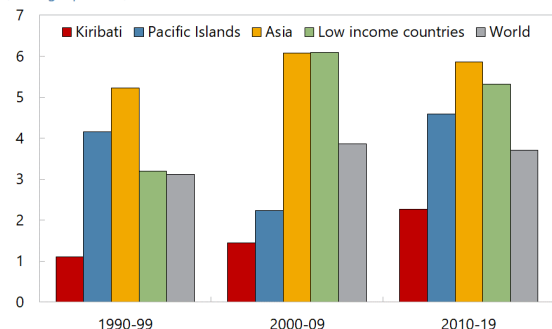
¹ Prepared by Anh Thi Ngoc Nguyen (APD) and Nico Valckx (AFR).

Figure 1. Kiribati: Economic Performance of Kiribati and Its Peers

Economic growth in Kiribati trailed peers...

Annual Economic Growth by Period

(Average, percent)

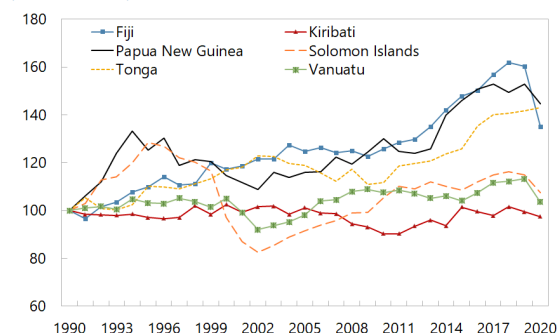


Source: IMF, *World Economic Outlook*.

...as high population growth translated in stagnant income per capita.

Transition of GDP per Capita in Selected Pacific Islands

(Index, 1990=100)

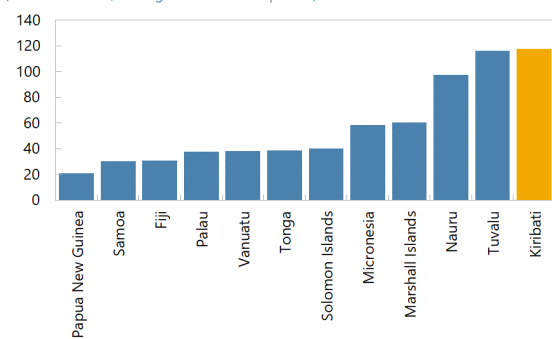


Source: IMF, *World Economic Outlook*.

The economy mainly relies on the public sector for growth...

Government Expenditure

(Percent of GDP, average over 2015-19 period)

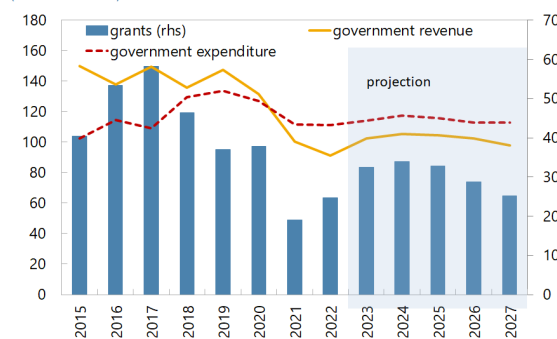


Source: IMF, *World Economic Outlook*.

... but a boost in the private sector is critical from a sustainability perspective.

Selected Indicators of The Public Sector

(Percent of GDP)



Source: IMF, *World Economic Outlook*.

4. This paper examines the potential growth and development effects of structural reforms and takes stock of what has been achieved and what gaps remain. The paper is organized as follows. Section B lays out a stylized model that shows economic growth under alternative scenarios. Section C takes stock of past reforms in various domains, and Section D concludes with policy recommendations.

B. Potential Growth Impact of Structural Reforms

5. The paper applies a long-term growth model to analyze the quantitative impact of structural reforms on GDP growth and poverty reduction. Long-term output growth can be boosted by an increase in the investment rate, expansion of the labor force, and improvements to human capital and technology—the total factor productivity (TFP) (Solow, 1956). It starts from a

baseline model developed by Loayza and Pennings (2018) (see Appendix Table 1 for a brief description) for long-term growth, and then introduces some additional elements: i) a differentiation of labor market participation by gender; ii) a growth path for factor productivity using scores for innovation, education, efficiency, infrastructure, and institutions, as in Kim and Loayza (2019); and iii) a differentiation of capital and investments by public versus private, with an adjustment for quality of public investment, as in Devadas and Pennings (2018). Kiribati's current policies and current macroeconomic conditions are used to calibrate a baseline path, and a scenario analysis is performed to illustrate the quantitative effects of comprehensive structural reforms. Appendix Table 1 provides details on the parameters and input factors used for this study.

6. Two scenarios are analyzed to demonstrate the impact on growth from different assumptions of the input factors—both human and physical capital and TFP. The baseline scenario assumes no change from the present data (2020 or latest available), whereas the comprehensive reform scenario sets ambitious growth goals for human capital, labor market participation and (public and private) investments, and assumes higher efficiency of public investments. Under this scenario, Kiribati would gradually move from its current position, close to the lowest tenth percentile of the low- and middle-income country (LMIC) group, to the twenty-fifth percentile of the LMICs.

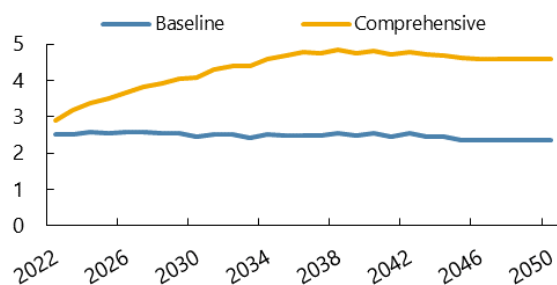
7. The results show that, in the absence of major structural reforms, Kiribati's long-term growth will hover slightly above 2 percent, while well-targeted development policies could push it to 4 percent and significantly reduce poverty (Figure 2). This conclusion is based on a comparison between the baseline and comprehensive reform scenarios. In the latter scenario, the investment rate increases from 15 percent of GDP in 2020 to 20 percent by 2035 and the labor participation increases significantly to 60 percent by 2050, alongside a boost to TFP and human capital. This scenario also allows for slightly higher external debt and FDI to finance some of these policies. In the baseline scenario, on account of generally low inequality and rising per capita GDP, the poverty headcount would fall from 30 percent in 2020 to 20 percent by 2050. However, if the pro-development policies were fully enacted, the poverty rate could fall below 10 percent, and as the inequality falls slightly, income growth would be slightly higher for the bottom 40 percent income group than the top incomes.

8. The scenario outcomes also suggest that higher growth may be easier to achieve through stimulus to private investments. In Kiribati, where a large part of total capital and investment is in the form of public sector capital, an increase in the size and efficiency of private investment will help increase GDP growth and reduce poverty. In addition, an expansion of private sector investment could lead to higher growth with lower cost: Panel 4 in Figure 2, which shows the private investment incremental capital to output ratio (ICOR), suggests that less than 1.4 percentage points of GDP of private investment is needed to increase growth by a percentage point, which is a fraction of the public investment ICORs (while not shown here, public investment ICORs is estimated to be 10.6 percentage points of GDP).

Figure 2. Kiribati: Growth and Poverty Reduction Under Alternative Development Scenarios

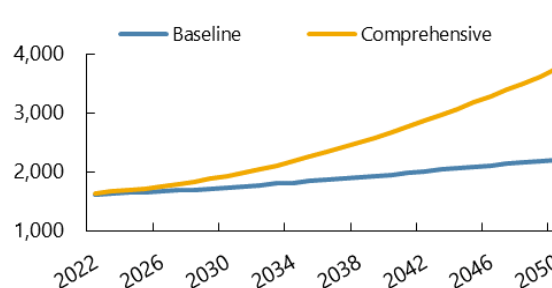
Real GDP growth is boosted in baseline+ and especially in pro-growth development scenario....

1. Real GDP Growth (%)



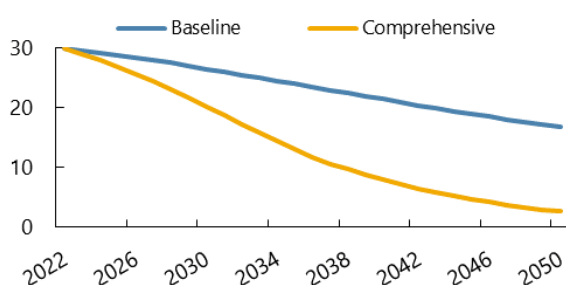
... and per capita GDP expands by between 20% in baseline and 100% in the development scenario

2. Real GDP per Capita (US \$)



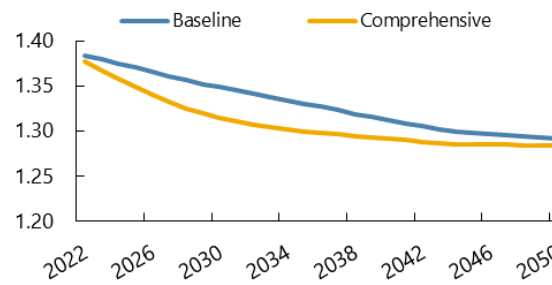
Poverty can fall substantially...

3. Poverty Headcount Rate (%)



... as private sector investment helps boost growth

4. Private Investment Incremental Capital to Output Ratio (%)



Source: IMF Staff Computations.

Notes: Computations based on World Bank's long-term model using parameters specified in Table 1. In panel 4, the private marginal incremental capital to output ratio measures how many extra percentage points of GDP of private investment Kiribati needs in order to increase growth by a percentage point.

9. These findings are in line with past IMF studies that analyze the benefits of structural reforms. IMF (2019) shows that structural reforms in various areas (product and labor market, governance, and trade and financial sector liberalization) can deliver significant output gains over the medium term for low-income and emerging market economies. It also notes differences between model-based analysis and empirical studies, with the former predicting larger output gains, but with notable differences across areas of reform (bigger differences for the financial sector, labor and product market reform, while equal effect for governance reforms). The study builds on an earlier study (IMF, 2015) which finds a broadly positive relationship between structural reforms and productivity and showed that benefits of reform tend to become more pronounced when reforms are bundled together, as done in our analysis.

C. Taking Stock of Recent Structural Reforms in Kiribati

10. Given the importance of structural reforms, the government has undertaken various attempts to revamp the economy through development plans. The Kiribati 20-year vision 2016-2036 outlines the government's ambition of turning the country into "a wealthy, healthy, and peaceful nation" by focusing on 4 pillars: (i) wealth, including natural capital, human capital, and cultural capital; (ii) peace and security; (iii) infrastructure for development; and (iv) governance. The 20-year vision has then been translated into detailed 4-year plans, with the latest one being the Kiribati Development Plan 2020-2023 (Table 1). Under the plan, 6 areas are prioritized and customized into concrete targets with specific numbers. It covers many areas of structural reforms, including education, labor training, health, infrastructure as well as governance, living environment and economic diversification through fisheries and tourism. The plan serves as a useful guidance as Kiribati moves forward with major structural reforms to boost growth.

Table 1. Kiribati: Development Plan, 2020-2023

| A Wealthy, Healthy and Peaceful Nation | | | | | |
|--|---|--|--|--|---|
| 6 Key Priority Areas | | | | | |
| Harnessing human capital | Improving health | Developing economic wealth and poverty reduction | Protecting environment and strengthening resilience | Developing infrastructure | Good governance |
| Area-specific Actions | | | | | |
| Increasing access to education and its quality | Improving health through safe drinking water and basic sanitation | Diversifying the economy through fisheries and tourism | Protecting environment through waste management, population control, and biodiversity conservation | Investing and upgrading roads, runways, buildings and coastal infrastructure | Transforming legal sectors and institutions for a corruption-free society |
| Strengthening TVET to boost labor mobility | Upgrading health care system to addressing national common diseases and child mortality | Fostering private sector | Improving food security and land scarcity | Developing sea and air transportation | Empowering public sector with better accountability and transparency |
| Upgrading skills for government servants | | Strengthening government revenue | | Transforming digital connectivity | Improving service delivery |
| | | Promoting trade and FDI | | Enhancing renewable energy supply | |

* Released in December 2021.

11. One of the main areas of government's attention is human capital development, through education, vocational training, labor mobility, and health.

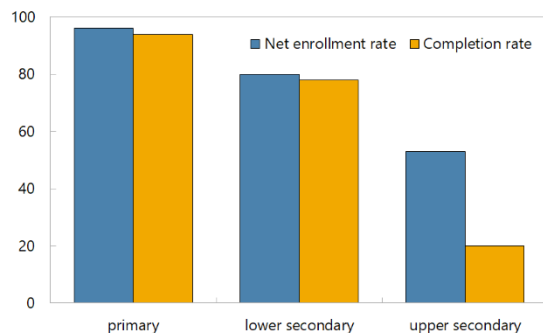
- **Education** has improved significantly following the passage of the Education Act in 2013 and the Early Childhood Care and Education (ECCE) Act in 2017. In 2015, the Employment and Industrial Relations Code was amended to increase the minimum working age and require child employees to be registered to address the issue of high drop-off rate in the secondary education. In 2019, 73 percent of eligible children were enrolled in early care and education, far above the target of 50 percent; while 96 percent of eligible children attended and 94.1 percent completed primary school (Figure 3, upper left panel). Further attention should now be paid to increase the attainments in the secondary (especially upper secondary) education.

Figure 3. Kiribati: The Need for Reforms in Labor, Capital and Infrastructure Markets

Primary education attainment is high, but secondary is low

Net Enrollment and Completion Rates by Education Level

(Percent, 2019)

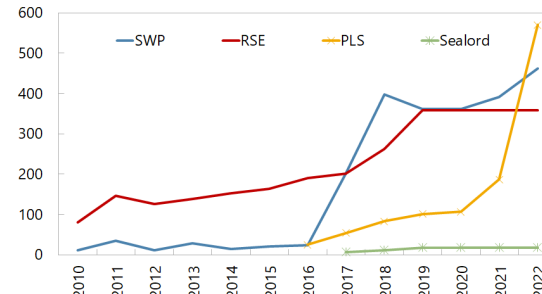


Source: UNICEF.

International labor mobility schemes have gained in popularity

Number of Oversea Workers

(Persons)



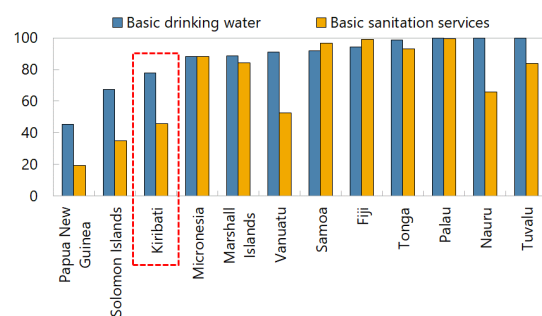
Source: Kiribati Ministry of Employment and Human Resources.

Note: Pacific Labor Scheme (PLS) and Seasonal Worker Program (SWP) are with Australia; Recognized Seasonal Employer (RSE) and Sealord are with New Zealand.

Access to water and sanitation can be improved

Access to Drinking Water and Sanitation

(Percent of population, 2020 or latest available data)

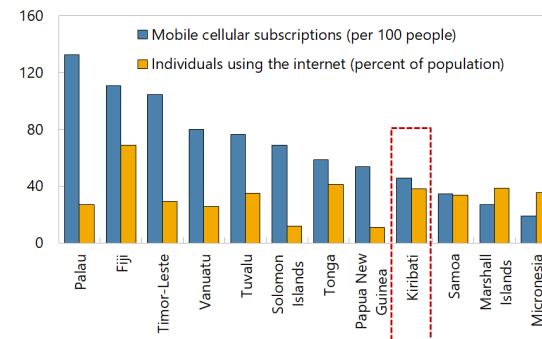


Sources: World Development Indicators; and IMF staff calculations.

...and ICT penetration remains very low in Kiribati

Internet Usage

(2020 or latest available data)



Source: World Development Indicators.

- Vocational training:** As the drop-off rate is a prominent issue in upper secondary education, technical and vocational education and training (TVET) provides school dropouts with continuing education and gives them necessary skills for future employment. TVET also trains workers for overseas employment, which is crucial for Kiribati, given its limited domestic job creation capacity.
- Labor mobility** serves as an important channel to alleviate domestic employment pressures amid limited job opportunities at home. The government currently has 4 labor schemes, all with Australia and New Zealand (Figure 3, upper right panel), and is actively working at increasing the size of existing schemes and negotiating new schemes with other countries. The Ministry of Employment and Human Resources (MEHR) set ambitious targets of sending 1,500 and 1,000 seasonal workers to Australia and New Zealand, respectively, in 2023, a significant increase in numbers compared to 1,032 and 376 workers, respectively, in 2022.
- Health:** Communicable diseases and other national health issues such as diabetes and high child mortality are important issues to be tackled under the agenda of the current KDP (2020-2023). The

government also vowed to improve access to quality healthcare and improve living conditions through proper waste management and pollution control.

12. Great efforts have also been taken to improve infrastructure, including transportation, water and sanitation, energy supply, and information and communication technologies (ICT).

More specifically:

- **Transportation** is underdeveloped due to high remoteness, fragility to climate change, and the resulted high cost of construction, maintenance, and service delivery. Roads in South Tarawa are deteriorating rapidly due to heavy usage, prolonged wet weather, and poor maintenance. Sea transportation also remains underdeveloped due to insufficient infrastructure and technical challenges, such as a lack of aid to navigation or ship-to-shore berthing infrastructure. Over the past few years, many infrastructure investment projects on transportation, including land, sea, and air transportation have been carried out to tackle the issues, with grants or concessional loans from international aid organizations and foreign governments (Appendix Table 2).
- **Water and sanitation:** The current poor access to water and sanitation services compared to other Pacific Island countries (Figure 3, lower left panel) is expected to come under further pressure from climate change as water lenses' yields and salinity are highly vulnerable to droughts or flooding events. The KDP 2020–2023 puts strict goals in place to raise the access to safe drinking water and good basic sanitation as well as to increase the number of desalination and distillation plants and installed water pumps by 80 percent. Projects, including the South Tarawa Water Supply Project, financed by the World Bank, the Asian Development Bank, and other donors are key to help accomplish the government's targets (Appendix Table 2).
- **Energy:** The government had sought out renewable energy to reduce the risk of external over-reliance and to support sustainable and green growth. In 2012, the Kiribati Grid Connected Solar Photovoltaic (PV) project was carried out to install solar PV systems, connecting to the main grid in South Tarawa. The project, finished in 2018, has increased both the capacity of electricity generation as well as the share of renewable energy in total electricity supply in South Tarawa from non-existence to 9 percent. Furthermore, another project, the 2021–2024 South Tarawa Renewable Energy Project (STREP), is expected to raise the renewable energy grid penetration to 44 percent by 2024.
- **ICT:** Access to ICT in Kiribati is limited, even compared to other countries in the region (Figure 3, lower right panel). To rejuvenate the system, the Communications Act was passed in 2013, paving the way for entry of two private companies and significantly increased the number of mobile subscribers and internet users as well as upgrading the network quality (from 2G to 4G in urban area and 3G in outer islands). Furthermore, the on-going Pacific Regional Connectivity Program Project will install submarine cables and connect Tarawa and Kiritimati Island to the global cable network as well as upgrade the internet services in the outer islands through a combination of microwave and satellite systems.² When completed, the project will triple the number of people with access to

² The cable in Kiritimati Islands has been landed in 2022 and is ready for connection installation.

internet in Kiribati, reduce retail prices by 80 percent, and increase the available bandwidth by 6 times (WB, 2022a).

13. Along with human and infrastructure capital, productivity enhancement reforms are continued to be implemented. One effort of the government is to reduce the footprint of state-owned enterprises (SOEs) in the economy, with a big merger and privatization of SOEs operating in the copra industry, telecoms, and hotel industries, reducing the number of SOEs from initially twenty-five to sixteen in 2016.³ At the same time, a number of bills improving the business climate and strengthening the financial sector were enacted recently, such as the 2019 Company Act, the 2021 Financial Supervisory Authority of Kiribati Act, and the 2021 Kiribati Financial Institutions Act. Fiscal reporting system is also expected to be improved by the publication of the Fiscal Reporting Policy, including procurement reports. After the Leaders Code of Conduct Act was passed in 2016, the Leader Commission was established in 2018 to fight corruption. Furthermore, the establishment of the Outer Islands Development Fund could potentially give a boost to economic opportunities in the outer islands. These reforms, accompanied with anticipated reforms in access to credit and land, are expected to help diversify the economy, boost productivity and provide employment for citizens.

D. Policy Recommendations and Conclusion

14. A full execution of the 2020–2023 KDP could help attain the stylized growth and development outcomes laid out in Section B. Specifically, the stock-taking in section C has found that the KDP pays attention to the various elements that feature in the long-term growth model: (i) human capital development, (ii) infrastructure development, and (iii) boosting productivity through better governance and business climate. Some elements that require further analysis pertain to gender equality and the role of the official development assistance (ODA) (in our model, captured by FDI). Although the model's growth and poverty reduction outcomes are only indicative, they suggest that an integrative policy could enhance Kiribati's potential GDP growth rate, while also reducing poverty. Going forward, the government should continue to invest in infrastructure capital, especially with a focus on basic infrastructure needs such as electricity, water, and internet. This investment not only leads to higher living standard for population, but also supports the development of the private sector. Investment in human capital through education and vocational training also needs to be enhanced, especially English language skills (critical for labor abroad schemes and in ICT) and improving working skills.

15. However, Kiribati's development outcomes may face severe constraints on both horizontal and vertical diversification levels (Figure 4). Horizontal diversification means diversifying into sectors with new opportunities; while vertical diversification is upgrading quality within the existing sectors. IMF (2014) found that increases in income per capita in low-income countries (LICs) are typically accompanied by a transformation in a country's production and export structure—through diversification into new products and trading partners as well as increases in the quality of existing products. However, Kiribati's economy is dependent on a narrow range of

³ As of January 2023, Kiribati has 18 SOEs, including 3 newly established SOEs.

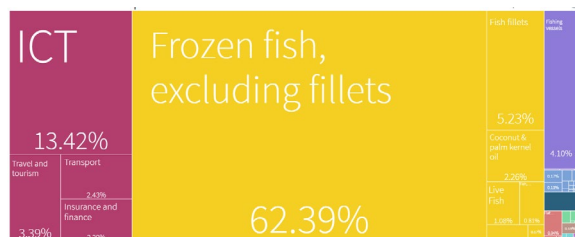
products, mainly tuna fishery and copra, and a small number of export markets—an obstacle to its development. On top of that, capacity constraints and significant delays in some of the ongoing projects due to COVID-19 further complicate Kiribati’s development and growth path.

16. To be successful, Kiribati will need to create opportunities for both horizontal and vertical diversification. Despite the difficulties—notably its remote location from potential export markets, a lack of natural resources (mainly fishing and copra), steep learning curves and competition (e.g., in tourism), and infrastructural constraints (slow internet connectivity for ICT services, a small population and a shortage of skilled workers), opportunities exist. Some options, outlined in the past IMF Article IV staff reports, include upgrading copra production (to higher value-added products), expanding tuna processing (processing and packaging tuna, instead of just selling tuna catch in foreign markets), and expanding the ICT and tourism sectors. Opportunities may also exist in niche agriculture (e.g., fruit commodities for snack foods and juices). Some industries, such as deep-sea mining—seeking to retrieve high-value polymetallic nodules from the seabed for use in energy transition projects—are promising but require in-depth cost-benefit analysis to assess the economic benefits versus the environmental costs from pollution, destruction of fishery habitats, loss of species, and noise pollution, among other things. Most of all, upgrading basic infrastructure such as transportation, electricity, water, and internet will be crucial to facilitate improvement in economic activities and diversification.

Figure 4. Kiribati: Economic Diversification

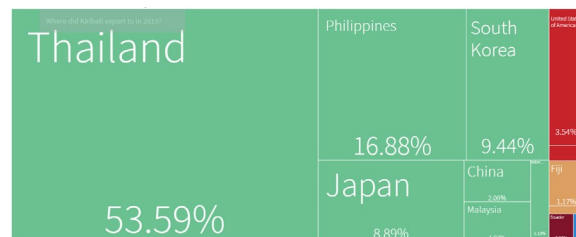
Kiribati’s exports are mainly in fisheries...

1. Kiribati 2019 Export Structure (in %)



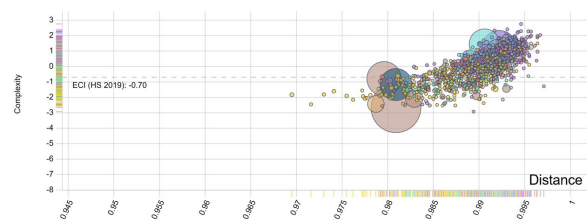
... and exports are concentrated in East Asia

2. Main Export Destinations in 2019



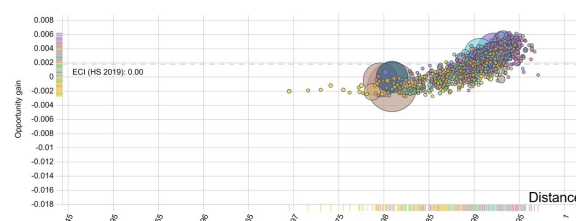
Kiribati’s exports diversification options are limited amid a high distance from existing capabilities ...

3. Complexity and Distance to Capabilities



... with limited scope for opportunity gains

4. Opportunity Gains and Distance to Capability



Source: IMF Staff calculation based on UN Comtrade, Harvard Growth Lab.

Notes: In panel 3, lower distance to existing capabilities (close to 0) signifies a product is “nearby” to existing knowhow. More complex products tend to support higher wages. In panel 4, larger opportunity gain for future diversification (higher values) holds more linkages to other high-complexity products, opening more opportunities for continued diversification. Research finds that countries tend to diversify by moving into nearby and related products or into those that require similar knowhow to build on existing capabilities.

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Appendix I. Model Input Parameters for Long-Term Growth Calculations, (2021-2050)

Table 1. Kiribati: Model Input Parameters for Long-Term Growth Calculations, (2021-2050)

| Model Type Inputs | Baseline (No change) | Comprehensive Development |
|--|-----------------------|---------------------------|
| Model Description | | |
| <p>The model uses a Cobb-Douglas production function $Y=AK^{\alpha H}(HL)^{1-\alpha}$, where Y denotes real GDP, A technology, K capital stock, L work force, H human capital and α capital-output elasticity (or capital income share), and an equation for capital accumulation $K_{t+1}=K_t(1-\delta)+I_t$, where I_t denotes investment and δ is the rate of capital stock depreciation. This yields an equation of long-term growth, which can be expanded to include demographic factors, so that</p> $g_y \approx g_A + (1 - \alpha)(g_h + g_\omega + g_N + g_p) + (\alpha / K/Y) I/Y - \alpha \delta$ <p>This equation implies that GDP growth (g_y) is the (weighted) sum of total factor productivity (g_A), human capital (g_h), demographic factors (output per worker or labor productivity (g_ω) and growth in working age to population ratio (g_N), labor market participation (g_p), the marginal productivity of capital ($\alpha / K/Y$) and the investment rate (I/Y), while controlling for the rate of capital depreciation (δ).</p> <p>The table below summarizes values for the model's parameters under different scenarios. When Kiribati data are not available, input values are selected as the lower tenth percentile of the World Bank's low and middle-income country (LMIC) group (comprising 52 countries) in the baseline scenario. Where appropriate, the comprehensive development scenario foresees a growth of Kiribati's input factors to achieve the twenty-fifth LMIC percentile within a given horizon.</p> | | |
| General Model | | |
| Capital-output ratio | 2.4 | 2.4 |
| Depreciation rate | 4.2% | 4.2% |
| Labor share | 39.7% | 39.7% |
| Human capital growth | 0.75%, 1% by 2035 | 1.50% by 2035 |
| Labor market participation | 45% | 60% |
| Male | 50% | 65% by 2050 |
| Female | 40% | 55% by 2050 |
| External Debt/GDP | 21% | 25% by 2035 |
| Net FDI/GDP | 0.33% | 2.8% by 2040 |
| Population growth | 1.30% - 1.18% (2050) | same |
| Working age to population | 60.3% - 63.5% (2050) | same |
| Poverty rate (headcount) | 30% | 30% |
| Threshold | National poverty line | same |
| Gini coefficient | 0.39 | 0.37 by 2035 |
| Investment/GDP ratio | 15% | 20% by 2035 |
| Initial GDP per capita (2019) | US\$ 1,615 | |
| Total Factor Productivity | -0.25% - 0% by 2050 | -0.25% - 0.21% by 2050 |
| Public vs Private Investments | | |
| Public investment share | 75% | 75% |
| Public investment ratio | 11.25% | 15% by 2050 |
| Public capital-output ratio | 1.8 | 1.8 |
| Public depreciation rate | 4% | 4% |
| Private investment ratio | 3.75% | 5% by 2035 |
| Private depreciation rate | 4.8% | 4.8% |
| Private capital-output ratio | 0.6 | 0.6 |
| Elasticity output to public capital | 0.10 (low) | 0.17 (default) |
| Efficiency of new public capital | 60% | 70% by 2050 |
| <p>Note: For total factor productivity, an alternative specification (using inputs on innovation, education, efficiency, infrastructure, and institutions) is experimented. TFP growth would be slightly higher under the baseline, based on paths from peers in the region and elsewhere, but similar under the development scenario.</p> | | |

Table 1. Kiribati: Major Infrastructure Projects Implemented

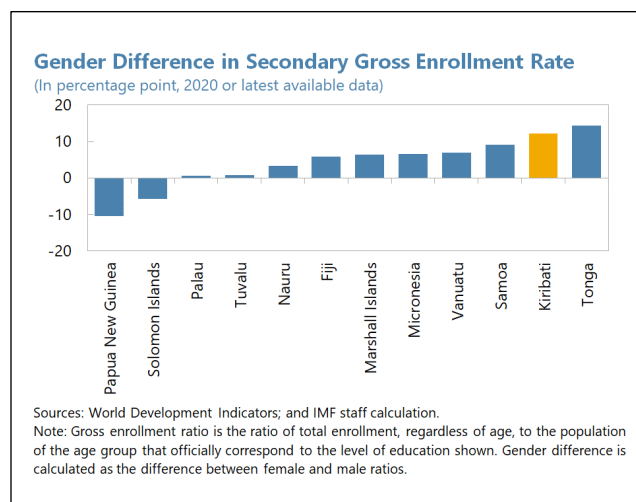
| Project | Content | Sponsor ^{1/} | Amount | Period |
|---|---|--|---|--------------------|
| Land transportation | | | | |
| South Tarawa Road Rehabilitation | To rehabilitate 33 km of roads and 33km pipeline for drainage resolution in South Tarawa. | WB, ADB and Australia | 33.7 million USD | 2011-15 |
| Reconstruction of Nippon Causeway | To rebuild the most congested causeway in South Tarawa connecting Beito and Bairiki. | JICA | 3.8 billion JPY | 2016-19 |
| Sea and air transportation | | | | |
| Kiribati Aviation Investment Project | To provide infrastructure investment, technical assistance training on airport operation and management capacity in the two international airport. | WB and Australia | 14.3 million USD | 2012-19 |
| Repair and Upgrade Bonriki International Airport Project | To upgrade infrastructure in Bonriki Airport. | Taiwan Province of China | 14.7 million USD | 2016-19 |
| Betio Port Expansion Project | To expand Betio Port for better access and lower cost. | Japan | | 2011-15 |
| <i>Kiribati Outer Islands Transport Infrastructure Investment Project</i> | To promote safe maritime transport through climate-resilient hydrographic surveys, nautical charts, aid to navigation, and other maritime infrastructure. | WB and ADB | 42 million USD | 2020-26 |
| Water and sanitation | | | | |
| Kiribati Water and Sanitation in Outer Islands (KIRIWATSAN) | To increase access to safe and sustainable water and sanitation and reduce water, sanitation and hygiene (WASH)-related diseases in at least 70 of 139 villages in 16 islands of the Gilbert group. | European Union | Phase I: 3.4 million EUR Phase II: 3.2 million EUR | 2011-18 |
| South Tarawa Sanitation Improvement Sector Project | To rehabilitate the South Tarawa's saltwater and sewage systems in Bairiki, Betio, and Bikenibeu. | ADB, Australia, Multi-Donor Trust Fund ^{2/} , GoK | 26.1 million USD | 2012-19 |
| <i>South Tarawa Sanitation Project</i> | To increase access to standard sanitation facilities in 7 villages in South Tarawa. | WB | 20 million USD | 2022-28 |
| <i>South Tarawa Water Supply Project</i> | To construct a desalination plant using green energy from the newly installed solar photovoltaic system. | WB, ADB, Green Climate Fund, GoK | 61.8 million USD | 2020-27 |
| Energy | | | | |
| Grid Connected Solar Photovoltaic (PV) Project | To install grid connected solar PV in South Tarawa to reduce Kiribati's dependence on imported petroleum for power generation. | Global Environment Facility, Australia | 3.9 million USD | 2012-18 |
| <i>South Tarawa Renewable Energy Project (STREP)</i> | To construct solar PV generation and a battery energy storage system in South Tarawa, raising renewable energy grid penetration from 9 percent (2018) to 44 percent. | ADB, New Zealand, Strategic Climate Fund, GoK | 14.7 million USD | 2021-24 |
| <i>Promoting Outer Island Development through the Integrated Energy Roadmap (POIDIER)</i> | To enhance outer island development in renewable energy and energy efficiency by addressing capacity gaps through training and outreach, installation of high-quality solar grid system, and the introduction of a revenue-billing system to facilitate financial sustainability. | Global Environment Facility | 5.4 million USD | 2021-24 |
| ICT | | | | |
| Kiribati Telecommunication and ICT Development Project | To support the restructure of Telecom Services Kiribati Limited and other technical assistance on policy, strategy and legal framework for new ICT infrastructure and regulation. | WB, Australia, New Zealand | 5.1 million USD | 2012-17 |
| <i>Pacific Regional Connectivity Program Project</i> | To construct submarine cables connecting Tarawa and Kiritimati Island to the global submarine cable network, while upgrading the internet in the outer islands through a combination of microwave and satellites. | WB | 20 million USD | 2017-22 (extended) |
| Sources: ADB (2010, 2016, 2019, 2020), and WB (2020a, 2022b). | | | | |
| 1/Abbreviation of donor names: World Bank (WB), Asian Development Bank (ADB), Japan International Cooperation Agency (JICA), and government of Kiribati (GoK). On-going projects are in <i>italic</i> . | | | | |
| 2/Financing partners: the governments of Australia, Austria, Norway, Spain, and Switzerland. | | | | |

GENDER EQUALITY IN KIRIBATI: ACHIEVEMENTS AND PROSPECTS¹

Kiribati has made significant progress in promoting gender equality in many aspects including in health indicators and access to education. However, gender inequalities in labor force participation, living standards, and legal equity persist. This paper illustrates how improvement in gender equality, including female legal equity, could help support growth. Policies to address gender gaps could include strengthening gender equality in the legal framework, introducing gender budgeting and fiscal policy reforms, and developing gender-disaggregated data collection for better monitoring.

A. Context

1. In Kiribati, females fare better compared to their male peers in several human development indicators. Health outcomes are significantly better for females where they have much lower child mortality rates and are expected to live longer than men by about 8 years (Table 1). A similar picture could be observed in education attainment. While females and males have equal net enrollment rate at the primary school level, net enrollment rates of females are significantly higher than those of males in both lower and upper secondary schools. This phenomenon of higher education for females (in terms of secondary gross enrollment rate) is found to be similar in most Pacific Islands countries (text chart). Females also have better education outcomes, as shown by their lower share in reading or writing difficulty compared to their male peers.²



¹ Prepared by Lisa Kolovich (SPR) and Anh Thi Ngoc Nguyen (APD).

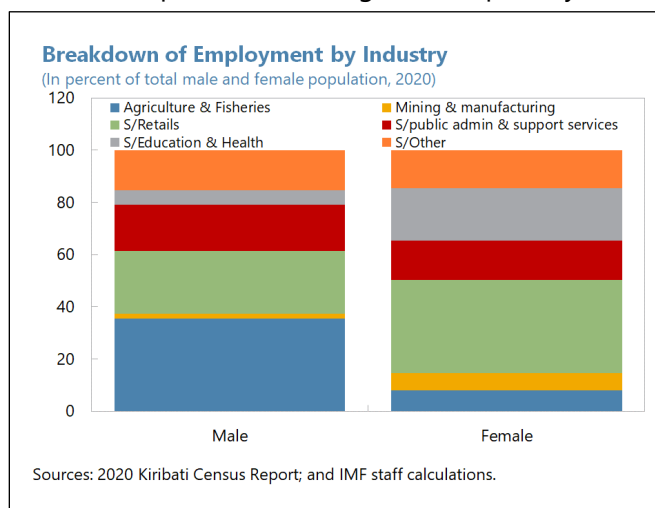
² While efforts to improve attendance rate in higher education are necessary for both genders, male education needs to be better promoted. This could partially be done by eradicating the worst forms of child labor for boys, as it is estimated that 8.6 percent of boys aged 5-17 years old engaged in child labor in 2019, higher than a 5.5 percent of girls (ADB, 2021). In 2015, the government tackled the issue by amending the Employment and Industrial Relations Code with an increase the minimum working age, the abandon of worst forms of child labor, and requirements to register child employees.

Table 1. Kiribati: Selected Indicator on Gender Equality

| Indicators (percent if not indicated) | Male | Female |
|--|-------|--------|
| Education | | |
| Adjusted net enrollment rate, primary | 96 | 95 |
| Adjusted net enrollment rate, lower secondary | 77 | 82 |
| Adjusted net enrollment rate, upper secondary | 48 | 57 |
| Difficulty in writing (% of population 12+) | 18.9 | 15.9 |
| Difficulty in reading (% of population 12+) | 18.7 | 15.9 |
| Health | | |
| Life expectancy at birth (years) | 64.3 | 72.3 |
| Mortality rate, under 5 (per 1,000 live births, child) | 53.9 | 45.0 |
| Labor | | |
| Labor force participation rate | 54.4 | 40.5 |
| Formality rate | 41.4 | 49.3 |
| Unemployment rate | 10.5 | 12.4 |
| Proportion in Managerial Position | 62.8 | 37.2 |
| Proportion in National Parliament | 93.5 | 6.5 |
| Living standard* | | |
| Average annual per capita income (AUD) | 3,627 | 1,881 |
| Average annual per capita expenditure (AUD) | 3,095 | 1,652 |

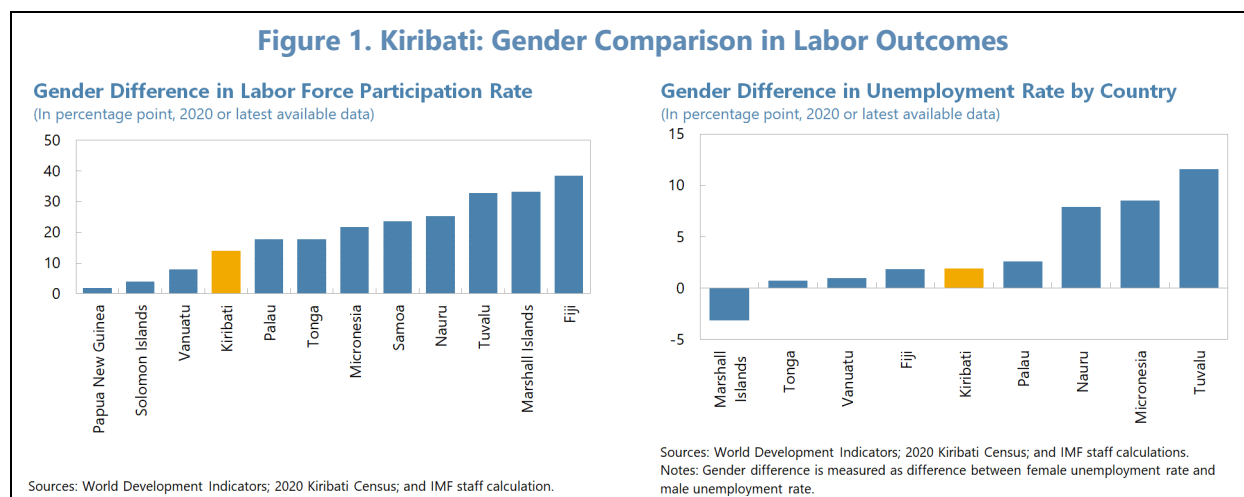
Sources: World Development Indicators; 2020 Kiribati Census Report; 2019 Kiribati Household and Income Survey; and IMF staff calculations.
* All indicators of living standard are calculated for male- and female-head households using household data.

2. Despite the higher educational enrollment rates, females have lower labor force participation rate and face higher risks of unemployment. Women in Kiribati account for a disproportionate share of unpaid work. They are found to spend three to eight hours per day for domestic work compared to the “infrequent” assistance role of men in doing housework (Caulfield, 2018). Greater time spent on domestic work could partially explain why the labor force participation rate for females is approximately 14 percentage points (ppts) lower than that of males.³ The difference, however, is smaller than most of other countries in the region (Figure 1, left panel). According to the 2020 Kiribati Census Report, the female unemployment rate in 2020 was about 2 ppts higher than the male rate, although this gender gap is at lower end in the Pacific Islands region (Figure 1, right panel). Gender differences in types of employment by sector exist as well, with more women than men working in public services sectors such as administrative, education, and health while men mostly engage in fisheries and agriculture (text



³ Low female labor force participation rate could also result from barriers in terms of parenthood and access to credit and property (see Section C for more details).

chart).⁴ Women are under-represented in managerial positions, holding only 37.2 percent of these positions in 2020. Similarly, women held only 6.5 percent of seats in the National Parliament in 2020. The numbers make Kiribati rank fourth and sixth respectively on share of women holding managerial positions and seats in the Parliament out of 11 countries in the Pacific (ADB, 2021).



3. Women in Kiribati are more vulnerable to poverty than men, which could have been further worsened by COVID-19. According to the 2019–2020 Kiribati Household Income and Expenditure Survey (KNSO 2021), female-head households earned just half of what male-head households earned in terms of average per capita income (Table 1). As a result, male-head households have higher per capita expenditure and higher savings—57 percent and 13 percent higher in terms of annual expenditure per capita and total savings, respectively—than female-head households. It is also reported that one in four female-head households is in the poorest quintile in South Tarawa and the rural Gilbert Islands (AusAID, 2012). The situation is expected to have been worsened during COVID-19 as the pandemic affected women disproportionately. Female labor could have been possibly adversely affected as a large proportion of women are working in the service sector, especially in retail sales (Figure 1, right panel).⁵ In addition, female-owned/led businesses were more negatively affected than male-owned businesses during the pandemic. According to Pacific Trade Investment (2020), 71 percent of female-owned businesses reported having experienced a very negative effect (compared to 57 percent of male-owned businesses) and 41 percent had to be temporarily closed (compared to 29 percent of male-owned businesses).

⁴ A high concentration of male labor in agriculture and fisheries could be a result of both the nature of fishery work which requires physical strength with (to a less extent) lower education levels. This gender distribution in sectors also explains why female have slightly higher formal rate than male. However, higher formality among women does not necessarily lead to higher income (Table 1) as fisheries also include a small proportion of high-earning seafaring jobs which is dominated by men (MWYSSA, 2018). More data on income by gender is required for better understanding and assessment.

⁵ While there is no data on the impact of COVID-19 on female labor force participation in Kiribati due to limited data capacity, similar incidences were seen in other countries including both advanced and emerging markets (Bluedorn et. al, 2021).

B. Impact of Gender Equality on Growth

4. **This section conducts a growth decomposition exercise to provide illustrative insights into the impact that gender inequality in Kiribati has on growth compared to peer countries.**

It follows the approach in Hakura et al. (2016) who use a growth regression that controls for the impact of initial income, investment, education, infrastructure, terms of trade, institutional quality, population, and inflation. The variables are as follows: initial income per capita is measured as the log of GDP per capita in the first year of each five year period; investment is measured using fixed capital formation as a percentage of GDP; education is defined as the total average years of schooling; infrastructure is measured based on an index of mobile phones, internet per 100 people, access to water and electricity, and total air transportation per year; terms of trade is defined as the ratio between export prices and import prices; institutional quality is from the International Country Risk Guide index, which captures the quality of political institutions in a country; population is the rate of dependent population growth; and inflation is measured by a dummy capturing periods of average inflation of 15 percent and above. Each of the variables is constructed as the five-year average except for the initial income per capita variable.

5. **The analysis also includes indices on gender inequality (Box 1), legal institutions, and a measure of income inequality.** Legal institutions are measured using an index based on the dataset from the World Bank Women, Business, and the Law. Values range from 0 to 6 and reflect the sum of six dummy variables, with higher values indicating higher legal rights for women: 1) unmarried women have equal property rights for immovable property; 2) married women have equal inheritance rights; 3) joint titling of property is default for married couples; 4) married women can get a job or pursue a profession; 5) adult married woman can open a bank account; and 6) married woman can sign contracts (without permission from another family member).⁶ Income inequality is captured by the ratio of income held by the richest 20 percent of the population relative to the poorest 40 percent.

⁶ The female legal equity index represents gender inequality in terms of legal framework, while the gender inequality index represents gender inequality in terms of health, education, and economic empowerment.

Box 1. Construction of Gender Inequality Index (GII) for Kiribati

The Gender Inequality Index (GII), published by the United Nations Development Program (UNDP), provides a measure of inequality across countries using indicators on reproductive health, labor market, and women's empowerment variables. The index ranges from 0 to 1, with higher values indicating higher gender inequality. Five representative indicators of the three aspects are used in the index's calculation: (i) maternal mortality ratio, (ii) adolescent birth rates, (iii) proportion of parliamentary seats occupied by females, (iv) female and male labor market participation rates, and (v) proportion of adult females and males aged 25 years and older with at least some secondary education.

In the latest publication (2020), the GII was unavailable for Kiribati due to missing information for indicators (iv) and (v). The data gap is common among Pacific Island countries, where only four countries—Fiji, Samoa, Tonga, and Papua New Guinea—had the indices published. Our attempt is to fill in the missing indicators for Kiribati, either by locating other alternative sources of information and/or calculating approximations to calculate the index.

Labor force participation rates (indicator iv) was augmented by using data from the 2020 Kiribati Census published in November 2021. The UNDP usually uses the data from International Labor Organization which does not have data on Kiribati.

Estimates for the education indicators (indicator v) proved to be more complicated, as there is no available education data for the defined population of aged 25 years and older. However, the 2019 Household Income and Expenditure Survey (HIES) provides useful information for approximating the numbers.

- **Percentage of population having at least some secondary education:** According to the survey, 86.2 percent of the population aged 18 and older had attended secondary school. Given the recent efforts to revamp education enrollment by the government and its positive impact on schooling for younger ages (population aged 18-24 accounts for a quarter of total population aged 18+), excluding these young cohorts from the adult population will likely lower the respective proportion in the remaining (aged 25+) population. The analysis therefore assumes that the proportion of the population aged 25 and older having at least some secondary education could range between 70 percent to 80 percent.
- **Gender disparity in education:** As shown in Table 1, girls at the age of secondary school have 5 ppts higher secondary enrollment rates than boys. The HIES 2019 survey also shows that the proportion of those having attended secondary school was 63.3 percent for men and 66.8 percent for women. Based on the numbers, it assumes that the differences between men and women could range between 3-5 ppts for the subjected indicators.

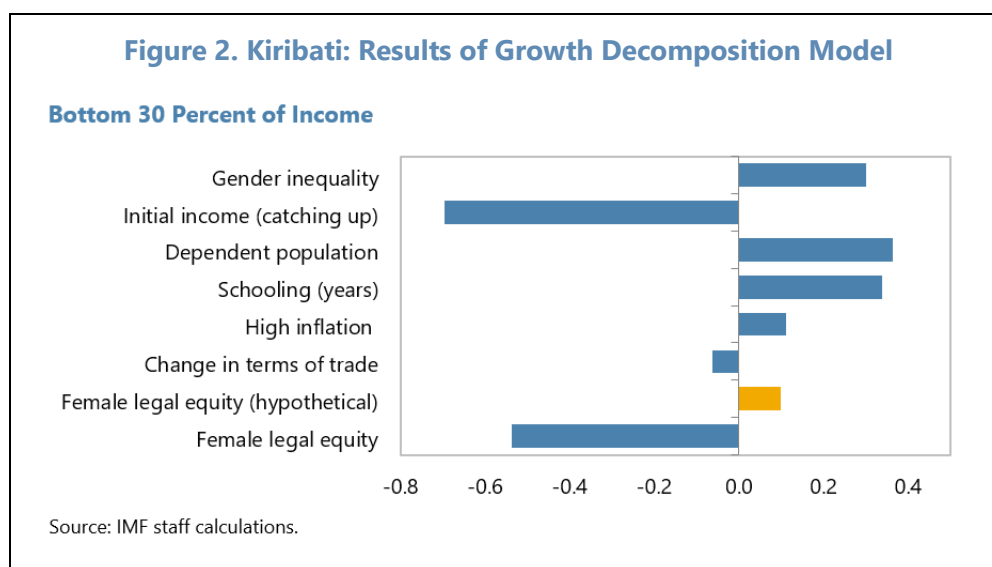
With the aforementioned information, six scenarios are assessed, with the proportion of male with at least some secondary education assumed to be 60 percent, 70 percent, and 80 percent, and those of female being 3-5 ppts higher than male for each scenario. The calculated GII ranged from 0.3919 to 0.3931. The marginal changes of GII allow the stability of the estimated results of the growth decomposition exercise among different scenarios. The calculated GII is also more or less at the same level with other PICs countries. Compared to four PICs countries having the index available, Kiribati's index was slightly higher (i.e., lower gender equality) than those of Fiji (0.37), Samoa (0.36), and Tonga (0.35) but significantly lower (i.e. higher gender equality) than that of Papua New Guinea (0.725).

6. The regression sample consists of 115 low-income and developing countries, emerging markets, and advanced economies covering the period 1995 to 2014. The following equation is estimated:

$$y_i = \beta_1 + \beta_{2,i}X_i + \varepsilon_t$$

in which y_i is the GDP per capita growth, X_i captures the aforementioned explanatory variables, and ε_t is the error term. A robust two-step GMM methodology could control for endogeneity issues.⁷ The estimation uses the coefficients from this regression to decompose the differences in average real GDP per capita growth rates in Kiribati and a benchmark group of countries in the bottom 30 percent of the global income distribution based on data from 2010 through 2018.

7. The results from this exercise help illustrate the potential GDP growth losses from Kiribati's higher level of legal barriers than those found in the peer group (Figure 2).⁸ The figure shows that Kiribati's relatively higher level of schooling and their overall lower level of gender inequality are positively associated with GDP growth. However, the level of female legal equity had a negative impact on the country's growth relative to the peer countries.



8. The better-than-average GII in Kiribati however masks a significant heterogeneity among its sub-components (text chart). A comparison of the sub-components of the GII that Kiribati has actual data reveals that Kiribati fares far better than peers in the health indicators, with both maternal mortality ratio and adolescent birth rate much lower in Kiribati than those of the benchmark group. Meanwhile, women empowerment is relatively weak in Kiribati with lower parliament seats held by women and lower female labor force participation rate. Thus, while the

⁷ A common issue with growth regressions is endogeneity. Instrumental variable techniques can be challenging due to the difficulty in finding acceptable instruments; that is, variables that are uncorrelated with the error term but partially and sufficiently associated with GDP growth. The GMM method is used for this analysis to address endogeneity issues.

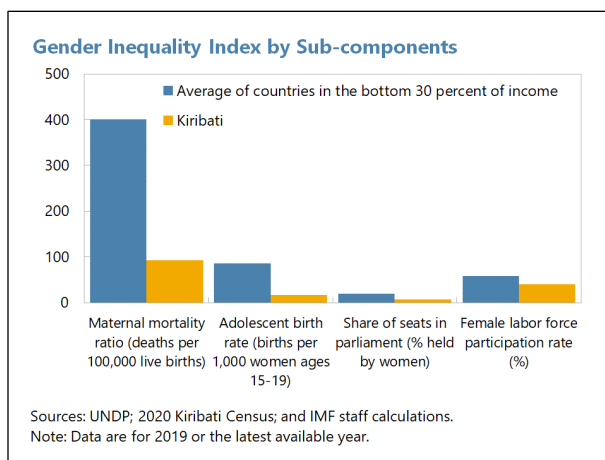
⁸ Note that Figure 2 only includes variables for which data are available for Kiribati.

results indicate a positive contribution of gender equality to growth in Kiribati compared to peers, there are areas that still have room for improvement.

9. A counter-factual growth decomposition exercise is conducted to capture the potential impact of these more recent legal reforms.

Since the end of the sample period, Kiribati has introduced legal reforms to enhance women’s economic participation. For example, the World Bank

Women, Business, and the Law (WBL) report (WB, 2022) highlights how, in 2018, Kiribati eliminated all restrictions on women’s employment, including previous restrictions on women working at night and in the mining sector. The growth decomposition exercise described in the preceding paragraphs would not fully capture the impact of these legal reforms for two reasons. First, the reforms took place towards the end of our sample period (2018).⁹ Second, it usually takes time for legal reforms to have an impact on gender-related outcomes. However, as Christopherson et al. (2022) note, laws can influence and change moral and cultural beliefs and produce positive outcomes in gender equality. Therefore, the analysis applies a counter-factual growth decomposition exercise by taking the average of the legal rights index for the six benchmark group countries closest in ranking to Kiribati in 2021 (three countries higher than Kiribati and three countries lower). This allows us to illustrate what impact legal reforms could have had on growth in Kiribati had they been completed during the last time period of our regression (yellow bar in Figure 2).¹⁰



C. Policies: Progress in the Past and Options for the Future

10. Kiribati has introduced several reforms to promote gender equality. In its National Policy for Gender Equality and Women’s Development (GEWD) 2019–2022, the government aimed to build a country where “all Kiribati men and women reach their full potential.” Five areas of policy were prioritized: (i) implementing gender mainstreaming,¹¹ (ii) improving economic empowerment of women, (iii) supporting stronger and informed families, (iv) improving women’s leadership, and (v) eliminating gender-based violence. In 2015, the Employment and Industrial Relations Code was amended to address gender harassment at workplace, promote equal pay for equal work, and introduce maternity leave which was one of the major advances on gender equality. Additionally, the Family Peace Act and its Implementation Plan (2014) and the Eliminating Sexual and Gender Based Violence (ESGBV) Policy 2011–2021 were also adopted to tackle the prevalent domestic violence in the country. These efforts have resulted in steady improvement of Kiribati’s performance of gender

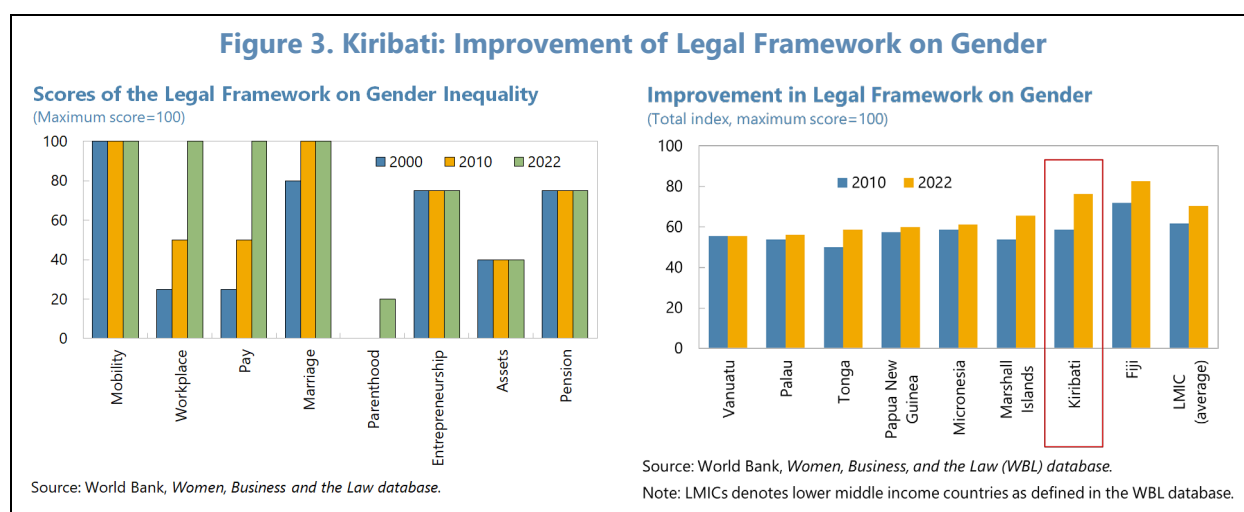
⁹ Prior to the reforms, Kiribati ranked in the bottom half of the middle of low- to lower-middle income countries on the WBL index in 2010. By 2021 though, the country had moved up to the top third of this group.

¹⁰ This counterfactual example assumes that no other countries in the benchmark group have introduced legal reforms that could have a positive impact of gender equality.

¹¹ Gender mainstreaming is the process of integrating a gender perspective into all government policies, programs and activities.

equality in terms of the legal framework, marking significant advance of Kiribati compared to other Pacific Islands as well as the lower middle-income group in average in this area (Figure 3).

11. However, opportunities for additional reforms remain. For example, in the WBL dataset, Kiribati receives a low score on the measure of Parenthood. This is driven by the fact that the country does not guarantee paid paternity or parental leave, the length of maternity leave is shorter than the recommended 14 weeks (it is currently 84 days), and it does not administer maternity leave benefits. The legal framework also does not grant spouses equal administrative authorities over assets during marriage. Many women also currently do not have the same ownership rights to immovable property (lands, etc.) as men,¹² and the legal framework does not ban gender discrimination in access to credit. Going forward, the country could consider options for introducing paternity or parental leave and addressing gender discrimination in access to credit/assets, as reforms in these areas could increase women’s ability and motivation to work and further support gender equality and women’s economic empowerment.



12. In addition, gender budgeting (GB) could help promote gender equality. Gender budgeting allows fiscal authorities to ensure that revenue and spending policies and public financial management instruments address gender inequality and the advancement of women in areas such as education, health, and economic empowerment (Budlender and Hewitt, 2003; Budlender and Sharp, 1998; Elson, 2003; Stotsky, 2006 and 2016; IMF, 2017 and 2020; Kolovich, 2018). By understanding the impact of policies and budget proposals—both intended and unintended—on gender equality, governments could use gender budgeting to help design fiscal policies and implement more effective budgets to support gender equality. For instance, gender impact assessments of investment projects and budget proposals could be conducted to facilitate budgetary decisions, alongside with tracking these budget allocations through its execution. In the case of Kiribati, one initial areas of focus could be investment in infrastructure (e.g., access to

¹² Some native land codes grant the right of inheriting a larger proportion of inherited lands to sons over daughters, regardless the wills of parents.

sanitation facilities, and clean water)¹³ or childcare/elderly care facilities. The government could conduct an assessment of their potential impact on gender—whether they help reduce the unpaid work burdens women face and support female labor force participation—and to prioritize this spending based on the assessment.

13. Analytical work on other low-income countries shows the potential positive impacts on fiscal policy reforms. Fabrizio et al. (2020) find that fiscal policies that address gender inequality (e.g., infrastructure or education investment, sanitation facilities, and parental leave) can not only help support female labor force participation but also have a positive impact on economic growth while reducing poverty and income inequality. Moreover, the authors show that most of these measures, in the long run, pay for themselves, as higher rate of labor force participation increases economic activity, growth, and tax revenues. In Senegal, for example, the authors use an analytical model to examine the impact of investment in safe water infrastructure and find that it would increase female labor force participation by about 9 ppts, and reduce poverty and income inequality.

14. Finally, collecting and analyzing gender-disaggregated data would allow Kiribati to accurately monitor its gender-related goals. The government acknowledged the need for gender-disaggregated data for systematic use for policy planning, monitoring, and evaluation. The Ministry of Women, Youth, Sports and Social Affairs (MWYSSA) has started the work to collect gender-disaggregated data. However, by December 2020, only 21.3 percent of indicators needed to monitor the Sustainable Development Goals (SDGs) from a gender perspective were available (UN, 2021). Data on poverty, wage payments, and access to assets/credit are also not available. Given the low institutional capacity in Kiribati, significant efforts are required in improving data collection and management, both in terms of data quality and data frequency, to facilitate accurate and timely monitoring and supervision.

D. Conclusion

15. While making significant achievements in promoting gender equality, further progress could be made to remove the still relevant gender gaps in Kiribati. Women in the country have fared well in terms of health and education, but face gender gaps in labor force participation rates, unemployment, income, and poverty. Legal barriers remain, particularly in terms of parenthood and access to assets/credit. Though the overall level of gender inequality is lower compared to the average of other countries in the same income group, there is a considerable heterogeneity among different categories, indicating room for improvement. Closing gender gaps could potentially support higher growth and help the country achieve its SDGs. Policies to strengthen gender equality include strengthening gender equality in the legal framework; introducing gender budgeting and fiscal policy reforms; and developing gender-disaggregated data collection for better awareness and monitoring.

¹³ A study by the [Asian Development Bank](#) (2021) points to the challenges in accessing fresh water in the South Tarawa region of Kiribati, while a study by the [World Bank](#) (2019) notes that women spend more time than men on fetching water for cleaning, washing, and child- and elder-care-related activities.

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FISHERIES DEVELOPMENTS IN KIRIBATI: SUSTAINABILITY AND GROWTH¹

This paper reviews the development and sustainability of Kiribati's fishery industry, and examines the literature on the marine protected areas (MPAs) and the impact of different fishery management regimes on sustainability. The note also discusses the recent development of the Phoenix Islands Protected Area (PIPA). Over time, sustainability of Kiribati's fisheries has improved, but more could be done to ensure sustainable fishing.

A. Introduction

1. Kiribati is a small Pacific Island country in the Western and Central Pacific (WCP), but with a large exclusive economic zone (EEZ). Kiribati is one of the smallest countries in the world with only 800 square kilometers of habitable land. However, its ocean territory spreads across 3.5 million square kilometers, making Kiribati the thirteenth largest country in the world if the EEZ is accounted for. Kiribati is one of the most productive tuna fishing grounds in the WCP and receives a large share of fiscal revenues from selling access rights to its waters to the distant-water fishing nations.

2. Tuna is the largest source of revenue for Kiribati. Tuna catch in the WCP has grown 10-fold from 265,000 tons in 1960 to 2.7 million tons in 2020, and its share of global tuna catch increased from 38 to 54 percent. Kiribati accounted for 7.6 percent (209,000 tons) of the total WCP catch. Tuna fishing license and access fee revenue accounted for 70 percent of Kiribati's fiscal revenues in 2020. Therefore, the ocean is central to Kiribati's economic development and poverty reduction.

3. Over time, Kiribati's tuna catch and stock management have changed significantly, with a key role for regional cooperation agreements. Before the 1980s, each country set its own rules and risked overfishing and undervaluation of natural assets. In 1982, the Nauru Agreement came into force among eight Pacific Island countries, i.e., Parties to the Nauru Agreement (PNA),² that aimed at the coordination and harmonization of their tuna purse seine fisheries management and their approaches to fishing for common stocks. In 1992, the Palau arrangement further expanded the coordination by limiting the amount of effort (number of fishing days) by the purse seine vessels in the PNA waters plus Tokelau, which culminated in the Vessel Day Schedule (VDS), which started in 2006. While official data are scarce, Kiribati is likely to account for roughly one quarter of VDS fishing days, reflecting high catch volumes thanks to its large EEZ and large biomass (Yeeting et al., 2018).

¹ Prepared by Nico Valckx (AFR).

² These PNA eight countries include the Federated States of Micronesia (FSM), Kiribati, Marshall Islands, Nauru, Palau, Papua New Guinea, Solomon Islands, and Tuvalu.

4. The establishment of the PIPA in 2008 was another key policy decision in Kiribati's fisheries management. Established in 2008 through a regulation, the Phoenix Islands, accounting for 11 percent of Kiribati's EEZ, became a protected area, aimed at protecting marine life, and enhancing fish stocks and biodiversity. In 2010, the site became a UNESCO World Heritage site, as an essentially pristine environment, free from human activities, and is one of the largest designated MPA in the world. In 2015, the government decided to fully close the PIPA to commercial fishing (previously, fishing was banned in only 3 percent of the reserve, between the 8 uninhabited islands), especially to protect bigeye tuna, a species prized for sushi that had been significantly overfished (Pala, 2014). Through an arrangement with international partners, the PIPA Trust Fund was set up to provide long-term sustainable financing for the conservation of terrestrial and marine biodiversity in the PIPA. The arrangement would also explore compensatory income from foregone fisheries revenues and possibly develop alternative income sources, including from high-end and low-volume tourism and scientific expeditions.

5. The Kiribati Cabinet announced in November 2021 the reopening of the PIPA to commercial fishing, reversing the 2015 commercial fishing ban. In doing so, it [cited](#) large uncompensated fishery revenue losses and substantial development financing needs. Specifically, the government claimed that between 2015 and 2021, the demand for the Kiribati fishing permits declined by 8 percent and would have a negative impact on future VDS allocations. It estimated the total revenue loss between US\$60 and US\$140 million over 2015-2021 for purse-seine and around US\$5.9 million for longline fisheries, translating into a loss of 720 days of fishing effort under the VDS. The reopening of the PIPA is aimed at attracting some fishing companies to return, which left when the PIPA was closed. It would also allow Kiribati to sell more fishing days at a higher price under the VDS. The reopening is expected to take several years and involves designating areas for fishing, tourism, and conservation.

6. More broadly, the question is whether sustainable fishing and greater revenue mobilization can co-exist in the medium to long term, once the PIPA is reopened. To answer this question, the paper analyzes fisheries income developments in Kiribati and the wider WCP area, using data back to the 1960s to gauge longer-term trends that affect fish stocks. Next, it examines the literature on the MPAs to see how the alternative fishery management arrangements may affect fishery revenues and fish stock sustainability. Based on this, it draws tentative policies for managing the reopening of the PIPA.

B. Developments in Catch Volumes and Sustainability

7. Like elsewhere in the WCP, Kiribati's tuna sector, with a focus on skipjack, has grown exponentially over the past 20-30 years, both in terms of catch volume and value. Since the 1980s, as the purse seine fishing developed,³ Kiribati's annual total catch volumes increased sharply

³ Purse seine accounts for the majority of catch, but longline catch has a relatively higher value as it is destined more for the sashimi market, while purse seine fishing goes to canneries.

(Figure 1, panel 1).⁴ Catch values reveal a broadly similar pattern (Figure 1, panel 2). More specifically, total catch volumes in Kiribati's EEZ remained broadly stable between the 1970s and early 1990s but increased sharply in 1998 due to the use of fish aggregating devices (FADs) and the occurrence of El Niño. After 2007, tuna catch volumes and value rose exponentially, following the adoption of the VDS, which set a total allowable effort in fishing days.⁵ The total catch dropped by 18 percent (panel 2) between 2015 and 2018, partly reflecting the closure of the PIPA to commercial fishing. However, the high fishing levels in 2014–2015 also likely reflect overfishing in anticipation of the closure (see below; the Blue Paradox). In 2019, catch values surged significantly, exceeding the 2015 catch levels, but the global pandemic led to another drop in 2020 and 2021. The pandemic had an impact across the whole WCP as tuna catch declined by 17 percent between 2019 and 2021 (panels 3 and 4). Also notable is the increase in catch by the Kiribati-flagged fleet—increasing from below 10 percent of the total catch in the years before 2010 to over 40 percent in 2021 (not shown here). However, a large share of the value ends up outside Kiribati, as onshore processing in Kiribati remains small (less than 1 percent of tuna caught in the national waters in 2019, according to FFA statistics).

8. Despite an overall exponential rise in tuna catch, significant year-to-year volatility is visible in tuna catch volume and values for Kiribati related to weather and climate change.

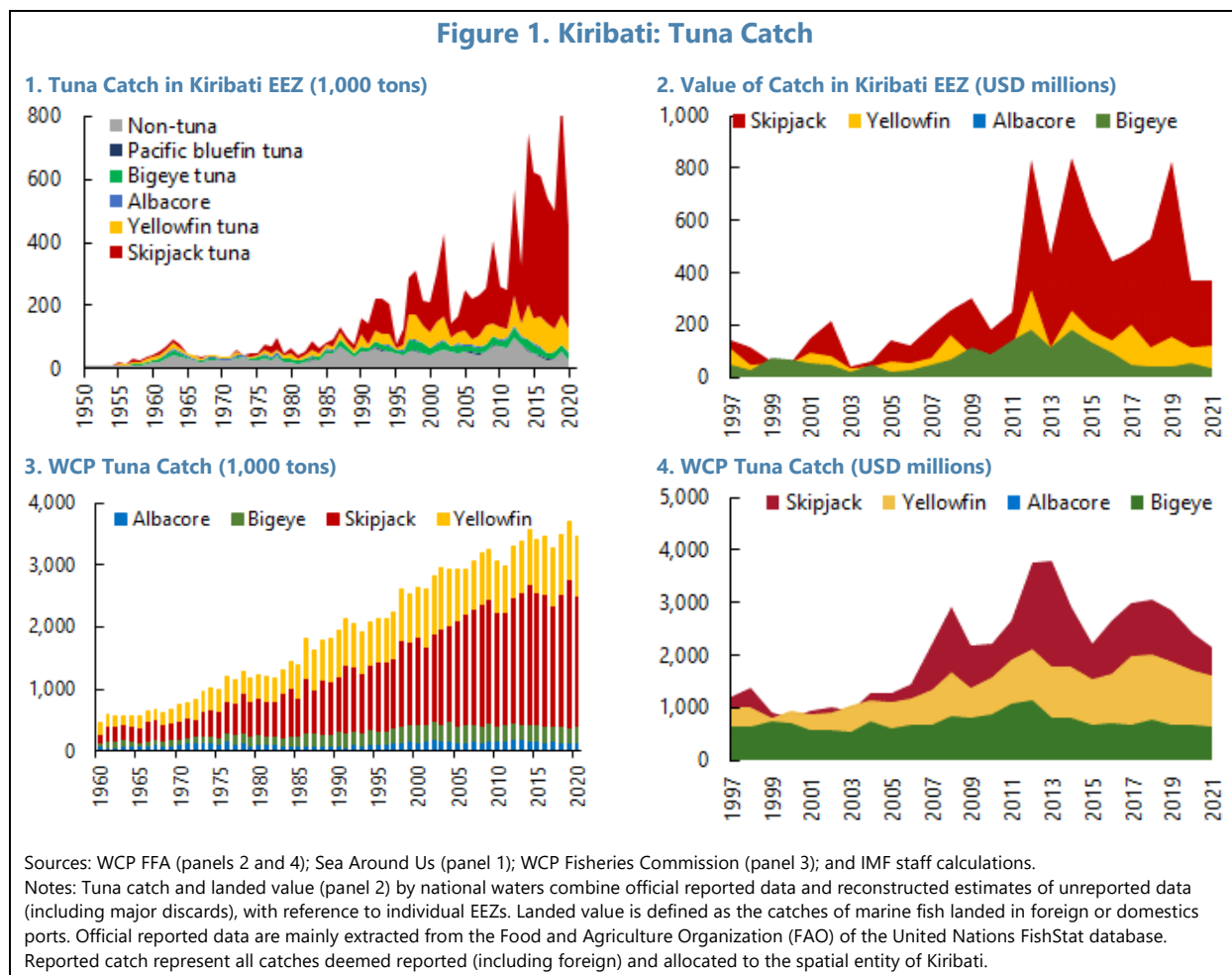
This variability reflects the fact that tuna is a migratory species and individual countries such as Kiribati can see pronounced year-to-year changes, as opposed to the WCP as a whole (panel 3). Research has pointed to climate conditions—El Niño Southern Oscillation (ENSO)—when warmer water comes to the western Pacific during La Niña periods, tuna moves towards the western side of the WCP area, causing a decline in Kiribati's tuna catch, as in 2021–2022 as it gets colder conditions than normal. Similar episodes occurred in 1988–89, late 1990/early 1991, 1995 and in the early 2000s. This phenomenon is documented for tuna in both the western Pacific (Lehodey et al., 1997) and the Indian Ocean (Kumar et al., 2014). As the effects of climate change become more prevalent, these oscillations may change and alter the interactions between tuna fishing and ecosystem structures (Callahan et al., 2021; Cai et al., 2015), negatively affecting the tuna fishery sector in Kiribati as temperature warming is likely to be larger in the eastern Pacific than in the western Pacific.

9. Given the importance of the tuna fisheries in the WCP, sustainability is carefully monitored using a variety of data and sources. The monitoring is based on a statistical model maintained by the WCP Fisheries Commission (WCPFC) that incorporates length, age, and spatial structure factors to mimic the patterns and values observed in terms of relative abundance (catch per unit of effort), tagging information, and tuna size frequencies (Hampton and Fournier 2001; see Box 1). In addition, weather events may have a big impact on tuna populations—during El Niño events, tuna fishing efforts typically expand eastwards in the WCP area, but during La Niña events,

⁴ Note that observers cite a definite lack of transparency in Kiribati's marine fisheries data, making it difficult to assess exactly what is occurring in Kiribati's waters, although data reporting improved over time.

⁵ The key to the VDS is the annual process of agreeing a limit on the number of days that can be fished by purse seine vessels across the combined EEZs of the Parties. A similar system is under development for longline fishing. Of note, the allocated days are relatively stable over time, but the number of VDS days used fluctuates from year to year, from a high of 93.3 percent in 2013 to a low of 78.3 percent in 2015 and increased to 82 percent in 2019.

they move westwards, as discussed above. In addition, biological features reveal some differences between various tuna species, with skipjack most resilient and bigeye tuna most susceptible to exploitation.⁶



⁶ The skipjack tuna population has a rapid turnover and is fast-growing, matures early (around 1 year of age) and is relatively short-lived (few live longer than 3-4 years). Disturbances in skipjack’s natural environment could impact this species relatively quickly, but it can recover quickly. However, if improperly managed, it could slip into a vulnerable state due to overfishing. Bigeye tuna, on the other hand, has a moderate turnover and is much slower-growing, mature late (around 3-4 years of age) and has a long lifespan (up to at least 12 years). Given these features, bigeye tuna is less resilient to exploitation and more at risk from overfishing, especially since juvenile bigeye tuna is increasingly caught as bycatch in skipjack tuna fisheries (World Wildlife 2022).

Box 1. Assessing Sustainability in Fisheries Management

The concept of maximum sustainable yield (MSY) is central to fisheries management. MSY is the largest average catch that can be taken from a stock under average environmental conditions without affecting stock health. Catch statistics per se are not a reliable indicator of depletion or abundance. Related indices frequently used as reference points within the WCPFC are:

- **F/F_{MSY}** , an indicator for the risk of becoming overfished—the level of current fishing mortality (F) compared to the fishing mortality at maximum sustainable yield (F_{MSY}). When $F/F_{MSY} > 1$, overfishing of the stock is occurring and the rate at which fish is caught is not sustainable in the long term.
- **$SB/SB_{F=0}$** , an indicator for stock depletion or overfishing—the current amount of spawning biomass (or adult tuna quantity) (SB) compared to the estimated amount of adult fish that would be present within the stock if it had not been fished ($SB_{F=0}$). A limit reference point of 20 percent $SB_{F=0}$ has been adopted for key tuna stocks, as it is considered a level below which the health of tuna stocks will be affected. For skipjack, a higher limit reference point in the 40–60 percent range has been proposed, but this has not been adopted.
- **B/B_{MSY}** , a variant for stock depletion, compares a stock's abundance or biomass (B) against its level at maximum sustainable yield (B_{MSY}).

In addition, an environmental impact rating measuring bycatch is used to assess sustainable fishing. This measures the amount of any species caught that is not targeted by the boat.

Alternative, broader indicators of marine ecosystem integrity and sustainability at the global and regional levels are the **Marine Trophic Index (MTI) and Fisheries in Balance index (FIB)**. More specifically:

- **Trophic level (TL)** is defined as the position of an organism in the food chain and ranges from a value of 1 for primary producers to 5 for marine mammals and humans (Pavluk and bij de Vaate 2017). The trophic level of most fishes can have any value between 2.0 and 5.0, and changes through the life history of fish, with juveniles having lower trophic levels than adults. A falling TL may indicate an increase in fish mortality as it results in more adult fish caught.
- **The FIB index** that is stable reveals whether changes in trophic levels are matched by appropriate changes in the catch in the opposite direction. FIB increases if both catches and mean trophic level increase, for example due to higher fish biomass or geographic expansion, suggesting that the fishery was expanding to stocks previously not, or lightly exploited. FIB will decrease when TL shows a stepwise decline and a corresponding increase in catches.

10. The WCP skipjack tuna, commercially the most important tuna species, does not appear overfished and the fishing rate is sustainable, although some studies have point to concerns. Based on the PNA Office data, the skipjack stock depletion appears to have increased, with $SB/SB_{F=0}$ going down from nearly 90 percent in the early 1970s when tuna fisheries just started to around 45 percent in 2019—significantly above the official 20 percent limit reference point—but close to the lower bound of the unofficial 40–60 percent limit reference point. The Bigeye tuna stock depletion shows a similar path over time, coming down from 95 percent in 1960 to 40 percent in 2019. The Yellowfin and Albacore tuna stock depletion metrics appear more favorable, with $SB/SB_{F=0}$ close to 60 percent in 2019, also down from 90 percent in the 1960s. Other sources, such as the United Nations Food and Agriculture Organization find that most tuna stocks are fully exploited, meaning there is no room for fishery expansion, and some are already overexploited, i.e., at risk of stock collapse. According to the International Seafood Sustainability Foundation, 65 percent of tuna stocks are at a healthy level of abundance, but 13 percent are considered overfished. The United

States of America's National Oceanic and Atmospheric Administration (NOAA)'s Fisheries Office assessed that the WCP skipjack tuna's fishing rate in 2019 was sustainable (F/F_{MSY} equal to 0.44) but with low biomass (i.e., at risk of stock depletion, with B/B_{MSY} equal to 0.88), while WCP yellowfin tuna was assessed as sustainable (F/F_{MSY} equal to 0.72) and its biomass above target (B/B_{MSY} equal to 1.24) in 2014.

11. However, there are gaps and weaknesses in the fishery management and conservation measures, particularly on the high seas and possibly further away from coastal areas. The PNA Office in its 2021 annual report noted that some distant water fishing nations which use these waters are not supportive of the PNA's efforts to ensure effective high seas management arrangements and are involved in systematic overfishing of their limits in the high seas, in contravention of the WCPFC conservation and management measures. In the longer-term, climate change is expected to generate a whole new set of challenges to the management of tuna stocks, which is corroborated by the WCP's Scientific Committee's assessment of tuna spawning, pointing to rising risks of spawning potential depletion. Similarly, region-based MTIs for Kiribati point to some concerns about a decline in the mean trophic level of fishery catches in the initial (coastal) and surrounding region of the Gilbert Islands while FIB indices increased. In line with the model of Kleisner, Mansour and Pauly (2015), this decline may likely reflect either increased catchability over time (from technological improvements) or the geographic expansion of fisheries to adjacent areas, as higher trophic levels of newly accessed resources overwhelm fishing-down effects closer inshore. In the case of the Phoenix Islands, on the other hand, MTI remained stable (light blue line in Figure 2, panel 4.c) and the FIB increase appears to coincide with the establishment of the PIPA in 2008, reflecting lighter exploitation and expansion of biomass, pointing to an improved fishery sustainability in the PIPA.

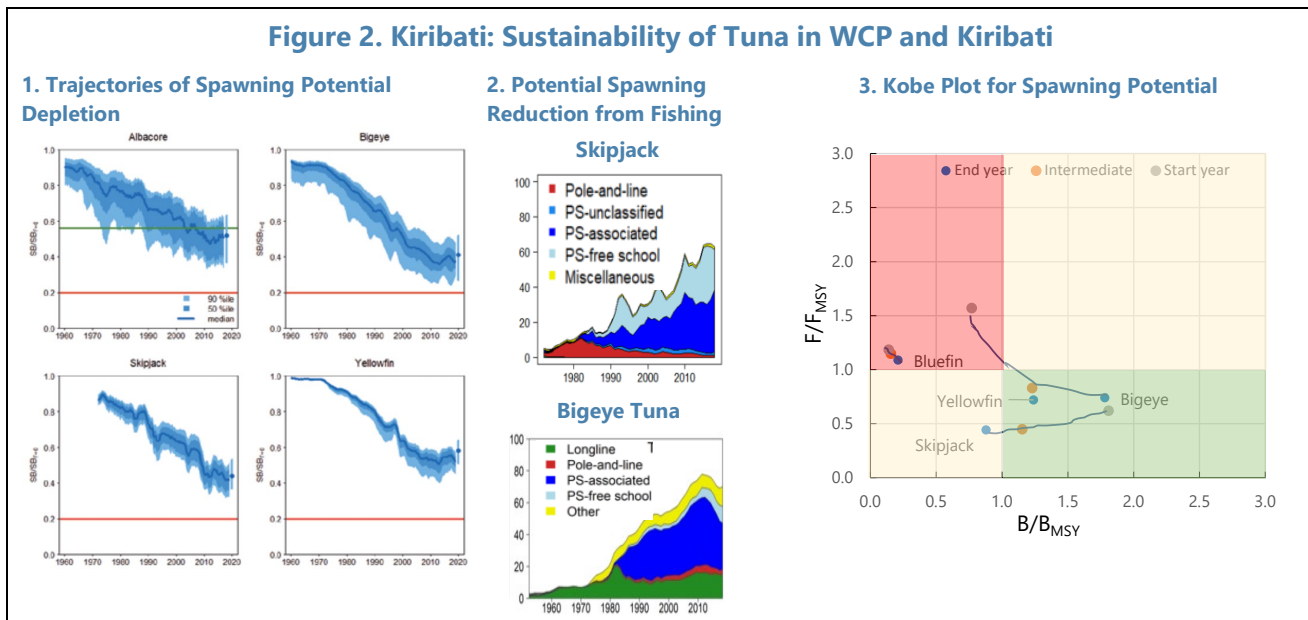
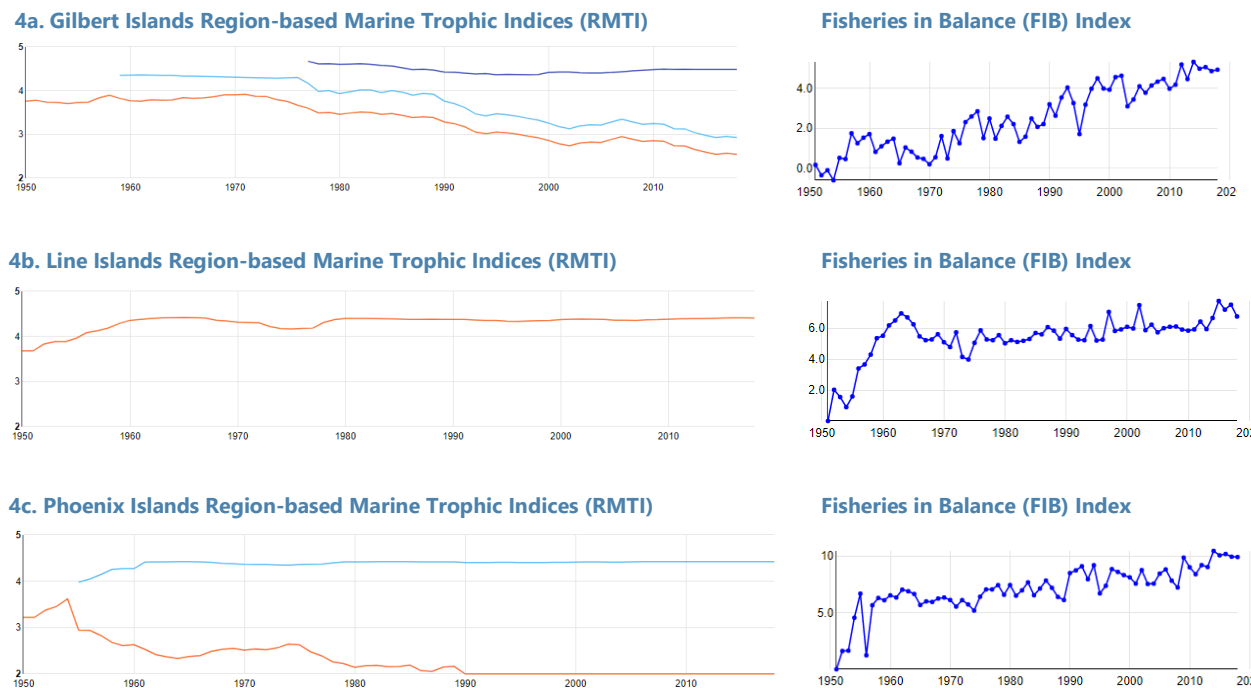


Figure 2. Kiribati: Sustainability of Tuna in WCP and Kiribati (Concluded)



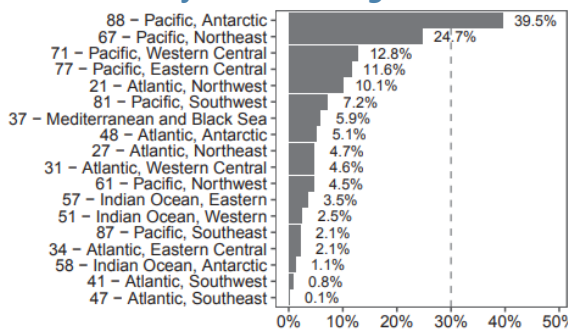
Sources: PNA Office 2021 Yearbook; WCP Skipjack Tuna 2018 Stock Status Report; Sea Around U.; and NOAA Fisheries.

Notes: In panel 1, plots show $SB/SB_{F=0}$ ratios for 4 major species of tuna in the WCP area. Red horizontal line indicates the agreed limit reference point, the green horizontal line indicates the interim target reference point. Plots show the trajectories of spawning potential depletion for the model runs included in the structural uncertainty grid of WCPFC tuna assessments. Panel 2 shows estimates of reduction in spawning potential due to fishing (fishery impact = $1 - SB_{latest}/SB_{F=0}$) for WCP Region 8, which includes Kiribati. Panel 3 shows estimated stock abundance (B) and fishing mortality (F) against their levels at maximum sustainable yield (MSY) over different assessment years (2020, 2016, and 2014), except for yellowfin tuna (2014 only) in the WCP region. Red area shows biomass below target and fishing rate too high, green area denotes sustainable fishing rate and biomass above target. Upper right yellow quadrant shows high biomass but too high fishing rate, while lower left yellow quadrant shows sustainable fishing rate but biomass below target. Panel 4 shows Regional MTI and FIB indices, where the longest Regional MTI series assesses the fisheries in an initial (coastal) region, and the MTI of new regions (further away in the EEZ) are calculated in a sequential manner. FIB increases point to an increase in both trophic level and catches.

C. Marine Protected Areas (MPAs) and Fishery Management Rules

12. Across the world's major fishing areas, the MPA coverage is generally low. The MPAs can be used as a fisheries management tool to contribute to achieving conservation and sustainability objectives, while contributing to biodiversity and habitat conservation (FAO, 2011). The International Union for Conservation of Nature (IUCN) put forward a target of placing 30 percent of all marine waters in no-take marine reserves by 2030. Only the Antarctic currently exceeds that target and the Pacific Northeast (near Alaska), at 24.7 percent, is close to that target (Figure 3). Apart from the MPAs in countries' EEZs, some are also established in the high seas, including in the Arctic, Atlantic,

Figure 3. Kiribati: Current MPA Coverage in Major FAO Fishing Areas



Mediterranean, Antarctic and Indian Ocean, where responsibilities of states to contribute and cooperate in the protection are defined within international conventions and agreements.

13. The creation of new MPAs to achieve the 30 percent global coverage may lead to temporarily higher fishing pressure and threaten sustainability. According to McDermott et al. (2019), fishing pressure can be expected during a preemptive harvesting phase following new MPA announcements (the so-called Blue Paradox). On a global scale, the percentage of fisheries experiencing overfishing would increase from the currently estimated level of 65 percent to a level of 72 percent. While this would not affect Kiribati directly, it may be indirectly affected if its neighboring countries partake, establish, or enlarge their MPAs.

14. Different fishery management regimes can greatly impact sustainability. Costello et al. (2016) simulated global fishery prospects under alternative management regimes from 2011 onwards, when biomass was estimated to be very low and catch levels too high.⁷ In the business-as-usual scenarios, including with a conservation concern, fishery stocks would continue to collapse, while sound reforms could regenerate biomass and lead to an increase in annual catch levels and substantially higher profits. This includes fisheries management with a maximum sustainable yield (MSY) target (F/FMSY reference limits) and a rights-based fishery management (RBFM) regime. Specially, the study finds that the RBFM policies could achieve the highest levels of biomass, while the MSY policies will ultimately generate the largest catch but have lower fish biomass, lower profits, and slower recovery times. If reform efforts are put in place, the median time to recovery would be just 10 years, and by 2050, the vast majority (98 percent) of stocks could be biologically healthy.

15. Fisheries management schemes with transferable fishing rights-such as the VDS- incentivize marine conservation. Villaseñor-Derbez, Lynham and Costello (2020) note that benefits from the large-scale MPAs typically accrue to other countries than to the one establishing the MPA or to the high seas. However, with transferable fishing rights through trading, tracking of vessels, and a biomass-based allocation rule, conservation can work, as evident from data presented in the previous section on the PIPA fishery sustainability. On the other hand, a fisheries trading mechanism based on past catch would result in substantial losses for countries with MPAs as it would grant more fishing rights to countries that fish the most. However, if a conserving country can trade the rights of spillover of fish from its MPA to waters of its neighboring countries, as with the VDS scheme, 88 percent to 99 percent of revenue losses can be avoided. It displaces, but does not reduce, overall fishing effort (Gruby et al., 2020). Hence, these studies support the VDS as a viable and well-designed fishery management scheme for countries with MPAs, such as Kiribati.

16. The marine spatial planning (MSP) can be an alternative to make a large MPA work but entails a series of challenges and tradeoffs. The MSP is a process of developing a blueprint for area-based management that accounts for multiple management objectives. It can be an important tool to achieve ecosystem-based management (EBM) of marine systems

⁷ Overall, the global median fishing mortality F/FMSY equaled 1.5 (overfishing is occurring) and biomass B/BMSY equaled 0.78 (stocks are overfished).

(Foley et al., 2010). A proper MSP can help to increase the stability, transparency, and predictability of the investment climate and reduce the riskiness of investment in ocean-based businesses (the so-called blue economy). In 2021, over 45 countries worldwide are either implementing or approving marine spatial plans—and dozens more are laying the foundation—following guidance set out by the Unesco-European Commission's MSPglobal (2021) initiative. However, as MSPs have broader objectives besides fishery management, which creates more complexity in delivering a blue economy. Key challenges include ecosystem threats (e.g., pollution, marine litter, climate change, habitat destruction, invasive species, etc.), governance issues (lack of resources, lack of sectoral or transboundary collaboration, and lack of governance integration) and sectoral issues (fisheries-overexploitation and illegal, unreported, and unregulated (IUU) fishing, seabed mining/spatial use conflicts, and the environmental impacts of tourism, maritime transport and offshore renewable energy). In addition, this may open a broader debate about diversification and reducing the weight of fisheries in the economy to make it more sustainable, while replacing low value-added subsectors in fisheries with high value-added ones (see the Selected Issues Paper on Unlocking Growth Potential in Kiribati: Taking Stock of Structural Reforms).

D. The PIPA – Kiribati's Marine Protected Area

17. In 2015, the PIPA was declared a marine protected area. PIPA was officially created in 2008 and fully banned commercial fishing in 2015. The Phoenix Islands area spans more than 400,000 square kilometers (about the size of California). It is one of the world's largest marine protected areas and serves as a spawning ground for tuna and other fish (Hernandez et al., 2019), a refuge for migratory birds and for rare coral reef formations. At the time, Kiribati was praised⁸ for its marine conservation efforts as a low-income developing country and served as a role model to address problems of overfishing and mitigate climate change, by contributing to the 30-by-30 goal (achieving 30 percent of oceans as marine-protected area by 2030) and as one of 41 signatories to the "[Because the Ocean Initiative](#)" in 2015.

18. In November 2021, the Kiribati Cabinet decided to re-open the PIPA to commercial fishing. As a result, the site may also have to be de-registered from UNESCO's World Heritage List. The official reason behind the move is to generate more revenues from tuna fishing in the marine reserve. Doing so would allow Kiribati to more fully utilize its natural resources while remaining committed to conservation, albeit in a very different form.

19. The authorities estimated that the closure of PIPA resulted in significant foregone fishing revenues. Fishing revenues account for about 70 percent of total fiscal revenues in Kiribati in 2021, averaging about AUD185 million during 2015–2020 (about 70 percent of GDP). As the PIPA accounts for about 11 percent of Kiribati's EEZs, the government estimated that the closure of PIPA led to a decline of fishing demand by 8 percent between 2015 and 2021 (720 fishing days), which also affected its future allocation of VDS days. In addition, there is recognition in the literature that

⁸ Kiribati's domestic marine conservation initiative was recognized by the United Nations General Assembly as an exemplary model of international cooperation, coordination, and collaboration in marine protection and conservation in 2018.

achieving financial sustainability for the PIPA conservation trust fund has proven difficult (Mallin et al., 2019). The accurate estimate of the loss due to the closure is difficult to assess, as other factors may influence these estimates. For example, weather and climate abnormalities (El Niño) could affect fish stocks, while economic conditions could affect fishing revenues. In addition, the base for comparison may be distorted by the pre-MPA overfishing, as McDermott et al. (2018) find that the amount of extra fishing effort before the PIPA closure was equivalent to the fishing effort avoided during the first 1.5 years of the designating the PIPA as an MPA. While Villaseñor-Derbez, Lynham and Costello (2020) show a downward trend in the VDS days for Kiribati, from 12,617 in 2014 to 7,677 in 2018, with displaced vessels driving the decrease, revenues and catch levels rebounded in 2019 and have remained high since then, at or above 2014 levels, suggesting the increase in the price of Kiribati fishing licenses may compensate for the reduction in the number of its VDS days.

20. The opening-up of the marine reserves may have broad implications for the region, particularly for the environment and fishing sustainability. In the short-run, Kiribati's fisheries sector may receive a boost and fiscal revenues are likely to increase as more licenses are likely to be sold (although the price per VDS license could go down). However, if not properly managed and monitored, there could be longer-term economic and environmental costs for the region as PIPA's location in the middle of the Pacific Ocean makes it a breeding and feeding ground for tuna, which contributes to the health of the oceans and global food security. In this regard, the PIPA is expected to act as an insurance policy for fishing effort more widely in Kiribati and the region. Besides the effects on fish stocks, the PIPA also had beneficial effects for the restoration of atolls and coral reef affected by record levels of ocean warming during the 2015-2016 El Niño. Sala (2022) finds that the abundance of reef fish—fully protected in the PIPA from fishing—helped the 'dead' coral recover, as the fish was eating the algae that smothered the coral, allowing it to come back.

21. Overall, the Kiribati authorities have taken sustainability concerns into consideration in laws, regulations and development plans, but better inter-ministerial coordination would be desirable. Actions to protect the environment include the Fisheries Ordinance (1979), with Line and Phoenix Islands Prohibited Fishing (Bonefish) Regulations, established to regulate and protect the bonefish species population within the waters of Kiritimati Island. Major legislation to protect biodiversity came from the Environment Act (1999), which included legal provisions for conservation, and prescribed coral reefs, mangroves, and sea grass as protected ecosystems. The Phoenix Islands Protected Area (PIPA) Regulations (2007) of the Environment Act 1999 (as amended 2007 and 2021) provided the legal framework for the designation of PIPA. The 2021 amended Environment Act added the shoal ecosystem to the protected ecosystems list and on management of biodiversity and the accompanying regulations will be finalized by end 2023. In addition, management plans for major coastal fish species and island-based management plans (with restrictions on catching certain fish) were established, following the adoption of Regulations for the Conservation and Management of Coastal Marine Resources in 2019. As such, Kiribati has made significant progress in mainstreaming the environment over the years. However, it remains to be seen how Kiribati will balance sustainability against development, growth and recently enlarged fishing access in the PIPA. A more coordinated and holistic approach involving the ministries of environment and fisheries could go a long way to better weigh the trade-offs between conservation, sustainability, and

enhanced fishing areas, as the transition from an MPA to an MSP approach can be a complex process, as outlined in the previous section.

E. Conclusions and Policy Recommendations

22. The fisheries sector sustainability is key for Kiribati's future and so far, appears to have been well managed. Kiribati depends on tuna fisheries for its development, as the sector is the main engine of economic growth. Existing studies for the broader WCP area point to a decline of tuna sustainability metrics since the 1970s due to more intense exploitation, but the depletion rates remain above critical thresholds. Regional agencies have raised concerns about gaps and weaknesses in WCP fishery management and conservation measures, particularly on the high seas. Specifically for Kiribati, increases in the FIB indices suggest that tuna stocks expanded, and while biomass increased over the years (as fisheries expanded geographically), only for the Gilbert Islands, there is some evidence of overexploitation to date, likely reflecting fishing-down closer inshore.

23. The government should maintain conservation efforts by adopting a robust MSP approach. The MSP is expected to balance social, environmental and economic objectives that have been specified through a political process (Unesco, 2017). The Kiribati authorities and other stakeholders should agree on the underlying scientific evidence and assess how the transition from the fully protected regime of the PIPA to the MSP will affect biodiversity and Kiribati's fishery revenues. In general, moving to an MSP framework requires many steps and takes time, to properly define the principles, goals and objectives, monitor and evaluate, regulate/enforce, and assess contingency plans (Unesco/European Commission, 2021). Hence, until the MSP plan is released and transparently discussed, Kiribati's adoption of an MSP approach to manage fishery stocks around the Phoenix Islands has uncertainties about biodiversity, sustainability of ecosystems, cooperation with third countries and the likely impact on Kiribati's VDS fishing days allocation. Effective coordination between all ministries and with external stakeholders (e.g., community-based management plans to restrict certain fish catch) will be essential to manage well the trade-off between sustainability and fisheries revenue growth.

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