

WAITRO



WORLD
ASSOCIATION OF
INDUSTRIAL &
TECHNOLOGICAL
RESEARCH
ORGANIZATIONS

THE GLOBAL INNOVATION FAMILY

Ambitious **then**.
Crucial **now**.
Indispensable for the **future**.



DEDICATION

WAITRO, throughout its 50 years of existence, has been lucky to obtain the stewardship of great minds, hearts and hands. This book is dedicated to the memory of all the great people who have impacted the formation, nurturing and grooming of the Association from its origins to what we know today.

Rohani Binti Hashim	 Malaysia	Secretary General	2007-2018
Morten Knudsen	 Denmark	Secretary General	1995-1998
Dr. J. K. Nigam	 India	President	1991-1994
Rustam Lalkaka	 USA	Member Standing Consultative Committee	1990-2002
Adel Abdel Azim	 Egypt	President	1983-1986
Hans-Georg Lindgren	 Sweden	Secretary General	1981-1986
Eiliv Sødahl	 Norway	President	1979-1982
Paul Trussell	 Canada	Secretary General	1970-1978

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FOREWORD BY WAITRO PRESIDENT HER ROYAL HIGHNESS PRINCESS SUMAYA BINT EL HASSAN



Welcome to WAITRO’s celebration of 50 years of ambition, growth, collaboration and friendship. This wonderful publication is an eclectic and indispensable record of the individual experiences and the collective achievements of WAITRO members over the years.

I know it will bring a fascinating and inspiring, yet rarely told story to a wider audience, both within our organization and beyond.

It is indeed a great privilege as President to participate in this celebration of our unique family as we honor its founders and those who championed our vision through the decades. Yet this is far more than an historical record, for I have no doubt that these recollections and reflections will encourage and inspire new generations of researchers and innovators to defy convention, to break through barriers and to drive collaborative and sustainable progress for all. Indeed, the drive behind the stories collected here represents all that is best in humanity – the ability to counter adversity, to collaborate, and to create a more durable future.

Over the years, WAITRO has brought together so much talent and has ignited so much innovative thinking. Today, our increased focus on sustainability can be traced through the pages of our own history. Those five decades since our

foundation have seen technology progress beyond expectations – The advancement of communications technology has progressed so quickly that we still haven’t fully grasped its impact or potential. This is indeed the right time to reflect, to assess and to forge a new path based on our pioneering heritage.

These pages will shine a light on how WAITRO evolved to become the leading global network of research and technological organizations, and how an ethos based on equality in partnership grew from the character and dedication of members from all cultures and backgrounds. Only by placing research above politics and innovation above ideology could our unique network have evolved to inspire, support and facilitate equal and long-term partnerships between members.

These are the stories of the people who gave birth to The WAITRO Innovation Ecosystem. This is a record of where we have come from. This wonderful collection will also help to guide us towards a future in which our vision will matter more than ever. We wholeheartedly recommit to providing inspiration across cultures and through generations, to sharing knowledge and to transferring skills; to facilitating spaces where each may be inspired by the other. I believe we have all come to this innovative family to enable the exchange of knowledge and to enhance the collective research capacity of humankind. This publication shows that we certainly have the heritage to achieve it.

SALUTATORY ADDRESS FROM HOLLIS CHARLES, FOUNDING MEMBER



I am exceptionally pleased to be afforded the opportunity to say a few words about WAITRO on the occasion of this publication, commemorating its 50th Anniversary. This publication is both appropriate and necessary for marking the event. The birth of WAITRO on 30 October 1970 coincided with the start of my own career – a month earlier- in the business of industrial and technological research. We have since matured together.

The path taken by WAITRO to arrive at this juncture was not an easy one. In fact, in the early years, it was less a path and more of an obstacle course! From the very beginning however there came a man for every moment of need. The past is strewn with their names and the memories of their deeds. Paul Trussell of Canada, Morten Knudsen of Denmark, Manuel Noriega Morales of Guatemala, Emmanuel Lartey of Ghana, Ahmad Adel Abdel-Azim of Egypt, Hans-Georg Lindgren of Sweden, JK Nigam and JN Johry of India, Jan Van Kaymulen of Belgium, Eiliv Sodahl of Norway are just a few. When the path in one direction was threatened, another way was found. It was as if the Members of WAITRO, many of whom had existed before in splendid isolation, having come to see themselves as part of a global community, were determined not to let that vision fade. And the saga was not only about individuals. Institutionally, the organizational support of the Members from Europe and Canada, the excellent example of the Indian scientific public service at CSIR and the encouragement and advice received from international

agencies were critically important early inputs. Later would come the sterling contributions of DTI in Denmark and SIRIM in Malaysia.

That WAITRO benefitted from the resolute attitudes of its Members and their representatives is noteworthy but perhaps not surprising. It was in the nature of what they did, routinely. The work done by WAITRO Members takes place at the interface of academia and commerce, and there is always tension at interfaces. Our employees are therefore persons who can function successfully in conditions at the interface environment. They respond favourably to 'defining moments'. They are inadvertently a special breed. Their feet are firmly grounded in the hard realities of what is happening in their societies but their minds have to populate the altitudes of scientific rigor and technological creativity! And they are few. But I postulate, a "fortunate few".

The personnel in the Members of WAITRO are among the fortunate few of humankind who have been given the opportunity to make a difference in their societies and contribute to the on-going story of human civilization. In the tapestry of human existence the threads of our lives glow with a sheen that is somewhat brighter than the rest.

At our 50th Anniversary I am optimistic for WAITRO. Our ethos is rooted in the use of applied knowledge for the benefit of humanity. Technological innovation is driving the visible future. It is a future that seems to have been made for us! As we forge ahead on our journey of the next 50 years may Good Fortune continue to walk with WAITRO!

FIVE DECADES OF WAITRO: A BRIEF OVERVIEW

1970–1979

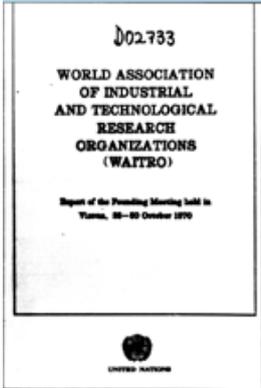
October 29–30, 1970: Founding of WAITRO

The World Association of Industrial and Technological Research Organizations (WAITRO) was formally founded as a non-governmental organization under the auspices of UNIDO. 84 industrial research organizations (RTOs) from 54 developing and developed countries met in Vienna from October 28–30, 1970 for the founding meeting.

In 1966 the United Nations Industrial Development Organization (UNIDO) was established to promote the industrialization of developing countries. UNIDO recognized that RTOs have a distinctive role to play in industrial development. The UNIDO Interregional Workshop and International Symposium on Industrial Development in 1967 in Athens was the first meeting to bring together representatives from developing and developed countries to address the subject of technical research services in developing countries. This meeting resulted in the idea of WAITRO: a parallel organization to UNIDO to help developing countries establish their own research organizations and cooperate with other research organizations, outside of political influences. The first Executive Committee meeting was held on June 23–25, 1971 in Vancouver, Canada. The first General Assembly was held October 24–27, 1972 at Juan Les Pins, France. The United Nations Fund for Science and Technology for Development (UNFSTD) was to fund WAITRO activities. It has to be noted that apart from that, no financing model or business plan was implemented which went on to challenge the Association repeatedly over the years.

UNIDO set up WAITRO in conjunction with UNESCO. UNESCO was responsible for trainings and science cooperation. There were two programs that were developed right from the start of WAITRO. The first program was intended to teach new directors of research institutes in developing countries how to manage the organizations and how to establish research programs. WAITRO sent those new directors to different institutes in the advanced countries for mentorship. All across the world new directors were recruited and trained to manage their institutes.

The other program was for scientists and researchers. They were sent to laboratories in different countries to be taught in different areas, for example: Atomic absorption, visible and infra-red spectrophotometry (Denmark), fermentation processes (Sweden), scientific and technical librarianship (Budapest), biological leaching of metals (Sao Paulo), technical information service (Ottawa). The program was instituted in 1973 as the “WAITRO Training Program for Developing Countries”. A report from 1977 listed 25 completions of trainings, six in progress and ten being negotiated.



Founding Document of WAITRO, UNIDO, 1970

“As WAITRO reaches 50 it is my fervent wish that WAITRO continues to connect across borders, to harness science and technology and engage with strategic partners to illustrate the distinctive role of RTOs as a key player in industrial development.”
- Dr. Nirmala M Pieris
(read her WAITRO story below)

“I recall the sense of pride at CARIRI when in 1973, we were among the first institutions to take part in a WAITRO project to pair members in Developed and Developing Countries. We were paired with RPC, Canada. The exercise was highly successful for both Institutes and for me personally, as I developed a close relationship with the RPC Directory Dr. Claude Bursill.”
- Hollis Charles
(read his WAITRO story below)

1973: The WAITRO Training Program for Developing Countries was instituted. It has continued in various forms until today.

The training program continued over the years. In its initial phase the program was structured on an individual training basis. Trainees were selected by WAITRO and emphasis was on training in areas identified as contributing directly to national developmental objectives. From the mid-1980s group training was strongly encouraged in the so-called new technology areas, information technology and biotechnology. In the late 1990s computers were supplied to member institutes in Africa and courses were provided on the use of computers in research and management and to establish computer training centres. In recent years, attention has turned to highly specialised trainings, e.g. on best practices for technology transfer to SMEs or how to participate in the EU framework research programs.

Besides the training program, WAITRO’s activities were and still are focused on:

- Biennial international conferences on topics of current interest to rtos in conjunction with general assembly meetings
- Promotion of research collaboration among member rtos
- Representation of members in united nations and other international science and technology fora

For internal communication WAITRO started publishing the monthly newsletter “Communiqué”, and a directory of members. A quarterly list of forthcoming conferences and courses was sent also out to all members.

From 1970 – 1977 the WAITRO Secretariat published and distributed important documents, such as the “Priority of Needs of Industrial Research Institutes in Developing Countries” and the “Handbook of Technical Information Sources”.

“To have Hollis Charles, with the booming bass of his laughter, explain to Morten Knudsen and me how a difficult organizational and social issue can be resolved; to have Dr. J.K. Nigam from India walk through some highly technical issues of optimization with a technology team from TNO, were direct, practical lessons in how global collective intelligence flows neither North-South, nor South-South, but in a true sense, from All to All.”

- Niels Christian Nielsen
(read his WAITRO story below)



Computers donated to Tanzania Industrial Research and Development Organization (TIRDO) by WAITRO in 2000 for the establishment of a National Computer Training Centre.



Signing of MoU between UNIDO and WAITRO in 1978

1980–1989

In 1981 Dr. Gerritsen informed WAITRO that he was going to retire from his post at TNO as of 1st of Januar 1982 and could not continue as Secretary General of WAITRO. At the same time the Deputy Secretary General, Mr. Pels, was ill and was unable to work for WAITRO any longer. TNO announced that they would not continue to host the Secretariat.

With the difficulty facing the Executive Committee to find a new host for the Secretariat, Mr. Hans-Georg Lindgren from Sweden, who himself was retiring from his work at the Swedish Council for Research and Development (STU) volunteered to run the Secretariat from a rented location in Stockholm and assisted by his wife as a part-time Secretary. Neither Mr. Lindgren nor his wife received a salary for their part-time work. In 1983, Mr. Lindgren obtained a research fellowship from the Swedish Institute to bring Moses Mengu from Ghana to the Secretariat.

Thanks to the funds made available from the UNFSSTD, in 1983 the Secretariat was further strengthened with a senior expert, Dr. Ingela Agrell, whose task was to plan and prepare for the implementation of the projects identified by the external consultant. The work plan



Hans-Georg Lindgren, Sweden, privately ran WAITRO when it lost its institutional support.

1982: WAITRO Secretary General Dr. Gerritsen retired and his Deputy Mr. Pels was ill and could not continue working. WAITRO lost the institutional support of its host TNO. Mr. Hans-Georg Lindgren decided to run WAITRO without a formal institutional host to keep the Association alive.

“We shall never forget that any good seed needs a good soil to grow, and the first seed of that project was watered by WAITRO collaboration to grow in the good soil of CMRDI.”
- Prof. Dr. Adel Nofal
(read his WAITRO story below)



5th General Assembly, UNIDO-WAITRO Seminar on Cooperative Arrangement in R&D, Colombo, Sri Lanka, October 1980

1983: A senior expert from Jamaica was engaged on a consultancy basis to identify projects suitable for collaboration among WAITRO members.

covered six operational activities on co-operation between member institutes:

- Production of food and energy from waste at rural level (Mexico, Venezuela, and China)
- Technology for the use of cassava wastes (Nigeria, Thailand, Korea)
- Prototype wind-mill (India, Denmark)
- Metallurgical research co-operation (Sweden, Egypt)
- Food processing and preservation (Nigeria, Denmark)
- Training abroad of scientists and research staff, mainly from developing countries.

In 1985 the Executive Committee further requested the Secretariat to investigate the interest among member institutes for twinning arrangements among institutes. As a result, a Compendium containing some 60-project proposals was established. During 1985 about ten of these were evaluated and processed by the Secretariat, and funding agencies were approached.

In 1983 CMRDI, Egypt and TNO, Netherlands started a cooperation that helped build CRMDI into one of the strongest Metallurgical institutes. The project established an experimental foundry at CMRDI that became one of the main suppliers of spare parts needed for the different sectors of the Egyptian economy. It also provided training activities for the foundry industry in most of the Arab countries. Prof. Dr. Adel Nofal was the initiator of this project, you can read the full story of this project in his WAITRO story below.

In 1984, WAITRO applied to the IDRC (Canada) for another research fellowship which allowed Moses Mengu to continue to work at the Secretariat. The Secretariat began to resume the publication of an expanded WAITRO Communiqué. In 1985 four issues of Communiqué were published, as well as a revised directory of members. The new directory was a substantially updated and extended version and included indexes, which facilitated information retrieval on activities of members as well as areas of interest in international R&D cooperation. In 1986 WAITRO published its first comprehensive “Handbook on sources of funds for international R&D cooperation”. The directory provided data and profiles of international and national funding agencies that supported research and training in science and technology. New challenges arose when the UNFSTD was terminated and taken up as a small unit in UNDP in 1986. It was replaced by another body, UNCSTD (UN Center for Science and Technology for Development) that could not support WAITRO financially. However, by the time of the General

1984-1986: WAITRO published expanded issues of Communiqué, a revised directory of members and a “Handbook on sources of funds for international R&D cooperation”.

“The role of passionate and committed individuals is invaluable”
- Berenice Lue Marias
(read her WAITRO story below)

“Some looked at us blankly as if we had arrived from another planet!”
- Roger Short
(read his WAITRO story below)

1988: The concept of the Global Technology Park (GTP) was developed. The idea was to link members and their clients via computer conferencing.

Assembly in 1986, the Secretariat had accumulated enough funds to continue its operations from its new seat at the Jutland Technological Institute (now part of Danish Technological Institute).

Shortly before the arrival of the internet, innovative WAITRO members tried to find a solution to the lack of funding for bilateral and multilateral cooperation by finding a way of connecting WAITRO organizations virtually: The Global Technology Park (GTP) would link member institutes, and their clients, via computer conferencing. However, the project did not gather enough support to be funded. It seems the idea was ahead of its time.

In the late 1980s Professor Mogens Jakobsen (University of Copenhagen) and Moses Mengu initiated a project to study African Fermented Foods. It was initially funded by DANIDA, but later expanded and received support through the EU-Framework Program. This is how WAITRO first entered the EU system. Thanks to the financial support close to 20 projects on the study of African fermented foods were carried out. It led to the education at doctorate level of more than 40 researchers from Africa and Europe in food science and technology and the largest collection of scientific publications on African fermented products and to the substantial upgrading of laboratory facilities at several African institutions in over 20 countries with three obtaining international laboratory accreditation.

1988: A WAITRO supported long term-project on African Fermented Foods started. It resulted in about 20 research projects being carried out across Africa, over 30 researchers obtaining PhDs and the substantial upgrading of laboratory facilities in over 20 African countries.

“I found this project very exciting because it established an African network of research institutes on fermented foods research. Many African scientists who hitherto had been working in isolation had opportunity of forging into a network.”
- Prof. S. A. Odunfa
(read his WAITRO story below)



Members of the African Fermented Foods Network, meeting in Ouagadougou, Burkina Faso, March 2009.

1990–1999

1990: WAITRO Special Interest Groups were established.

With Roger Short who had already started to analyze the problems and strengths of WAITRO becoming Secretary-General in 1988, WAITRO underwent a process of restructuring. An important strategy of WAITRO was to focus the attention of its members on small and medium enterprises (SMEs). SMEs are recognized as major engines of innovation, employment and ultimately economic stability, in both developed and developing nations. WAITRO’s role was to assist its members in providing technological development and innovation services to this sector as it faced increasing pressures in the global market place. This focus of WAITRO on RTOs has carried on since then.

At the General Assembly in Arusha, Tanzania in 1990 a new organizational structure was launched that sought to establish “nodes of expertise” which would be coordinated by a Member Organization:

- SMEs and innovation
- Environment and energy efficiency
- Food technology
- Women and technology
- Information technology

Known as the Special Interest Groups (SIGs), these bodies were to generate ideas that would lead to long-term programs in their respective fields. The concrete achievement of the Association during the 1990s were largely based on the activities developed under the auspices of the SIGs. For example, the above mentioned African Fermented Foods Network that exists to this day was the focus of the SIG on food technology, while the Best Practices project that is described below emerged from the group on SMEs and innovation.

Following another decision of the GA in 1990, the WAITRO Regional Focal Points (RFPs) were established in 1994 to bring the Association’s services closer to its members. Initially only in three regions, later for all five regions (Africa, Asia and the Pacific, Europe, MENA, Latin America and the Caribbean) one member organization was appointed to support the Secretariat regionally. It was decided to provide each RFP with seed funding of USD 5,000 to start operations but they were expected to generate their own income from developing joint regional activities. The RFPs still play an important role in WAITRO to this day.

Through the Special Interest Groups and the Regional Focal Points WAITRO became more visible to potential new members and donors. This partial decentralization of certain responsibilities resulted in more

1994: WAITRO Regional Focal Points took up their responsibilities.

“During
my term as president of WAITRO (from 1999 to 2002) weak cooperation between RTOs and industry was a general global problem. Big industrial companies cooperate with academia directly, so WAITRO focused on cooperation between SMEs and RTOs.”
- Ömer Kaymakçalan
(read his WAITRO story on below)

“During
this period, WAITRO also gave me the great satisfaction of being the Chairperson of the WAITRO Special Interest Group on Women and Technology, a role that I fully enjoyed since I firmly believe that women play a key role in promoting technology worldwide. This is one of the many wonderful features of WAITRO, an organization that has promoted gender equality since its foundation in 1970.”
- Eugenia J. Olguin
(read her WAITRO story below)

activities being generated at a regional level.

In June of 1994, WAITRO commenced an international collaborative research project aimed at identifying and disseminating best practices used by RTOs in their tasks of providing services to industrial clients, especially in the SME sector. Funding was provided by Canada's International Development Research Centre (IDRC) and Danish Development Assistance (DANIDA). The project was managed by Moses Mengu and implemented by Niels Henrik Hansen (DTI, Denmark), N. Mrinalini and Pradosh Nath (NISTADS, India) and led by David Grier (SRC, Canada). After a literature review and a pretest phase, Mrinalini and Nath gathered information from 20 RTOs in South and Southeast Asia, Mengu and Hansen worked with 20 RTOs in Africa and Europe and Grier studied 20 RTOs in the Americas.

“Both
during the project, and
once it was complete, I made
presentations at WAITRO events
and performed consulting activities
in RTOs based on the findings. These
started in January 1995 in New
Delhi, India and continued until the
General Assembly in Medellin,
Colombia in October 2016.”

- David Grier
(read his WAITRO story below)

The team assembled reports on each RTO they studied, identifying the processes used and the practices associated with each process. Practices were categorized under “best”, “good”, and “bad”. The best practice was the practice that was measured to be best by the performance indicators used. Good practices were those that had a high score and within the margin of error of the work or under special circumstances, could in fact be the best. Bad practices were those that were clearly not effective.

The project then moved into an information dissemination phase. Training workshops were held in India, Nepal, Ghana, Egypt, South Africa, Trinidad and Tobago, Guatemala, Brazil, and Venezuela and several implementation projects were conducted, e.g. Chile and Jamaica. The final results were disseminated in a WAITRO international seminar held in September 1998 in Warsaw, Poland. The results of this study continue to be relevant and were presented as recently as 2016 at the General Assembly in Colombia where they also served as the basis of training activities. The results were also used to transform the internal operations of selected RTOs across the globe including Turkey, Chile, Jamaica, Ghana, India and South Africa.

1994: WAITRO started to coordinate an international collaborative research project: “Benchmarking the Best Practices of Research and Technology Organizations (RTO) for Strengthening the Capabilities of Small and Medium Enterprises (SMEs)” in collaboration with DANIDA, Denmark and IDRC, Canada.



Participants at the WAITRO International Seminar on Best Practices, Warsaw, Poland, 1998



Published book on the best practice study, Palgrave Macmillan, 2002

2000–2009

2002: SIRIM, Malaysia took over as WAITRO Secretariat. It was the first time that the organization was hosted in a developing country.

While in Denmark, the work of the WAITRO Secretariat was supported by DANIDA. However, DANIDA policy is to support international endeavours like WAITRO’s research collaborations and training activities for a period not exceeding 10 years. So DANIDA’s support stopped at the end of 2001. The Secretariat could rely on its own accumulated funds for another year, but in 2002 a new location and governmental support was needed. Different member organizations had applied to host the Secretariat. At the General Assembly in the Netherlands in September 2000, SIRIM, Malaysia was strongly endorsed as it demonstrated long-term financial commitment. In March 2002 the agreements between WAITRO and SIRIM for the transfer of the Secretariat were signed.

When SIRIM took over from Danish Technological Institute, the new Secretariat saw the necessity of rebranding WAITRO. The WAITRO Newsletter was enhanced with many feature articles. Other promotional materials were published, such as the WAITRO Pictorial Reports. Another initiative by the Secretariat was to redesign a new website to disseminate and share information on WAITRO activities, develop a mission statement, review WAITRO’s objectives and formalize a corporate logo.

Due to the support of the Malaysian government, WAITRO members had the opportunity to participate in the Malaysia Technical Co-operation Program (MTCP) which offers training programs on topics that are very relevant to WAITRO members, such as Standards and Quality, Cleaner Production Technology, SME Development and the Senior Management Program on Managing RTOs.

The WAITRO Poverty Alleviation Committee (PAC) was formed mainly to contribute to the overall aims and objectives of the United Nations to alleviate poverty in different parts of the world. PAC Committee members, the Secretariat and SIRIM Berhard presented and deliberated 8 proposals in Sabah in January 2007. In June 2007 WAITRO and the Islamic Educational, Scientific and Cultural

2005: WAITRO facilitated participation of member organizations in EU funded project. Increasingly, WAITRO encouraged its members to collaborate through the EU programs by offering proposal writing workshops and networking sessions.



New formalized WAITRO logo, 2002

“The agreement of SIRIM to take over the Secretariat stands out as an all-important WAITRO success, demonstrating that RTOs need not only look to Europe and North America for inspiration. South-South networks and collaboration have undoubtedly received a huge boost from SIRIMs long period as a host.”
- Kristian Olesen
(read his WAITRO story below)

2007: Malaysia joined hands with project partner ISESCO and embarked on several community projects in different parts of the world on economic empowerment projects for poverty reduction.

Organization (ISESCO) signed a Memorandum of Understanding and WAITRO and ISESCO jointly embarked on several community projects all over the world for poverty alleviation.

A project in a rural area in West Java began in July 2008. In cooperation with WAITRO member LIPI, the local community was assisted to set up its local co-operative called Amanah Terus to coordinate the maintenance of a Micro-Hydro Power System. In 2009 a project that aimed to enhance the efficiency and safety of Hydro-Generators and provide power supply to 45 households in a village was launched in Sabah, Malaysia.

Later the projects started to focus on women empowerment. In 2012 a project called “Food Security and Muslim Women Economic Empowerment through Technology Dissemination on Standard Kunu Production Techniques for Local Consumption and Export” was introduced in Nigeria. In 2014 and 2015 projects to empower women in rural Pakistan through Fish Farming Technology were implemented. From 2015 to 2016 a project worked to improve the living conditions of rural women in Egypt through agricultural technology transfer, in coordination with WAITRO member ARC. Finally, in 2018 two women economic empowerment projects on Shea Butter Development and Beekeeping were launched in Nigeria.

Because funding from funding agencies was no longer available for individual training for scientists (only in combination with projects) or direct support for administration of associations or networks, the focus of the Association shifted to more competitive funding models. WAITRO started to increase its activity in building consortia for EU projects and offering workshops for opportunities under EU programs.



Signing of the Contract Agreement between President of WAITRO, Ömer Kaymakçalan, (4th from right), and Haj. Dr. Arafin, President of SIRIM (3rd right), Looking on are new Secretary General, Aziz Manan, (far left) and outgoing Secretary General, Kristian Olesen, (far right).



Women Economic Empowerment Programme, Nigeria, 2012

WAITRO facilitated the development of a successful project proposal under the Asia Pro Eco II Program of the European Union. Starting in 2006, it was implemented over 30 months and focused on sustainable production of electrical products in cities. In 2007 WAITRO was heavily involved in the Go Global Project that sought to establish a global platform to set the food safety research agenda and share results on emerging food safety issues.

LABNET was a web-based portal set up by UNIDO and WAITRO to support testing laboratories that certify commodities and products meet the technical requirements and quality standards of importing countries. This project started in 2006 with the objective of providing access and dissemination of laboratory and related activities in information especially in relation to ISO/IEC 17025 standard, so that laboratories from developing nations were able to upgrade and build their capacity and capability as conformity assessment bodies. The development and design was contracted to Vimta Labs Ltd. The Portal was officially launched in India in 2008.

2008: The UNIDO-WAITRO LABNET Web Portal was launched: a tool that provided information on Standards and Conformity Assessment in the area of Chemical Lab, Metrology Lab and Microbiology Lab.

2010–2019

2012: A WAITRO strategic and action plan directed the Association towards a greater focus on solving the grand societal challenges.

A WAITRO strategic plan of WAITRO’s way forward and action plan were formulated in early 2012. The new WAITRO value proposition proposed by Mr. Moses Mengu which was unanimously accepted was ‘innovative, integrated, multi-disciplinary approach to solving the grand societal challenges’.

The same year a large EU project kicked off involving ten WAITRO members, including the WAITRO Secretariat. The “Biowaste4SP Project” ran for three years and successfully identified bio-waste streams in five African countries that could be transformed to bioethanol, biogas and fertilizer.

The WAITRO Innovation Award was created to reward innovations with significant social or economic impact produced with major contribution from the submitting organization, in line with WAITRO’s objective of enabling the development of action-oriented partnerships for sustainable development. This award was open from April 2014 to July 2016 to all WAITRO members and non-WAITRO member RTOs that attended the 23rd WAITRO Biennial Congress and General Assembly held on September 28-19, 2016 in Medellin, Colombia. The two categories for the award were Social Innovation and Business Innovation. Entries received were evaluated and the shortlisted finalists were invited to defend their innovation during the Evaluation Committee scrutiny on September 27th 2016 after which the winners were selected. The prize was awarded during the WAITRO Biennial Congress 2016 closing ceremony.

2016: At the WAITRO Biennial Congress in Medellin, Colombia the WAITRO Innovation Award was inaugurated.



Biowaste4SP Project Meeting, Durban, South Africa, October 29–21, 2013



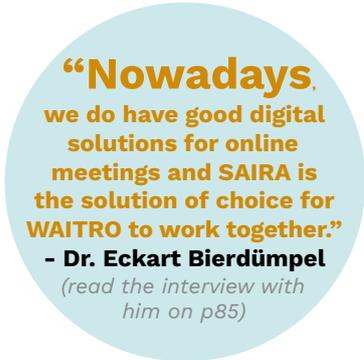
WAITRO Workshop on Opportunities for Collaboration under Horizon 2020, held by DTI, at Taastrup, Denmark, 2014.



WAITRO Innovation Award 2016, Medellin, Colombia

2017-2018: A WAITRO Global Benchmarking Exercise for RTOs on SME Innovation and Technology Support assessed the cooperation of WAITRO members with SMEs.

From November 2017 to November 2018, a total of 14 webinars and one skype meeting facilitated valuable knowledge sharing among established RTOs of WAITRO’s global innovation family. The Danish Technological Institute (DTI) launched an extensive benchmarking study to help WAITRO members evaluate best practices, particularly in terms of working with SMEs. In addition to providing RTOs with an opportunity to learn from each other, almost 300 SMEs in eight countries filled out a questionnaire about their experience with WAITRO institute services. The results showed a very high satisfaction with WAITRO innovation consultation, but also identified areas that will benefit from future improvement.



After 16 years in Malaysia, the WAITRO Secretariat was transferred to new hosts in 2019. Following a Strategic Meeting in 2018 in Malaysia, it was decided to split the responsibilities between JITRI, China and Fraunhofer, Germany. In January of 2019, Fraunhofer and JITRI took over responsibilities to co-host the new secretariat under the leadership of the new Secretary General, Dr. Eckart Bierdümpel.

Among the first acts of the new Secretariat was a redesign of the WAITRO website and the Association’s Corporate Identity. The WAITRO Innovation Ecosystem, as described below, was developed. The Open Innovation Hub for Sustainable Development SAIRA was launched to provide a digital platform for WAITRO members to connect with each other and the private and public sector. The platform is based on a technology developed by Fraunhofer.

In 2020 we celebrate 50 years of WAITRO at the first Global Innovation Summit. The story of WAITRO is not one of constant success but rather one of an ongoing struggle and challenges waiting just around the corner. It seems appropriate to conclude this brief overview with a quote from Moses Mengü, one of the most important contributors to both WAITRO’s development and this publication:

“Somebody said if no one had founded WAITRO in the 1970s it would have been founded today. This was in 1984. I think in 2020 I would be saying the same thing again. Because the objectives in the constitution seem like they had been written today. That’s why WAITRO has lasted 50 years.”



2019: The WAITRO Secretariat is hosted by two organizations for the first time: Fraunhofer, Germany and JITRI, China joined forces to jointly take over the responsibility. In their first year as Secretariat, SAIRA – The Open Innovation Hub for Sustainable Development is launched.

50 YEARS OF WAITRO WORKSHOPS, TRAININGS AND CONFERENCES

1972	Biennial Conference on Management of Industrial Research Institutes	France
1974	Biennial Conference on Applying Research and Technical Training to Current Realities in the Third World Countries	Lebanon
1976	Biennial Conference on the roles of WAITRO in industrial development	Guatemala
1978	Biennial Conference on Self-reliance in R&D	The Netherlands
1980	Biennial Conference on Co-operative arrangements for R&D: ways for implementation	Sri Lanka
1982	Biennial Conference on Appropriate Technology through Co-operative arrangements	Venezuela
1984	Biennial Conference on Co-operative Research on Advanced Technologies Appropriate to Developing Countries	India
1986	Biennial Conference on Interaction of R&D institutes with local industry	Denmark
1988	Biennial Conference on Technological Innovation	Trinidad & Tobago
1990	Biennial Conference on Technology Management	Tanzania
1991	Biennial Conference on WAITRO-UNESCO workshop on the use of microcomputers in technology management	Ghana
1992	Biennial Conference on R&D Strategies for 1990s	Canada
1995	Biennial Conference on Human Resources Development in R&D Institutes	India
1996	Biennial Conference on Accreditation and Certification in RTOs	Egypt
1998	Biennial Conference on Best practices for the management of RTOs	Poland
	3rd International Symposium on Cleaner Bioprocesses and Sustainable Development	Mexico
2000	Biennial Conference on Knowledge Management in RTOs	The Netherlands
2002	Workshop on RTO Benchmarking and Technology Incubation	Malaysia
	Workshop on Building an Innovation Based Economy – The European, Commonwealth and Worldwide Experience	Cyprus

2002	Biennial Conference on the role of research and technology organizations in a globalized world	Brazil
2003	Workshop on Technology Based Incubator in SADC Countries	Mauritius
	International Committee for Food Microbiology and Hygiene Workshop	South Africa
	International Conference on Plastics and Environment – Opportunities and Challenges	India
2004	Workshop on Rapid Prototyping Manufacturing Technology	Egypt
	Workshop on Developing Market-Driven R&D	Malaysia
	Workshop on Functional Foods for ASEAN Countries	Indonesia
	Biennial Conference on Knowledge Management for RTOs	Indonesia
2005	Workshop on SME Development Through Technology and Quality	Egypt
	WAITRO-UNIDO Workshop on Significance of Testing and Conformity Assessment in Global Trade	Malaysia
	Africa-EU INCODEV: Proposal Development Workshop	South Africa
	Malaysia Technical Co-Operation Program (MTCP)	Malaysia
	Developing Global Competitiveness – Technology, Innovation and Enterprise Development	Trinidad & Tobago
	Online Benchmarking Workshop	Malaysia
2006	Forum on Developing Global Businesses from Market-Driven Technology and Research	Philippines
	Senior Management Program on Managing RTOs	Malaysia
	Biennial Conference on The Business of Innovation	Canada
	Capability Building of RTOs in Good Laboratory Practice	Tanzania
	Seminar on Testing and Conformity Assessment for Global Trade	Trinidad & Tobago
	Science & Technology Based Water Scenarios for Sub-Saharan Africa	Namibia
	Training of Extension Agents and Establishing of Outreach Centres	Malaysia
2007	Recent Trends in Investment Casting	Egypt
	Regional Workshop on Integrated Water Resources Management	Jordan
	Awareness Workshop on Science and Technology Europe-Africa Project (ST-EAP)	South Africa
	Senior Management Program on Managing RTOs	Malaysia
	International Forum on Market-Driven R&D and the trends of Technology Application	China

2007	2nd ICFMH Workshop: Food Safety in Africa	South Africa
	Training of Extension Agents and Establishing of Outreach Centres	Uganda
	International Technology & Quality Conference (ITE-Q) on Sustainable Growth through Technology and Quality	Malaysia
	Networking Session – Role of RTOs in Small and Medium Enterprises (SMEs) Development	Uganda
	Networking Session – A Conduit for Projects with Developing Countries	Germany
2008	Seminar on the Challenges of Traditional Knowledge, Genetic Resources and Traditional Cultural Expressions: Paving the Way Forward	Malaysia
	Advanced Tools & Technique for Plastic Design and Production	Egypt
	Senior Management Program on Managing RTOS	Malaysia
	Turning Technology Innovation into Profit	Malaysia
	WAITRO Research Fellowship Program for Young Professionals in Chemical Sciences	Indonesia
Biennial Conference on Turning Technology Innovation into Profit	Malaysia	
2009	Regional Symposium on Innovation Technology Capacity Building	Pakistan
	International Workshop on Advanced Material for New and Renewable Energy (AMNRE)	Indonesia
	Senior Management Program on Managing RTOs	Malaysia
	International Conference on Electron Beam Irradiation: An Eco-Friendly Technology for Processing of Food and Industrial Products	India
	Workshop on Food Safety	India
	WAITRO/ST-EAP European Union Seventh Framework Program (FP7th) Workshop	South Africa
	WAITRO Research Fellowship Program in the Area of Tooling and Machinery	Malaysia
	Capability Building of Research Technology Organization in ISO/IEC 17025	Malaysia
	Strengthening RTOs and SMEs for Sustainable Development	Ghana
2010	Commercialization of Hi-Tech Products	Iran
	Malaysian Technical Cooperation Program (MTCP)	Malaysia
	International Conference on Modern Trends in Mineral Processing	Nigeria
	WAITRO-ISESCO Workshop on Technology Foresight	Malaysia
	WAITRO-ISESCO Technology Foresight Program – Workshop in Technology Road Mapping	Iran

2010	WAITRO-ISESCO Research Fellowship Program in the Area of Ceramic Processing Technology	Malaysia
	Workshop on the European Commission Seventh Framework Program (EU FP7) Biowaste Project	Malaysia
	Biennial Congress on Leadership for Innovation	Dubai
	International Conference on Radiation Processing: Value Addition for Food, Agro, Healthcare, Polymers and other Industrial Products	India
2011	Networking Session on Competing in the Challenging Global Economy	Malaysia
	Regional Seminar on Improving Capacities of Research Practices and Identification on Marketable Scientific and Technology Research	Indonesia
	WAITRO FP7 Project Proposal Workshop	Morocco
	Networking Session on Creating and Sustaining Globally Competitive Businesses: Challenges for Developing Economies	Trinidad & Tobago
	Senior Management Program on Managing Research Technological Organizations	Malaysia
2012	EU Framework 7 Project Proposal Workshop	Indonesia
	Research and Development Funding Opportunities through the EU Frame Program	South Africa
	Senior Management Program on Managing RTOs	Malaysia
	EU Framework 7 Project Proposal Workshop	Indonesia
	WAITRO-ISESCO Senior Management Program on Managing RTOs	Bangladesh
	Biennial Congress on Technological Innovations for All-Inclusive Growth	India
2013	WAITRO European Union (EU) Project Bidding Workshop for European Members	Denmark
	WAITRO Management Program	Malaysia
	European Commission Framework 7 (EU FP7) Project Proposal Development on Plant High Value Products	Kenya
	WAITRO EU FP7 Project Initiatives	Germany
	WAITRO-RSS International Forum on Managing RTOs in Market-Driven Economies	Jordan
	WAITRO-ISESCO Workshop on Technology Foresight	Indonesia
2014	Networking Forum on Increasing Competitiveness through Innovation and Public-Private Partnerships	Trinidad & Tobago
	Regional Workshop on Technology Foresight for ISESCO Member Countries	Jordan
	WAITRO Workshop on Opportunities for Collaboration under Horizon 2020	Denmark

2014	WAITRO-ISESCO Research Fellowship Program in the Field on Non-Destructive Ultrasonic Testing and Evaluation	Malaysia
	Workshop on Opportunities for Collaboration under Horizon 2020	Denmark
	WAITRO-ISESCO Research Fellowship Program in the Field of Non-Destructive Ultrasonic Testing and Evaluation	Malaysia
	Biennial Congress on Horizon 2020 and Beyond	Denmark
	Senior Management Program on Managing RTOs	Malaysia
2015	WAITRO-UIRI Networking conference on RTOs as Drivers for Industrialization and Socio-Economic Transformation	Uganda
	WAITRO Management Program	Malaysia
	Biowaste4SP African Conference	Morocco
	WAITRO-TISTR Networking Conference on STI to Strengthen SMEs and Communities	Thailand
	WAITRO-ISESCO Waste to Wealth Workshop	Uganda
2016	WAITRO-ISESCO International Proposal Writing Workshop for HORIZON 2020	Turkey
	WAITRO-ISESCO-TISTR Training Program on production upgrading and value creation for SMEs and Micro-Enterprises	Thailand
	WAITRO Capability Building Workshop on project funding by international development agencies	Nigeria
	Biennial Congress on Public-Private Partnership to Innovate Innovation	Colombia
2017	WAITRO-ISESCO-LIPI Workshop on RTO Management	Indonesia
	WAITRO Management Program	Malaysia
	Introduction to the Innovation Agent Program: RTO-SME partnerships	Malaysia
	WAITRO-ISESCO-SIRIM Research Fellowship Program in the Area of Intelligent System	Malaysia
	WAITRO Management Program	Malaysia
	WAITRO-ISESCO-LIPI Workshop on RTO Management	Indonesia
2018	WAITRO-ISESCO-SIRIM Capacity Building Workshop on Herbal-Based Cosmeceuticals for Rural-Based Entrepreneurs	Morocco
	Capacity Building on the Development of Halal Food Production Standard	Thailand
	Capacity Building on Halal Standard Requirements	Nigeria
2019	Driving the Ultimate Goal and Capacity Building on the Development of Industry 4.0, Smart Food Factory and Supply Chain in Food Industry	Thailand
	Capacity Building Program on Solar Thermal Technology, Smart Farming and Commercialization of Research and Innovation and more	Malaysia
	Collaborating for Horizon 2020/Horizon Europe	Germany

#WAITRO50 PHOTO CHALLENGE

In preparation for the celebration of half a century of WAITRO, the members were asked to post photos from their favorite memories of WAITRO with the hashtag #WAITRO50. Here are some selected submissions:









The winning post was from Theresia Ningsi Astuti from LIPI, Indonesia. Congratulations!

This is her photo and the story behind her picture:

I am Theresia, from the Indonesian Institute of Sciences (LIPI), one of the participants in the WAITRO event. This photo was taken at the WAITRO dinner held on 29 April-4 May 2019 at the Concorde Hotel, Shah Alam, Malaysia hosted by SIRIM.

There were 5 topics of capacity building program related to RTO Management, Commercialization, IoT, Personal Care, Solar Thermal was attended by +/- 100 participants from the various continents such as Europe, South America, Asia, and Africa. I am very grateful to WAITRO for giving me

and friends from LIPI the opportunity to learn, share experiences and develop our capacity to support organizational tasks. I have participated in several WAITRO events in the past and I feel how beneficial it is and I feel that there is a strong bond between participants/members. For me, WAITRO is a big family where members come from various countries and cultural backgrounds but we have one goal of innovating together. We call it "the Global Innovation Family".

I hope on this 50th anniversary, WAITRO becomes stronger and able to give more benefits for the members in solving problems on world issues. We must strengthen the synergy between the members and work together to achieve the main goals. On behalf of LIPI, we want to actively participate and contribute to WAITRO.

Happy Anniversary!!

#WAITRO50

THE WAITRO STORY
1970-2020: MEMORIES
OF THE PAST AND
REFLECTIONS ON THE
FUTURE. CONTRIBUTIONS
FROM FORMER PRESIDENTS
AND MEMBERS OF THE
EXECUTIVE COMMITTEE



WAITRO IS LIKE A SEAGULL ...THE SIGN OF LAND!

“We in the industrialized nations know that ships sometimes get lost, despite the fact that their crews know that they have the best helms, the best sails, and the best auxiliary engines. But, the seagull is the sign of land, and ships with seagulls never get lost” *Mr. J. L. Kahn, Association Nationale de la Recherche Technique, France (Second Vice President of WAITRO) at the opening of the Second WAITRO international seminar on Technology Management, Beirut, Lebanon, October 22 – 25, 1974.*

INTRODUCTION

This collection of short stories is intended to give a quick snap-shot of the 50-year history of WAITRO as seen from the eyes of many of the leaders who helped shape its past and present. It is not intended to give detailed accounts of past projects or single events, or to try to evaluate its past performance in any formal manner. It is a short documentary of the true personal feelings of the individuals regarding events, places and people they interacted with on their WAITRO journey and how these instances helped influence their own careers or the evolution of their organizations.

WAITRO's raison d'être is to bring research and technology organizations (RTOs) together through the people who lead and work in these organizations. WAITRO can only fulfil this role if those who represent these organizations are able

to build strong personal relations upon which long-lasting cooperation can thrive. Many of the stories in these accounts testify to this fact.

I have had the pleasure of knowing and working with all those who have contributed to this short report. In many of the instances I have been part of the story. I hope you will enjoy reading it in as much as I have enjoyed collecting these stories together. It is the hope of the contributors that their personal stories will inspire and provide lessons-learned for the future leaders of our beloved Association.

Moses Mengu

*Deputy Secretary General, 1984
African Regional Representative 2004-2007
European Regional Focal Point 2011-2017*

Contributors and their Role in WAITRO

Name	Country	Role in WAITRO
Dr. Yongvut Saovapruk	Thailand	WAITRO President, 2016-2018
Prof. Charles Kwesiga	Uganda	WAITRO President, 2015-2016
		1st Vice President, 2013-2014
		2nd Vice president, 2009-2012
		RR Africa, 2007-208
Prof. Dr. Rakesh Kumar Khandal	India	WAITRO President, 2010-2014
Dr. Dieter R. Fuchs	Germany	WAITRO President, 2007-2010
Dr. Björn Lundberg	Sweden	WAITRO President, 2002-2006
Ömer Kaymakçalan	Turkey	WAITRO President, 1999-2002
Hollis Charles	Trinidad & Tobago	WAITRO President, 1999-2002
		1st Vice President, 1985-1986
		2nd Vice President, 1983-1984
Prof. Eugenia J. Olguín	Mexico	Ag. President, 1998
		1st Vice President, 1999-2002
		2nd Vice President, 1995-1998
		RR, Latin America & Caribbean, 1987-1988
Niels Christian Nielsen	Denmark	1st Vice President, 1993-1996
		2nd Vice President, 1991-1994
David Grier	Canada	1st Vice President, 2007-2008
		2nd Vice President, 2003-2006
		RR North America, 1998-2002

Dr. Nirmala M Pieris	Sri Lanka	2nd Vice President, 2007-2008
		1st Vice President, 2003-2006
		RR Asia & Pacific, 1999-2002
Dr. Robert Arunga	Kenya	RR, Africa, 1985-1988
Prof. S. A. Odunfa	Nigeria	RR, Africa, 1999-2000
Berenice Lue Marais	South Africa	Regional Focal Point, Africa, 1999-2012
Denis Gosselin	Canada	RR, North America, 1995-1998
Prof. Dr. Adel Nofal	Egypt	RR, Middle East & North Africa, 1997-2000
		Regional Focal Point, MENA, 2001-2005
Liaquat A. Shah	Trinidad & Tobago	1st Vice President 2011-2014
		2nd Vice President 2007-2010
		RR, Latin America and Caribbean, 2003-2006
Prof. Dr. Ildar Utiamyshev	Russian Federation	RR, Central and Eastern Europe, 1998-2002
Dr. Rohani Hashim	Malaysia	WAITRO Secretary General, 2006-2019
Aziz Manan	Malaysia	WAITRO Secretary General, 2002-2004
Kristian Olesen	Denmark	WAITRO Secretary General, 1998-2002
Roger Short	UK/Italy	WAITRO Secretary General, 1988-1991

PRECIOUS MOMENTS WITH WAITRO

- Dr. Yongvut Saovapruk, Thailand

It is my great pleasure to have an opportunity to share my experiences and precious moments during my term as President of WAITRO, the Global Innovation Family, during the biennium 2016-2018. I actually trace my association with WAITRO back to the years when I was the Governor of Thailand Institute of Scientific and Technological Research (TISTR) as the Asian and the Pacific Regional Representative of WAITRO Board from 2015-2016.

Personally, I feel it is more than just a connection; it is a deep bond. I still recall series of moments in time serving WAITRO as President, which filled me with lots of valuable and wonderful memories, interacting with the WAITRO members from every corner of the world. Among them, the Third WAITRO Strategic Planning and Brainstorming workshop held in Langkawi, Malaysia, was truly impressive. I and the other Board members had been working intensively and energetically to combine the ideas and suggestions that will

identify the strategic direction framework and action plan for years 2019 to 2020 to serve as a platform for the new secretariat to prepare the next steps on the road for the benefit of the WAITRO global innovation family.

I also appreciate the opportunity to organize two WAITRO programs in Thailand in 2018 as the President of National Food Institute (NFI). One was the program on Capacity Building on the Development of Halal Food Production Standard jointly supported by WAITRO and SME Bank of Thailand, where there were fifteen participants and speakers from eight Muslim countries. The program created the chance for participants to learn and connect with each other regarding research, development, technology transfer on halal food production and processing, certification, marketing, and logistics, etc. The other program was an international conference on Digitization Driving the Ultimate Goal and Capacity

Building on the Development of Industry 4.0, Smart Factory and Supply Chain in Food Industry under the auspices of JITRI and WAITRO, which gathered participants and speakers from JITRI (China), DTI (Denmark), Fruanhofer-IFF (Germany), SIRIM (Malaysia), UNIDO, ITU, FAO, and Thailand. The participants shared experiences and ideas and visited a large food production company and a precision farming enterprise in Thailand, where they could learn and apply the lessons in their own countries.

On the occasion of its 50th anniversary, I have high hopes that all the members of WAITRO share the same vision of a global innovation family in building strength from diversity through cooperation for a world of harmony. Your contributions would serve as a key pillar in moving WAITRO forward towards sustainability and prosperity for the next generation. Wish you all great success.



WAITRO-NFI-JITRI Seminar, Bangkok, Thailand, August 2018



WAITRO-NFI seminar on halal food production, Bangkok, Thailand, July 2018

FROM REGIONAL REPRESENTATIVE TO PRESIDENT

- Prof. Charles Kwesiga, Uganda



From Left: Munjoma Hasvinei, DTI Energy Consultant, Prof. Charles Kwesiga, Executive Director, Uganda Industrial Research Institute and David Tveit, Executive Vice President, DTI, Denmark. Kampala, March 2015

My exciting odyssey with WAITRO started in earnest in 2006 in Saskatoon, Saskatchewan, Canada, when I attended the General Assembly organised by the indomitable David Grier, under the auspices of the Saskatchewan Research Council (SRC). His remarkable hospitality and impeccable organizational skills were well complemented by the leadership of the avuncular Björn Lundberg (IVL, Sweden) as President of WAITRO, and the meticulous planning of the effable Peck Sim (SIRIM, Malaysia) as Secretary General.

Prior to the Saskatoon, I had attended a meeting in Cairo hosted by CMRDI, and one in India hosted by NISTADS. Both CMRDI and NISTADS were stalwart members of WAITRO at the time. Friendships I made, especially in Cairo, have endured the test of time.

Back in Saskatoon: Peck Sim, David Grier, and others on the Executive Board, apparently impressed by my presentation during the plenary, suggested that I contest for the position of Regional Representative for Africa. After a short dialogue

with the sub-Saharan Africa delegation I was fronted and elected unopposed to the position of RR for the term: Jan 2007 to Dec 2008. I was elected 2nd Vice President from 2009 to 2012 and as 1st Vice President from 2013 to 2014. At the General Assembly in Copenhagen, Denmark in September 2014, I was unanimously elected President of WAITRO for the biennium 2015-2016.

As an active member of the Executive Board since 2006 to 2016, then as an Ex



WAITRO General Assembly Meeting in Copenhagen, September 2014

Officio Board Member after that, I have achieved a lot professionally. UIRI has also benefited substantially as it metamorphosed from a backwater institution to an internationally highly regarded RTO. By 2013 UIRI was recognized as a regional Centre of Excellence in R&D. Out of a long list of achievements, inter-institutional collaborations, and high level interactions, I wish to highlight just a few milestones:

Hosting the 74th WAITRO Board, and 15th RFP meeting in Kampala, Uganda (26th to 28th March, 2015). Conference theme was “RTOs as drivers for industrialization and socio-

economic transformation”. I will always cherish WAITRO for being broad-based.

I was honored to accompany the Vice President of the Republic of Uganda, H.E. Edward Kiwanuka Ssekandi during his state visit to Nordic countries of Norway and Denmark (16 – 19 May, 2015). At all bilateral discussions WAITRO had a slot because I was introduced as its President. Promises were made to assure that our organization gets considered in future projects that would be sponsored by the Nordics.

UIRI’s Business Incubator was introduced to us by another

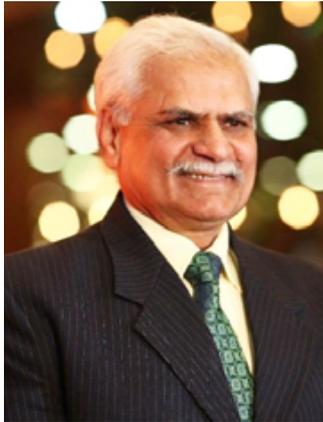
prominent member of WAITRO – CSIR of South Africa. Since then business incubation has been one of the flagship activities at our campus, and has been mainstreamed into Uganda’s National Development Plans.

I have hosted numerous RTOs and visited many more, thus enhancing symbiotic collaborations and best practices in R&D. Thanks to WAITRO, RTOs have become synonymous with global industrial development.

Happy 50th, the Golden Jubilee, to the Global Innovation Family!

MY FOOTPRINTS ON GROWTH PATH OF WAITRO

- Prof Dr Rakesh Kumar Khandal, India



Preamble:

WAITRO's 50th anniversary is an occasion of joy and celebration, especially for those who have dedicated themselves towards its growth and keeping it relevant for mankind. As an association of institutions of research and technology from countries across the globe, it is mandated to build capabilities to bridge gaps by sharing and caring. Its member institutions collaborate to render benefits of innovation to mankind. Thus, it has the potential to emerge as one of the most relevant UN-

initiated bodies for sustainability. I congratulate the new WAITRO Secretariat, Fraunhofer Institute, Germany, for bringing out a souvenir on the Golden Jubilee of WAITRO. I express my deep gratitude for having been invited to share my experiences in this souvenir. My association with WAITRO spans over 12 years, including two terms as the President: 2010-2012 and 2012-2014.

The start of my WAITRO journey:

It was in the year 2003 that I met Madam Goay Peck Sim, the Secretary General of WAITRO, while she was in India along with her team. Coincidentally, we were organizing an international conference on plastics at the same time. I invited Ms Sim to the dais during the valedictory function of the conference, jointly showcasing the activities of WAITRO and making the participants aware of the benefits of becoming a member. With this began our professional relationship.

I started getting invited to undertakings, programs and projects, as a valuable resource of WAITRO. My first engagement was as a keynote speaker at a conference in Manila, Philippines. It helped forge the bond between WAITRO and several ASEAN institutes. This resulted in the joint execution of several capability building projects in the fields of Food, Health, Water and Energy. A workshop on "Functional Foods" in the 2006, hosted by Prof Kardono and Dr Roy, both Directors of LIPI, Indonesia, deserves a mention here. I stayed there for two weeks, sharing my knowledge and expertise with scientists of ASEAN countries. Multi-institutional and multi-disciplinary projects were developed after that. WAITRO's two great advocates, Prof Kardono and Dr Roy are unfortunately no more, I express my deepest appreciation for their role in its growth. They are thoroughly missed.

Over a period of time, my engagements with WAITRO got



more frequent and the network became wider. Every time I participated in a program, it led to several other programs even outside of WAITRO, for each of which I made sure to involve and include WAITRO. For instance, in a food safety program of ASEAN, I involved WAITRO members from Africa, Trinidad and Tobago, as special guests. We also used such occasions to foster cultural ties by providing exposure to Indian music and culture. During one such event, participants even attended a marriage ceremony performed as per Hindu tradition.

I invited and involved WAITRO member institutes from Asia (Thailand, Malaysia, etc.) and Africa (Ghana, Nigeria, etc.) for an EU project, "Go Global", that was hosted in Delhi, India. Experts from EU, especially the Netherlands, USA, Asia, Africa, and Latin Americas, worked together on ways to eliminate "emerging food safety risks". Thus, I ensured that WAITRO

played an important role as a facilitator for many programs.

Revisiting the milestones of this journey:

I am pleased to recount a few encounters with global experts of industry, industrial research, and innovation:

1. The one at the Saskatchewan Research Council, Saskatoon where I learnt about self-sustainable institutes and their creation and ran through contract research as well as providing different technical services; A memorable experience helped evolve my understandings of research and innovation
2. Meeting hosted by the Institute of Electrical Research, Mexico, headed by a brilliant and wise Director Prof. Fernando Kohrs Aldape. Network of laboratories with ISO IEC-17025 accreditations is very essential for industrial growth is what I

learnt from this meeting. I got to know an evolved soul, Mrs. Kohrs, who has been an established yoga teacher in Mexico for decades. At the end of it, we have gotten to be close friends with Prof. Kohrs' family, and it feels like a connection from our previous lives only to be revived thanks to this WAITRO meeting. This is the spiritual dimension of WAITRO that I experienced.

3. Meeting in Trinidad and Tobago hosted by CARIRI, an institute of eminence headed by a dynamic and proactive Director Mr Liaquat Shah. Here, I also met Eng. Hayden Ferrera, Chairman, CARIRI and the then Minister for Urban Development, Dr. Bhoendradatt Tewarie, two great souls that I learnt a lot from. Together, we planned and executed a number of capability-building projects, and even had an exchange program for scientists





between our research centers. Scientists from CARIRI also got trainings at other member institutes and that continued to speak volumes about Mr. Shah and impressed me. It was here that I got a chance to interact with Dr. Bhoendradatt Tewarie, a rare politician with thorough knowledge about innovation. He has authored several books, one of which I was fortunate to have written the foreword for. I consider myself incredibly lucky to have met with and befriended such great scholars, all thanks to WAITRO.

4. Memories from the ones hosted by Prof Chi in China will stay with me forever. I got the opportunity to see, up close, how academicians and researchers work towards getting SMEs and MSMEs to be competitive. If institutes across the world adopted those practices, self-sustainability would no longer be an issue for any RTO. A select few institutes such as, Fraunhofer Institute, Germany, DTI, Denmark, SRC Canada etc., have been doing the same and others can and must follow suit. WAITRO is an

ideal platform where its members can learn from each other in a much easier way. During my twelve years with WAITRO, I can confidently say that it is the best organization for members to share their knowledge and expertise and raise each other's standards for quality of research. How an RTO can remain relevant by serving the industry in the neighborhood regions is evident here. Each host institute of WAITRO including SIRIM has benefited from the same. Prof Chi can be a resource person for WAITRO, in this regard.

5. Meeting in Dubai, where I was elected as President of WAITRO in 2010 shall ever remain the most memorable one for me. Given my contribution in most of the key projects of WAITRO, I was nominated for the post. It is a cherished memory how members from all over the world- Asia, Europe, Latin America, and Iran and Egypt from MENA supported my candidature and I consider myself lucky to have been unanimously elected by all members as its President in 2010. The

candidacy and the position felt like a blessing from everyone. I felt and continue to feel honored by the universal support. During my tenure, I made it my main aim to champion self-sustainability for WAITRO and its members. Towards this goal, I led a team from the WAITRO Secretariat to meet the UN bodies for providing regular policy support. By virtue of this well-planned effort, we ensured outreach of the capability of WAITRO and its members in different regions of the world. If we were to continue along a similar path, I am certain of the possibility of several multi-institutional projects spanning different continents.

My inspirations and learnings:

Further to the aforementioned notable events, I must state other interesting developments, for the record. Ms Goay Peck Sim introduced me to WAITRO and Dr Rohani Hashim took good care of me over the years. She not only motivated me but also guided me to accept candidature of President of this great organization. Mr Zulkefli Nani, Mr Mair Nesrul Zainal Abidin, and everyone in the Secretariat was a great source of support for me. They helped me build and develop relations with SIRIM. I was fascinated with SIRIM, especially during the period of Director Dato'Ir. Hj. Yahaya Ahmad who patronized WAITRO from the core of his heart. At one point in time, there was a crisis situation wherein he worked hard and arranged finances from his government. Unfortunately for all of us, he has passed away since, but

the memory of his gesture and efforts will continue to stay with me and all of us. The current Secretary General, Dr Eckart Bierdumpel, is a person of high virtue; a one-of-a-kind soul, ever ready to help all! I have worked with him closely over the years and I have come to learn of his novel ideas and innovative ways to resolve issues. He has demonstrated presenting options to bring improvements as well as ensuring that the task is completed as expected. I am confident WAITRO will scale to great heights during his time. Fraunhofer, being a host of WAITRO, is set up to achieve big as well.

I am grateful to Dr Dieter Fuchs, my predecessor, and Dr. Björn Lundberg, from whom Dr Fuchs took charge. I gained a lot of knowledge working with them. My successor, Dr Charles Kwesiga, has gone on to do a lot for creating linkages amongst African institutes. I will cherish the contributions of Moses Mengu, also known as the “encyclopaedia of WAITRO” due to his extensive knowledge of the history of WAITRO. He is always ready to serve the

cause; incredibly commendable. Together, Dr Bierdumpel and Moses Mengu, form a superb team, in my view, to meet any challenge in WAITRO’s path.

Path forward:

Due to COVID-19, I should highlight that WAITRO will be more in-demand in the future than ever before. Membership would increase with a little bit of effort, to ensure of which, the following efforts need to be made:

1. The current WAITRO website should be populated with details about what it can do, has been doing and plans to do. It should also present a growth path that WAITRO has covered so far. Today, this information is nowhere to be found
2. The website must contain a database of all the technologies for the benefit of the members and it should be interactive and attractive to users
3. There is value in creating a list of programs based on the self-sustainability model and posting that on the website as well

4. In addition to its members, WAITRO must have expert personnel in its pool to play the role of mentors to its members; Such a resource pool must be created
5. Resource-generating projects should be planned with adequate consultation of its members and mentors

How an RTO can remain relevant by serving industry in the neighborhood regions must be the key task of WAITRO. The host institute of WAITRO must focus on creating collaborations, joint programs and developing a culture of caring and sharing amongst its members.

This is all that I have to say about my footprints on the growth path of WAITRO and once again express my thanks for your support and blessings. While wishing you all good luck, I hereby submit that I shall ever remain committed to serving WAITRO in whichever way the organization deems my services can be of use.

Best Regards.



Prof. Khandal (left) with Prof. R. A Mashelkar at the WAITRO General Assembly, September 2014, Copenhagen, Denmark

At a WAITRO Strategic Planning meeting, Pretoria, South Africa, 2012

WAITRO STATEMENT

- Dieter R. Fuchs, Germany

When I try to recall the most touching moments during my time serving WAITRO as President, I am quite overwhelmed by all the precious memories of those years. Of course for me personally the Saskatoon Conference 2006 was impressive, as I then started to get involved deeply in developing our Global Innovation Family further. Until today, that spirit of sharing mutual values and committing ourselves to crosslink as much as possible on a global level was spread and blossomed. In the years after this starting point, I especially appreciated opportunities to extend our range of activities. Also to areas like grass root projects out of the box of our usual high tech research, like the hydrogenerator project in Sabah. I remember well that our WAITRO delegation was the first ever foreign group who visited that village LIBANG LAUT in the remote rainforest and facilitated electricity supply for the regional school there.

In the same spirit it was a real pleasure to establish and organize the first ever School Kids Science Challenge in the United Arab Emirates in 2010, jointly under the auspices of WAITRO and Fraunhofer. This Dubai Youth Science Challenge was joined by hundreds of local and international kids to compete with their innovative skills and foster their interest in science and research. One may easily understand, that my best wishes for WAITRO include such smaller, perhaps less spectacular activities, which focus on our young generation.

I am convinced that WAITRO will substantially add to addressing our future challenges of mankind by its unique international targeted approach. Please get the youngsters inside and outside our member organizations involved, as this may be another highlight of our contributions!



Global Innovation Family

THE IMPORTANCE OF WAITRO

– Dr. Björn Lundberg, Sweden

My first contact with WAITRO was in the early 1980ies, when the organization had its headquarters in Stockholm under the leadership of Hans Georg Lindgren. Hans Georg had an assistant named Moses Mengu. At this time, WAITRO was a poor organization and asked the institute for which I was working, IVL, for help with copying and sending mail and similar tasks.

At that time, I did not know about WAITRO and its mission. In connection with this first contact, I happened to plan my first international project, but had few contacts that I could use for the assignment in Egypt. It became obvious through my contacts with Hans Georg and Moses that WAITRO could provide the contacts necessary in Egypt but also in many other countries around the world.

When I some time later arrived in Cairo, Egypt, I was welcomed by Abdul Azim who had arranged contacts and meetings for me,

contacts and meetings which I would not have been able to organise myself. This made me understand the importance and advantages of WAITRO. The next year, I became CEO of IVL and then decided that IVL should join WAITRO as a member. My first participation at a General assembly took place in Arusha in Tanzania.

Sweden started environmental research quite early and IVL was the first environmental institute that was a member of WAITRO. Environmental problems are global. Integration of environmental aspects in WAITRO's mission of technical development and transferring of technical knowledge was perfect for IVL as an environmental institute.

For IVL there were many advantages with the WAITRO membership. We became part of an international network. We had the opportunity to introduce environmental aspects early in technical

development. We also could introduce the concept of sustainability globally as part of technical development. Within the environmental field and sustainable development, the international cooperation has been and is important and will be even more important during the decades to come. This is why the membership in an organization such as WAITRO is important and will become even more important.

However, for WAITRO to continue to be an important organization in the future competition for funding and attention, it is important to continue delivering both business opportunities for the large, rich institutes but also opportunities and support for development of the institutes with less resources. Today, in the globalised world in which we are living, WAITRO has become even more important than when I first got in touch with the organization in the early 1980ies.

The economic conditions and technical knowledge are today even more misallocated than earlier, and the technical development takes place at increasing speed. Therefore, WAITRO has an important role in developing sustainable technology and transfer knowledge within this area.



WAITRO EXPERIENCES

- Ömer Kaymakçalan, Turkey



WAITRO General Assembly, The Netherlands, 2000

I was appointed President of Marmara Research Center of (MRC) by Technical and Scientific Research Cooperation (TUBITAK) attached to prime minister of Turkey in 1991 and was asked to establish close cooperation between the MRC and industry by increasing contract applied research projects. I started to look for success stories of Research and Technology Organizations and best practices from around the world. That's when I found WAITRO and learnt about its benchmarking studies. TUBITAK's MRC became a member of WAITRO and we made use of WAITRO's benchmarking project. Using the knowledge that I gained from WAITRO's benchmarking

and other sources, I started restructuring the MRC. The Danish Technology Institute, Force Institute of Denmark and WAITRO contributed in preparing a Strategic Plan for restructuring the MRC. We greatly benefitted from being a WAITRO Member in restructuring the Marmara Research Center. I have to point out that I learnt much from Rustam Lalkaka about restructuring and technology transfer. During that period Eiliv Sodahl of WAITRO visited the MRC and after his visit WAITRO chose the MRC Restructuring project as the best in the world. I was elected president of WAITRO in the General Assembly of 1998.

During my term as president of WAITRO (from 1999 to 2002) weak cooperation between RTO's and industry was a general global problem. Big industrial companies cooperate with academia directly, so WAITRO focused on cooperation between SME's and RTO's, and this needed financial support from third parties such as governments and international organizations. In the 1990's the global economy was poor and it was difficult to find financial support from governments and international organizations. We focused on low cost activities. Transferring management to SIRIM in 2002 was a good decision. SIRIM was a financially strong organization. Now I believe under the management

and leadership of Fraunhofer Institute and China, WAITRO will grow and increase its activities.

The executive committee and WAITRO consultants were very valued and wise people, they helped me a great deal. I have to mention especially, Rustam Lalkaka, Eiliv Sodahl, Hollis Charles and Morten Knudsen. Also Kristian Olesen as general secretary was very hard working and efficient, I formed a good team with him.

In 1999 the MRC organized an international congress on technology parks in Istanbul, to

which WAITRO participated. A terrible earthquake happened one month before the congress but we did not change the program and all WAITRO members attended.

During the last twenty years, technology parks and individual technical entrepreneurs have gained importance in the areas of technology development and innovation. WAITRO can play an intermediary role between entrepreneurs, RTO's and industry to promote the commercialization of new ideas. Priority has to be given to technology development

projects between Technology Readiness Levels 4-7. In these Technology Readiness Levels both academia and industry are reluctant to contribute and entrepreneurs need technical and financial support. WAITRO can act as an intermediary to bring together entrepreneurs, RTO's and industry. I believe Fraunhofer Institute has valuable experience in this type of project management. Cooperation between WAITRO and Technology Parks' management will bring young entrepreneurs to WAITRO.

I met various valuable persons from different parts of the world and from different cultures and established valuable contacts. This is my personal gain by being a WAITRO member. I believe WAITRO is a good medium to bring North and South, East and West, developed and developing countries globally for the benefit of mutually all. I congratulate 50th Anniversary and wish successful and fruitful second 50 years.



MY JOURNEY WITH WAITRO

- Hollis Charles, Trinidad & Tobago



Around the mid-1960s the small twin islands Caribbean state – Trinidad & Tobago (population 1.3 million) began the process of creating an industrial economy. The Country sought development assistance via the United Nations and received technical help to establish an Industrial Research unit. By 1970 a UNIDO project was in train. Richard Westergaard from the Technological Institute in Norway was in place in T&T. He was UNIDO Project Manager and Director of the newly formed Caribbean Industrial Research Institute, (CARIRI). As a young industrial engineer (30 years old) I was recruited from the private sector as Co-Director in September, for an initial period of two years. My first task was to learn about this new type of organization with which no one in T&T was familiar.

That is how in October 1970 I found myself in Vienna, Austria, at my first international

Conference – the Inaugural Meeting of WAITRO. My education began from the first morning of the Meeting. I found myself sitting behind the delegate from Yugoslavia and was very impressed by the many documents he had spread out before him and the assiduousness with which he was studying them and taking notes. I had been given no more than two papers so on the coffee break I passed by his seat to get a glimpse of his documents. They were brochures of all the tourist attractions in Vienna!

As it turned out I remained at CARIRI for twenty years, effectively defining my life and career. For those 20 Years WAITRO was my tutor and advisor. I made many personal friends as I discovered that despite whatever Country or Institute they came from, those Directors shared and related to issues with which I was wrestling, in my own small establishment and Country. I was elected President of WAITRO in 1987 and again in 1989. In 2002 I received the WAITRO General Assembly’s Award of Honour “for contributions to the advancement of industrial research and technology and its application to development, in fulfilment of the aims and objectives of WAITRO”.

In my memories there are many significant circumstances that are associated with WAITRO. Among them are the dedication and visions which

individuals in the Executive and the Secretariat brought to their responsibilities, especially in the formative years when the whole idea could have been abandoned. I recall the sense of pride at CARIRI when in 1973, we were among the first institutions to take part in a WAITRO project to pair members in Developed and Developing Countries. We were paired with the Research and Productivity Council of New Brunswick, Canada. The exercise was highly successful for both Institutes and for me personally, as I developed a close relationship with the RPC Director Dr. Claude Bursill, who in many ways mentored me.

Among the more dramatic memories was the Israeli and Egyptian delegates who had been attending WAITRO meetings but not speaking to each other, hugging and toasting each other at the bar when Egyptian President Anwar Sadat, visited Israel in 1977. Demonstrating that while WAITRO membership might ameliorate the effects, it could not isolate us from geopolitics of the world! In similar vein was arriving for the General Assembly in Delhi, in 1984 on the morning when Prime Minister Indira Gandhi was assassinated! Our group was locked down in our hotel for almost a week, as the Indian authorities managed the crisis. As President, I travelled with then Secretary General Roger Short, through the capitals of Europe and North America trying to promote the concept

of a Global Technology Park which via telecommunications, would have linked Member institutes, technological organizations and their clients, globally. The viability of that concept has since been proven emphatically, but in the late 1980s its time had not yet come. We discovered for example that up to that time none of the major UN Agencies had ever collaborated on a project!

If I have however to select the most significant circumstance within WAITRO I would chose the decision made by the Executive Council at the General Assembly in 1978 at Noordwijkerhout, Holland. The decision was taken to bring professional staff from Developing Country members to

the Secretariat, for training in the administration of international organizations. The decision was effected in 1983 when WAITRO obtained funding to bring Moses Mengu from Ghana to work at the WAITRO Secretariat. Like my original two years at CARIRI, what was supposed to be a short term career shift became a life changing event for Moses and his family and a most serendipitous occurrence for WAITRO! Moses had no sooner joined the Secretariat when WAITRO was plunged into one of our most perilous periods. During that time Secretary General Hans-Georg Lindgren held WAITRO together almost by sheer will and Moses was his support. Moses Mengu has

continued to be the Institutional Memory and standard bearer of the WAITRO ideal ever since. His work for WAITRO in Africa has been exemplary. Hans-Georg Lindgren received the WAITRO Award of Honour in 1988. Our 50th Anniversary would be an appropriate juncture at which to recognize the contributions of Moses Mengu.

At my recent 80th birthday I had the occasion to say that my personal fortune is made up of the gems which are the relationships I have been privileged to enjoy during the course of my life. A large number of those gems come from among the individuals I encountered through WAITRO.

PERSONAL STORY OF MY YEARS WITH WAITRO

– Prof. Eugenia J. Olguín, Mexico

On the occasion of celebrating the 50th Anniversary of WAITRO, I would like to express my sincere gratitude and recognition to this great international organization. My first encounter with WAITRO was in 1982 during the celebration of an International Symposium in conjunction with the 6th Biennial General Assembly held at San Felipe Yacucy, Venezuela. I then realized the many benefits that this organization could provide to the NGO that I founded and was heading at the time, the “Mexican Institute of Appropriate Technologies (IMETA, S.C.)”. Among the

many benefits I received was to become involved in an international RTOs network learning from RTOs well established in developed countries.

In 1986, I had the honour to be elected to represent the Latin America and Caribbean Region at the 8th WAITRO General Assembly held at Aarhus, Denmark. My very fruitful and joyful experiences while serving on the Executive Committee lasted for several years. In 1989, when I became a leader of the Environmental Biotechnology Group at the Institute of Ecology (INECOL), one of the Research Centers

of the National Council of Science and Technology (CONACYT), based at Xalapa, Veracruz, México, I started to develop and promote cleaner bioprocesses for controlling the water pollution by tropical agro-industries using aquatic plants (phytoremediation) and microalgae (phycoremediation). WAITRO gave me the opportunity to promote environmental technologies and in 1992, I was made Chairperson of the WAITRO Special Interest Group on Environment.

Being elected as Second Vice President of WAITRO at the 12th Biennial General Assembly held at New Delhi, India, in February 1995, I was committed to serve WAITRO in many ways and I had the privilege to represent it in very important events. I was appointed President of the NGO’s Forum on Cleaner Production organized by UNIDO at Vienna in 1995. During this period, WAITRO also gave me the great satisfaction of being the Chairperson of the WAITRO Special Interest Group on Women and Technology, a role that I fully enjoyed since I firmly believe that women play a key role in promoting technology worldwide. This is one of the many wonderful features of WAITRO, an organization that has



*WAITRO Executive Committee Meeting, RSS, Amman, Jordan, 1995
From Left: Dr. Ashok Jain (NISTADS, India), Mr. Moses Mengu (DTI, Denmark), Mr. Frans Grandjean (DTI, Denmark), Mr. Niels Christian Nielsen (DTI, Denmark), Dr. Hani Mulki (RSS, Jordan), Dra. Eugenia Olguin (IE, Mexico), Prof. W. Wielezynski (Poland), Prof. C. Chetsanga (SIRDC, Zimbabwe), Mr. J. Ridder (TNO, Holland), Prof. Aziza Yousef (CMRDI, Egypt), Mr. Denis Gosselin (CRIQ, Canada)*

promoted gender equality since its foundation in 1970. A confirmation of this wide vision of WAITRO is that in 1998, at the 14th General Assembly held at Warsaw, Poland I was appointed as Chairperson of the Assembly and later elected as First Vice President a position I held until 2002. During that period, I was appointed Acting President from October to December 1998.

One of the aims of WAITRO has been the strengthening of individual and institutional capacities. I am fully convinced through participation in several activities with WAITRO that such purpose has been fully achieved in the case of our activities at INECOL. In 1997, through the auspices of WAITRO, we were able to establish the International Center of Cleaner Technologies and Sustainable Development (CITELDES, S.C.). The purpose of this NGO is to promote the development and diffusion of technologies aimed at creating a sustainable society. WAITRO helped INECOL and CITELDES to organize the “3rd International Symposium on Cleaner Bioprocesses and Sustainable Development” at the city of Veracruz in June 1998. Due to the success of this event, the 4th International Symposium on Cleaner Bioprocesses and Sustainable Development together with the 6th International Symposium



WAITRO General Assembly, Warsaw, Poland, September 1998. From left are Eiliv Sødahl (Norway), Prof. W. Lubiewa-Wielwzynski (Poland), Prof. Eugenia J Olguin (Mexico), Moses Mengu (WAITRO Secretariat) and Hollis Charles (Trinidad & Tobago)

of Environmental Biotechnology, were organized by INECOL and WAITRO in conjunction with the International Society of Environmental Biotechnology (ISEB), CITELDES and CONACYT and it was held at the city of Veracruz in June 2002. Both events were attended by about 300 participants from many countries and helped many RTO's to acquire new knowledge about innovative technologies while it provided a forum for disseminating their technologies.

WAITRO has been very active in many important international events and I had the great honour to represent this magnificent organization at the “UNESCO World Conference of Science”, held in 1999 at Budapest, Hungary and at the International Conference "Business Incubation and Technology Innovation" organized by the Chinese

government in Shanghai, China, in April 2000. Needless to say that such privilege and the many years serving on the WAITRO Executive Committee have contributed immensely not only to my personal professional growth but also to strengthening my experience of belonging to a worldwide community full of expertise and knowledge, able to tackle the most difficult challenges and to find solutions within the three dimensions of Sustainable Development, the environmental, the social and the economic.

Last but not least, I would like to thank all my friends and the colleagues that I met during several meetings or worked with on WAITRO's Executive Committee for their continuous support, kind words and joyful attitudes that always helped to accomplish our goals.

WAITRO 50 YEARS ANNIVERSARY

- Niels Christian Nielsen, Denmark

Happy Birthday, WAITRO.

As always, a significant birthday for someone, you have known well, is an occasion for reflection on the relationship and on some of the key qualities of the one we celebrate.

I have known WAITRO since 1987, when I joined the Danish Technological Institute (DTI) and met Morten Knudsen, Moses Mengu and Roger Short. Through them I was introduced to WAITRO and served the Association in different capacities, among others, as the Executive Committee representative for Europe, as WAITRO's Second Vice President, and as an active participant in many WAITRO activities. After I left DTI at the end of 1999 to take on company building, investing and Board roles in Silicon Valley, WAITRO still felt like family, and meeting people from WAITRO was always a reunion with friends. Today, 20 years later, when I meet David Tveit, news about WAITRO dominates on our agenda.

I still have very fond memories of all the individuals from different parts of the world that I met in WAITRO, among them, Hollis Charles (Trinidad), Eiliv Sødahl (Norway), J. K. Nigam (India), Abdel Aziz (Egypt), Hani Mulki (Jordan), Eugnia Olguin (Mexico), Mathilde Miedema (The Netherlands) and many others. I remember with nostalgia, the many WAITRO events that I participated in, especially, the General Assemblies in Trinidad and Tobago (1988), Arusha (1990),

Québec City (1992), New Delhi (1995), Cairo (1996), and The Hague (2000), as well as several Executive Committee meetings in Pretoria, Veracruz, Bangalore, Amman, Bruge, Kingston, Bangkok, and many other places.

The real impact of WAITRO on the world community and on me personally, however, has been the total transformation of the paradigm and our understanding of global flows of knowledge, innovation, and best practices. As a child of the 60s, 70s, and 80s in Western Europe and the US, my "benevolent" understanding of innovation flows was from North to South, and when we were radical from South to South. What WAITRO demonstrated in the strongest and most direct way is that in spite of our different degrees of luck in "the lottery of birthplace", human ingenuity and talent cannot be denied. To have Hollis Charles, with the booming bass of his laughter, explain to Morten Knudsen and me how a difficult organizational and social issue can be resolved; to have Dr. J. K. Nigam from India walk through some highly technical issues of optimization with a technology team from TNO, were direct, practical lessons in how global collective intelligence flows neither North-South nor South-South, but in a true sense, from All to All.

During my early years with WAITRO, I had not yet learned that lesson well. DTI had successfully developed and implemented an Industrial Competitiveness Program in



Denmark, the SME Network Program, and we were discussing within WAITRO ways to transfer that program. One of the candidates was the silk industry around Bangalore. North-South business as usual.

However, while we were having a WAITRO Board Meeting in Bangalore, I was discussing with my Indian colleagues a different issue that was posing problems for me in my role as Head of the Computer Technology Department at DTI. Our biggest effort was organized within the European Program for Advanced Continuing Education, EuroPACE. DTI was founding member along with all the lead companies in the European IT industry at the time: Siemens, Nixdorff, Bull, Alcatel, Philips, Olivetti, Telefonica, British Telecom, and the European extensions of the US giants IBM, HP and DEC. The purpose was to supply the most advanced education for the deepest specialists in these companies, in areas where there was maybe one or two people in the world qualified to teach. The programs were

delivered by very advanced (and expensive) satellite video combined with virtual classrooms on an interactive computer conferencing system. The original system used was EIES (Electronic Information Exchange System), developed by the legendary Murray Turoff and his wife Starr Roxanne-Hiltz at NJIT. At the time of the meeting in Bangalore, DTI had joined NJIT in the effort, and we had developed the EIES2 system. We had, however, realized that our big mainframe based, centralized systems would never really be able to deliver an adequate solution for a globally distributed user community, and we would never be able to tailor the conferencing facilities for the different user needs. We needed a tailorable EIES – TEIES.

The next morning early I found myself in a car with my Indian WAITRO colleagues, and we went to their joint computer technology facility some 20 miles outside the city where a group of highly qualified computer scientists came up with the architectural and conceptual solution to my problem, and over the following months they worked with the systems developers at DTI and NJIT to develop a distributed, Unix-based computer conferencing system.

That, for me, became a lesson for life: that innovation and transfer of knowledge in its true form is never polar and unilateral, it is always from all to all. If not for WAITRO, I am not sure how many years it would have taken me to get to that understanding. (The fact that our wonderful new TEIES system – about the time that we had it ready in a beta version for testing within EuroPACE – was

overtaken by something called the Internet and the World Wide Web represented a very different and no less profound lesson, but that is beside the point in this context).

That the pool of talent, knowledge, innovation, and solutions is global and everywhere; that the pool and available potential grows the more we realize that basic fact, is to me the founding principle and working ethos of WAITRO. In the following years of my active engagement with WAITRO, I saw it demonstrated again and again. And it certainly changed both my life and my career.

Let me illustrate how by a few words about two of my present companies, Unumed and Wikifactory.

Unumed delivers an advanced hospital and health management system. The company was started in Kenya, and though the company HQ since has been relocated to Denmark, its largest presence is still in Kenya. Other significant subsidiaries are in Indonesia and Thailand. The latest version of the platform is the world's first fully cloud native (micro services architecture), AI first and mobile first hospital and health management system. Within this month a leading hospital in Kenya and a leading hospital in Indonesia will be first in the world to run all their operations on this new release, and will – in IT platform terms – become the most advanced hospitals globally. The need for new standards in hospital IT was seen first in Kenya. The necessary innovation undertaken by a global developer team. And the globally leading users in Kenya and Indonesia. The ethos

of WAITRO applied in health and IT!

Wikifactory is a company that delivers the Internet of Production. Two years in, the platform is used by more than 50,000 product developers – the number is growing by more than 20% per month – to jointly design and develop new products. More than a thousand on-demand manufacturers have joined, and their number is growing exponentially as well. SW developers are delivering enabling tools and apps to the community. Users – product developers and on-demand producers – are located in more than 180 countries across all continents. A product idea generated by someone anywhere in the world can be developed by a globally distributed team, and the end-results can be manufactured anywhere and, indeed, everywhere, using Wikifactory's Internet of Production platform. From All to All. The ethos of WAITRO.

Personally, I can assert that I am involved with these groundbreaking companies in part because of what I learned in WAITRO. I see these companies as extensions of the WAITRO ethos.

Therefore, dear WAITRO: Celebrations of you on your birthday. And lots of gratitude to you. You have enriched my life. But of course, much more important: You have had and are having a positive impact on the world and on the future of humanity. Please remain vibrant and true to your ethos. The need for what you do is great and growing.

Thank you and warm wishes for the future.

WAITRO EXPERIENCES

- David Grier, Canada

WAITRO played a very large role in my 44-year career as a research engineer, research manager, and senior executive working in research and technology organizations. My work took me to 36 countries on five continents. I conducted WAITRO business in 27 of these. And, although I went to some countries for both WAITRO and other business, 22 of the 27 were exclusively on behalf of WAITRO. I am extremely grateful for the opportunities that being involved with WAITRO has afforded me.

My involvement with WAITRO began in 1994 when it was considering a worldwide project to identify the best practices for managing research and technology organizations (RTOs). The project lasted four years during which the team from Danish Technological Institute (DTI) Denmark, National Institute of Science, Technology and Development Studies (NISTADS) India, and myself from Saskatchewan Research Council (SRC) Canada, studied 60 RTOs in Europe, Africa, Asia, North and South America. Rather than the common methodology of identifying particularly effective RTOs and labelling their management practices as "Best Practices", we took an industrial engineering approach of using measurement to identify the best practices. First, we separated the activities involved in managing an RTO into processes. Then we asked the 60 RTOs we studied how they did each process, thereby

developing a list of practices for each process. And, finally, using performance indicator data collected from each RTO, we formed conclusions about which practices were best, good, and bad for each process. As a result, we learned that no single RTO was home to all the best practices. All RTOs could learn from each other.

Both during the project, and once it was complete, I made presentations at WAITRO events and performed consulting activities in RTOs based on the findings. These started in January 1995 in New Delhi, India and continued until the General Assembly in Medellin, Colombia in October 2016.

As a result of my extensive involvement with RTOs throughout the world, I was invited to stand for election to serve on the Executive Committee. I was the North American Representative from 1998 to 2002, Second Vice-President from 2002 to 2006, and the First Vice-President from 2006 to 2008. Through my time on the Executive Committee, I made many wonderful friends and was afforded the luxury of visiting many glorious places in Africa, Asia, Europe, Central and South America. In addition to seeing the sights in these places, I added to my already extensive list of RTOs and seeing the impressive technologies being developed and implemented through them. The highlight of my time serving on the Executive Committee was the



hosting of the 2006 General Assembly in my home city of Saskatoon, Saskatchewan, Canada.

I am truly grateful to WAITRO for giving me the opportunity to grow professionally and as a person. I am a very firm believer in the value of knowing and understanding people who live differently and under different circumstances. If we understand and value our differences, and learn from each other, we will be better able to address the challenges we face. WAITRO creates this opportunity for organizations operating in the field that has the greatest chance of improving the world – technology.

Congratulations WAITRO, on 50 years, and may there be many more!

MY YEARS WITH WAITRO

- Dr. Nirmala M Pieris, Sri Lanka

The mere mention of ‘WAITRO’ still brings a smile to my face as I reminisce on the wonderful times, the delightful people and the most exclusive places we traveled to carrying the message of WAITRO. My association with WAITRO dates back to 1995 when I was the focal point in Sri Lanka and at the Ceylon Institute of Scientific & Industrial Research (CISIR) for the WAITRO Project on “Best Practices for the Management of Research and Technology Organizations”. During this same year and for the first time I attended the WAITRO General Assembly held in New Delhi in India. I distinctly recall the genuine friendship and camaraderie between the participants. There was so much enthusiasm and affection and as I continued to attend the WAITRO activities, I became more and more familiar with the greetings and blended

into the distinguished gathering quite smoothly.

Subsequently, I was actively involved in WAITRO activities presenting papers on Development of SMEs, Technology based Incubators and Restructuring of RTO’s at several Regional and International seminars, workshops and other programs in the Asia Pacific, region. After having been closely involved with the Restructuring process of the CISIR my first consultancy assignment at the request of WAITRO was for the restructuring of the Tanzania Industrial Research and Development Organization (TIRDO) in 1997 in Dar es Salam. During this time links with the World Intellectual Property Organization (WIPO) and the World Association of Small and Medium Enterprises (WASME) based in New Delhi in India

were also established to further the objectives of WAITRO.

At the 14th WAITRO General Assembly held in Warsaw, Poland in 1998, I was elected to the Executive committee and as the Regional representative for Asia and the Pacific for the biennium 1998 to 2000 and then again for the biennium 2000 to 2002 at the General Assembly held in The Hague, Netherlands. In this capacity I made contacts and built close relationships with over 25 RTOs in the region on a membership drive while championing the membership of the Zhejiang SMB Institute in China who became the first institute from China to gain WAITRO membership status. In January 2001, a link was established with the Southern African Development Community (SADC) subsequent to being a resource person at an SME development workshop



WAITRO EXCOM Meeting, Saskatoon, Canada, September 2002

held in Gaborone, Botswana.

In 2002 at the General Assembly held in Porto Alegre in Brazil I was elected as the 1st Vice President of WAITRO in which position I continued for 2 years. A highlight of my association with WAITRO during this period was when the Executive Committee of WAITRO was hosted in Colombo, Sri Lanka in March 2004 together with a networking session on “Quality and Performance in RTOs”. In September 2004 I was indeed privileged to present the opening address and welcome the Hon. Vice President of Kenya, Mr. Arthur Moody Awori, on behalf of the WAITRO President at the Biennial Congress held in conjunction with the 17th Biennial Meeting of the General Assembly in Nairobi, Kenya where I was also re-elected to the position of 1st Vice President. In 2005 I was a member of the two-member WAITRO delegation to international agencies including UNIDO, UNESCO, UNCTAD, WIPO in order to establish and strengthen relationships, as well as to explore collaborative projects. In 2006 at the Biennial Congress in Saskatoon, Canada, I was elected to continue in the WAITRO Executive Committee as the 2nd Vice President until 2008. In 2007 relationship with UNIDO was enhanced through the Signing of the Memorandum

of Cooperation which launched a UNIDO-WAITRO LABNET project in collaboration with VIMTA in Hyderabad, India.

During my journey of 13 years with WAITRO I attended several meetings that included Executive Committee meetings, Regional Focal Point meetings, Core Committee meetings as well as the launching of collaborative programs and projects seeking to enhance partnerships and collaborations with RTO’s as well as International agencies. In conjunction with these activities I traveled on more than 40 occasions to 24

countries in the Asia Pacific, European, Middle East and American regions that also provided me with opportunities to blend with the different cultures and nationalities that indeed was most enlightening.

As WAITRO reaches 50 it is my fervent wish that WAITRO continues to connect across borders, to harness science and technology and engage with strategic partners to illustrate the distinctive role of RTOs as a key player in industrial development.

Congratulations, WAITRO.



With the FIVE WAITRO “WISE MEN”: from left: Morten Knudsen (Denmark), Hollis Charles (Trinidad & Tobago), Eiliv Sødahl (Norway), Adel Abdel-Azim (Egypt), far right, Rustam Lalkaka. Third left, Nirmala Pieris (Sri Lanka), Fifth left, Suriati Mokhtar, (Malaysia), Second right, David Grier (Canada). Nairobi, Kenya, 2004

PERSONAL REFLECTIONS ON WAITRO

- Dr. Robert Arunga, Kenya

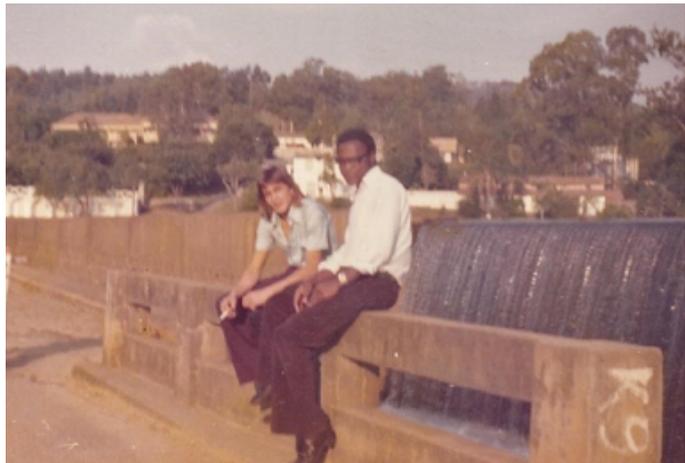
The World Association of Industrial and Technological Research Organizations (WAITRO), at its inception, was an ideal instrument for global collaboration and progress in industrial research and development, particularly for Africa and other developing countries. It continues to play an important role in capacity building, innovation and transfer of technology. The story of industrial research and development in Kenya exemplifies the contributions made by the WAITRO and UNIDO in a span of two decades.

The sixties in Africa and particularly in Kenya were characterized by the quest for independence and educational opportunities. Many African countries became independent in the early sixties with Kenya attaining its independence in 1963.

Educated manpower to take over from the colonialists was still a major concern. Kenya had only one post-secondary graduate school in Nairobi, The Royal Technical College (RTC) established in 1961 and admitting less than 75 students per year from the whole of East Africa. Students not admitted to RTC had to look elsewhere for graduate education. The immediate outlets were at the Makerere University in Uganda and the University of Dar es Salaam in Tanzania. The demand for higher Education far outstripped the supply. Kenyan leaders, notably Tom Mboya and Jaramogi Oginga Odinga organized for students to go for higher education in the West and the East, respectively. They were keenly aware of the need to have qualified manpower to take over governance, commerce, industry, research and development from the colonialists, who had taunted Africans that they were not ready for independence since they could not even manufacture a needle!



Kenyan students received by the late Tom Mboya on board a plane to USA, 1960

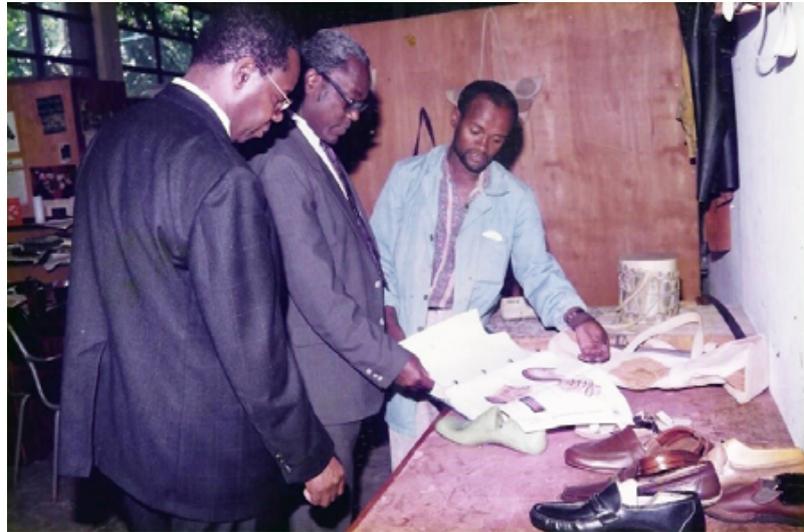


ITAL, Campinas, Brazil, 1975



WAITRO Executive Committee Meeting, Tobago, 1988

The seventies were characterized by young graduates taking their positions in various institutions. Literary being thrown in the deep end to swim without the necessary experience. Having benefited from American graduate training, I was employed at the East African Industrial Research Organization (EAIRO) as a Research Officer to lead in adapting, adopting, developing and deploying technologies to promote sustainable industrial development in East Africa. Fortunately, EAIRO was one of the founder members of WAITRO which had been established by UNIDO through the efforts of a young international civil servant from Cameroon called Shadrack Ndam working together with progressive RTOs in Europe, Africa, India and South America. I was one of the beneficiaries of WAITRO and UNIDO capacity building programs at various institutions. In Brazil at the Institute of Food Technology (ITAL) in Campinas we worked on fruit processing, particularly sugar cane, cashew apples, avocados and guava. The Central Food Technology Research Institute (CFTRI) in Mysore, India exposed us to research management, structures and operations of SMEs. At the Tropical Products Institute (TPI) England, a major center for post-harvest technologies, we examined post-harvest losses in agricultural produce. The Jutland Technological Institute (JTI) later Danish Technological Institute (DTI) provided insights in industrial parks and incubation technologies. The Federal Institute of Industrial Research, Oshodi (FIRO) in Nigeria, one of the founder members of WAITRO, excelled in research in agro-industries



Leather & Leather Products Institute, Addis Ababa, Ethiopia, 1990



WAITRO General Assembly, Aarhus, Denmark, September 1986

especially in tubers and cereals, just to mention a few. relevant institutions.

Subsequently, I took over as the Managing Director of Kenya Industrial Research and Development Institute (KIRDI) which was a product of EAIRO following the collapse of the East African Community (EAC). The fellowships and the exchange visits, had helped me prepare adequately for this role. During the period 1985 – 1988 I was a member of the WAITRO Executive Committee

representing the African Region. We held meetings and visited many countries including Trinidad and Tobago, Jamaica, Denmark, Netherlands, Sweden, Norway, India, Canada, Austria and several African countries.

WAITRO also organized training sessions for research scientists. In 1990, research scientists from various countries converged at KIRDI in Nairobi to attend an important course on the Use of Computers in R&D Management for Developing Countries, organized by WAITRO

and UNIDO.

In the seventies and the eighties, institutions like KIRDI were contributing significantly in the development and deployment of industrial technologies.

The engineering workshop established with the support of UNIDO had helped promote and set up a number of SMEs manufacturing spare parts for the sugar, textiles, wood, metals and transport industries. This was the era of the first Kenyan assembled car. These developments were interrupted by the Structural Adjustments Programs (SAPs) promoted by the World Bank and IMF Loan conditionalities imposed globalization characterized by liberalizations, production

for exports and privatization. Local fledgling, infant industries collapsed. Local industrial research was devalued and underfunded. Rapid sustainable industrial development became a pipe dream. From 1993-2001 I established the Leather and Leather Products Institute (LLPI) in Addis Ababa, Ethiopia through the support of UNIDO and the Common Market for Eastern and Southern Africa (COMESA). Leather industries, although adversely affected by the SAPs, are still contributing to industrial development in a number of African countries.

In the seventies and the eighties our industrial policies were shaped by UNIDO and WAITRO. Later we were guided by OAU and ECA Lagos Plan of Action (LPA) and the Final Act

of Lagos (FAL) in our efforts at sustainable industrial research and development. Subsequently, developmental concepts such as Millennium Development Goals (MDGs) and Sustainable Development Goals (SDPs) espoused by various UN organs have not had impact in the progress of industrialization in Africa. The challenge for WAITRO is to invigorate the RTOs to deliver on its major goal of sustainable industrialization in developing countries. Its commendable contributions in the first two decades is fully acknowledged and appreciated in this brief review of progress of one individual and one country who benefited from its programs, I am sure this was the experience of many individuals, countries and RTOs who were members of WAITRO.

WAITRO: A WORTHWHILE EXPERIENCE

- Prof. S. A. Odunfa, Nigeria



I recollect with nostalgia my experience of interaction with WAITRO. Soon after I took over, in December 1990 as the Director/Chief Executive of Nigeria's premier Industrial Research Institute the Federal Institute of Industrial Research, Oshodi, (FIIRO), I was briefed about the activities of WAITRO, and noted that FIIRO was one of the founding members of the organization and that FIIRO has benefited well in the relationship with it.

The first activity I was exposed to was invitation to attend a WAITRO/UNESCO workshop on the use of microcomputers in technology management in July 1991 in Accra, Ghana. The exposure to the use of microcomputers was extremely beneficial to the development of the use of microcomputers in technology management in FIIRO and presumably in other African research organizations.

Later I got information from WAITRO bulletin that WAITRO

facilitated a research project on research on fermented foods of Ghana at Food Research Institute, (FRI), Accra, Ghana and was being supported by a Danish Development Agency. Because my research had been on African fermented foods and I have already become Africa's leading authority in this field, I requested through WAITRO that FIIRO participates in the project. Unfortunately, I was told that this was not possible as Nigeria was not eligible for funds from the Danish Agency. However, I was invited to their seminars at FRI and the annual conferences organized by FRI/KVL/WAITRO in Accra where I was invited as a leading resource person.

In a later development, Moses Mengu of WAITRO, Prof Mogens Jakobsen of the University of Copenhagen (UC), Denmark, and Prof. Wilhelm Holzapfel of the Institute of hygiene and Toxicology (IHT), Karlsruhe, Germany involved FIIRO in a European Union STD 3 research project on Quality Assurance and fermentation technology for traditional African fermented foods in 1994. This was a collaborative project involving research institutes in Denmark, Germany and six African countries (Benin, Burkina Faso, Ghana, Kenya, Nigeria and Zimbabwe). I found this project very exciting because it established an African network of research institutes on fermented foods research. Many African scientists who hitherto had been working in isolation had opportunity of

forging into a network. The productivity and benefits of cross fertilization and linkage with advanced laboratories in Denmark and Germany was amazing. Meetings were held in rotation in the African research institutes and I am proud to say that the meeting in FIIRO was most exciting (See photos) and of high profile.

The success of the project facilitated other projects specifically on Degradation of aflatoxins in fermented maize and sorghum products in 1999 and on Cocoa fermentation all supported by EU and facilitated by WAITRO. These projects brought nearly twenty African research institutes into the African traditional fermented foods network coordinated by Moses Mengu of WAITRO. The Aflatoxins project led to the discovery of a novel microbe involved in the degradation of aflatoxin, a process that led to a patent application.

The projects were personally satisfying to me as they boosted my personal research interest which as well coincided with that of FIIRO which had been known for her landmark research in process development and mechanization for the production of fermented foods, cassava product, gari and fufu and cereal product, ogi. The emphasis of the international agencies on fermented foods in Africa is appropriate. Fermented foods constitute a significant part of foods in Africa. I have documented

over thirty fermented foods in different regions in Africa; they have tremendous impact on food security and nutrition of different classes of the people. The benefit the projects is that they provide research capacity for the African institutes. In FIIRO, a state-of-the-art laboratory for basic molecular biology was acquired. Another benefit to the African scientists who participated in the projects was the opportunity to obtain doctoral degrees and research associateships in the participating European laboratories.

Some important areas where

research organizations benefited from WAITRO were in Human resources development and in the formulation of Best practices to strengthen research and development to facilitate development of small and medium enterprises. Seminars organized along these lines in New Delhi, India, 1994 and in Warsaw, Poland, in 1998 were enriching.

At one of the meetings of WAITRO, I was elected the African Regional Representative. This position helped me to shape the policy of WAITRO and also to involve more African research organizations. On a

lighter note, the position also gave me opportunity to visit some cities which were not on my usual “radar” – Warsaw, Brasilia, Cairo, Shanghai, etc. They always provided a pleasant break from my busy schedule at FIIRO.

When I left FIIRO at the end of my tenure of about ten years, the WAITRO projects in FIIRO were still ongoing and I was happy they did.

Wishing WAITRO a Golden Anniversary and many more years of productive existence!



African Traditional Fermented Foods Seminar, FRI, Accra, Ghana, 1992



African Traditional Fermented Foods Seminar, Lagos, Nigeria, 1997



WAITRO SME Seminar, Shanghai, China, 1998

A REFLECTION ON WAITRO

- Berenice Lue Marais, South Africa

When I got the message from Moses Mengu that the Secretariat would like to mark the 50th year of WAITRO's existence with a short historical review with the aim of collecting short personal stories and reflections from those who have known the Association from its beginnings until now; I felt honoured, nostalgic, and then immediately challenged to reflect on what we achieved, and what we could do better ~ and hopefully offer some guidance for the future.



A true African!

Moses Mengu, by the way ~ is one of those Africans whose name should go down in history as one of those people that was instrumental in facilitating access for Africa in global science and technology. Without a doubt, he is one of the most active contributors that I have met in the past 2 decades in the African diaspora! I am proud to have followed in his footsteps, and to have had him as an ever-present mentor over this time. He has led quietly and determinedly, with humility, patience. Indeed, Africa would not have succeeded in the European Union Science and Technology Program without his long-sustained efforts.

The WAITRO Dilemma!

As a key past member of the Association, I am keenly interested in contributing to reviewing our activities of the past and providing some

pointers for adapting and contributing to the future. WAITRO, the global platform that offers tremendous benefits to its members; learning, sharing experiences, good practices, partnerships, alliances, frontier science, innovation and leadership, - for CEOs, executives, young career enthusiasts, communities, countries, regions, and Continents - My question is - if you could expose your staff, leaders, organization, region to all of this - why wouldn't you? The question leads to what I call the WAITRO dilemma!

What could we have done better!

We spent many long days and late nights deliberating how we could be more effective as organizational and regional representatives. How could we get our organization's to buy in, actively participate, and get the maximum benefit? My key learning, which comes from my lifework of identifying,

establishing, and managing stakeholders, partnerships, and strategic alliances - across political, public and private sector, and community spheres - is that the role of passionate and committed individuals is invaluable and needs to be understood strategically and demonstrably supported at the highest level of the organization. Demonstrated leadership is a defining feature! Did we manage to secure impact in our own institutions? Clearly, those organizations that had leadership support and commitment, invested in, and participated in the network benefitted strategically and as growing Research Development and Innovation institutions. We could not have run a global best practices movement if it were not for a few dedicated, committed, talented and passionate individuals. However, individuals move on and sustainability is created through embedding good practices in institutions. I see the benefits of handing over the reigns to

younger talented, passionate, and directed leaders; I urge you to take the reigns, lead the charge and to keep learning all the way. Our role is to guide, support, mentor and coach and develop leaders. Don't hold on too long – make way for the future leaders! If I have learned anything - control is good but well placed trust is much better!

Thank You!

As one of the younger executives to join long-standing stalwarts, I have been inspired by the life contributions made

by several previous Executives who I had the privilege of working alongside and learned much from, humble thanks and respect is given to Morten Knudsen, Christian Olsen, Horris Charles, Rustum Lalkaka, Dieter Fuchs, Peck Sim, Rohani Hassim, Henry Thairu, the WAITRO Secretariat, Regional Focal Points, the CSIR, and the South African Department of Science and Technology. Highlights for me include convening and hosting the African workshops facilitating African access to the EU Framework Program and Horizon 2020; representing

the Africa network' and all the leadership and executive training – I learnt a lot about what to do and even more about what not to do - from very senior and noteworthy Executives, mentors, colleagues, scientists, and friends. I would be remiss not to mention the unwavering support of my CSIR Strategic Alliances team, who often sat long into the night working on our African Regional Focal Point reports. It was a privilege to convene and lead The African Science and Technology network of 47 Research and Technology institutions, which I represented for 15 years. I am certainly a better person and leader because of those all who contributed their time, knowledge, good practices, failings and successes so freely. Salute!

Happy 50th Birthday WAITRO!

**"Do not follow where the path may lead.
Go instead where there is no path and
leave a trail."**

-Ralph Waldo Emerson

WAITRO 50TH ANNIVERSARY GREETINGS

- Denis Gosselin, Canada

My first encounter with WAITRO was through Hollis Charles, who first came to the Centre de recherche industrielle du Québec (CRIQ) in 1987, seeking to find out how CRIQ's technical assistance and technological information services operated and how it connected with the industrial sector in Québec. He then invited me to visit the Caribbean Industrial Research Institute (CARIRI) in Trinidad and Tobago to present seminars on this subject to its staff. That marked the beginning of a productive international technological transfer service for CRIQ and for myself. I had the immense privilege of traveling to more than 45 countries through WAITRO and CRIQ's international business development branch.

CRIQ hosted the WAITRO

General Assembly and Seminar in October 1992 in Québec City. It was the first time the conference had been held in North America.

I became an Executive Committee member from North America in 1995. In 1996, WAITRO agreed to my suggestion of including a francophone chapter of RTOs from West African countries with participants from Senegal, Ivory Coast, Burkina Faso, Guinea Conakry, Benin, Togo, Cameroun and the Democratic Republic of Congo. I set up and coordinated a network among the francophone RTOs, connecting them with each other and with other RTOs in Africa. Several projects were identified in the area of technology development and transfer, technological



information and certification.

WAITRO gave CRIQ a great opportunity to develop its business opportunities, expand its market and provide services to help other RTOs also grow their services and markets. It gave me personally the chance to meet wonderful people and enrich my career.



General Assembly and Seminar, October 1992, Québec City



Members of the WAITRO Francophone Chapter, 1996

MY UNIQUE EXPERIENCE WITH WAITRO

- Prof. Dr. Adel Nofal, Egypt

This is very short note on my first steps with WAITRO, before I become a member of WAITRO EXCOM for the MENA region for several terms. Of course, needless to say that my memories with the wonderful and very pleasant people I met during those years and the very interesting places we visited together are simply unforgettable but let us start from the beginning.

My report will concentrate on a unique experience, where two WAITRO founding members could start a project that turned to be, in a very short time, an example of how two RTOs from developing and developed countries could collaborate under WAITRO's umbrella and how such experience could expand to cover north-south-south collaboration in one extremely vital industrial sector: metal casting. This experience started just when I came back from my Ph.D. studies in Moscow in the early 1970's.

During that period, from the mid-1970's till the early 1980's, I had been very heavily involved in the establishment of our Metal Casting Department at CMRDI to be the first metal casting research facility in Africa and the Middle East. One of my first tasks as the head of that new facility was to carry out a study on the potential of the Egyptian foundry industry to secure the needs of different sectors of our economy for spare parts. From that study, I came out with the main conclusion that

this was a very difficult task. The spare parts requirements in Egypt, as in other developing countries cover a rather wide range of items but in limited numbers of each item. Such situation makes it unjustifiable and unfeasible to establish production lines in commercial foundries and so I became convinced that a sacred mission is waiting CMRDI if it would have a small flexible foundry, where the results of its R&D programs aiming at developing special alloys for special purpose applications would be implemented to produce high quality castings as import replacement.

Financing of such a project from local funds was at that time impossible for a beginner institute such as CMRDI, trying to put its first steps in the industry. Our late Prof. Azim, CMRDI founder and first President of CMRDI was at that time the Vice President of WAITRO together with the President of TNO, the Dutch Organization of Applied Research. Prof. Azim advised me to approach TNO to explore potential for collaboration with the Metal Institute affiliated to TNO. So, I went to The Hague and met the TNO management, who put me in contact with a group at the Metal Institute headed by Mr. Van der Holst, and this was my first involvement with WAITRO in the early 1980's. Both sides then submitted a joint proposal in the foundry field to the Dutch Ministry of International Collaboration,



aiming at establishing of an experimental foundry at CMRDI. The generous approval came very fast and in a few months, the modern foundry, that we at CMRDI had been dreaming about was in operation.

The first phase of CMRDI -TNO collaboration was directed towards the technology transfer of a novel technology the vortex process developed by TNO-foundry group to produce the so-called "ductile iron" to the Egyptian Foundry Industry. The joint team travelled all over Egypt to implement that technology in different foundries, located in remote Egyptian areas.

Finally, the technology was acquired by eight foundries producing new components of special importance to the Egyptian industries. The new material, the ductile iron represents nowadays around 40% of the total castings production in the Egyptian foundries. To give an idea about the importance of ductile iron introduction to our foundry

industry, this material has been identified as the most important invention in material science during the 20th century.

In the starting phase, we would use that new facility to conduct our R&D research projects with the industry as well as limited training programs for our Egyptian foundrymen. In the meantime, we used to accept modest orders to produce short series of spare parts castings to meet demands of different sectors of our industry. In some cases, one locally cast expensive component could save a very expensive machinery from being scrapped as it could have been impossible to secure that component from the original supplier, who already stopped the production of the same model.

During the next years, and due to the remarkable success of the experimental foundry project, both CMRDI and TNO started other side projects to support the experimental foundry. A modern CNC machining and metal cutting unit as well as centers for tribological and spectrometry measurements were annexed to the foundry, so that to complete the chain of metal casting, machining and quality control.

Year after year the new foundry facility turned to be one of the main suppliers of spare parts needed for the different sectors of the Egyptian economy; engineering, agricultural, metallurgical, railways industries as import replacement. Moreover, the training activities expanded to cover the foundry industry in most of the Arab countries. One of the first programs was conducted by the request of the Dutch Ministry

of International Collaboration to train the technical staff of the Khartoum Central Foundry (KCF) in Sudan, which was established in the frame of the technical assistance of the Netherlands to Sudan. The engineers and technicians of KCF worked with us at CMRDI for almost two years and that was our first experience with North-South-South collaboration in the history of the African foundry industry. Later, a joint team of CMRDI and TNO started a training tour to some selected foundries in Kenya and Zimbabwe.

As success breeds success, collaboration of CMRDI with RTOs from other European countries in other foundry related fields continued under the umbrella of WAITRO. CMRDI together with MEFOS (nowadays SWERIM) worked together in projects aiming at implementing the water-cooled panels to the arc furnaces in different Egyptian steel plants to enhance both productivity and quality. Both sides later collaborated to transfer the Swedish experience in designing and manufacturing air cleaning

filters to improve environmental aspects in the Egyptian foundries.

In brief, this was a unique experience conducted under the umbrella of WAITRO, where two WAITRO members from developing and developed countries could join their activities and start projects of vital importance.

Over more than 35 years of very active contribution to the research and industrial communities in Egypt, the experimental foundry at CMRDI has tremendously grown and expanded to be, up to my knowledge, the largest and best equipped experiment foundry all over the world. We have been trying over those years to develop and upgrade the facilities of that foundry, making use of any national or international funding opportunity; the Japanese JICA input is very highly appreciated. However, we shall never forget that any good seed needs a good soil to grow, and the first seed of that project was watered by WAITRO collaboration to grow in the good soil of CMRDI.



Experimental foundry at CMRDI, Egypt

WAITRO COLLABORATION

- Liaquat A. Shah, Trinidad & Tobago

Established in 1970, the Caribbean Industrial Research Institute (CARIRI) was a founding member of WAITRO. Owned by the Government of the Republic of Trinidad and Tobago, it was formed with technical and financial assistance from the United Nations Development Program (UNDP) and the United Nations Industrial Development Organization (UNIDO). The main objectives were to provide technical and industrial services to public and private industrial enterprises, inclusive of engagement in industrial programs. It was clearly intended as a bridge between academia and the private sector.

The majority of the Research and Technological Organizations (RTO's) today are government assisted, operating under a Board of Directors, and, as such, have a degree of dependency on the public sector for their financial support. The challenge in the long run is to earn the confidence of the private sector so that they use the services of the RTO's beyond just routine testing. It is the value-added services which would lead to a greater percentage of the operational costs being earned. This earning capacity is fundamental to the strategic growth of these RTOs as it does equip them with a degree of independence especially toward their policies in serving the private sector. A few of the RTO's who are members of WAITRO have attained

self-sufficiency, through the returns on their Research and Development efforts.

Over the years, technology has been having a significant impact on the nature of competition in the industry. Rapidity of technological change and accessibility are two main militating factors. The need for innovation has been far outstripping even technological capabilities. Effective collaboration has been the key ingredient to acquire technology and/or make innovation happen.

It is against this background that CARIRI, as a relatively small Institute operating in a small island economy (SIDS) with its understanding of the operations of WAITRO commenced on a pathway reaching out to members in order to establish working linkages. In this context the inputs of the Executive and participation at all of the bi-annual congress meetings were of invaluable assistance. This, strictly speaking, commenced some fifteen (15) years ago.

At the core of this approach were the following strategic considerations:

- Pertinent resources are finite in relation to Small Island Developing States (SIDS). It is virtually impossible to be on par with technological advances even some of the simplest. Linkages with other Institutions can provide a basis for non-duplication of efforts, re-inventing the



wheel, rapid acquisition of methodologies and optimal usage of these resources, etc.

- Public Private Partnerships (PPPs) involving RTOs and SMEs can boost the innovation potential of the latter and assist with accessing finances both locally and internationally for start-ups combining human resources from both public and private sector. In this context, RTOs are considered to be Public sector.

A basic minimum technological infrastructure is required in RTOs and linkages with other RTOs can lead to expeditious growth of capabilities. The requesting RTO must have access to some level of funding in order to be in a position to negotiate operational agreements beyond Memoranda of Understanding. Long term sustainable growth can only be achieved in conditions of continuous innovation which means that the creation of

products and services must be part of the developmental matrix.

Implementation is the key. If only to demonstrate achievements and encourage public/private support.

This paper summarises a Journey in Collaboration amongst select WAITRO members. Funding was mainly provided by CARIRI with some reduction in fee structures by individual partnering Institutes and later on, International agencies. The main examples include:

Capacity building laboratory infrastructure:

- Sri Ram Institute (SRI), India: Eighteen (18) Members of staff trained in Chemistry, Microbiology, Materials Technology, Select Method development, Quality Accreditation: Ten (10) year period. Assisted in fast forwarding acquisition of services required by private sector and building staff confidence.
- Central Metallurgical and Research Development Institute (CMRDI), Egypt: Two (2) persons in

Metallurgical analyses and new technologies facilitating the design of laboratory infrastructure.

- National Metallurgical Laboratory, (NML), India: Knowledge sharing by mechanisms which involved reaching operational agreements with both well- defined financial and technical objectives. CARIRI offered expanded services with the arrangements with the more experienced staff of NML. Additionally, the equipment required was finalised, thereby optimising the acquisition of key laboratory equipment. Research efforts between NML and CARIRI capacity building is still in progress. One (1) patent is presently being processed.

Capacity building/ technology transfer/ program development

- Biotechnology and Nuclear Agricultural Research Institute (BNARI), Ghana: Mushroom Cultivation and Establishment of network of small producers. Supply of microbial spores for transfer to Trinidad environment.
- National Food Technology

Research Centre (NFTRC), Botswana: Transfer of food processing know how and specialized machinery from CARIRI to NFTRC.

- SIRIM BERHAD (SIRIM), Malaysia: (over a ten-year period)
 - Plastics – Overall survey and outline of program for deepening the plastics conversion industry. Report led to the minimization of further investments in laboratory at CARIRI. (Two staff from SIRIM were involved in this exercise).
 - Environment Overall Survey of National Institutes and Systems and development of a plan for commercialization. This led to the identification and development of several laboratories in CARIRI that is today attracting local, regional and international funds and projects. (Two staff from SIRIM were involved in this exercise)
 - Laboratory methodology in environmental testing of effluents and problem solving and specific methods in Food analysis. (Three persons from CARIRI were involved in this exercise).
 - Approach to



CARIRI-DTI Training course on the Ideas Advisory Programme, 2018-2019

commercialization by SIRIM – (Two persons from CARIRI involved in this exercise).

- Programs on management of RTOs – (Three persons from CARIRI involved in this exercise.)

- Research Centre for Chemistry, Indonesia Institute of Sciences (LIPI), Indonesia: Technology in fermented foods based on soy. Training on process know-how with a view to commercialization. (Two persons from CARIRI in 2014).
- Council for Scientific and Industrial Research (CSIR), South Africa: (over an eight-year period):
 - Essential Oil Technology for specific crops (extraction, agricultural practice, marketing)
 - Mushroom cultivation
 - Asphalt/ Used tyre Application evaluation
 - Innovation infrastructure inclusive of licensing arrangements for the commercialisation of technology developed by research staff of CSIR.
 - Linkage with the Innovation Hub which is established to encourage idea generation, development and Incubation facilities providing an insight into an approach to the infrastructure which can be used.

Commercialisation

A RTO nightmare is usually the challenge of commercialisation. Pre-commercial partnerships arise in the context of commercialization of R&D output generated by RTOs, whether self-generated or acquired from another RTO. This

is a major challenge largely as a result of the high risk perceived by investors in the absence of the successful demonstration of the technical and commercial feasibility of the new product.

The Centre for Enterprise Development (CED), Trinidad

Arising out of the diverse training and knowledge acquired mainly through the WAITRO collaborative activities over the years, CARIRI developed its CED in 2013. This facility is slated to accommodate a full gamut of activities along the Enterprise creation spectrum from Idea to Market.

Facilities at the Centre include: separate incubation sections for Innovation, Business and Technology generation for SME projects. Additionally, in recognition of the ever-increasing role of ICT within the framework of the Fourth (4th) Industrial Revolution, an ICT Centre forms an integral part of the establishment.

The Danish Technological Institute (DTI), Denmark:

At a bi-annual congress held in Denmark the opportunity was provided to visit DTI where its Ideas Advisory Program (IAS) was demonstrated. DTI had been providing this service in Denmark for the past forty-three (43) years and an arrangement was made to transfer the know how to CARIRI.

A team from CARIRI (twelve persons), with underlying backgrounds and capabilities was trained to exercise this service. This initial phase was undertaken over a two-year period.

Many great ideas are not commercialized because of a disconnect between the ideas, what the market wants and how the product of service is evaluated by the market. The IAS seeks to close this gap by working with potential innovators to assess the facts and assumptions surrounding these ideas.

This IAS program fitted into the core of the functions of the CED and with the help of DTI and other WAITRO members these functions slowly matured.

The DTI/CARIRI program was extended into another, the Innovation Gap Analysis (IGAP). Private sector companies were being reviewed in order to assist them with their innovation generating activities. This program attracted international funding and extended for a three (3) year period. The relationship with DTI is ongoing as this program is customized accordingly.

Collaboration- the way forward:

The efforts at collaboration require the commitment of the Board of Directors, the Organization’s management and staff. Funding in the beginning came from the budgets provided by the government but as the earning capacity increased, funds were generated through PPPs and internationally funded agencies.

WAITRO acted over the years as a catalyst to collaboration but the realisation of the intent came from the mutual agreements mainly between the executives and/or senior members of the Institutes involved. Flexibility in the fee

structures, understanding of currency exchange disparities and allocation of human resources, were among the challenges to be overcome.

The collaborative effort has been most effective at building relationships with common goals, pulling teams together and building confidence in the Institute's staff towards working with the private sector in problem solving.

The private sector can be made through such ventures to experience technology acquisition in a practical and less costly form. Without collaborative and cross disciplinary fertilization, radically new ideas are at times difficult to come by.

This paper provides an insight into the many options that are possible with linkages from both- most developed to less developed Institutes. The list is by no means exhaustive.

Collaboration is today facilitated and generally less costly as our Institutes become more tech- centric and

more "virtual" organizations. Remote teams can be more facilitated and dimensions such as cost structures, licensing arrangements, manpower availability and quality assurance would have to be designed accordingly. In this context WAITRO, programs such as SAIRA can assist tremendously in expediting arrangements being sought.

WAITRO can play a major role in advancing the PPP agenda by establishing a PPP

Resource Database aimed at strengthening the capabilities of member institutions and by extension their relationships with the private sector which must be encouraged to move towards technology acquisition through the RTOs. This provides the basis for the strengthening of diversification efforts of many economies and the channelling of the large private sector funds towards the further development of RTOs.



Signing of MoU between CARIRI and DTI with members of the WAITRO Executive Committee and Secretariat looking on, Shah Alam, Malaysia, 2012

WAITRO ON MY MIND

– Prof. Dr. Ildar Utiamyshev, Russian Federation

My first acquaintance with WAITRO took place in November 1993 in Sofia. I was Director General of Applied Research Institute in Moscow. Our group participated in an international conference and consisted of four people: me, my father, the academician Rustam Utiamyshev former head of a leading Soviet research institute for medical engineering and the COMECON Coordination Center, and two of my colleagues. In general, the Russian delegation was quite representative. That time was quite a dramatic period of development for Russia. The armed confrontation between the President and the Russian Parliament had recently ended. Society was divided into two irreconcilable camps.

In our presentations, we described the current crisis in the Russian economy, science and industry quite sharply without decoration. Representatives of Western European countries were very wary and critical of our statements, but then, having dropped political propaganda, we found common ground with

all of them. First, participants from the former Soviet Republics and some Eastern European countries united around us. As a final result we all Europeans celebrated the Soviet holiday by singing Russian songs in our room. Prof. Jan van Keymeulen (Belgium) demonstrated good knowledge in Russian folklore.

Later I participated in WAITRO conferences in Delhi (1995) and Cairo (1996). It is worth noting the extraordinary atmosphere of sincerity and openness at all the WAITRO venues.

Two years later in Warsaw (1998) I was elected a member the Executive Committee of the organization responsible for the region of Central and Eastern Europe, including the former Soviet Republics. WAITRO was a good platform for sharing experiences and collaborations at a time of transition and global change around the world. I can say, a training school. During my time on the WAITRO Executive Committee, I was able to attract more than 20 RTO's from Russia, Georgia and



Turkmenistan into WAITRO. WAITRO membership was prestigious and respected by my Russian colleagues.

That time I organized national industrial exhibitions abroad, and many WAITRO member RTO's participated in them and indicated their membership in the organization.

As it was expected, due to expansion of the European Union, the region of Eastern and Central Europe has lost its importance. On the other hand, it is actual now to consider the formation of a regional



Participants at the WAITRO General Assembly, Porto Alegre, Brazil, September 2002

structure based on the Eurasian Union. In this way the Russian Academy of Natural Sciences, which brings together more than 1,000 organizations in Russia and representatives of 50 countries, could become such a consolidating center.

I find WAITRO a very unusual society. The informal environment, the absence of political ambitions and prejudices, benevolence and openness of the people you meet in WAITRO have made it an exceptionally attractive club of scientists, specialists, heads of scientific and technological organizations, who have become essentially close comrades. I have developed good business and friendship relations with many of them.

Especially I would like to note the fruitful and active work of Moses Mengu, who was real locomotive and communicator of our organization for many years. Moses is good at the subject, quickly gets to the heart of the matter, gives invaluable advice and provides possible support. With great warmth, I remember the meetings with Adel Nofal. We actively cooperated during the preparation and holding of the Russian National Industrial Fair in Cairo, meetings with Kristian Olesen, Wojciech Lubiewa-Wielezinsky, Eiliv Sødahl in Moscow, Ömer Kaymakcalan,



*WAITRO General Assembly, February 1995, New Delhi, India.
Left: Hans-Georg Lindgren of Sweden, former WAITRO Secretary General 1978 – 1986, Prof. Dr. Ildar Utiamyshev*

always smiling Nirmala Pieris, Eugenia Olguin, Morten Knudsen and many more.

President Bjorn Lundberg had participated in several International forums at the Russian Academy of Sciences. During my activities in WAITRO, I took thousands of photos and shot many hours of video. Looking through them I remember with joy and nostalgia meetings with my colleagues, conversations with them, interesting trips and impressions, return to that interesting period of my life. Some of these materials I have sent to WAITRO secretariat for archiving.

I want to express the desire and hope of reviving and further developing new activities within the framework of WAITRO, establishing new points of

contact and opportunities for fruitful cooperation. The challenges presented by modern reality require to unite the efforts of organizations of all countries for active and decisive action.

First of all, there are new technologies in healthcare, especially in the fight against the global infectious threats, disaster management, ecology, new energy, information technologies, etc.

I warmly congratulate the leadership of WAITRO, all the members and my dear veterans on a significant anniversary. The organization has taken shape, is time-tested and progressively developing.

I wish everyone good health, prosperity and success in your creative activities.

AS I WAS PASSING

– Dr. Rohani Hashim

Life is not about who you know, it's about who you meet. Oh how true this saying is. I have worked with four WAITRO presidents all with different but strong characters with a wealth of knowledge, experience and wisdom. From them, I learned the good [and not so good] side of leadership qualities, tolerance and most important of all the art of diplomacy when the situation gets really “sticky”.

“Ubuntu” as defined by Desmond Tutu means “I am because we are”. Far too often people think of themselves as just individuals separated from one another, whereas we are connected, and what we do affects the whole world. When we do well, it speaks out, it is for the whole humanity.

With this in mind, my team [former Secretariat, Malaysia] and I joined hands with our main project partner ISESCO

headquartered in Rabat, Morocco decided to embark on several community projects in different parts of the world [Malaysia, Egypt, Pakistan, Uganda and Morocco] on economic empowerment projects for poverty reduction. Among these, the most memorable is the women economic empowerment for displaced communities in Egypt. These women are single mothers and young widows. They were left to fend for themselves with no roofs over their heads, living at the mercy of their neighbours but with no financial aid. One should only look into their eyes that constantly brimming with tears hoping for miracles for a better tomorrow. One look into their eyes is enough to pierce your heart with their pain. Those looks are enough to haunt me to cry until today. I hope and pray with what little contribution from WAITRO will



help these women on the road to a better life.

Credit must be given to Agricultural Research Cotton ARC, our WAITRO member in Cairo Egypt for willingly be one of our partners and for the transfer of various technologies [hatching of quail eggs, quail,



*WAITRO
General
Assembly,
Copenhagen,
Denmark,
September
2014*

poultry, goat rearing and cultivation of grass for animal feed with minimal available spaces].

On a happier note, my journey as a Secretary General is a memorable one. Along the way I made many good friends some of whom became part of my family. I have brilliant sons and daughters from almost all over the world who adopted me as their Mom and remain close until today. One of them has bestowed on me the title of the “Mother of WAITRO” that also made me feel quite ancient.

Then, there is also this former Deputy Secretary General, Moses Mengu, diligent, kind, generous and who knows the ins and outs about WAITRO at the very tip of his fingers. If one is looking to bestow the title the “Father of WAITRO”, in my

very humble opinion, look no further because Moses is the one. He is always there when one needs any information on WAITRO.

To all the current and past WAITRO Board members and members of the Global Innovation Family, thank you very much for your prayers,

encouragement and best wishes for my health recovery. Thank you to the current President, HRH Princess Sumaya, Eckart, the Secretary General and others for initiating and sending me a short well-wishes video.

Until we meet again one day.

Rohani

A Poem to Ponder

**If I can stop one heart from breaking
I shall not live in vain
If I can ease one life from aching,
Or help one fainting robin
Unto its nest again,
I shall not leave in vain.**

Emily Dickinson

In Memoriam

It is with great sadness that just as this volume went to press, The Secretariat received news that Dr. Rohani Binti Hashim had passed away in Kuala Lumpur on October 24th 2020. Dr. Rohani was the longest-tenured Secretary General of WAITRO, from 2007 to 2018. She led partnerships between WAITRO and ICESCO, and was particularly known for her focus on poverty alleviation initiatives around the world and her devotion to the cause of global female empowerment. More than the “Mother of WAITRO,” she styled herself as a Malaysian Mother to all young members who participated in the various WAITRO programs and generously gave her personal attention to making all visitors feel at home wherever WAITRO functions were held. Our thoughts and prayers are with her family and her extended WAITRO family. No one personified the term “Global Innovation Family” more than Dr. Rohani. She will be greatly missed and fondly remembered.

ʾinnā li-llāhi wa-ʾinna ʾilayhi rājiʿūn

MY WAITRO STORY

- Aziz Manan, Malaysia



Thank you for this opportunity to convey my congratulations on the occasion of WAITRO's 50th Anniversary in October 2020.

WAITRO has contributed enormously to the development of member organizations in various aspects especially in capacity and capability building. I have good memories of the work in WAITRO. My duties as Secretary General fitted in well with my work schedule as Senior Vice President of SIRIM. WAITRO is a unique association of RTOs that is able to bring together the cooperative and collaborative efforts of members from different parts of the world to successfully implement programs. I attended

meetings, workshops, seminars and networking activities in many countries. I was fortunate to have an efficient team of staff at the Secretariat that worked closely with WAITRO Executive Committee members, Regional Focal Points and Representatives to develop programs and activities to be implemented.

My involvement in WAITRO began in 1998 when I represented SIRIM at the WAITRO General Assembly and Biennial Congress in Warsaw, Poland. SIRIM then indicated its interest to host the Secretariat. With strong support and financial commitment from the Malaysian Government, SIRIM's bid was presented at the WAITRO Executive Committee Meeting in Saskatchewan, Canada. It was accepted and at the 16th General Assembly and Biennial Congress in Porto Alegre, Brazil in 2002, SIRIM was appointed to host the WAITRO Secretariat. The transfer of the Secretariat from DTI, Denmark to SIRIM, Malaysia in 2002 was a significant milestone as it was the first time that the WAITRO Secretariat was to be hosted by an organization in a developing country. Note that in the early days of WAITRO in the 1970s,

the first person to participate under WATRO Training Program was from NISIR (SIRIM). My colleague, a Researcher attended a 5-month course in Industrial Pollution Control in 1974 at B. C. Research, Canada.

In November 2018, I was invited to the 24th WAITRO General Assembly and Biennial Congress in Penang Malaysia. This is the closing chapter the WAITRO Secretariat in SIRIM as it was the last major event organized by it. I was honoured to attend and met some of my friends from overseas. I was impressed with the performance and achievement of the WAITRO Secretariat in SIRIM for 16 years. Well done Peck Sim, Dr Rohani and the team.

In closing, I would like to suggest that an organization will host the WAITRO Secretariat for a period of only 4 years with extension of time only if there are no other bids from other organizations at the end of the period. This will allow more RTOs to get an opportunity to host the Secretariat.

Congratulations WAITRO on 50th Anniversary. Moving forward with momentum.

WAITRO MEMORIES

- Kristian Olesen, Denmark



My personal involvement with WAITRO began in the early 1990ies and lasted for the following decade, encompassing the final period of the secretariat being hosted by Danish Technological Institute, first in Aarhus and then in Taastrup on the outskirts of Copenhagen. From 1996 to 2002 I acted as the association's Secretary General. In fairness, my role was to a large extent to act as a figurehead and provide sparring and support to my deputy Moses Mengu, a prime example of a fiery soul that any ideal organization is so dependent upon. Moses worked tirelessly for the members and managed to achieve a lot with the limited means provided by the membership fees and a rather meagre Danida grant.

African Food Research Network

A fine example of that is the African Food Research Network that was set up and co-ordinated by WAITRO and managed to obtain EU funding

for a string of research projects, expanding into different crops (millet, sorghum, coffee) amongst others and involving RTOs from an increasing number of countries, principally from Western Africa. The projects targeted the fight against dangerous toxins from fungus growth in dried or decaying food items. Toxins that could be passed to humans even through meat and milk from animals being fed contaminated fodder. Here, it is worth noting that success rates in the competitive application rounds are no more than 10 % at the most. Still, Moses managed to get new projects through in practically every application round.

One of my first experiences as Secretary General was to participate with Moses in the audit (by state authorised auditors) of the first EU research project. According to the EU rules, the coordinator should divide the funds amongst the participants according to their respective shares of the budget. The African partners should receive German analytical equipment to enable them to detect the presence of toxins in foodstuffs. Moses knew, however, that if funds were transferred to the RTOs, an automatic exchange to local currency would take place, effectively barring imports of the equipment from Siemens and Bayer. Therefore, WAITRO bought the equipment and shipped it to the recipient RTOs. It worked!

But the auditors told us this was against the rules and warned of consequences. Through a further tense meeting, we managed to convince them that this was the only way the project could have succeeded, and that was stated in their report to the EU. Probably this did not relate directly to later successes with applications, but it certainly did increase WAITRO's standing with the European Commission.

The good practices project

Apart from research and technological cooperation, WAITRO did also engage in learning between RTO managers. The initiative came from Canada where the International Development Research Centre had two dedicated managers, Sitoo Mukherjee and Ravi Maithel, with a strong interest in applied technological research coupled with development of small and medium enterprises and how that could be a significant contributing factor behind sustained growth of developing economies. The basic idea behind the project was to investigate and select the best management practices for maximizing that contribution building on proven experience from all continents.

Further, the Saskatchewan Research Council offered a senior figure, David Grier, with deep knowledge of management processes in RTOs in different parts of the world.

David, another important fiery soul in the history of WAITRO, drove that project to a success in collaboration with DTI from Denmark and NISTADS from India.

A major result of the good practices project was a steeply increased awareness amongst RTO directors of the necessity to survey the actual needs of their industrial target groups as well as engaging in marketing of the business services (such as testing, training, technical problem solving & research) enabled by their research activity.

A new host for the WAITRO Secretariat

By 1996, Danida that had supported the secretariat in Denmark since 1987, indicated that support would not be extended beyond 1997. Still, we decided to submit an application for a further period which was initially rejected. Of course, we tried to appeal the decision and engaged Morten Knudsen, former DTI director general and until recently chairman of Danida's board in the lobbying process.

Time dragged on and by 1998, Danida support was still not forthcoming. The secretariat could survive for 12 months because Moses had wisely saved on the funds from the membership fees and a small income stream from the EU projects was being generated.

Finally, as we had almost lost hope, and prepared for emergency talks with the Executive Committee about the association's future, a Danida grant for 3 years, 1999, 2000, and 2001 came through, with a stipulation that it was to be the absolute final period of support.

A new host should be found.

Moses initiated consultations, and the future of the secretariat was high on the agenda of the 6-monthly meetings of the Executive Committee headed by Ömer Kaymakcalan of Turkey. Three candidates emerged: Fraunhofer of Germany, CSIR of South Africa and Sirim Berhad of Malaysia.

In particular, I remember a visit that Moses and I paid to Fraunhofer HQ in Munich in late 2000. The principal RTO in

Europe had unfortunately for some years been at the fringes of WAITRO. The meetings went very well, however, as Fraunhofer was in the process of increasing its engagement in north-south collaboration. The Fraunhofer management agreed that support for running the WAITRO secretariat should be sought from the German government.

Unfortunately, the efforts were not successful, and Fraunhofer ultimately declined to become the new host. Still, I believe that these efforts helped towards reactivating a most resourceful RTO in the WAITRO family which has benefitted many members all over the world and raised the association's standing with important decision-makers and donors.

CSIR was already being funded by the government of South Africa to act as WAITRO Regional Focal Point. The RFP was being led by an enthusiastic Berenice Lue Marais, another fiery soul that helped carry WAITRO through the times I was involved with the association. An application for funds for the global secretariat was launched, but ultimately the effort was unsuccessful.

SIRIM Berhad of Malaysia had been active in various WAITRO activities and hosted seminars on e.g. ISO 9000 and laboratory management. Personally, I had the pleasure of visiting the institution located just outside of Kuala Lumpur in connection with a meeting of the WAITRO Executive Committee. To me it was clear that SIRIM with significant efforts in implementing ISO 9000 in the country, its world class accredited laboratories and



Visit to Moscow, June 1999

industrial research programs, was a perfect role model for RTOs in developing and emerging economies. And also for more than a few of us in the so-called developed world.

Therefore, the agreement of SIRIM to take over the secretariat, stands out as an all-important WAITRO success, demonstrating that RTOs need not only look to Europe and North America for inspiration. South-south networks and collaboration have undoubtedly received a huge boost from SIRIM's long period as a host that has now come to an end

and Fraunhofer has – finally – taken over.

Conclusion

In conclusion, I would suggest that WAITRO in connection with its 50th anniversary celebration, recognises the critical contributions to the association's success from 4 key persons through the period I was involved: Ömer Kaymakçalan, Berenice Lue Marais, David Grier and Moses Mengu.

I am certain that other significant contributors before

and after my time, now rather exactly in the middle of the 50 years' period, equally deserve recognition. Such as past president Hollis Charles of Trinidad who was with WAITRO almost from the beginning. As one of the group of "wise men", he, together with the 3 others, Rustam Lalkaka, Eiliv Sødahl, and Morten Knudsen, that are unfortunately not amongst us any more, provided important support to the secretariat and Executive Committee in the delicate deliberations about the future location of the secretariat 20 years ago.

WAITRO EXPERIENCES

- Roger Short, UK/Italy

I was Secretary General of WAITRO from 1988 until early 1991 when I took a sabbatical from the Danish Technological Institute to work for the International Labour Organization (UN) in Geneva. Without a doubt, this was one of the most exciting periods of my varied career. Naturally, this had not been my first contact with WAITRO. Still, I will focus on some of the factors that influenced my approach during the period as Secretary General.

When the Jutland Technological Institute (JTI) took over the WAITRO secretariat in 1987, during its first year at JTI, I was not directly involved with the running of the Secretariat but intuitively, I understood the Organization was riding troubled waters: the running costs of the Secretariat depended on the goodwill of the host organization; due to the financial constraints faced by many institutes, particularly in developing countries, there were difficulties in paying the annual membership fees; bilateral donors were only interested in funding activities as opposed to the Secretariat per se; the option of multi-bilateral funding cooperation between Denmark and UNIDO still remained elusive despite earlier efforts by Danish industry to forge collaboration with the Organization; the SME client group of WAITRO's members were not aware of the potential role the Organization could play in their internationalisation efforts; and

WAITRO had an image problem within its Member institutions, in that it was perceived as no more than a globe-trotting club for its directors. A further potential issue was the interface between WAITRO's interests and those of institute hosting the Secretariat.

During this period, JTI's work in electronic communication (testing email and computer conferencing) and video conferencing. These experiences inspired me to prepare two short papers for the 1988 WAITRO Conference in Trinidad and Tobago. The papers outlined the potential for linking WAITRO members. They formed the basis for the direction I took during my term as Secretary General supported with enthusiasm by the then President, Hollis Charles.

After a few months into my tenure, the concept of the Global Technology Park (GTP) evolved (I still have a copy of the brochure and the project document). GTP would link Member institutes via computer conferencing, (three years before the arrival of the Internet). And video conferencing/TV channel (if one translates to the media of today, a WAITRO YouTube channel). These would be accessible to Members and their client groups in the broadest sense. Hollis Charles and I undertook visits to several UN organizations. Some looked at us blankly as if we had arrived from another planet! Remember



at the time many were still using telex and the telefax had only just arrived. UNESCO had been extremely receptive to the idea. The Soviet Union had recently offered access to their low-level satellite technology for distance-learning. However, the USA and the UK blocked the opportunity. The idea was too premature.

The other areas explored were:

- the possibility of a multi-donor/private sector trust fund that would be managed by the Secretariat;
- an independent "home" for the Secretariat;
- and most importantly, the idea of thematic focal points distributed between Member institutions.

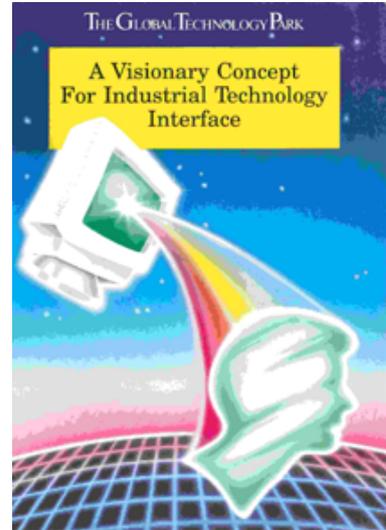
The first of focal points were adopted in 1990 by the Executive Committee at the Biennial WAITRO Conference in Arusha. The Committee also adopted the GTP concept as a priority area for the

Organization.

I did not return to Denmark after my sabbatical. After leaving the ILO, I started to work for the European Commission as a programming consultant for their assistance to the Soviet Union and then as Team Leader for the social impact of closing Chernobyl Nuclear Power Plant under the auspices of the G7 Nuclear Safety Working Group. WAITRO has always been in the back of my mind. I have attended the occasional conferences and

when I had the opportunity to encourage an Italian technology agency to join. Unfortunately, shortly after a merger of institutions occurred. I am working on bringing them back into the fold!

WAITRO has undoubtedly come a long way since my period as Secretary General. I want to thank Hollis Charles and the ever-resourceful Moses Mengu for contributing to the thoroughly enjoyable experience.



*The Global Technology Park
– An idea ahead of its time?*



WAITRO TODAY

ADAPTING TO CHANGING TIMES: REFOCUSING WAITRO

At the Strategic Meeting in Langkawi, Malaysia from 20–24th of July 2018 the direction of WAITRO for the future was reflected on. Especially with more pressing global challenges affecting everybody around the world, WAITRO’s role in the strive towards more sustainability was discussed. This is mirrored in a refocusing of WAITRO’s core values, vision, mission and objectives and the establishment of the WAITRO Innovation Ecosystem.



Core Values:

Sustainability – Innovation – Collaboration.

Vision:

WAITRO is the leading global network of research and technological organizations that enables transformation for a sustainable future.

Mission:

To facilitate action-oriented science, technology and innovation partnerships among members that contribute to sustainable development

Objectives:

- To facilitate equal and long-term partnerships between members
- To enable the development and the transfer of (sustainable) technologies and know-how
- To strengthen capacities of members in RTO management and technical capabilities in science, technology and innovation
- To contribute to the SDGs

THE WAITRO INNOVATION ECOSYSTEM



The WAITRO Innovation Ecosystem integrates WAITRO’s main programs and services into a seamless offering that should provide benefits and opportunities to the membership. Every two years, the WAITRO Secretariat and Board will decide on a particular topic of global importance, on which to focus the Association’s activities. The topic for the term 2019-2020 was chosen to be water. The main components of the ecosystem are:

SAIRA – The Open Innovation Hub for Sustainable Development

SAIRA is WAITRO’s Open Innovation Hub that

forms the roots of the WAITRO Innovation Ecosystem. SAIRA was developed to facilitate the initiation of cooperation between WAITRO members. Using SAIRA, WAITRO members can upload project ideas and challenges to attract the right partner in order to implement a collaborative research project or jointly apply for funding. Already in 2019, 10 international research project teams were formed on SAIRA, amongst them several EU projects as well as a project on the internationalization of organizations. The impact of a system such as SAIRA will grow exponentially with the number of active users and the size of the WAITRO network, just like the impact of social networking hubs like

Facebook and Twitter grew from curiosities to major international communications networks. The success of this initiative therefore critically depends on the membership using it, publicizing it, and growing it.

The WAITRO Innovation Award

The Innovation Award was reestablished into the WAITRO Innovation Ecosystem with a new focus as the “fruit” of the WAITRO Innovation Ecosystem. The idea of the Innovation Award is to encourage and reward the best partnerships formed between WAITRO members, and also to encourage the use of SAIRA, thereby helping it to scale. From October 2019 until May 31st 2020 WAITRO members were encouraged to upload their water-related challenges on SAIRA or apply to Challenges already posted by other members to form project teams that could ultimately apply for the Innovation Award on the WAITRO Intranet. The Secretariat allocated 50,000 USD to be shared by two winning teams. A scientific advisory board was formed to evaluate the proposals, chaired by Will Sarni. A round of interviews will be conducted by the Scientific Advisory Board who will choose the finalists that the WAITRO Secretariat will invite to the Global Innovation Summit to pitch their idea, after which the audience of WAITRO members will be able to vote for two winning project teams that will be awarded 25,000 USD each to fund early-stage development of their project.

Capacity Development

The new Secretariat continues to uphold WAITRO’s Capacity Development as an integral part of the Association’s work. In July, 2019 the Secretariat held a strategic workshop for the newly elected Regional Focal Points (RFPs) as well as the Board. During that workshop a needs assessment survey was developed that was later on shared by the RFPs in their perspective region. The RFPs evaluated the results during the Board and RFP Meeting in Botswana in November 2019. Based on the results of the evaluation, the RFPs, together with the Board, decided that the topic for the 2020 Capacity Development Workshops will be: Strengthening international collaborations within the HORIZON framework.

In addition to subject-specific training in response to members’ needs, the new Secretariat will continue to expand the Capacity

Development Program by developing a new concept in which parts of the Program serve as nutrients to grow the WAITRO Innovation Ecosystem. Chosen project teams formed using SAIRA, in the focus area chosen by the Board, will get to attend project-specific workshops that will help them develop their projects, manage intellectual property and, finally, develop a pitch for funding, to be delivered to the membership and WAITRO partners at the biennial Innovation Summit.

The WAITRO Innovation Summit

The WAITRO Global Innovation Summit is a newly conceived addition that we hope will become the flagship event of the Association. It will be held every two years in conjunction with the WAITRO General Assembly. The WAITRO Global Innovation Summit will always evolve around a focus topic chosen by the Executive Board to best engage and benefit the WAITRO membership; for 2019 and 2020 the focus area was chosen to be water. The first Global Innovation Summit was supposed to take place on December 8th and 9th 2020 in South Africa. Due to the outbreak of Covid-19 it had to be postponed to December 2021. A virtual Summit will be held in October 2020 to celebrate WAITRO’s anniversary, vote for the Innovation Awards and exchange ideas on water-related challenges.

The WAITRO Fellowship

The WAITRO Fellowship Program supports researchers and employees within the WAITRO community to conduct research or other work in a member organization in a different country. The aim is to facilitate knowledge transfer and learn from RTOs around the world. The WAITRO Fellowships are open to researchers or technical staff of WAITRO member RTOs. WAITRO covers part of the cost of the Fellow's stay abroad for 6 to 12 months depending on the membership category of the Fellow’s RTO. Depending on the Fellow’s home organization as well as where they are intending to undergo their Fellowship, WAITRO will adapt its financial support accordingly. There will be at least one round of call for fellowship each year, and the goal is to eventually support 6 to 10 fellows each year. The first WAITRO Fellow has already been approved by the Secretariat, and we look forward to expanding the program as it matures.

INTERVIEW WITH THE SECRETARY-GENERAL DR. ECKART BIERDÜMPEL



What is your history with WAITRO? When and why did you become involved?

In 2004 Dr Polter, at that time member of the Executive Board of Fraunhofer in charge of human resources and legal affairs, told me to attend the biennial meeting in Nairobi and “have a look at WAITRO”. He suggested that I take care of WAITRO on behalf of Fraunhofer,

as I was already involved in different networks, for a long time: e.g. from 1993 to 2011 chair of the Executive Committee of ERCIM, the European Research Consortium for Informatics and Applied Mathematics.

When I arrived at the meeting in Nairobi, I was surprised to be greeted as new RFP (Regional Focal Point) for Europe – obviously, Dr Polter had offered or agreed that Fraunhofer would take that role without even informing me beforehand about it! Thus, I was taken by surprise and got kind of accidentally involved in WAITRO. It was not my own decision, but I had no problem to accept it. Right from the beginning I felt a certain spirit and a positive vibe – so I gladly accepted my new role.

What does WAITRO mean to you?

On the one hand I see WAITRO as a small UN in research terms, on the other hand it is even more than the UN: not one country one member, but ALL organizations involved in research or development can become a member. So for me it is the real global innovation family – the slogan, which was created by the previous secretariat and which describes WAITRO very nicely.

Are there benefits of being a member of WAITRO, which might not be immediately obvious?

We all come from different cultures and backgrounds, speak different mother tongues, but sharing time together creates a solid basis and paves the path to work better together.

There might be different opinions and views, but working together and enjoying time together also broadens the individual horizon. It simply leads to a better understanding of each other, of different cultures and helps to see many things from different perspectives.

The combination of both, working and enjoying leisure time together, that is the glue, which is strengthening the ties between people, what makes them understand each other and generally opens their minds. This intercultural or cross-cultural understanding is one hidden, but very important side-benefit of WAITRO, which is often not seen or underrated.

What are some of your fondest memories of WAITRO events?

There are many. For example my second biennial conference, which took place in Saskatoon, Canada in 2006. We had a long day at the conference with some interesting discussions and presentations. After the official dinner with a local show we found ourselves very late in the bus back from the venue to the hotel. A bus, which is normally used for public transport: so not all in rows of two one after the other, but mixed: some were standing, others were sitting. Thanks to the open set-up, people were not half asleep from the long day or each by themselves, as it is usual at transfers back to the hotel after a long day. Just the opposite: people from Latin America, Africa, Asia and

Europe – from all continents were in the bus, you couldn't notice any difference, and all were very much awake. There were very good vibes in the air. A lively discussion quickly turned into a first joke and stand-up performance, followed by many others and resulted in a lot of laughing together. Although it was quite a long bus drive back to the hotel, time just flew by. At the end, we hardly wanted to leave the bus, we had so much fun altogether.

How did the Association change over the years?

Generally speaking, we are living in different times than 50 years ago. And I guess that WAITRO changed accordingly. Technology and innovation are even more important than back then, so being a member of WAITRO and working together is even more important than ever. Communication channels changed, too. Back in the 70s there was no internet, not even a fax machine in wider use. In contrast to these early times, today, with our new tool SAIRA, the open innovation hub, we now offer all members the opportunity to work together – independent of their location and on a daily basis if they want to. No need to wait for a biennial event every two years: one can find partners for example for new project ideas in other member organizations 24//7! Yes, I think there has been a big change lately – welcome to the digital age!

What makes WAITRO unique?

The vision already 50 (!) years ago to build a global community based on research and innovation. Not determined by politics, but by research and

results. And in spite of all the communication challenges you had at that time (mainly relying on letters and expensive phone calls).

For the first time in history of WAITRO there are two WAITRO offices. How does this affect the governance of the Association?

At first, I was a little worried, whether that would work: me having one office in Germany and another one in China – with two different teams. I can imagine that it would not have worked 50 years ago. But by meeting a couple of times at WAITRO events and having a joint team event, we built a team, whose members have a good understanding of and trust in each other. And thanks to modern communication technologies with frequent online meetings that is almost no issue at all. Many people discovered this thanks to COVID-19 lately.

What is the relevance of RTOs to current societal challenges, and what role can it play in the context of sustainable development?

I already mentioned that nowadays technology and innovation are more important than ever. So it is clear that RTOs are more relevant as well. And the often cited synergy effects can be achieved by working together, best on a global scale – WAITRO is the best basis to do so! And for that purpose it is important for the future that WAITRO will grow significantly. In order to strengthen the existing basis further.

In my opinion, RTOs working together with their combined knowledge and know-how can

play a pivotal role in supporting the SDGs. That is also the reason, why in its vision WAITRO describes itself as global network that “enables transformation for a sustainable future”, its mission says “to facilitate action-oriented science, technology and innovation partnerships among members that contribute to sustainable development” and one of the objectives is explicitly “to contribute to the SDGs”. And that is also the reason, why in our Innovation Summit we want to concentrate on a topic which is relevant for the SDGs.

Recently, SAIRA – the Open Innovation Hub for Sustainable Development was established to connect WAITRO members online. Are digital solutions the way to move the Association forward?

Yes, absolutely! We can't promote and support the SDGs and at the same time fly around the globe more and more often in order to meet each other in order to plan, prepare and do work together.

Of course, it is important to meet once in a while to get to know each other, build our network, see each other face to face and renew bonds, but it doesn't have to be exaggerated. Nowadays, we do have good digital solutions for online meetings and SAIRA is the solution of choice for WAITRO to work together. As I mentioned earlier: one can find partners for example for new project ideas in other member organizations of WAITRO 24//7! Instead of perhaps 10 travels, which are time-consuming and the emissions created as a side-effect, two personal meetings might be sufficient. The rest can be done with digital solutions.

MEMBER'S CORNER

WAITRO is made up of its members. For the celebration of 50 years of WAITRO we do not only want to look back at everything that shaped the Association but also lend a voice to the individuals that are active in WAITRO now. They share their motivations, experiences and ideas for the future.



WAITRO members coming together online for Global Day of Solidarity, May 2020

Africa



Joanita Orishaba, UIRI, Uganda

What was your first impression of WAITRO?

My first impression of WAITRO was great. I felt really honored and privileged to be part of this family of great minds and pure genius. There was a lot to marvel at and be amazed by.

What was your most memorable experience with WAITRO?

The most memorable experience for me was in November 2012 at the 21st WAITRO Biennial Congress in New Delhi, and also my first contact with WAITRO. The Chief Guest was Prof. A.P Abdul Kalam (RIP), world renowned scientist and former president of India. His address, his demeanor, his composure

all had me captivated. The hosts were pleasant and the participants suave. As a young scientist, I was awestruck! This was a very grand welcome into the WAITRO family and exactly what I would have wished for. I live to remember it.

What are the benefits of WAITRO membership for your organization and individual staff?

For the organization, WAITRO provides a platform for co-operation with other RTOs. It also improves the international visibility of organizations. For individuals, WAITRO is a great networking forum and presents unmatched growth opportunities for staff through the various capacity



development and fellowship programs.

What are your expectations and hopes for the future?

I want to see a WAITRO where young voices are represented in the top management of the organization. It's refreshing and energizing to see the secretariat



With former Secretary-General Dr. Rohani Hashim in Malaysia, 2019



Cultural Visit to the Taj Mahal during the WAITRO Biennial Congress, 2012

being run by young agile persons with fresh ideas and I would love to see this cascade to the top! I also expect revolutionary results from the SAIRA initiative.

How can WAITRO best impact the world?

WAITRO is already impacting the

world. Keep doing what you do. The impact can, however, be strengthened by forming strategic alliances with Governments, UN Agencies and International Development Agencies (e.g. DANIDA, NORAD, SIDA, USAID, JICA, IDRC)

What could WAITRO do to better benefit for your region?

While certain problems are global, different regions will prioritize them differently. As such, it might be helpful to categorise the core problems of the different regions so that topics for the challenges /open calls capture pertinent issues for a region (at least once over a specific period, say 2 years).

Felix Adigwe, RMRDC, Nigeria

What was your first impression of WAITRO?

My first impression of WAITRO was that of excitement and anticipation of a mutually beneficial relationship between the Association and my organization (Raw Materials Research and Development Council, RMRDC, Abuja, Nigeria).

What was your most memorable experience with WAITRO?

My participation in WAITRO Management Program (WMP) in 2015 in Shah Alam, Selangor, Malaysia.

What are the benefits of WAITRO membership for your organization and individual staff?

Participation in WAITRO capacity building programs and the Association's sponsorship/ collaboration.

What are your expectations and hopes for the future?

Consolidation of the Association's gains and breaking

of new frontiers.

How can WAITRO best impact the world?

Turning out programs and projects relevant to the new normal.

What could WAITRO do to better benefit for your region?

Opportunity for increased participation in WAITRO capacity building programs and sponsorship.



At the WAITRO Biennial Congress, Denmark, 2014

Europe



Marianne Jessing, DTI, Denmark

What was your first impression of WAITRO?

I first got to know and to work with WAITRO when the Secretariat was moved from DTI in Aarhus to the DTI Taastrup campus where I was employed. My colleagues at the time were the late Prof. Morten Knudsen, former Director of DTI who served for a short period as WAITRO Secretary General before handing over to Mr. Kristian Olesen. I also worked very closely with Mr. Moses Mengu, who was directly responsible to the WAITRO office. I was involved in and participated in most WAITRO activities from 1995 until the Secretariat was transferred to Malaysia in 2003. All through my links with WAITRO, I have been impressed by how diverse institutions and individuals from all over the world share common problems and how beneficial it is for them to exchange and share experiences. I have also been impressed by the spirit of belonging that its members feel when they get to know the Association well and participate actively in its activities.

What was your most memorable experience with WAITRO?

There are many moments and meetings that spring to mind but I can't get away from the World Congress in 2014 hosted by DTI in Denmark. I got to meet

many of the representatives from Institutes that I had been in contact with by phone or email, and I think the personal meetings created another dimension to collaboration. The Congress aside, it is always a pleasure and enriching to meet the various delegations that come to DTI or when visiting other member Institutes. You feel welcome, and the mindset is similar.

What are the benefits of WAITRO membership for your organization and individual staff?

Through WAITRO DTI is in contact with Institutions around the world. Solutions to identical problems are not always the same but you get inspired to see facets that you otherwise might not have thought of, and your ideas and solutions will be based on a broader foundation. As staff it is always inspiring to meet and discuss with people that work in the same field as you. Another benefit is also the easy access to potential partners when applying for international projects. You have a fair idea about the strengths of other members, which makes it easy to map a preferred Consortium for the various projects.

What are your expectations and hopes for the future?

The WAITRO members being



local beacons of knowledge are key to assisting their various societies in ensuring a future with clean water and food for all and sustainable industrial development and innovation to mention a few of the UN Sustainable Development Goals. I hope that through our joint efforts, at least, in my lifetime, WAITRO and its members will be able to make a noticeable impact to solving the grand global challenges.

How can WAITRO best impact the world?

As an organization WAITRO should create the fora (physical and/or virtual) that can further information sharing and collaboration among the partners. An important part is also to drive benchmarking and best practice processes and training for the members. In addition, WAITRO can serve as the voice for influencing policies and programs that affect the

global RTO community.

What could WAITRO do to better benefit for your region?

I am satisfied with the activities in Europe. WAITRO should continue building bridges between European RTOs, and to

serve as the platform for North-South collaboration.

Jorge Saludes, AINIA, Spain

What was your first impression of WAITRO?

Very interesting organization, with good worldwide coverage and very heterogeneous partners, that creates new opportunities of cooperation

What was your most memorable experience with WAITRO?

We are newcomers (less than one year) but the agility and proactivity of the German secretariat and of the Spanish focal point are really remarkable.

What are the benefits of WAITRO membership for your organization and individual staff?

This is the worst year in many senses, but we expect to rise projects and alliances through the networking possibilities given of being member.

What are your expectations and hopes for the future?

Definitely, the increase of the networking, the creation of new opportunities of project and good visibility for our center as well.

How can WAITRO best impact the world?

The networking actions and visibility are the key for the facilitation of outcomes.

What could WAITRO do to better benefit for your region?

The creation of platforms like Green Deal, with the matchmaking events and other activities, is the most reliable and productive effort by now.



Latin America



Francisco Javier Serna Alzate, CIDET, Colombia

What was your first impression of WAITRO?

A large and well organized network to exchange knowledge with researchers all around the world.

What was your most memorable experience with WAITRO?

I was lucky to take part in the Capacity Building Program 2019 in Shah Ahlam, Malaysia. It was a wonderful experience, not only for the huge amount of knowledge and tools that we received to manage our RTO, but for the fact that I was in the same room with so many people from all around the world, listening to them, learning from their problems, experiences and solutions, and also making new friends.

What are the benefits of WAITRO membership for your organization and individual staff?

I think the most important benefit right now is the

possibility of participate in grants, in collaboration with other WAITRO members.

What are your expectations and hopes for the future?

I would like to see more exchange programs for researchers, in order to compare the problems and experiences from different RTOs and find together better solutions for business issues. I also would like to have more access to funding for projects with WAITRO members.

How can WAITRO best impact the world?

Maybe the capacity building programs could have an "Editon for non-members", in which WAITRO could deliver knowledge for certain companies or population groups, in order to strengthen the capabilities in different sectors of different countries. For example, here in Colombia we could check the "Public Development Plan" from de

government, and prioritize some points in which WAITRO members could help with tools, methodologies, etc. then we could perform a capacity building program for such necessities (maybe paid by the local government). We could do similar things in other countries.

What could WAITRO do to better benefit for your region?

Maybe the research collaboration could focus on areas such as sustainable renewable energy deployment, strengthening of health infrastructure capacities, and building a culture against corruption.

Dr. Eugenia J. Olguín, Institute of Ecology (INECOL), México

What was your first impression of WAITRO?

My first encounter with WAITRO was in 1982 during the celebration of an International Symposium in conjunction with the 6th Biennial General Assembly held at San Felipe Yaracuy, Venezuela. My first impression was that WAITRO was a very interesting and well-structured organization that could provide me with several contacts throughout the world. I could learn a lot from the members of the various RTOs that I met at that time.

What was your most memorable experience with WAITRO?

Difficult to say, since I had several memorable experiences. One of them was to be able to organize with the support of WAITRO, INECOL and the International Centre for Cleaner Technologies and Sustainable Development (CITELDES), the “3rd International Symposium on Cleaner Bioprocesses and Sustainable Development” at the city of Veracruz in June 1998. Due to the success of this event, the “4th International Symposium on Cleaner Bioprocesses and Sustainable Development” together with the “6th International Symposium of Environmental Biotechnology”, was organized in conjunction with the International Society of Environmental Biotechnology (ISEB), CITELDES and CONACYT at the city of Veracruz in June 2002. Such events gave me the opportunity to meet

around 300 participants from several RTO’s, Universities, and companies. The interchange of technological information was huge and very beneficial.

What are the benefits of WAITRO membership for your organization and individual staff?

There are several benefits. One of them is to meet members from RTOs located in very different regions of the world and learn from their different capacities, abilities, and organization. Another important benefit is to be able to receive capacitation for applying to calls from international funding organizations with some possibility to obtain research funds which are badly needed nowadays in México.

What are your expectations and hopes for the future?

My main expectation and hope are to win the WAITRO Innovation Award at the end of October during the General Assembly to celebrate the 50th Anniversary.

How can WAITRO best impact the world?

Launching a global Program including calls for financing research projects and capacity building. Actions to mitigate global warming, Covid 19-pandemic and water pollution could greatly impact all regions.

What could WAITRO do to



better benefit for your region?

At the current moment, I have not met the Regional Representative and I only had a short virtual meeting with the RFP. However, no further actions were taken. Thus, I am not familiar with any regional action. I am only aware of the various programs and opportunities that are launched from the Secretariat, which have drawn my attention and I have applied for two of them: a) Innovation Award and b) Capacity Building for preparation of proposals for the European Union.



Asia & the Pacific

Pimprapai Supornrat, TISTR, Thailand

What was your first impression of WAITRO?

It was 10 years ago, and I thought what the WAITRO is.

After that, I saw many TISTR persons got opportunity to participate various WAITRO courses of development per year not only in technical R&D field but also RTO management.

What was your most memorable experience with WAITRO?

It was when I participated the WAITRO Management Program (WMP) 2015 in Shah Alam. It was my memorable 1 week in Malaysia to learn and share ideas and life style with the team of former WAITRO Secretariat namely Dr. Rohani, Mr. Zulkefli, Mr. Nesrul, Ms. Kay Niza, Ms. Ruzana and many from their team, including I

got the new friends who were participants from other RTO members of that time Board members and RFPs. Dominik, the current head of WAITRO Office Germany was one of them. The WMP provided me to know better on WAITRO working functions, their expectations and how should we support them.

Thereafter in the next year, my second most memorable experience was when TISTR hosted the WAITRO-ISESCO-TISTR Training Program on Product Upgrading and Value Creation for SMEs and Micro-enterprises in 2016. That was the time I really worked and coordinated with WAITRO since budget, payment transfer, application and selection, logistic, and program to make the course run smoothly. The program was 2 weeks to bond



friendship, and a lot of learning during the 6 months before for the course preparation. That was such a valuable experience for me.

What are the benefits of WAITRO membership for your organization and individual staff?

WAITRO is a window to the world.

Basically, individual staff will have opportunity to enhance their technical knowledge and skills according to WAITRO capacity development courses. Especially in these recently years, WAITRO is providing more channel like SAIRA or multimedia channels to connect your organization with the network of collaboration, or opportunity to join part of funding source proposal like Horizon 2020.



At the Workshop on Horizon 2020, Germany, 2019

What are your expectations and hopes for the future?

Well realization and recognition on WAITRO from persons/ researchers of RTO members and from others excluding RTO members.

How can WAITRO best impact the world?

Establish to regional or inter-regional projects of global issues

or interests. For examples, sustainable ways to cope with climate emergency, Promote the use of biodegradable plastics and ecotoxicity concern, R&D for circular economy, etc.

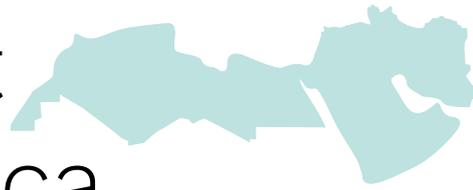
Besides of Board and RFP members, the expert teams or technical knowledge committees should be considered to set up. The committees could help screening the annual projects,

evaluate the impact, or give suggestions to Board, RFP and Secretariat.

What could WAITRO do to better benefit for your region?

The projects of capacity development, increase recognition, or technology transfer on bio-based, circular, and green technologies should be promoted in Asia and Pacific or across the regions.

Middle East & North Africa



Bahadır Tunaboğlu, TUBITAK, Turkey

What was your first impression of WAITRO?

When I was introduced to WAITRO during the workshop at Tubitak in 2014, I was impressed by the strong global research institutions brought together in a very friendly atmosphere. A lifetime of friendships forms among its members across the globe, that is quite unusual!

What was your most memorable experience with WAITRO?

Having the secretariat transfer from Sirim to a creative joint design of Fraunhofer and Jitri institutions.

What are the benefits of WAITRO membership for your organization and individual staff?

It is the widest and largest set of global research governmental institutions, enabling joint research projects across countries and continents.

What are your expectations and hopes for the future?

Bringing science and technology collaborations of these government institutions into the networks of local industries.

How can WAITRO best impact the world?

Develop joint sustainable solutions by this network to local problems of importance that will have global impact to societies.

What could WAITRO do to better benefit for your region?

Pull together local companies, universities and the research institutions to address local capacity buildup and help regional economic growth through relevant technology and industrial development.



Abeer Arafat, RSS, Jordan

What was your first impression of WAITRO?

I was following WAITRO activities since 2006, and made sure that my colleagues know about the opportunities offered by the Secretariat. But my first impression was in 2013 when I met the board in person and found how important is to be with this global community.

What was your most memorable experience with WAITRO?

All meetings, workshops and conferences I attended and participated in are memorable. Each event had a special

influence in my life and career.

What are the benefits of WAITRO membership for your organization and individual staff?

WAITRO offers members from all contents around the world, and this can help in forming consortiums for many projects.

What are your expectations and hopes for the future?

I hope the Royal Scientific Society (RSS) wins a grant and in cooperation with the reputable RTO members of WAITRO, to learn and transfer

technologies to Jordan.

How can WAITRO best impact the world?

The cooperation between most countries in projects of influence to the Glob will help in supporting world decisions and for the benefit of the humanity.

What could WAITRO do to better benefit for your region?

Special capacity development programs with focus on Regional challenges to encourage region collaboration in projects, and to increase memberships.



THE WAY FORWARD

21ST CENTURY WAITRO: QUO VADIS?

Paul E. Burrows,¹

*Vice President, Jiangsu Industrial Technology Research Institute (JITRI).
Head of China Office, WAITRO Secretariat.*



So WAITRO has reached the age of 50, which used to sound quite old until I passed that milestone myself some years ago. I was asked to contribute some thoughts on what the next 50 years might hold. This is risky because, despite my unfortunate status as “older than WAITRO,” I remain a relative newcomer to the Association. It is easy to imagine the Ghosts-of-Presidents-Past materializing to reprimand my limited vision and mistaken assumptions. And as Yogi Berra famously said, “Prediction is very difficult... especially about the future.”

I hope that the fundamental focus of WAITRO will not change. It was created to serve research technology organizations (RTOs), to facilitate them working together to solve problems, and to help them produce their best possible work. The WAITRO mission is even more valuable now than it was in 1970 because the pace of change

is so much faster and the stakes to achieve sustainability so much higher. While celebrating WAITRO’s many achievements, however, it is worth considering how to make it even better. So with the important caveat that this is my personal view, here are four trends that may change how we achieve WAITRO’s goals in the next 50 years.

The idea of WAITRO was birthed by the United Nations Industrial Development Organization (UNIDO) at the “Athens Meeting” in 1967, just one year after UNIDO itself came into being. The initial UNIDO focus on promoting and accelerating the industrialization of developing countries quickly led to a realization that to effectively do this required an association not of countries but of organizations. In helping to put together the program for WAITRO://50, I have been struck by the high regard for WAITRO shown by all those who have been closely involved with it. I think this fondness, and its positive impact, stems directly from WAITRO’s membership being of RTOs rather than countries. While countries often find reasons to disagree, at the RTO-level one overwhelmingly finds people who just want to work together to solve problems. And this is the WAITRO spirit: working together regardless of global politics. Lose that, and you lose everything.

While industrial research in the 1960s was concentrated in the northern hemisphere, UNIDO had the foresight to specifically recommend (in the WAITRO founding document) that, in addition to international collaboration, the new Association should promote “...regional and interregional co-operation and co-ordination of activities...” The first highlighted trend is that the importance of that regional co-operation has grown, and I think it will continue to do so.

¹. With acknowledgements and thanks to the WAITRO leadership team who helped these ideas develop in extended, amicable discussions, even while not agreeing with all of them; especially Dominik, Eckart, David, Moses, Ruben, Bahadir and Dirk.

In the decade prior to the Athens Meeting, a surge of new states (41 had gained independence from the United Kingdom and France alone) had poorly-developed industrial bases. This is no longer the case. I have recently visited RTOs in Asia, Africa, and Central America; areas that would previously have been considered “developing.” I have consistently found not only international-quality research, but unique and innovative ideas. Many such ideas use local materials to solve local problems. In the next 50 years, it is as likely that industrial research challenges will find solutions in regional capacity as in the traditional northern hemisphere industrial base. The flow of expertise will no longer be from north to south, and WAITRO likewise needs to be a multi-directional network in the modern vein. WAITRO’s regional focal points (RFPs) will consequently become increasingly important. Our mechanisms for managing them may need to evolve to best integrate their expanding function.

I feel that WAITRO itself was born far ahead of its time because it was born as a network of RTOs, long before the internet connectivity revolution of the 1990s made networks ubiquitous. The value of a network, however, depends on its size, an idea now enshrined in Metcalfe’s Law². The legacy, tiered membership fees of WAITRO are holding back potential growth in membership. Achieving sustainability for WAITRO itself requires new thinking about how we finance the value that we create.

Indeed, the second trend concerns how we engage members and recognize value. The true value of WAITRO is not a “good” that we can create and sell to our RTO members; it lies in the network that these members themselves create! Our job in the Secretariat is to curate that network and optimize its effectiveness. There are multiple highly successful models for how to operate in this 21st century environment: Facebook, LinkedIn, Instagram, to name but a few. In the case of Facebook, annual revenues now exceed \$80 billion, but none of these networks charge a membership fee because

they understand that monetization is a result of engagement, rather than the other way around. Getting members to “check out” to pay an annual membership fee represents 20th Century thinking. The network era requires successful enterprises to incentivize their customers to “check in” and create value, and a growing WAITRO is no exception.

To add value and to secure engagement, the nascent SAIRA³ system, led by my Fraunhofer colleague Dominik Reinertz, forms the roots of a new WAITRO Innovation Ecosystem. I hope that SAIRA will become a cooking pot for ideas, in which members can develop new recipes. Associate Membership then offers the potential to bring non-RTO stakeholders (including our industry customers) into the kitchen to look over the cooks’ shoulders at what is going into the pot, and perhaps even to suggest new dishes. Other offerings such as our traditional Capacity Development programs and the new WAITRO Fellowship will add further value by enabling members to teach one another, fill gaps in their expertise, and develop cross-border partnerships.

Industry must become more directly engaged with WAITRO. The UNIDO Founding Document itself specifically highlights a “...need for closer integration of industrial research with industrial development...” and this has only become more compelling because of a third trend: that most RTOs are required to seek increasing portions of their funding from industry and other non-governmental sources. Many organizations worldwide can benefit from engaging with the WAITRO network, including investment funds and incubators that will value an early look at the unique proposals to advance the UN sustainable development goals (SDGs) that culminate in the WAITRO Innovation Award. Finalists for the Award can, in return, thereby benefit from much larger scale investments than WAITRO itself could ever provide. Simultaneously, WAITRO can and should act to validate the importance of RTOs to their respective national governments. A WAITRO certification could act in two ways: to

2. First published by George Gilder as “Metcalfe’s Law and Legacy,” *Forbes* ASAP, 13 September 1993. There are caveats, particularly for large networks (not least the assumption that all nodes have equal value), but it is at least accepted that the value is super-linear, e.g. <https://spectrum.ieee.org/computing/networks/metcalfes-law-is-wrong>, accessed 2020/8/4.

3. www.saira.eco

advocate for RTO funding at the national level as a long-term driver of economic growth and national security, and to assure governments that their research investments are in the hands of organizations capable of efficiently transferring the results into real, local economic growth.

Finally, as a fourth trend, I hope we can learn to work more efficiently. Looking back, we used to spend too much of our lives in airports, airplanes and hotels. The advent of Covid-19 created many problems for cross-border cooperation and for WAITRO events, including the postponement of our much-anticipated first Global Innovation Summit. But like most adversity, it also created opportunities to innovate and we have learned (much to my surprise) that we can organize extremely focused and effective meetings of the WAITRO Executive Board online. We should make this a habit: spend fewer resources flying our leadership around the world, and devote those resources instead to supporting WAITRO members to learn, improve, and cooperate, both in the cloud and in our traditional physical meeting formats. The saved carbon emissions alone will contribute to demonstrating WAITRO's commitment to the SDGs.

Since WAITRO's birth, the global population has more than doubled, sixty five new nations have joined the UN, and the total gross domestic product of my current home (The People's Republic of China) has grown by over 15,000 %. In 1970, it was beyond imagination that JITRI in Nanjing, China could partner with Fraunhofer in Sankt Augustin, Germany to host the WAITRO Secretariat. Indeed JITRI itself, with its model of building an innovation ecosystem via research institutes owned by their technical teams and governed by independent boards of directors, was inconceivable. What technology will look like in 2070, when members gather to celebrate WAITRO's centenary (presumably without me), is similarly beyond imagination. It is reasonable, however, to assume that the pace of change will continue to accelerate. Opportunities for RTOs to work together and for people to cooperate regardless of their cultural, religious or political differences; to learn, teach, and fill one another's weaknesses with their respective strengths, will also grow. WAITRO will be the string that links individual pearls of research excellence around the world into something beautiful and valuable.

Nanjing, October 2020.



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