MAPÚA UNIVERSITY

2020-2021
REPORT SYNOPSIS
SUSTAINABLE DEVELOPMENT GOALS

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MAPÚA
UNIVERSITY

CONTENTS

1 PRESIDENT'S MESSAGE
2 SDG ICONS
3 PARTNERSHIP FOR THE GOALS
8 NO POVERTY
10 ZERO HUNGER
13 GOOD HEALTH AND WELL-BEING
15 QUALITY EDUCATION
18 GENDER EQUALITY
20 CLEAN WATER AND SANITATION
25 AFFORDABLE AND CLEAN ENERGY
30 DECENT WORK AND ECONOMIC GROWTH
32 INDUSTRY INNOVATION AND INFRASTRUCTURE
35 REDUCED INEQUALITY
38 SUSTAINABLE CITIES AND COMMUNITIES
42 RESPONSIBLE CONSUMPTION AND PRODUCTION
45 CLIMATE ACTION
48 LIFE BELOW WATER
50 LIFE ON LAND
52 PEACE, JUSTICE AND STRONG INSTITUTION
ACKNOWLEDGEMENT

Words from The President

I would like to express my thanks and appreciation to all our partners from distant shores and from this country, the Philippines. The Mapúa University expresses the support and its contribution for the attainment of the United Nations Sustainable Development Goals. Indeed, through partnership we can all join hands from all over the world to address global sustainability concerns by means of a common platform for research, development and innovation.

Dr. Reynaldo B. Vea

President
Mapúa University

"The Sustainable Development Goals are a call for action by all countries – poor, rich and middle -income – to promote prosperity while protecting the planet."

-UN, 2021

17 PARTNERSHIPS FOR THE GOALS

INTERNATIONAL PARTNERS

OFFICE OF INTERNATIONAL LINKAGES FOR RESEARCH AND DEVELOPMENT

Netherlands
- Saxion University

Sweden
- Jonkoping University
- KTH Royal Institute of Technology

Russia
- Rosinfocominvest (RICI)

Thailand
- Chulalongkorn University

France
- Ecole Nationale Des Travaux Publics De l'etat

Bulgaria
- Varna University of Management

China
- Sichuan University of Science and Engineering
- Tongji University

Iceland
- Rekjavik University

Serbia
- University of Belgrade

South Korea
- Dong A University
- Seoul Nat'l University of Science and Technology
- University of Science and Technology

United Kingdom
- Glasgow Caledonian University
- University of East Anglia
- University of Glasgow

India
- Suresh Gyan Vihar University
- Amity University Madhya Pradesh
- SRM Institute of Science and Technology
- Delhi Technological University

Japan
- Osaka University

Ireland
- West BIC

Italy
- Deus Technology
- University of Studies Guglielmo Marconi

Taiwan
- Chia Nan University of Pharmacy and Science
- Chung Yuan Christian University
- Nat'l Kaohsiung Univ of Science & Technology
- Nat'l Pingtung Univ of Science & Technology
- Nat'l Taiwan University of Science & Technology
- National Cheng Kung University
- National Tsing Hua University
- National Chiao Tung University
- National Sun Yat-Sen University
- National Ilan University
- Chang Jung Christian University
- National Taiwan University
- National Taipei University of Technology
- National Chung Cheng University
- Meiho University
- Taiwan Water Conservancy
- Taiwan Water Corporation
- Tainan Hydraulics Laboratories

United States
- Environmental Strategies International
- Old Dominion University
- Rowan University
- University of California, Berkeley
- Michigan State University

Greece
- University of Thessaly

Vietnam
- Ho Chi Minh Open University
- Hue University
- University of Economics and Business of Vietnam National University

Kenya
- UNEP GUPES

Malaysia
- Universiti Tenaga Nasional
- Universiti Teknologi Petronas

Canada
- The University of Western Ontario

Indonesia
- Binus University
- Institut Teknologi Bandung
- University of 17 Augustus 1945

Australia
- Royal Melbourne Institute of Technology
- Deakin University

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INTERNATIONAL PARTNERS FOR THE GOALS

Co-funded by the Erasmus+ Programme of the European Union

Building Entrepreneurial Ecosystems to Enhance HIgher Education Value-Added for Better Graduate Employability

at Varna, Bulgaria with BEEHIVE team

BEEHIVE team training at Baguio City, Philippines

at Yuchengco Innovation Center, Mapúa University, Manila City, Philippines for the pitching event

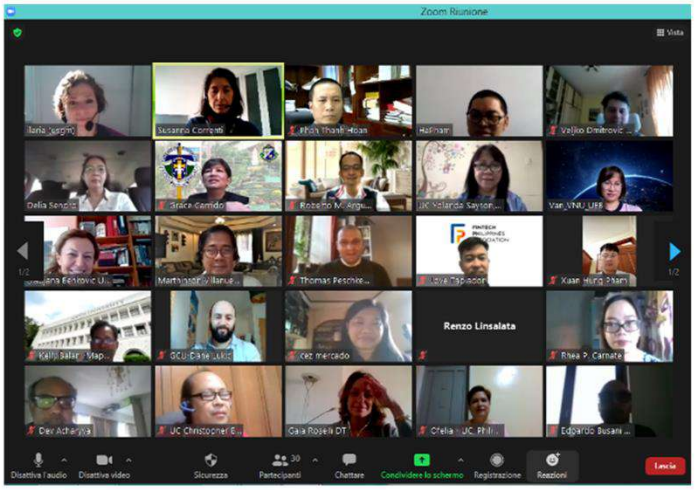
at Rome, Italy with BEEHIVE team

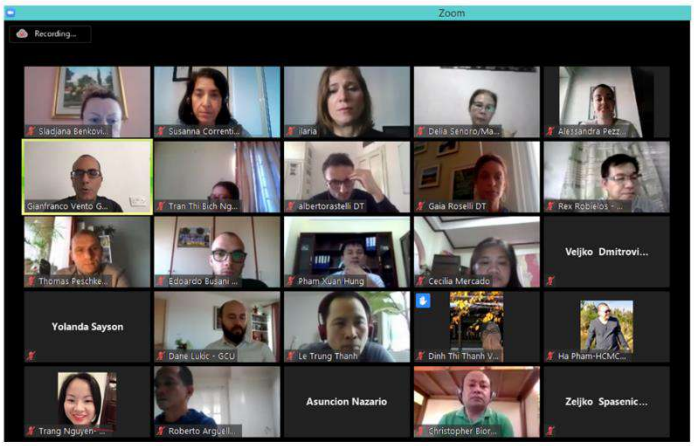
INTERNATIONAL PARTNERS FOR THE GOALS

Co-funded by the Erasmus+ Programme of the European Union

TRUST

Financial Technology and digital innovation to modeRnise and develop cUrricula of VietnameSe and Philippines UniversiTies





TRUST PROJECT PROFESSIONAL DEVELOPMENT WEBINAR: FINAL SHOWCASE EVENT

The final showcase event in the series will highlight outputs and resources from previous workshops and associated study groups.

The session will provide a focus for a launch of a local Community of Practice around FinTech education in Vietnam and the Philippines, linking to future dissemination and exploitation activities of the TRUST Project.

Speakers:

Dr Dane Lukic, GCU London
Dr Colin Milligan, GCU,
Dr Thomas Peschken, GCU London.

Ilaria Reggiani, Università degli Studi Guglielmo Marconi

This session will also include contributions from study group participants.

Thursday, October 21, 2021
0730-0930 BST
0830-1030 CET
1330-1530 VN
1430-1630 PH

To register for the session, please complete the registration form at https://bit.ly/3v3JgvR

INTERNATIONAL PARTNERS FOR THE GOALS

SATU
Presidents' Forum

CERTIFICATE of MEMBERSHIP

This is to certify that

Mapua University

has been granted an honourable membership in the
SATU Presidents' Forum of Southeast and South Asia and Taiwan Universities
from January 2020–December 2021

Date: May 2020

Prof. Huey-Jen Jenny Su
Chairperson, SATU Presidents' Forum

Mobile Laboratory
Prompt Detection and Analysis for Environmental Quality Monitoring

NATIONAL PARTNERS FOR THE GOALS

D-HIVE features 3 tools for monitoring and prompt emergency response:

- **Health Vulnerability Indices**
- **Health Hazard Maps**
- **eSalba application**

1 NO POVERTY

END POVERTY IN ALL ITS FORMS

Local start-up assistance through Basic Welding Workshop

Mapúa University's Office for Social Orientation and Community Involvement Program (SOCIP) offered a free seminar workshop on Basic Welding last February 2020 to help students and adopted community (Pandacan, Manila) in acquiring an added basic life skill to help them in seeking possible jobs as a source of their income for their livelihood.

The BEEHIVE project is funded through the Erasmus+ Capacity Building in Higher Education. The project aims to enhance the employability and ability to create jobs of the students and graduates from the higher education. Furthermore, the project strives to support the involved universities' transformation into entrepreneurial universities.

BEEHIVE:
Building Entrepreneurial Ecosystems to Enhance Higher Education Value-Added for Better Graduate Employability

International pitch event organized by BEEHIVE team. The event was participated by students from Philippines and Indonesia. This is to address poverty reduction.

Potential investors and various industrial sectors were invited to watch the event for possible business opportunities.

2 ZERO HUNGER

End hunger, achieve food security and improved nutrition and promote sustainable agriculture

Sharing the best practices at Rutgers University, USA with Mapúa University, Philippines to address Zero Hunger during the ASDG2021 concatenated fora.

The Banaue Rice Terraces of the Philippines – one of the primary sources of rice.

"An estimated **2 billion people** in the world did not have regular access to safe, nutritious and sufficient food in 2019."

- Dr. Sladjana Benkovic, 2021

Dr. Sladjana shared information, during the ASDG2021 about the role of the university on how to reduce hunger.

CHANGED

CAMPUS FOOD WASTE MONITORING

Mapúa University continues to monitor the amount of food waste generated from the food served within the campus. This was a strategy to create policy and plans to avoid excessive left-over food and contribute to the attainment of SDG 2 – Zero Hunger. Affluent individual was advised to buy "just enough food" for every needed meal and encouraged to fully consume the food they bought. This would give chance to others who have not eaten yet to have readily available food in time of need. This is also to have reduced quantity of wastes.

	MONTH	WW1	WW2	WW3	WW4	SUB TOTAL
Calendar Year 2021	January	11.9	4.6	5.4	5.2	27.0
	February	7.5	6.0	4.2	4.8	22.6
	March	2.0	2.0	2.0	1.0	7.0
	April	1.0	2.0	1.0	1.0	5.0
	May	2.0	1.0	1.0	1.0	5.0
	June	3.4	6.5	4.9	8.9	23.7
	July	2.50	1.26	1.82	5.30	10.9
	August	1.20	1.55	2.74	3.34	8.8
	September	2.52	1.02	1.03	1.63	6.2
	October	3.20	3.01	2.50	2.30	11.0
	November	1.74	2.82	1.03	1.96	7.6
	December	5.6.	2.18	3.50	1.88	7.6
					TOTAL	142.4

AFFORDABLE PRICES

VMES CANTEEN
Mapua Institute of Technology
Muralla st, Intramuros , Manila

MEALS

Pork	Price with Rice
Pork Adobo	P65.00
Pork Tenderloin	65.00
Pork Terriyaki	65.00
Pork Dinuguan	65.00
Lechon Kawali	65.00
Lumpiang Shanghai	65.00
Pork Menudo	65.00
Nilagang Baboy	65.00
Korean Pork	65.00
Sweet sour Pork	65.00
Pork chop in white sauce	65.00
Pork Afritada	65.00
Pork Asado	65.00
Pork Binagoongan	65.00
Pork Humba	65.00
Pork kalderetа	65.00
Pork Kare Kare	65.00
Pork Potchero	65.00
Pork sinigang	65.00
Pork Sisig	65.00
Pork Steak	65.00
Pork fried Liempo	65.00
Sweet sour Meatballs	65.00
Tokwat baboy	65.00
Pork giniling	65.00
Pork Egado	65.00
Spicy Pork	65.00
Pork Lechon Paksiw	65.00
Pork Tapa	65.00
Pork Mushroom	65.00
Pork Stew	65.00
Pork Callos	65.00
Pork Longanisa	45.00
Pork Skinless	45.00
Pork Chicharong Bulaklak	65.00

Seafood with Rice	
Fried Tuyo	P10,00 per pc.
Fried Tinapa	35.00
Fried Daing	35.00
Adobong Pusit	65.00
Sweet Sour Tilapia	65.00
Fried Tilapia	65.00
Fried Bangus	55.00
Sinigang sa Miso Salmon	65.00
Fried Galunggong	50.00
Fried fish Fillet	65,00
Rellenong Bangus	65,00
Calamares	65,00
Tahong	45.00
Sinigang na Hipon	75.00

Chicken	Price with Rice
Chicken Adobo	P65.00
Buttered Chicken	65.00
Chicken Afritada	65.00
Chicken Caldereta	65.00
Chicken Curry	65.00
Fried chicken	65.00
Chicken Liver and Gizzard	65.00
Chicken Terriyaki	65.00
Hawaiian Chicken	65.00
Chicken Sinampalukan	65.00
Chicken Tinola	65.00
Korean Chicken	65.00
Chicken steak	65.00
Chicken Lechon Paksiw	65.00
Chicken Fillet	65.00
Chicken Pastel	65.00
Grilled Chicken	65,00

Beef with Rice	
Beef Nilaga	P75.00
Beef Steak	75.00
Sinigang na Baka	75.00
Braised Beef	75.00
Beef with Mushroom	75.00
Beef Estufado	75.00
Beef Kare Kare	75.00
Beef Stew	75.00
Beef Caldereta	75.00
Beef Pares	75.00
Beef Tapa	75.00
Burger steak	75.00
Beef Terriyaki	75.00
Beef Nilaga	75.00
Cornedbeef	75.00

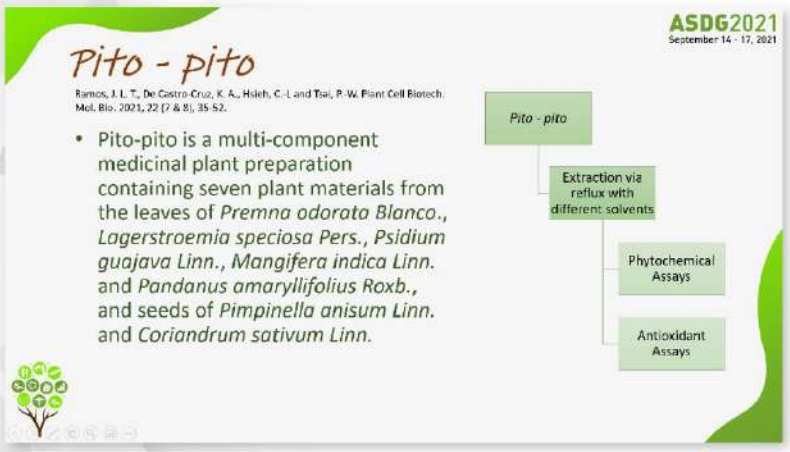
Vegetable with Rice	
Adobong Sitaw	45.00
Chopsuey	55.00
Patola with Misua	45.00
Ginataang Langka	45.00
Ginataang Kalabasa (sitaw)	45.00
Ginisang Ampalaya	45.00
Ginisang Mongo	45.00
Ginisang Pechay Bagiuo Repolyo	45.00
Ginataang Puso ng Saging	45.00
Ginisang Chayote	45.00
Ginisang Upo	45.00
Gising gising	45.00
Laing	45.00
Pinakbet	45.00
Tortang Talong	45.00
Sprouted Mongo	45.00

Mapúa University's Campus Development and Maintenance Office reported that the Mapúa Canteen's concessionaire "VMES Canteen" provides the students, faculty members, employees, and even visitors with a variety of meals and snacks at affordable prices that are cooked fresh daily.

3 GOOD HEALTH AND WELL-BEING

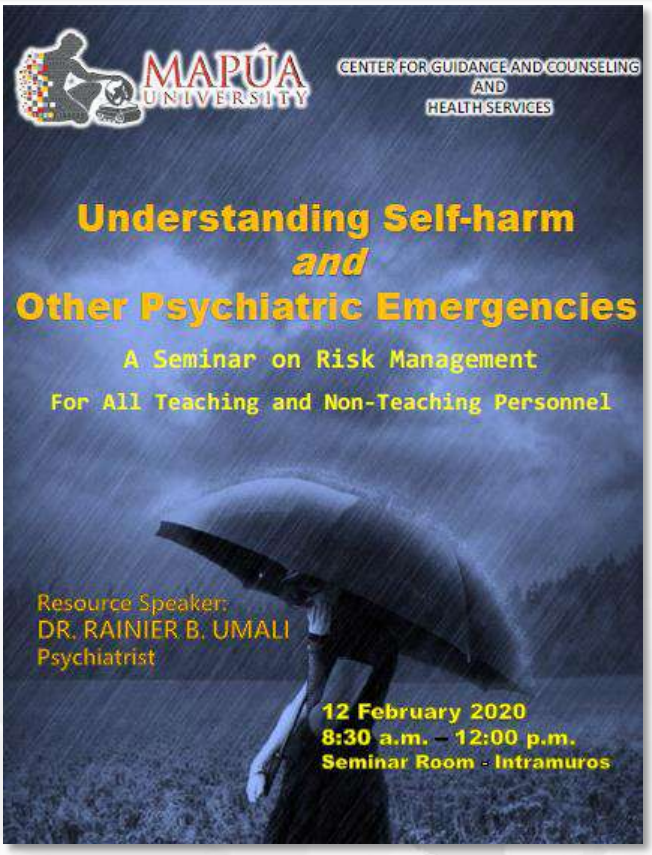
To ensure healthy lives and promote wellbeing for all at all ages

Natural product research is the interest and expertise of Dr. Kathlia De Castro-Cruz of the School of Chemical, Biological, and Materials Engineering and Sciences. The focus of research is the application of natural products for medicine, food and drink products, biocides, beauty products, and essential oils for well-being.



According to Dr. Cruz during the event Addressing Sustainable Development Goals, among the natural products is the local plant "**Pito-Pito**".

Health support for students and staff amidst the pandemic



Mapúa University understood the need for professional medical care, especially in the time of the pandemic. Mapúa's Health Services Department provided online health consultation to students and employees. It also partnered with Mapúa's Center for Guidance and Counseling to provide webinars aimed at mental health. In addition to that, students and employees were provided online medical support through the service app KonsultaMD, which can be accessed anytime and anywhere. All these efforts contribute to the physical and mental wellness of students and personnel during the COVID-19 pandemic.

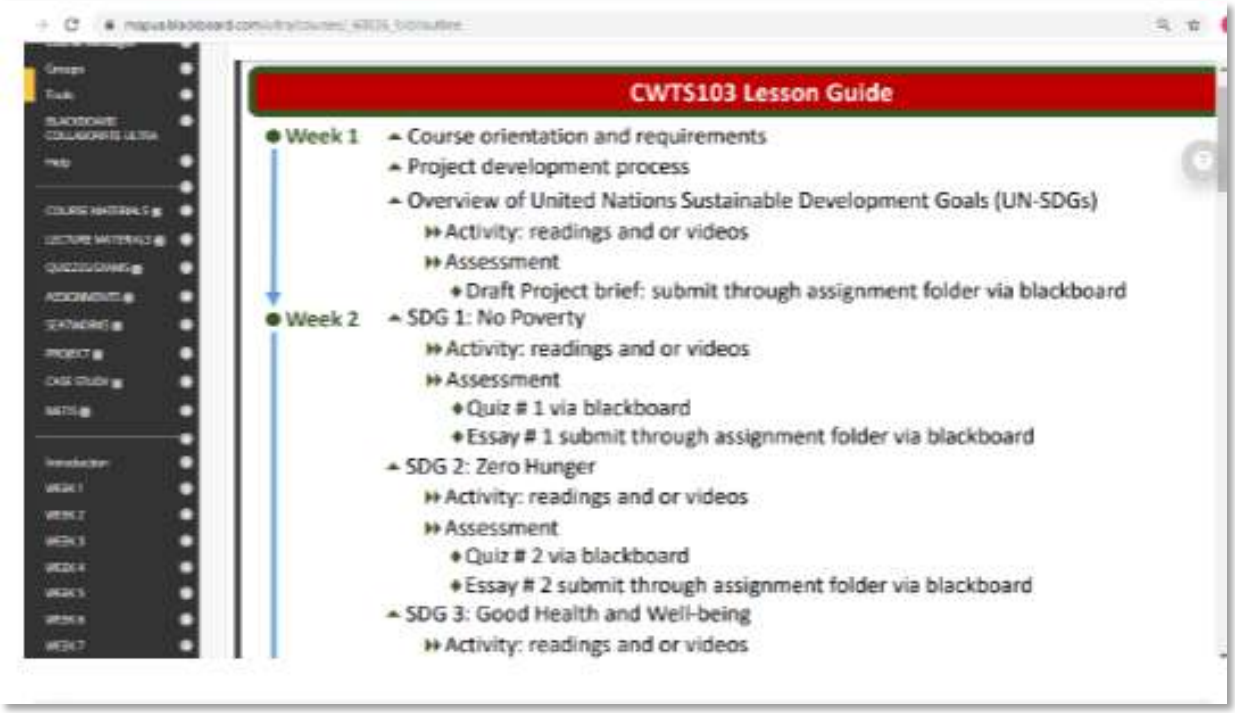
Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Mapúa University is a member of TRUST project team co-funded by the European Union Erasmus Plus Programme. The objective is to develop a new master's degree program in financial technology and digital innovation as well as to modernize existing master's degree programs. This is to produce human resources with quality education and life-long learning to support the financial services industry's needs.

The University of Studies Guglielmo Marconi, the international coordinator of TRUST project, participated in the ASDG2021 concatenated fora organized by Mapúa University. The event was participated by the Philippine Commission on Higher Education, Saint Louis University, University of Cebu, and 207 participants from academe and financial services industry.

Dr. Bonifacio T. Doma, Jr., Mapua University's Executive Vice President for Academic Affairs, presented the academic programs of Mapúa University focusing on the "Industry 4.0: Innovation Accelerators" during the ASDG 2021. These consisted of academic programs that have subjects on the 8 major areas of innovation, namely, IOT, cybersecurity, cloud computing, big data, simulation, additive manufacturing, autonomous robots, and augmented reality. These subjects help in ensuring the students' lifelong and high-quality learning opportunities.

Freshmen students in all Mapúa programs were required to take a full course tackling all 17 SDGs. The course CWTS103 is designed to discuss the SDGs with a final requirement to render community outreach. The course consisting of micro-lecture videos, readings, and assessments were delivered in synchronous and asynchronous modes via Mapúa's learning management system Cardinal EDGE.



Snapshot of the micro-lecture video that discusses UN SDGs.

5 GENDER EQUALITY

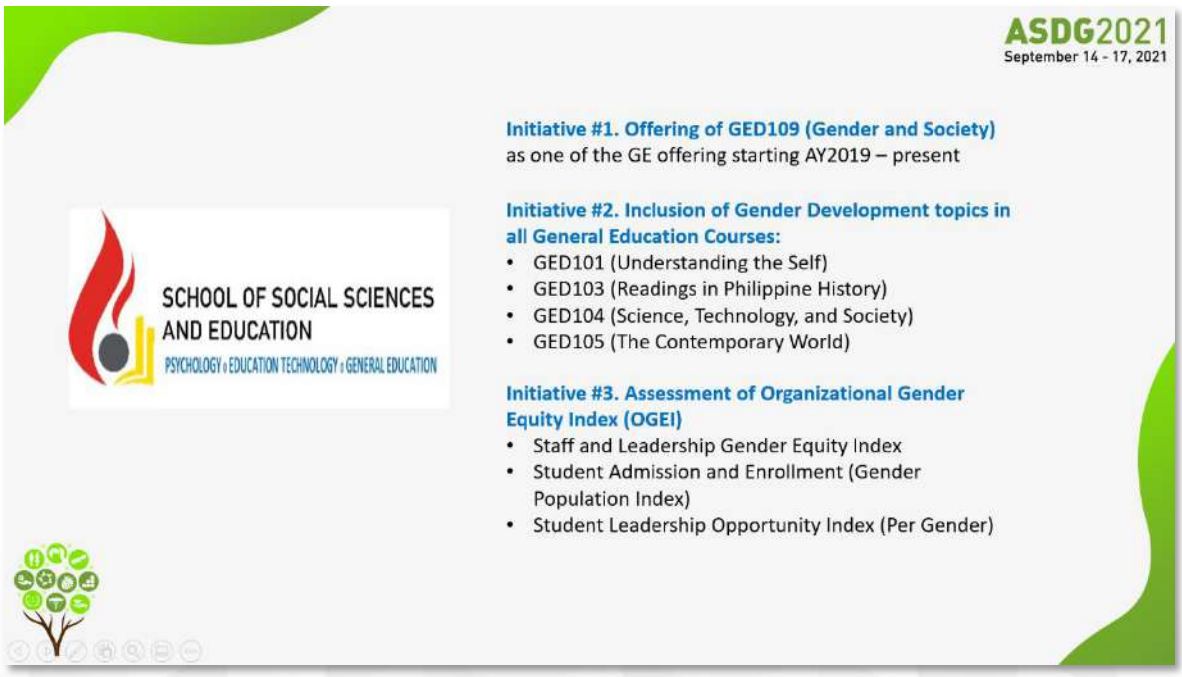
Achieve gender equality and empower all women and girls

The Mapúa's Office of International Linkages for Research and Development, in collaboration with international partner organizations and academic institutions, hosted a series of fora and events entitled "Addressing Sustainable Development Goals (ASDG) by Partnership in Research, Innovation and Academic Programs," inviting both women and men leaders as speakers and presenters.

In addition, young women and girls are being encouraged to enroll in electrical engineering program, which was formerly known as program for men and boys only.

Mapúa University's Gender equality initiatives in the academic program

The gender equality concept of UN SDG has been embedded in the academic programs of the School of Social Sciences and Education.



6 CLEAN WATER AND SANITATION

Ensure availability and sustainable management of water and sanitation for all

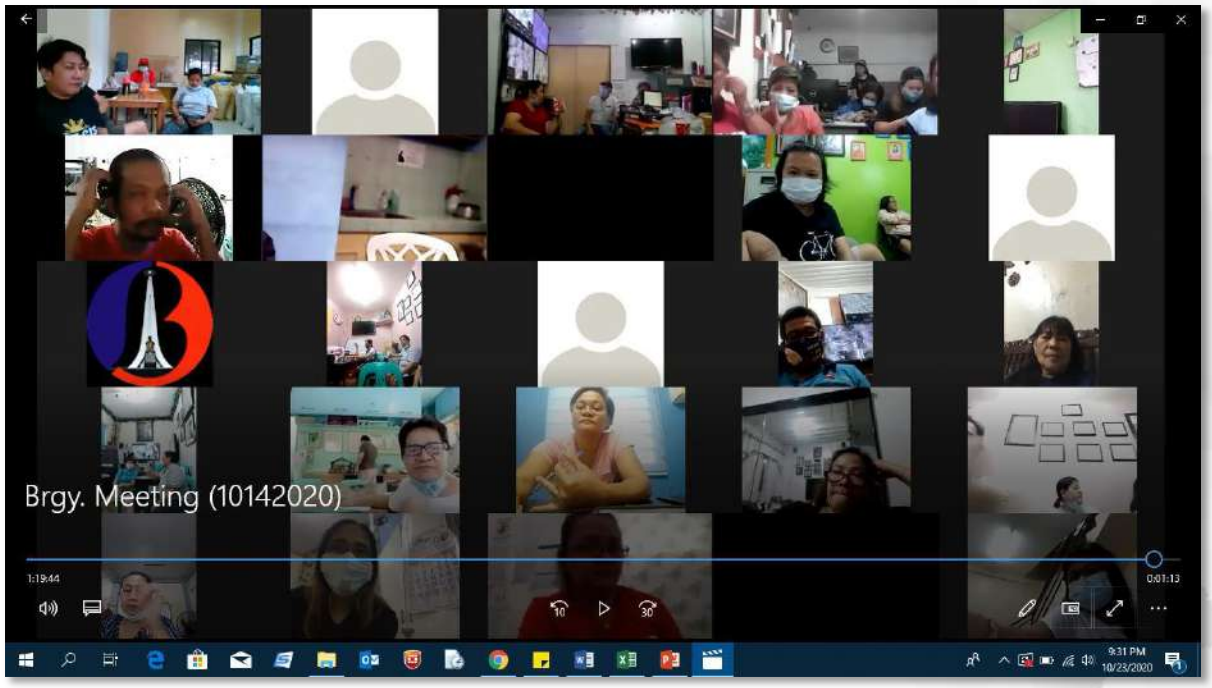
Use of rainwater for sustainability

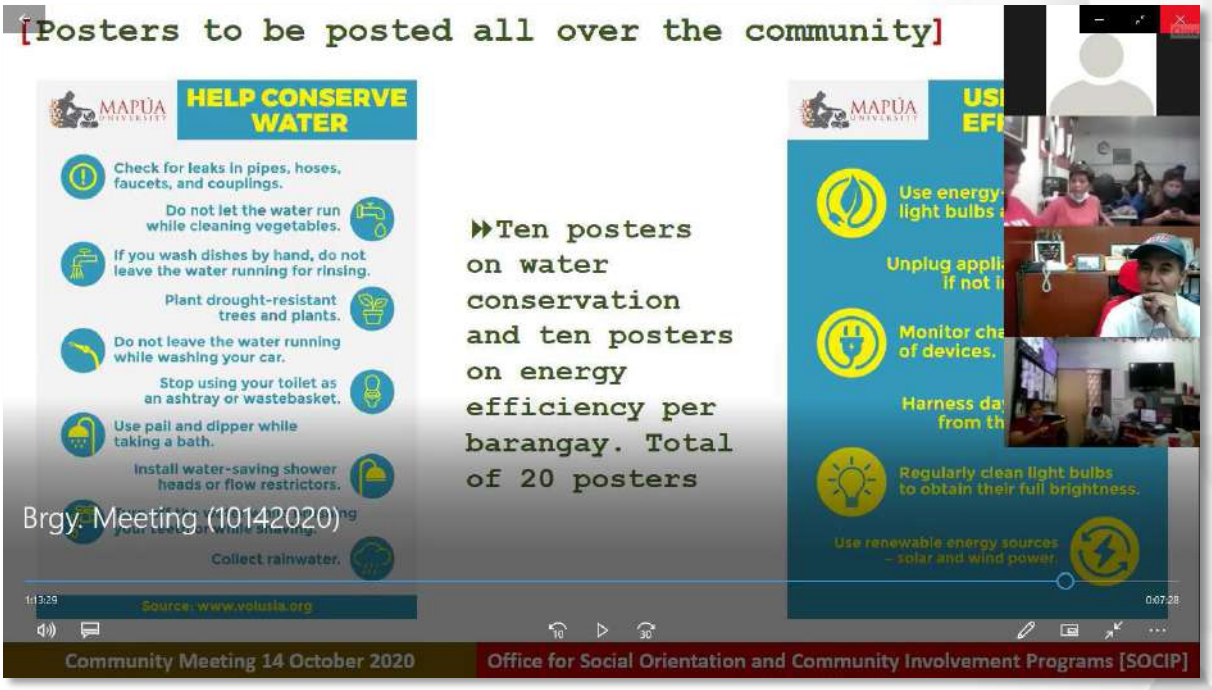
Mapúa University has implemented rainwater harvesting at its Yuchengco Innovation Center (YIC) in Intramuros, Manila City. This is to conserve water and reduce the volume of water use. The collected rainwater is used to water the plants and landscape of YIC. The Mapúa Makati campus also followed suit by installing rainwater collector tanks.

The rainwater harvesting system at YIC

Mapúa Makati's rainwater collector tanks

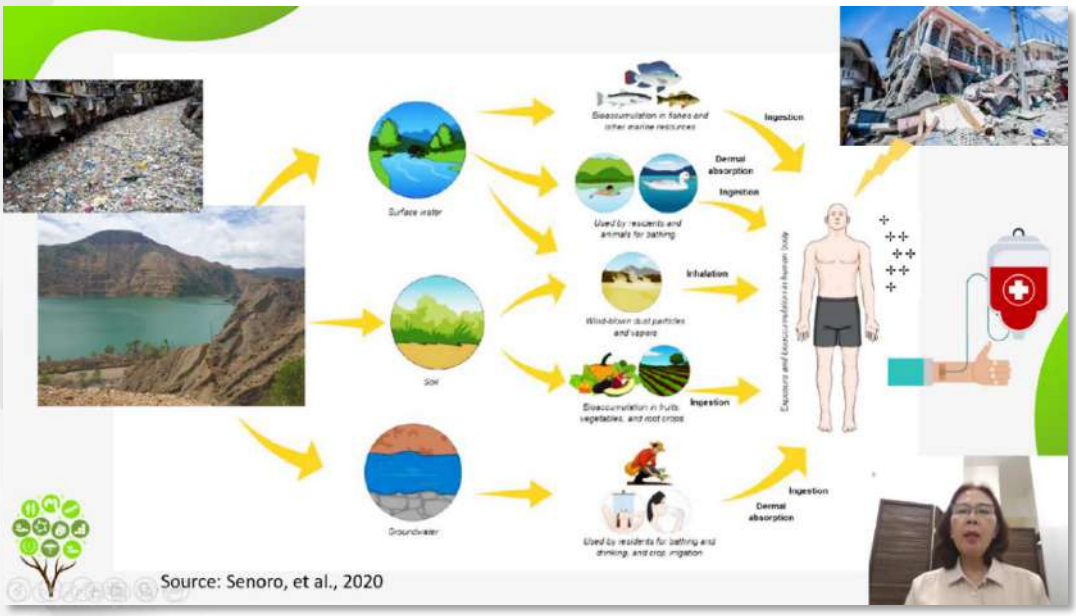
Water Conservation Promotion and Awareness to Partner Communities



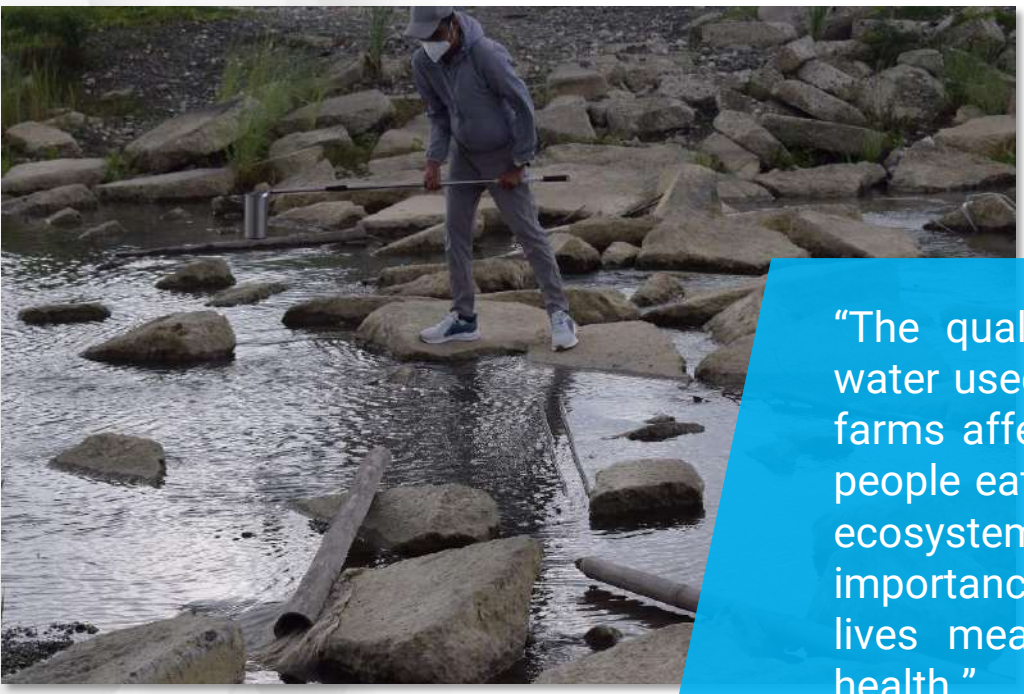


In support to the off-campus effort in water conservation, an online community assembly was held by Mapúa's Office of SOCIP through a Zoom meeting last October 2020. This was to encourage community partners (Pandacan, Manila City) to contribute in water conservation efforts. Also, this online event created awareness on how people can reduce unnecessary water usage.

D-HIVE research project funded by the Department of Science and Technology-Philippine Council for Health Research and Development: Monitoring of metal concentration in water in some island provinces of the Philippines in cooperation with state universities and colleges (SUCs) and local government units (LGUs).



Source: Senoro, et al., 2020

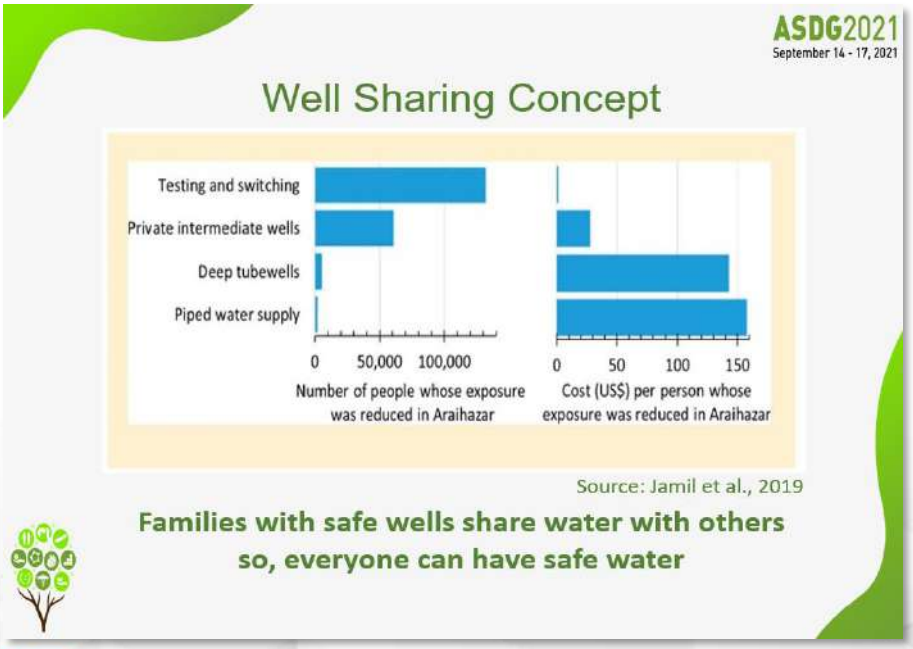


"The quality of ambient water, the water used for cooking and irrigating farms affect the quality of food that people eat. Hence, taking care of the ecosystem and being aware of the importance of sanitation in everyday lives means taking care of public health."

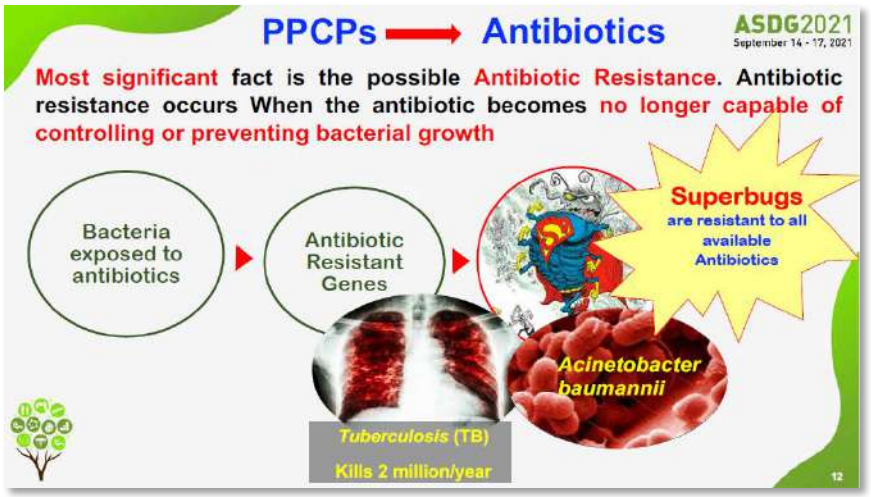
- Dr. Delia B. Senoro, 2021

Well Sharing Concept: A Low-Cost Method for Safer and Cleaner Water

Dr. Robert Kurkjian of Environmental Strategies International at U.S.A. presented a sustainable and low-cost strategy developed in a select community in Bangladesh named “Well Sharing Concept” as shown in the figure below. According to him, this method implements a program in which families within safe wells share water with others that have higher exposure to Arsenic present in their nearby water wells. This is to help improve the availability of cleaner water for the community, which is to be replicated later across Bangladesh and other countries.



Sustainable Management of Emerging Water Contaminants: Pharmaceuticals and Personal Care Products (PPCPs)



An insight on emerging contaminants particularly PPCPs in urban water in Sri Lanka was presented by Dr (Eng). Tushara Chaminda at the ASDG2021 online webinar. According to him, an increased prevalence of PPCPs in water has significance in the increased antibiotic resistance, which could lead to health concerns in the future. Thus, to manage the sustainability of urban water, it is recommended to:

- Develop programs that continuously monitor emerging water contaminants.
- Develop policies for industrial, hospital, and municipal wastewater discharge.

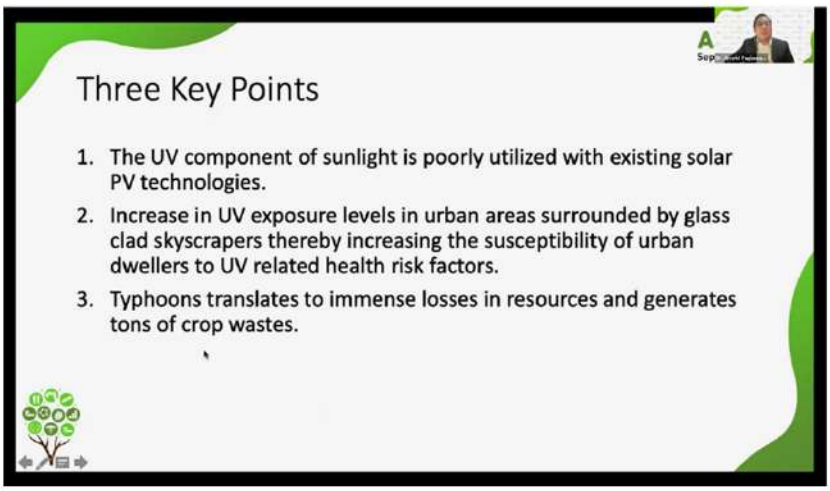
7 AFFORDABLE AND CLEAN ENERGY

Ensure access to affordable, reliable, sustainable, and modern energy for all

Renewable Energy from Vegetables

Dr. Arnold Paglinawan, the Dean of the School of Electrical, Electronics, and Computer Engineering at Mapúa University, presented at the Addressing Sustainable Development Goals (ASDG) 2021 webinar the innovation of their student Carvey Ehren Maigue.

The 3 key points of motivation are:



Carvey uses waste crops from fruits and vegetables that converts UV light into renewable energy. This innovation is called the AuREUS or Aurora Renewable Energy and Ultraviolet Sequestration.

The AuREUS system is an evolution of four walls and windows and uses technology synthesized from upcycling crop wastes to absorb stray UV light from sunlight and convert it to clean, renewable energy. This invention addresses the issues of UV sequestration. It provides better access to solar energy for climate change mitigation, and it supports the local agricultural industry hit by calamities. This is by upcycling crops that would otherwise be considered wastes, thus mitigating farmer loss. Ultimately addressing the three key point challenges the university had targeted serves as its contribution towards addressing the seventh sustainable development goal.

"AuREUS INCREASES SOLAR ENERGY HARVESTING DENSITY BY TENFOLD, AND OPENS THE POSIBILITY OF URBAN AREAS AS SOLAR FARM SITES"

Inspiration for the AuREUS technology:

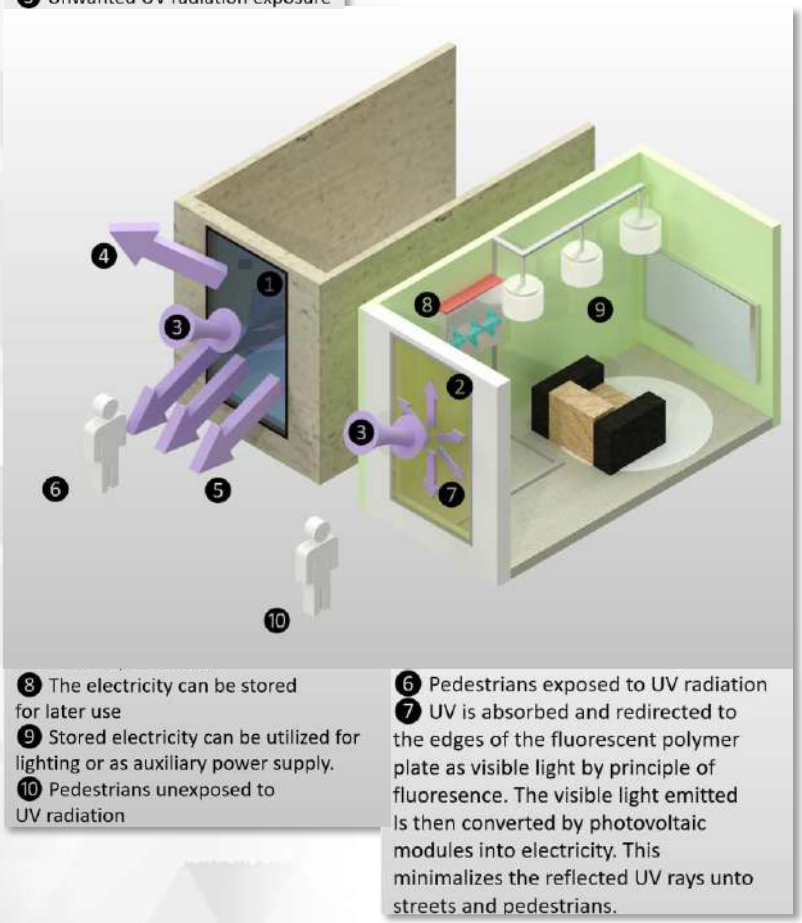
Features of Borealis Solar Window

(1) Excess UV exposure in urban areas is being induced by glass buildings. The inspiration for the solution came from the Auroras, wherein high energy (gamma, UV) is degraded to low energy state (visible light) by luminescent particles in the atmosphere. The AuREUS technology is based on this concept and uses similar functioning particles.

(2) Solar farms are built horizontally and never vertically, until now. Since our AuREUS captures UV, it can produce electricity even when not facing the sun, so buildings clad on all sides with AuREUS become vertical solar farms.

(3) Crops easily spoil and cause losses to farmers. With this technology, waste can be upcycled.

There are two AuREUS devices, the Borealis Solar Window and Australis Solar Wall, which use the same technology derived from the phenomenon that governs the Northern and Southern lights.



How AuREUS works?

• High energy particles are absorbed by luminescent particles that re-emit them as visible light.
• Similar type of luminescent particles (derivable from certain fruits and vegetables) were suspended in a resin substrate and is used as the core technology on both devices.
• When hit by UV light, the particles absorb and re-emit visible light along the edges due to internal reflectance.
• PV cells are placed along the edges to capture the visible light emitted.
• The captured visible light is then converted to DC electricity.
• Regulating circuits will process the voltage output to allow battery charging, storage, or direct utilization of electricity.

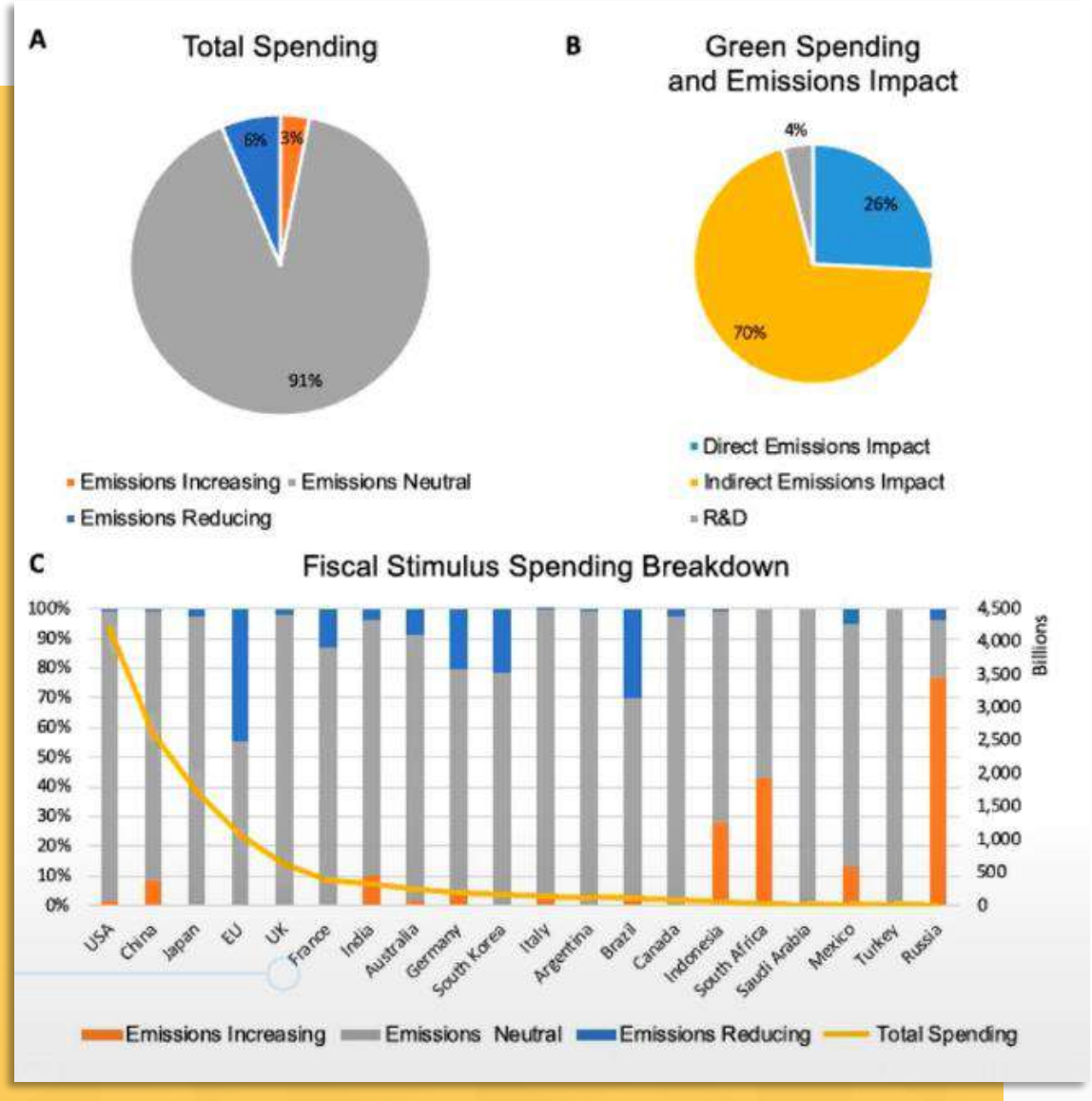
AuREUS			
VS Quantum Dot Solar Windows	**VS Solar Panels**	**VS Commercial Grade Windows**	**VS Crop Waste Disposal**
• AuREUS used cheaper materials and as of 2019 has been applied and tested for mechanical and acoustic properties for building settings. • In terms of application, AuREUS has been constantly leading.	• AuREUS can function even when not directly facing the sun, it can rely on UV scattering through clouds and by UV light bouncing along walls, pavements, other buildings. • This will enable the construction of a Vertical Solar Farm even with a small lot area. • This is highly applicable for skyscrapers in urban settings allowing access to clean renewable electricity.	• glass cladding used in buildings use special films that reflect UV away from the building. • This causes induced UV exposure to people outside. • AuREUS absorbs UV light instead, protecting people both indoors and outdoors.	• AuREUS upcycles fruit and vegetable scraps giving life to materials considered as trash.

AuREUS was compared to other energy harnessing materials and the table shows how AuREUS is different from materials such as Quantum Dot Solar Windows, Solar panels, Commercial Grade Windows, and Crop Waste Disposal.

CHANGED

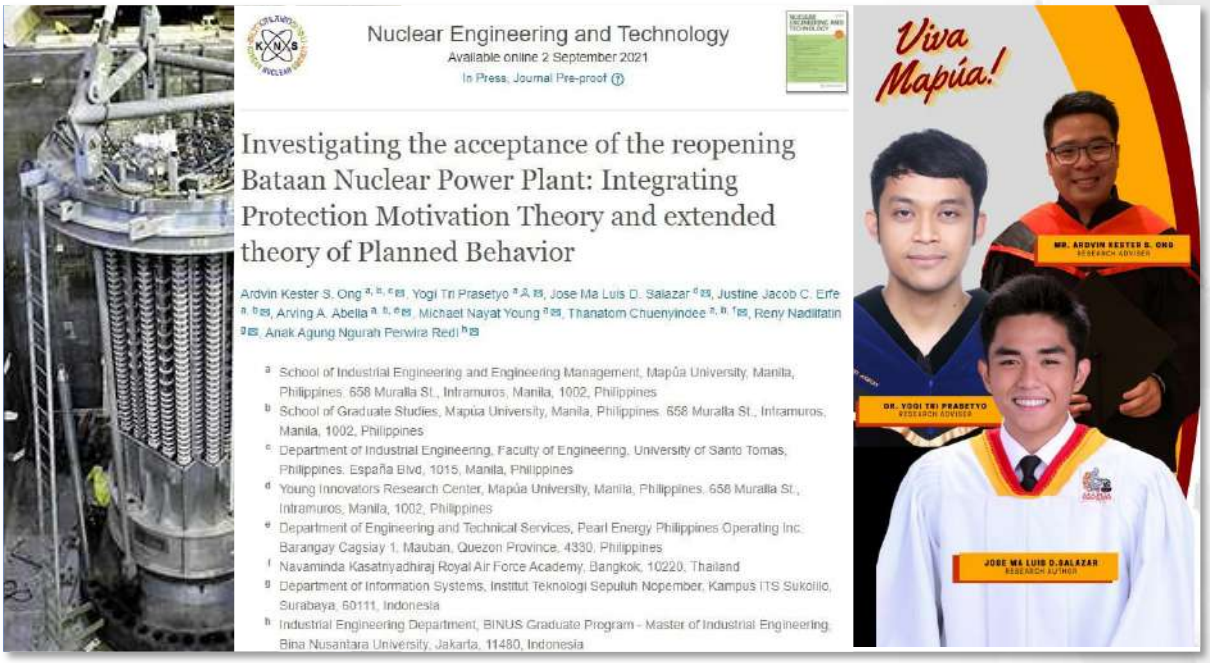
Affordable and Clean Energy: Data on Emissions Impacts

Dr. Johannes Urpelainen of Johns Hopkins University in the U.S.A. presented the data that support the clean energy policies. According to him, the figures above show the data of stimulus spending on increased emissions of various countries in 2020.



Bataan Nuclear Power Plant re-opening: Positive or Negative?

During the ASDG 2021 Dr. Yogi Tri Prasetyo shared a study on the acceptance of the reopening of the Bataan nuclear powerplant (BNPP). Results showed that a person who is more particularly knowledgeable with the risk of opening the BNPP tend to lead to a negative acceptance. While, if a person's knowledge is more on the benefits of opening the BNPP then, they tend to have positive acceptance.



Nuclear Engineering and Technology
Available online 2 September 2021
In Press, Journal Pre-proof

Investigating the acceptance of the reopening Bataan Nuclear Power Plant: Integrating Protection Motivation Theory and extended theory of Planned Behavior

Ardvin Kester S. Ong [a, b, c], Yogi Tri Prasetyo [a, d], Jose Ma Luis D. Salazar [d], Justine Jacob C. Erfe [a, b], Arving A. Abella [a, b, e], Michael Nayat Young [a], Thanatorn Chuenyindee [a, b, f], Reny Nadlifatin [g], Anak Agung Ngurah Perwira Redi [h]

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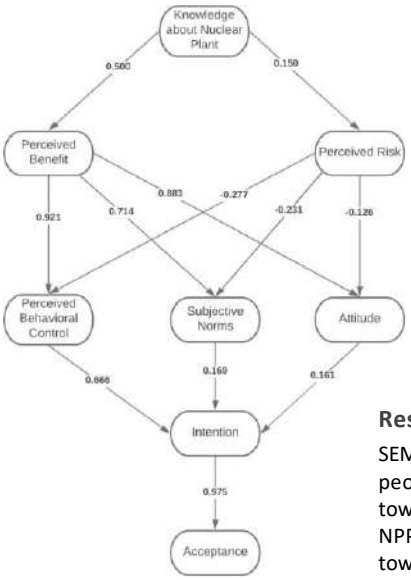
[b] School of Graduate Studies, Mapúa University, Manila, Philippines. 658 Muralla St., Intramuros, Manila, 1002, Philippines
[c] Department of Industrial Engineering, Faculty of Engineering, University of Santo Tomas, Philippines. España Blvd, 1015, Manila, Philippines
[d] Young Innovators Research Center, Mapúa University, Manila, Philippines. 658 Muralla St., Intramuros, Manila, 1002, Philippines
[e] Department of Engineering and Technical Services, Pearl Energy Philippines Operating Inc. Barangay Cagsiay 1, Mauban, Quezon Province, 4330, Philippines
[f] Navaminda Kasatriyadhiraj Royal Air Force Academy, Bangkok, 10220, Thailand
[g] Department of Information Systems, Institut Teknologi Sepuluh Nopember, Kampus ITS Sukolilo, Surabaya, 60111, Indonesia
[h] Industrial Engineering Department, BINUS Graduate Program - Master of Industrial Engineering, Bina Nusantara University, Jakarta, 11480, Indonesia

"This study is the first study that explored the acceptance of the reopening BNPP."



Results:

SEM showed that PBC and attitude are mediators towards the acceptance of people regarding the reopening of BNPP. If an individual's knowledge gravitates towards the perceived risk, then this can lead to the negative acceptance of the NPP reopening. On the other hand, if an individual's knowledge gravitates towards the perceived benefits, then this will lead to positive acceptance.

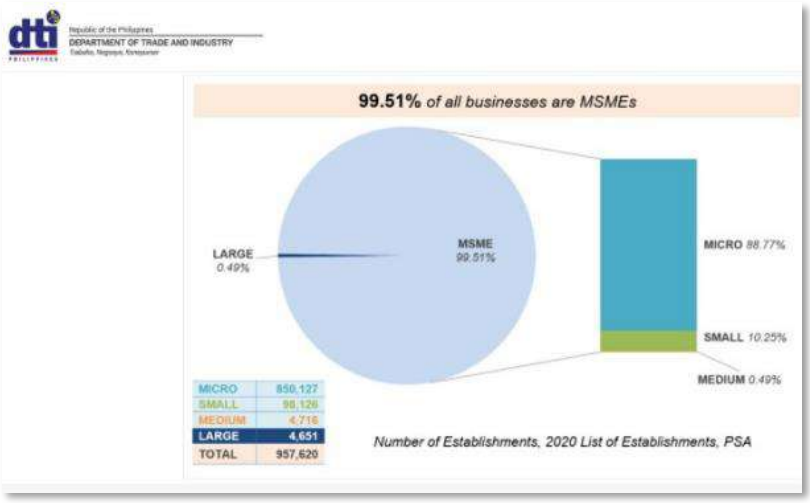
8 DECENT WORK AND ECONOMIC GROWTH

Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

Call for more support to MSMEs for economic growth

A faculty member of the School of Industrial Engineering, Mr. Elisier Fantillo, was tapped by RTI international to be part of a program called "STRIDE". The STRIDE program is a joint USAID/Philippines initiative to improve STI capability in the Philippines for inclusive growth. It expands on the Philippines' 2017–2022 Philippine Development Plan, which has a similar aim. One of the outcomes of this aim is the Regional Inclusive Innovation Centers.

According to Mr. Fantillo, the prevalent types of enterprises is micro, small, and medium enterprises (MSMEs), which is 99.51% of the whole industry. The MSMEs are companies with less than ten employees that need entrepreneurial programs and support from government and research and development institutions (RDIs).



Pili Seal - A Fuel Tank Sealant from Pili Tree: Encouraging inclusive economic growth

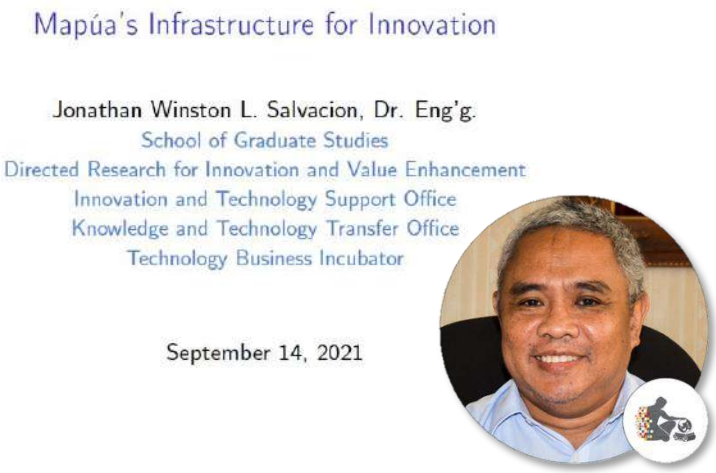
Mark Kennedy Bantugon, a Materials Science and Engineering graduate student at Mapúa University, has developed an aviation fuel tank sealant made from Pili tree resin's wastes. He called it "PILI SEAL".

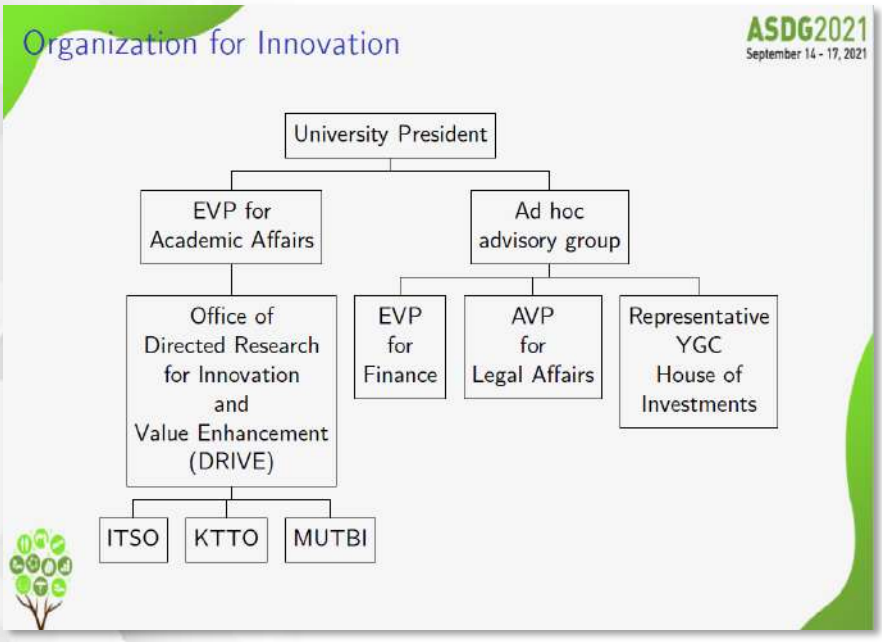
His Pili Seal was chosen by James Dyson Awards 2021 in the Philippines, where Bantugon was awarded the national champion.

Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

Mapúa's Infrastructure for Innovation

Dr. Jonathan W. L. Salvacion presented the Mapúa University's Organization for Innovation during the ASDG 2021 event. The organization involves a representative from the Yuchengco Group of Companies (YGC) in which Mapúa University is a member. YGC is the oldest and largest conglomerate in the Southeast Asia with companies in various industry sectors.



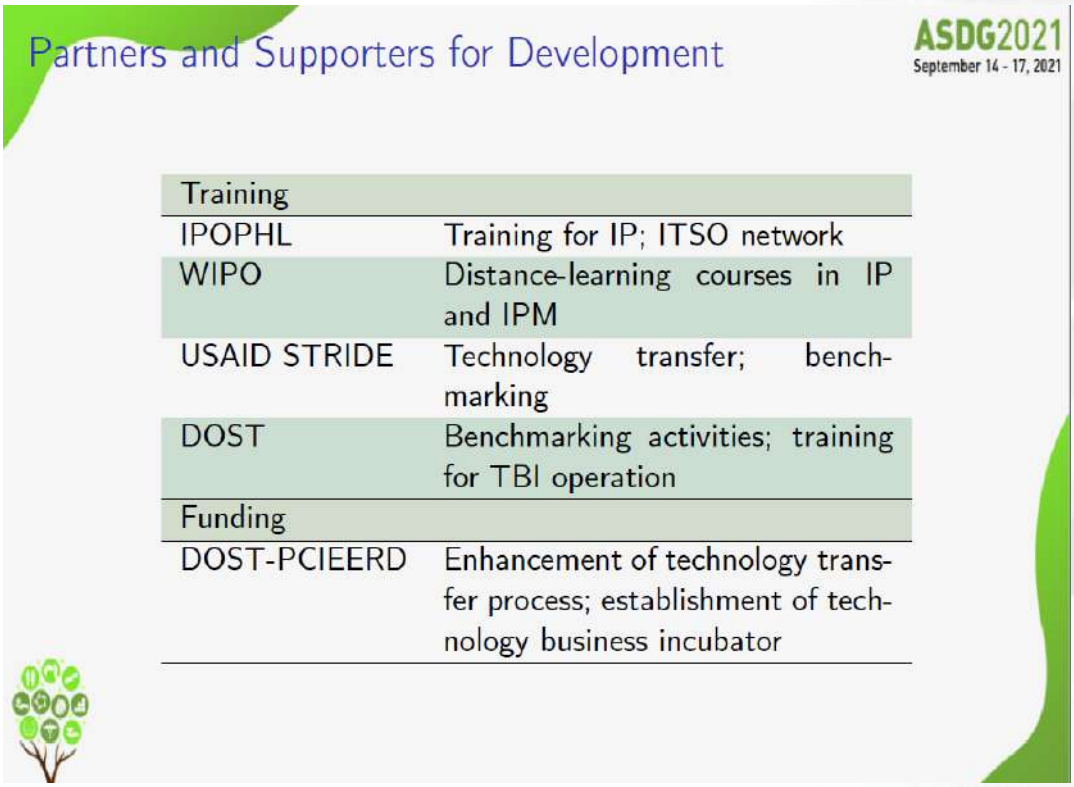


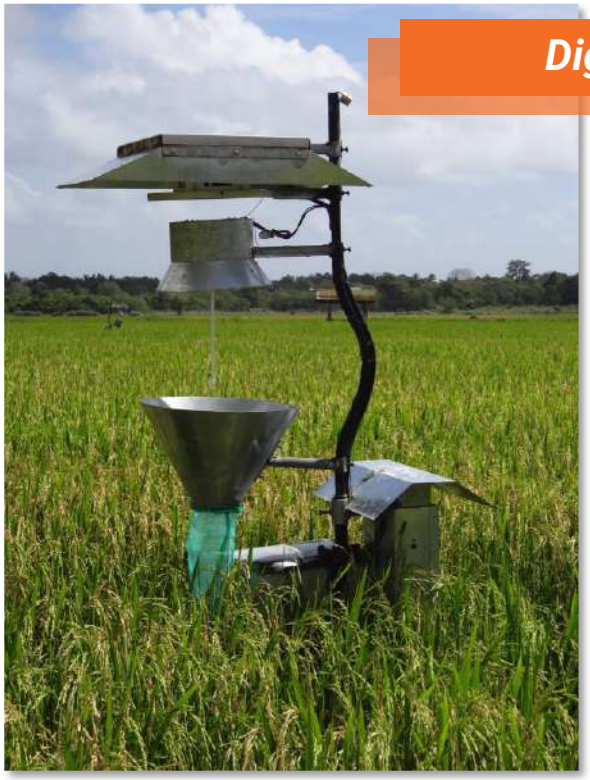
ITSO: Innovation & Technology Support Office

KTTO: Knowledge and Technology Transfer Office

MUTBI: Mapúa University Technology and Business Incubators

Mapua's partners and supporters for the enhancement of the technology transfer process are IPOPHL, WIPO, USAID STRIDE, DOST, and DOST-PCIEERD.





Digital Pest Controller

- Invented by Ivane P. Banlawe, a graduate student from Mapúa University.
- A self-powered (solar and wind energy capture) prototype of an alternative digital pest controller for rice which eliminates the use of chemicals (from pesticides).
- Lures insects by means of light and sound.
- Patent application has entered substantive examination at IPOPHL in 2018.

Dr. Bas Baskaran of Deakin University in Geelong, Victoria, Australia shared their good practices in innovation during the ASDG 2021. According to him, these key innovative projects in four themes such as ManuFutures, TechnoFutures, Energy Futures, and AquaFutures promote sustainable innovations and robust infrastructures. These projects are expected to create 1,500 jobs.

"A catalyst for investment is developing entrepreneurial, innovation and leadership capability in the region."

- **Dr. Bas Baskaran, 2021**

10 REDUCED INEQUALITIES

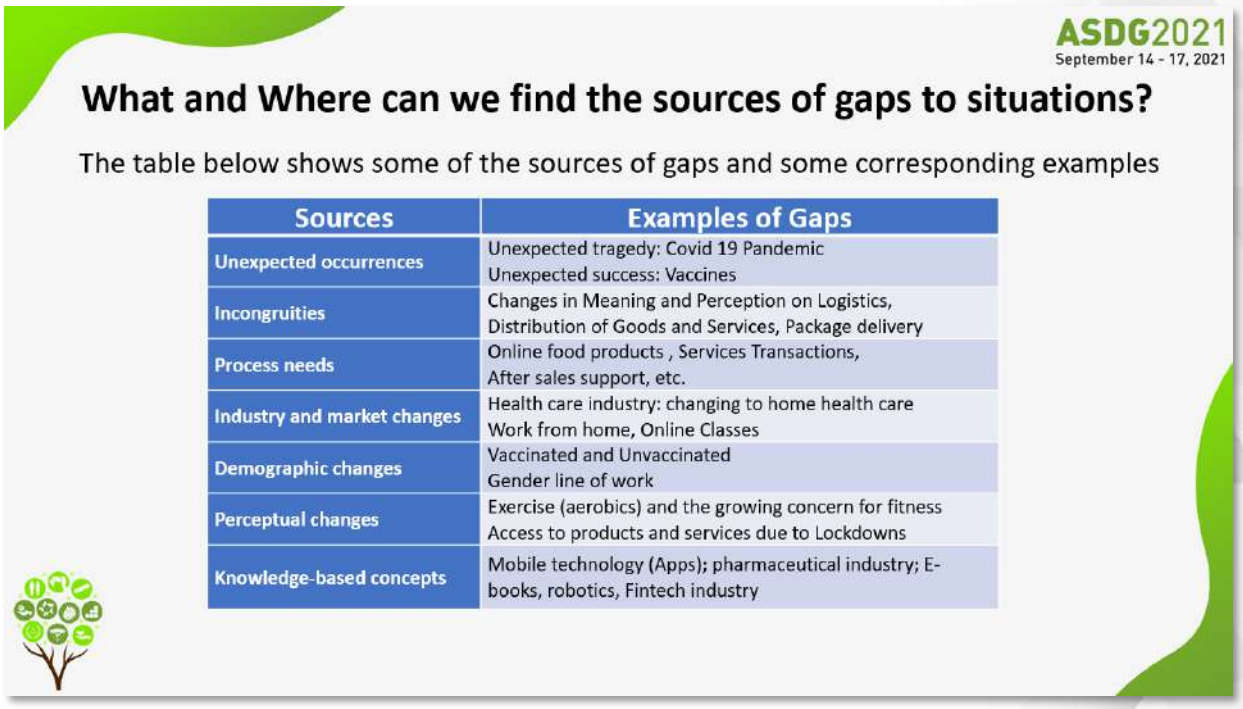
Reduce inequality within and among countries

Equal opportunities through an entrepreneurial mindset

The BEEHIVE (Building Entrepreneurial Ecosystems to Enhance Higher Education Value-Added for Better Graduate Employability) capacity building project co-funded by European Union Erasmus Plus Program under Key Action 2 – Capacity Building in Higher Education aims to enhance partner universities in the Philippines and Indonesia to produce graduates with ability to create jobs and acquire higher employability competency. The BEEHIVE team is composed of men and women from various countries such as Bulgaria, Greece, Iceland, Indonesia, Ireland, Italy, and Philippines.

Equality for all regardless of gender and social status

During the ASDG 2021 webinar series, Dr. Marthinson Villanueva mentioned about the technique to reduce inequalities such as the Gap-Situation Analysis. According to him, the entrepreneurial opportunities shall be performed by people regardless of the gender and social orientation. Below are the sources of gaps to situations:



Sources	Examples of Gaps
Unexpected occurrences	Unexpected tragedy: Covid 19 Pandemic Unexpected success: Vaccines
Incongruities	Changes in Meaning and Perception on Logistics, Distribution of Goods and Services, Package delivery
Process needs	Online food products , Services Transactions, After sales support, etc.
Industry and market changes	Health care industry: changing to home health care Work from home, Online Classes
Demographic changes	Vaccinated and Unvaccinated Gender line of work
Perceptual changes	Exercise (aerobics) and the growing concern for fitness Access to products and services due to Lockdowns
Knowledge-based concepts	Mobile technology (Apps); pharmaceutical industry; E-books, robotics, Fintech industry

Accessible facilities for people with disabilities (PWDs): Reducing inequalities within Mapúa campus

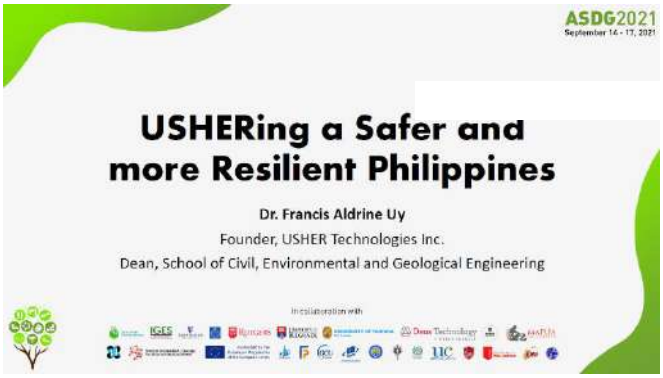
Mapúa University promotes the inclusion of people with disabilities through incorporating its buildings with ramps for PWDs allowing easy access through entrances and exits.

There are also PWD-friendly bathrooms built in the buildings designed with clear floor space and wide doors that open inward to allow for easy wheelchair access.

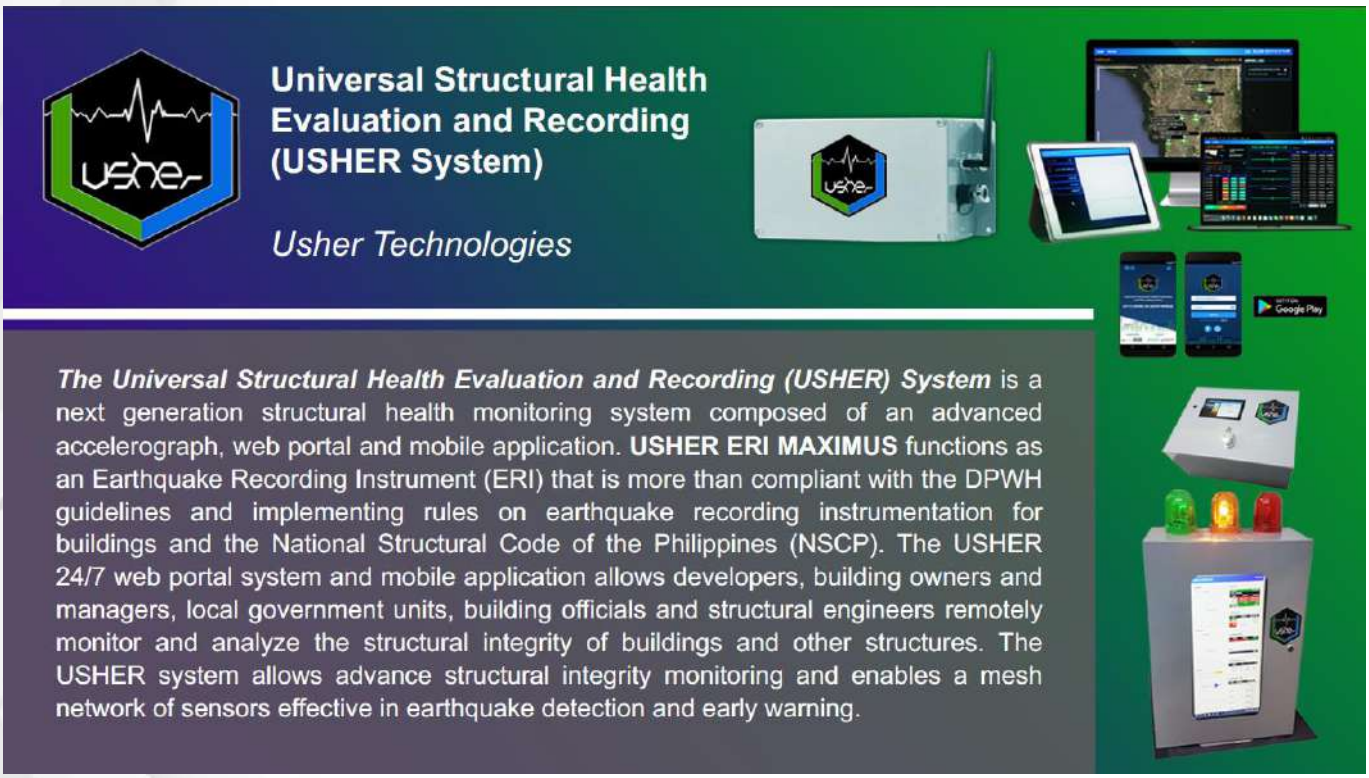
11 SUSTAINABLE CITIES AND COMMUNITIES

Make cities and human settlements inclusive, safe, resilient and sustainable

USHERING a Safer and more Resilient Philippines



Dr. Francis Aldrine A. Uy discussed about Universal Structural Health Evaluation and Recording (USHER) Technologies. This technology contributes to the attainment of SDG 11 – Making Cities More Resilient and Sustainable. USHER technology is a next-generation structural health monitoring system.



The eSalba system: Supports disaster preparedness and resiliency for sustainable communities

Source: DOST - PCHRD

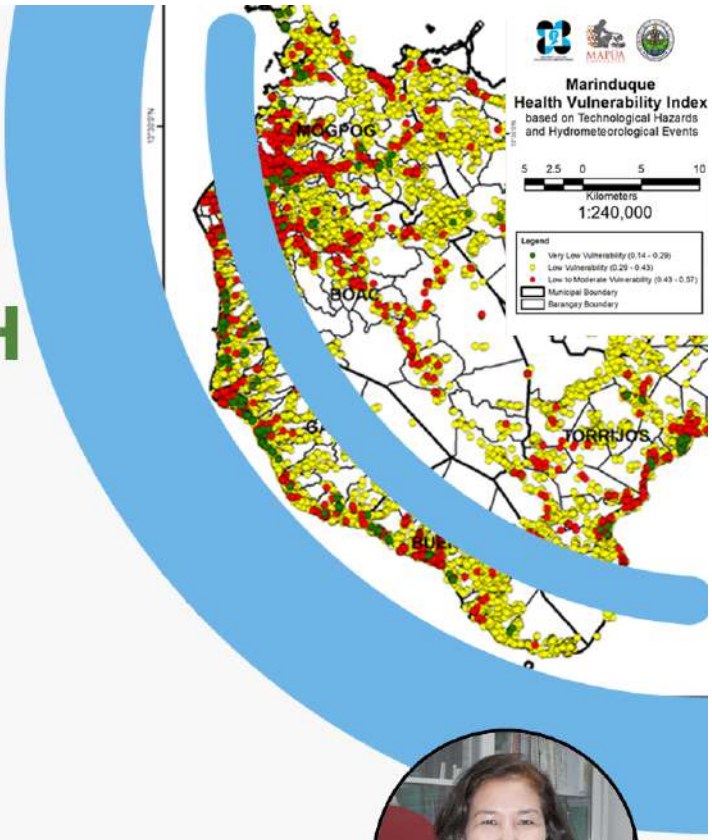
Research ang magbibigay daan sa pagbangon ng bansa

DHIVE: 3 TOOLS FOR A DISASTER-RESILIENT PH

In 2020, the Philippines was among the top countries most affected by extreme environmental events. This means that millions of Filipinos are highly vulnerable to health hazards caused by natural disasters.

To support disaster preparedness and resiliency in our communities, the Development of Health Index and Vulnerability Reduction System for Region IV-B Capital or the D-HIVE 4B Capital Research Project develops the eSalba system, composed of 3 main tools.

The system features **health vulnerability indices** and **health hazard maps** which are provided to local government units (LGUs) to strengthen their disaster-preparedness and resiliency programs. These indices and maps show the environmental quality of specific areas as well as their vulnerability to health risks, among other crucial information. Users are able to access these information easily through the **eSalba app**, a mobile and web-based monitoring and emergency response application.



Dr. Delia B. Senoro
Director, Office of International Linkages for Research and Development
Mapua University

DEPARTMENT OF SCIENCE AND TECHNOLOGY
R&D MAKING CHANGE HAPPEN
NRDC 6th
DOSTNRDC

Simulating Cascading Rainfall-Triggered Landslide Hazards in The Philippines (SCaRP)

SIMULATING CASCADING RAINFALL-TRIGGERED LANDSLIDE HAZARDS IN THE PHILIPPINES (SCARP PROJECT)

The Philippines and the United Kingdom bring together experts in geomorphology, meteorology, and hydraulic engineering to develop the SCaRP project, which effectively and efficiently addresses the need for better understanding of the impact of hydrometeorological hazards, hence supporting cities' and human' safety and resiliency.

Dr. Björn Berggren of KTH Royal Institute of Technology in Stockholm, Sweden shared their best practices in achieving SDG 11 that aims to provide inclusive, safe, and resilient cities and communities.

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

Ensure sustainable consumption and production patterns

Alternative process and instruments to reduce the use of acid solutions

Portable X-Ray Fluorescence

Accusensing device with chips and strips

Source: D-HIVE 4B Capital Research Project with Fund from PCHRD

Alternative devices used to detect metal concentrations and avoid the use of acids to address SDG 12 – Responsible Consumption. It also avoids producing hazardous wastes.

Hazardous and Non-hazardous Wastes Tracking Initiative of Mapúa University

Mapúa University started monitoring the amount of hazardous and non-hazardous wastes generated in the campus enumerated below. This allows for the university to track its consumption patterns and make steps to reduce usage waste that is potentially causing environmental adverse effects.

A. NON-HAZARDOUS WASTE (RECYCLABLE)

Month / Year	Weight (Metric Ton)
January 2020	1.25
February 2020	0.80
March 2020	0.34
April 2020	0.06
May 2020	0.09
June 2020	0.16
July 2020	0.16
August 2020	0.09
September 2020	0.15
October 2020	0.19
November 2020	0.10
December 2020	0.14

B. NON-HAZARDOUS WASTE (RESIDUAL)

Month / Year	Weight (Metric Ton)
January 2020	1.43
February 2020	1.66
March 2020	0.72
April 2020	-
May 2020	0.14
June 2020	0.18
July 2020	0.22
August 2020	0.10
September 2020	0.15
October 2020	0.21
November 2020	0.22
December 2020	0.21

C. HAZARDOUS WASTE (CHEMICAL WASTE)

Month / Year	Weight (Metric Ton)
January 2020	0.82
February 2020	1.53
March 2020	0.40
April 2020	0.64
May 2020	0.76
June 2020	0.52
July 2020	0.20
August 2020	0.31
September 2020	0.28
October 2020	-
November 2020	-
December 2020	-

D. HAZARDOUS WASTE (E- WASTE)

Month / Year	Weight (Metric Ton)
January 2020	0.04
February 2020	0.03
March 2020	-
April 2020	-
May 2020	-
June 2020	-
July 2020	-
August 2020	-
September 2020	0.01
October 2020	-
November 2020	0.06
December 2020	-

Recycling of Hazardous and Non-hazardous Wastes

The university tracks the quantity of wastes generated and the proportion of wastes that have been recycled. This is to encourage students and personnel to do recycling and upcycling activities.

A. NON-HAZARDOUS WASTE (RECYCLABLE)

Month / Year	Weight (Metric Ton)
January 2020	1.25
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September 2020	0.28
October 2020	-
November 2020	-
December 2020	-

D. HAZARDOUS WASTE (E- WASTE)

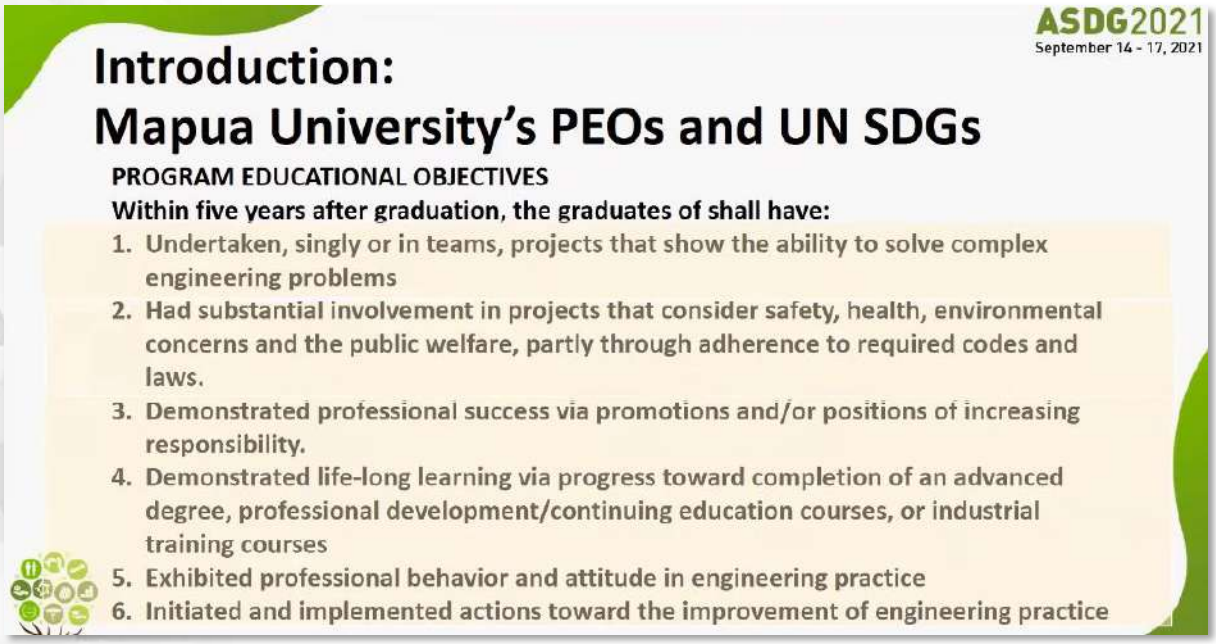
Month / Year	Weight (Metric Ton)
January 2020	0.04
February 2020	0.03
March 2020	-
April 2020	-
May 2020	-
June 2020	-
July 2020	-
August 2020	-
September 2020	0.01
October 2020	-
November 2020	0.06
December 2020	-

13 CLIMATE ACTION

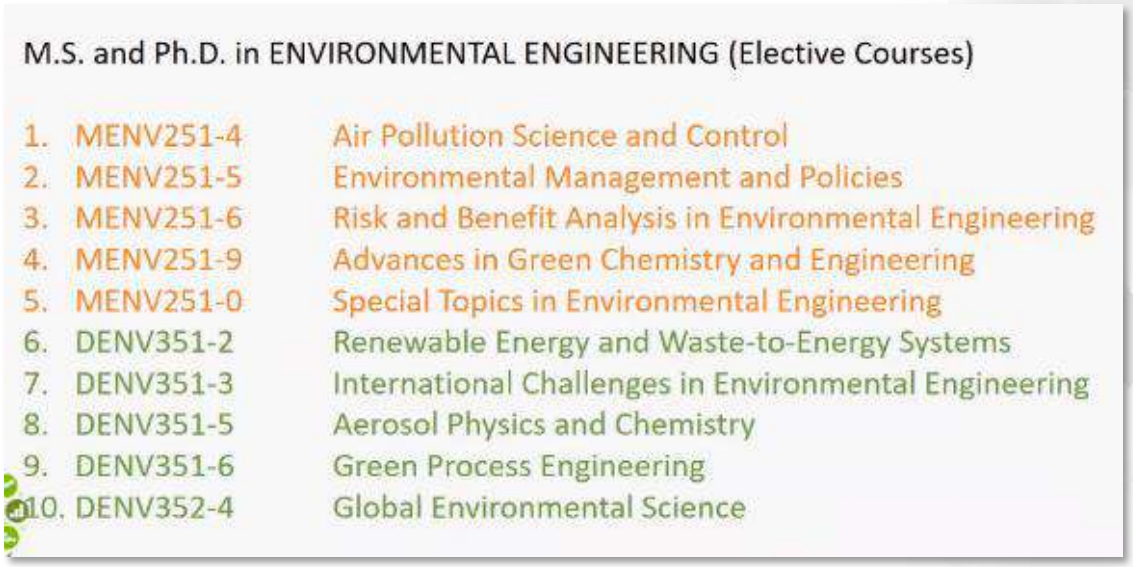
Take urgent action to combat climate change and its impacts

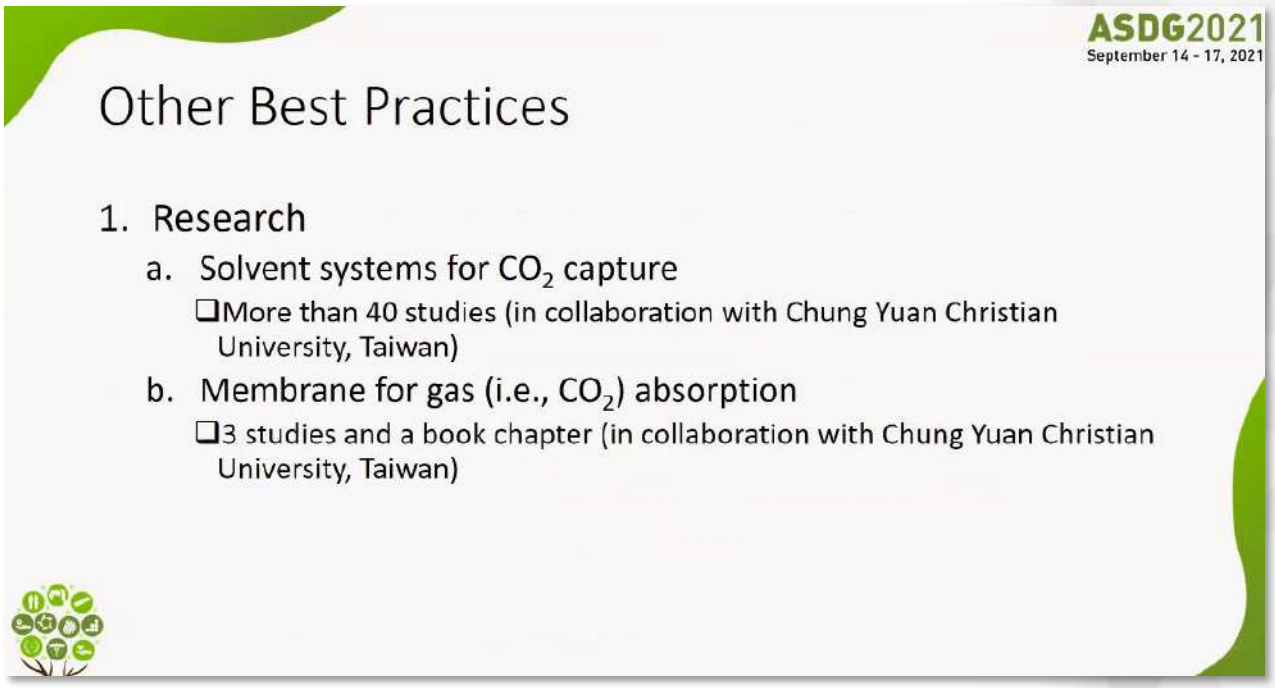
Practices in the university

Dr. Alvin Caparanga, the Dean of Chemical, Biological, and Materials Engineering and Sciences (CBMES) of Mapúa University, presented the best practices of CBMES in achieving SDG 13: Climate Action. He elaborated the inclusion of SDG 13 into the Program Educational Objectives (PEOs).



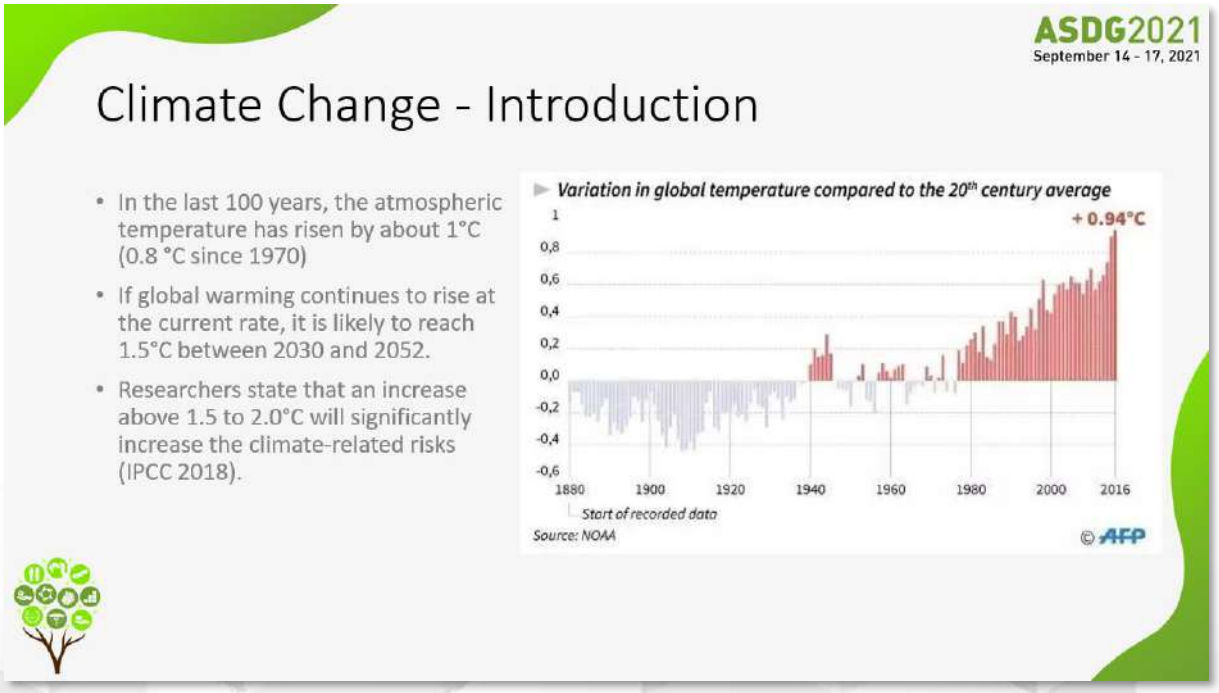
CBMES' four undergraduate and nine graduate programs include topics that are directly or indirectly related to global warming, climate change, climate change impacts in their curricula. The courses encourage students to do research and/or case studies to provide awareness and best practices to combat climate change and its subsequent environmental crisis.





Global Waste Cleaning Network

Dr. Roger Achkar, the Director General and Dean of Research of the Global Waste Cleaning Network (GWCN), discussed the importance of adaptation and mitigation activities in addressing climate change issues. This was during the online concatenated event organized by Mapúa University on September 14, 2021. GWCN is a nonprofit organization functioning as an international network comprising NGOs, private and public sector companies, expert consulting firms, and educational institutions among which is Mapúa University.

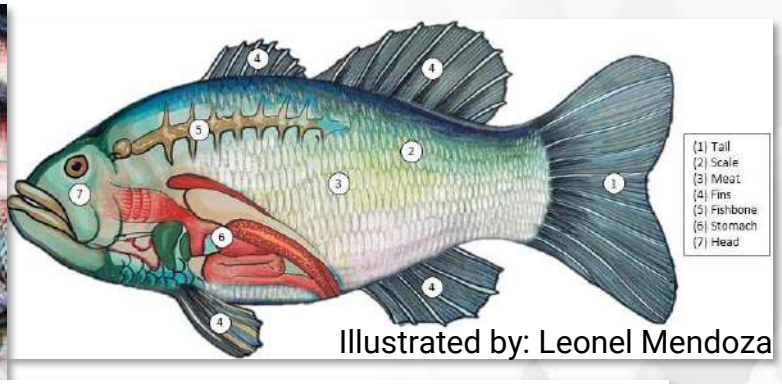


14 LIFE BELOW WATER

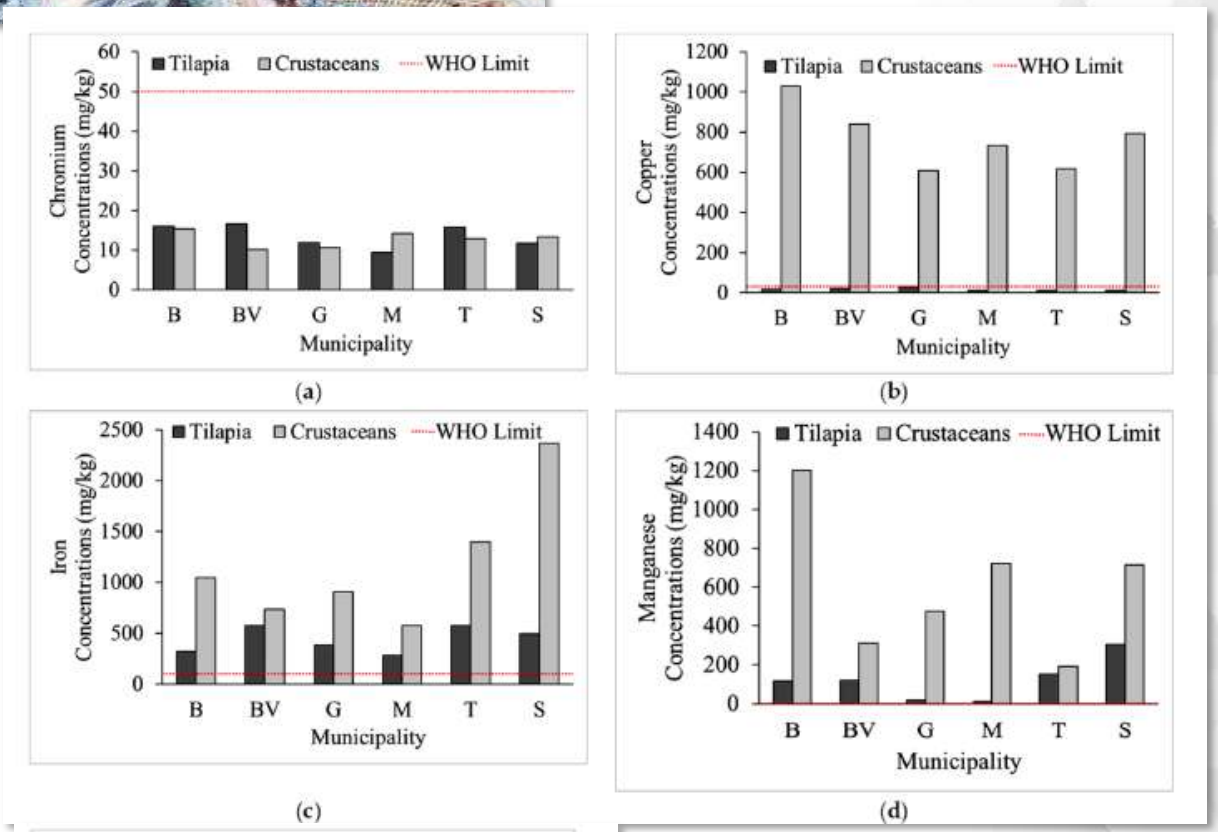
Conserve and sustainably use the oceans, sea and marine resources for sustainable development

Dr. Yogi Tri Prasetyo, a faculty member of the School of Industrial Engineering and Engineering Management, in full diving gear.

Research activities in small island community recorded various elevated metal concentrations in tilapia and crustaceans.



Illustrated by: Leonel Mendoza

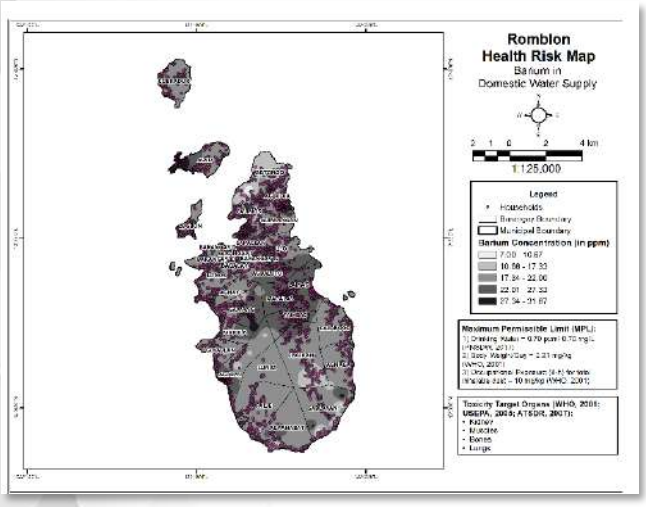


Source: Agarin et al., 2021 (https://doi.org/10.3390/toxics904007

The red horizontal lines in the five bar charts above represent the maximum permissible limit set by the World Health Organization.

Protect, restore and promote sustainable use of terrestrial ecosystems and reverse land degradation

Students from KTH Stockholm, Sweden participated in Mapúa University's International Field and Study Research program. Visited the Beema Bamboo plantation in Tablas Island, Romblon Province.



Monitoring of soil quality with respect to metal concentration to prevent land degradation.

Source: D-HIVE 4B Capital Research Project

Land degradation, soil quality affects agricultural yields

JOURNAL OF DEGRADED AND MINING LANDS MANAGEMENT
ISSN: 2339-076X (p); 2502-2458 (e), Volume 8, Number 2 (January 2021): 2551-2558
DOI:10.15243/jdmlm.2021.082.2551

Research Article

Spatial distribution of agricultural yields with elevated metal concentration of the island exposed to acid mine drainage

Delia B. Senoro[1,2*], Pauline B. Bonifacio[2], Doreen R. Mascareñas[3], Carlito B. Tabelin[4], Froilan P. Ney[2,5,7], Ma. Rowela L. Lamac[6], Fibor J. Tan[1]

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[6] School of Allied Medicine, Marinduque State College, Boac, Marinduque, Philippines 4900
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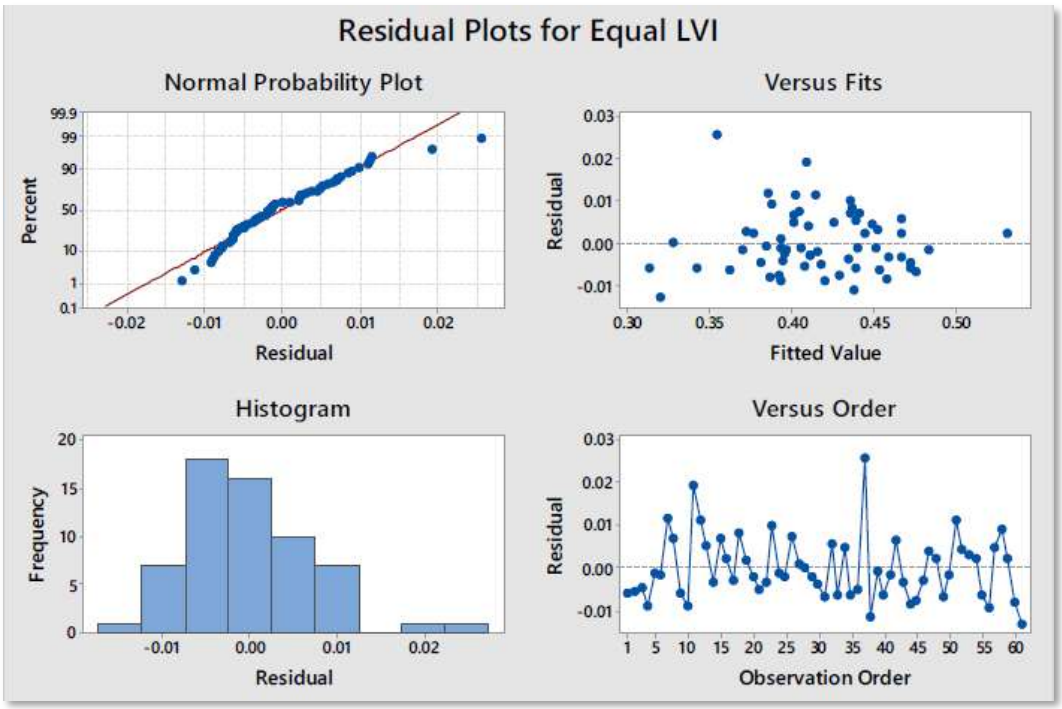
Received 25 September 2020, Accepted 28 November 2020

Vulnerability of households to natural disasters



Source: German et al., 2021

Residual plots that give emphasis to the significance of hazard indicators, such as landslide and typhoon, in determining household vulnerability.

Promote peaceful and inclusive societies for sustainable development

Sustainable Development Goals and Solutions (SDGs) Workshop in Romblon and Marinduque organized by Mapúa University and funded by GIZ. Atty. Glen Nino M. Sartillo of Romblon State University presented the targets and indicators of SDG 16. He highlighted the Philippines development plan 2017-2022 that focuses on corruption reduction, seamless service delivery enhanced administrative governance, empowered, and engaged citizens, and strengthening of civil service.

Other speakers were Dr. Beatriz M. Cabadongga, Atty. Lizette Mortel, Dr. Merian Catajay-Mani, Congressman Eleandro Jesus F. Madrona, Governor Jose R. Riano, Mayor Esteban Santiago F. Madrona, Jr., Dr. Delia B. Senoro, and Dr. Renato R. Menrige, Jr.

Training peacebuilders

The Asian Peacebuilders Scholarship 2020 is a scholarship program aimed to train young Asian professionals to become peacebuilding practitioners, equipped for international organization leadership positions. This is a shared initiative of Mapúa University with The University for Peace (UPEACE), and Ateneo de Manila (AdMU) and The Nippon Foundation that serves to strengthen the representation of Asian professionals with expertise in Asian issues.

Research study contributes to the attainment of peace within the community

CHANGED

This study aims to develop a curfew monitoring system using Image Processing with notifying features via SMS. LBPH (or Local Binary Pattern Histogram) algorithm is implemented in the study. The system was successful in recognizing faces that are registered to the system.

2021 IEEE International Conference on Automatic Control and Intelligent Systems, I2CACIS 2021 - Proceedings •
Pages 180 - 184 • 26 June 2021 • Article number 9495921 • 2021 IEEE International Conference on Automatic Control and Intelligent Systems, I2CACIS 2021 • Virtual, Shah Alam • 26 June 2021 • Code 170757

Document type
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Source type
Conference Proceedings

ISBN
978-166540343-6

DOI
10.1109/I2CACIS52118.2021.9495921

View more

SMS based Curfew Monitoring System for Detecting Minors from a Facial Database to Aid the Local Government Unit Using Image Processing

Balbin J.R.[a] , Ramos J.M.[a] , Reyes J.N.[a] , Santiago C.M.[a]

Save all to author list

[a] Mapua University, School of Electrical, Electronics and Communications Engineering, Manila, Philippines

Source: Balbin J.R. et al., 2021

Acknowledgement

The Sustainable Development Goals report synopsis 2021 was prepared by Mapúa University, with inputs from international and national organizations, and offices, funds and programmes. Special thanks of gratitude to all respected speakers of the ASDG2021 online concatenated fora, and TRUST project professional development webinar who shared their best practices towards the attainment of the United Nations SDGs, and presented the future dissemination of activities of the project in Vietnam and Philippines, respectively.

Atty. Lily Freida C. Cabacungan	Commission on Higher Education, Philippines
Dr. Alvin Caparanga	Mapúa University, Philippines
Dr. Arnold Paglinawan	Mapúa University, Philippines
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