ISLAMIC WORLD ACADEMY OF SCIENCES

Newsletter

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UNDER THE HIGH PATRONAGE OF HIS EXCELLENCY THE PRESIDENT OF PAKISTAN IAS CONVENED ITS 25TH INTERNATIONAL SCIENTIFIC CONFERENCE UNDER THE THEME

Water-Energy-Food-Ecosystem Nexus for the Security of the OIC Countries

Under the high patronage of His Excellency the President of Pakistan, the Islamic World Academy of Sciences (IAS) has convened its 25th international scientific conference in Islamabad, Pakistan during 22-24 July 2024 jointly with the Pakistan Academy of Sciences (PAS), Islamabad.

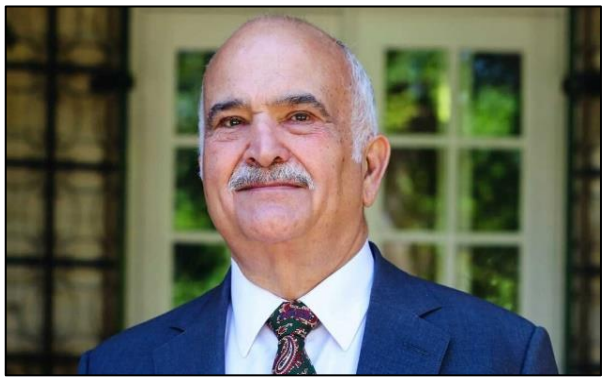
The conference was co-sponsored by; the Higher Council for Science and Technology (HCST), Amman, Jordan and the Higher Education Commission (HEC), Islamabad, Pakistan. The theme of the conference was **Water-Energy-Food-Ecosystem Nexus for the Security of the OIC Countries.** The IAS is patronized since its foundation in 1986, by HRH Prince El Hassan bin Talal of Jordan.

The conference was held at the A. Q. Khan Auditorium at the Pakistan Academy of Sciences (PAS). It was an open activity in which around 140 local and international participants attended from 13 countries. Among the participants were Fellows of IAS, Fellows of PAS, local and international scientists from various universities and institutions as well as world-renowned lecturers and experts, invited speakers, academics, decision-makers, scientists, researchers. The conference was a hybrid event where some speakers and participants joined via zoom.

Conference photos available in the Photo Gallery Section on the IAS website: www.iasworld.org

MESSAGE FROM HRH PRINCE EL-HASSAN BIN TALAL[1] PRESIDENT OF HCST, FOUNDING PATRON OF IAS

TO THE 25TH ISLAMIC WORLD ACADEMY OF SCIENCES CONFERENCE ON "WATER-ENERGY-FOOD-ECOSYSTEM NEXUS FOR THE SECURITY OF THE OIC COUNTRIES"
ISLAMABAD, PAKISTAN
22-24 JULY, 2024



Distinguished guests, fellow scientists, ladies and gentlemen,

It is a privilege to speak to you today as we represent a diverse array of countries, organizations, and disciplines, gathered here to explore solutions through science and technology research and development. This conference is united by a vital priority-the Water-Energy-Food-Ecosystem Nexus, crucial for the security of OIC countries.

I am profoundly grateful to His Excellency, the President of Pakistan, for his patronage of this conference here in Islamabad, and I extend my thanks to the Pakistan Academy of Sciences for graciously hosting us.

I am deeply concerned by the global shift towards material-greedy policies at the expense of our fundamental values-liberty, justice, dignity-and the resulting social and environmental challenges. Our world is increasingly marred by man-made disasters, wars, climate change, desertification, and the destruction of our biodiversity. These crises not only threaten our infrastructure and social fabric through discrimination and racism but also exacerbate the struggles for resources, leading to conflicts and mass casualties.

Most Islamic countries are diligently striving, albeit with varied success, to foster societies rooted in knowledge, ethics, and hard work, where every individual can lead a decent life. However, we face formidable challenges across social, economic, cultural, and environmental dimensions. There is no alternative but to unite as scientists and policymakers, dedicating ourselves without reserve to overcome these obstacles.

This concern is particularly acute in the Middle East, where the refugee crisis has worsened dramatically over the past year, compounding the already complex socio-economic and environmental landscape. The unfolding tragedies in Palestine and Sudan, with the looming threat of displacement for over two million people, illustrate the dire consequences of ignoring the intricate Water-Energy-Food nexus.

In the MENA region alone, there are 103 refugee camps struggling with access to basic necessities like water, electricity, and food-not only in the camps but also in host communities. The recent cutbacks in funding to crucial international support organizations like UNRWA highlight the fragility of the systems intended to uphold human dignity and solidarity. As members of the Islamic world, it is our duty to ensure that no one is left behind, particularly the most vulnerable, by enhancing support and ensuring their

[1] *Delivered by Prof. Adnan Badran, President, IAS.*

safety and dignity through better resource management and policies.

Reliable data is essential for scientists searching for solutions and for safeguarding our interests in multilateral negotiations on climate change, environmental protection, and sustainable development. Since the Paris Agreement's adoption in 2015, there has been a marked increase in countries committing to carbon neutrality, paralleled by a global surge in demand for metals and minerals for green energy initiatives. It is crucial for OIC members to establish a robust, collective digital mining database. This will enable us to effectively participate in the global energy transition and achieve emissions neutrality.

The Arabian Nubian Shield, with its exceptional geological features, stands as a highly **prospective yet underexplored** region, rich in minerals critical for the energy transition necessary to achieve carbon neutrality. This region holds the key to transforming the future of green energy within the Islamic world. By harnessing these resources through a coordinated and sustainable approach, OIC countries can lead in the global shift towards green energy, simultaneously fostering economic growth and environmental sustainability.

Water, the resource upon which all life depends, is becoming increasingly scarce in many countries of the Islamic world. This scarcity is driven by a combination of rising demand, rapid population growth, improvements in living standards, and inefficient water management and utilization practices. Furthermore, the challenge is exacerbated by the geopolitics of international rivers originating in upstream countries. Conflicts over water resources are emerging among nations under these pressures.

In regions like the Arab world, where 80% of water is used for agriculture, innovative approaches are essential. We must prioritize the conservation of water and enhance agricultural productivity through advanced science and technology, ensuring that industrial and household demands are met sustainably. For some nations, these challenges are compounded by economic constraints that limit their ability to import essential energy and food supplies.

Science-based evidence is indispensable for water diplomacy, building confidence, and fostering trust among nations. It promotes cooperation and helps prevent conflicts over shared resources. Today, 263 river basins and countless aquifers cross the political boundaries of multiple states, defining them as transboundary water resources. These shared basins cover 45% of the earth's land surface, support 40% of its population, and account for 60% of the world's river flow. Identifying and understanding the Water, Energy, Food, and Ecosystem (WEFE) nexus within these basins can create incentives for cooperation. By developing thematic projects that focus on regional benefits and shared goals, we can build confidence and encourage a collaborative approach. Ultimately, a comprehensive and integrated approach to the WEFE nexus is critical for the sustainable economic and social development of entire regions, promoting a green economy and fostering interdependence that benefits all nations involved.

To achieve this, our path forward must foster broader, more diverse regional Nexus dialogues. These dialogues should include political leaders, decision-makers from various WEFE sectors, and users of these resources. Together, we will build harmony and realize collective benefits, creating a Nexus that serves everyone effectively. Our collaborative efforts will not only solve immediate challenges but also pave the way for sustainable development across our regions.

INAUGURAL ADDRESS BY SENATOR SHERRY REHMAN, NOMINEE OF THE PRESIDENT OF THE ISLAMIC REPUBLIC OF PAKISTAN PATRON OF THE ISLAMIC WORLD ACADEMY OF SCIENCES (IAS)

TO THE 25TH ISLAMIC WORLD ACADEMY OF SCIENCES CONFERENCE ON "WATER-ENERGY-FOOD-ECOSYSTEM NEXUS FOR THE SECURITY OF THE OIC COUNTRIES"
ISLAMABAD, PAKISTAN
22-24 JULY, 2024

H.E. Prof. Dr. Adnan Badran, *President Islamic World Academy of Sciences*
Prof. Dr. Kauser Abdullah Malik, *President Pakistan Academy of Sciences*
Prof. Dr. Mukhtar Ahmad, *Chairman Higher Education Commission*
Honorable Guests,
Distinguished Scholars,
Ladies & Gentlemen

Assalam-u-Alaikum and a very warm welcome to all of you.

It is indeed a profound honour and privilege to address this distinguished assembly of scholars and academicians on behalf of the President Islamic Republic of Pakistan at the 25th IAS Scientific Conference of the Islamic World Academy of Sciences held here today in collaboration with the Pakistan Academy of Sciences, Islamabad.

At this occasion, I wish to extend my deepest gratitude to the organizers of the conference both from Islamic World Academy of Sciences (IAS) and Pakistan Academy of Sciences (PAS) for bringing us all together to discuss a topic of paramount importance that is: "Water-Energy-Food-Ecosystem Nexus for the Security of the OIC Countries."

We gather here in Islamabad at a time when the world is grappling with complex and interwoven challenges. The nexus of water, energy, food, and ecosystems is central to our quest for sustainable development and security. The Islamic world, rich in history and potential, faces unique challenges that necessitate innovative and collaborative solutions.

We need to understand the Significance of the "Water-Energy-Food-Ecosystem Nexus". The interdependencies within the water-energy-food-ecosystem nexus are profound and multifaceted. Water is indispensable for agriculture, energy production, and maintaining ecosystems. Energy drives water extraction, treatment, and distribution, as well as food production and processing. Food security hinges on the availability of water and energy, while ecosystems provide essential services that underpin these sectors. Addressing these interconnections is critical for several reasons and specially for **three reasons** of great significance, namely:

1. **Resource Efficiency**: Optimizing the use of water, energy, and food resources enhances efficiency, reduces waste, and boosts productivity.
2. **Sustainability**: A holistic approach ensures that our development does not compromise the needs of future generations.
3. **Resilience**: Integrated management strengthens resilience against climate change, economic volatility, and geopolitical instability.

At this moment, we also need to address the challenges in the OIC Countries. The OIC countries face unique challenges in managing this nexus. Many of our member states are characterized by arid and semi-arid climates, limited water resources, and rapidly growing

populations. These challenges are further compounded by political instability and economic constraints. **Four of these challenges** are quite important to be shared and addressed. These include:

1. **Water Scarcity:** Many OIC countries are among the most water-scarce in the world. Efficient water management, including technologies such as desalination, wastewater treatment, and rainwater harvesting, is crucial.
2. **Energy Access and Sustainability:** Ensuring access to affordable, reliable, sustainable, and modern energy is essential. Investing in renewable energy sources like solar and wind power is imperative.
3. **Food Security:** Achieving food security amidst climate change and limited arable land requires innovation in agricultural practices, including smart agriculture and biotechnology.
4. **Ecosystem Preservation:** Protecting our ecosystems is vital for maintaining the services they provide, such as water purification, flood control, and biodiversity.

To tackle these challenges, we must adopt comprehensive strategies and integrated approaches such as the following:

1. **Integrated Policies and Governance:** Policies must recognize and address the interdependencies within the nexus. Cross-sectoral governance frameworks can facilitate better coordination and decision-making.
2. **Technology and Innovation:** Embracing technological advancements and fostering innovation can drive efficiencies and open new avenues for sustainable resource management.
3. **Capacity Building and Education:** Investing in human capital through education and training programs will equip our societies with the skills needed to implement and sustain integrated management practices.
4. **Regional Cooperation:** Strengthening regional cooperation can help share best practices, pool resources, and address transboundary challenges effectively.

Ladies and Gentlemen:
At this point, I wish to congratulate both the Islamic World Academy of Sciences (IAS) and the Pakistan Academy of Sciences (PAS) for demonstrating their deterministic role for the betterment of OIC region by organizing this important Conference in Islamabad. The collaboration between the Islamic World Academy of Sciences and the Pakistan Academy of Sciences exemplifies the power of unity and shared vision. I believe that by working together, both IAS and PAS can leverage the collective expertise, knowledge, and resources to address these pressing issues. I am confident that the partnership of IAS and PAS would certainly serve as a model for other nations and institutions, demonstrating the benefits of cooperation and mutual support.

Dear Audience

As we engage in discussions and deliberations over the next few days, let us remain steadfast in our commitment to finding integrated and sustainable solutions. The Water-Energy-Food-Ecosystem Nexus is not merely a theoretical construct; it is a critical pathway to securing the future of our nations. I am confident that through our collective wisdom, dedication, and collaborative efforts, we can pave the way for a future where our resources are managed sustainably, our ecosystems are preserved, and our people thrive. I hope that you will participate in the deliberations of this conference with full zeal and enthusiasm.

I thank both IAS and PAS for inviting me to speak at this occasion. I happily inaugurate this event and I wish you all a very productive and successful conference.

I thank you all for your very kind attention.

May Allah bless you all.

INAUGURAL WELCOME ADDRESS BY PROF. KAUSER ABDULLA MALIK, PRESIDENT OF THE PAKISTAN ACADEMY OF SCIENCES (PAS)

TO THE 25TH CONFERENCE OF ISLAMIC WORLD ACADEMY OF SCIENCES ON
"WATER-ENERGY-FOOD-ECOSYSTEM NEXUS FOR THE SECURITY OF THE OIC COUNTRIES"
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His Excellency Syed Yousuf Raza Gillani, Chairman Senate of Pakistan
Honourable, Senator Sherry Rehman
His Excellency, Prof. Dr. Adnan Badran, President, Islamic World Academy of Sciences
Prof. Dr. Atta Ur Rehman, Fellow Pakistan Academy of Sciences
Prof. Dr. Mukhtar Ahmed, Chairman Higher Education Commission
Prof. Dr. Tasawar Hayat, Secretary General IAS & Fellow Pak Acad. of Sciences
Prof. Dr. M. Aslam Baig, Secretary General, Pakistan Academy of Sciences
Distinguished Foreign Delegates and Invited Speakers
Fellows and Members of the IAS and Pakistan Academy of Science
Dignitaries, Academicians, Researchers, On-line Participants
Ladies & Gentlemen

Assalam-o-Alaikum & a Very Good Morning
It is indeed a matter of great honour and pleasure for me to welcome you all at the Inaugural Session of the **25th IAS Scientific Conference on "Water-Energy-Food-Ecosystem Nexus for the Security of OIC Countries**".

First of all, I wish to thank Senator Sherry Rehman and the Chairman Senate of Pakistan, H.E. Syed Yousuf Raza Gillani for taking time out of their very busy schedules to grace the occasion at the A.Q. Khan Auditorium of the Pakistan Academy of Sciences in the presence of dignitaries, notably Prof. Dr. Adnan Badran, President Islamic World Academy of Sciences and his colleagues and the Fellows of IAS who are attending this event. I wish to inform the audience that the IAS enjoys the patronage of Jordan and Pakistan namely; His Royal Highness Prince El-Hassan bin Talal, Founding Patron of the IAS, Jordan and His Excellency, Mr. Asif Ali Zardari, President of the Islamic Republic of Pakistan. From the IAS side, the Higher Council for Science and Technology (HCST), Jordan is also coordinating in the organization of this event, while from the PAS side, the Higher Education Commission (HEC) of Pakistan is coordinating in the organization of this event.

I very warmly welcome the 12 delegates from the OIC countries including Bangladesh, Jordan, Lebanon, Malaysia, Palestine, South Africa, and Sudan and over 100 scientists, academicians, scholars, industrialists and policy makers from within Pakistan who are keenly attending this scientific conference.

The selection of the theme of this Conference namely Water Energy Food Ecosystem Nexus for the security of OIC countries is most relevant and timely considering the current climate change scenario. This approach recognizes that water, energy, food, and ecosystems are not isolated sectors but are closely linked through various feedback loops, synergies, and trade-offs.

Presently, many developing countries, specifically the OIC Member States are confronted with issues related to WEFE nexus. For example, the OIC member states are confronting distinctive challenges, including mushrooming populations, climate change impacts, and resource scarcities, necessitating integrated and innovative approaches to ensure sustainable resource management and security.

Ladies and Gentlemen
World population presently is 8.1 billion and projected to reach 10 billion by 2050. Seventy percent of the increase between now and 2050 will be in 24 of the poorest countries of the World.

Earth just had its hottest year on record. Around 7.3 billion people faced temperatures strongly influenced by global warming. This increase of temperatures will impact the flora and fauna including aquatic marine life forms, and trigger zoonotic disease, and impact soil microbe and viruses which could pose a hazard for human health.

Meanwhile, the projected increase of temperature beyond 1.5 C° will reduce food production by 20% to 50% by year 2050. Additional 2 billion increases in population will call for the need to produce more food as much as 80%, while reducing the environment footprint of food systems in general but that of agriculture in particular. However several technologies including biotechnology are being adopted in Climate Smart Agriculture by developing heat, drought and salinity tolerant crop varieties.

Ladies & Gentlemen
It is in this backdrop that this Conference is being held. It is indeed a great honour for the Pakistan Academy of Sciences to host this prestigious event at its Secretariat in Islamabad to focus on a matter of immense importance to the Islamic world and the humanity at large.

Dear Participants
Water scarcity, energy insecurity, food shortages, and ecosystem degradation are challenges that transcend borders. They require a holistic approach, integrating policies that are an outcome of scientific research and driven by a common vision for sustainable development. The 25th IAS Scientific Conference symbolizes a collective commitment to addressing the issues facing OIC Member States w.r.t. the Water-Energy-Food-Ecosystem (WEFE) nexus through science, innovation, and cooperation. Fortunately, the Organization of Islamic Cooperation (OIC) countries is rich in history, culture, and diversity, and also possesses the intellectual and scientific potential to lead in sustainable development.

Dear Audience,
Pakistan, like many of our brotherly countries, is aware of the vulnerabilities associated with the Water-Energy-Food-Ecosystem Nexus. We have experienced first-hand the impacts of climate change, resource depletion, and environmental degradation. Yet, we also recognize the power of resilience, adaptation, and sustainable practices. It is through platforms like the IAS conference that we can exchange best practices, foster innovation, and build partnerships that are crucial for our collective resilience. I am confident that the deliberations and insights shared during this conference will pave the way for innovative solutions and actionable policies that address these interlinked challenges.

Ladies and Gentlemen
At this occasion, I take the opportunity to say a few words about the Pakistan Academy of Sciences known as PAS. The Academy was established in 1953, comprises of over 100 distinguished scientists and academicians in basic and applied sciences. The Academy aims to foster collaboration among scientists, technologists, and philanthropists to advance research and innovation and represents Pakistan among the global science academies. Its collaborations with international science academies have led to several scientific, academic, and development initiatives. PAS also serves to facilitate interaction between the public, the policymakers, and the media vis a vis scientific trends and innovations and hosts a very viable Scientific Advice to Government Unit at this Secretariat for evaluation and upgradations of national policies of importance for socioeconomic development.

Dear Audience
Finally, I once again welcome you to this IAS-PAS scientific event. This 3-Day event is spread into 8 technical sessions comprising of keynote lectures, panel discussions and presentations. I urge all participants to engage deeply in the discussions, share your invaluable knowledge, and collaborate towards a shared goal. Let us reaffirm our commitment to scientific excellence, sustainable development, and the security of our future generations. Together, we can turn challenges into opportunities and secure a prosperous and sustainable future for all OIC countries. May this conference be a resounding success. I thank you for your kind attention. May Allah bless you all.

CALL TO EARTH
ADDRESS OF PROF. ADNAN BADRAN,
PRESIDENT OF THE ISLAMIC WORLD ACADEMY OF SCIENCES (IAS)

TO THE 25TH CONFERENCE OF ISLAMIC WORLD ACADEMY OF SCIENCES ON
"WATER-ENERGY-FOOD-ECOSYSTEM NEXUS FOR THE SECURITY OF THE OIC COUNTRIES"
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Dear Fellow Scientists
Ladies and Gentlemen

On behalf of IAS, I wish to thank the Pakistan Academy of Sciences for hosting our 25th IAS conference entitled "**Water-Energy-Food-Ecosystem Nexus for the Security of the OIC Countries**".

Also, I wish to thank the President of Pakistan for his patronage of our conference.

Dear Colleagues:

Breaking the stereotype and style of traditional introductory opening address, I decided instead, to present to you the dialogue I had with **Mother Nature** concerning the theme of this conference "Water-Energy-Food-Ecosystem Nexus for the Security of the OIC Countries".

Calling on Mother Nature, I had the following dialogue:

- **Mother Nature**,

tell me since the Rio Earth Summit 1992, how do you assess your ecosphere?

- **Her reply**:

Miserable, my natural ecosphere and ecosystems are degrading, (Rio+10) of consequent summits should be called (Rio-10). Co2 is on the increase causing greenhouse effect of heat and climate change.

Glaciers in poles are melting raising the sea level drowning coastal zones and polluting fresh water aquifers by seeping sea waters where delta may disappear.

Land, oceans, freshwater are increasingly polluted. Science and technology should deliver solutions to stop turning my beautiful planet into charcoaled dead planet. Look at the piles of nuclear weapons accumulated across my land, they are enough to erase my planet and its biodiversity including Homo-sapiens. Desertification and deforestation are on the increase, poverty particularly in LDCs, is draining my resources. Finding enough food will be a major problem. Wars and

conflicts are killing civilians including women and children, and destroying infrastructure of man and biosphere, (MAB). Selfishness of powerful rich countries contradicts a policy of share and care.

- **Then I asked**:

But Mother Nature, look at countries of the world meeting in the UN, to solve world problems. They put an SDGs agenda to achieve reforms by 2030.

- **Mother Nature replied**:

You must be joking, how reforms could be made by those self-centered with their **veto** which is used to stop any resolution not in their favor and self-interest. Look at one superpower country used to be a heaven and refuge for the obsessed and suppressed migrants, and was called "**land of the free**" is turning now to be "**land of the greed**"

- **Then I asked**:

Mother Nature, why you don't do anything about it?

- **Mother Nature replied**:

You must be dreaming, I've been sending many signals of natural disasters: cyclones, tornados, storms, heatwaves, fires, floods, droughts, climate change, to shake them and wake them up, to stop man-made disasters, but apparently, they are deaf, shortsighted, looking for immediate gains and do not care of having a healthy well-balanced nature for future generations.

- **Then I asked Mother Nature**:

What do you think of our IAS science platform taking priority on "Water-Energy-Food Security Nexus" for all.

- **Mother Nature replied**:

Yes IAS, I have been following your declarations after each annual conference and recommended solutions, to preserve my nature and manage natural and human resources and preserve my planet using Frontier areas of science and creating knowledge for all.

Your WEFE conference is a corner stone and a pillar of sustainability for achieving the UN SDGs to alleviate poverty and achieve economical and social order for all. But look dear IAS, you must be dreaming again, decision-makers do not read your declarations.

There is a gap between academia and policy makers. Politicians do not read, they love to talk. They are busy in arranging for their re-election. They want to lead and dominate, not to share, my planet with its beauty of natural resources, which will fade away, due to self-interest policy.

Then lastly, **I asked Mother Nature**:

When do you think that, one day will come to have world's people living in harmony together and achieving sustainable development for succeeding generations.

Mother Nature with running tears pouring on her face looked at me sadly and replied "**not in my lifetime**".

INAUGURAL ADDRESS BY HIS EXCELLENCY, SYED YOUSUF RAZA GILLANI, CHAIRMAN, SENATE OF PAKISTAN

TO THE 25TH CONFERENCE OF ISLAMIC WORLD ACADEMY OF SCIENCES ON
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Dr. Adnan Badran, President, Islamic World Academy of Sciences,
Dr. Kauser Abdullah Malik, President Pakistan Academy of Sciences,
Senator Sherry Rehman,
Dr. M. Aslam Baig, Secretary General of the Pakistan Academy of Sciences,
Distinguished Scientists, Researchers and Guests,
Ladies and Gentlemen.

Assalam-o-Alaikum and a very good morning to all.

I am delighted to be here today at this prestigious event jointly organized by the Islamic World Academy of Sciences (IAS) and the Pakistan Academy of Science (PAS). The conference's focus on addressing the issues of water-energy-food ecosystems for the security of the OIC countries is very pertinent and relevant for our shared future.

I convey my deepest appreciation and acknowledgment to the Islamic World Academy of Sciences (IAS) and Pakistan Academy of Sciences (PAS) for their efforts toward promoting scientific excellence and innovation as an engine to drive socioeconomic progress. Your work and collaborative efforts are vital for sustainable and inclusive development, as well as prosperity of the people of OIC nations. I also deem it very promising and reassuring that the IAS enjoys the patronage of His Royal Highness Prince EI-Hassan bin Talal of Jordan and His Excellency Asif Ali Zardari, President of the Islamic -Republic of Pakistan. This high-level political patronage highlights the significance our leaders attach to scientific collaboration and innovation, which are essential for the prosperity of the Ummah. Enhancing collaboration between OlC nations is imperative to addressing and resolving all common challenges.

Ladies and Gentlemen!

The definition of national security is evolving beyond traditional military threats to include a broader range of issues. The modern discourse now also encompasses threats to water, food, energy and the environment as matters of national security.

This is in recognition of the fact that addressing and resolving these emerging challenges is critical to a nation's development, stability, survival, and security. The security of water, food, and energy resources is paramount to securing the future of coming generations. The situation is particularly acute in the OIC countries, where

rapid population growth, urbanization, and environmental degradation are putting immense pressure on our natural resources.
In Pakistan, we are acutely cognizant of these issues. Given that agriculture plays a pivotal role in Pakistan's economy, water is critical to our agricultural productivity and overall food security. Similarly, energy, being the backbone of industrialization, is essential for increasing exports and driving economic growth.

The water-energy-food nexus is, therefore, central to the progress and prosperity of Pakistan and the Muslim Ummah as a whole. Addressing the aforementioned challenges and their timely resolution is also crucial for achieving the Sustainable Development Goals (SDGs). These goals offer a comprehensive framework to transform adversity into opportunity and foster innovation and research, essential for the advancement and well-being of nations.

The issues that this conference aims to highlight and address are cross-cutting and not confined to a single region or country. Therefore, it is our collective responsibility to combine our synergies and build partnerships to not only address these issues effectively, but also help fulfill our national commitment to SDGs.

Ladies and Gentlemen!
I have always been an avid proponent of proactive policies and initiatives that promote sustainable development and ensure equitable distribution of resources.

My stance is clear: science and technology must serve as a pivotal for social justice and economic empowerment.

During my tenure as the Prime Minister of Pakistan, my government was dedicated to addressing these critical challenges head-on.

One of the most impactful initiatives was the national tree plantation campaign, which aimed at combating climate change and improving biodiversity through increased forestation. The project's success has globally, demonstrating been recognized Our commitment to environmental sustainability and climate resilience. Such initiatives highlight the importance of proactive action to ensure that all citizens benefit from sustainable development.

To this end, our government also implemented comprehensive climate change policies aimed at building resilience and mitigating the impacts of climate change.

The National Climate Change Policy, conceived and adopted during my tenure as Prime Minister, provided a framework for integrating climate considerations into national development planning.

This policy outlines measures to enhance water resource management, promote renewable energy and strengthen disaster risk management. I take immense pride in the fact that many climate-related projects by successive governments stemmed from the foundational work laid down by this policy.

Ladies and Gentlemen!
I envision a future for OIC nations whereby:
- **Scientific research** drives sustainable development;
- **Whereby innovation** addresses environmental, food, water and energy related challenges,
- **And whereby every citizen** has the opportunity to contribute to and benefit from scientific advancements.

This vision demands sharing of expertise, resources and scientific innovations to build up collective resilience and response since the challenges we face transcend national borders and require concerted action.

The forum of parliament, by virtue of its constitutional authority, can play a pivotal role in ensuring that policies and laws are effectively formulated and implemented in

line with our national aspirations and international commitments.

In this regard, I strongly urge the Parliamentary Union of OIC Member Countries (PUIC) to proactively push sustainable development agendas through legislative interventions, House debates and relevant parliamentary committees. This we must prioritize to ensure that our policies and laws are aligned with the principles of innovation and sustainability.

The PUIC members also need to promote 'Science Diplomacy' by initiating collaborative initiatives and sharing of good practices between parliaments, friendship groups and relevant committees.

This can be a game changer in our common endeavour to enhance national food, water, energy and environmental security.

As the Chairman of the Senate of Pakistan, I reaffirm our commitment to prioritizing our national response, especially proactive parliamentary action, to foster scientific research and innovation as a vehicle for inclusive development and growth.

I also urge forums like Pakistan Academy of Sciences and the Islamic World Academy of Sciences to strengthen OlC countries' scientific research capabilities to not only help advance national interests, but also contribute to the betterment and prosperity of entire Ummah.

I look forward to more collaborative ventures in the future to support interdisciplinary cooperation, imbibing scientific knowledge on common challenges and opportunities in the public and policy domains, and promoting science diplomacy to advance the common good and address shared challenges.

Ladies and Gentlemen!

I also take this opportunity to share a few recommendations to further our common goals in science, technology and sustainable development.

Firstly, we must prioritize Good Governance for effective management and strengthening of our national institutions for optimum action and performance to meet all challenges. By fostering innovation within both the public and private sectors, we can improve efficiency and build public trust. This approach can help lay a strong foundation for sustainable progress.

Another step in the right direction will be incentivizing sustainable practices by implementing subsidies, tax breaks, and grants for sustainable agriculture, renewable energy, and water conservation technologies. By aligning economic incentives with our sustainability goals, we can make environmentally-friendly practices economically viable for businesses and individuals, thus driving green growth and ensuring long-term environmental health.

Lastly, I set great store by financial support in the form of grants and low-interest loans for research and development in clean energy, climate resilience and advanced agricultural techniques.

By supporting researchers, startups, and companies, we can accelerate the development and deployment of sustainable technologies, which are crucial for addressing the emerging challenges we face.

In closing, let us all renew our commitment to the pursuit of knowledge and innovation. Let us work together to create a brighter, safe and sustainable future for OIC countries.

May Allah Almighty help us in our endeavours.

Thank you.

HIGHER EDUCATION, SCIENCE AND TECHNOLOGY---IMPERATIVES FOR SOCIO-ECONOMIC DEVELOPMENT

ABSTRACT

ATTA-UR-RAHMAN FRS

UNESCO Science Laureate and

Professor Emeritus, International Centre for Chemical and Biological Sciences,

University of Karachi, Pakistan

The future of the Islamic world lies in the giving of the highest national development priorities to education, science, technology and innovation. The beginning made by Pakistan during 2000-2008 when I was Federal Minister of Science and Technology/Chairman Higher Education Commission (HEC) has been designated as a model for other developing countries by the Royal Society (London) in a book entitled "A New Golden Age?". The remarkable developments in the higher education sector, triggered by the higher education reforms introduced by us in Pakistan during 2002-2008, have led to an unprecedented growth in high quality research publications in Pakistan. The focus of the HEC reforms under my stewardship was to improve the quality of higher education and research, provide greater access to higher education, and provide education relevant to national needs and international demands. The establishment of the Pakistan Education and Research Network (PERN) in 2004 brought a revolution by providing free access of 65,000 textbooks and 25,000 international journals to students, teachers and researchers. The single biggest contribution to the improvement of the higher education research environment was the emphasis of the HEC programmes on the development and absorption of high-quality faculty. Thousands of our brightest students were selected and sent abroad for training at PhD and post-doctoral levels to leading universities of the world in USA, UK, Germany, France, Sweden, Australia and Austria. The world's largest Fulbright program was initiated with 50% of the funds being invested by Pakistan. Pakistan was about 400% behind India in research output on a per capita basis but overtook India in 2017 and was about 15% ahead of India by 2018---- no mean achievement. A satellite (Paksat 1) was placed in space with some of its capacity directed to education. The rapid progress made by Pakistan set off alarm bells in India. The Indian Prime Minister was given a formal presentation regarding the programmes that I had launched as Chairman HEC. This was reported on 22nd July 2006 in India's man English newspaper Hindustan Times on 23rd July 2006 (article headed "Pak Threat to Indian Science" by Neha Mehta). Neutral international observers reviewed these programmes. Comprehensive reports applauding them were written by the World Bank, British Council, The role of higher education, science and technology has now become central to socio-economic development. The stunning developments in artificial intelligence, new materials, energy storage systems, biotechnology, gene editing, regenerative medicine, and other disruptive innovations are changing the landscape of businesses of today and tomorrow. Some of these developments will be described

MANAGING WATER-ENERGY-FOOD SECURITY-ECOSPHERE NEXUS

ABSTRACT

ADNAN BADRAN

President, Islamic World Academy of Sciences &
Chancellor, University of Petra &
Chairman of the Board of Trustees of the University of Jordan, Jordan

Nature is at risk due to climate change, demography, unfriendly economy in a world of globalization, forced migration, and overtaxing and exploiting our natural resources to a level of irreversibility. In addition to mass destruction of the habitat of fauna and flora, not excluding eradication of Homo sapiens, their infrastructure and ecosystems.

Intersectoral linkages are needed to achieve the SDGs 17 goals. Building synergy is needed for Water-Energy-Food Security-Ecosphere (WEFE) Nexus and Efficient integrative governance approach and management beyond the traditional silos. Under the Nexus paradigm, there is a need to integrate priorities from a single sector policy to overall trade-off solutions and evidence-based policy making. The fundamental principles of WEFE Nexus is to understand the interdependence of resources within a system across space and time, recognizing the power of synergy between water, energy, food and ecosystems, identifying integrative approach and policy solutions to optimize trade-offs and maximize synergies across sectors, ensuring coordination with stakeholders and value the natural capital of land, water, energy sources and ecosystems. WEFE Nexus aims to enhance water-energy-food security without compromising ecosystems through exploitation of co-benefits to improve overall performance, and streamlining development and improving resilience, with stimulating policy and investments. So, managing the nexus efficiently requires assessment of interactions of outputs and evidence-based data. In addition to a scenario development stimulation of the delivery of the Nexus. Water-energy-Food-Ecosphere Nexus is an economic and social priority and a common interest for OIC action plan. Around this Nexus may develop a common OIC market economy to share and care of raising the standard of living of all OIC population. It is indeed a win-win scenario to be undertaken and included in Islamabad declaration of IAS.

THE ROLE OF RENEWABLE AND NANO TECHNOLOGIES IN ENERGY SECURITY IN THE 21ST CENTURY

ABSTRACT

MUNIR H. NAYFEH

Professor, Department of Physics, University of Illinois at Urbana-Champaign & President, NanoSi Advanced Technologies, Inc. Champaign, Illinois, USA

Considerable effort is focused on developing alternative approaches to reduce the world's reliance on fossil fuels. Hydrogen fuel, nuclear reactors, and other renewable sources are proving to be the cleanest energy sources that offer such alternatives with CO2 zero-emission. Hydrogen gas powers our primary renewable solar light, i.e., our sun through thermonuclear fusion burning of hydrogen. Renewables such as solar, wind, geothermal, hydro, and biomass including biofuels constitute a potentially very useful component, but they are intermittent. Burning hydrogen and oxygen on earth releases chemical energy efficiently with only water emission; but it is locked in hydrocarbon fossil fuels, and in water, both are problematic. Being in a hydrocarbon carrier allows it to burn but with the CO2 emission while it is incapable of burning while it is locked in water. It is therefore imperative to harvest pure hydrogen. However, harvesting and storing hydrogen by methods that are both cost-effective and environmentally friendly and safe faces a significant challenge. The advent and development of nano science and technology and nano materials have opened new avenues for novel renewable technologies. Laser ablation, ball milling, electrochemical etching, are among the high-tech technologies that enable synthesis of novel fuels, such as nano silicon powder and other nano metal powders (nanoMg, nanoAl, and nanoFe, ..) and mixtures that efficiently react with water to generate hydrogen gas ('Silicon Fuel' and 'Metal Fuel'). Other innovative developments include nanostructured electrodes, and miniaturized micro cells for fuel, current, and biofuel and more. These innovations are destined to drive low-cost portable devices of renewable energy sources, and conservation, as well as mass production that meets the demand of the ever-increasing population, scattered in remote areas and poor neighborhoods in industrial and developing countries alike. Nuclear energy, however, remains critical, and there can be no real security without advanced modular nuclear energy to provide the package with a *steady energy* component. Finally, we believe that hydrogen and nuclear-based energy remain the ideal and cleanest supplementary components for the 21st century, that offer true security and stability in the World's energy market for all participants, importers, and exporters, rather than the narrowly defined interest of any one country.

Session Two of the 25th IAS conference started with a presentation entitled **Challenges and Opportunities in Achieving SDGs in OIC Countries: Role of STI** by **Prof. Mohamed Hag Hassan** FIAS, President, Sudanese National Academy of Sciences (SNAS), Sudan,

followed by a presentation on **The Biodiversity Nexus and Security in OIC Nations** by **Prof. Zabta Khan Shinwari** FIAS, Vice President, IAS and Vice Chancellor, Federal Urdu University of Arts Science and Technology, Pakistan.

Next was a presentation entitled **Exploring the Impact of Size and Thickness of Nanoparticle Hollow Spheres on their Performance** by **Prof. Hala El-Khozondar** FIAS, Professor, Electrical Engineering and Smart Systems Departments, Islamic University of Gaza, Palestine.

Next was a presentation on **Malnutrition and Dementia among Elderly: A Growing Food Security Concern in OIC Countries** by **Prof. Liaquat Ali** FIAS, Honorary Chief Scientist and Advisor, Pothikrit Institute of Health Studies, Dhaka, Bangladesh.

Lastly, a presentation entitled **Impact of Local Stresses and External Shocks on the Food System in the Arab Region** by **Prof. Abdullah Al Musa**, President, National Center for Research and Development (NCRD), Jordan.

The second day of the conference started with Session Three that consisted of the following presentations:

From Engaging Stakeholders to Influencing Policy and Practice: Aims, Design, Outputs and Hopes of the EU Project UPWATER for Protecting Groundwater and Enhancing Water Quality by **Prof. Jeff Camkin**, University of Western Australia and Global Consultant, Australia/Portugal that was delivered online via Zoom.

Next presentation was **Unveiling Hidden Treasures: Identifying Rare Earth Elements in Northern Pakistan** by **Prof. Muhammad Aslam Baig**, Secretary General, Pakistan Academy of Sciences (PAS).

Next presentation was **Climate-Triggered Threats to Food Security in the OIC Regions** by **Prof. Muhammad Ashraf** FIAS, Rector, University of Lahore, Lahore, Pakistan.

Session Four was a Group Works Session where participants were divided into three teams to discuss different themes; Theme 1: Integrated Water Resource Management for Sustainable Agriculture, Theme 2: Renewable Energy Solutions for Sustainable Food Production and Theme 3: Enhancing Food Security through Ecosystem-Based Approaches.

These themes encourage comprehensive discussions and collaborative efforts among OIC countries to address the interconnected challenges of water, energy, and food security through sustainable and innovative solutions.

Some photos of the Work Groups Discussions.

Session Five consisted of the following presentations:

Global Warming and Climate Change Threats to the Natural Habitat of the Tibetan Plateau by **Prof. M. Qasim Jan** FIAS, Professor Emeritus, University of Peshawar, Peshawar, Pakistan;

Combating Micronutrient Malnutrition in Human Populations by Agronomic Biofortification of Staple Cereals by **Prof. Abdul Rashid**, Fellow, Pakistan Academy of Sciences, Islamabad, Pakistan;

Enhancing Food Security and Ecosystem Health through Biochar Innovation by **Prof. Dilfuza Egamberdieva**, FIAS, Institute of Fundamental and Applied Research, National Research University TIAME, Tashkent, Uzbekistan.

The third and last day started with Session Six and consisted of the following presentations:

Climate Change and Health in Pakistan by **Prof. Mohammad Perwaiz Iqbal**, Professor, School of Science, Department of Life Sciences, University of Management and Technology, Lahore, Pakistan and Professor Emeritus, Aga Khan University, Karachi.

Botanic Gardens and Food Security in the Present Scenario of Climate Change by **Prof. Mohammad Qaiser**, University of Karachi, Karachi, Pakistan;

Ensuring Food Security through Sustainable Agriculture in Changing Climate by **Prof. Anwar Gillani**, Advisor, Higher Education Commission, Islamabad, Pakistan.

Session Seven was a panel discussion session entitled: Navigating Shared Water Resources: Strategies for Ensuring Future Food Security, that was moderated by Prof. N. M. Butt. Panelists in this session were: Prof. Adnan Badran, Prof. Kauser Malik and Prof. M. Qasim Jan.

Lastly, at the concluding session of the Conference, Prof. Kauser Malik read the declaration to the audience then Prof. Adnan Badran read their final remarks and expressed their gratitude and appreciation to everyone who made the conference a successful event.

CONFERENCE DECLARATION

of the 25th Islamic World Academy of Sciences Conference on

"Water-Energy-Food-Ecosystem Nexus for The Security of the OIC Countries"

Adopted at Islamabad, Pakistan

on 24 July 2024

The Islamic World Academy of Sciences (IAS), the Pakistan Academy of Sciences (PAS), and the Higher Council for Science and Technology (HCST) extend their appreciation and gratitude to His Excellency the President of Pakistan for his high patronage of the conference and to His Royal Highness Prince El Hassan bin Talal, the Founding patron of IAS.

Preamble

Whereas all countries have the right to their basic needs of clean water for drinking, personal and house-hold use.

Whereas the achievement of water security and consequently food security remains a fundamental challenge globally.

Whereas OIC and developing countries are suffering from severe water shortage due to different reasons among which is the lack of comprehensive national water policies.

Therefore, The Islamic World Academy of Sciences (IAS):

Realizing with utmost concern the deteriorating water-energy-food-ecosystem security situation in the OIC countries and alarming food gap that has emerged as a consequence of the unsatisfactory production situation as compared to the adequate needs of the OIC countries.

Realizing further that this threatening situation may have social, economic and political implications affecting the entire OIC countries.

Realizing that the development of water-saving and desalination technologies have not been an R&D priority in most of the OIC countries.

Realizing that some OIC member countries face critical energy shortages and rely heavily on fossil fuel.

Recognizing that OIC countries have the natural, human and capital resources to achieve and sustain an adequate level of food security.

Recognizing further that a substantial level of food security can be achieved by conscious, concerted and coordinated effort on water and energy towards pooling and integrating natural and human resources available in the OIC countries.

Recognizing the pressing need to encourage investment in science and mathematics education, leveraging advancements in Information and Communications Technologies (ICTs) and Artificial intelligence (AI).

Recalling the successful efforts made by some OIC countries to achieve self-sufficiency in the production of basic food commodities and the lessons that can be learned from their experiences.

Recalling that a useful beginning have already been made for evolving mechanisms of cooperation in science and technology and in other fields in the OIC countries.

Moreover, the IAS,

- **Noting with Concern** the critical water shortages experienced in some OIC-Countries; a situation which is hampering the socio-economic development and even the very existence of man and is partly due to the basic scarcity of this resource since most OIC counties lie in arid and semi-arid regions, lack adequate storage capabilities and suffer from water distribution network inefficiency.
- **Noting with Concern** the existence of conflicts between OIC countries over shared international waters.
- **Noting with Concern** the absence of North-South and South- South co-operation in the area of water policies, a situation which is adversely affecting the

development of sound water policies in developing countries.

- **Noting with Concern** the serious depletion of fresh-water resources in many OIC countries, which is partly due to the excessive use of water for irrigation, and the mis-use and mis-management of water in large urban centers.
- **Noting with concern** the absence of co-ordination between the various institutions involved in science and mathematics education within the educational process.

And, the Islamic World Academy of Sciences:

Acknowledging the work being done by many governmental and non-governmental organizations in the area of water and water policies.

Acknowledging that a basic pre-requisite of a sustainable Water Resources Policy has to be the formation of up-to-date water data-bases that provide planners with realistic data which can be used in drawing up policies that primarily aim at:

a) Charting practical paths in sectorial (municipal, agricultural and industrial water sharing,
b) Minimizing resource-losses through effective water Resources Systems Operation.

Acknowledging that renewable energy resources, appropriate to local conditions, usually offer an attractive energy resource to rural populations and can make an increasing contribution in urban areas, and that – for economic, strategic and environmental reasons – renewable energy resources are expected to become the supply of choice.

Acknowledging that nuclear energy, wind, hydro, biomass, geothermal, and solar energies, appear to be attractive for the generation of electricity and that their contribution to the global energy mix will significantly increase in future.

The IAS invites the political leaders and decision-makers in the OIC countries:

- **To devote** special attention to the problem of food consumption and nutrition specially for vulnerable groups.
- **To give** science and technology a major role in maximizing the utilization of available resources, for this purpose to decide for the formulation of a science and technology strategy for food security in the OIC countries.
- **To strengthen** trade and marketing policies.
- **To provide** adequate incentives to food producers and farmers.
- **To promote** mechanisms and instruments like a common market or free trade zones among sub-regions to facilitate free trade of food commodities in the OIC countries.
- **To resolve** to work together to achieve the ultimate goal of sustainable food security in the OIC countries.
- **To deal** with the WEFE Nexus in an integrated multidisciplinary approach and not as separate sectors.
- **To incorporate** considerations of water into their national agricultural policies, with the aim of maximizing production without over-exploiting available water resources.
- **To re-examine** the policy of irrigated agriculture in light of the related social factors associated with this type of agriculture, such as the stability of rural population which is agriculture-dependent in many OIC countries;
- **To formulate and execute** national water-harvesting policies (involving all sectors of society) that would ultimately maximize water volumes stored and minimize waste of this precious resource.
- **To establish** national academies of sciences in their countries, or where such independent entities exist strengthen them, so that they may act as independent advisory bodies to their respective governments.
- **To evaluate** their energy policies and where possible incorporate them into national S&T policies.
- **To strengthen** specialized R&D institutions, the output of which can

eventually be smoothly transformed into marketable technological products.

- **To introduce** environmental awareness programs at the various stages of the educational process.
- **To introduce** appropriate legislation and incentives, including tax relief and customs exemptions, to promote the use of sustainable energy resources.
- **To adopt** a holistic approach to scientific research and development and technology utilization and establish the necessary technology management processes for the purpose.
- **To promote** collaboration between academies of science in OIC countries by strengthening the activities of the Network of Academies of Sciences in OIC Countries (NASIC).
- **To facilitate** the engagement and support of private sector to development-oriented science and technology projects.
- **To train** a new generation of problem-solving scientists in the Nexus areas.

And the IAS calls upon the international community to extend all possible help to developing countries in terms of funding, training and supply of technology, to assist them in their quest to achieve some form of water and food security.

Recommends:

1. Assessing synergy and tradeoffs between water-energy-food security and impact on the ecosystem at the local, regional, and global levels.
2. Interdependence of the Nexus and its relation with SDG's and the economic dynamics.
3. Bridge the R&D of the Nexus with decision-making processes.
4. Off-grid renewable energy solutions for real farm irrigation with the newly-developed energy storage for intermittent sources of energy.
5. The Nexus will be more efficient if implemented on geography and shared basins. This would lead to sharing and caring of unique Nexus under one ecosystem. (i.e. Nile basins with 12 riparian countries in Africa)
   The Nexus is a priority and common to OIC for a shared common-market economy to develop around this Nexus, sustainable sharing and caring, on win-win, the delivery of outputs within balanced ecosystems, which lead to self-reliance dignity and cooperation to alleviate poverty, in all countries.

IAS Council holds its 46th Meeting in Islamabad, Pakistan

The 46th Meeting of the IAS Council was held at the Pakistan Academy of Sciences (PAS), Islamabad, Pakistan on 24 July 2024, after the conclusion of the IAS 25th Conference with the participation of IAS Council Members including IAS-President and DG, Prof. Adnan Badran, who outlined the activities undertaken by the IAS for the period (March 2023-July 2024). The Council members discussed some issues related to the activities of the IAS.

IAS General Assembly holds its 26th Meeting in Islamabad, Pakistan

The General Assembly of the Islamic World Academy of Sciences held its 26th meeting at the Pakistan Academy of Sciences (PAS), Islamabad, Pakistan on 24 July 2024. The meeting was attended by a number of IAS Fellows as well as the IAS President. The General Assembly after approving the minutes of the previous meeting, took note of the very detailed report presented by the IAS President on the various activities implemented by IAS from its headquarters in Amman. It went on to discuss an extensive agenda that included a review of financial statements, IAS programs, as well as a number of organizational matters related to the IAS. Prof. Elias Baydoun, Treasurer, IAS, talked in brief about the finances of the IAS.

AI REVOLUTION: TRANSFORMING TB DETECTION AND TREATMENT IN AFRICA

Article contributed by Prof. Yahya Tayalati Honorary FIAS

Tuberculosis (TB) remains a significant global health challenge, particularly in low- and middle-income countries, where timely diagnosis and effective treatment are critical yet often inadequate. TB affects one-quarter of the global population and causes 1.3 million deaths annually, with 90% occurring in developing countries. In African countries, late diagnosis, treatment adherence issues, and treatment failures are major challenges faced by national TB programs. The rise of multidrug-resistant (MDR) and extensively drug-resistant (XDR) TB strains further complicates efforts to control the disease, especially in regions already struggling with HIV and malaria co-epidemics. These poverty-related diseases form overlapping epidemics that complicate case management and overall control efforts.

To address these challenges, the AI4TB project, part of the broader AI4PEP: Global South Artificial Intelligence for Pandemic and Epidemic Preparedness and Response Network, is leveraging artificial intelligence (AI) to improve TB management by enhancing early detection and optimizing treatment protocols. The AI4PEP Network, established in August 2022, harnesses interdisciplinary insights from AI, clinical public health, One Health, and data sciences to design practical tools and locally relevant interventions, focusing on the disproportionate impact of pandemics and epidemics on vulnerable communities.

Funded by the Canadian International Development Research Centre (IDRC) under the AI and Global Health Investment initiative, the Global South AI4PEP Network unites an interdisciplinary team of experts, including clinical public health professionals, AI and data scientists, epidemiologists, physicists, mathematicians, software engineers, and specialists in disaster and emergency management, citizen science, and community engagement. This diverse team collaborates with community health practitioners, program managers, policymakers, and decision-makers across government levels, along with other stakeholders from Africa, Asia, Latin America, the Caribbean, and the Middle East and North Africa.

The AI4TB project, with partners from Morocco, the Democratic Republic of Congo (DRC), Burkina Faso, and South Africa, focuses on improving diagnosis, optimizing treatment, and enhancing monitoring. AI tools assist healthcare professionals in diagnosing TB more accurately through advanced analysis of medical imaging and diagnostic data. Machine learning algorithms create personalized treatment plans for patients, improving therapy efficacy and reducing potential side effects. AI-driven systems are also implemented to monitor patient progress and adapt treatment plans as needed, ensuring better adherence and minimizing the risk of drug resistance.

AI can significantly improve TB management in resource-limited areas by providing tools for early diagnosis, especially where radiologists are scarce. For instance, chest X-rays can be photographed using a cell phone and analyzed remotely by AI, making early identification and treatment more accessible. AI models also offer potential for predicting MDR-TB and optimizing treatment regimens, which is crucial for interrupting transmission chains and preventing more severe drug-resistant forms.

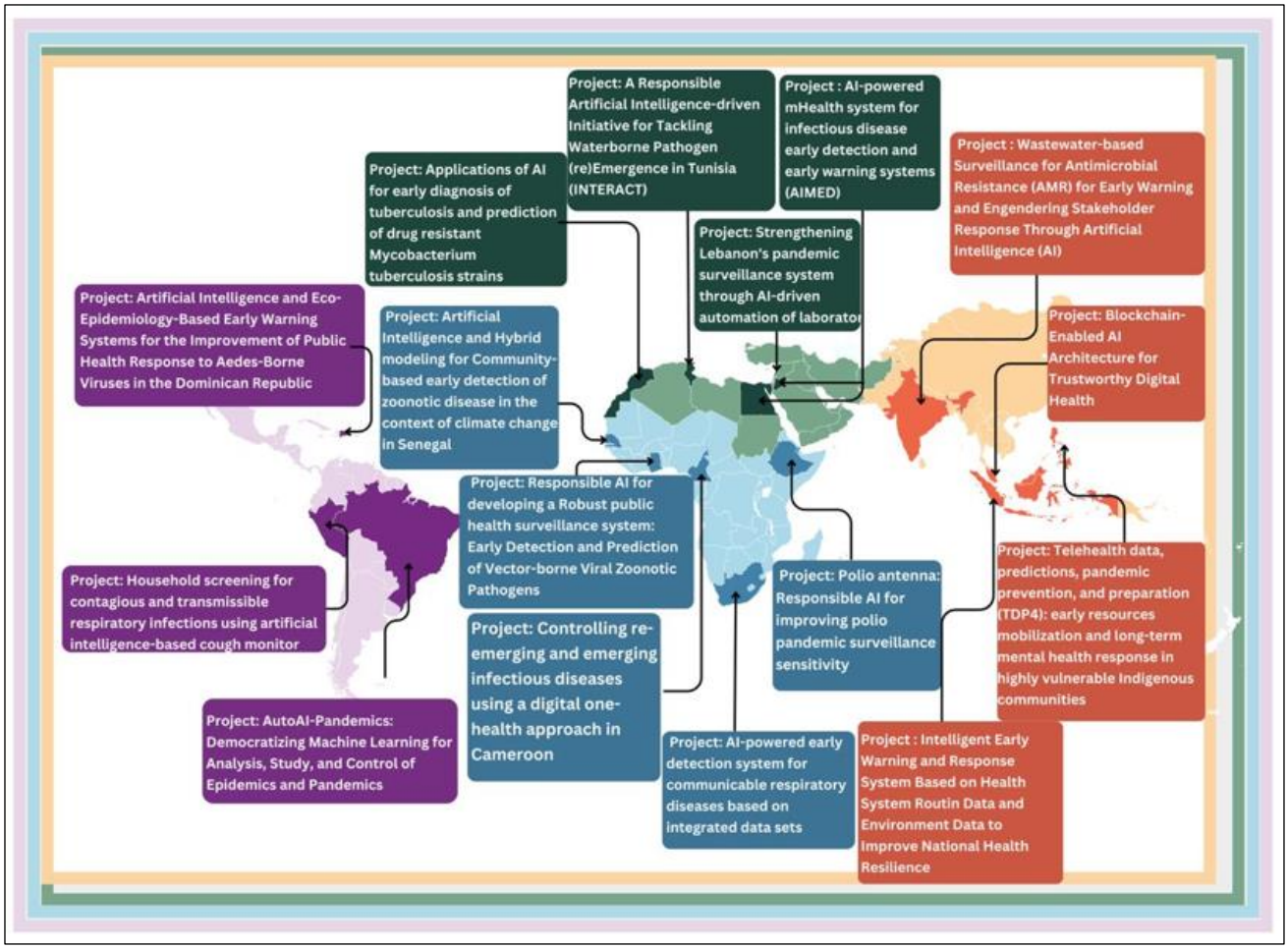
Despite technological advancements, many African countries still rely on traditional TB diagnostics like tuberculin tests, chest X-rays, and smear microscopy, which are less sensitive than newer molecular tests. AI offers a promising solution to bridge this gap by enhancing

diagnostic accuracy and supporting healthcare systems in delivering timely and effective care. Moreover, AI can optimize healthcare professionals' workloads, freeing up resources for research, innovation, and infrastructure improvements.

Collaboration between national and international interdisciplinary research networks is essential for effectively implementing AI techniques due to the complex nature of TB and the diverse factors affecting its spread and treatment. The AI4TB consortium emphasizes the importance of global cooperation and innovative solutions to end TB. Supported by the AI4PEP Network, the IDRC and York University, this initiative aims to harness responsible AI to develop equitable and resilient governance strategies, enhancing societal preparedness for future pandemics and epidemics, and ultimately making a significant impact on global health.

Dr. Aketi Loukia from Cliniques Universitaires à Kinshasa, prsenting the AI4TB projet during the TB day organized in RDC.

Project website: https://ai4pep.org/our-projects/



Projects awarded funding by International Development Research Centre (IDRC), Canada.

LETTER FROM THE INTERNATIONAL SCIENCE COUNCIL (ISC) TO PROF. ZABTA SHINWARI FIAS

International Science Council
The global voice for science

Islamic World Academy of Sciences

Paris, 15 July 2024

Subject: Thank you for your valuable input on the ISC strategic plan

Dear Zabta Shinwari,

On behalf of ISC President Peter Gluckman, and the Secretariat, I would like to extend our heartfelt thanks to Islamic World Academy of Sciences for responding to our recent consultation regarding the ISC Strategic Plan for 2025-2028. Your insights and contributions are invaluable and will significantly shape the development of our first draft.

We deeply value your input, which has provided essential perspectives on our strategic priorities and areas for future focus. As we move forward, we will continue to engage with you in this iterative process. We are pleased to announce that there will be a second round of consultation later this year, where you will have another opportunity to provide feedback and help refine our strategic direction.

In the coming weeks, Alison Meston, Communications Director, may request a one on one with you as Islamic World Academy of Sciences' focal point to explore your input further. I make myself available to participate in such a discussion should you wish us to elucidate specific aspects of the ISC's work in the future from the angle of your organization's priorities and views on the future strategic directions for the Council.

Thank you once again for your commitment and active participation in this crucial initiative. We look forward to your continued engagement and collaboration. We expect the next draft of the Strategic Plan to be available to Members for comment in the last quarter of the year.

Kind regards,

Salvatore Aricò
Chief Executive Officer
International Science Council

FELLOWS NO LONGER WITH US

THE LATE PROF. HAMEED AHMED KHAN (PAKISTAN)

(1942 - 2024)

It is with a sense of sadness and sorrow that the secretariat of the Islamic World Academy of Sciences (IAS) announces the passing away of the eminent scientist and IAS Fellow; **Prof. Hameed Ahmed Khan (Pakistan).**

Prof. Hameed Ahmed Khan Sitara-Imtiaz (SI) was the Chief Scientist of Pakistan Atomic Energy Commission (PAEC) and Director General of Pakistan Institute of Nuclear Science & Technology (PINSTECH), Islamabad, Pakistan.

Dr Hameed Ahmed Khan (SI) was born at Rangoon (Burma) in 1942, and earned his BSc (Hons.) and MSc degrees from Punjab University in 1963 and 1964, respectively. He joined Pakistan Atomic Energy Commission (PAEC) in 1965 and participated in the commissioning of Pakistan's first Research Reactor (PARR-1). He then obtained an MSc (Reactor Physics) and a PhD (Radiation Physics) from Birmingham University (UK) in 1969 and 1972, respectively.

Dr Hameed Khan's PhD research work produced about 20 international research publications and resulted in the development of a new radiation detection system that was applied to many branches of science and technology. He served on the research/teaching faculties of Birmingham University till 1974.

He was awarded a DSc in Physics and Space Research from Birmingham University (UK) in 1994.

The President of Pakistan decorated Dr Khan with a high civil award of "Sitara-i-Imtiaz" (SI), in recognition of his scientific research work and its applications in Pakistan, and the National Book Council of Pakistan bestowed upon him the award of the Scientist of the Year, 1987.

The Islamic Academy of Sciences elected him a Fellow in 1988. In 1990, the Pakistan Academy of Sciences (PAS) elected him a Fellow of the Academy. The Iranian Research Organization for Science & Technology (IROST) awarded him "Khawarizmi Prize" in 1993 for his contribution to science. The National Book Foundation of Pakistan awarded him first prize in Physics for the years 1991, 1992 & 1993. The Third World Network of Scientific Organizations (TWNSO), Trieste, Italy awarded him its 1998 TWNSO Prize in Technology in recognition of his scientific contributions, particularly for developing the technique of SSNTD and its applications.

Realizing the energy problem in Pakistan, Dr Khan developed and applied an inexpensive technique for uranium and thorium exploration with a view to use these minerals in nuclear power generation programme of Pakistan Atomic Energy Commission (PAEC).

Dr Khan has also been a member of the Editorial Board of "Radiation Effects" and "Radiation Measurements," and Chief Editor of the "Nucleus," the scientific journal of PAEC. He has over 450 research publications to his credit.

BAHA AL-DIN MUHAMMAD IBN HUSAYN AL-AMILI (SHEIKH BAHA'I) (1547-1621)

Prepared by: International Relations Office of Iran Academy of Sciences

Baha al-Din Muhammad ibn Husayn al-Amili (1547-1621), commonly known as **Sheikh Baha'i**, was a towering figure in the intellectual landscape of the Safavid era. He was a scholar, poet, philosopher, architect, mathematician, and astronomer whose multifaceted contributions left an indelible mark on Islamic thought and culture.

Sheikh Baha'i's father, a prominent scholar, migrated to Safavid Iran with his family after the execution of al-Shahid al-Tani, his mentor. The Safavid court, under the reign of Tahmasp I, welcomed Sheikh Baha'i's father, appointing him as Shaykh al-Islam. This environment nurtured young Sheikh Baha'i's intellectual growth, leading him to complete his studies in Isfahan.

Driven by a thirst for knowledge, Sheikh Baha'i embarked on a journey across the Islamic world in 1570, visiting Iraq, Syria, and Egypt. This experience broadened his horizons and deepened his understanding of diverse Islamic traditions. After four years of travel, he returned to Iran, where he continued to flourish as a scholar and intellectual.

Sheikh Baha'i's contributions to astronomy were particularly significant. He was one of the earliest Islamic astronomers to suggest the possibility of the Earth's movement, predating the spread of the Copernican theory. His treatise Tashrīḥ al-aflāk (Anatomy of the Celestial Spheres) is a testament to his innovative thinking, affirming the view that supports the positional rotation of the Earth. This groundbreaking idea, independent of Western influences, demonstrates his intellectual prowess and his willingness to challenge established paradigms. Beyond astronomy, he excelled in mathematics. His Khulāṣat al-ḥisāb (Essentials of Arithmetic) became a popular textbook throughout the Islamic world, from Egypt to India, until the 19th century. It was translated into German and French, further solidifying its influence on mathematical education.

Sheikh Baha'i's architectural contributions are equally noteworthy. While the attribution of specific designs to him is debated, he is widely associated with planning the city of Isfahan during the Safavid era. The Imam Square, Imam Mosque, and the Zarrin Kamar Canal are often attributed to his architectural genius, showcasing his mastery of urban planning and water management.

Sheikh Bahai engineered and constructed a bath that maintained constant heat, fueled by a single candle. The Sheik Bahai bath's mysteries are among the most significant yet-to-be-uncovered secrets related to the construction of this bath in Isfahan (see Figure 1).

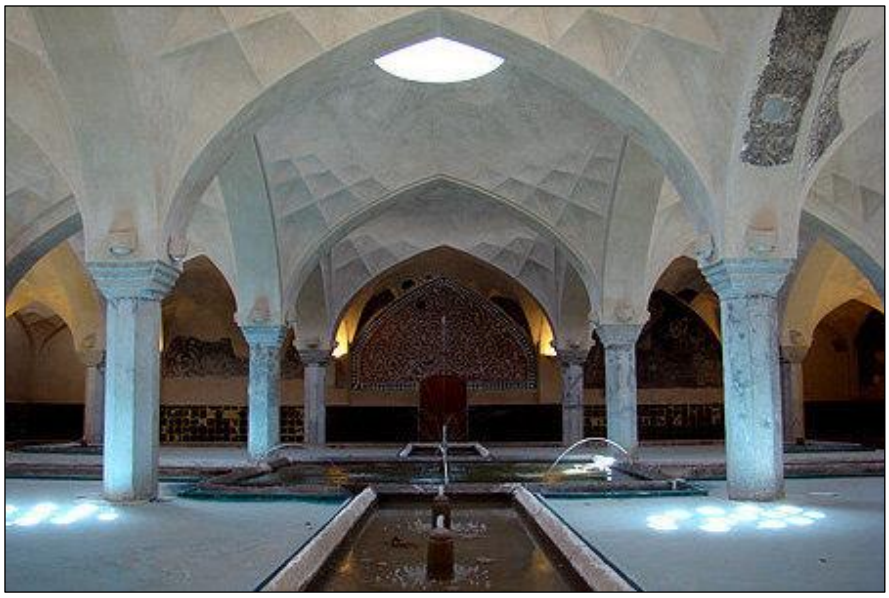


Figure 1: The Sheikh Bahai bath, with its enigmatic heating method utilizing a perpetually lit candle, stands as a remarkable testament to engineering ingenuity in Isfahan, Iran.

Sheikh Baha'i's intellectual pursuits were not limited to the sciences. He was also a prolific writer and poet, composing over 100 treatises and books on various subjects, including Islamic jurisprudence, philosophy, and mysticism. His works, written in both Persian and Arabic, reflect his deep understanding of Islamic theology and his profound engagement with the philosophical and mystical traditions of his time.

His mystical leanings are evident in his writings and his frequent interactions with Sufi circles. He was known to dress like a Dervish during his travels, indicating his affinity for Sufi practices and beliefs. His work Resāla fi'l-waḥda al-wojūdīya (Exposition of the concept of Wahdat al-Wujud (Unity of Existences)) further highlights his mystical inclinations.

Sheikh Baha'i's legacy extends beyond his achievements. He was a key figure in the development of the Isfahan School of Islamic Philosophy, a vibrant intellectual movement that flourished during the Safavid era. His teachings and writings influenced many scholars, including Mulla Sadra, one of the most prominent figures in Islamic philosophy.

Sheikh Baha'i's life and work stand as a testament to the intellectual dynamism of the Safavid era. He was a polymath who excelled in diverse fields, leaving behind a rich legacy of scholarship, poetry, architecture, and mystical thought. His contributions continue to inspire and inform Islamic thought and culture, solidifying his place as one of the most influential figures in the history of the Islamic world. Sheikh Baha'i died in Isfahan, Iran, and his tomb is located in the city of Mashhad (Figure 2).

Figure 2: Sheikh Baha'i's Tomb in Mashhad, Iran.

IAS NEWSLETTER

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The IAS welcomes the submission of short articles for publication in the Newsletter (publication however is at the IAS discretion)

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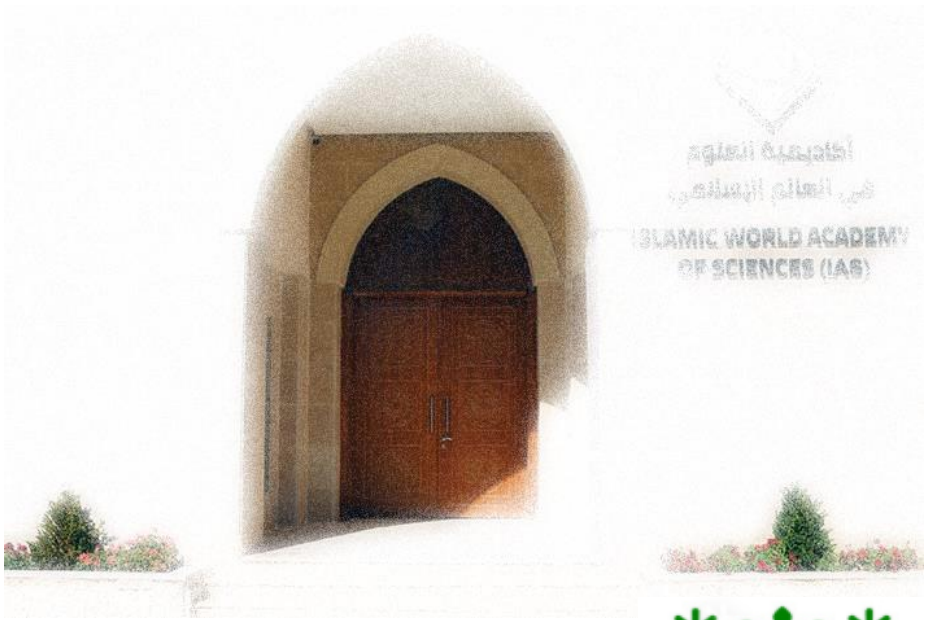

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