Published by the WAITRO Secretariat with contributions from the Regional Focal Points.

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WAITRO ANNUAL REPORT 2021

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Executive Summary

Welcome to the WAITRO Annual Report 2021. The Annual Report represents the closest cooperation between the two offices of the WAITRO Secretariat to produce an official report of the WAITRO year for the membership. Input and design come from both the Germany Office and the China Office of the Secretariat, with final production in Nanjing. We hope you find it both interesting and informative.

The Report opens with letters from both the Secretary General and the President of WAITRO, followed by a summary of “WAITRO at a glance” which illustrates the administrative structure and membership in 2021, particularly highlighting new members. A new update to SAIRA is also described.

The year 2021 was again spent entirely under travel restrictions due to the ongoing pandemic, so all of the events reported herein were attended virtually. To make the best of what we could offer, the Secretariat added an additional WAITRO Innovation Award (WIA), essentially bringing forward what would have been part of the 2022 Summit. This culminated in a Finals event, again held virtually but hosted out of the China Office of the Secretariat, which became something of a celebration of WAITRO’ s ideals of cross-border cooperation. The event included appearances by the WIA 2020 winners to report their progress, an invited plenary speaker, pitches by the finalists, and a discussion panel on increasing the impact of WAITRO. A full report on the event forms Chapter 3.

A full report on all the other virtual events follows; capacity development, projects and proposals continued despite our unprecedented inability to meet in person. Finally, you will find a report about our online marketing efforts and the current organizational structure of the Association.

We hope you will find the Annual Report 2021 to be a valuable record of a year in which WAITRO emerged from unprecedented challenges with a growing membership base and a new sense of determination to overcome barriers to solve problems. Most of all, we hope to hear your comments on what was more or less interesting, what was too long or too short, and how we should adjust the format of future Annual Reports.

Letter from the Secretary General

Dear members and friends of WAITRO,

Last year I wrote that 2020 turned out to be very different from what was planned and expected earlier. Unfortunately, the problems dragged on into 2021 and beyond. At the beginning of the year, we were optimistic and thought that, with the vaccinations becoming available, personal meetings would become normal again towards the second half of the year. But it took much more time than we thought beforehand. Anyway, we all learned in the pandemic that we can do a lot together online. It is not necessary to travel to every meeting in person. Many, if not most, regular meetings can easily be held online, thus contributing a little bit to SDG 13 (climate action) and at the same time also saving time, which would otherwise be used for traveling. At WAITRO we made use of these advantages by offering many capacity development workshops online. More details on these workshops you will find in this Annual Report. On the other hand, we also experienced the limitations of “online only” . For example, the Fellowship Program is still suspended, and we really missed meeting members in person – especially the growing number of new members, which we haven’ t yet met personally at all. Generally speaking, networking and connecting with people one hasn’ t met beforehand is quite difficult online only. Therefore, we are looking forward towards the end of 2022 as the WAITRO Executive Board has decided to hold the next WAITRO Summit in Cape Town on 14-15 November, followed by the 26th General Assembly on 16 November. It is a challenge and also a risk, as we can’ t be certain how the ongoing pandemic will develop. We hope that everything goes well, and no new, potentially dangerous variant will appear.

In 2021 we started also a couple of internal projects. For example, creating a member data base, which in a first step should ease the administration processes concerning the membership and the communication with the contact points. This goal should be reached in 2022. In a second step the more ambitious goal would be to connect the Secretariat directly with individual researchers at the various member organizations.

Another example is the benchmarking project, which should help our members to identify best management practices, learn from one another, and measure their performance relative to their peers. For this purpose, existing benchmarking practices are being reviewed, and a digital benchmarking tool is being developed and introduced to members. We hope to complete this project in 2022.

A third example is the open innovation platform SAIRA. Soon after the inauguration of a brand-new version in mid 2021, the number of users reached 700 in more than 60 countries and several successful matches were already made. I am sure that this powerful matchmaking tool does not only serves the Global Innovation Family to connect its members, but also different stakeholders from across the globe to engage in collaborative research and innovation with and beyond the WAITRO network.

The WAITRO Innovation Award 2021 focused on Food Security and Sustainable Agriculture. Five finalists presented their proposals, two awards were given and funded with US$ 25,000 each. An extensive coverage of the Innovation Award process and the project ideas brought forward, is also part of this Annual Report.

Looking back, I think we can be quite satisfied with how WAITRO weathered the second year of the pandemic in 2021. At the time of writing, the pandemic is still ongoing, but in most regions of the world it is no longer the all-dominant topic that it was in 2020 and 2021. From WAITRO’ s point of view, we already had our first Executive Board Meeting in person since 2019 and a successful Horizon Europe Capacity Development and Networking Event. We are now looking forward to the WAITRO Summit 2022 and hope to be able to meet all of you there in November.

Keep your fingers crossed that it will be possible and stay safe!

Dr. Eckart Bierdümpel

Letter from the President

Our journey through a relatively new century has been defined by unexpected challenges and urgently reassessed priorities, as many of our fellow human beings sought merely to survive rather than thrive. But through all the pain and uncertainty I believe that those of us who cherish the transformative potential of science and technology should feel reinvigorated as we move forward in a changed world.

2021 provided moments of reckoning for those who might not previously have placed science to the forefront of our search for a better future, and who may not have properly valued the innovative capacity of humankind to do good when challenged. As an increasing number of Covid-19 vaccines were approved and rolled out, many communities on our planet could breathe collective sighs of relief. But, of course, not all were so lucky.

However, as our roadmap to Agenda 2030 perhaps seemed less achievable, the voices of scientists and researchers become more respected and anticipated in every quarter. The pandemic rolled back and forth in waves of mutation and infection, and the world looked to science for answers. In this context, I am proud to say that WAITRO shone. Our organization was steadfast and determined, yet reflective and responsive.

We showed our utmost commitment to collaboration for humanity under the guiding framework of the Sustainable Development Goals, not least through the WAITRO Innovation Award. Under the theme of Food Security and Sustainable Agriculture, two unique and visionary projects were awarded for their collaborative success and their real potential to improve food security at local levels.

WAITRO' s co-hosting of a roundtable on vaccine intellectual property, technology transfer, equity and access underlined our commitment to representing all nations in which our network of researchers and technologists operate and collaborate. We are determined to move beyond research itself, to tackle the structures and strictures that create inequalities. We know that talent may shine in any place where science is supported, and where researchers are free to assess and to enquire.

This pandemic has certainly highlighted and exacerbated very real imbalances in our unequal world. We have reiterated in 2021 that our mission is not only to equalize access and opportunity but also to acknowledge and support local knowledge and local solutions to challenges that we may all share. Knowledge is consumed and produced by all of us. As we face an uncertain future around the globe, we know that our unique and diversified network has never been more relevant.

Sumaya bint El Hassan

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WAITRO AT A GLANCE

WAITRO was founded in 1970 under the auspices of the United Nations.
As of December 2021, WAITRO has 122 member organizations from 58 countries.

32 members in Africa

New members 2021:
ACTS, Kenya
ILG, Nigeria
SAN, Nigeria
Tele-Bere, Ghana
AlgoAfrica, Sierra Leone
EMC, Guinea
MUST, Kenya
SU, Kenya
HACRED, Somalia
InnoTechLab, Cameroon
ACT, Sudan

30 members in Asia & the Pacific

New members 2021:
RSX, Thailand
NHA, Thailand
Pragati Foundation, India
NISCO, China
IWRP, Vietnam
NJ Rubrain, China
BJYJTK, China
BJGTX, China

23 members in Europe

New members 2021:
AIT, Austria
IPN, Portugal
CEA Tech, France
VITO NV, Belgium
BRI, Spain
IZNE, Germany
Sa Te, Italy
AU, Denmark
Virkon, Denmark
POLIMI, Italy

22 members in Latin America & the Caribbean

New members 2021:
GECYT, Cuba
INACAL, Uruguay
A.E.I. Group SAS, Colombia
Yachay Tech, Ecuador
IC, Colombia
EAFIT, Colombia
UNA, Costa Rica
UAI, Peru

14 members in Middle East & North Africa

New member 2021:
ICE, Egypt

1 member in North America

New member 2021:
NVM, USA

WAITRO'S GOVERNING BODIES

General Assembly

WAITRO full member organizations are represented in the General Assembly. Delegates of member organizations meet every two years. Next meeting: 2022.

Secretariat

The WAITRO Secretariat employs 18 staff members in two offices. One office is located in Fraunhofer-Gesellschaft, Sankt Augustin, Germany; and the other office is located in Jiangsu Industrial Technology Research Institute (JITRI), Nanjing, China.

Executive Board

The WAITRO Executive Board constitutes the President, two Vice-Presidents, and five Regional Representatives:

· Africa
· Asia & the Pacific
· Europe
· Latin America & the Caribbean
· Middle East & North Africa

The Executive Board Meetings are held twice a year. Next meeting: May 2022 in Barcelona, Spain.

WAITRO INNOVATION ECOSYSTEM

WAITRO Programs & Services

- Open Innovation Platform - SAIRA®
- Capacity Development Program
- Innovation Award
- Global Innovation Summit
- Fellowship Program

More at: waitro.org/programs-services

WAITRO-UNITED NATIONS RELATIONS

Special Consultative Status with the United Nations Economic and Social Council (ECOSOC)

Consultative Status with the United Nations Department of Economic and Social Affairs (UN DESA)

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WAITRO’s Open Innovation Platform - SAIRA®

Launch of SAIRA's new version

A brand-new version of SAIRA was launched in June 2021. The planning of an update of the first version (released in 2019) already started in early 2020, when the COVID-19 pandemic started to impact people's lives across the globe.

As a reaction to the evolving pandemic, the WAITRO Secretariat at the Fraunhofer-Gesellschaft started working on an updated matchmaking system, which met the challenging conditions and adapted to the digitalization era.

Fraunhofer's internal funding then allowed a technical implementation, which started at the end of 2020 and ended with the relaunch of SAIRA in June 2021.

The newly introduced version brought many changes. From a new design and improved usability to conceptual changes and new features, such as a chat function, visible user profiles, visibility option, among other things. Furthermore, a blockchain solution was installed to secure matching and collaboration processes and ensure the authenticity and integrity of registered data on the platform.

Yet the main goal of SAIRA remains: Connecting people with collaborations needs or innovative ideas with knowledge and technology.

Between its re-launch in June and end of December 2021, SAIRA has already generated remarkable results. The platform has created over 13 successful "matches", which means that users have found one or more partners using the system. Moreover, the platform partially enabled four consortia for HORIZON projects, of which one application was successful.

SAIRA was also successfully used by the WAITRO members to build their international project teams for the WAITRO Innovation Award (WIA) 2021. After the "matches", the teams jointly developed project proposals under the WIA 2021 topic “Food Security and Sustainable Agriculture”, and then applied for the award. Two teams were awarded UDS 25,000 each to quick-start their projects.

Still in 2021, a cooperation with an agency was also started in order to sharpen the value proposition of SAIRA and to determine further potential for optimization.

Users
582

Organizations
312

Countries
61

www.saira.eco

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The WAITRO Innovation Award

THE WAITRO INNOVATION AWARD 2021 FINALS

Pitch Event and Roundtable on Improving Innovation Impact

27th January 2022

Opening:

Good morning, good afternoon and, here in Nanjing China, good evening and welcome to the WAITRO Innovation Award 2021 Finals Pitch Event and Roundtable on Improving Innovation Impact (I3). WAITRO is the World Association of Industrial and Technological Research Organizations. Created by UNIDO in 1970 to help fulfill its mission of inclusive and sustainable industrial development, WAITRO now has well over 120 member organizations in over 50 countries.

And this is an important point: that WAITRO' s members are not countries, and not individuals, but research organizations. My experience of international research is that countries often find reasons to disagree, but in organizations one usually finds people who are just interested in working together to solve shared problems. WAITRO' s goals are to build innovation capacity amongst its members, enabling them to increase their global competitiveness and to be the best they can possibly be, while focusing on the United Nations Sustainable Development Goals (SDGs).

The WAITRO Innovation Award was created to serve as a focal point for the WAITRO Innovation Ecosystem. We all know how many meetings are held every year, now mostly online, where sustainability problems are dissected, strategic plans developed and roadmaps published. We wanted the WAITRO Innovation Ecosystem to do more, enabling WAITRO members not just to discuss and propose novel solutions but to find partners, develop plans and obtain seed funding to start work.

Finding partners for international projects starts with SAIRA, the open innovation ecosystem under development at Fraunhofer. Indeed, SAIRA 2.0 allows any registered user, not just WAITRO members, to find the missing pieces needed to start a project, usually in the form of collaborating partners, but also now includes useful project management tools. If you want to try it, you can find all the information you need on the WAITRO website here, or at www.saira.eco.

Beyond SAIRA, the WAITRO Innovation Ecosystem consists of various events to increase the capacity of members and improve their ability to compete in international partnership and achieve measurable impacts in the development of sustainable technology. The WAITRO Innovation Award was designed to reward the products of that ecosystem.

The original idea for the WAITRO Innovation Award was to run the event once every two years, culminating in the WAITRO General Assembly and Global Innovation Summit. Each Award would focus on a different subject relevant to the SDGs, chosen by a vote of the members themselves, from a list proposed by the Executive Board. Since the Secretariat and Executive Board lack the technical depth and market experience to judge the proposals themselves, a Scientific Advisory Board of global experts is convened for each cycle of the WAITRO Innovation Award.

Teams formed within SAIRA can apply for the WAITRO Innovation Award. Finalists, selected in consultation with the Scientific Advisory Board, are given specialized training in how to make a pitch for investment. They then present that pitch to the members and the Scientific Advisory Board, with the most compelling pitch awarded $25k to advance their project. But the bigger prize is hoped to be exposure of WAITRO member's ideas to a broader investment audience, hence the goal of the finals event today.

The previous WAITRO Innovation Award started in early 2020 with a focus on "water" and winners were selected at the WAITRO General Assembly, which, for the first time ever, was held online on WAITRO' s 50th birthday on October 30th, 2020. To kick off the presentations today, the two winning proposals from that topic will tell us briefly about the progress they have made with the Award.

This year, with WAITRO's in-person activities still shut down by pandemic restrictions, it was decided to run an extra "off-year" award. The subject chosen by the Members was Food Security and Sustainable Agriculture (SDG 2-Zero Hunger). Specifically, they asked for innovative project ideas related to new sources of marine and terrestrial non-conventional food, such as micro- and macro-algae, insects or new forms of agriculture (e.g. hydroponics) that are less susceptible to climate change impacts.

We are very grateful to this year' s Scientific Advisory Board who have given their very valuable time to evaluate the project proposals and most of whom are joining us here:

- *Jean-Marc Champagne, Head of Environmental Finance, Bankable Nature Solutions Asia WWF-Hong Kong.*
- *Muzamil Abdelkarim, Chairman and CEO at African Trade Alliance.*
- *Mogens Jakobsen, Professor Emeritus, University of Copenhagen, Denmark.*
- *Yongvut Saovapruk, National Food Institute in Thailand (Retired).*
- *Olga L. Orozco, Chief Technical Advisor, Responsible Business Conduct in Latin America and the Caribbean, International Labor Organization, joining us from Lima, Peru.*
- *El Houssine Bartali, MENA Network of Water Centers of Excellence (Morocco).*
- *Hu Zheng-Yi, Principal Director of Sino Danish Centre for Education and Research, University of Chinese Academy of Sciences, Beijing*
- *Jane Ambuko – Lukhachi, Associate Professor of Horticulture at the University of Nairobi, Kenya*

Thank you all, and I hope this meeting will be the beginning, rather than the end, of your partnerships with WAITRO. The Scientific Advisory Board has already evaluated the five finalist proposals, and the teams have received all their scores and comments, both positive and negative. The online pitches you hear today, therefore, represent their chance to learn from and address those criticisms and convince the Board to invest. And they have all participated in WAITRO's pitch training to do just that.

It has, of course, been a tough year in which to attempt this sort of thing. In the WAITRO Secretariat, we have made mistakes and we are still refining the Innovation Ecosystem concept. Thank you all for your patience in making this journey with us.

In this respect, we hope today is a learning exercise for us all. For WAITRO members to learn the art of compelling investment pitching, for the world to learn more about WAITRO, and for us all to discuss and learn about impact investing from our experts.

Following the presentations from last year' s winners, Jean-Marc Champagne, the Head of Environmental Finance at WWF in Hong Kong, kindly agreed to describe WWFs investment strategy that they call "Bankable Nature Solutions" as our Plenary Presentation, blending public and private finance for sustainability goals.

Then we will hear the pitches from the 2021 candidate teams, and finally we hope everyone will participate in a roundtable discussion with thoughts on Improving Innovation Impact. After today' s event, the Scientific Advisory Board will give us their revised opinions on each Team, and based on that advice we will announce up to two winners on February 3rd, using the WAITRO website and social media channels. So, follow us, if you do not already!

And now would like to invite the President of WAITRO, HRH Princess Sumaya bint El Hassan, to open the event:

HRH:

Ladies and Gentlemen, my dear friends and colleagues in our WAITRO family: It is my very great honor to welcome you all to the WAITRO Innovation Awards Final. In the face of challenges that have tested us, and setbacks that we have overcome, our participation here today is a testament to our resilience and our commitment to creative innovation.

Our global organization has never been more needed to help ensure that research is diverse and distributed around our planet, wherever humans innovate to survive and to thrive.

Together, we embrace more than 120 member institutions in more than 50 countries, proving to all that meaningful research must be a global endeavor. And there can be no more basic, yet essential, human need to innovate for than that encompassed by SDG 2, "Food security and sustainable agriculture". Like so many of our challenges, this is not one around which we may build walls. If we are to ensure peace and stability, then our world must eat, and it must eat sustainably.

The finalists who we celebrate today represent the very best of humanity' s gift of innovation. They show us that we truly shine when we are put to the test and urged to develop creative solutions for our most pressing challenges. And when those challenges threaten the very survival or our civilization, our environment, and our planet, then we must surely empower the very best talent globally to innovate for a better future. In an era when life has become so much more stressful for many around the world, when certainties have been questioned, and progress has become even more uneven and unequal, we must reinvigorate efforts to innovate together. We must ensure that we all enjoy a right to life that is secure and healthful. That must entail a constant reassessment of our actions and a reaffirmation of our commitment to facilitating and supporting innovation everywhere. Only then may we support our common objective for shared security and opportunity.

I am therefore honored to celebrate our finalists today and to hear the outcomes of our roundtable. Our mission is an honorable one and our members are a source of great pride to each one of us.

Presentations from Winners of the WAITRO Innovation Award 2020

1.Development of Low-Cost Solar-Powered Water Treatment for Remote Communities

Center for Transformational Environmental Technologies (CTET), Yixing, Jiangsu Province, China, partnered with the University of New South Wales, Sydney, Australia.

Presenter: David Waite

We are building water purification units based on technology known as capacity deionization. The goal is to desalinate salty water. When salty water passes through electrodes, charged species are attracted to the opposite electrodes. When the electrodes fill up, we can reverse the polarity and create a brine stream. By alternating the polarity of the electrodes, we essentially create a clean stream and then a brine stream. Our units contain sets of these electrode pairs.[1]

This technology is not in itself new, but we have developed a range of innovations that assist in making it more cost effective. The first innovation is using solar energy. The technology involves DC current at low voltage and we can also use converters to recover energy from the electrodes once they've been used to remove the salt. And our third innovation involves developing digital twins to add control of these units in remote locations. These digital twins are virtual models of our units, which we use to control our unit, maintain, and also to train users.

With the support from the Innovation Award and partners in Australia and in China, we built a prototype unit. This was built in China during 2021 and the COVID pandemic and was shipped to Australia, first to Sydney and then transported to Dubbo, a small community about a four-hour drive from Sydney in central New South Wales. The unit with its solar panels is shown in the figure. This unit was based at a sewage treatment plant and used to treat wastewater from the plant. Over two months of operation, water recovery was about 85%, so the unit worked well.

On the basis of that success, we have obtained support for a second trial in Central Australia. This is in a remote village about 400 kilometers north of Alice Springs and there it is used to treat saline groundwater. The unit from the Dubbo trial has now been moved to another location in New South Wales, a coal mine that has a problem with salty water, and we will trial the unit for desalinating that water.

Through the support from WAITRO, we've managed to conduct one trial and also initiate two new trials. The next challenge for this project is to commercialize the technology. We are grateful to WAITRO and the Innovation Award. It really has helped raise the profile of the project and helped attract new partners. I think we are on the way now to commercializing this technology with the innovations I mentioned of solar power, energy recovery and digital twins to aid operation, so thank you very much!

[1] *For a more detailed overview of the technology, see the WAITRO Annual Report 2020.*

Covid-19 Challenge: Phytotechnologies to Provide Clean Water in Small Communities

El Instituto De Ecología (INECOL, Mexico)
and Thailand Institute for Scientific and Technological Research (TISTR, Thailand)

Presenter: Eugenia Olguín Palacio

The team and I greatly appreciate the opportunity to share with you how the WAITRO Innovation Award 2020 helped us to advance in our project.[2] We are establishing floating treatment wetlands to improve water quality. We have demonstrated the efficiency of these floating treatment wetlands under extreme conditions of an oil spill in April and a very strong hurricane in August, and in both these cases and, indeed, throughout the year, the floating wetlands were very efficient. For example, there is an increase in the dissolved oxygen in the water and very efficient removal of total nitrogen, nitrates and phosphates throughout all the year.

We have also had a chance to demonstrate the capacity of these floating wetlands for carbon sequestration and for providing biomass for biofuel generation. These are very important issues now to counteract the global change. So, these plants can sequester around 25 to 40 tons of carbon per hectare and their biomass can produce biogas. We also work with the community, organizing workshops and writing informative newsletters. And so, the community is happy with these kinds of phyto-technologies.

The project has increased the support from the National and municipal authorities to continue working not only in lakes but also elsewhere, as a national policy. We have promoted collaboration agreements with Mexican Social Security, which is the largest health institute in Mexico, for the use of phyto-technologies especially in a hospital as a model to recycle the water from the kitchen by treating it with phyto-technologies and using the clean water for cultivating spirulina, which is a micro-algae that is excellent food for fish. Also, the clean water can be used for cultivating medicinal plants and organic waste from the kitchen can be composted to feed the plants. This follows a circular economy concept.

Also, we are going to start a project to clean a river with phyto-technologies to benefit the surrounding community. The team has chosen to establish constructed wetlands as a learning center in the Northeast region, a challenge because the area is experiencing a water shortage and they have problems in in the dry season. They have shown that there is a decrease in heavy metal concentration and micro-organisms, so they can improve the water quality and use this to show how to reuse water and decrease the water shortage.

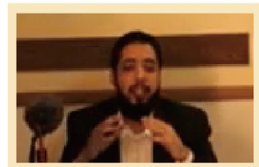
Finally, but not least, the Thailand Institute for Scientific and Technological Research has benefited a lot from close interaction, exchanging knowledge and sharing experience between researchers. We have made a very nice bond between the two groups and we are planning to initiate a new product if funds are available, though we have also tried to encourage researchers to submit proposals for funding. Thanks a lot for your attention.

[2] *For details of the project see the WAITRO Annual Report 2020.*

Plenary Presentation

Bankable Nature Solutions

Jean-Marc Champagne, Head of Environmental Finance,
Bankable Nature Solutions Asia WWF-Hong Kong



ean-Marc started by clarifying that WWF stands for two things, although it is one organization. In the USA, it is the World Wildlife Fund and internationally it is the Worldwide Fund for Nature. Since he was kind enough to also serve on the 2021 WAITRO Scientific Advisory Board, his biography can be found there in this Report. More information about Bankable Nature Solutions may be found here:
https://wwf.panda.org/discover/our_focus/finance/bankable_nature_solutions/

Each year, there is an estimated $2.5 trillion shortfall of finance to achieve the UN Sustainable Development Goals (SDGs) and philanthropy and public finance alone are unlikely to ever fill this gap. Private investors, however, are willing to invest into sustainable, bankable projects.

Bankable projects are clever investments that generate financial returns while building more resilient ecosystems, societies and economies. The problem with this, however, is that so far there has been no pipeline of bankable projects, even though investors are keen to get the ball rolling. Financiers, therefore, continue to invest in projects that degrade ecosystems and their ability to adapt to climate change. Regrettably, communities, businesses, and countries end up paying the full social and environmental costs of such investments. WWF has crafted an innovative solution to blend public and private finance to create a pipeline of scalable bankable projects, redirecting financial flows into more sustainable projects, which is critical to the health of our natural resources.

This table shows the results from a risk perception survey done by the World Economic Forum that was just released. The top three risks, plus numbers seven and eight, are all environmental issues that have been identified as the most severe risks on a global scale over the next 10 years. Furthermore, I think numbers four, five and six, which on the surface appear more related to societal issues, are also indirectly related to the environment. So, the environment is a huge issue and environmental issues are something we really need to start moving money into to address the problem.

World Economic Forum Global Risks Perception Survey 2021 - 22	
1. Climate action failure	6. Infectious diseases
2. Extreme weather	7. Human environmental damage
3. Biodiversity loss	8. Natural resource crises
4. Social cohesion erosion	9. Debt crises
5. Livelihood crises	10. Geo-economic confrontation

At present, the United Nations Conference on Trade and Development (UNCTAD) estimates that solving urgent environmental and social issues requires an annual investment of US$4.2 trillion, compared to a current total of about US$1.7 trillion. We therefore have a deficit of US$2.5 trillion in order to get anywhere close to the SDGs. Now, US$1.7 trillion looks like a big number and we would all like to have some of that going towards our projects. However, when you look at it in the context of global private capital, it is tiny. Total global private sector debt, including things like corporate bonds, totals about US$185 trillion. All the stock markets around the world amount to about US$90 trillion. Add in US$70 trillion in global public debt, US$7.5 trillion in sovereign wealth funds and US$4.1 trillion in private capital, and you begin to realize just how small that US$1.5 trillion from Foundations for global development assistance actually is.

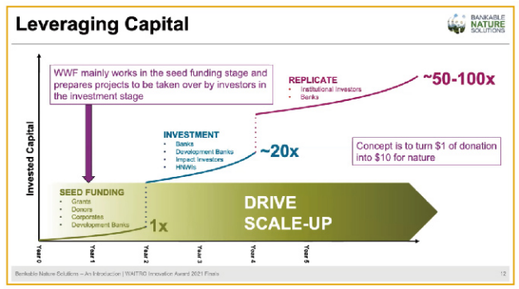
Private sector investors wanted to invest in bankable, sustainable projects but needed partners like WWF to identify and incubate them. So, we want to mobilize these much larger pools of capital. We look at the private sector as being absolutely crucial to accomplishing what we call bankable nature solutions because corporations are involved in the areas in which we want to work. They are not only active in those landscapes, they are dependent on them for their operations and linked to the pressures and risks to those landscapes. At the same time they control a vast amount of financial resources and are influential with the public sector, i.e. the government. Without them, we can never get to the scale that we need in order to have impact.

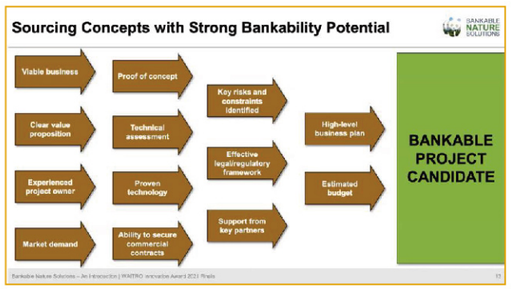
The importance of the private sector
1. Active in almost all landscapes
2. Dependent on the landscape for its operations
3. Linked to risks and pressures on the landscape
4. Commands vast financial resources
5. Influential with public sector

Bankable means essentially the same thing as investable. Investors can finance the project by providing a loan or an equity investment. A bankable project, however, is a conservation idea that also has a business around it. So, you're looking for the impact for the environment, but at the same time, you have to have a business. It could be a new business or an improvement on an existing business, but it needs to address market dynamics because it will create a product that is going to face competition from other businesses.

For WWF, the first criterion for a bankable project is that it has environmental and social impact (because the two are intertwined). Secondly, it has to have commercial value and generate predictable returns. Thirdly, it needs to be financed by private capital looking for profit. Many proposed projects meet the environmental or commercial criteria, but are lacking an ability to scale and replicate. To encourage these projects, we use grant or seed funding,

Indeed, WAITRO seed funding could provide the initial grant start a project that would then look for additional capital. Such a project would have to be structured to ensure it is a business and that there are predictable revenues with good margins so that a bigger investment can be involved at the next stage. The concept at WWF is to take $1 of donation and turn it into $10 additional investment. This potential is how we come up with a bankable project candidate.





So to make this work you need a viable business and a clear value proposition. To select candidates for bankable projects, we look for a proof of concept and to identify any potential risks or constraints. The project also needs a very experienced owner or partner that is financially viable because it will be taking investment or loans at a later stage. Then of course there must be market demand. We look for a high level business plan and an estimated budget with a good chance of success.

To get a candidate ready for investment, making it bankable, it must be made more attractive for investors. You need to increase the expected return from your products, and at the same time you need to decrease the risks that are associated with the project. A strong motivation for the private sector to get involved, to not only run the project but to invest in it, is the potential for new revenue streams or price increases. For example, if you can improve an existing product, like upgrading from shrimp to organic shrimp, that can potentially increase the value of that product in the marketplace.

Some of the typical risks that we find when we're doing projects all around the world include those of currency and capital, i.e. having enough money to continue the project. There is the risk of missing deadlines. Certain countries may be a little bit less stable, bringing further risk of expropriation or civil unrest. Then of course, on any project, you have operating risk; is there demand for the product you are creating? Insufficient demand leads to lower than expected revenues.

One way to decrease risk is to build on an existing concept rather than developing early stage technology. A second way, again, is to have an experienced product owner or sponsor, one that is not only experienced in what you're doing but also financially viable. Then it is important to ensure there is a very strong regulatory framework around what you're doing at the government level, local, provincial and national; they should be on side with what you're doing. Finally, risk can be diversified by allocating it among the stakeholders, for example the project owner, the project investor, and one or more off-takers for the product. In some cases, one particular private sector partner could be all three.

Another risk reduction strategy is to use what we call blended finance. So, in the case of the WAITRO Innovation Award, WAITRO capital can be used to help de-risk the project and get it to the point of a proof of concept, so that when investors come in, they don't have to worry about taking on that risk.

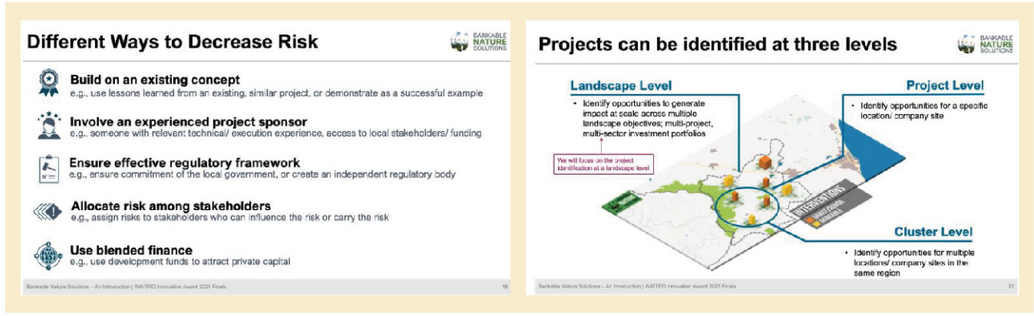
You also have to define a value proposition. What is the problem that you're trying to solve? Maybe in an environmental project it is to prevent loss of biodiversity in a particular base or maybe it is treating water before it is discharged into the water system to reduce pollution. It is important to show that the project reduces costs and brings additional revenue. The value proposition is needed to attract more investment capital. When we look at projects at WWF, we find it more beneficial to look at them at what we call a

Risks Exist in Every Project

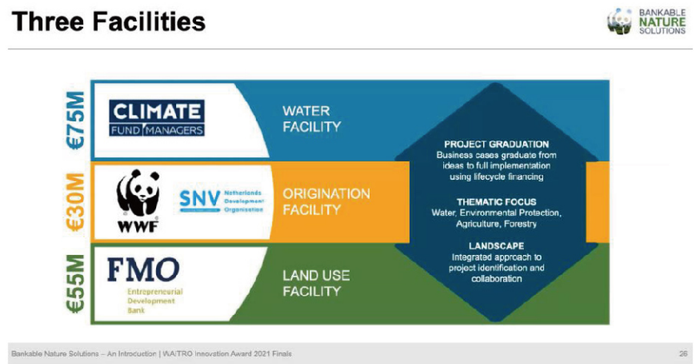
Financial risk	Currency risk	The risk of depreciation of local currencies against common used currencies (e.g. EUR/USD)
	Capital risk	The risk that a project cannot access enough funding for the next phase, resulting in delays and/or discontinuation
Completion risk	Budget risk	The risk of budget overruns
	Planning risk	The risk of planning overruns causing project delays
Sovereign risk	Expropriation risk	The risk that a public agency claims privately owned property, to be used for the benefit of the overall public
	Regulatory risk	The risk tha ta change in laws and regulations will impact the budget
	Civil Unrest risk	The risk of unrest such as civil war, protests or labor strikes impacting the project
Operating risk	Demand risk	The risk that the offtake is not as expected, resulting in lower revenues
	Performance risk	The risk that the project fails to perform as intended or fails to meet certain requirements

landscape or seascape level. We try to identify the ecological pressure points in a particular landscape, and, at the same time, who are the private sector actors that rely on the landscape and its resources for their business because it is they who have a very important reason to be involved in the landscape. Firstly, they are using its resources for their product but also because it could become a risk for them and they have to mitigate any potential risks to that landscape. Increasingly, refining companies are concerned that climate change, biodiversity loss and other environmental issues are slowly sinking their profits. They are beginning to realize that they need to be aligned with nature and the environment rather than being against it and doing nothing to replenish or to take care of the landscape or surroundings that they're in.

The term landscape is used typically in biodiversity conservation in urban areas. Actors that are involved in it have different objectives, whether it's biodiversity, agricultural productivity, or livelihood security. Landscape is typically defined as being small enough to be manageable, but also large enough to deliver multiple returns or multiple functions for stakeholders with different interests. The landscape is typically bounded by natural boundaries, distinct land features, or it could be defined by administrative boundaries, or even by biodiversity. At WWF we prefer to address projects within a landscape.



So how is this relevant to the WAITRO Innovation Award that is the subject of this meeting? We would call that grant funding the origination capital. This should take the project from its seed stage and bring it through the bankable nature solutions preparation process, getting it ready for investors. This is a long process, usually between 18 and 24 months from doing pilots, making sure it is structured ready for investment and how the investment will be split between equity and debt. This is really no different from any standard project finance: a private sector partner, investors in the project and offtakers and then you sell your product into the market.



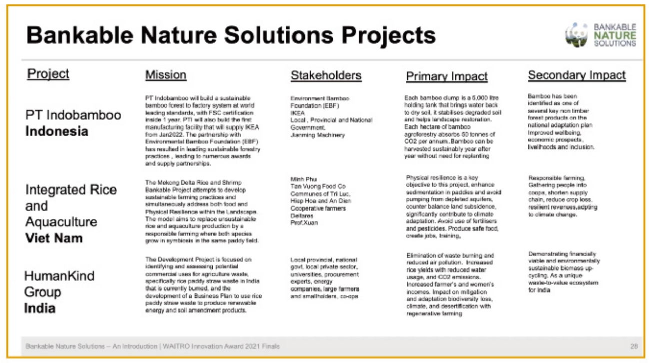
At WWF, we have used several sources of investment capital. One of the big ones is the Dutch Fund for Climate and Development (DFCD). This pioneering facility is 160 million Euro that was provided by the Dutch Ministry of Foreign Affairs and the idea is similar to what I said earlier about taking $1 donation and turning it into $10. In this case, the goal is to take 160 million Euro and mobilize it into 1 billion Euro of private finance for projects. So it's a pioneering consortium of FMO, the Dutch Development Bank, Climate Fund Managers, SNV, which is another NGO from the Netherlands, and of course WWF. If there were WAITRO capital, it would in theory be possible to combine that with some of our origination capital, and then we would look to put a project later in the later stages into the next facilities, which is a land use facility and a water facility between the partners already mentioned.

In terms of project pipeline, I'll just briefly highlight one and summarize others in the Table. Currently, we're working on a project in the Mekong Delta in Vietnam. The idea is to integrate rice production with aquaculture. The Mekong Delta is sinking, as are many others. There is a huge issue with land subsidence in many similar places. We want to introduce natural integration processes into rice farming to build up the land over time through sediment distribution. Currently, the combination of subsidence with sea level rise in that area results in farms being inundated with saltwater that kills rice and loses money. So, what we want to do is integrate a shrimp business with their current rice business. So, in certain seasons, you can still grow rice but in other parts of the year we will integrate that with shrimp farming. So, it provides the farmers with two sources of income. The idea is to get climate resilience using the new irrigation process but to also produce additional and better revenues for the farmers. This brings social as well as environmental impact.

We do this globally, it's not just restricted to Asia. So if anyone wants to know more, I'm happy to happy to discuss that. Thank you very much WAITRO for inviting me to speak it's a pleasure to o do it.

Q: I know you showed that pipeline projects from the small scale or the medium to the large scale and gave a couple of examples but in total how many projects do you have in each stage of that process?

A: Actually, it varies, but right now just in Asia, we have about 25 projects. The majority of the projects, I would say, are in that early stage of seed funding but about four or five are now ready to graduate to the next stage where there's actually going to be the large funding from external investors, whether it be FMO or climate fund managers or someone else. We expect three to be graduating very soon to that level, and then another two coming later. By soon, I mean about maybe six to eight months, and then the next two probably by the end of the year.


Bankable Nature Solutions Projects

Project	Mission	Stakeholders	Primary Impact	Secondary Impact
PT Indobamboo **Indonesia**	PT Indobamboo will build a sustainable bamboo forest to factory system at world leading standards, with FSC certification inside 1 year. PTI will also build the first manufacturing facility that will supply IKEA from Jan2022. The partnership with Environmental Bamboo Foundation (EBF) has resulted in leading sustainable forestry practices , leading to numerous awards and supply partnerships.	Environment Bamboo Foundation (EBF) IKEA Local , Provincial and National Government. Jianming Machinery	Each bamboo clump is a 5,000 litre holding tank that brings water back to dry soil, it stabilises degraded soil and helps landscape restoration. Each hectare of bamboo agroforestry absorbs 60 tonnes of CO2 per annum..Bamboo can be harvested sustainably year after year without need for replanting	Bamboo has been identified as one of several key non timber forest products on the national adaptation plan Improved wellbeing, economic prospects, livelihoods and inclusion.
Integrated Rice and Aquaculture **Viet Nam**	The Mekong Delta Rice and Shrimp Bankable Project attempts to develop sustainable farming practices and simultaneously address both food and Physical Resilience within the Landscape. The model aims to replace unsustainable rice and aquaculture production by a responsible farming where both species grow in symbiosis in the same paddy field.	Minh Phu Tan Vuong Food Co Communes of Tri Luc, Hiep Hoa and An Dien Cooperative farmers Deltares Prof.Xuan	Physical resilience is a key objective to this project, enhance sedimentation in paddies and avoid pumping from depleted aquifers, counter balance land subsidence, significantly contribute to climate adaptation. Avoid use of fertilisers and pesticides. Produce safe food, create jobs, training,	Responsible farming, Gathering people into coops, shorten supply chain, reduce crop loss, resilient revenues,adapting to climate change.
HumanKind Group **India**	The Development Project is focused on identifying and assessing potential commercial uses for agriculture waste, specifically rice paddy straw waste in India that is currently burned, and the development of a Business Plan to use rice paddy straw waste to produce renewable energy and soil amendment products.	Local provincial, national govt. local private sector, universities, procurement experts, energy companies, large farmers and smallholders, co-ops	Elimination of waste burning and reduced air pollution. Increased rice yields with reduced water usage, and CO2 emissions. Increased farmer's and women's incomes. Impact on mitigation and adaptation biodiversity loss, climate, and desertification with regenerative farming	Demonstrating financially viable and environmentally sustainable biomass up-cycling. As a unique waste-to-value ecosystem for India

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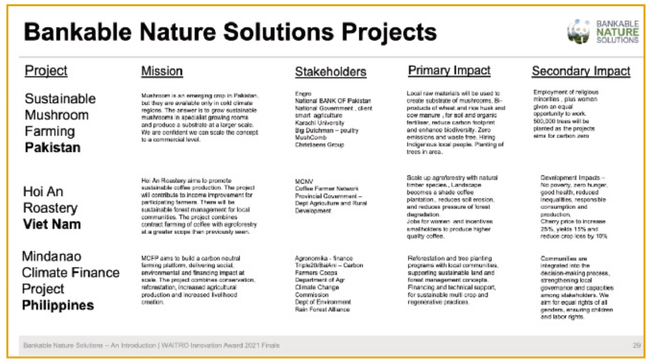
Bankable Nature Solutions Projects

Project	Mission	Stakeholders	Primary Impact	Secondary Impact
Sustainable Mushroom Farming **Pakistan**	Mushroom is an emerging crop in Pakistan, but they are available only in cold climate regions. The answer is to grow sustainable mushrooms in specialist growing rooms and produce a substrate at a larger scale. We are confident we can scale the concept to a commercial level.	Engro National BANK OF Pakistan National Government , client smart agriculture Karachi University Big Dutchman – poultry MushComb Christiaens Group	Local raw materials will be used to create substrate of mushrooms. Bi-products of wheat and rice husk and cow manure , for soil and organic fertiliser, reduce carbon footprint and enhance biodiversity. Zero emissions and waste free. Hiring Indigenous local people. Planting of trees in area.	Employment of religious minorities , plus women given an equal opportunity to work. 500,000 trees will be planted as the projects aims for carbon zero
Hoi An Roastery **Viet Nam**	Hoi An Roastery aims to promote sustainable coffee production. The project will contribute to income improvement for participating farmers. There will be sustainable forest management for local communities. The project combines contract farming of coffee with agroforestry at a greater scope than previously seen.	MCNV Coffee Farmer Network Provincial Government – Dept Agriculture and Rural Development	Scale up agroforestry with natural timber species., Landscape becomes a shade coffee plantation., reduces soil erosion, and reduces pressure of forest degradation. Jobs for women and incentives smallholders to produce higher quality coffee.	Development Impacts – No poverty, zero hunger, good health, reduced inequalities, responsible consumption and production, Cherry price to increase 25%, yields 15% and reduce crop loss by 10%
Mindanao Climate Finance Project **Philippines**	MCFP aims to build a carbon neutral farming platform, delivering social, environmental and financing impact at scale. The project combines conservation, reforestation, increased agricultural production and increased livelihood creation.	Agronomika - finance Triple20/BaiAni – Carbon Farmers Coops Department of Agr Climate Change Commission Dept of Environment Rain Forest Alliance	Reforestation and tree planting programs with local communities, supporting sustainable land and forest management concepts. Financing and technical support, for sustainable multi crop and regenerative practices.	Communities are integrated into the decision-making process, strengthening local governance and capacities among stakeholders. We aim for equal rights of all genders, ensuring children and labor rights.

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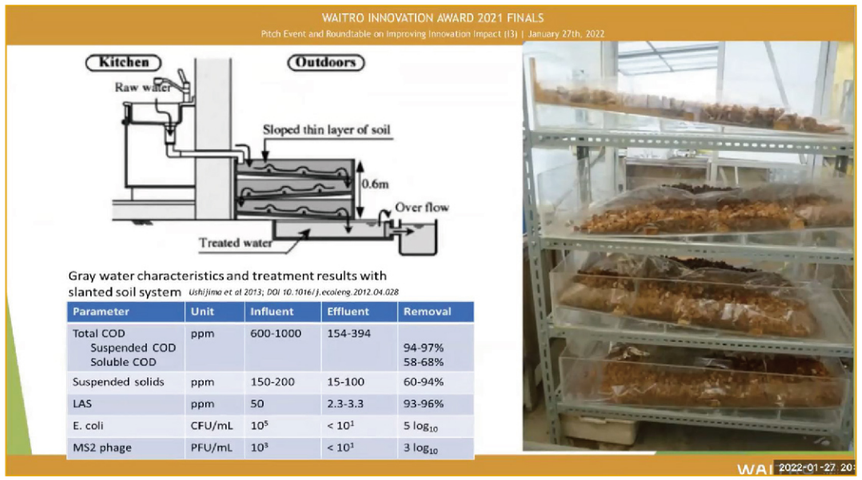
WAITRO Innovation Award Finalists Presentations

Development of urban agriculture through vertical hydroponic cultivation with grey water treated with slanted soil system

Agricultural Institute of Iranian Research Organization for Science and Technology (IROST) and Research Unit for Clean Technology, National Research and Innovation Agency Republic Indonesia (RUCT-BRIN)

Presenter: Rozbeh Abbaszadeh



Our ancestors lived in nature for a long time but now we live in cities, far from our origin. It is impossible to go back and live permanently in nature but it is possible to bring nature to our houses through creative technology. Urban farming is a popular approach in cities consistent with many Sustainable Development Goals but there are two main challenges for performing agriculture in an apartment: water and space.

Our solution is to treat grey water and use it for vertical farming using hydroponic techniques. Grey water means domestic wastewater from non-toilet sources such as sinks, showers and laundry. It is generated at a high volume but is often not treated. One of the main deterrents for grey water treatment in an urban area is the lack of available space. Our slanted soil system is a vertical filtration system using graduated filtration media. The system can remove surfactants and other contaminants.

Hydroponics is the cultivation of plants without soil and using nutrient rich water. Some elements which are essential for plants are present in grey water, such as nitrogen and phosphorus. The treated water meets the requirement for agriculture and our hydroponic system uses the treated water for the vertical cultivation of plants in a closed system. It also uses new technology such as smart sensors and the Internet of Things and automated control systems, considering a balance between cost and complexity.

It will improve the lives of urban residents by increasing access to fresh and healthy food, reducing the environmental problem of wastewater and increasing the economic and social effects of agriculture in urban areas. What makes us different is integrating a grey water treatment system with a vertical hydroponic system and our focus on growing edible plants after food safety experiments. Maybe people will doubt that plants grown with treated grey water are not safe as food, but we would like to change this perception by showing that it can be safe.

It is forecast that the market for urban farming will reach $555 billion in six years. We will start commercialization from our own city and expand to other cities and finally global markets. Finally, our team includes valuable diverse experience in wastewater treatment, hydroponic system architecture, the environment, and engineering and we share our knowledge and experience.

Q: Who are your competitors and how do you differ from them?

A: Most competitors use fresh water not treated grey water.

Q: It's well known that grey water can easily be a source of contamination comprising human pathogens. So have you carried out a risk assessment of this process of water treatment?

A: Yes, exactly. We should test and conduct some experiments to show the contamination and also we need to do some experiments to select suitable plants for our hydroponic system.

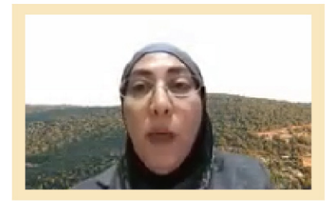
Q: Does your system take care of toxic heavy metals? Do you assay for toxic heavy metals outside the microbiology or the micro pathogenic organisms which were just mentioned right now?

A: There are usually not a lot of heavy metals in grey water sources. Our filtration system can manage this, but it is not much of a problem.

Sustainable Farming Under Climate Change – Adoption of Climate Resilient Crops

Royal Scientific Society (Jordan) and Aarhus University (Denmark)

Presenter: Amna Jrrar



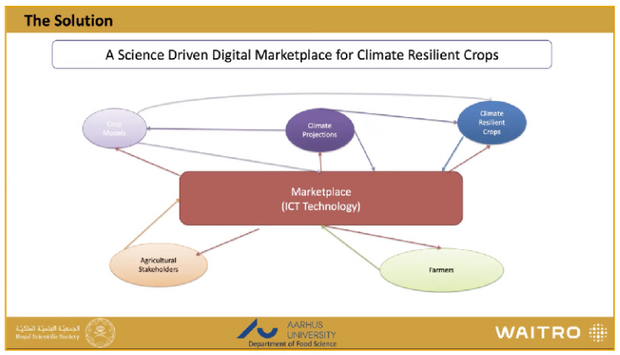
Our project addresses sustainable farming under climate change and the adaption of climate resilient crops. Climate change will lead to a reduction in crop yields, which will impact food security. This impact will be huge for small scale producers, who depend on rain-fed agriculture. It is a big problem in the water-deprived Middle East, where around 84 million people work in agriculture.

Current crops may not be tolerant to future climatic conditions. We need to find new, climate-resilient crops and also convince farmers to switch to them. If farmers have enough knowledge and information about climate change and potential solutions, and also access to social networks, they are more likely to adopt climate-resilient crops. We also need to develop crops which are suitable for the purpose we are utilizing them for and also farmers need to be able to access these seeds.

Our solution is a science-driven digital marketplace for climate resilient crops. Climate projections and crop models will provide a theoretical basis for the development of climate-resilient crops in the laboratory. Growers will facilitate data entry into the market and then farmers will have access to climate change information and knowledge about these new seeds. Through the Marketplace, we can provide consultation services, test current crops under future climatic conditions and provide data about their resilience. Through the Marketplace, there will be a continuous feedback process for the benefit of all.

Access to our marketplace will be free to farmers, but at a fee for other users who want, for example, to list their services on the marketplace. So the plan actually is to have a one stop shop for climate resilient crops.

We will benefit from the combined expertise of scientists and agricultural stakeholders to accelerate from lab to market to combat climate change. It will improve food security, while providing farmers with viable solutions for sustainable farming under climate change. Our platform will be flexible and can be extended to other related services, e.g. weather forecasts and seasonal predictions. Most importantly, the time is right due to the growing interest and investment in climate-smart agriculture worldwide.



Our team includes myself, a climate modeler, Dr. Rong Zhou from Aarhus University leading on resilient crops, Engineer Ayat Hazaymeh from RSS, leading on crop modeling, and Engineer Islam Ahmad from RSS, leading on the creation of the digital platform.

Q: What is the governance framework responsible for the adoption and management of the digital platform?

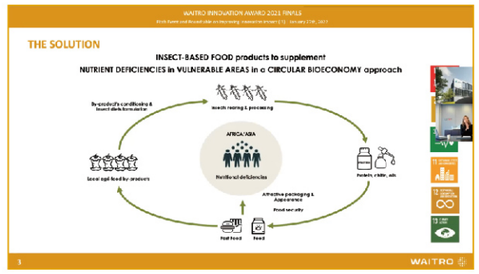
We are thinking of this as being private, but this doesn't mean that other organizations on a local level or research centers cannot get involved. Obviously, we want to work with seed banks and many of the seed banks will actually be aligned with the government.

Q: Is the general education level adequate to use the platform?

A: I think, at least for Jordan and Egypt, one of the resilience factors is ICT, as mobile use is relatively high, but I do not know specifics about other Middle Eastern countries. For example, the Food and Agriculture Organization of the United Nations already launched a mobile application to give advice to farmers. The fact that they are launching such mobile applications suggests that they know it will be used.

Q: You need to consider is the market users themselves. Countries like Jordan or Egypt each have a certain type of consumption. Whatever the farmers are growing is basically market-driven, rather than need-driven. So you need to start convincing the end users first before convincing the farmers. So my advice would be to look at the same crops that are already being grown, for which they have the equipment, the knowledge, and the knowhow for, and work on developing more resilient seeds of that same crop.

A: I think the idea for us here is not to move outside to a completely new crop but possibly to something with different genetic traits that we know will survive with less water or a different soil. The idea is not to completely move out of the comfort zone. But still it is not wrong to think about new crops which might also be useful to improve food security.



SMARTinFOOD: Insect-Based Food Sources to Supplement Nutrient Deficiencies in Vulnerable Areas

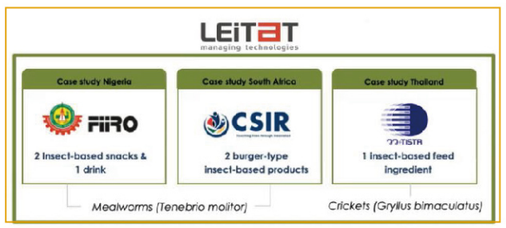
Acondicionamento Tarrassense (Leitat, Spain),
Federal Institute of Industrial Research Oshodi (FIIRO, Nigeria),
Council for Scientific and Industrial Research (CSIR, South Africa)
and Thailand Institute of Scientific and Technological Research (TISTR, Thailand)

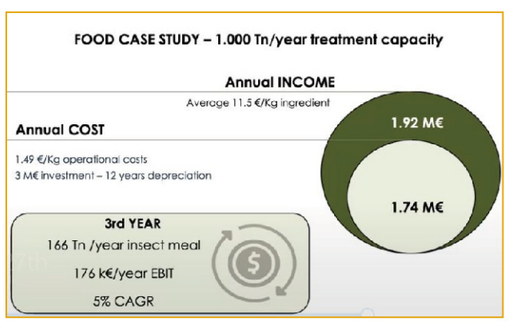
Presenter: Julia Garcia Montaño

Smart InFood uses insect-based food sources to supplement nutrient deficiencies in vulnerable areas. The problem is that food demand is expected to increase by 70% by 2050. In addition, there are nutritional deficiencies in some areas and other stressors such as impacts from climate change. We propose a solution based on a circular bioeconomy approach.

We are going to cover nutritional deficiencies in terms of protein, minerals and vitamins with food that will be obtained through insects that will be fed by local agri-food byproducts. We are planning to implement the whole value chain at a local level so we are going to incorporate a centralized facility, simple technologies that are adapted to the to the requirements of the of the area, and then add the conditions to cover the nutritional requirements of the target population.

A novelty is that we will obtain high-quality fast-food products that will be very attractive to the target population, for example children at school. We are also going to involve people from the very beginning of the whole value chain and we are even going to create jobs at local scale. So we are not only going to have benefits at the nutritional level but at the social level and the environmental level because we are going to use our waste.





The first stage will be linked to the WAITRO Innovation Award in which we are going to establish the basis for subsequent stages to demonstrate this solution at three demonstration sites for validation. If we are successful, we are going to industrialize the solution aiming to replicate the system at full scale in other vulnerable areas.

There are partnerships with four experienced technological centers around the world and three demo sites. Two of them will be in Africa, one in Nigeria and one in South Africa, where we are going to make fast food using mealworms and another one in Thailand in which we are going to obtain ingredients using crickets.

The market opportunity is shown in the figure below. Three points to note are the increasing global protein demand and the increasing global market size for both protein and animal feed. We estimated some preliminary data for a representative case study for food in Africa, in which we consider a treatment plant of 1000 tons per year. Also shown are the projected results with some realistic data coming from our partners, with the annual income and annual costs. After the third year of operation, we expect to have positive profit taking into account the market size and positive growth thereafter. This project impacts many SDGs and we think that it is not an option but an obligation for everybody. So thank you very much for your attention.

Q: Thank you for the presentation. Nutrition is closely linked human health so how can these insect-based sources influence human health?

A: Yes, of course, there is a need to cover an additional deficiencies mainly in the in the field of protein content and minerals such as iron and zinc, depending on the region. We are going to formulate diets to ensure that we obtain insect biomass with as much as protein and minerals or micronutrients as possible. We will use the characterization information to determine direct links that can be studied more specifically in later stages of the project.

Q: Will SDG3 impact lifestyle diseases, now becoming an issue particularly in developing countries?

A: Yes, in this case we propose a human-centered solution by involving people from the beginning, creating jobs, new companies and new opportunities for the for the people of the countries in which we operate. So, I think here we can find easily connections between the project and the wellbeing of society.

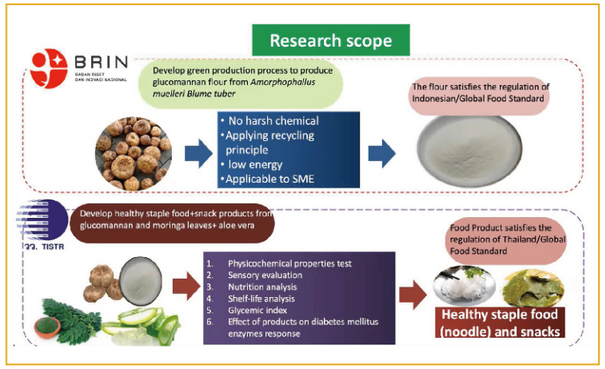
Strengthening Food Sustainability in South East Asia by Utilization of Local Tuber of Amorphophallus Muelleri Blume

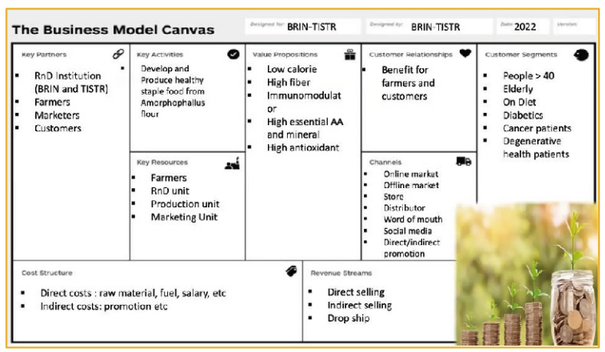
The Research Center of Appropriate Technology-National Research and Innovation Agency (RCAT-BRIN, Indonesia) and Thailand Institute of Scientific and Technological Research (TISTR, Thailand)

Presenter: Achmat Sarifudin

Our project proposal is about strengthening food sustainability in Southeast Asia by utilization of local tuber called Amorphophallus. Many degenerative diseases are caused by bad food habits that induce high blood sugar and health problems. The solution is to change our habits to consume more healthy staple food and healthy snacks.

In this project, we propose to adapt a healthy staple food and also a healthy snack from a local tuber called Amorphophallus Muelleri, enriched with moringa leaves and also aloe vera extracts. We select these ingredients because Amorphophallus is low calorie, high fiber, high prebiotic and also immunomodulatory. In Indonesia there are currently more than 5,000 new farmers because our president promoted these as a new food for the future, not only for Indonesia but also for the world.





Moringa extract is known to be a super food because of its high content of essential amino acids and it is also high in minerals and antioxidants. We also add aloe vera because of the benefit of its high levels of antioxidants. So our product is a new healthy staple food with low glycemic index, low calories, and high fiber and probiotics. The product is particularly targeted at the 40 – 50 year old market, which in Southeast Asia consists of about 10% of the population of 67.6 million people, and also diabetic patients and people with degenerative health problems.

Our business model canvas is shown below. This product is perfect for the elderly on a diet, people with diabetes or cancer, or people with genetic health problems. We divided the research into two teams of BRIN from Indonesia we will develop a clean production process to produce a glucomannan flour without using harsh chemicals and applying the principles of recycling and low energy. The glucomannan flour will satisfy the regulations of Indonesia and global standards. Also, the Team from TISTR in Thailand will develop the healthy staple food and snacks. They will do physical and chemical analysis and nutritional analysis so that the product will satisfy the regulations of Thailand and global food standards.

The team from Indonesia will be led by myself and the team from TISTR will be led by Dr. Waraporn Sorndech. We hope that at the end of this project we will have a healthy staple food and snack product, and that we can all benefit from this product.

Q: You want to do green extraction of the flour from the tuber and fortify it with moringa and aloe vera. So, I think you were trying too many things because already this tuber, as you said, is very rich. It has very good health benefits. So the question is that this tuber has been produced in Indonesia for many years. Why do you think that people are not eating it? Consumer habits have to change if you will come in with a new product. You don't know if the people of Indonesia will like it compared to the rice which is their staple and then, even before you know if they'll accept it, you want to fortify it with Moringa and aloe vera. You seem to be trying too many things at the same time. You have a risk.

A: For years till now, most of Indonesians don’ t how to consume this tuber. This is because we know that if we eat the tuber then we will feel itchy on our tongue and get burnt. Today we know that the tuber contains calcium oxalate which can irritate our body. So that my team in Indonesia will extract the glucomannan from the tuber because it is known as high fiber and at the same time remove calcium oxalate from the product. As far as staple foods from Indonesia, perhaps you maybe know in Africa, Indomie is a popular noodle that is very famous that comes from Indonesia. We will not try to replace rice because we want to have another form of staple foods. So what we will introduce is in the form of noodles or something similar.

Q: But dealing with food habits is where you need to start because we have a lot of products which are good, but people won't eat them. So, you need to sensitize the people first, before you go and develop the green extraction. Consumer sensitization is key before you try to bring in the product. I hope you get what I mean.

A: Yes. Okay. Thank you for your suggestions. Thanks.

Q: Have you considered to carry out human intervention studies to document these positive effects on health?

A: Yes, human studies will be the part of the TISTR work so we will also test for that.

Green Technology of Botanical Pesticide and Fertilizer for Sustainable Food Production and Maintaining Ecosystems to Strengthen Capacity for Adaptation to Climate Change

Research Center for Chemistry (BRIN, Indonesia) and
Department of Biochemistry, University of Yaounde 1 (Cameroon)

Presenter: Melati Septiyanti

It is already known that use of chemical pesticides is a common method to control pests and fungi in plants. Their extensive use leads to accumulation that can affect the environment, decreasing water and soil quality, and our health. Common symptoms of chemical poisoning include dizziness and nausea. It can be worse for farmers that are directly contacted with these chemical pesticides.

We are making an innovation to replace chemical pesticide with botanical or plant-based pesticides. The study has been done in Indonesia and Cameroon. In Indonesia we do research with neem oil, citronella oil, and clove oil, while in Cameroon work is focused on clove, basil and sunflower, not only for pesticide but also as a biofertilizer.

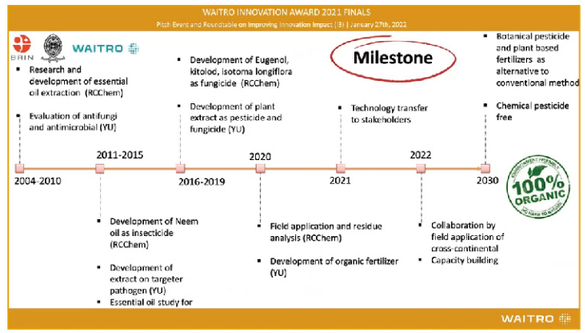
It really works! Yaounde University in Cameroon has demonstrated the induction of soybean plant flowering after treatment with bio pesticide and soil amendments with biofertilizer. Also, spraying with essential oils and aqueous extracts can reduce brown spot disease in rice. This treatment can improve crop yields by 20% to 200%, it also prolongs the shelf life of foods at four degrees Celsius up to 40 to 130 days. The use of biofertilizer allows the slow release of nitrogen and improves the nitrogen use efficiency by 90%. Also we can have pesticide-free fruit and soil. In addition the organic soil amendment improves some biological fertility indicators.

We studied the effect of neem oil on army caterpillars and the mechanism is that neem oil reduces a caterpillar' s appetite so they won' t damage the vegetables. Another study carried out in tomato plants showed that the application of a fungicide made from neem, citronella, and clove oil was able to protect tomato plants from fungi for four months through different weather. The treated plants remained in good condition whereas the untreated plants had more rotten leaves.

Indonesia has 25 million hectares of fields and we keep developing the formulation and efficacy through links with local farmers to do field applications of botanical pesticide and fertilizer to measure how it works under actual field conditions. Furthermore, it can open farmers' eyes to be aware that pesticide and fertilizer can be found all around us.

We have done research and characterization since 2004 to find the best plan and best formulation for field application but we try to reach out for more collaboration and aim to do mass production so that botanical pesticides and fertilizer can be well known and well distributed to farmers. We are strengthening our capacity to establish a consortium between farmers, academicians, industry and regulators in order to reach our goal where botanical pesticide and plant-based fertilizers will be used as alternatives to conventional methods, thus freeing us from dependency of chemical based pesticides.

Why now? Because we cannot wait any longer. Earth is getting older and we have to preserve our environment and save the life of humankind. Our team is from Indonesia and Cameroon, from Asia and Africa. We hope through this project we could prove how important these products are.



Q: This is really interesting. Do you have any sort of evidence-based data to basically show what kind of insects this is most effective for and what type of plants it is most effective in? Secondly, how are you planning to go to market with this product and how are you planning to protect your intellectual property from competitors who might dominate the market? Do you have any patents or trademarks?

A: Yes, we have data and we also published a paper. So for one for example, in a Cameroon site, we developed a fertilizer and also a pesticide that are suitable for rice. From our side, we focus on vegetables and tomato plants using neem oil, citronella and also clove oil and other than that we use neem oil for vegetables like cabbage. The second question about the market: We aim at farmers who already brand their product as organic vegetables free from chemical pesticides. And yes, we already patented our formulation so the IP is protected.

Panel Discussion

Improving Innovation Impact: How can WAITRO members attract investment to maximize their contribution to the sustainable development goals.

Muzamil Abdelkarim

Thank you, it is a pleasure and honor to be here. I would like start by giving you a brief background on Africa, the opportunities here and how RTOs can benefit from Africa and the instrumental role it will play in shaping the future. When we look at Africa, it is no secret tremendous economic potential it has to offer, as it holds the solutions to many of the future' s problems, but it has always been a somewhat opaque space due to bad PR and misperceptions that are now gradually being uncovered.

Global investors are now excited about Africa's growth prospects. This can be seen from the surge in foreign direct investments into African startups, which increased twofold from 2020 to 2021 to almost $4.9 billion in announced deals, of which $1.2 billion was invested in financial technology startups. The issue, however, is that most startups are focused on retail, logistics or payment innovations rather than innovations based on technology research, which shows a lack of systems in place to manage university-to-industry as well as cross border knowledge transfer in Africa.

With that being said, researchers have a chance to create new and exciting growth opportunities for both corporate and financial investors, not by creating innovations around the status quo but by actually improving and advancing the entire scope of Africa's industries. As you know, global capitalism and economic growth survives on innovation and natural resources. Today, Africa holds over 60% of the world's uncultivated arable land to feed 9 billion people by 2050, yet has the lowest production yield globally and suffers from 30 to 50% post-harvest losses and still imports approximately $72 billion worth of food every year. Also, Africa has 30% of the world's remaining mineral resources and yet they are extracted unsustainably and exported in their raw form. Africa contributes just 2% of the world research output, accounts for only 1.3% of its research spending and produces only 0.1% of all patents. Because of the lack of adequate policy making in technology and know-how combined with its poor innovation infrastructure, the continent is challenged to achieve its aspirations of undergoing an industrial transformation - from a reliance on extractive industries to a diversified economy built on the premises of value added goods, innovation, and high tech manufacturing. But I firmly believe that this is where global research institutions can play a pivotal role in Africa in-order to overcome many of the potential threats and downfalls facing our future.

To win in Africa, RTOs must create a wide open front door to become more accessible and more aligned with the interests of various players in business, government, development, and entrepreneurship around the world that have strategic interests in Africa, to gain valuable insights, understand their various objectives and identify the right problems to solve; providing demand-driven solutions that these stakeholders are ready and willing to allocate adequate funds for in-order to have them researched, developed, and/or transferred.

I also believe WAITRO, in addition to its current activities, is uniquely positioned to act as a global coordinator and client-facing representative on behalf of its members, as well as a single point of contact for technology transfer and business development, leveraging its members' intellectual capital resources and areas of expertise to operate in a One Research Institute model and deliver the best possible solutions to external stakeholders with the support of local collaborators.

On the other hand, RTOs should allocate a reasonable amount of their efforts towards late stage research and bolster commercialization that supports industrial development and economic competitiveness in Africa - making it an easy choice for corporate, development finance, venture capital and financial investors to deploy capital into. The reason is the Africa free trade continental agreement is expected to boost the collective consumer and business to business spending in Africa, up to $6.7 trillion by 2030, and total exports are projected to increase by an additional factor of $560 billion, mainly driven by manufacturing.

WAITRO should create and source new demand for technology on behalf of its members by approaching local governments with nascent innovation infrastructures, make them aware of their intellectual firepower and capabilities, and develop proposed roadmaps to help jumpstart their national innovation and economic growth agenda from policymaking and incentive program development for R&D, and benchmarking their R&D, extending all the way into addressing potential areas for unlocking new sources of growth within their existing strategic sectors and creating new industries that support their private sector development.

Partnerships must be built with international development and humanitarian aid agencies and foundations like GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit), USAID, JICA, and the Bill and Melinda Gates Foundation, just to name a few, in order to develop or provide innovations to tackle the problems in which they are active on across the SDG spectrum in Africa, such as clean water, access to energy and post-harvest losses. In 2019, the net development assistance and foreign aid into sub-Saharan Africa alone was estimated to be $55 billion.

WAITRO can as well start looking at onboarding in-house entrepreneurs to proactively identify market opportunities and ideas for investable research with clear off takers, as well as to identify existing technologies with potential commercialization opportunities in new untapped markets.

Last but not least, WAITRO can start diversifying the revenue streams to not only attract investments, but to also become financially independent. A comprehensive set of services can be offered to external clients, such as technology transfer and IP licensing on behalf of WAITRO members like I mentioned earlier; startup incubators and venture studios or spinouts in order to enjoy the long term success of innovations; technology sourcing and local commercialization services for the private sector; complete outsourced R&D programs tailored for governments and large private sector organizations; and, most importantly, crisis and disaster rapid response services: pandemic outbreaks like COVID, or other country-specific events. As I said earlier, governments and the private sector often do not have the equipment, the knowhow, or the expertise to run their own R&D programs in Africa. So outsourcing it into WAITRO members is an important point on which to focus.

We must acknowledge that the world is rapidly changing. By 2050, we will witness the largest intergenerational wealth transfer of all time, valued at almost $70 trillion in the US alone. But at the same time, Africa's population is expected to double with over 50% being youth that are globally connected have high levels of education and a broader outlook towards science and technology with a bigger workforce than the rest of the world combined – and they are collectively united under one conviction - that the future is sustainable, but only with RTOs will this transition be possible. Thank you.

Chair Comments:

There is a lot to unpack from what you said. WAITRO has a lot of members in Africa, at least 25 and probably more if you include the North Africa region. One thing this Secretariat did at the last General Assembly was to introduce a new category of WAITRO membership, which we call Associate Membership, which is specifically for for-profit industry. That was our idea to open the door to the industry side of technology. We need help to more effectively connect those Associate Members to our traditional RTO members so that we have both sides of the technology push-pull represented within WAITRO.

Another door is also open: When I introduced SAIRA in my opening statement, it was specifically in relation to the WAITRO Innovation Award but you can go and join SAIRA anytime and use it to look for partners if you have an idea that needs help or if you have a problem that needs solving. It is not even limited to WAITRO members, it is free to use if you go to www.SAIRA.eco.

Jean Marc, do you have any further comments on what WAITRO can do to improve how its members access these bankable projects that you described?

Jean Marc Champagne

Muzamil covered quite a bit and made some really strong points. I would add a few highlights and suggestions for processes that your Members should use when they're looking at their projects to source strong bankability candidates. A couple of things stood out when I was reviewing and listening. One thing is that a lot of projects are at the theoretical stage not the commercial stage. In theory it has commercial value but it has not yet been brought to that point. From the commercial side, one thing that that is often lacking is the vision to scale to the size that we need. Many people, whether an entrepreneur or academic, tend to think that it is better to ask for a small amount of money because it is easier to get. We want to eventually get those projects to $50 - 100 million, not just for the sake of having the money but because we want to drive impact at a much larger scale. So we want the vision to be big. I think scalability needs to be considered a lot more when thinking about projects.

Also, true bankability or investability needs to be much more at the forefront of these ideas. In many cases, the theory is there and the scientific part is there and the environmental impact has been very much thought through but the commercial side, the business side, needs to be much more developed. If you want to take these projects from being traditional grant funding to move into the more investable side you need a high level business plan, no different than attracting venture capital. So one of the things I thought was missing was attention to the commercial viability.

It is absolutely essential to have a project owner or project sponsor that will really run with the project. Most of the people in academia cannot run the project. They have the idea but an entrepreneur or a corporation has to come in and take ownership of the project once you pass that grant stage and are looking for investment capital, you need to have skin in the game and you need to have investment in the project. So you need to have an experienced project owner that can run the business, invest and/or accept either equity or debt financing.

I think the money's there but what we need to do is develop and design projects to fit where that money needs to go.

The other part that has to be considered is the market demand and whether these projects or ideas have the ability to secure commercial contracts. Can you get off takers and has any of that even been assessed? I could sum this all up by saying that you need to put the bankable project criteria in place at the beginning. This is an issue even at WWF because finance people are few and we have to educate our conservationists and scientists how to incorporate the bankable concept. It's a learning process. So I think that the biggest part is to really incorporate the commercial side much more deeply because the theory side and the understanding of the environmental impacts is already there.

Q: Are there ways and means for WAITRO to the winners of the WAITRO Innovation Award get new funds to complement the seed funds provided by the Award?

A: I would be happy to be involved in these on an annual basis. I do not think that the money is so much is the issue, but rather we have to get the projects to fit what the money wants. You hear big announcements that some bank or development agency or government is going to commit funding but where are the projects? I think the money's there but what we need to do is develop and design projects to fit where that money needs to go. The Dutch Fund for Climate and Development is one of our biggest funding facilities for bankable projects. That is one bucket of capital that can at least initially get things started if the project suits the investors and what they want. There are a lot of variables that go into the process. WAITRO can provide seed capital and projects may need even more seed funding to get them into in doing pilots that may need more money, but if we can at least get those initial ideas in and I think if we can get one, then we can start to move forward, so hopefully we can find more projects.

Chair:

We are out of time and have to close the event. First of all, I would like to thank all of the presenters, both of last year's winners for coming back to tell us how you did and I hope WAITRO can help you take those projects to the next level. I want to thank this year's candidates as well for their patience presenting in the face of tough questions and comments, I particularly wanted to thank again, the Scientific Advisory Board for all the effort they've put in and I really hope that this will be the start of your relationship with WAITRO, not the end of it. And finally, Duan Ran in the China office for running the Zoom call here and all the behind the scenes stuff and Andrea Santos over in our Germany office, who's handled all of the social media and publicity. And please go check out the results one week from now we will have at least one winner of the Waitrose Innovation Award 2021 Thank you very much everybody and good night.

WORLD
ASSOCIATION OF
INDUSTRIAL &
TECHNOLOGICAL
RESEARCH
ORGANIZATIONS

WAITRO Activities

Projects/Proposals

REFERENT Towards systemic and integrated management of agricultural practices: turning pesticides and fertilizers into regenerative agricultural tools

Date: January 27th 2021

REFERENT proposal was submitted under one of the last calls of the H2020 program the European, the Green Deal topic LC-GD-6.1C, in which international cooperation was encouraged. This was led by LEITAT in collaboration with WAITRO partners (i.e. DTI, AINIA, TISTR and the University of Yaoundé). The main REFERENT goal is to deliver a panel of innovative and eco-friendly plant protection products, organic fertilizers, biofertilizers and plant biostimulants to replace or reduce the use of conventional pesticides and fertilizers. REFERENT solutions will be tested in 4 EU territories and in 3 international countries, Cameroon (CM), Chile (CL), and Thailand (TH).

FOOD REHUB Innovation hubs to reduce food losses and waste and avoid unsustainable packaging by creating resilient and robust food chains

Date: January 27th 2021

FOOD-REHUB was submitted under the LC-GD-6-1-202 topic of H2020-LC-GD-2020 call in which international collaboration was encouraged. LEITAT participated as a partner in the consortia where several partners were WAITRO members, including the coordinator, DTI and others (i.e FhG and AINIA). The main objective of FOOD-REHUB is to find and implement strategies to reduce food loss and waste by transitioning the European food value chain to a circular business model to achieve vast environmental, economic, and social benefits. The project includes the implementation of three hubs throughout Europe to tackle regional issues but also to work together for a holistic solution to food waste and loss. These hubs represented Northern/Central, Southern and Eastern Europe.

GREENDESERT Boosting agricultural productivity in the Saharan region through self-sustained productive use of energy from biomass and unexploded water resources

Date: April 30th 2021

GreenDesert was submitted under the LEAP RE (MAR5) call in which international collaboration was encouraged. LEITAT participated as a subcontracted entity from the Spanish partner Hidroquimia SL (which was engaged in the proposal by LEITAT) in the consortia where several partners were WAITRO members, including the coordinator, FRAUNHOFER and the ARC as the Egyptian Partner. The overall objective of GreenDesert is the productive use of renewable energy from biogenic residues for the supply of novel fertilizers and purified irrigation water. The ambition of GreenDesert is to boost the agricultural productivity in the Saharan region in a self-sustained manner utilizing unexploded local resources in the middle term through technological innovation, technology transfer and capacity building. This was not posted in SAIRA since SAIRA 2.0 version was still not launched. This was unfortunately rejected for funding.

LIVELY LIVing, ELectrif Ying and smart solutions for building integrated agriculture

Date: May 25th 2021

LIVELY was submitted under the EITH Pathfinder 2021 call (HORIZON-EIC-2021-PATHFINDEROPEN-01-01) in which international collaboration was encouraged. Lead by the University of Bath with the participation of LEITAT. LIVELY' s long-term vision is to increase the resilience of cities by generating sustainable and affordable self-regulating rooftop greenhouses for building integrated agriculture, which will restore green spaces destroyed for urbanization, enable local food production, decrease the buildings' carbon footprint and increase carbon offsets. On the one hand, LIVELY will develop and integrate cutting-edge soil microbial fuel cell (SMFC)-based technology for point-of-care soil diagnostics and precise automated intervention to safeguard crops growth and health. On the other hand, it will develop innovative thermochromic windows to enable fine control of light and temperature to promote plant growth, while using eco-friendly natural building materials to lead to a superior hygrothermal performance of both the rooftop greenhouse and the building itself. This was not posted in SAIRA since SAIRA 2.0 version was still not launched.

NEXUS-Manufacturing. "Green extraction of polysaccharide from existing by-product waste for sustainable manufacturing"

Date: September 23rd 2021

The NEXUS-Manufacturing proposal was submitted under the HORIZON-CL4-2021-TWIN-TRANSITION-01-05: Manufacturing technologies for bio-based materials on the 23rd of September. The proposal, led by the University of Huddersfield, have the participation of LEITAT (both WAITRO partners). NEXUS-M aims to accelerate European green manufacturing by developing novel value chains using carbon positive biomaterials for the substitution of traditional petroleum-based materials to establish sustainable, circular use in industrial applications with high environmental impact. NEXUS-M engages the full manufacturing supply chain, from raw material supply through breakthrough extraction methodologies, product specific additive optimization to the manufacture of consumer products, for food packaging , personalized textile wound dressings and intelligent lubricants applications.

PATH4DEA "Paving the Way towards Digitalization Enabling Agroecology for European Farming Systems"

Date: October 6th 2021

The PATH2DEA proposal was submitted under the HORIZON-CL6-2021-FARM2FORK-01-03 on Digitalization as an enabler of agroecological farming systems. PATH2DEA is committed to unlocking digitalization' s catalyzing power to foster European agriculture' s transition towards enhanced sustainability. It will build on farmers' competences and views and match them with the rich repertoire of digital solutions already available for agriculture, aimed at tailoring digital technologies to users' needs and fostering wide-range adoption of digital agroecological farming in the EU and associated countries. Strategic engagement by multiple actors includes early adopters of digital ecological farming represented by six Showcase farms located in different pedo-climatic regions, with hands-on experience for solid consensus validation of the project' s conclusions. The proposal was led by AIT with the participation of LEITAT and VITO, WAITRO members matched via SAIRA 2.0. An external evaluator funded by WAITRO supported the proposal with a review and feedback that allowed for improvement.

SEW-IT Sewing the acceleration of a circular textile sector transforming the whole value chain

Date: October 6th 2021

Led by LEITAT with the participation of DTI and HUD, the SEW-it project proposal was submitted to address the topic HORIZON-CL6-2021-CIRCBIO-01-04 Increasing the circularity in textiles, plastics and/or electronics value chains. SEW-it aims at accelerating the transition towards a circular EU textile sector. SEW-it will develop an innovative circular methodology through co-creation approach based on behavioral analysis of the stakeholders' intentions and needs, shaped in a digital toolset which will comprise a decision support tool, exchange platform and social games to promote the best circularity strategies and engagement in each step of the value chain. SEW-it seven pilots will demonstrate: 1) sustainable manufacturing processes focused on polyester, cotton and polycotton, 2) alternative consumption patterns (reuse, repair, remanufacture), 3) tailored-made and effective collection schemes for textiles 4) suitable textile sorting, 5) recycling (from innovative pre-treatment process to polyester and cotton chemical recycling). Economic, social, legal, and environmental dimensions will be analyzed to strengthen the implementation, replicability and transferability of SEW it solutions. Moreover, with SEW it results, recommendations for policymakers and textile industry will be elaborated and validated. Importantly, SEW-it will be aligned with the UN initiative SDGs for Better Fashion addressing businesses, students and consumers globally, with special focus on SDG 9, 12, 13 and 4. The proposal was led by LEITAT with the participation of DTI and HUD, WAITRO members matched via SAIRA 2.0. The proposal was very well evaluated and passed the threshold and was put on the reserve list due to lack of funding.

Strengthening the Beekeeping sector in Antioquia, Colombia

Headed by CTA and Fraunhofer (Chile), the aim of the project is to strengthen the capacities of Science, Technology, and Innovation of the producers of the beekeeping chain for environmentally sustainable and competitive production in the departments of Antioquia and Cauca. The sources of financing are the Fund for Science, Technology, and Innovation - General System of Royalties - SGR of Colombia.

Colombia Bioremediation Project

Headed by INECOL (México) and CTA, the aim of the collaborative project is to develop knowledge transfer processes and technologies of sustainable agricultural practices that reduce the polluting effect on the environment and enhance the productivity of the pig sector and promote the articulation and productive chain between the actors of the pig sector in the departments of Córdoba and Sucre in Colombia.

Waterproof Europe Horizons

The Waterproof project proposes a resource-efficient solution to convert CO2 emissions from waste(water) processing into green consumer products. At the heart of the Waterproof concept is an electrochemical process that converts CO2, originating from waste incineration and wastewater processing, to produce formic acid. This reaction is paired with the generation of high-energy oxidants, which are used to remove persistent contaminants from wastewater thereby contributing to a clean water cycle with zero-waste. The energy to run the electrochemical process is provided by waste incineration facility. The formic acid is a feedstock to produce Acidic Deep Eutectic Solvents (ADES). The project was led by CTA in collaboration with FUNDITEC (Spain) and AVANTIUM (Netherlands).
Project presented and approved by the Horizon Europe Framework Program - HORIZON-CL4-2021-TWIN-TRANSITION-01.

Workshops

Asia - US Innovation Dialogue in Biomedicine

Date: April 21st 2021

The event was hosted by JITRI, WAITRO Office China on April 21st, 2021. It took place in Nanjing, China both online and offline. TISTR helped approaching speakers from regional members. Dr. Mukul Das, Director of Shriram Institute for Industrial Research (SRI) of India made a presentation on “Is Hypoglycemic Encephalopathy Syndrome” in Muzaffarpur, India Associated with Litchi Consumption in Starved Children, and Dr. Krittiya Thisayakorn, Senior Research Officer of Expert Centre of Innovative Herbal Products (InnoHerb), TISTR presented on “Research and Development on Herbal Product for Parkinson Disease”.

Virtual Coffee Meeting "Don't die trying ... do it - Good Practices and keys to present R+D+i projects in Latin America before international financing funds"

Date: August 5th 2021

It presented to the target audience the most important good practices and keys to be considered in the formulation of R+D+i projects to access international cooperation. This conversation was based on the INTI´s (Argentina) experience on these issues.

Forum on Science, Technology and Innovation policies in Latin America and the Caribbean

Date: September 9th 2021

This workshop aimed to identify the advances, lessons learned and good practices that, in terms of public policies in science, technology and innovation, are taking place in Europe, and contrast them with the advances we have in Latin America while generating a reflection on the challenges and opportunities we have in the region.

International Webinar on Biosphere Reserves: Living in Harmony with Nature, Lessons Learned and Way Forward

Date: December 15th 2021

The webinar was hosted by TISTR and partnered with UNESCO as it focused on biosphere reserves and sustainable development. The webinar invited WAITRO members who were interested to participate in. The advertise materials were promoted through WAITRO’ s communication channels e.g. website, Facebook, and Instagram.

The webinar was keynoted by Dr. Hans Thulstrup of UNESCO Office in Jakarta to understand the importance of biosphere reserve, networks for sustainable development, and opportunities in UNESCO Program. There were sessions of knowledge sharing and best practices among experts who have directed experience working at biosphere reserves, including expectations of Biosphere Reserves from the perspective of stakeholders in Thailand.

The webinar was aimed as a platform to create awareness on global environment crisis and importance of having biosphere reserves, as well as lessons learned for sustainable development of biosphere reserves.

Among the WAITRO members who joined the event were: ARC of Egypt, and Pragati Foundation of India, and TISTR of Thailand registered to attend the webinar.

Grant Writing Workshops

North-West University (NWU) organized the grant-writing workshops but rescheduled them from June to November 2021 to allow time for the Round Table on Intellectual Property and the NWU Innovation Fireside Chat. These workshops were held across NWU three campuses in collaboration with WAITRO, the Department of Higher Education and Training (DHET), and the University Capacity Development Programme (UCDP). The workshops aimed to highlight collaboration and connectivity amongst various organizations, partners, and members to ensure that resources and funding are distributed to thrive in Research, Technology, and Innovation. In addition, the attendance for these workshops was excellent among scholars in various fields.

The expected results were not only to provide insight and awareness on the relevance of collaboration and cooperation across borders, particularly in Africa but to enable researchers and innovators to understand the use of research funding.

The Scheduled dates for the workshops were as follows:

• 12th November 2021 – Research collaborations and grant writing for SDGs related research in the SADC presented by Prof. Innocent Nhapi, Zimbabwe

• 26th November 2021 – Formulating research grant proposals for international funding presented by Dr. Charmaine Williamson, South Africa

• 30th November 2021 – Working together to build research capacity in an age of uncertainty presented by Prof. Steve Greenfield, UK

Science Forum South Africa

They were promoting intra-African collaboration between research and technology organizations (RTOs) through WAITRO. Africa has developing countries and is the world's least industrialized region with plenty of room to advance. However, to bring about radical changes to have industrialization, by fully committing to the transformation agenda that reflects the industry's crucial role in the continent's development, African countries need to come together and become team players. Technology and Innovation are essential in building the foundation for developmental growth. The role of RTOs is vital as entities that are assigned and sanctioned to catalyze the industrialization process through advanced technology use and deployment of a highly skilled workforce.

The purpose of the initiative is to promote collaboration among African (RTOs) to enhance their capacities for Innovation that will lead to the improvement of the quality of life of the people and the economic competitiveness of the countries of Africa. The outcomes were the need to pool resources and share infrastructure amongst the African countries, to co-create knowledge and African solutions for Africa, to be agile and resilient and to support some intra-Africa collaboration initiatives. The stakeholders are the Department of Science and Innovation, National Development Plan, and the Science Forum South Africa. WAITRO facilitated engagement and support from various members and partners. Many collaborations and ideas to work together are brought forth by the familiarity and support we have from WAITRO.

The Scheduled dates for the workshops were as follows:

• 1-3 December 2021; the Science Forum South Africa held the Igniting conversations for World Science Forum.

• 2nd December 2021: The WAITRO Africa Collaboration Initiative discussion took place online.

ARC & WAITRO Webinar and Workshop on Managing Food and Agriculture Value Chains for Sustainability: Roles of RTOs and Industrial Sectors

The event was hosted by ARC of Egypt, MENA region in 2021. “Managing Food and Agriculture Value Chains for Sustainability: Roles of RTOs and Industrial Sectors” was successfully held, jointly organized by the WAITRO Secretariat and Agricultural Research Center, Egypt.

This event for the senior management aims to share the scientific development experience in WAITRO members from MENA and other regions with each other, to strengthen regional and sub-regional cooperation and nurture collective self-reliance among developing countries. The workshop was formulated based on the belief that the development of a country depends on the quality of its human resources through information sharing and the development of experience. How to generate value from productivity and innovation in an RTO? The objective of the workshop was to provide key concepts for the generation of value from the concept of productivity and innovation, good practices, and keys for an RTOs to generate value for its stakeholders.

Relationship building

Promotion of WAITRO in JASIS 2021

TISTR participated in the exhibition in the JASIS 2021, one of largest expo event in Asia held in Japan in November 2021. JASIS gathered the leading industries and organizations worldwide in related to analytical system and solution. TISTR nominated the poster of WAITRO and TISTR to display in the international partners’ exhibition zone.

Collaborative Research Activity between TISTR and Aarhus University, WAITRO member in Denmark.

TISTR is having collaboration with GreenAnt Company, the Netherland on weaver ant farming. Within the team member of GreenAnt, there is a professor of Aarhus University, WAITRO member in Denmark who is a key person of collaboration and training.

As a part of the joint activity, TISTR organized the Webinar on “Small Things but Giant Steps to BCG and Resilient Economy: Food, Health, Wellness for the Future and Business Opportunity” on 29 March 2022.

There were two sessions, one of Microorganisms and Utilization for Food Industries having speakers from TISTR of Thailand, Food Industry Research and Development Institute (FIRDI) of Taiwan, and another session of Insects as a Trend of Alternative Protein Source having speakers from Aarhus University of Denmark, GreenAnt Company of Netherland, and Leitat Technological Center (LEITAT) of Spain.

The webinar opened publicly, having over 150 participants from 19 countries registered. The event motivated GreenAnt to join WAITRO membership in 2022 respectively.

Capacity development

Getting Ready For International Cooperation: Horizon Europe

Date: May 4th 2021

The Capacity Development Workshop “Getting ready for international cooperation under the Horizon Europe Framework” took place on May 4, 2021. The digital event, organized by LEITAT and WAITRO with the support of the Danish Technological Institute (DTI), introduced the WAITRO members to the new features of Horizon Europe. The EU’ s new key funding program for research and innovation is the successor of Horizon 2020.

To best prepare the WAITRO membership for the new EU framework, the workshop featured key speakers from the European Commission, National Contact Points (NCPs) and experienced project promoters and managers. They introduced the most relevant topics concerning Horizon Europe Strategic Plan, changes of budget, proposals presentation, partnerships, validation and benefits within the Horizon Europe Framework.

- Siv Jacobsen, Seconded National Expert in DG R&I from the European Commission presented the main differences between Horizon 2020 and Horizon Europe. She introduced the three pillars of the framework program, the budget and cross-cutting issues like gender, environmental effects and security scrutiny. She also talked in detail about strategic planning and describing the impact of a proposal.
- The NCP for legal and financial aspects in Germany, Bastian Raue, gave insight into international cooperation in Horizon Europe. He went into detail about the possibilities of joint research between EU and non-EU partners under the Horizon Framework.
- Abishek Ramesh, the UK NCP and Global Innovation Lead, presented the arrangements for the UK in Horizon Europe and encouraged participants to consider the UK as a collaborator as the UK is now officially an associate member and will be able to fully participate in Horizon Europe.
- With a new framework program comes a new proposal template. Amro Satti, the Director of International Projects in Promotion and Management Department at LEITAT, highlighted important aspects of the new template, particularly in comparison with Horizon 2020.
- Similarly, Xavier Ponte, coordinator of International Projects at LEITAT, presented the new Model Grant Agreement and gave helpful tips on international participation, third parties, international partners and cost calculation, among others.

  The final presentation was on WAITRO’ s innovation ecosystem in Horizon Europe.
- Laia Piñol, representing the WAITRO Regional Focal Point for Europe, and Anna Wohlrab, WAITRO’ s program officer showed how WAITRO can support Horizon Europe proposals through working groups, information dissemination and even external evaluation and Letters of Support. WAITRO’ s matchmaking platform SAIRA was introduced as an easy and convenient way to find trustworthy partners. Kirsty Kaiser, Research Fairness Initiative implementation manager, presented tools on ensuring the equitability of partnerships.

The event was moderated by Laia Piñol, Anna Wohlrab and Alexandra Hyldgaard, Senior Consultant at DTI. WAITRO was delighted with the huge success and acceptance of the online Capacity Development Workshop. It was tailored for European WAITRO Members but welcomed Members worldwide. With over 100 participants of member organization from all around the globe, the WAITRO membership is ready to form consortia and get started on Horizon Europe.

Workshop on the APEC ESCI Best Practices Awards

Date: May 28th 2021

The event was hosted by JITRI, WAITRO Office China in May 28th, 2021 in Nanjing, China both online and offline. The workshop was organized with the support of the APEC Sustainable Energy Center (APSEC). The workshop aimed at helping participants prepare to apply for the APEC ESCI Best Practice Awards, and to increase WAITRO members' chances of success. The key speaker, Mr. Muxue Wang from the APEC Sustainable Energy Center, gave valuable insights on the APEC ESCI Best Practice Awards. The speech included the award' s background, application timeline, key points for writing a proposal, and the significance and influence of the award. With Gold and Silver awards, the ESCI Best Practices Awards recognizes outstanding achievements in five categories in the APEC region:

-Smart Transportation

-Smart Buildings

-Smart Grids

-Smart Jobs

-Low-carbon Demonstration Towns

WAITRO Webinar on Bio-Circular-Green (BCG) in Action

Date: August 24th 2021

Regarding to the WAITRO Capacity Development Needs Assessment in early 2021, the topic on "Circular Economy" was ranked at the top 3 most selected by members.

The said area aligned by the interest of TISTR and national agenda of the country in Bio-Circular-Green (BCG) for sustainable economy. BCG is marked as a key deliverable to achieve one priority of APEC 2022 in sustainability and inclusive growth as well. Therefore, TISTR decided to organize the WAITRO Webinar on Bio-Circular-Green (BCG) in Action on 24th August 2021 online.

There was a keynote speaker from The Office of National Higher Education Science Research and Innovation Policy Council (NXPO), Thailand who engaged in the white paper development of BCG to give a lecture on what the BCG is, how and examples of its action, driving BCG to regional and international platform, and opportunities in funding platform.

Besides of keynote, we opened this platform for members to showcase their projects or ideas related to BCG for opportunity of future collaboration.

There were 50 participants. WAITRO Members attending the event were TISTR of Thailand, LEITAT of Spain, SIRIM of Malaysia, CSIR India, BRIN of Indonesia, Fraunhofer of Germany, JITRI of China, NHA of Thailand.

WAITRO Workshop on Modern Sustainable Agriculture

Date: August 25th 2021

The event was jointly organized by the WAITRO Secretariat Office China and Jiangsu Science and Technology Department (JSTD). Qing Liu, President of JITRI, and Yangwei Zhao, Director of the International Cooperation Division of the Jiangsu Science and Technology Department, attended the workshop and gave welcome addresses.

During the event, WAITRO and Jiangsu Science and Technology Department jointly launched more than 20 sustainable technology cooperation projects from China, Thailand, Malaysia and Jordan, aiming to provide sustainable and cost-effective technologies. Eight of the projects were selected for live audiovisual presentation during the event.

JITRI Vice President Dr. Paul Burrows introduced the international cooperation platforms that JITRI has developed in recent years as well as WAITRO' s innovation ecosystem. Then, the Program Manager of WAITRO Secretariat Office Germany, Anna Wohlrab, presented the new features of WAITRO' s Innovation Platform SAIRA.

Dr. Moses Mengu, Senior Project Leader of Danish Technical Institute (DTI) and former Deputy Secretary general of WAITRO, exposed at the end of the first segment the current cooperation opportunities in African agriculture and possibilities that WAITRO members have in this field.

After the keynote speeches, eight sustainable agriculture project teams from China, Malaysia, Jordan and Thailand gave a detailed introduction of their projects. The workshop provided an opportunity for WAITRO members and non-members to showcase their projects and, in line with the WAITRO Innovation Award 2021 – Food Security and Sustainable Agriculture theme, provided new collaboration opportunities and technology reserves for the award applications.

How To Sell Ideas: Pitch Training For Researchers

Date: November 4th 2021

"How to Sell Ideas: Pitch Training for Researchers" the final Capacity Development workshop of this year was hosted by the WAITRO Office Germany on November 4th. The pitch training was held to answer members' needs and tackled a very important and frequent issue within the innovation world: how to raise funds or convince investors about the value of a research project? The workshop was conducted by Dirk Lehmann, an international pitch trainer with over 10 years of experience. With over 150 participants from 25 member organizations, the WAITRO Capacity Development Workshop on "How to Sell Ideas: Pitch Training for Researchers" was a success. To provide all WAITRO members the opportunity to attend independent of their geographical location, the workshop was held in two sessions.

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WAITRO Online Marketing

Quarter 2 | 2021

The WAITRO communications team started its activities in the second quarter of 2021 with the development of a marketing campaign to promote the online event **"Round Table on Intellectual Property: Vaccines and Patents"** organized by the WAITRO office Germany in collaboration with African Europe Innovation Partnership (AEIP), Research Fairness Initiative (RFI) and North-West University (NWU).

The campaign featured posts on the WAITRO website and social networks (#RoundTableonIP), as well as email marketing actions. The campaign attracted over 100 registrations and participants. After the event, an event recap post and a high-level panel paper were published on the WAITRO website.

Quarter 3 | 2021

The third quarter focused on the development and implementation of a marketing campaign to promote the **WAITRO Innovation Award 2021**. A logo was created and a PDF presentation was made available on the website and shared via email. The entire campaign followed the same visual language that had the logo as its starting point. Colors, shapes and images were used uniformly in all advertising pieces, which added a visual identity to the campaign.

Communication actions were implemented in all WAITRO online channels. The posts on social media were published under the hashtag #WIA2021. The campaign was also broadcast on earned channels (online channels of WAITRO members and partners).

The campaign proved to be effective in attracting public interest, with more than 100 downloads of the PDF presentation and more than 250 downloads of the application form. During the period of the campaign (July to September), more than 30 opportunities were uploaded to SAIRA related to the topics: SDG 2, Agriculture, and Food & Nutrition.

Quarter 4 | 2021

We started the last quarter of the year with the promotion of the online event: **"How to Sell Ideas: Pitch Training for Researchers"**. The event was a success with +450 registrations, +150 participants and +130 feedback responses. WAITRO events are identified by the hashtag #WAITROEvent.

The rest of the quarter was dedicated to the development of a Content Marketing Calendar. The purpose of this marketing content is, among others, to support the goals and objectives of the **WAITRO Strategic Plan 2030**. Highlights:

UN International Days

The posts celebrating the UN International Days aim to raise awareness of the topics chosen by the United Nations and connect them to the role played by WAITRO and its members.
WAITRO Strategic Plan objective supported: 3.1 - Stimulate the sharing of knowledge and best practices among WAITRO member organizations.
#InternationalDays

New WAITRO Members

The posts about the New WAITRO Members are intended to announce the new members and inform about the benefits of WAITRO. It is a two-way post, also working as a repost, in case new members wish to inform their audience about their recent membership.
WAITRO Strategic Plan objective supported: 1.1 - Provide members with relevant information about WAITRO's value and the benefits of membership and ongoing opportunities.
#WAITRONewMember

SDG Series

The SDG Series posts aim to generate informative content about the SDGs. As well as promoting WAITRO member projects and WAITRO activities published in the "Impact & Insights" section of the WAITRO website.
WAITRO Strategic Plan objective supported: 4.1 - Promote WAITRO members activities on WAITRO website.
#SDGSeries

WAITRO Members Outreach

The WAITRO Members Outreach was created to promote the activities of the WAITRO members, and generate informative content for the WAITRO community.
WAITRO Strategic Plan objective supported: 4.1 - Allow members to share results and impact stories, which will increase the visibility of WAITRO members and its activities on a global scale.
#WAITROMemberOutreach

WAITRO Funding Series

The WAITRO Funding Series was created to share calls for funding programs of interest to the WAITRO community.
WAITRO Strategic Plan objective supported: 2.1 - Support the identification of funding opportunities for WAITRO members.
#WAITROFundingSeries

Results

Website

Growth (2020-2021)

New Users:	↑ 85,15%
Visits:	↑ 18,26%
Countries:	188

waitro.org

Social Media

Growth (2020-2021)

Audience:	↑ 24,91%
Engagement:	↑ 12,28%
Impressions:	↑ 48,19%
Posts:	↑ 178,52%

LinkedIn: @waitro Facebook: @waitro Twitter: @waitro Instagram: @waitro_org

Email Marketing

Performance (2021)

Subscribers:	↑ 46,20%
Open Rate:	27.39%
Click Rate:	8.72%

waitro.org/newsletter

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WAITRO Organizational Structure

WAITRO GENERAL ASSEMBLY

Executive Board

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Her Royal Highness Princess Sumaya bint El Hassan

FIRST VICE-PRESIDENT
Dr. Rubén Dario Cruz Rodríguez

SECOND VICE-PRESIDENT
David Tveit

REGIONAL REPRESENTATIVE FOR AFRICA
Dr Mapitso Molefe

REGIONAL REPRESENTATIVE ASIA AND THE PACIFIC
Theresia Ningsi Astuti

REGIONAL REPRESENTATIVE FOR EUROPE
Dirk Saseta Krieg

REGIONAL REPRESENTATIVE FOR LATIN AMERICA AND THE CARIBBEAN
Dr. Randall Loaiza

REGIONAL REPRESENTATIVE FOR MIDDLE EAST AND NORTH AFRICA
Dr. Emad Mohamed M. Ewais

Secretariat

Dr. Eckart Bierdümpel
Secretary General

Dominik Reinertz
Director
WAITRO Office Germany

Dr. Paul E. Burrows
Director
WAITRO Office China

Julia Wiethüchter
Program Manager

Ran Duan
Program Coordinator

Andrea Santos
Head of Marketing & Communication

Yiwen Jiang
Program Support

Anna Wohlrab
Program Manager

Nala Müller
Administration

Linn Sommerhoff
Legal Advice

Mona Kern
Communication & Social Media

Jerome Harrison
Strategy & Analysis

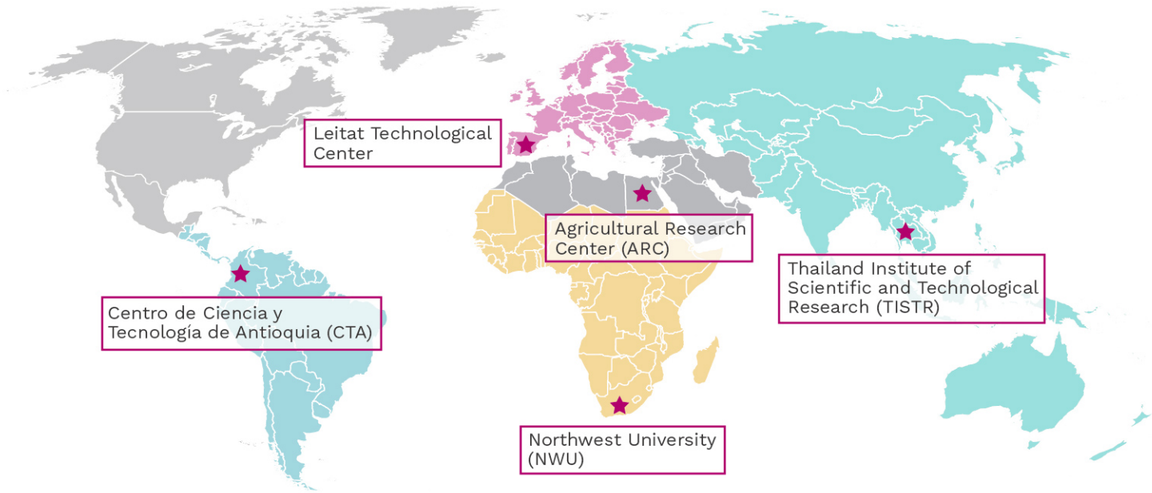
Dikshita Kalita
IT Solutions

Johanna Engelbach
Design

Karla Garcia
Communication

Sarah Großmann
Marketing &
Communication Assistant

Regional Focal Points



Africa
Northwest University (NWU)

Asia & the Pacific
Thailand Institute of Scientific and Technological Research (TISTR)

Europe
Leitat Technological Center

Latin America & the Caribbean
Centro de Ciencia y Tecnología de Antioquia (CTA)

Middle East & North Africa
Agricultural Research Center (ARC)