

Mozambique TNA Summary 2021

Overview

Mozambique is a Southeast African nation with a population of nearly 31 million, of which 57% is under the age of 20. The economy is primarily driven by agriculture and services, particularly tourism, while industrial activity remains limited, contributing only 19% of GDP. Despite its abundant natural resources, including natural gas, coal, aluminium, and hydropower, the country faces significant challenges, such as low industrialization, underdeveloped infrastructure, and vulnerability to climate change. The COVID-19 pandemic exacerbated these issues, leading to negative GDP growth (-1.28%) and exposing structural weaknesses, particularly in employment and public services. In its new *Five-Year Plan 2020–2024 (FYP)*, Mozambique prioritizes science, technology, and innovation (STI) as a catalyst for economic growth, diversification, and sustainable development. The plan aims to strengthen institutional capacity for scientific research and technological development to support industrialization and resilience.

Agriculture (70% employment)

24% of GDP

Industry

19% of GDP

Services (tourism)

57% of GDP

Priority Technology Needs

Mozambique's Five-Year Plan (2020–2024) and STI Strategy prioritize agriculture, conservation, education, health, and biotechnology for technological transformation, addressing key challenges to social and economic development. Agriculture, critical to food security and employment, requires contract farming, climate-resilient crops, precision agriculture, modern irrigation, and post-harvest technologies. Other priorities include renewable energy, digital infrastructure, telemedicine, and e-learning. Strengthening STI capacity, technology transfer, and innovation is vital for industrialization, economic diversification, and climate adaptation, ensuring Mozambique maximizes its resources and workforce for sustainable development.



Agriculture & Food

In the agriculture and food sector, low productivity, inefficient input use, and limited mechanization remain challenges. Key technologies needed include precision agriculture tools like drones, sensors, GPS-guided equipment, and modern irrigation to optimize yields. A mobile B2B platform can connect farmers with markets, providing weather forecasts, pest alerts, seed exchange, and equipment rentals. Contract farming systems can enhance structured production, while aquaponics and integrated farming promote sustainability.



Conservation & Environment

Water scarcity, pollution, deforestation, biodiversity loss, and climate risks are major challenges for Mozambique. Key technologies needed include GIS, remote sensing, and monitoring systems to track climate events and water resources, along with ICT-based flood forecasting and early warning systems. Sustainable urban drainage systems can reduce flooding, while wastewater treatment, water purification, and water/fog harvesting technologies can mitigate water scarcity. Drone-based seed ball shooting can aid reforestation and conservation, and decision-support systems with ICT integration can improve environmental management and resilience to extreme weather events.



Education

Weak digital infrastructure, limited internet access, and lack of ICT equipment hinder education in Mozambique. Key technologies needed include e-learning platforms, virtual tools, and affordable tablets and computers. Expanding ICT infrastructure, including mesh networks and high-speed internet, is essential. STEM-focused curricula and online libraries are needed to bridge the digital divide and enhance workforce readiness. Interactive displays, smart classrooms, and video conferencing are also needed to improve engagement and remote learning.



Energy

Limited electricity access, reliance on fossil fuels, and weak infrastructure are key challenges. Technologies needed include microgrid and solar energy solutions, and biogas digesters for clean cooking and waste management. Hydrogen production from natural gas can support energy transition, while portable battery storage can improve reliability in remote areas.



Health

Limited access to care, weak data systems, and inadequate local pharmaceutical production are key issues. Telemedicine and virtual consultations can improve rural health-care access, while digital health records and surveillance systems can enhance disease monitoring and response. Expanding local production of vaccines, medicines, and medical supplies can improve self-sufficiency, can reduce chemical use and promote sustainable bique's healthcare system.



Biotechnology & Biosciences

In biotechnology and biosciences, the need for food security, disease control, and sustainable agricultural practices is critical. Establishing a National Centre for Biotechnology and Biosciences, along with molecular techniques for disease diagnosis and crop improvement, can drive innovation. Biofertilizers and biopesticides improve self-sufficiency, can reduce chemical use and promote sustainable farming practices.

Mozambique's technology priorities align with its goals of boosting productivity, enhancing resilience, and promoting inclusive growth. By advancing agriculture, energy, infrastructure, conservation, health, and education, the country seeks to modernize its economy, bridge disparities, and tackle climate challenges. Investments in STI, digital infrastructure, renewable energy, and human capital are key to economic diversification and long-term sustainability. By harnessing technology to address structural challenges, Mozambique can create new opportunities, strengthen resilience, and improve livelihoods, paving the way for a more sustainable and equitable future.

Country Context & Science, Technology, and Innovation Landscape

Mozambique's science, technology, and innovation (STI) ecosystem is evolving, guided by the **Mozambique Science, Technology, and Innovation Strategy (MOSTIS)**, which sets the framework for technological development and capacity building. The government has also established initiatives like the National Research Fund (FNI) to support R&D, innovation, and knowledge transfer across key sectors, including renewable energy, digital infrastructure, and education technologies. These efforts aim to enhance productivity, create jobs, and drive inclusive growth. However, challenges persist, including limited funding, weak stakeholder coordination, and minimal private sector involvement, requiring stronger investment and governance to fully leverage STI for sustainable development.

Human Development Index (HDI) Rank in 2019: 181/189 (UNDP, 2021)

30,78million Population <small>(M-NSI, 2020)</small>	57% Youth <20 <small>(M-NSI, 2021)</small>	-1.2% GDP Growth <small>(WB, 2020)</small>	\$462.43 GDP per capita <small>(WB, 2020)</small>	37.07% Urbanization <small>(M-NSI, 2020)</small>	7.3% Tertiary Enrollment <small>(UNESCO, 2019)</small>
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Frontier Technology Readiness Index (FTRI) Rank: 149/158 (UNCTAD, 2021)

17.8% Internet Penetration <small>(WB, 2020)</small>	0.35% of GDP R&D Expenditure <small>(GoM, 2018)</small>	22.3% of GDP FDI Inflow <small>(UNCTAD, 2020)</small>	30.6% Access to Electricity <small>(WB, 2020)</small>	29.1 PCI <small>(UNCTAD, 2021)</small>	49.6% of adults Financial Inclusion <small>(WB, 2021)</small>
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Mozambique has made notable progress in institutionalizing STI, guided by the Mozambique Science, Technology, and Innovation Strategy (MOSTIS), which aims to enhance research capacity, technology transfer, and industrial innovation. The government has, for instance, established institutions such as the **Maluana Science and Technology Park** and the **Mozambique Research and Education Network (MoRENet)** to strengthen ICT infrastructure and research collaboration.

However, significant challenges that constrain Mozambique's ability to compete in high-tech sectors remain. R&D expenditure remains low at 0.35% of GDP (2018), with most research concentrated in public institutions and minimal private sector involvement. Weak stakeholder coordination, fragmented policies, and reliance on external funding (56% of R&D financing in 2018) further constrain STI development. While STI is a government priority, challenges in policy implementation, intellectual property regulations, and industry linkages limit Mozambique's ability to compete in knowledge-intensive sectors. Also, the education system struggles to keep pace with industry needs, with gaps in STEM-focused curricula and outdated higher education frameworks reducing the country's ability to develop a competitive knowledge-based workforce.

Despite these challenges, Mozambique has several opportunities to strengthen its STI ecosystem. **The country's young population presents a significant potential for human capital development, particularly in STEM fields.** Additionally, Mozambique's rich natural resources, including natural gas and hydropower, offer opportunities for technology transfer and innovation in energy and agriculture. By addressing policy, education, digital, and financial constraints, Mozambique can better leverage STI as a driver of economic transformation, thus enabling it to position itself as a regional leader in sustainable and technology-driven development.

Key Recommendations

- Enhance STI governance by strengthening policy frameworks and coordination among stakeholders.
- Establish an effective Intellectual Property (IP) system to support technology commercialization and protect innovations.
- Invest in human capital by focusing on STEM education, especially for women, and attract youth to research careers.
- Improve infrastructure, including internet access, modernize energy systems, and develop transportation networks.
- Increase funding for research institutes and encourage private sector involvement in innovation. Strengthen their capacity to conduct and commercialise R&D for priority sectors.
- Invest in quality assurance, metrology, and standardization infrastructure to provide internationally recognized certification across industries.
- Facilitate technology transfer by integrating FDI into innovation ecosystem and encouraging local firms to adopt advanced technologies.
- Establish a national technology transfer office to coordinate the adoption and commercialization of R&D.