ORGANISATION OF ISLAMIC COOPERATION

STATISTICAL, ECONOMIC AND SOCIAL RESEARCH AND TRAINING CENTRE FOR ISLAMIC COUNTRIES (SESRIC)

STATISTICAL EVALUATION OF THE CURRENT SITUATION OF OIC COUNTRIES TOWARDS THE IMPLEMENTATION OF THE "OIC STI AGENDA 2026"

Ankara, November 2022

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ACRONYMS USED

COMSTECH	Standing Committee on Scientific and Technological Cooperation
CPIA	Country Policy and Institutional Assessments
CSP	Concentrated Solar Power
DTP3	Three doses of diphtheria, tetanus, and pertussis
ECA	Europe and Central Asia
EGDI	E-Government Development Index
EPI	Environmental Performance Index
ESALA	East and South Asia and Latin America
EurepGAP	European Retail Protocol for Good Agricultural Practice
GDP	Gross Domestic Product
GPS	Global Positioning System
HPCCs	High Performance Computer Centres
IAEA	International Atomic Energy Agency
ICANN	Internet Corporation for Assigned Names and Numbers
ICT	Information and Communication Technology
IFS	Food Safety Initiative
IOFS	Islamic Organization for Food Security
IsDB	Islamic Development Bank
LDCs	Least Developed Countries
MDR	Multiple-drug-resistance
MENA	Middle East and North Africa
NAPA	National Adaptation Plans of Action
ND-GAIN	Notre Dame Global Adaptation Index
OIC	Organisation of Islamic Cooperation
PPP	Purchasing Power Parity
R&D	Research and Development
RE	Renewable Energy
RNSS	Regional Navigation Satellite System
SDGs	Sustainable Development Goals
SESRIC	Statistical, Economic and Social Research and Training Centre for Islamic Countries
SMIIC	Standards and Metrology Institute for Islamic Countries
SSA	Sub-Saharan Africa
STEM	Science, Technology, Engineering, Mathematics
STI	Science, Technology and Innovation
T&D	Transmission and Distribution
TFEC	Total Final Energy Consumption
UAE	United Arab Emirates
UNFCCC	UN Framework Convention on Climate Change
USD	United States Dollars
WIPO	World Intellectual Property Organisation

INTRODUCTION

Throughout the human history, knowledge and critical thinking, of which science and technology are the most visible symbols, were and are still representing the key drivers of change not just in terms of economic growth and development, but also in all human enterprises. Today and in the years to come, science and technology will continue to play a critical role in addressing contemporary challenges of development across multiple dimensions including poverty alleviation, health, environmental preservation, and ensuring security of food, water, and energy.

Over the last two decades, encouraging advances have been recorded in many OIC Member Countries in the areas of higher education, science, and technology. This has been reflected, for example, in the tripling of scientific publications and researchers and major investments by many Member Countries in education and scientific infrastructure. However, the OIC Countries, as a group, are in general still lagging behind the group of other fast developing nations.

In this regard, the OIC STI Agenda 2026 proposes a mechanism for building collective competence in a wide array of themes ranging from water, food and agriculture to energy, basic and applied sciences, and large multinational projects, in addition to strengthening international linkages with the best in the world.

The OIC STI Agenda 2026, which was adopted by the First Summit of the Organization of Islamic Cooperation on Science and Technology in Astana in September 2017, has a focus on 'high technology' within the context of the ongoing global imperatives and the accompanying techno-economic-information revolution. This transition has resulted in a massive realignment and shift in centres of economic activity and relocation of manufacturing, services and design from developed to developing countries, globally and regionally.

The OIC STI Agenda 2026 identifies specific aspirational recommendations and targets as with each government setting its own national targets guided by global level of ambition but taking into account national circumstances. The OIC STI Agenda 2026 is proposed to be implemented through a series of interconnected interventions detailed in the Work Plan, which has been prepared by the COMSTECH Secretariat.

Against this background, this Report aims to provide a statistical evaluation of the current situation of OIC Member Countries towards the implementation of the OIC STI Agenda 2026 using the most recent available data. The Report also serves as a call for action to encourage the changes needed to ensure the achievement of the targets identified in the STI Agenda 2026.

PRIORITY 1: NURTURE THE THINKING MIND: BUILD A CULTURE OF SCIENCE AND INNOVATION

Notwithstanding some important gains in the past decade, a true scientific culture is conspicuous by its absence. There should be no fears about the disruptive nature of knowledge and science, as this has been part of our heritage and traditions for centuries.

Science is nurtured as much by governments as by the social norms of a country, which must be willing to embrace the pursuit of knowledge and its accompanying disruptions. Building a true scientific culture in Muslim countries would require a paradigm shift and greater commitments from governments for building an enabling eco-system.

Recommendations and Targets:

i. Ensure universal, equitable and inclusive quality education at all levels of education, and promote life-long learning opportunities that advance knowledge and skills needed for gainful employment, entrepreneurship, innovation and sustainable development.

ii. "Catch them young" at the school, so that critical thinking, integrity, curiosity, and creativity can flourish in the school systems.

iii. Select teachers and develop curricula with care, especially the former. Critical thinking skills can only be taught to students if teachers go through effective communication training.

iv. Provide broad based quality education, including the social sciences, which includes appreciation of one's own cultural heritage and that of others.

The Current Situation:

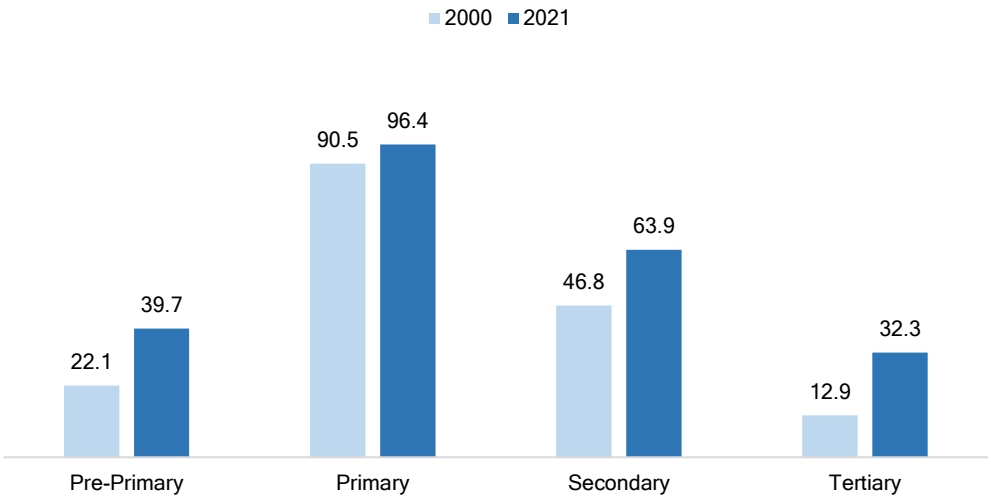
Participation in Education

Education is a primary driver for sustainable development as it helps to improve employability, productivity, innovation and competitiveness. Furthermore, education is crucial for fostering tolerance, which contributes to prevent growing dissention in the Muslim societies.

The OIC average gross enrolment rate at all levels of education including pre-primary, primary, secondary and tertiary increased between 2000 and 2021. In pre-primary education, there is a 17.6 percentage-point increase from 22.1% to 39.7% between 2000 and 2021. For primary education, the OIC average was 90.5% in 2000 and increased to 96.4% in 2021, meaning a 5.9 percentage-point increase. For secondary education level,

there is a 17.2 percentage-point increase from 46.8% to 63.9% between 2000 and 2021. Moreover, for tertiary education, there is a 20.4-percentage-point increase from 12.9% to 32.3%, equal to a 19.3 percentage-point increase in the same period (Figure 1).

Figure 1: Gross Enrolment Rates, Both Sexes, Percent, 2000 vs. 2021



Source: SESRIC staff calculations based on data from UNESCO, UIS.Stat Database accessed on 01/11/2022.

Quality Education

Despite the improvements in enrolment figures at different education levels, the quality of education across the OIC countries — particularly in the OIC countries in Sub-Saharan Africa (SSA) region — has remained low. Based on the most recent available data at UNSD (2022), the proportion of children and young people achieving a minimum proficiency level in reading at the end of primary education in the OIC countries in SSA was 27.3% in 2021. As to achieving a minimum proficiency level in mathematics at the end of primary education in the OIC countries in SSA, it was 18.6% in 2021.

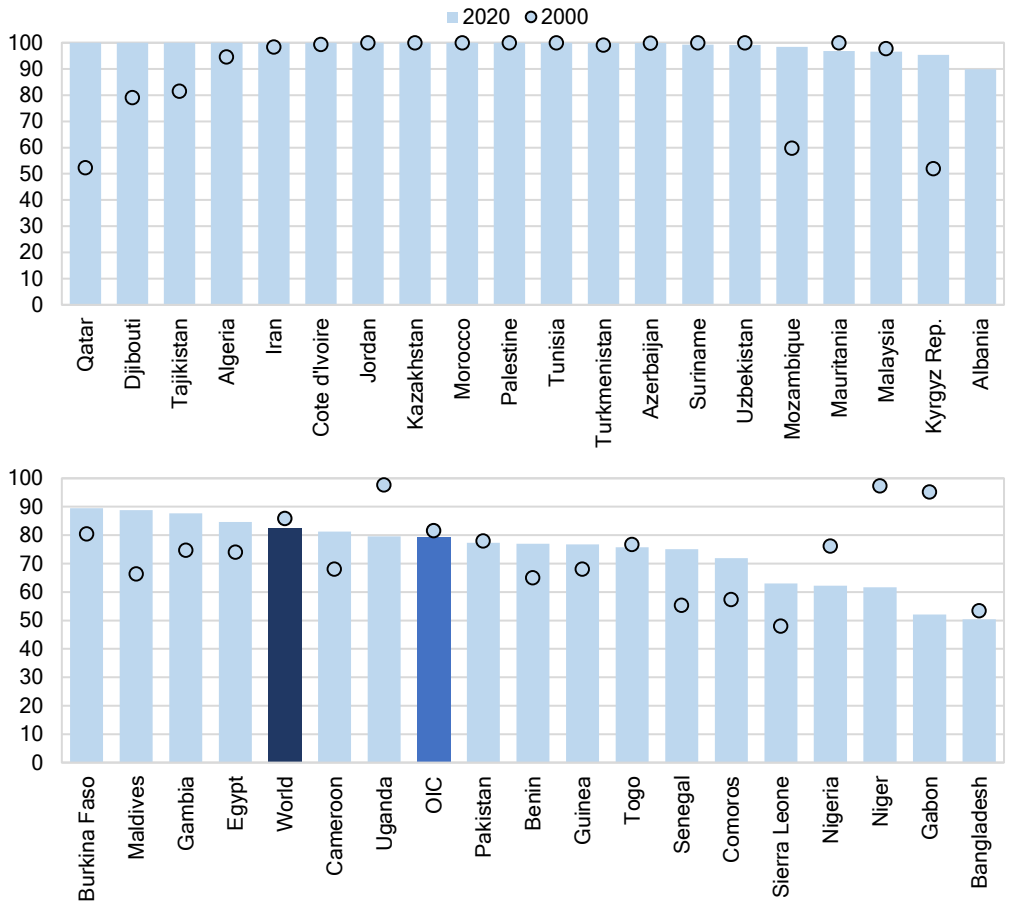
Qualified School Teachers in OIC Countries

Qualified specialists, professionals and overall human resources play a critical role in the development and prosperity of any country. Lacking to provide adequate education for youth hinders the future economic growth of any country. In this regard, adequately trained teachers are considered important for the long-term progress of a country.

Globally, the proportion of teachers in primary education with at least minimum teacher training was 82.5% in 2020. In comparison, it was 79.4% for the OIC countries group based on data of 37 member countries. As of 2020, 19 member countries had over 95% of

primary level teachers who received organised teacher training. On the other hand, the proportion of teachers in primary education that received minimum required training have decreased in 12 OIC countries between 2000 and 2020. Among these countries, visible degradation, either in terms of annual rate of change or total change between the two years, can be observed in four OIC countries (Figure 2).

Figure 2: Proportion of Teachers in Primary Education who have Received at least Minimum Organized Teacher Training, 2000 vs. 2020



Source: SESRIC, Towards the Achievement of Prioritised Sustainable Development Goals in OIC Countries 2022.

Educational Attainment

Educational attainment, at least completed upper secondary, for population ages 25+ is the percentage of population ages 25 and over that attained or completed the corresponding education level. Upper secondary education is typically designed in

preparation for tertiary education or provides skills relevant to labour market entry, or both.

There is a large disparity across the 26 OIC countries with available data between 2015 and 2021 in terms of educational attainment rate (completed upper secondary education or higher, ages 25+). In 2021 (or most recent year available), the percentage of population with ages 25+ who completed upper secondary education or higher ranged between 5.4% (Mali) and 97.4% (Kazakhstan). Thus, the highest and lowest educational attainment rates across the OIC countries are more than 90 percentage points for the attainment of upper secondary education or higher among the population with ages 25 or older.

Gender Parity

As of 2020, 17 OIC countries out of 29 countries with available data have recorded a gender parity or disparity in favour of girls in completion rate in primary education. In lower secondary level education, gender parity in favour of girls in completion rate has been achieved by 13 OIC countries out of 29 with available data in 2020 (or most recent year). Similarly, in upper secondary level education, gender parity has been achieved by 11 OIC countries out of 29 member countries with available data.

Graduation Rates in Social Sciences, Arts and Humanities in Tertiary Education

The UNESCO Institute for Statistics (UIS) disseminates the percentage of graduates from Social Sciences (together with Journalism and Information programmes), Arts and Humanities programmes in tertiary education (both sexes) for 25 OIC countries. Based on the last year available data (2020 and 2021), the share of graduates from Social Sciences programmes in tertiary education was over 10% in only nine OIC countries (Turkmenistan, Bangladesh, Burkina Faso, Algeria, Qatar, Mauritania, Morocco, Türkiye, and Benin). Whereas, the share of graduates from Arts and Humanities programmes in tertiary education was over 10% for only 13 OIC countries (Bangladesh, Mauritania, Burkina Faso, Algeria, Saudi Arabia, Turkmenistan, Jordan, Morocco, Tunisia, Türkiye, Bahrain, Oman, and Qatar).

PRIORITY 2: MAKING PEOPLE EMPLOYABLE: EDUCATION AND SKILLS

Every OIC Member State shall increase public investments at all levels. It is imperative to ensure universal and equitable access to education up to the secondary level, irrespective of gender, coupled with major investments in development of skills and vocational training for the youth as well as adults. A better balance also needs to emerge between graduate and post graduate education. There is a general consensus that proficiency in mathematics and science, as well as computer skills are essential enablers for learning, generation of new knowledge, enhanced competitiveness, and providing decent employment with decent jobs and wages, leading to a new set of entrepreneurs.

Recommendations and Targets:

i. Consider increasing the allocation for all tiers of education to a minimum of 8% of annual national budgets in accordance with the relevant national legislation in each member state.

ii. Focus on the technical and vocational levels and development of common curricula and standards for enhanced productivity in agriculture, industry and service sectors, with a target of minimum 20% enrolment in technical / vocational education among the 15-19 year age cohort. In this regard it is important to engage industrial and professional organizations.

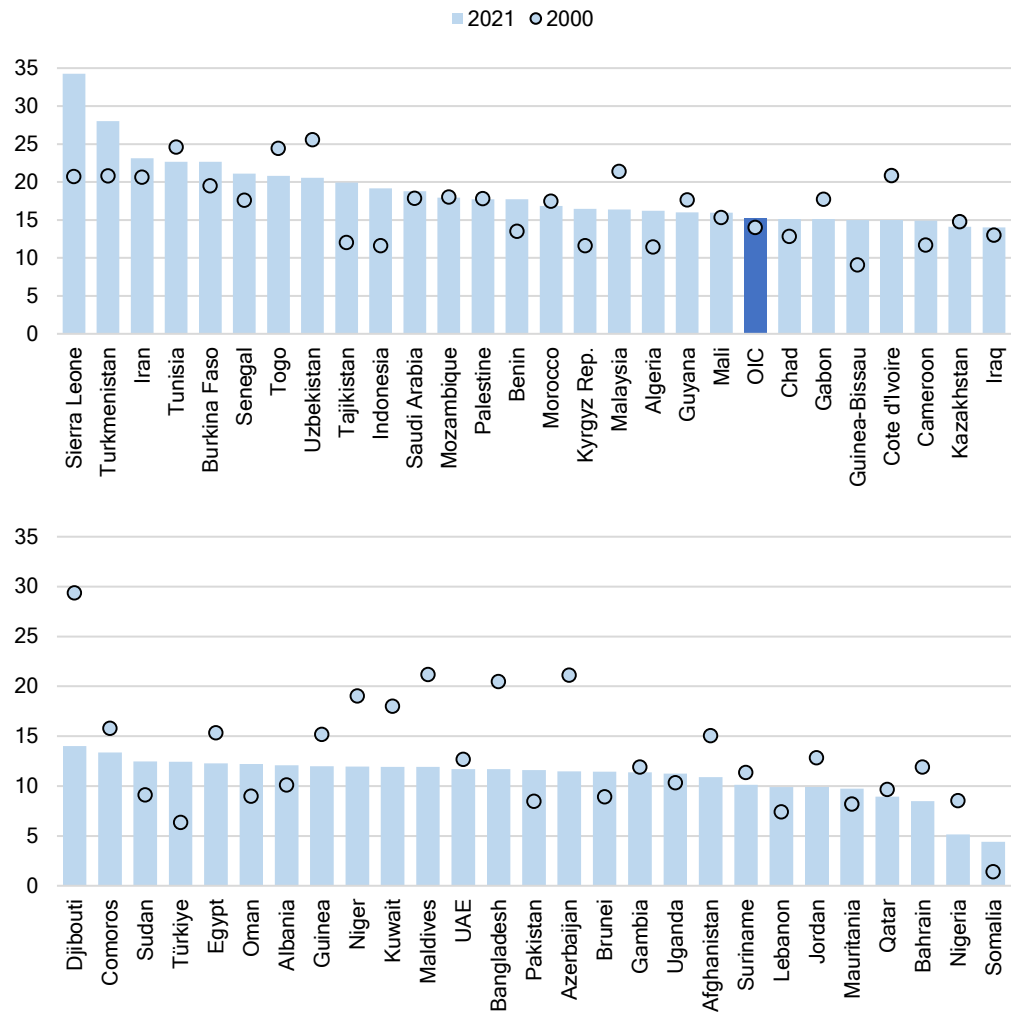
iii. Elevate STEM education (science, technology, engineering, mathematics), as a key priority in OIC Countries, while skills in ICT and digital technology must be made compulsory at all tiers of education, especially in high schools, where appropriate.

The Current Situation:

Total Public Spending on Education

The share of government spending on education in total public spending in the OIC countries group has grown from 14% to 15.2% in the period 2000-2021. At the individual country level, the share of government spending on education in total public spending increased across 27 OIC countries in the same period. Progress has been most noteworthy for seven OIC countries (Chad, Benin, Algeria, Kyrgyz Republic, Guinea-Bissau, Indonesia, and Tajikistan) which were below the 15% threshold in 2000 but succeeded to achieve by 2021 the target of Incheon Declaration (calling for the allocation of the total public spending on education in the range of 15%-20%) (Figure 3).

Figure 3: Proportion of Total Government Spending on Essential Services, Education, Percent, 2000 vs. 2021



Source: SESRIC, Towards the Achievement of Prioritised Sustainable Development Goals in OIC Countries 2022.

Technical and Vocational Education

The UIS disseminates data on the proportion of upper-secondary and post-secondary non-tertiary students enrolled in vocational education for 17 OIC countries. Based on the last year available data (2016 to 2021), the proportion of upper-secondary and post-secondary non-tertiary students enrolled in vocational education were over 10% for 12 OIC countries (Kazakhstan, Azerbaijan, Kyrgyz Republic, Bahrain, Niger, Djibouti, Cameroon, Morocco, Togo, Saudi Arabia, Bangladesh, and Tunisia). Out of these

countries, six of them (Kazakhstan, Azerbaijan, Kyrgyz Republic, Bahrain, Niger, and Djibouti) have already achieved the target of minimum of 20% enrolment in technical/vocational education in of upper-secondary and post-secondary non-tertiary schools.

Share of Youth Not in Education, Employment or Training

The share of youth (aged 15-24) not in employment, education or training represents a measure of youth who are outside the educational system, not in training and not in employment. It is also known as the "NEET rate". It serves as a broader measure of potential youth labour market entrants than youth unemployment as it also includes youth outside the labour force such as discouraged worker youth as well as those who are outside the labour force due to disability or engagement in household chores among other reasons.

Based on the most recent data from UNSD Global SDG Indicators Database, the performance of the OIC countries concerning the youth NEET rate has been quite heterogeneous. Out of 30 OIC countries with data available, the youth NEET rate decreased in 16 of them and increased in 14 of them between 2000 (or earliest year available) and 2021 (or latest year available). At the individual member country level, the situation is generally less favourable. More than one fifth of youth was not engaged in employment nor in education and training in 25 out of 30 OIC countries with available data in 2021.

STEM (Science, Technology, Engineering, Mathematics) Education

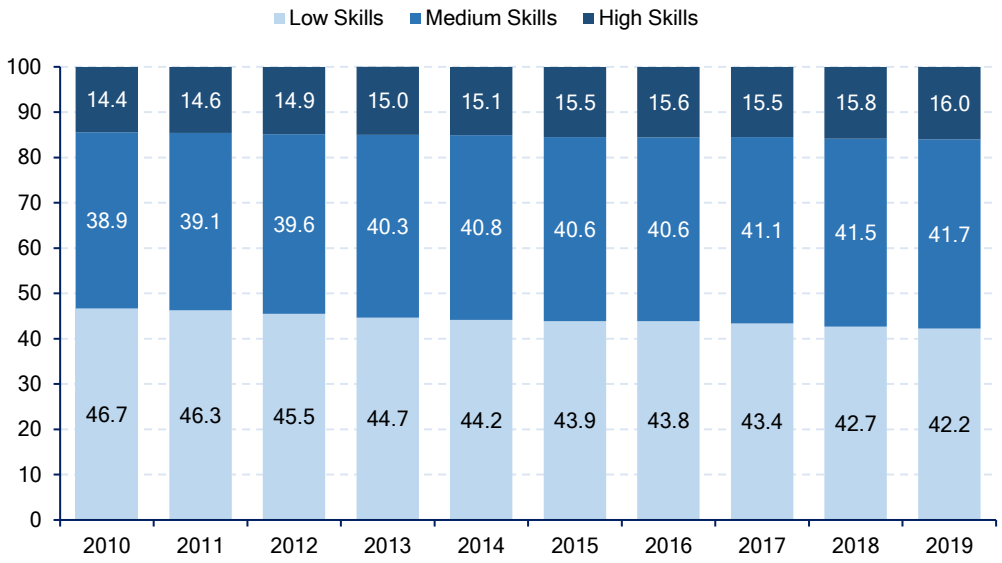
The UIS disseminates the data on percentage of graduates from Science, Technology, Engineering and Mathematics (STEM) programmes in tertiary education (both sexes) for 30 OIC countries based on the last year available data (from 2017 to 2021). The share of graduates from STEM programmes in tertiary education was over 30% for 10 OIC countries (Turkmenistan, Oman, Iran, Malaysia, Brunei, Tunisia, Mauritania, UAE, Uzbekistan, and Algeria). Based on the latest data available for the period 2017 and 2021, 10 member countries were observed to increase their percentages of graduates from STEM programmes and 15 of them recorded decreases.

Employment by Skills Levels

Figure 4 shows the distribution of workers in the OIC countries by their skills levels based on their occupations under three categories of low, medium, and high skills. While the shares of employed people with medium and high skills increased, the share of employed

people with low skills is falling over the years across the OIC countries. The share of people with medium and high skills reached 41.7% and 16%, respectively in 2019 as compared to 38.9% and 14.4% in 2010. The share of people with low skills in total employment, however, decreased from 46.7% in 2010 to 42.2% in 2019.

Figure 4: Skills Levels in OIC Countries, 2010-2019



Source: SESRIC, OIC Labour Market Report 2020.

PRIORITY 3: SAFETY OF WATER, FOOD AND THE ENVIRONMENT

Food safety and security is affected by several factors. First, the "green" revolution is essentially over and high growth rates in agriculture will not be sustained through current technology, practice and attitudes alone. Second, the use of genetically modified seeds is increasing. Third, climate change has increased the vulnerability of farming communities. Fourth, food processing is widespread. This brings about long shelf life of products.

Recommendations and Targets:

a) Water Use, Re-cycling, and Management:

i. Increase efficiency in water use and combat desertification through the use of new technologies and farming methodologies;

ii. Aim for maximum recycling of urban waste water;

iii. Prepare national water budgets at the 'local' levels where possible, supplemented by monitoring of sub-aquifers, glaciers, and loss in canals;

b) Farm Productivity and Plant Biodiversity:

i. Encourage setting up National Gene Banks for conservation and exchange of PGR (plant genetic resources) with research centres in Member States;

ii. Undertake legal and other measures in Member States for protection of the 'geographical' origin' of their traditional foods and crops;

iii. Increase farm productivity through sharing and adoption of modern and indigenous technology, based on specific case studies and best practices in the world;

iv. Promote cooperation in the development and adaptation of the concept of "personalized agriculture", which is the transfer of knowledge and experience of modern sciences to a specific genotype of crops based on its response to a specific environment, soil, fertilizer, water and bio-stimulators".

c) Food Safety and Halal Standards:

In concert with the Islamic Organization for Food Security (IOFS) and Standards and Metrology Institute for Islamic Countries (SMIIC) and national legislations;

i. Re-organise National Food Safety Authorities for integration of safety and security of the entire food chain, from the land to the factory and the table by verification of hygienic, nutritional and organoleptic qualities;

ii. Ensure proper identification to avoid adulteration and misrepresentation;

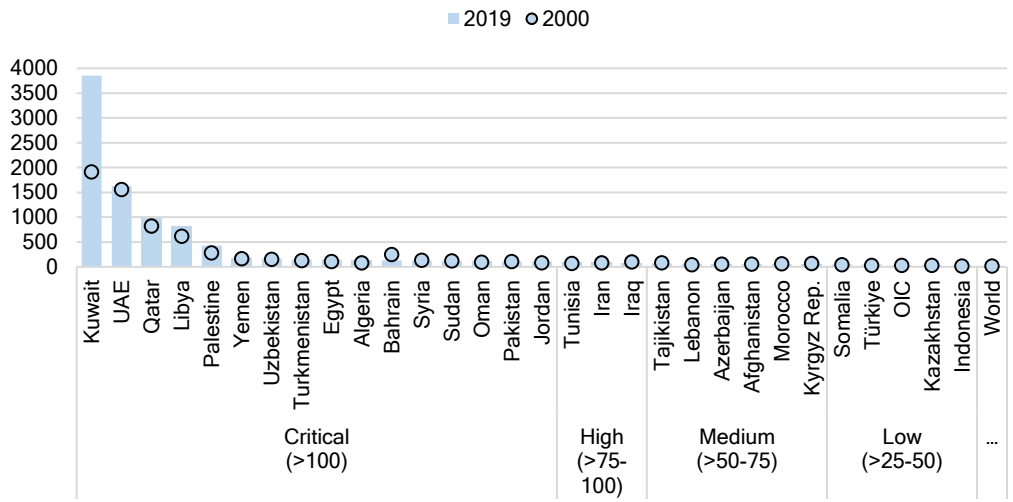
iii. Encourage Member States to consider implementing International Standards such as IFS (Food Safety initiative), BRC (British Retail Consortium), EurepGAP (European Retail Protocol for Good Agricultural Practice), and ISO 22000 (Food Safety Management System) as well as the OIC/SMIIC standards and national legislations of the Member States.

The Current Situation:

Water Stress & Water-Use Efficiency

The global water stress level was estimated at 18.55% while the average stress level for the group of OIC countries was observed at 33.11% in 2019 corresponding to a low water stress level. At the individual country level, there were 29 OIC countries undergoing water stress (>25%), 19 of which were experiencing high (>75% – 100%) and critical (>100%) water stress levels (Figure 5). Most OIC countries that suffer water stress were the ones in arid and semi-arid regions where water resources are scarce.

Figure 5: OIC Countries by Water Stress Level, Percent, 2000 vs. 2019



Source: UNSD, Global SDG Indicators Database. * The earliest year for world average is 2015.

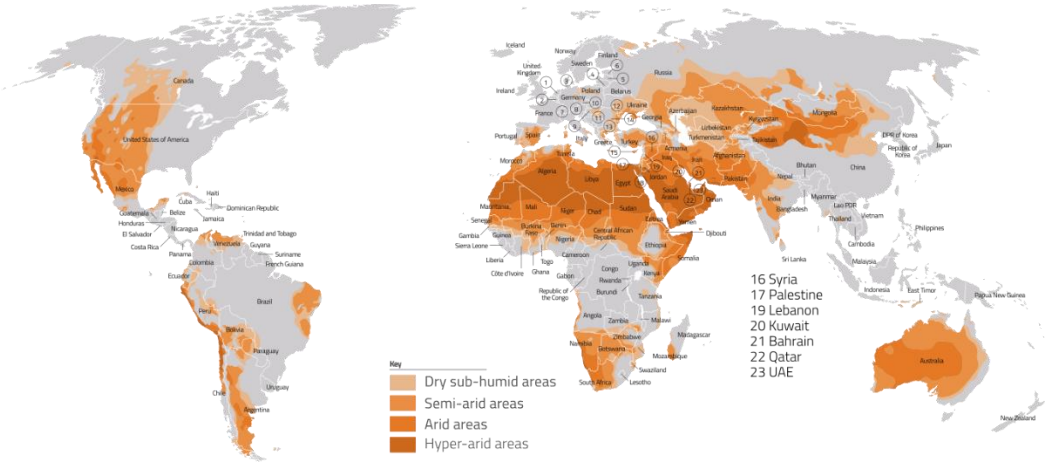
According to the data made available at the Global SDG Indicators Database (UNSD, 2022), water-use efficiency (WUE) is approximately 19.4 USD per m^3 around the world in 2019. According to the analysis of SESRIC (2022), 18 out of 54 OIC countries with available data have WUE values above the world average. Among the other 36 OIC countries – with WUE values below the world average – Tajikistan, Kyrgyz Republic, Afghanistan, and Somalia have

values even less than 1 USD per m^3. Generally, countries with a technologically advanced agriculture sector have higher water use efficiencies (FAO, 2018).

Desertification

Vulnerability to desertification is largely high and very high especially among the OIC countries located in ECA and SSA. Member countries in the MENA region also have substantial coverage of hyper-arid and semi-arid areas. Some member countries are particularly vulnerable due to the high prevalence of dryland systems (Map 1, UNCCD).

Map 1: World Map of the Drylands



Wastewater Treatment

According to the latest data from AQUASTAT Database of the FAO, about 19.03 km^3 of municipal wastewater was treated in the OIC countries in 2019. Around 3.35 km^3 of the treated municipal wastewater was directly used. Disparities of treated wastewater and its direct-use exist in the OIC countries. Member countries in the MENA region account for 56.9% of total treated wastewater in OIC and more than 97.1% of OIC's total direct-use of treated wastewater. Top five OIC countries with largest direct utilization of treated wastewater are Egypt, UAE, Syria, Saudi Arabia, and Jordan.

Agricultural Productivity

Between 2010 and 2020, agricultural land productivity of the OIC countries group grew annually by 3.6%. In 2020, the land productivity of the OIC countries group was 580.70 USD (constant 2015) per hectare (ha), compared to the global average level of 759.97 USD (constant 2015) per ha. More than half of the OIC countries had lower land productivity level compared to the world average, most of which were countries in the SSA region. Maldives, Bahrain, Brunei, Egypt, and UAE were among the OIC countries with the highest land productivity. On the other hand, Kazakhstan, Mauritania, Libya, Djibouti,

and Somalia were observed as the lowest land productivity countries in the OIC countries group.

The average use of fertilizers (by total nutrients) per hectare (ha) of the arable land in the OIC countries group climbed up from 69.6 kg in 2010 to 85.6 kg in 2020. In comparison, the world average was 127.7 kg per ha of arable land in 2010 versus 144.6 kg per ha of arable land in 2020.

The latest data on agricultural mechanization is outdated and therefore, the available estimates should be interpreted with caution. As per the available data from FAO on the OIC countries, the total number of tractors per 1000 ha of arable land declined from 11.9 during the period 2000-2002 to 8 in the period 2007-2009. A similar downward trend was also experienced by other country groups. As of 2007-2009, the world average was 11.8 and the average of other developing countries was 11.6. In other words, compared with other developing countries and the world average, the use of tractors in OIC countries remained low.

National Gene Banks and Plant Genetic Resources Status

As per the available information, a few OIC countries do maintain national gene banks. Nevertheless, majority of OIC countries are parties to international biodiversity agreements such as Convention on Biological Diversity in 1992 (57 OIC countries are party) and International Treaty on Plant Genetic Resources for Food and Agriculture in 2001 (44 OIC countries are party). In 2021, plant genetic resources accessions stored ex situ in the OIC countries were reported at around 390 thousand or equivalent to 6.7% of world total.

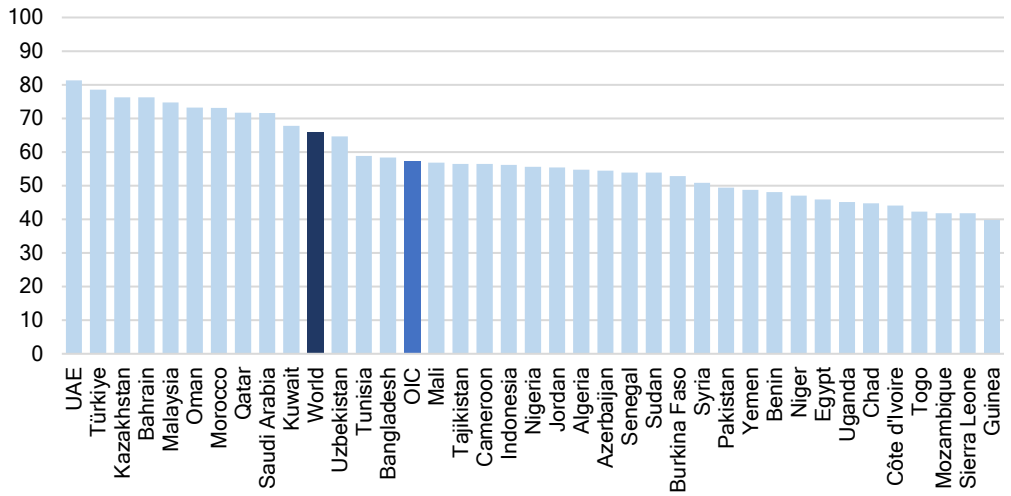
Food Safety & Quality

The Global Food Security Index (GFSI) (The Economist Group, 2022) considers the issues of food affordability, availability, quality and safety, and natural resources and resilience across a set of 113 countries. The index is a dynamic quantitative and qualitative benchmarking model constructed from 68 unique indicators that measure the drivers of food security across both developing and developed countries. Comparing the 2022 GFSI values, the performance of 37 OIC countries with available data is highly variable depending on their geographical location, income status, and current political climate (stability/conflict). On one hand, 14 OIC countries with scores between 60 and 75.2 were among the "good" food security environments in the world. On the other hand, only one OIC country was classified as "weak" food security environments (scores between 20 and 39.9) in 2022.

The GFSI's Food Quality & Safety dimension measures the variety and nutritional quality of average diets as well as the safety of food. Based on the GFSI Food Safety & Quality dimension scores of 37 OIC countries covered in the GFSI 2022, the average of OIC

countries group was 57.4 compared to that of the world with 65.9. Based on the same index, 10 OIC countries (UAE, Türkiye, Kazakhstan, Bahrain, Malaysia, Oman, Morocco, Qatar, Saudi Arabia, and Kuwait) had food quality & safety scores higher than the global average in 2022 (Figure 6).

Figure 6: Food Quality & Safety Dimension of GFSI, 2022



Source: SESRIC staff calculation based on GFSI 2022. Index scores range between 0 and 100 where 100 is most favourable food security environment in the indicated dimension.

In 2022, in terms of food safety sub-indicator of GFSI, 14 out of 37 OIC countries had food safety scores lower than the global average of 76.4. Only one OIC country (Bahrain) achieved a perfect score of 100 in the "Food Safety" sub-dimension. FAO reported that in most SSA countries, poor packaging is one of the main constraints of local food products to compete with imported ones.

Halal Certification Bodies

Currently, 43 OIC countries are members of SMIIC and 30 of them participate in the Technical Committee of Halal Food Issues (TC1) while six countries are observers. Even though there are more than 400 Halal certification bodies worldwide, the recognition of Foreign Halal Certification Bodies (FHCBs) differs from country to country. For instance, in 2020, the International Halal Board Authority (Malaysia) recognized 84 FHCBs from 46 countries, the Assessment Institute for Foods, Drugs, and Cosmetics of Majelis Ulama Indonesia (MUI LPPOM, Indonesia) recognised 45 FHCBs from 27 countries and Emirates Authority for Standards & Metrology (ESMA, UAE) recognised 53 FHCBs from 27 countries (Serunai, 2020). In this connection, SMIIC is about to finalize the establishment of accreditation mechanism enabling a trustworthy certification system that is based on intergovernmental accreditation so that Halal products can move freely on global scale based on OIC/SMIIC standards and related reference documents.

PRIORITY 4: ENSURE HEALTHY LIVES FOR ALL CITIZENS

Together with education and skills, and food security, it is necessary to ensure that the determinants of effective public health are firmly in place to ensure well-being of citizens.

Recommendations and Targets:

i. Strengthen commitment for developing public health systems;

ii. Consider increasing health financing in order to raise it to a minimum of 10% of national budgets by 2025 and allocate nearly half to cover essential scientific healthcare and financial risks in accordance with the relevant national laws in each member state.

iii. Improve training of all para-medics and technicians in conformity with the best international practices;

iv. Consider providing reliable access to safe, effective, quality and affordable essential medicines and vaccines for all, and increase the capacity for their indigenous production;

v. Promote rational use of drugs as a public health priority to confront the challenge of antimicrobial MDR (multiple-drug-resistance);

vi. Create a cadre of trained epidemiologists to reduce the burden of communicable / non-communicable diseases;

vii. Implement fast and cheap diagnostic systems allowing early disease prognosis and containment of epidemic cases;

viii. Promote healthy lifestyle to prevent chronic diseases that would help in reducing expenditure on health;

ix. Encourage R&D in neglected tropical diseases in the OIC Member States;

x. Promote cooperation in alternative healthcare/medicines; tele-medicines; epidemiological studies and R&D for healthcare and pharmaceuticals.

The Current Situation:

Health Expenditure

According to the available data from the WHO, Global Health Expenditure Database (2022), domestic general government expenditure on health as a share of general

government expenditure has substantially increased in the OIC countries group in recent years as it increased from 6.89% in 2000 to 8.83% in 2019. The OIC STI Agenda 2026 encourages the OIC member countries to consider increasing their health financing to a minimum of 10% of their national budgets by 2025. In 2019, only 9 OIC countries (Iran, Maldives, Suriname, Lebanon, Jordan, Tunisia, Saudi Arabia, Algeria, and Guyana) were able to allocate at least 10% or more of their national budgets to health. However, the remaining 42 OIC countries with available data for the same year allocated less than 10% of their national budgets to health.

Immunization Coverage

The proportion of the target population with access to three doses of diphtheria, tetanus, and pertussis (DTP3) refers to the percentage of surviving infants who received the three doses of diphtheria and tetanus toxoid with pertussis containing vaccine in a given year (UNSD, SDG metadata).

In 2020, approximately 83% of the child population worldwide received DTP3 vaccine; likewise, 79% of the child population in the OIC countries group accessed the DTP3 vaccine. The DTP3 vaccination coverage in 30 individual OIC countries was above the global average and in 25 of them, it even reached at least 90% of coverage (Figure 7).

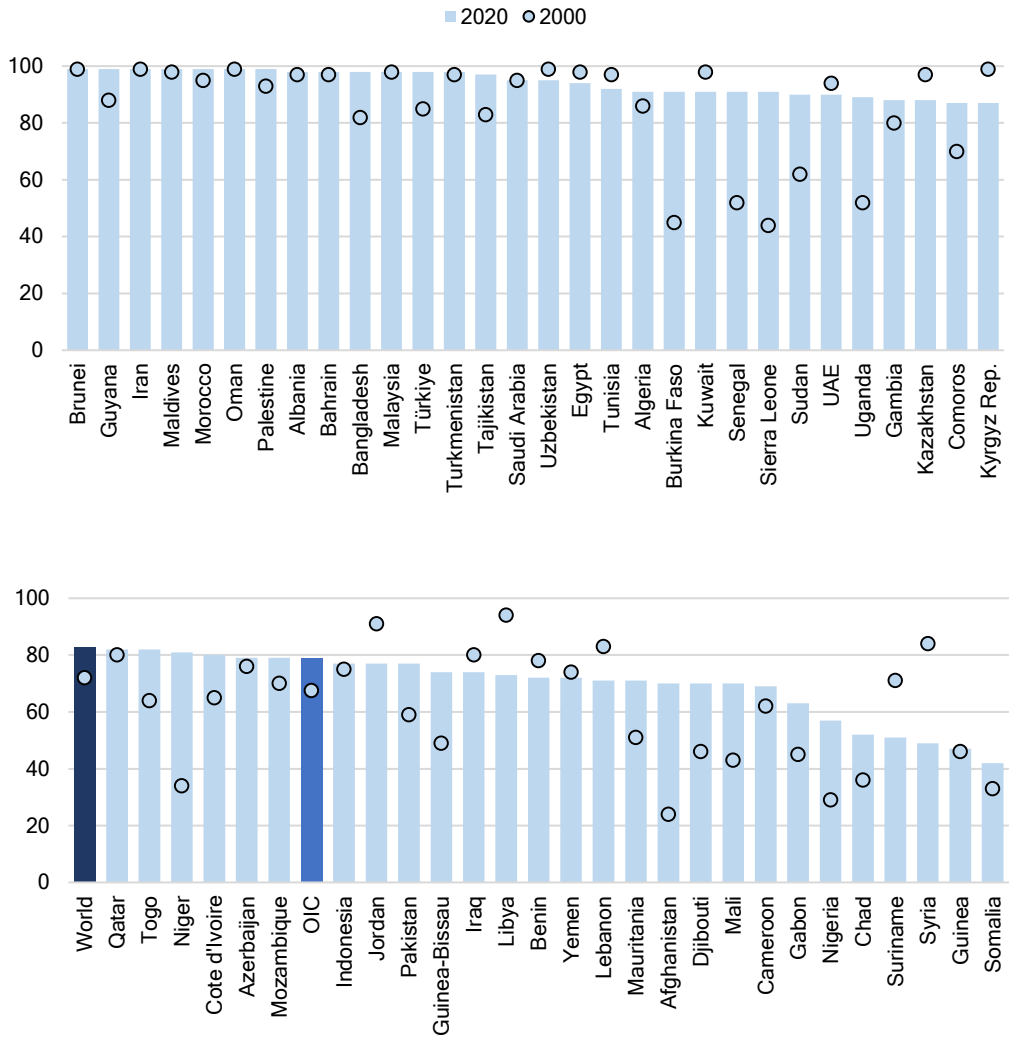
On the other hand, in comparison with pre-COVID-19 pandemic period, access to DTP3 vaccine in the OIC countries group and the world dropped by 3.8 and 3.0 percentage points respectively between 2019 and 2020. In the individual OIC countries, access to the vaccine declined in 35 countries during the pandemic (between 2019 and 2020) and among them, notable declines of more than 10 percentage points were observed in seven OIC countries. The pandemic caused a serious setback to children immunization programs as many countries' responses and vaccination programs were geared towards the fight with COVID-19.

Communicable Diseases

Based on the UNSD Global SDG Indicators Database (2022), the burden of communicable diseases such as tuberculosis and malaria are still high in the OIC countries compared to the world averages. In 2020, 17 OIC countries had incidences of tuberculosis ranging between 135 and 527 per 100,000 population compared to the world average of 127 incidences. Among the member countries, Saudi Arabia, Oman, Jordan, UAE, and Palestine had less than 10 incidences of tuberculosis per 100,000 population in the same year. As to the malaria incidence per 1,000 population at risk, out of 46 OIC countries with available data in 2020, 18 OIC countries had incidences of malaria ranging between 73.4

and 389.9 per 1,000 population at risk compared to the world average of 58.9 incidences. On the other hand, 16 OIC countries had zero malaria incidence per 1,000 population.

Figure 7: Proportion of Target Population with Access to DTP3, Percent, 2000 vs. 2020



Source: SESRIC, Towards the Achievement of Prioritised Sustainable Development Goals in OIC Countries 2022.

Preventing Chronic Diseases

Chronic diseases such as heart disease, cancer, and diabetes emanate from a short list of risk behaviours including tobacco use and exposure to second-hand smoke, poor nutrition, lack of physical activity, and excessive alcohol use.

In 2020, the average rates of age-standardized prevalence of current tobacco use among persons aged 15 years and older were more than 10% in 33 OIC countries and the

prevalence rates were less than 10% in 13 OIC countries. Of the OIC countries with the available data on the age-standardized prevalence of current tobacco use among persons aged 15 years and older, the rates declined in all the countries except four OIC countries between 2000 and 2020 (UNSD, 2022).

In 2019, alcohol consumption levels varied widely across the OIC countries with the lowest per capita consumption levels in 24 OIC countries with less than 1 litre per capita within a calendar year. However, 31 OIC countries had alcohol consumption levels of more than 1 litre per capita within a calendar year with 11 of them having more than 5 litres of consumption per capita within a calendar year. Considering the period between 2000 and 2019, annual alcohol consumption per capita declined in 28 OIC countries with more than 1 litre per person aged 15+ in nine OIC countries (UNSD, 2022).

The OIC countries group progressed well in reducing the prevalence of current tobacco use among persons aged 15+ and per capita alcohol consumption between 2000 and 2019/20 though action is needed to strengthen the prevention of these two harmful substances to promote a healthy lifestyle.

Total Official Development Assistance to Medical Research and Basic Health Sectors

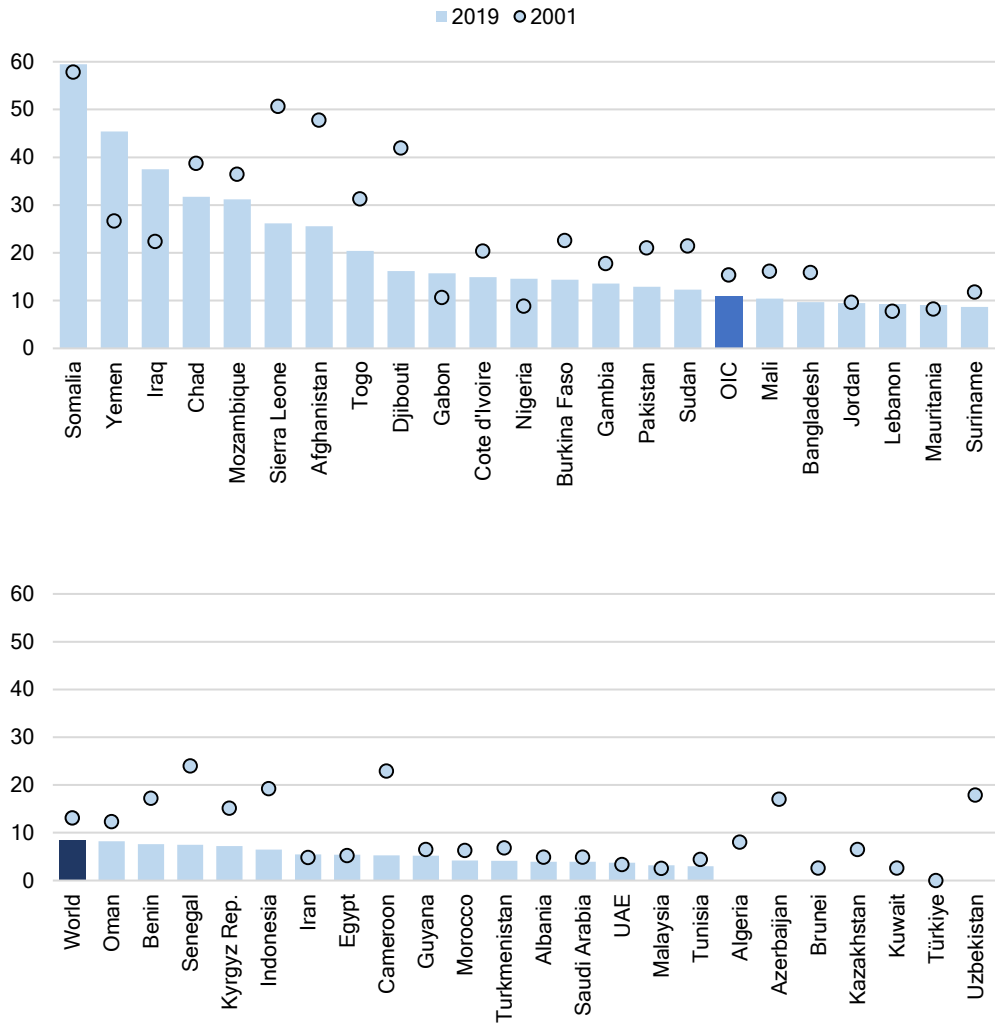
Research is indispensable for resolving public health challenges especially in tackling diseases of poverty, responding to rise of chronic diseases, or ensuring that mothers have access to safe delivery practices among others. In the aspect of cooperation to promote R&D for healthcare and pharmaceuticals, 50 OIC countries have received a net disbursement of total official development assistance (ODA) for supporting their medical research and basic health sectors in 2020. Among them, 17 (Pakistan, Nigeria, Bangladesh, Mozambique, Afghanistan, Uganda, Côte d'Ivoire, Yemen, Palestine, Mali, Morocco, Niger, Burkina Faso, Sudan, Jordan, Indonesia, and Senegal) OIC countries received more than 100 million USD (in constant 2020 prices) of net disbursement of ODA to enhance their medical research and basic health sectors.

Prevalence of Undernourishment

Between 2001 and 2019, the prevalence of undernourishment as percentage of population in the OIC countries group dropped from 15.4% to 11% yet higher than the world averages of 13.1% in 2001 and 8.4% in 2019. At the country level, seven OIC countries (Algeria, Azerbaijan, Brunei, Kazakhstan, Kuwait, Türkiye, and Uzbekistan) already achieved the "zero undernourishment by 2030" goal with proportion of undernourished people below 2.5% of their total populations. Two more OIC countries (Cameroon and Tunisia) are also expected to achieve the set target with a prevalence of undernourishment rate less than 2.5% by 2030. Meanwhile, 11 OIC countries out of 45 with available data have demonstrated regression in tackling the prevalence of

undernourishment. Among them, Somalia (59.5%), Yemen (45.4%), and Iraq (37.5%) had extremely high prevalence rates of undernourishment in 2019 (Figure 8).

Figure 8: Prevalence of Undernourishment, Percent, 2001 vs. 2019



Source: SESRIC, Towards the Achievement of Prioritised Sustainable Development Goals in OIC Countries 2022.

PRIORITY 5: IMPROVE THE QUALITY OF HIGHER EDUCATION AND RESEARCH

With the foundations of education and skilled healthy manpower firmly in place, it will be possible to focus on promotion of higher education and research in emerging areas of science and technology. This requires building up sustainable infrastructure in universities and research institutions, and preparation of programmes for building domestic innovation and technology capabilities.

In an environment of rapid growth in enrolments and expectations from higher education, it is emphasised that these challenges will basically have to be managed by each and every member state itself.

Although several OIC Member States have developed and strengthened national policies in recent years, the quality of higher education and research intensity still lags behind the developed countries.

University education in Member States must move beyond simple expansion in enrolment and faculty numbers or publications, and shift the focus towards contemporary knowledge generation, excellent teaching, expanded international linkages and societal impacts.

Recommendations and Targets:

i. Consider doubling the annual expenditure by 2025 on scientific infrastructure and R&D in those countries which spend less than 0.3% of GDP, and aim for a target of 2.0% in countries which are at a relatively advanced level, in accordance with the relevant national laws in each member state.

ii. Increase the share of Member States in global scientific output (publications and patents) by 100% in the next ten years.

iii. Double the number of R&D workers (all levels of scientific manpower, including certified technicians) per million population.

iv. Increase the share of high technology goods and services in the economies and trade of Member States, aiming for 10% by 2025.

v. Encourage Technology Parks adjacent to leading universities in OIC Member States. This will promote linkages with industry and business.

vi. Aim for a minimum of 50 universities for inclusion among the top 500 universities according to recent international ranking by 2025.

vii. Support the basic sciences and develop ethics and social responsibility;

viii. Make faculty the 'long pole' in the tent of education and research and allow time to build a critical mass of teachers and research groups in key areas, especially for fresh PhDs;

ix. Promote networking and linkages within OIC and with leading world universities for research partnerships sharing of knowledge and experience and best practices.

x. Reduce exclusive dependence on government financing or student fee, by returning to the traditional 'Waqf', as is the case in many universities in the developed countries.

xi. Establish centres for Young Scientists to share their experiences and knowledge and to carry out joint research projects.

The Current Situation:

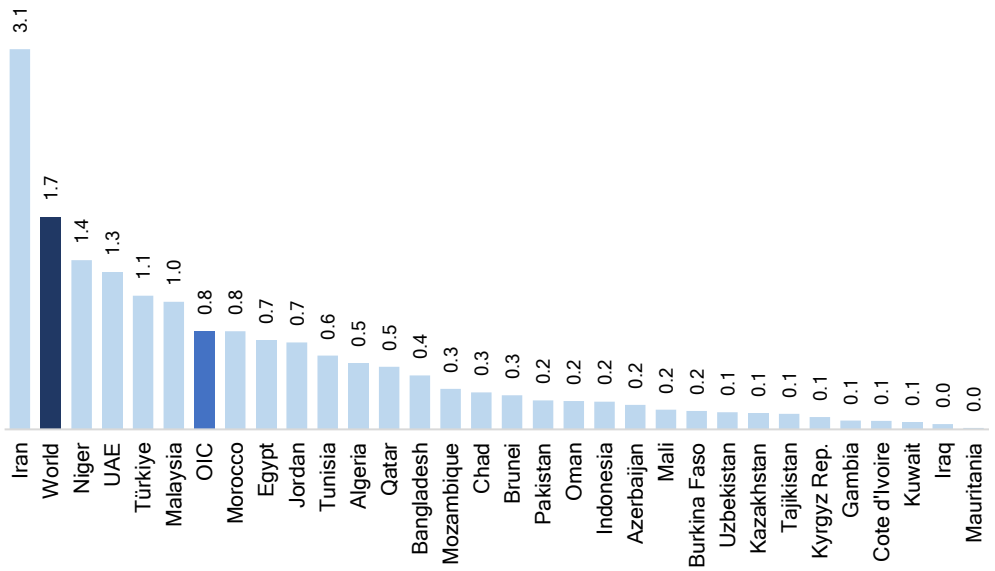
Expenditure on Scientific Infrastructure and R&D

Gross expenditure on R&D (GERD) as a proportion of GDP is the amount of R&D expenditure divided by the total output of the economy. R&D expenditure is a key enabling factor for sustainable and inclusive growth as it is a vital contributor to human capital development by creating knowledge and improving skills (UNSD, SDG 9.5 metadata). A higher R&D intensity could indicate that relatively more resources are devoted to the development of new products or production processes. The OIC economies can increase their competitiveness in the world by strengthening their scientific and technological base.

However, expenditure on R&D in relation to GDP of the OIC countries group is only 0.8% in 2021 or the latest year with available data. On the other hand, the world average (1.7%) was more than two times of the OIC average (Figure 9).

At the individual OIC country level, only Iran, Niger, the United Arab Emirates, Türkiye, and Malaysia exceeded an R&D expenditure above or equal to 1% of GDP based on the latest year available data (spanning from 2016 to 2021) across the OIC countries. Moreover, as Figure 9 clearly indicates all OIC countries except Iran with data available are lagging behind the world average in R&D spending. Thus, more concerted efforts in R&D are urgently needed to enhance research capabilities of the OIC countries.

Figure 9: GERD as a Proportion of GDP, %, 2021 or Latest Year Available



Source: SESRIC staff calculations based on data from the Questionnaire for the Mid-Term Review of the Implementation of the OIC-2025 POA and Global SDG Indicators Database of the UNSD accessed on 08/06/2022.

Articles Published and Patents

Articles published refer to the number of scientific articles published in journals covered by Science Citation Index Expanded (SCI-EXPANDED), Social Science Citation Index (SSCI), Arts & Humanities Citation Index (A&HCI), Book Citation Index– Science (BKCI-S), Book Citation Index– Social Sciences & Humanities (BKCI-SSH) and Emerging Sources Citation Index (ESCI). Number of articles published in the international academic journals by the OIC countries group has increased significantly over the last decade from 94,497 in 2010 to 361,474 in 2021. Based on the progress demonstrated during this period, 50 OIC countries are expected to a doubling (or more) of their articles published in 2017 by the end of 2026.

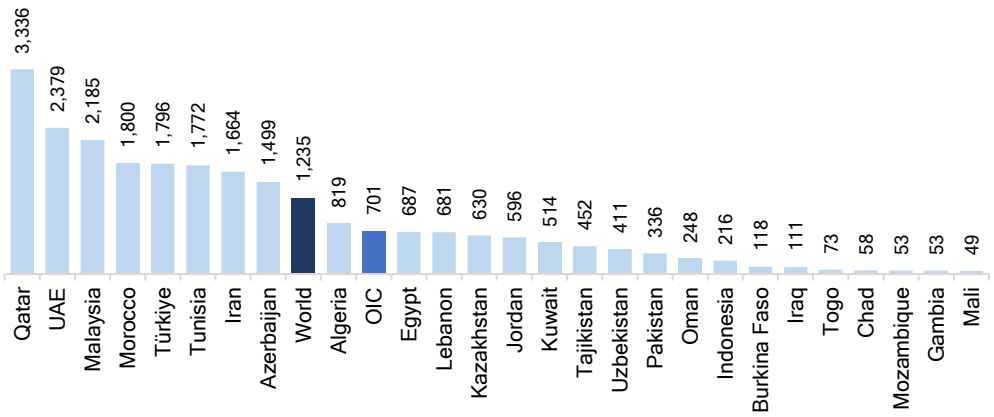
On the other hand, number of patent applications of OIC countries increased from 39,942 in 2010 to 53,567 in 2020. This progress rate is not sufficient to achieve the target of increasing output by 100% in the next ten years. At the individual OIC country level, Iran made the largest number of patent applications (12,030) among the OIC countries, accordingly, claimed 22.46% of the total OIC patent applications in 2020. Following Iran came Indonesia and Türkiye (each with 15.23%), Malaysia (12.75%) and Saudi Arabia (6.66%) of the total patent applications filed in the group of OIC countries in the same year.

Researchers

The availability of abundant and highly qualified researchers is an essential condition to foster innovation and promote the scientific and technological development of a country. The researchers (in full-time equivalent) per million inhabitants is a direct measure of the number of R&D workers engaged in the conception or creation of new knowledge per million people. The full-time equivalent of R&D personnel is defined as the ratio of working hours actually spent on R&D during a specific reference period (usually a calendar year) divided by the total number of hours conventionally worked in the same period by an individual or by a group (UNSD, SDG metadata).

In 2021 or the latest year with available data, the average number researchers per million inhabitants in the OIC countries group was 701, which was considerably below the world average of 1,235 (Figure 10). Moreover, large disparities exist across the OIC countries in terms of the number of researchers per million inhabitants. It was highest in Qatar, UAE, Malaysia, Morocco, Türkiye, Tunisia, Iran, and Azerbaijan with over 1,000 researchers; however, it was significantly lower in some OIC countries mostly in Africa, namely Togo, Chad, Mozambique, Gambia, and Mali with less than 100 researchers based on the latest year available data (spanning from 2016 to 2021).

Figure 10: Researchers (in Full-Time Equivalent) per Million Inhabitants, 2021 or Latest Year Available



Source: SESRIC staff calculations based on data from the Questionnaire for the Mid-Term Review of the Implementation of the OIC-2025 POA and Global SDG Indicators Database of the UNSD accessed on 08/06/2022.

Higher Education World University Rankings

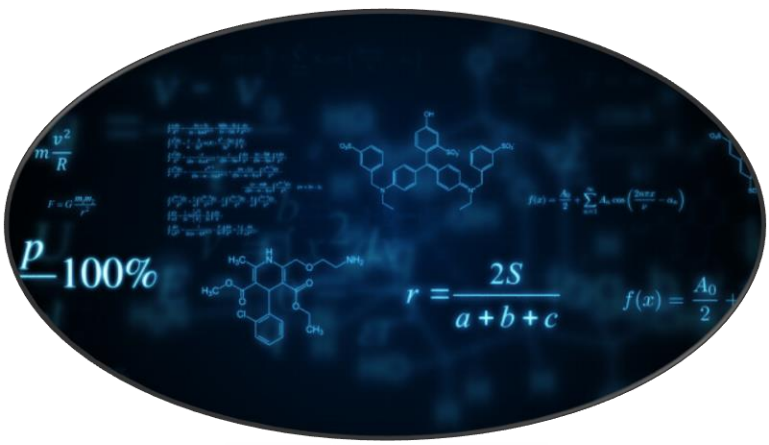
According to the Times Higher Education World University Rankings 2023 that includes 1,799 universities across 104 countries, 35 universities in 12 OIC countries are ranked in top 500. In comparison, according to World University Rankings by Round University

Ranking that evaluates performance of 1,019 leading higher education institutions in the world, 25 universities in eight OIC countries were ranked in top 500 higher education institutions globally in 2022.

Intra-OIC Cooperation for the Advancement of Science, Technology and Innovation

In order to expand the scientific and technological progress of OIC countries, the "OIC-15 Dialogue Platform" was proposed by Kazakhstan. The platform will bring together 15 leading OIC countries with strong credentials in the STI field to suggest practical measures to help the OIC countries in their efforts for the development of STI. A brainstorming session was held in Almaty, Kazakhstan to deliberate upon various aspects of the establishment of the platform with the participation of representatives of member countries, the OIC General Secretariat, OIC Institutions (COMSTECH, SESRIC, IOFS) and officials from Al Farabi Kazakh National University on 19 November 2019.

PRIORITY 6: THE CASE FOR MATHEMATICS AND PHYSICS; BIOLOGY AND BIOTECHNOLOGY; AND THE CHEMICAL SCIENCES



Basic sciences have quite often been neglected at the altar of patents and economic gains, even though these have unintended disruptive consequences for society at large.

The trend is now for multidisciplinary research with mathematics, physics, biology, chemistry, material science, and computers coming together to create a complete new value set, including exciting new measurement and characterisation tools for industry and the sciences.

At the theoretical level, mathematics and physics have always produced excellent science in areas of general relativity and gravitation, cosmology, particle physics, group theory and nonlinear problems.

The 21st century will probably belong to biology and new materials. The drug discovery paradigm has shifted from the traditional hit-and-miss affair to computer aided drug design for target-based discovery to improve bioavailability and biological activity.

The excitement in recent years is the application of quantum mechanics to molecular and chemical systems resulting in designer molecules. Computational chemistry and computational biology now offer the possibility of manipulating atoms and molecules to create totally new entities, systems, membranes, materials, and also fuel cells, which are critical for energy storage.

Recommendations and Targets:

i. Promote physics and mathematics at all levels, from the school to the university, since their rigorous foundations provide excellent applications in research and industry.

ii. Invest in the better physics centres in OIC Member States to enable them to grow into 'Mother Institutes', focussing on specific groups of activities, which can be shared by other countries.

iii. Encourage designing and development of modern teaching equipment and aids for schools and universities (this capability exists already in some countries, and can be shared).

iv. Expand work on biotechnological tools, using novel strategies and animal models;

v. Support and leverage indigenous knowledge and medicine;

vi. Expand research in genomic and proteomics studies, regenerative medicine for congenital defects, disease, trauma and ageing, and cultivation of medicinal plants;

vii. Apply biotechnology and Next Generation Sequencing for personalized medicine, and development of antibodies and recombinant antibodies for disease detection and theranostics;

viii. Initiate and expand research and development of biosensors and rapid and cheap disease detection kits (real time monitoring, serologic detection system, DNA/RNA arrays);

ix. Manage issues related to patents for bio-similars, or indefinite extension of pharmaceutical patents through 'data exclusivity';

x. Support nanosafety as a means for safer design of nanomedicine;

xi. Assist academia and industry for research in industrial high value-added chemicals, catalysts, polymers, composites/non-composites, nano-materials;

xii. Expand research in fuel cells as priority;

xiii. Employ regional high-performance computation centers (HPCCs) in Member States to be shared by researchers from all Member States.

xiv. Encourage research in the design of electrical and mechanical systems.

The Current Situation:

Scientific and Technical Journal Articles

The World Bank disseminates the data on scientific and technical journal articles for 57 OIC countries through its World Development Indicators (WDI) Database based on the data extracted from US National Science Foundation (NSF), Science and Engineering Indicators Database. The data covers the number of scientific and engineering articles published in the following fields: physics, biology, chemistry, mathematics, clinical medicine, biomedical research, engineering and technology, and earth and space sciences.

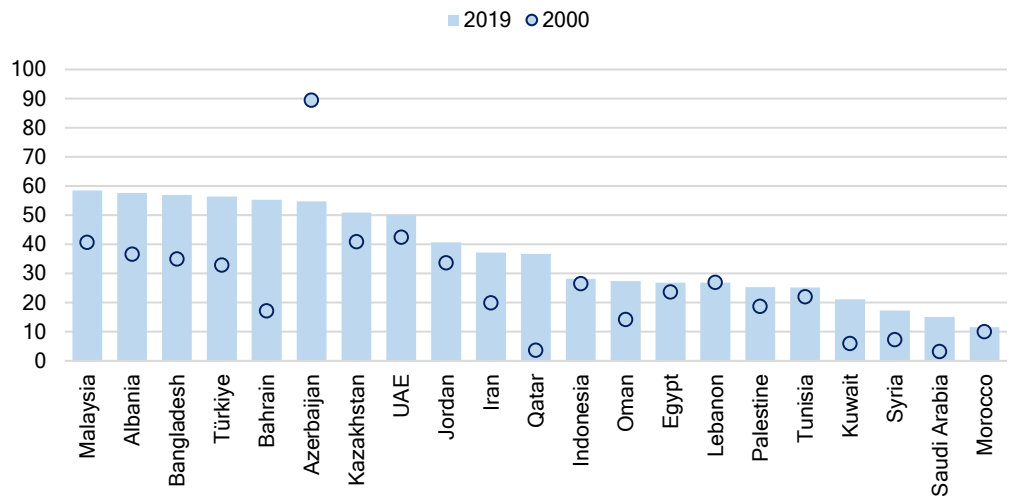
In 2020, the number of scientific and technical journal articles were over 5,000 for 12 OIC countries (Iran, Türkiye, Indonesia, Malaysia, Egypt, Saudi Arabia, Pakistan, Iraq, Nigeria, Morocco, Algeria, and Tunisia). With the pace of growth recorded since 2000, 56 OIC countries have experienced an improvement in the number of scientific and technical journal articles published. However, the improvement was in different degrees. In 27 OIC countries, the annual exponential growth rate was over 10%, 23 OIC countries were

observed to be between 5% and 10%, and remaining seven OIC countries' annual exponential growth rates were below 5% during the 2000-2020 period.

Proficiency in Mathematics

19 of 21 OIC countries with available data demonstrated an increase of approximately more than 1.5 percentage points in the proportion of students achieving minimum proficiency in mathematics in lower secondary from 2000 to 2019 or latest year available. Eight OIC countries with the proportion of students achieving minimum proficiency in mathematics in lower secondary with 50% or more were Malaysia (59%), Albania (58%), Bangladesh (57%), Türkiye (56%), Bahrain and Azerbaijan (55% each), Kazakhstan (51%) and UAE (50%) in 2019 or latest year available (Figure 11).

Figure 11: Proportion of Children and Young People Achieving a Minimum Proficiency Level in Mathematics, Lower Secondary, Both Sexes, Percent, 2000 vs. 2019



Source: UNSD, Global SDG Indicators Database. Only 11 OIC countries reported 2019 data. The latest year available data of remaining OIC countries correspond to years between 2009 and 2018.

R&D Expenditure by Fields

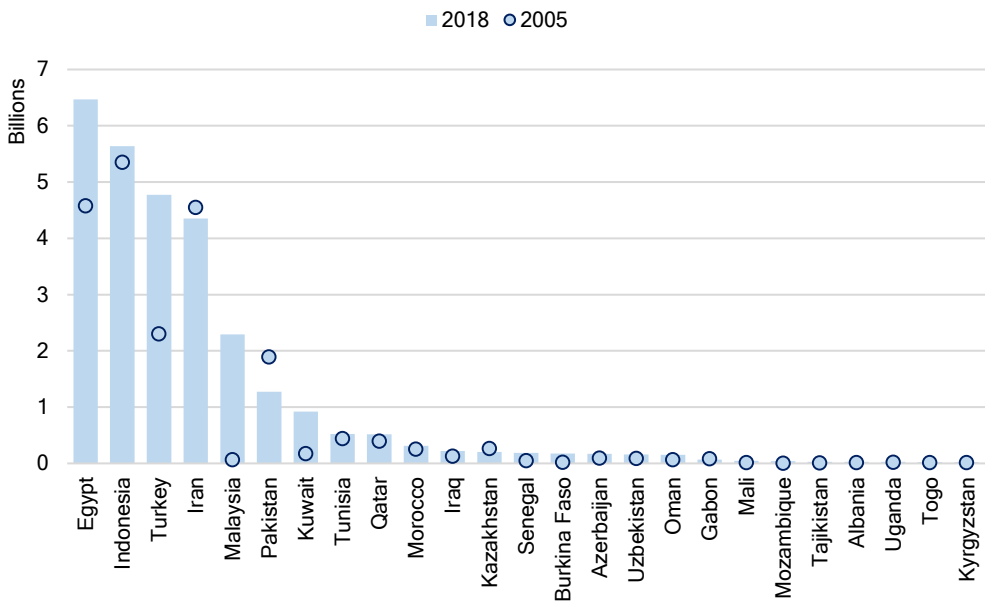
The UIS disseminates the total intramural expenditure on R&D data performed during a specific reference period, broken down by the following fields of research and development (R&D): natural sciences, engineering and technology, medical and health sciences, agricultural and veterinary sciences, social sciences, and humanities and the arts. The number of available data varies between 22 and 24 OIC countries according to the fields as end of February 2022.

For the R&D expenditure on natural sciences, 10 out of 12 OIC countries have experienced an improvement from 2005 to 2018 in terms of constant 2005 USD PPP at the pace of growth over at least a five-year time span. Similarly, it is also observed that the R&D expenditure have increased in 10 out of 12 OIC countries in engineering and technology, in 8 out of 11 OIC countries in medical and health sciences, in 8 out of 10 OIC countries in agricultural and veterinary sciences, in 11 out of 12 OIC countries in social sciences, and in 9 out of 10 OIC countries in humanities and the arts. Overall, the majority of OIC countries with data available have increased their R&D expenditures in different fields from 2005 to 2018.

Government Expenditure on R&D

Among 25 out of 57 OIC countries with available data, 10 OIC countries (Malaysia, Burkina Faso, Kuwait, Mozambique, Senegal, Tajikistan, Uzbekistan, Mali, Oman, and Türkiye) increased their government R&D spending more than double and this growth was more than 50% in four more OIC countries (Albania, Iraq, Azerbaijan, and Qatar) during the period 2005-2018 (Figure 12).

Figure 12: Government Expenditure on R&D, Billions of Constant 2005 USD PPP, 2005 vs. 2018



Source: UIS, UIS.Stat Database. Only 11 OIC countries reported 2018 data. The latest year available data of remaining OIC countries correspond to years between 2008 and 2017.

Medium and High-Tech Industry Value Added

A modern, intricate production structure based on R&D and innovation offers better opportunities for skills development and economic growth. Industrial development requires a structural transition from resource-based and low technology activities to medium and high-tech (MHT) industry activities. The proportion of MHT industry value added in total value added of manufacturing (MVA) is a ratio value between the value added of MHT industry and MVA. The share of MHT in total MVA increased by 1.7 percentage points from 31.2% in 2000 to 32.9% in 2019 in the OIC countries group. In contrast, the world witnessed a decrease around 1.6 percentage points from 46.7% in 2000 to 45.1% in 2019.

At the country level, the proportion of MHT industries in total MVA increased by more than 10 percentage points in six OIC countries (Qatar, Oman, Kuwait, Saudi Arabia, Bahrain, and Kazakhstan). Overall, while the share of MHT manufacturing increased in 18 OIC countries, it stagnated in nine of them and decreased in 15 OIC countries during the 2000-2019 period. Only Qatar had a higher share of MHT manufacturing than the world average in 2019.

PRIORITY 7: MANAGING BIG DATA WITH SECURITY IN THE DIGITAL ECONOMY

Information and Communication Technology (ICT) is a major catalyst and enabler for socio-economic development with a strong footprint in many sectors where it can directly add value.

ICT is also a unique factor in the emerging relationship between science and society in the 21st century digital economy, whereby physical proximity is no longer necessary in making key decisions, or implementing them. This requires seamless matching of transnational skills, which can facilitate low cost solutions in developing countries.

However, availability of wider bandwidth, cheap storage and easy access to the digital media, the internet, and social networking and personal management, has exposed the vulnerability of individual privacy and privileges, especially the well-being of young children.

Recommendations and Targets:

i. Review cyber security strategies, programmes and laws and best practices in leading OIC countries for their uniform adoption and to cooperate in case of cyber-attack.

ii. Counter the adverse effect on young children, and protect them by disseminating awareness about better parental control/ child protection tools;

iii. Review curricula and delivery of IT education, in order to bridge the academia / industry gap, and undertake 'train the trainer' courses, workshops and security exercises.

iv. Harmonize regulatory policies, frameworks and IP laws to facilitate easier sales, and commissioning of IT products and services across Member States.

v. Connect OIC Member States through secure, high speed, fibre-optic land and sea-based networks and satellite links. This would need to be a secure intra-OIC network in addition to SEAMEWE 3 and SEAMEWE 4, with service nodes within the OIC Member States, in order to avoid disruption and enhancing security;

vi. Ensure faster transition to e-government for faster and more transparent decision making;

vii. Protect TLDs with Islamic identities at the Internet Corporation for Assigned Names and Numbers (ICANN) through a coordinated approach by all OIC Member States.

viii. Establish additional library to collect information about ancient manuscripts and historical works in the OIC Member States.

ix. Consider establishing a consultative mechanism to periodically review ethical and legal issues emanating from the growth of technology and developments in the field of medicine, with a view to evolve consensus positions on these issues.

The Current Situation:

Next Generation Network (NGN) Systems

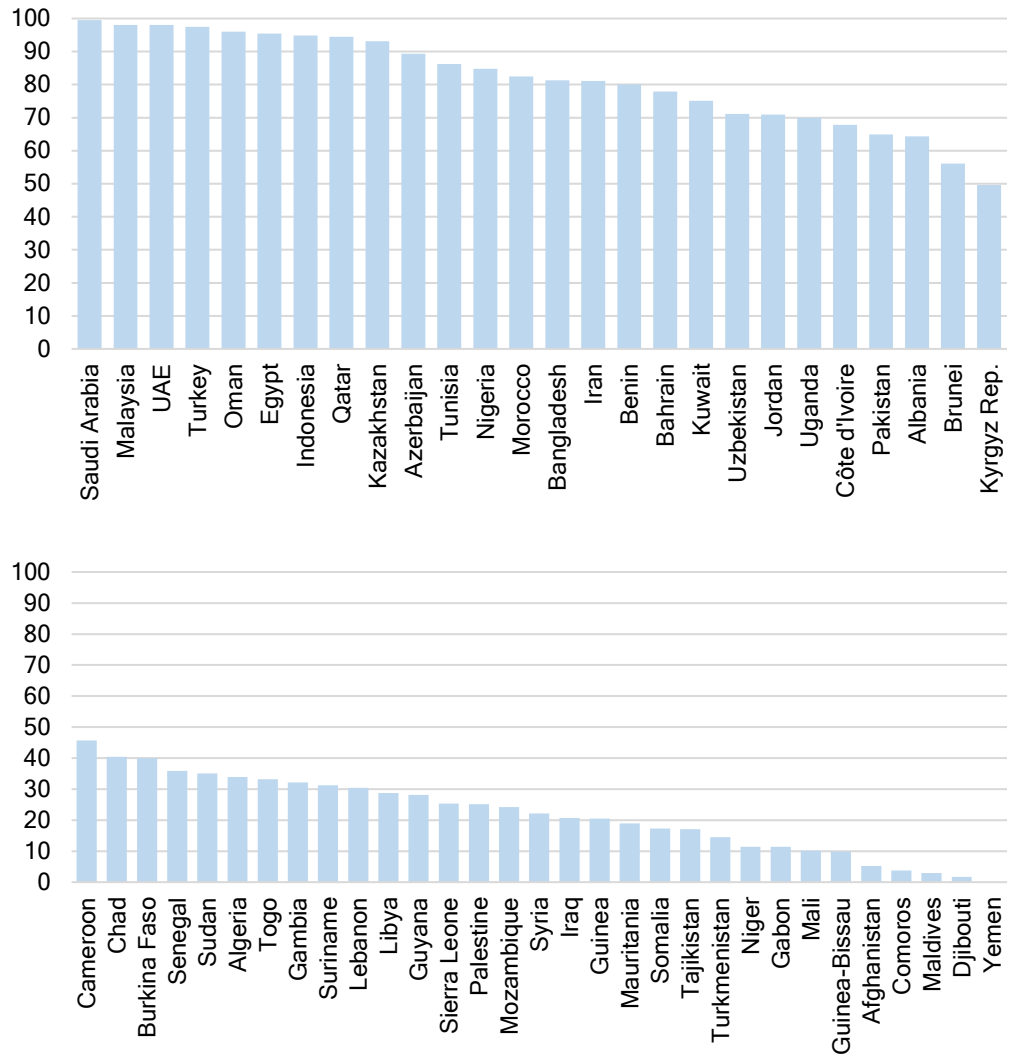
International Telecommunication Union (ITU), the UN specialized agency for information and communication technologies, evaluates the level of introduction of the Next Generation Network (NGN) systems by country and the data are disseminated for 52 OIC countries through ITU DataHub. As of 2021, 14 OIC countries have completed the introduction of the NGN systems. In comparison, no OIC country was in the stage of completion of NGN systems in 2010. 22 OIC countries were in the implementation stage of the introduction of NGN systems in 2021, compared to only 14 OIC countries were at the implementation stage in 2010. Eight member countries were in the process of either planning, introduction, or were still conducting a feasibility study in 2021, while the other 13 member countries were remaining in unidentified stages of the introduction of the NGN systems as of 2021.

Cyber Security

ITU has developed the Global Cybersecurity Index (GCI) that evaluates the countries' commitment to cybersecurity at a global level. The cybersecurity is multidimensional and applied in different sectors and industries, thus countries' levels of advancement are assessed along five pillars – (1) Legal Measures, (2) Technical Measures, (3) Organizational Measures, (4) Capacity Development, and (5) Cooperative Measures – and then aggregated into an overall score.

In 2020, the OIC countries with the highest GCI scores including Saudi Arabia with 99.54, followed by Malaysia and UAE (each with 98.06), and Türkiye (97.46) were ranked among the top 20 countries globally. On the contrary, 28 OIC countries were ranked between 100th and 182nd in the world based on their GCI scores (Figure 13).

Figure 13: Global Cyber Security Index (GCI), 2020



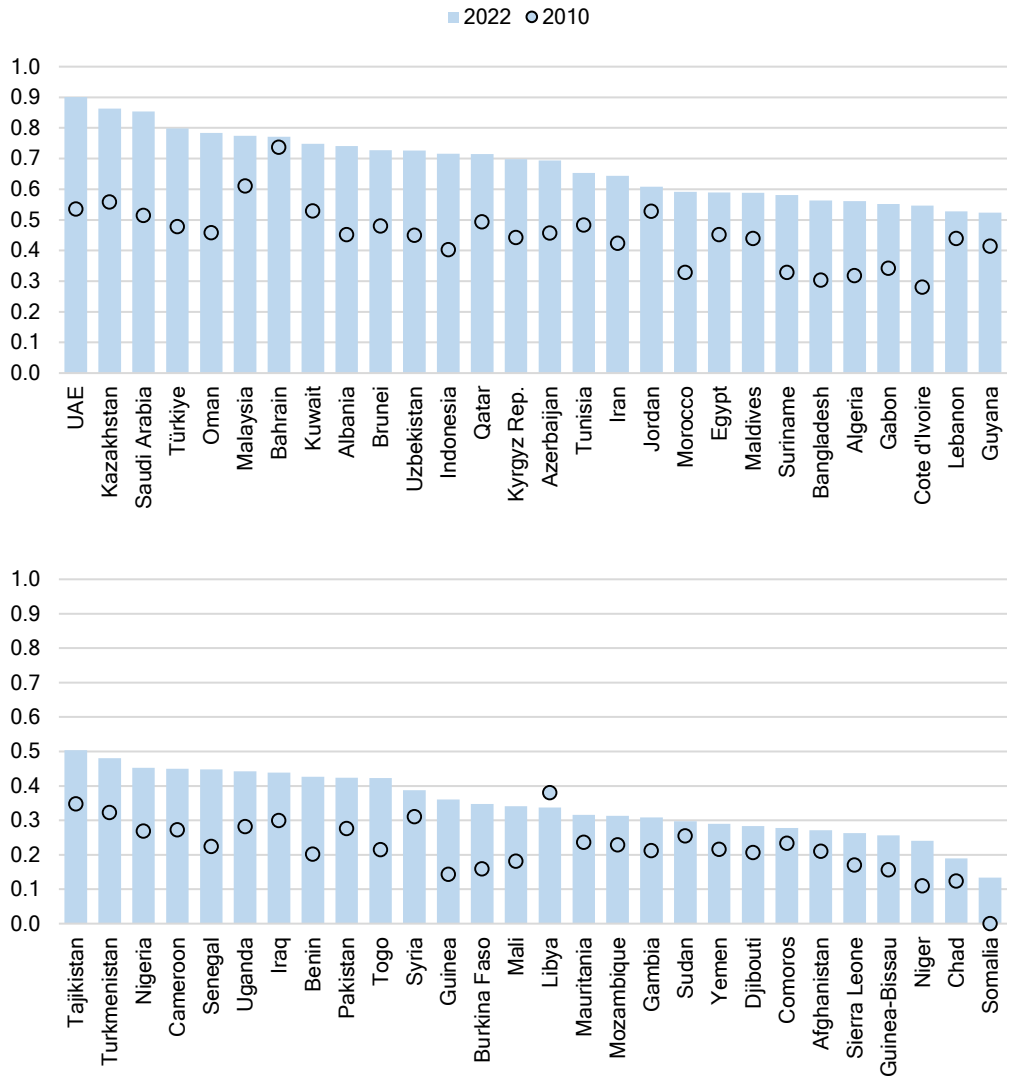
Source: ITU, Global Cybersecurity Index 2020 Report.

E-Government

According to the UN E-Government Knowledgebase, seven OIC countries (UAE, Kazakhstan, Saudi Arabia, Türkiye, Oman, Malaysia, and Bahrain) achieved "very high" E-Government Development Index (EGDI) scores (EGDI>=0.75) in 2022. In comparison, no OIC country had "very high" EGDI scores in 2010. Meanwhile, 22 OIC countries had "high" EGDI scores (0.5<=EGDI<0.75) in 2022, compared to only seven member countries in 2010. 24 member countries had "medium" EGDI scores (0.25<=EGDI<0.5) in 2022,

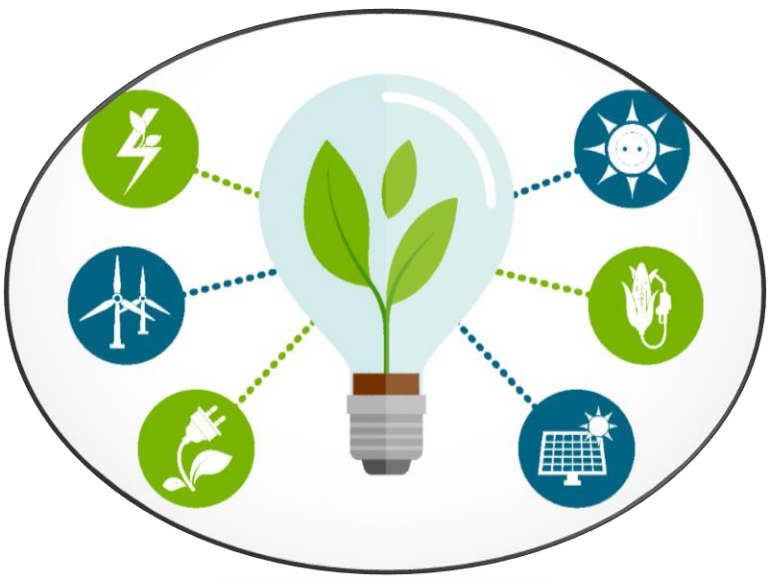
compared to 31 OIC countries in 2010. Only three member countries had "low" EGDI scores (EGDI<0.25) in 2022, compared to 18 OIC countries in 2010 (Figure 14).

Figure 14: E-Government Development Index (EGDI), 2010 vs. 2022



Source: United Nations (UN) E-Government Knowledgebase.

PRIORITY 8: MANAGING ENERGY REQUIREMENTS



The quality of modern human life has been and always will be completely dependent on the availability of affordable energy. There are serious concerns, however, that consumption of water, land, and fuel resources may become unsustainable at the present rates of consumption.

The priority everywhere remains the assurance of universal access to affordable, reliable and modern energy services. More people are moving out of poverty and are demanding and gaining access to energy. Several studies suggest that global energy demand will double by 2040 vs 2000 levels, and emerging economies will be responsible for 90% of growth in energy demand caused by rising populations and a fast growing middle class.

The goal of energy autarky will be met through diversification of primary resources which, in turn, is governed by national domestic resources, policies, and programmes, within the impact of volatility in global pricing, and geo-politics or competition for resources.

Recommendations and Targets:

i. Move towards high efficiency electricity generation systems.

ii. Upgrade national T&D (transmission and distribution) systems and introduce flexible two-way T&D systems and distributed micro-grids to integrate renewable energy (RE).

iii. Promote passive houses, efficient cooling and heating systems, and energy efficient appliances which are certifiable internationally.

iv. Increase the number of human settlements which adopt and implement integrated policies for energy, resource efficiency, mitigation and adaptation to climate change.

a) The Case for Renewable Energy

The move towards RE (renewable energy) will be sustained, although its share in the primary energy mix will still be over- shadowed by fossil fuels which are predicted to have a 60-65 % by 2040.

The problem with RE (solar, wind) is that it does not offer 'base-load' supply, which is only available through fossil or nuclear fuels. The RE output is intrinsically variable and even intermittent, which is the biggest challenge for its integration with existing systems.

There is a need to focus on designing large scale storage technologies, such as covering peak demands and improved power quality and frequency regulation. These requirements are already having major impact on the evolution of flexible two-way T&D (transmission and distribution) systems and grids of the 21st Century.

Another significant source of renewable energy which has lagged behind solar and wind energy is geothermal energy, perhaps due to uncertainties in reservoir capacity even though this source has a greater base-load capability and potential.

Recommendations and Targets:

i. Target a RE share of at least 10% in national energy mix of OIC States by 2025.

ii. Introduce micro-grids and integrate them into national systems, and encourage distributed standalone systems for small communities;

iii. Consider enhancing national research for increasing solar cell efficiencies to reach commercially deployable conversion factors of 40%;

iv. Design and develop energy storage systems such as fuel cells (5 MW for 2 hours) and batteries (such as Lithium Ion and Vanadium Redox) for small storage applications;

v. Design and develop at least 60 MW molten salt storage tank with steam turbine systems, compatible with concentrated solar power (CSP);

vi. Exploit recent advances in geophysical and reservoir engineering for using geothermal energy in OIC countries where it is possible and available;

vii. Enhance intra-OIC and international cooperation to facilitate access to clean energy research and technologies.

b) The Case for Nuclear Energy

There is a revival of interest globally in nuclear power. Many OIC Member States are planning to start constructing nuclear power plants. Excellent opportunities exist for cooperation in peaceful applications of nuclear technology in power and non-power sectors.

Recommendations and Targets:

i. Initiate peaceful applications of nuclear technology in power and non-power sector, consistent with respective obligations of Member States, and their commitments under regulatory safety/security standards as enunciated by the IAEA (International Atomic Energy Agency).

ii. Establish joint projects among Member States for nuclear power plant equipment.

iii. Initiate programmes for manufacturing radio-pharmaceuticals, and using radiation for sterilisation of medical and food products, as per IAEA norms.

iv. Encourage preparing multinational programmes for safe disposal of highly radioactive waste under IAEA guidelines.

The Current Situation:

Adaptation to Climate Change

Adaptation and mitigation measures are integral parts of an effective strategy to address the climate change. In this regard, all countries are expected to prepare their vulnerability assessments, prioritization of action, financial needs assessments, capacity building and response strategies, and integration of adaptation actions into sectoral and national planning. Adaptation is particularly important for the developing countries, especially due to their high vulnerability to the climate change.

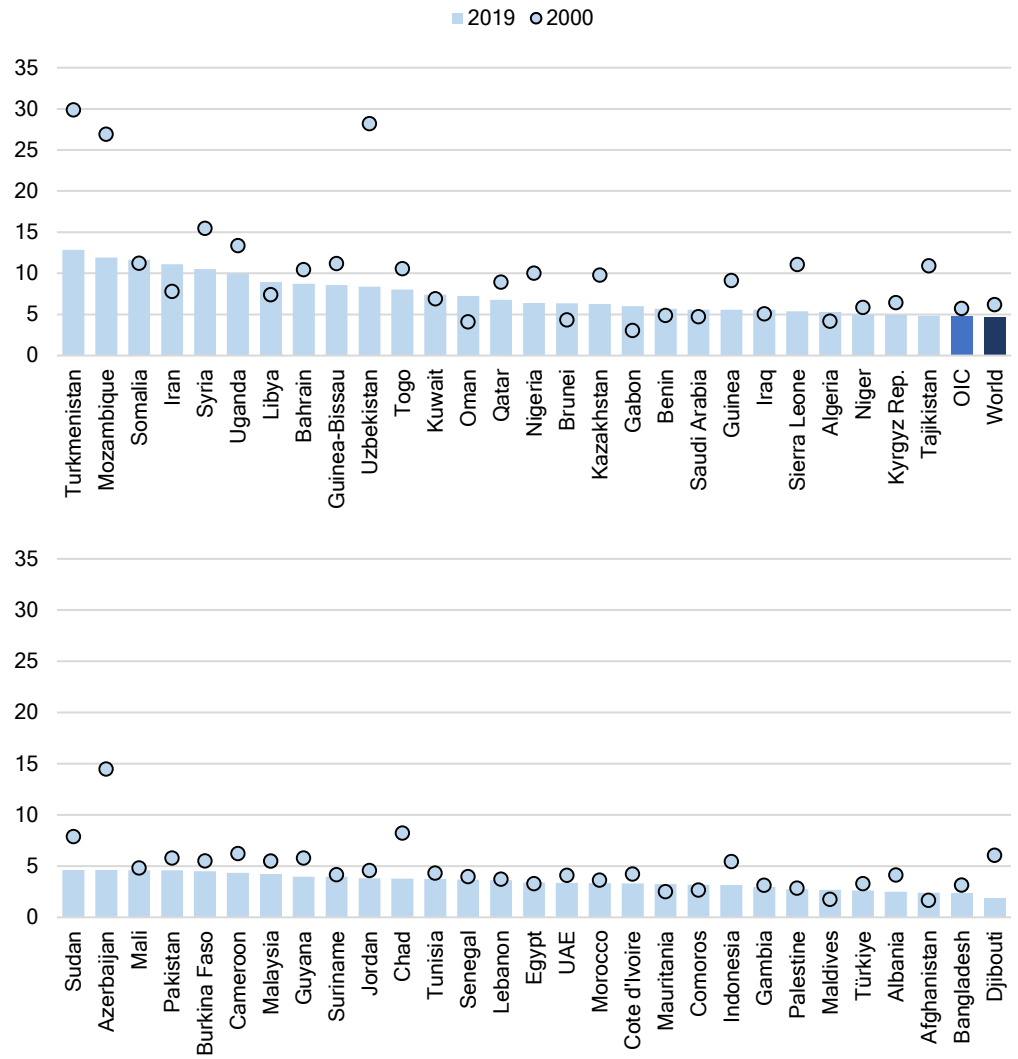
In this context, adaptation is a key building block of the UN Framework Convention on Climate Change's (UNFCCC) response to climate change. All LDCs are supposed to prepare their National Adaptation Plans of Action (NAPA) and submit their priority projects to the UNFCCC Secretariat for financing. According to the UNFCCC's NAPA Priorities Database, 21 OIC countries submitted 246 projects. Among these OIC countries, Mauritania, Guinea and Sierra Leone submitted more than 20 projects. The implementation of these projects required around 439 million USD.

Energy Efficiency

The OIC population with access to electricity showed a significant growth of 14.32 percentage points from 2000 to 2020 by reaching 81.02% in 2020. On the other hand, the OIC countries group accounted for around 11% of global electricity production in 2020 (EIA, 2022).

Also known as energy efficiency, energy intensity is used to monitor and analyse how much energy is consumed to produce per unit value of economic output. In the period 2000-2019, energy intensity level of primary energy slightly improved with around 1 percentage point in the OIC countries group from 5.70% to 4.78% (Figure 15).

Figure 15: Energy Intensity Level of Primary Energy, Megajoules per Constant 2017 GDP PPP, 2000 vs. 2019



Source: SESRIC staff calculations based on data extracted on 09/09/2022 from OIC Statistics Database (OICStat).

At the member country level, the energy intensity level of primary energy improved in 40 OIC countries between 2000 and 2019. Among these countries, six OIC countries decreased their energy intensity level by more than 5 percentage points (Figure 15).

Nuclear Energy

15 OIC countries (Bangladesh, Egypt, Indonesia, Jordan, Kazakhstan, Malaysia, Morocco, Niger, Nigeria, Saudi Arabia, Sudan, Türkiye, Uganda, UAE, and Uzbekistan) that are embarking on a nuclear programme have initiated cooperation with IAEA through their Integrated Nuclear Infrastructure Review service. Based on the updated information in October 2022, Bangladesh, Egypt, Iran, Türkiye, and UAE will have completed construction of a total of 9 nuclear power reactors by 2028 (WNA, 2022).

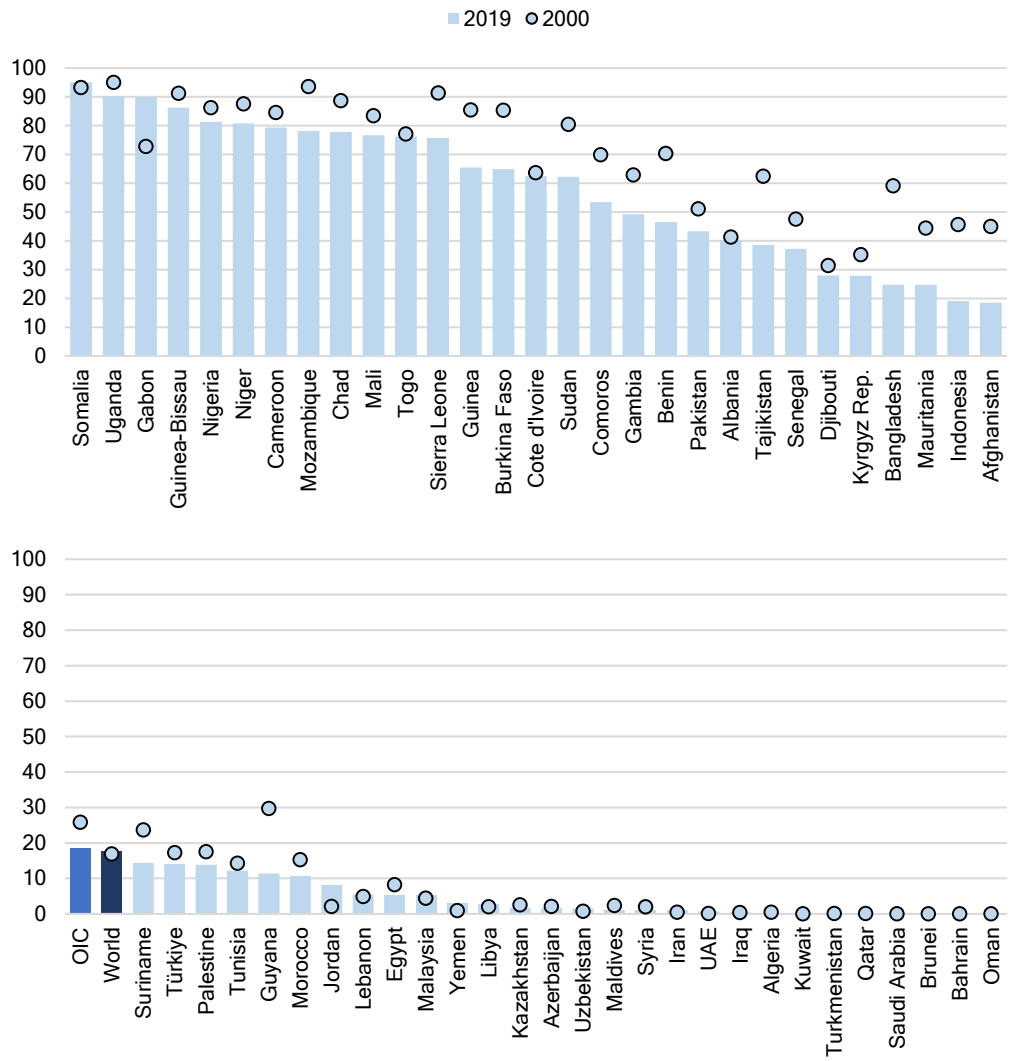
The OIC countries adopted the Resolution No. 29/46-POL on Establishment of a Nuclear-Weapon-Free Zone in the Middle East during the 46th Session of the Council of Foreign Ministers on reaffirming the inalienable right of all states in full compliance with obligations emanating from the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) to develop research, production and use of nuclear energy for peaceful purposes without discrimination in accordance with the NPT provisions and the statute of the IAEA; and, in this regard encourages cooperation among the OIC Member States on the peaceful uses of nuclear energy.

Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management was opened for signature on 29 September 1997 and entered into force on 18 June 2001. So far, only three OIC countries have ratified the convention namely; Indonesia (2011), Kazakhstan (2010) and Morocco (year of ratification: 1999 / year of entry into force: 2001). Moreover, 15 OIC countries (Albania, Benin, Gabon, Jordan, Kyrgyz Republic, Mauritania, Niger, Nigeria, Oman, Saudi Arabia, Senegal, Syria, Tajikistan, UAE, and Uzbekistan) are in the accession phase (IAEA, 2022).

Renewable Energy

Due to the negative environmental impact of greenhouse gas emissions, increasing demand for energy should be supplied by generating energy from renewable sources. The share of renewable energy in total final energy consumption (TFEC) in the OIC countries decreased from 25.9% to 18.3% over the period 2000-2019. As a consequence, the renewable energy share in TFEC decreased in 42 countries whereas it increased in 13 countries. On the other hand, no change was observed in two OIC countries. In 2019, renewable energy share in TFEC of 29 OIC countries was above the world average. Of that, in 17 member countries, more than 50% of the energy consumed came from renewable sources (Figure 16).

Figure 16: Renewable Energy Share in the Total Final Energy Consumption, Percent, 2000 vs. 2019



Source: SESRIC staff calculations based on data extracted on 09/09/2022 from OIC Statistics Database (OICStat).

Apart from a few member countries, the OIC countries group seems to be benefiting from either no or very small amounts of geothermal energy based on most recent data from IRENA. In 2020, Indonesia was ranked second among 27 countries with available data with 15,563 GWh electricity generation from geothermal resources, corresponding to a 66% increase from 9,357 GWh in 2010. Türkiye has also enormously increased its capacity in using geothermal energy for electricity generation from 668 GWh in 2010 to 10,028 GWh in 2020.

PRIORITY 9: ONE PLANET: THE ENVIRONMENT, CLIMATE CHANGE AND SUSTAINABILITY

Climate change is of particular concern for OIC Member States lying in climate-sensitive regions which are already aggravated by desertification, drought, sand and dust storms degradation of land and water, especially the marine environment and fisheries therein.

Recommendations and Targets:

It is recommended to set up an OIC Advisory Group with experts drawn from the Member States to prepare a detailed plan of action including mitigation options in line with the commitment made under the Paris Agreement on Climate Change. It would help the Member States in:

i. Preparing national policies for effective planning and management for the protection and restoration of ecosystems, including the marine environment.

ii. Establishing stations which monitor and collect detailed local data over time for integration into system models, instead of remote foreign studies.

iii. Prepare a template of 'green technologies' which encompass the human habitat;

iv. Encourage Member States to adopt voluntary national targets to achieve land degradation neutrality.

v. Strengthen policy-making by supporting integrated land use planning in the Member States vulnerable to drought.

vi. Exchange experiences among Member States to accelerate the integration of UN Sustainable Development Goals 2030 into national policies in accordance with national legislations, values and priorities and how to track progress in this area.

vii. Strengthen the capacity of the Member States to tackle the adverse impacts of climate change.

viii. Extends support to Climate Vulnerable States to easily access available Climate Financing and to extend Forest and Carbon Sink for mitigation.

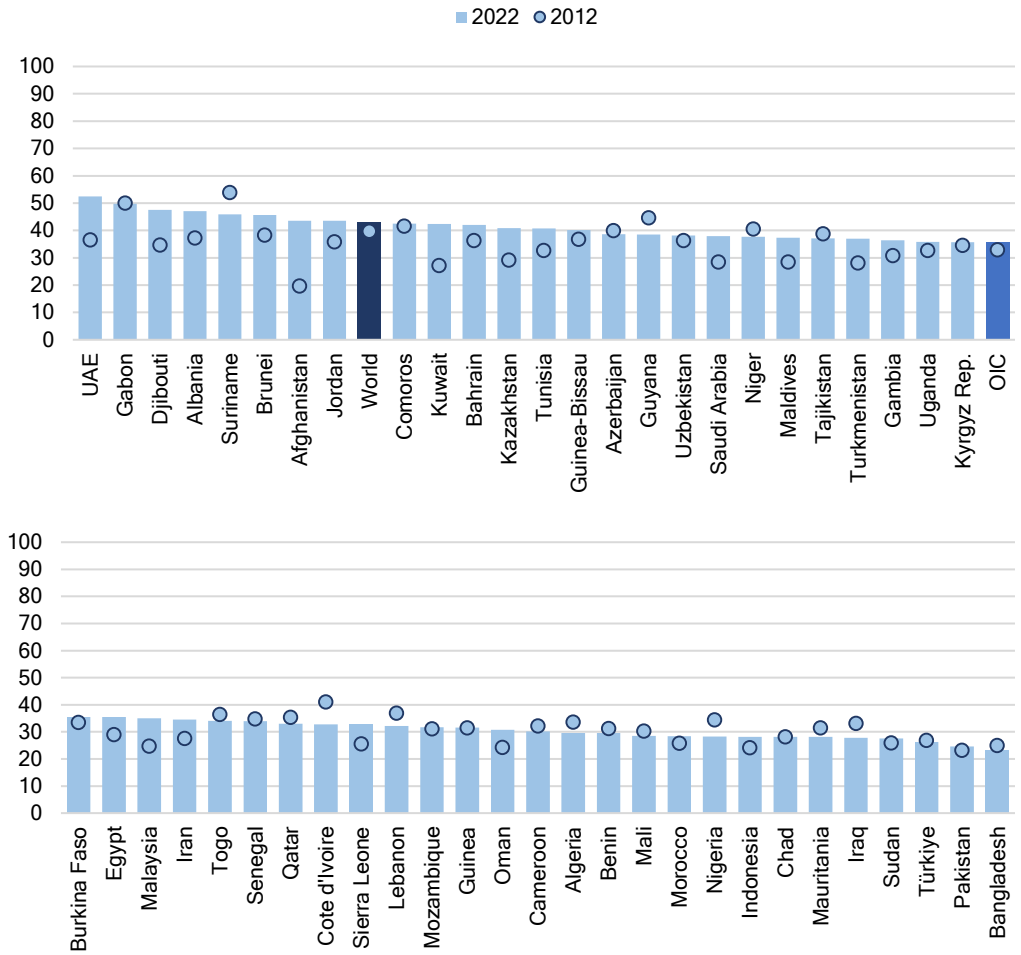
ix. Facilitate technology transfer at cheap and affordable cost to enhance mitigation and adaptation capabilities of the Member States.

The Current Situation:

Environmental Performance & Climate Change Readiness

In 2022, the OIC countries on average scored 35.7 out of 100 in the Environmental Performance Index (EPI) (Wolf et al, 2022) compared to the global average score of 43.1. Nevertheless, during 2012 and 2022, the environmental performance of OIC countries has improved by 8.61% compared to 8.65% improvement at the global level and 6.08% in other developing countries. Figure 17 shows the Environmental Performance of OIC countries in 2012 and 2022.

Figure 17: Environmental Performance, 2012 vs 2022 (score 0-100, where 100 = best)



Source: SESRIC Staff calculation based on EPI 2022.

Readiness dimension of the Notre Dame Global Adaptation Index (ND-GAIN) (Chen et al., 2015) measures the level of effective use of investments for climate change adaptation actions. ND-GAIN reported that OIC level of readiness to climate change is at 0.3567 level (score 0-1, where 1 = best), lower than the world average level of 0.4284 in 2020. At the individual country level, 14 OIC countries have readiness scores higher than the world average, half of which are non-OECD high income countries. The least ready OIC countries to the impacts of climate change are Chad, Syria, Turkmenistan, Afghanistan, and Yemen.

Biodiversity & Habitat

The biodiversity & habitat dimension of EPI measures progress in terrestrial as well as marine protection and biodiversity. In 2022, the OIC countries on average scored 44.54, while the global average, in comparison, was at the level of 54.11. Nevertheless, the OIC countries group significantly recorded an improvement of 21.5% relative to its 2012 level, while at the same period; the global average saw an improvement of 16%.

As to the country-level biodiversity & habitat performance of OIC countries for 2022, it is observed that 18 OIC countries scored above the global average level. Top five OIC countries with the largest level of biodiversity & habitat performance were Gabon, UAE, Burkina Faso, Niger, and Guinea-Bissau (Figure 18).

Biodiversity & habitat is vulnerable to climate change impacts. Based on the ND-GAIN, the average level of habitat vulnerability to climate change in the OIC countries (0.5231) was slightly higher than the global average (0.5128) in 2020. Top five OIC countries with the lowest level of habitat vulnerability to climate change were UAE, Egypt, Morocco, Qatar, and Kyrgyz Republic. On the other hand, five OIC countries with the most vulnerable to its habitat were Gabon, Somalia, Sierra Leone, Guinea, and Cameroon.

According to the latest available information, 24 OIC countries have an explicit and 25 OIC countries have a partial national urban plan (National Urban Policy Database). In 2021, national urban plans of only five OIC countries considered climate change with various development stages of mitigation and adaptation strategies (OECD, UN-HABITAT, UNOPS, 2021).

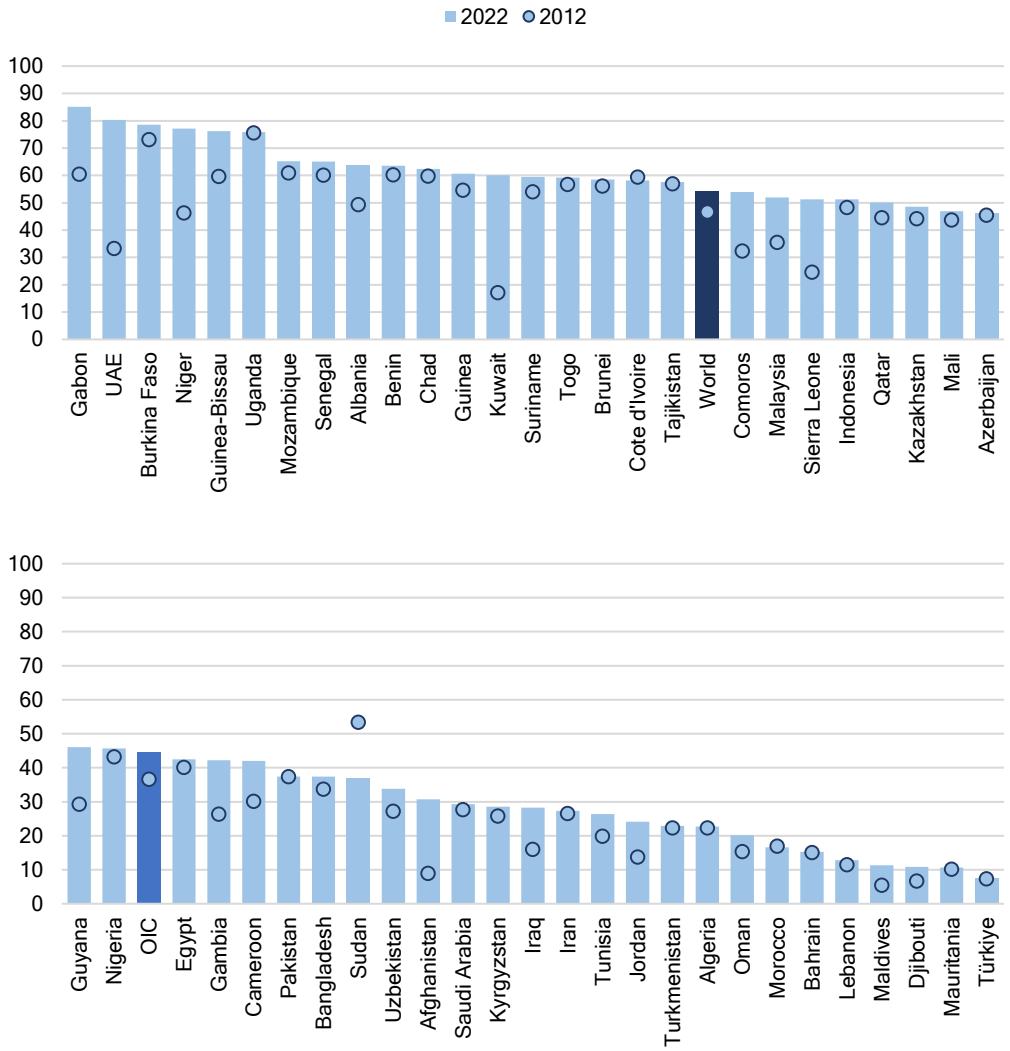
Land Degradation & Disaster Risk Reduction

Latest data show that 14% of the land area of OIC countries group is degraded. The OIC countries in Europe and Central Asia sub-region experience the largest land degradation at 30%. Furthermore, the least degraded region is observed in the MENA region. Four OIC countries (Tajikistan, Bangladesh, Kuwait, and Benin) experience land degradation of more than 50% of their land area.

Some OIC countries have managed to implement local disaster risk reduction strategies in line with the national disaster risk reduction strategies. In Türkiye and Kazakhstan, for

instance, disaster risk reduction strategies in all local levels have been set up to conform with the national strategies.

Figure 18: Biodiversity & Habitat Performance, 2022 (score 0-100, where 100 = best)



Source: SESRIC Staff calculation based on EPI BDH issue category 2022.

Environmental Management Capacities & Policy Integration with SDGs

According to the latest data on the Country Policy and Institutional Assessments (CPIA) released by the World Bank (2022), the capacity for environmental sustainability (in terms of both policies and institutions) in 83 low and middle-income countries is relatively stable at a score of 3.12 (1=low to 6=high) since 2005. This database also includes data on 30 OIC countries. The capacity for environmental sustainability for these member countries

is averaged at a score of 3.17 in 2021. Given the fact that CPIA scores 1 to 4 describe poor capacity and 5 to 6 quite advanced capacity, the majority of these member countries like their developing counterparts elsewhere are characterized by weak capacities.

For 19 out of 30 member countries, CPIA scores either increased or remained stable between 2005 and 2021. In 2021, CPIA scores in the OIC countries ranged from 2 to 4, indicating very low environmental management capacities across the 30 OIC member countries with data.

In 2022, 15 OIC countries presented their voluntary national reviews, as part of the national implementation of SDGs. Those countries reported the integration of SDGs targets with their national development strategies.

Technology Transfer & Climate Change Adaptation Projects

As of mid-October 2022, there are 280 projects globally (in various phases) that benefit(ted) from the Climate Technology Centre and Network, the operational arm of UNFCCC, which promotes the accelerated transfer of environmentally sound technologies for low carbon and climate-resilient development in developing countries. The OIC countries up to now are taking part in 89 of those technology transfer projects. Most of the projects in the OIC countries are cross-sectoral and in the area of energy.

All LDCs are supposed to prepare their NAPA and submit their priority projects to the UNFCCC secretariat for financing. According to the UNFCCC's NAPA Priorities Database, 49 countries have submitted 533 projects of which 246 were submitted by 21 OIC countries. Among these OIC countries, Mauritania, Guinea and Sierra Leone submitted more than 20 projects. The implementation of these 246 projects in OIC countries required around 439 million USD. In general, priority sectors/areas addressed in the NAPAs are agriculture and food security, water resources, coastal zones, and early warning and disaster management.

PRIORITY 10: ENHANCING INTRA-OIC COOPERATION

There is little scientific cooperation among OIC Member States, due to lack of awareness among academics and scientists of the expertise available in different countries, coupled with the heterogeneous nature of educational quality. It is important to build smaller linkages first, which may be bilateral or trilateral initially, and subsequently grow into regional groupings over the next ten years.

Recommendations and Targets:

i. Strengthen the Concept of 'Mother Institutes'; Centres of excellence exist in many OIC countries in all fields of education and S&T. These Centres are expected to emerge as 'Mother Institutes' which will be at the centre of collaborative efforts in OIC Member States and 'transfer' of knowledge in OIC Member States.

ii. There is very little mobility among faculty and researchers in OIC countries. There is urgent need to consolidate and expand the OIC Educational Exchange Programme through a special programme, which would promote exchange of students, faculty and researchers. The OIC Educational Exchange Programme may be named as the Al Haytham Programme, after the Muslim scientist Ibn Al Haytham, regarded as the father of modern optics.

iii. Commend the kind acceptance of His Highness Sheikh Sabah Al-Ahmad Al-Jaber Al-Sabah, the Amir of the State of Kuwait, may Allah protect him, to host an international conference to support Education in Somalia, as announced by His Highness at the opening session of the 27th Ordinary Session of the Council of the League of Arab States held at the Summit level in Nouakchott, Mauritania, on 20-21 Shawal 1437 A.H., corresponding to 25-26 July 2016.

The Current Situation:

Centres of Excellence

The Centres of Excellence play a significant role in developing high standards in research, innovation and learning. Mainstreaming the role of Centres of Excellence with the aim of building technical capacities of the relevant institutions in the OIC countries further contribute to attain desired scientific developmental targets stated in the OIC STI Agenda 2026.

In fact, many OIC countries have a diverse portfolio of R&D institutions that have valuable knowledge and deep expertise in their respective fields. However, these institutions are needed to be mapped and scaled up as "Mother Institutes" to increase their role in development cooperation. In this regard, pooling of technical expertise and resources in

the technological and scientific sectors in these Centres would promote efficiency and cost-effectiveness, thereby provides quick-wins towards rewarding multilateral cooperation among OIC countries.

Since the adoption of the OIC STI Agenda 2026, the OIC countries have increased their efforts to map their Centres of Excellence and leverage their resources to strengthen their capacities towards effective development cooperation. Some notable examples include Pakistan, Indonesia, Malaysia, Morocco, and Türkiye whose efforts are supported by the relevant OIC institutions such as IsDB and SESRIC.

Within the framework of these efforts, Pakistan profiled 16 Centres in four priority areas including agriculture, agro-based industries, pharmaceuticals industry, and ICT. Similarly, Malaysia identified 28 institutions under aerospace & MRO (maintenance, repair and overhaul), agriculture and R&D, education and training, green technology and environment, ICT, healthcare and pharmaceutical. Türkiye presented five to six Resource Centres in each of the following sectors: agriculture, livestock and food security; health and nutrition; technical and vocational education and training. Indonesia mapped 16 Centres of Excellence in the fields of agriculture, marine and fisheries, health, pharmaceutical, and vocational education and training. Finally, Morocco mapped seven Centres of Excellence in the fields of agriculture, food security, and fisheries.

OIC Educational Exchange Programme

Education is central to human capital formation and development. Increasing the mobility among the students, researchers and academics among the OIC countries can advance technological innovation, channel the progress towards a knowledge-based and innovation driven economy, and generate further benefits for all countries involved. Recognizing the importance of this mobility, several OIC countries contribute to educational exchange programmes as exemplified below:

- An increasing number of OIC countries offer scholarships through Al Haytham Programme at masters, doctoral and post-doctoral levels.
- COMSATS Institute of Information Technology, Pakistan Institute of Engineering and Applied Sciences and the Higher Education Commission of Pakistan have offered scholarship awards to students from OIC countries in more than 60 fields, including medical, agriculture, nuclear engineering, medical physics, radiation physics, nuclear medicine, radiation and medical oncology.
- The Educational Grant Programmes of Azerbaijan provides an opportunity for the selected candidates from the OIC countries on an annual basis to study in the leading universities of Azerbaijan.

- Bangladesh presents scholarships in the fields of medical/dental study and renewable energy engineering for eligible students from OIC countries.
- The Government of Brunei offers scholarships to the eligible students from the OIC countries to study in four-year higher education institutions in Brunei.
- Egyptian Ministry of Higher Education and Scientific Research is giving scholarships across 23 different fields.
- The Government of Libya, through its Libyan Government Scholarships, presents the opportunity to eligible students from OIC countries to study Islamic sciences towards a PhD degree in their country.
- Türkiye offers "Türkiye Scholarships" which is a competitive scholarship program awarded to international students to pursue full-time or short-term programs at the top universities in the country.
- The Moroccan Agency of International Cooperation (AMCI) offers scholarships for international students at Moroccan public universities at undergraduate, graduate, and postgraduate degree levels.
- The Turkish Cypriot State, an observer member of the OIC, offered 20 scholarships in 2018-2019 academic year and 5 scholarships in 2019-2020 academic year within the framework of the OIC Educational Exchange Programme (Al Haytham Programme).

Supporting Education in Somalia

The State of Kuwait announced at the Global Education Summit on 29 July 2021 in the UK that the State pledged a total of 30 million USD to the Global Partnership for Education to contribute to solving problems and crises facing education in African countries, including Somalia. During his address at the Summit, HE Dr. Ali Al-Mudhaf, Representative of HH the Amir of the State of Kuwait, Sheikh Nawaf Al-Ahmad Al-Jaber Al-Sabah and Minister of Education, said that Kuwait Fund for Arab Economic Development (KFAED) and the UK's Foreign Ministry had signed a Memorandum of Understanding in 2019 to prepare for Kuwait to host a conference on supporting education in Somalia.

PRIORITY 11: BIG SCIENCE PROGRAMS

The present trend in scientific research is for joint 'big' science programmes which encourage multidisciplinary frontier research in basic and applied sciences. All of them have important spill overs in technological innovation and industry.

Several countries can pool their human and financial resources for joint designing, implementation and operation of large programmes which can reduce financial burdens on individual states. This will also lead to better collaboration and collective capacity building which is the Vision of all OIC Member States.

a) Space:

Space has become very important field for R&D which necessitates to explore those horizons for further progress of OIC Member States.

Recommendations and Targets:

i. Design and launch small satellites singly or jointly, for elegant experiments in low orbit;

ii. Jointly design and launch remote sensing satellites for observation, crop estimation and disaster management, rescue at sea, and weather prediction.

iii. Consider establishing a network of remote sensing centres among OIC Member States.

iv. Consider establishing an OIC Communication and Global Positioning System/Regional Navigation Satellite System (GPS, RNSS).

v. Centers for Space Technologies may be established. This may lead to an Inter-Islamic Space Agency, focusing on projects from space launch systems to manned vehicles.

b) Astronomy:

There are no reasonably sized, functional astronomical telescopes in Member States, whereas this is one area where Muslim scientists made seminal contributions in the past.

Recommendation:

A ground-based 4m telescope using adaptive mirrors and laser 'guide stars' can now provide the same or better resolution as the Hubble space telescope. There is need for at least 3 - 4 such observatories in different OIC regions.

c) Accelerators and Synchrotron Light Sources:

Accelerators and synchrotron light sources permit multidisciplinary research at the frontiers of human scientific knowledge in multiple fields, as well as handling of extremely large data, apart from excellent opportunities for technological and industrial development.

Recommendation:

Member States should work to build at least one new 2-4 – 2.7 GeV accelerator. It would provide excellent opportunities for technology and industrial development.

d) Mapping the Marine Environment:

The majority of Member States are maritime states, and are interconnected from the Atlantic to the Pacific Ocean through the Mediterranean, the Red Sea, Arabian Sea, and Indian Ocean. The maritime jurisdiction of OIC Member States needs to be mapped extensively.

Collaborative and cross-disciplinary research is the key to providing the knowledge and tools that we need to achieve ecosystem-based management and protection of valuable marine resources and services.

Recommendations:

We must initiate programmes for reviewing and compiling bathymetric data of the marine environment under the jurisdiction of Member States. The data and map products will provide information on the sea-bed substrate including rate of accumulation of recent sediments. All interpretations and primary information regarding mineral wealth will be owned by the country whose area is mapped, except that in the public domain. Four vessels and 5 years will be needed for the entire exercise (2-3 partners in each sub-region). 21 countries already possess 39 oceanography institutes, with 42 research vessels, and cover the entire OIC region from the Pacific to the Atlantic).

e) The Minerals Directory of OIC Member States:

Apart from oil and gas, the OIC region is blessed with large mineral deposits. The uncharted coastlines promise much more. All this needs to be mapped and disseminated.

Recommendation:

i. It is recommended to prepare a Minerals Directory of OIS States OIC Member States; enhance capabilities of OIC Member States for sustainable exploration and mining, and development of high-value added products, research, training, and safety; and jointly prepare a series of Geological and Geophysical Surveys for more effective site classification and monitoring of geo-hazard assessment of major settlement areas in OIC countries.

f) High Performance Computer Centres (HPCCs):

Modern research demands high performance computing for simulation and modelling of complex systems. It will benefit basic and applied sciences, big science and climate modelling and industry.

Recommendation:

It is recommended to set up at least six HPCCs in the major regions of the OIC.

g) Increasing Public-Private partnership for Science and Technology Projects with Economic Potential:

OIC Countries are major importers of communication and industrial equipment and associated software. It is important to encourage the growth of private sector consortiums specialising in one or more types of equipment. This includes digital equipment (communications, computers, and sensors), power plants and their modules (boilers, generators, turbines, and control rooms, and modern laboratory equipment and associated teaching aids.

h) Harmonising Trade Laws, Industrial Standards and IP:

As trade develops among OIC Member States, it will be necessary to harmonise legal and regulatory framework to facilitate this process. Intellectual Property Laws will be a priority.

The Current Situation:

Space

As of 11 October 2022, 18 OIC countries (Algeria, Azerbaijan, Bangladesh, Egypt, Indonesia, Iran, Iraq, Kazakhstan, Malaysia, Morocco, Nigeria, Pakistan, Qatar, Saudi Arabia, Tunisia, Türkiye, Turkmenistan, and UAE) have a total of 117 satellites in orbit. 19 OIC countries (Algeria, Azerbaijan, Bahrain, Bangladesh, Egypt, Indonesia, Iran (with

launch capability), Kazakhstan (with a launch facility leased to Russia until 2050), Malaysia, Morocco, Nigeria, Pakistan, Saudi Arabia, Syria, Tunisia, Türkiye, Turkmenistan, UAE, and Uzbekistan) have space agencies.

Astronomy

Only Azerbaijan has a telescope with 2 metres of aperture. Four OIC countries (Egypt, Kazakhstan, Türkiye, Uzbekistan) have telescopes with apertures between 1 and 2 meters. Two OIC countries (Nigeria and Türkiye) has telescopes with an aperture below 0.50 metre.

High Performance Computer Centres (HPCCs)

Only three OIC countries (Morocco (1), Saudi Arabia (6), and UAE (2)) with a total of nine supercomputers are being listed in the TOP 500 List (June 2022 edition) where computers are ranked by their performance on the LINPACK Benchmark. The maximal achieved performance (Rmax) score of these 9 supercomputers equals around 67.5 thousand TFlop/s which would rank 8th in the TOP 500 List if these nine supercomputers were one supercomputer.

Increasing Public-Private Partnership for Science and Technology Projects with Economic Potential

There is no set recommendation. However, based on the 2017-2021 data available on World Bank's Private Participation in Infrastructure Projects Database, there are currently three active projects receiving private sector participation in the ICT sector in Cameroon, Comoros, and Indonesia (all are with 100% private sector participation corresponding to around 596 million USD of total investment). In the energy sector, 28 OIC countries have received private participation in 205 infrastructure projects (corresponding to around 54.43 billion USD of total investment). In 191 of those projects, the share of private participation is 100%. 14 projects have received private sector participation ranging between 40% to 95%.

Harmonising Trade Laws, Industrial Standards and IP

World Intellectual Property Organisation (WIPO) serves as the global forum for intellectual property (IP) services, policy, information and cooperation of which 56 OIC countries are its members. In 2020, the National Patent Filing Offices in the OIC countries granted 26,895 patents in comparison to 13,759 patents granted in 2010. In 2020, the largest number of patents granted by the National Patent Filing Offices among the OIC countries was in Malaysia with 8,206 patents (30.5% of the OIC total). Malaysia was

followed by Indonesia (29.7%), Iran (13.6%), and Türkiye (7.7%) in the same year. There is no set recommendation in the OIC STI Agenda 2026 concerning the harmonisation of trade laws, industrial standards and IP. According to WIPO Lex, 55 OIC countries have a total of 275 main IP laws in their judicial systems and 21 OIC countries have introduced or amended 44 new or existing main IP laws in their judicial systems since 2017.

PRIORITY 12: FUNDING, IMPLEMENTATION AND MONITORING

No programme would be sustainable without adequate funding and its effective implementation. The goals and work plans listed in the OIC STI Agenda 2026 are extensive, but they are desirable and implementable if Member States can pool the available expertise.

Implementation of the programs for advancing STI should be owned by the Member States for ensuring their effectiveness and sustainability, while the OIC institutions will undertake the monitoring, support and facilitation of such programs. OIC Member States and OIC institutions have to demonstrate solidarity and provide committed support and resources to implement the comprehensive strategic road map outlined in the OIC STI Agenda 2026. Its key features are:

I. Member States will be at the centre of the entire process.

II. There will be a Steering Committee comprising all relevant OIC institutions and organs and headed by COMSTECH for overall supervision. The Steering Committee is meant to 'steer' only, not to 'row'. It will also provide directions and guidelines on all major programmes requiring funds. Existing OIC agencies and organs will be directly involved wherever relevant. The Committee will meet every six months to review the progress on the implementations of the proposals adopted by the Summit and make necessary recommendations to the Member States.

Recommendation:

Encourage the OIC Member States to establish science and technology funds for joint bilateral and multilateral projects.

The Current Situation:

Since the adaptation of the OIC STI Agenda 2026, establishment of science and technology funds at the national and regional level hastened within the OIC region. At the national level, Türkiye is actively engaged in supporting STI researchers and projects through the country's Scientific and Technological Research Council (TUBITAK), the leading national institution in this domain responsible for the development and coordination of scientific research in line with the national targets and priorities of the country. On the institution's website, a number of calls for proposals are available in cooperation with different institutions and networks around the world. Similarly, many other national institutions in the OIC countries are active in supporting researchers and projects, such as Egyptian Science and Technological Development Fund, Indonesian Science Fund, Iran National Innovation Fund, Kuwait Foundation for the Advancement of Sciences, Ministry of Science, Technology and Innovation of Malaysia, National Fund to Support Scientific Research and Technological Development of Morocco, Research Support Programme under the Pakistan Science Foundation, Qatar Science & Technology Park, King Abdullah University of Science and Technology Innovation Fund of Saudi Arabia, and Sandooq Al Watan Fellowship and SWARD Programme of UAE among many others.

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