Guinea
TNA Summary 2021

UN TECHNOLOGY
UNITED NATIONS TECHNOLOGY BANK FOR LEAST DEVELOPED COUNTRIES

Overview

Guinea, a West African nation, had a population of 11.5 million in 2017, with 64% in rural areas. Despite rich natural resources, including one-third of the world's bauxite reserves, as well as gold, diamonds, and iron, it remains a Least Developed Country (LDC) due to governance, infrastructure, and human capital challenges. The economy relies on agriculture, mining, and energy, with 79% of rural residents dependent on agriculture. GDP growth averaged 2.3% (2011–2015) but fell to 1.1% in 2014 and 0.1% in 2015 due to socio-political instability and Ebola. ***Vision 2040*** aims to leverage hydroelectric potential, minerals, and human capital. PNDES 2016–2020 set the foundation for economic diversification, infrastructure, and poverty reduction, prioritizing agriculture, fisheries, mining, and energy. Science, Technology, and Innovation (STI) are key to sustainable growth and long-term development.

Agriculture, Forestry and Fisheries

25.6% Small share of GDP but provides 79% of rural income due to subsistence farming practices.

Industry

39.4% Main sector, contributing most to government revenue and exports.

Services

35% Hydroelectric potential is high, but struggles with energy access and reliability

Priority Technology Needs

Guinea's Science, Technology, and Innovation (STI) framework is a crucial component of its development strategy, aiming to modernize key economic sectors and drive structural transformation. The ***National Development Plan (PNDES) 2016–2020*** outlines STI as a driver for productivity and sustainable development, with emphasis on mining, agriculture, energy, and infrastructure. Key STI investments focus on modernizing agriculture through improved seeds, irrigation, mechanization, and agro-processing while promoting research, digitalization, and industrial efficiency in the mining and energy sectors.

Mining
Guinea's mining sector is a key revenue source but faces outdated technology, weak digitalization, and environmental challenges. Despite vast mineral resources, the sector lacks advanced geological mapping tools, automated processing systems, and real-time monitoring technologies needed for efficiency and sustainability. Weak institutional coordination, poor data management, and a shortage of skilled personnel further hinder growth. To modernize, STI integration, capacity-building programs, and better regulatory enforcement are essential. Guinea is actively developing an STI policy and promoting sustainable mining practices, including waste management solutions and environmental monitoring technologies.

Agriculture
Guinea's agriculture sector relies on smallholder farming but is hindered by outdated practices, low mechanization, climate vulnerability, poor post-harvest management, and inefficient land use. To improve productivity, technologies such as artificial insemination, improved seeds, sustainable land management, smart irrigation, composting, and better storage solutions are needed. Strengthening agricultural research, farmer training, and digital advisory services is essential to enhance yields, reduce losses, and improve market access.

Energy
Guinea has vast hydropower potential but struggles with energy distribution, weak grid infrastructure, and low rural electrification rates. Outdated transmission systems contribute to power instability and high energy losses. Strengthening grid infrastructure, modernizing transmission networks, and improving energy management are crucial for efficiency. Expanding off-grid solutions, particularly solar and mini-hydro projects, is essential for increasing rural access. Additionally, investing in hydroelectric infrastructure and transmission upgrades can enhance power stability and reduce reliance on fossil fuels.

Health
Guinea's healthcare system faces major challenges, including poor infrastructure, unreliable energy, staff shortages, underfunding, and weak supply chains. The National Health Development Plan (2015-2024) aims to strengthen infrastructure, expand services, and improve workforce capacity. Priorities include enhancing health information systems, upgrading facility connectivity, expanding digital tools, and investing in staff training. Additionally, boosting lab capacity and improving pharmaceutical supply chains are crucial for better healthcare delivery.

Environment
Guinea faces severe environmental challenges. Unregulated resource extraction depletes forests and degrades land, while urbanization strains sanitation and pollution control. Climate change worsens coastal erosion and water shortages, with weak enforcement of environmental laws. To address these issues, Guinea needs to enforce regulations, improve resource management, and strengthen institutions. Monitoring tools like GIS can track deforestation, while better waste management and pollution control are essential.

Guinea's strategic focus on STI reflects its commitment to sustainable development and economic modernization. By prioritizing renewable energy, ICT, health technology, sustainable agriculture, and water management, the country aims to tackle energy access, food security, healthcare challenges, and economic diversification. These efforts align with Guinea's Vision 2040 and the National Economic and Social Development Plan (PNDES), positioning the nation for technological advancement and inclusive growth. With targeted investments in key sectors, stronger STI policies, and workforce development, Guinea is enhancing national innovation capacity, improving infrastructure, and fostering economic resilience for long-term prosperity.

Country Context & Science, Technology, and Innovation Landscape

Guinea is making progress in advancing Science, Technology, and Innovation (STI) through initiatives in agriculture, digital health, and ICT-driven entrepreneurship, with a goal to allocate 1% of GDP to R&D by 2030. Opportunities exist to strengthen policy coordination, increase R&D funding, and modernize infrastructure, while ongoing efforts are expanding digitalization and industry-academia collaboration. Enhancing research commercialization, fostering public-private partnerships, and upgrading research facilities will accelerate progress. By building on these strengths, Guinea is well-positioned to leverage STI for sustainable economic growth and long-term development.

Human Development Index (HDI) Rank in 2021: 182/191 (UNDP, 2020)

11,56million	33%	4.7%	$923	35%	5.77%
Population *(2017)*	**Youth <25** *(2017)*	**GDP Growth** *(WB,2020)*	**GDP per capita** *(WB, 2020)*	**Urbanization** *(2017)*	**Tertiary Enrollment** *(UNESCO, 2020)*

Frontier Technology Readiness Index (FTRI) Rank: 161/166 (UNCTAD, 2021)

20%	N/A	$198m	33%	31.0	31.7%
Internet Subscribers *(ITU, 2020)*	**R&D Expenditure**	**FDI Inflow** *(WB, 2020)*	**Access to Electricity** *(WB, 2020)*	**PCI** *(UNCTAD, 2020)*	**Financial Inclusion+25Y** *(WB, 2021)*

Guinea's strategic vision for STI is anchored in its natural resource potential, digital expansion, and growing investment in research and innovation. With plans to increase R&D funding to 1% of GDP by 2030, the country is working toward strengthening scientific institutions, improving infrastructure, and fostering public-private partnerships. Key sectors such as agriculture, mining, and healthcare are benefiting from STI-driven initiatives, including the West Africa Agricultural Productivity Programme (WAAPP) for modern farming technologies and the "Pitch Ton Innovation" competition, which supports young entrepreneurs in ICT. Expanding digital networks, research facilities, and renewable energy projects is also a priority to drive sustainable economic transformation.

However, Guinea faces structural challenges that limit STI progress. Weak policy enforcement, fragmented governance, and low industry-academia collaboration hinder research commercialization. **Limited access to modern laboratories, outdated ICT infrastructure, and inadequate funding mechanisms constrain innovation and technology adoption**. Additionally, climate change, energy shortages, and gaps in digital access pose further obstacles, particularly for rural areas and key industries. Addressing these challenges requires stronger institutional coordination, incentives for private sector participation, and targeted investments in STI education and workforce development.

Despite these barriers, Guinea's STI trajectory is promising, with government-led efforts and international partnerships supporting sectoral transformation. Strengthening policy implementation, research funding, and digitalization will be essential to achieving Guinea's Vision 2040 for economic resilience and technological advancement. With continued commitment to sustainable energy, ICT expansion, and science-driven solutions, Guinea has the potential to emerge as a regional leader in innovation and economic growth

Key Recommendations

- Develop a comprehensive STI policy framework to enhance governance, coordination, and policy enforcement, ensuring a clear national strategy for research and innovation.
- Increase R&D investment to 1% of GDP by 2030 to ensure sustainable funding for research and innovation.
- Strengthen PPPs to mobilize funding for STI infrastructure, including high-tech laboratories, ICT expansion, and industry-driven research initiatives.
- Improve industry-academia collaboration by creating structured partnerships between research institutions, universities, and the private sector to promote applied research and commercialization.
- Upgrade scientific and digital infrastructure by investing in modern laboratories, research equipment, and ICT networks to improve the country's research capacity and technological development.
- Expand digital access and connectivity to bridge the digital divide, particularly in rural areas, through enhanced internet infrastructure and affordable broadband access.
- Introduce incentives for research and innovation, such as tax benefits, research grants, and entrepreneurship programs, to encourage STI-driven solutions and private sector engagement.
- Promote gender and youth inclusion in STI by increasing access to education, technical training, and entrepreneurship opportunities, especially for women in science and technology.
- Strengthen STI's role in climate resilience and environmental sustainability, including promoting renewable energy, sustainable land management, and waste recycling technologies.
- Enhance STI governance and monitoring mechanisms by establishing regulatory frameworks and evaluation systems to track STI progress and ensure alignment with national development goals.

The United Nations Technology Bank for the Least Developed Countries, established in 2016, enhances science, technology, and innovation capacities in the world's 44 Least Developed Countries. Based in Türkiye, UN Technology Bank focuses on improving access to essential technologies and knowledge. Its key initiative, Technology Needs Assessments, identifies gaps and priorities in each country, creating a roadmap for impactful technology adoption aligned with national development goals.

Contact Ms. Federica Irene Falomi, **federica.falomi@un.org** or **untb@un.org**