

Utilization of Mine Tailings

DR. MICHAEL ANGELO PROMENTILLA
Project Leader
De La Salle University – Manila

For the rehabilitation of mined-area, the PCIEERD has recently approved a program titled “3R Program: 3R Approach to Sustainable Management of Nickel Laterite Ore Mining Waste: Reuse, Recycling and Reprocessing for Environmental Remediation and Material Valorization.”
(Note: This is an on-going Program)

This Program is a collaboration of three (3) universities namely Central Mindanao University (CMU), Mindanao State University – Iligan Institute of Technology (MSU-IIT) and De La Salle University – Manila (DLSU).

The Philippines is one of the major suppliers of nickel laterite ore which are mined through open pit mining. Although the mining activities have brought economic benefits to the surrounding communities, the environmental impacts and damage to the original mountain ecosystem due to mining is appalling. Recently, there were more than 20 mining companies that were ordered to stop operation by the government and mostly are operating a nickel mining in the Caraga Region. The various violations include cutting of trees without permit and impairment of critical watershed due to siltation of river beds, and poisoning of the river and waterways especially during rainy season.

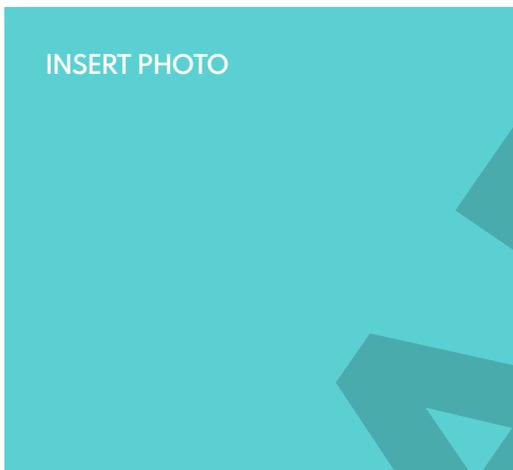
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The siltation problem is the most common concern which is affecting the way of life of the people who are mostly dependent on farming and fishing ventures. Thus, the main goal of this proposed research program is to develop solutions toward the sustainable management of such mine wastes.



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The Program aims to investigate the potential of the Nickel laterite mine waste particularly the silt and low-grade laterite (waste) rock for reuse, recycling and reprocessing with application on environmental remediation and carbon sequestration, and advanced materials and construction. The outcomes of the research program are:

1. Geopolymer Bricks that can be used for construction and road pavements. Such development of the local technology will provide an alternative method of producing eco-friendly binder or building material which could be at par with the Portland cement-based material.
2. Novel adsorbent for water and wastewater treatment applications
3. Production and utilization of nanominerals and purified minerals as raw materials for researches and industrial consumption not limited to ceramic fields that can highly reduce quantity of silt from nickel mining waste
4. Utilization of Serpentinite waste rock for acid mine drainage treatment.

If cost-competitive, products will be designed properly and fabricated and a business opportunity may also be opened for local communities.

The Program was endorsed by the Chamber of Mines of the Philippines (COMP) and was able to forge a Memorandum of Understanding (MOU) with a Nickel Mining industry operating in Mindanao.

It is hoped that the outcome of these projects can somehow address the siltation issue and can come out with outstanding results that can be utilized by the Nickel Laterite Mining Industry.

Luwas Pilipinas: Ang Kahibalo sa Agham, Yawe sa Kaluwasan

Early 2019, the Department of Science and Technology (DOST) partnered its Councils and R&D Institutes to its regional offices to bring the programs, projects, and activities to the regions. The Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD) was tasked to collaborate with DOST-CARAGA.

With the theme, "Luwas Pilipinas: Ang Kahibalo sa Agham, Yawe sa Kaluwasan" (Knowledge in Science is key to a safe Philippines), the Caravan was conducted on 24-25 July 2019 in Almont Inland Resort, Butuan City. It was aimed to bring greater awareness on DOST and develop possible collaborations on disaster resilience, pushing forward the country's R&D agenda.

Specifically:

- Create greater awareness of DOST-PCIEERD and Caraga projects through engagement to target audiences;
- Entice target audiences to engage DOST-PCIEERD and Caraga through science and technology interventions in their area; and
- Present to target audiences various avenues of collaboration that they may take in

The target audience were LGU Officials, youth, researchers, national government agencies, national and local media, and investors. Various activities were planned to target each of the audiences to maximize the outcome. However, due to the limited time, some activities were held simultaneously.



DOST-PCIEERD Executive Director (left) and DOST XIII Regional Director Dominga Mallonga (right) delivered their opening and welcome remarks at the Caraga Science and Tourism Industry Forum.

Discover Diwata-1 at The Museo Pambata

In April 2016, the Philippines' first microsatellite, Diwata-1, was launched into space from the International Space Station (ISS). This is an important milestone for space science in the country especially that Diwata-1 was designed and made by an all-Filipino team.

To celebrate and promote this achievement, the Department of Science and Technology's Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD) partnered with the Museo Pambata Foundation, Inc. to come up with a display on Diwata-1. It targets to inspire and encourage the museum goers, especially children, to explore science and technology.

Discover Diwata-1 Exhibit was launched in December 8, 2017 in the presence of the Diwata engineers and scientists. It is composed of different interactive and informative modules that is made comprehensive for the children. The ground floor consists of a changing closet where children can wear lab gowns; a replica of the look of the ground receiving station that shows the track of Diwata-1; and microsatellite-related puzzles at the corners. The exhibit has a mezzanine area where a replica of the Diwata is displayed, while sample photos taken by Diwata-1 can be viewed through a box that lights up when the button is pushed.

DOST-PCIEERD, together with Museo Pambata Foundation, Inc. and STAMINA4Space Program, celebrates the third year anniversary of Diwata-1 in space through an activity-workshop with children from Sta. Ana and Tondo, Manila. Titled "R U DI?: Inspiring the Next Generation Diwata Engineers", the activity aims to make the kids appreciate space science through a presentation of how it helps us in our daily lives. The presentation will be delivered by Benjamin Magallon, one of the Diwata Engineers. A hands-on activity will follow wherein the children will make their own versions of a microsatellite.

Diwata-1's mission, which is towards disaster response and mitigation and environmental and natural resource assessment, was expected to take place for around 20 months. However, it has exceeded this and reaches 36 months by 27 April 2019. Since its launch into space, it has produced remarkable data that has helped in resource monitoring in the country.



Caption

The Philippines Goes to Space

Launching of Exhibits at The Mind Museum

The exhibits mainly focused on space technologies developed by our Filipino talents, and its applications. It features our all-Filipino made microsattellites—Diwata-1 and Diwata-2, and cube satellite Maya-1 in an interactive and hands-on activities.

Entitled “The Philippines Goes to Space”, this project is a collaboration between three agencies—DOST-PCIEERD for the funding assistance, The Mind Museum for the concept and creative works, and the STAMINA4Space Program, with representatives from UP and DOST-ASTI, for the exhibit content.

Two versions of the exhibit were launched—the permanent exhibit that will stay at the Universe Gallery, and the Space Adventure that will travel around the country for the next two years. Both versions have similar content and activities.

The exhibit launch was attended by PCIEERD, The Mind Museum, STAMINA4Space, and students and teachers from Benigno Aquino High School.



The Mind Museum representative gives a message to the audience.



Benigno Aquino High School students wearing the 'Philippines Goes to Space' Activity Shirt.

Enabling the Electronics & Semiconductor Scene

THz Photoconductive Antenna Devices

The electronics industry in the Philippines is a progressive area that thrives in innovation throughout the years. In fact, information from the Semiconductor and Electronics Industries in the Philippines, Inc. (SEIPI) says that the industry's major players are situated not only in Metro Manila, but also in the CALABARZON, Northern Luzon, Central Luzon, and Cebu regions. In line with this, the industry also boasts of a significant number of talents and skilled workers at a count of 500,000 yearly graduates.

With the goal of expanding our local reach, furnishing our global performance, and equipping the country's talent pool with the skill set aligned with the current human resource needs of semiconductor industries, researchers from the National Institute of Physics in UP Diliman came up with the "Ultrafast MBE-grown Terahertz Photoconductive Antenna Devices" project.

Aiming to develop novel PCAs (Printed Circuit Assembly) fabricated on Molecular-Beam Epitaxy or MBE-grown semiconductor heterostructures for high-efficiency, broad-bandwidth, and cost-effective generation and detection of Terahertz (THz) radiation, the project is designed to characterize and fabricate various materials in a single platform that paves way for a more controllable and flexible development and optimization of novel devices.

Through this project, the researchers also aims to provide exposure and training to students and potential talents when it comes to the forefront innovations in the ultrafast optoelectronics and device fabrication area.

This DOST-PCIEERD supported project has been going on for two years, and has already established various MBE growth parameters of the semiconductor heterostructures. Moreover, it was also able to design and characterize the MBE growth of LTG-GaAs (Low Temperature Grown Gallium Arsenide) on SI-GaAs (Semi-Insulating Gallium Arsenide) substrates via optical characterizations and measurements, as well as fabricate an LTG-GaAs/SI-GaAs semiconductor heterostructure into a PCA.

In the near future, the project also aims to push further into its goal by tapping scientists and engineers and equipping them with the advanced skill sets essential for the growth of the local semiconductor industry.

Bio-based plastics in the works

DR. ARNOLD ALGUNO

Project Leader

Mindanao State University-Iligan Institute of Technology (MSU-IIT)

Petroleum is a fossil fuel found in vast underground reservoirs beneath the land and ocean floors. It is most commonly used to make gasoline for transportation, fuel oil for heating and power electricity, and in medical devices for different medical applications. Nearly everything we use everyday used petroleum as its ingredient. However, this resource forms in millions of years and is a non-renewable source of energy like coal and natural gas.

Another use of Petroleum is as feedstock in making chemicals, plastics, and synthetic materials, particularly in combination with polyols and isocyanates to create Polyurethanes (PU). PUs are a type of plastic material that is found in all manner of consumer and industrial products that now play a crucial part in our lives. Few examples are mattresses, car parts, sportswear, adhesive, cushioning for furniture, and insulation for refrigerators and freezers. But as our source for petroleum is about to be exhausted, we turn to alternative components to continue creating PUs.

Professors at the Mindanao State University-Iligan Institute of Technology (MSU-IIT) delve into the possibility of using non-petroleum sources in the development of PUs. Dr. Arnold Lubguban, one of the project leaders, is exploring the use of lignocellulosic biomass such as rice straw and/or pineapple leaves in a one-pot liquefaction process to develop a highly-functioning polyols for a rigid PU foam insulation sheets.

On the other hand, Dr. Arnold Alguno's research aims to produce bio-based PU foaming system for commercial production of PU foam packing materials and anti-corrosion coatings. His team uses rice and coconut oil through heat-polymerization and hydroxyl-functionalization process to achieve desired polyols.

The prototype developed for a rigid PU foam insulation sheets turned out to have levelled with the commercially-available PU foam. Further testing of the products are in the works and is aimed to be commercialized once all products conform to the industry standards. Moreover, the processes in producing bio-based Polyurethanes for a rigid PU foam, packing materials, and coating will be optimized for a bigger scale production and adoption of the industries.

It's more than just the fish meat

DR. ROSALIE RAFAEL
Project Leader
Central Luzon State University

Have you ever wondered where fish wastes go to?

For every ton of fish processed daily, an estimate of 25% or 250kg of fish wastes are generated. This include heads, scales, skins, bones, offal, and blood. Fish processing industries nowadays sold these fish wastes mostly as fish meal and/or silage and fertilizer. However, studies show that up to 75kg of oil and 42kg of fish collagen can still be extracted from these fish wastes--a significant amount that can boost its improve utility and commercial value.

Dr. Rosalie Rafael of the Central Luzon State University is leading a PCIEERD-funded program that examines fishery by-products processing for application in food formulation. Her team studies the possibility of making collagen, gelatin, fish oil, proteases, and hydrolysates from the by-products of the fish processing industry that can compete with commercially-available products.

Fish are high in important nutrients which are retained even after processing. Fish oil is a rich source of polyunsaturated fatty acids and is widely used as dietary supplement. Collagen and gelatin are currently derived mostly from pigs and cattle that it raises question and skepticism among consumers due to socio-cultural and health-related concerns. One alternative to this is fish sources for having high amino acid profile.

Dr. Rafael's research team aims to develop processes to add value to fishery by-products. Some target applications are fish protein hydrolysate as bouillon cubes, sauces, and marinades; fish gelatin as processed meat, fish concentrate, and salad dressing; collagen as edible starch-based casing for sausages, and as extender and binder; while proteases and hydrolysates can be used as meat tenderizer.

"We are developing alternatives that are healthier and are locally available. Other countries have started utilizing their fishery by-products, it won't be too long that Philippines can catch up," claims Dr. Rafael.

To further maximize our fishery by-products, production of chitosan from fish scales is being studied at the Western Mindanao University to coat tuna to potentially extend its shelf-life. Chitosan derived from fish scales is found to have non-toxic, biodegradable, antimicrobial, and adsorbable biological properties that makes it an excellent choice as food additive component. Other applications of Chitosan include wastewater treatment, packaging material, agricultural applications, and cosmetic ingredient.

Adding value to the mining industry

In 2012, Philippines was recorded to be the fifth most mineral-rich country in the world with an estimate of over \$840 billion untapped mineral resources. One abundant and most commonly mined mineral is the magnetite found in iron ores. The Metallic Resource/Reserve Inventory of the Philippines recorded around 1.56 billion metric tons of iron ore in the country in 2015, all of which are directly shipped to other countries.

"The iron resources of the Philippines are mostly in the form of magnetite sands or lump ore. These are exported abroad with minimal value adding, that is magnetic separation to improve the grade of lump magnetite and iron sands," says project leader Dr. Agustin Fudolig.

There have been previous studies on ironmaking, roadmap of the iron and steel industries, and government policies in the country that recommend development of value-adding activities and downstream industries for strategic metallic ores. With 4% overall contribution of minerals to the country's total exports, it is an opportune time for value addition to reap its maximum benefits.

In the joint project between DOST and Department of Trade and Industry-Board of Investments (DTI-BOI), Dr. Fudolig led a team composed of researchers and experts from DOST-Metals Industry Research and Development Center (MIRDC) and Mines and Geosciences Bureau (MGB) to look into the most suitable ironmaking technology for value adding of Philippine magnetite resources.

The following ironmaking technologies abroad were tested for compatibility with our local ores: Rotary Kiln Electric Arc Furnace Process (RKEF), Blast Furnace Process, Midrex Process, and the Corex Process. Among these technologies, Blast Furnace had the highest return of investment (ROI) but unfortunately, it requires imported iron ore and coking oil in its process. RKEF, on the other hand, is the second most economically feasible with second highest ROI next to Blast Furnace. RKEF can operate entirely with local magnetite sand concentrate to create iron ore products such as steel billets which have more market than pig iron.

In the feasibility study, Dr. Fudolig and his team supports setting up an RKEF facility near the ore sources to greatly benefit the coal deposit industries like in Leyte and Cagayan but there is still a need to conduct technical feasibility to determine the mining companies' magnetite sand grade and particle size distribution. Moreover, it is also recommended to establish a Ferrous Metallurgical Processing Laboratory where equipment used abroad can be replicated for further palletization and reduction tests.

The Philippine Iron and Steel Institute reported that iron and steel are the sixth biggest imported products at US\$1.7 billion in 2015 mostly from China, Korea, Russia, and Japan. Putting up an ironmaking facility in the Philippines is seen to boost the country's economy especially since its steel consumption has been increasing in the previous years.

Low-cost wastewater treatment now in Ph

Looking for a simple, low-cost, space-saving, and environment-friendly wastewater management for your community? Then this one's for you, because wastewater treatment need not be expensive!

Patterned after the Netherland's leading water technology, Vertical Flor Constructed Wetlands, the Vertical Helophyte Filter System (VHFS) was designed, constructed, and deployed in small communities in Davao through the initiative of Dr. Ludivina Porticos of the University of Immaculate Concepcion.

The system utilizes different layers of soil: gravel, sand/iron fillings, rock wool, sand or hay, and limestone, that is generally planted with reeds. The reeds serve principally to aerate the roots and capture nitrates and phosphorus, while the layers of soil prevents the release of unpleasant odors as the water seeps below the surface.

Ideally, the pre-treated grey- or black-water enters the planted filter surface, passes through the soils, then undergo physical, biological, and chemical process to purify the water. The treated water can then be reused for irrigation or discharged into surface water.

In an interview, Dr. Anthony Sales, DOST Region XI Regional Director shared the success of VHFS in Davao's Porky Best, a successful enterprise selling processed meats: "It has been proven to be efficient in transfiguring wastes into Class A/B water approved by the Department of Environment and Natural Resources (DENR). This technology will help minimize the contamination of the water systems in the region."

Eight sites are cooperating in testing the performance and effectivity of the VHFS. Each of which was designed according to the nature of the cooperator: a slaughterhouse, a large-scale poultry farm, a small community in Davao City, and one in each province in Davao Region.

[INSERT RESULTS FROM ONE COOPERATOR, awaiting document from project leader]

The Next Generation of Innovation

Young Innovators Program

Any big accomplishment starts small – small ideas, small steps, small beginnings. Small and simple it may be, but it could possess a huge potential. The same is true with our young ones who are of no less a potential and an asset to the country. It is only justifiable that they get the right motivation and cultivation that should not only come from their parents and teachers but even from the government as well.

Realizing the support system needed by our young ones, PCIEERD gets into the picture by providing opportunities through its Young Innovators Program (YIP) which was launched last 2017.

The YIP aims to provide financial assistance to students under the age of 30 with promising and innovative researches leading to quality research paper, publication or product/invention. The program aids in ushering the potential researchers to independent research to accelerate the production of scientific workforce and encourage new, innovative research areas.

During the first call last 2017, only seven (7) stood out one of which most remarkable is the 14-year-old Isabel Sieh who developed an app that gamifies sustainable practices. While for the second batch, out of the fifty-five (55) hopeful applicants only six (6) – three (3) individuals and three (3) teams were selected and awarded as 2018 Young Innovators.



Caption



Caption

[Testimonial from one 2018 YIP grantee]
*"What made you apply for the program?
How did the YIP help you?"*

Two researchers from the University of the Philippines – Diliman had their studies qualified for the program. John Kenneth A. Cruz from the Department of Mining, Metallurgical and Materials Engineering (UP-DMMME) works on his research study on treating osteoarthritis, the most common chronic condition of joints, by creating a 3D printing of artificial cartilage made from local biomaterials such as chitosan and nanocellulose. While Janina Guarte from the Institute of Biology develops a method to process carabao milk using a combination of microorganisms to increase its shelf life and have a product with benefits of probiotic drink and milk's nutrition value.

Another researcher from the MAPUA University's School of Electrical, Electronics and Computer Engineering is Jeremy De Leon who designed Project BAGWIS, a low-cost micro wind turbine system for lighting, charging and electrified floodwater detection.

Aside from the three individuals with outstanding research undertakings, three teams also stood out among other applicants. A team from the Philippine Science High School (PSHS) SOCCSKSARGEN Campus Team is working to develop a device which provides a real-time data logging and analysis through machine learning of sound frequencies to prevent deforestation, specifically illegal logging using Arduino and sound sensors.

Meanwhile, students from the Angeles City Science High School is creating an eco-friendly and cost-effective acoustic panel made from biomass materials such as corn, coconut, and abaca which is an alternative to the commercially available panels made from synthetic fiber that has been proven to be a health hazard.

Not again missing a spot in the cream of the crop are students from St. Cecilia's College – Cebu Inc. who carries another promising study. The team last 2017 explored successfully in creating a high-altitude balloon with a life support system while this year's team is developing a high-performance yet cost-effective Hybrid Rocket capable of deploying a can satellite and the like in high altitudes.

[Testimonial from Engr. Bacarra] "What is the most significant impact YIP creates and leaves in our young ones?" "We believe that through this Young Innovators Program..." said Engr. Ermie Bacarra, head of the Human Resource Institution Development Division.

With the collaboration among parents – for raising creative and talented children, the academe – for further equipping students, and the government – for providing support and opportunities, these young minds with their small beginnings can be the future's big makers of innovation.

QUALIFICATIONS REQUIREMENTS

- Filipino citizen
- Age 30 years old and below
- Full-time HS/BS/MS student without employment but involved in research/innovation activities

ENTITLEMENTS

- The financial assistance shall be for a maximum of P 1,000,000.00 covering stipend/living allowance, laboratory/equipment expenses, honoraria for mentor, other professional services.

Empowering People for Science Power

Human Resource Development Program

To better boost the scientific community, Filipino scientists and researchers ought to be capacitated with advance knowledge and skills to further their research outputs on their respective field of expertise.

Realizing the huge importance being played by the human resource, PCIEERD created the Human Resource Development program which aims to develop and enhance Filipino R&D capabilities of academic/ research institutions as well as of other DOST agencies.

The program covers provision for degree programs, conduct of research activities, and expert mobility in the industry, energy and emerging technology sectors to meet the present and future human resources requirements. It is also made sure that scientists and researchers are able to extend their knowledge and skills to the scientific community through a service obligation.

Through the HRD program, PCIEERD was able to provide trainings among which are the Additive Manufacturing Training Program and the Data Science Training that benefited many researchers and scientists in different academic and research institutions.

Kicked-off in 2018, the Data Science Training program is the first online learning module by PCIEERD which was delivered through Coursera, an online learning management platform, in partnership with MOOCS PH. The training gained considerable attention due to the increasing demand for data scientists in many industries, thus, resulting in thousands of applications that branched into three training batches.

Batch 1 successfully had 108 graduates for its Data Science 1-4 module training while Batch 3 of the same training still has 88 ongoing trainees. On the other hand, for Batch 3, a wide array of trainings was provided such as Excel to MySQL, Python programming, Data warehousing, Cybersecurity and Data Science 1-9 module which had successful 53 graduates and 94 ongoing trainees.

It is aimed that through this training, a pool of Filipino Data Scientists with enhanced skills will help address the needs of the government, academe and industry sectors.

Meanwhile, the Additive Manufacturing (AM) Program which was implemented last 2016 was created to develop highly trained and highly skilled scientists and engineers in the field of additive manufacturing. It covers training on nanocoatings and nanocomposites, 3-D printing materials development, light-weight high-performance polymers for automotive and aerospace applications, semiconductor materials and devices and other related fields.

Under the supervision of Dr. Rigoberto C. Advincula, a Balik Scientist, a total of seven (7) trainees completed the program which was conducted at the Case Western Research University, Cleveland, Ohio, USA. In 2018, two (2) more applicants were granted of the training and are yet to complete the program.

A remarkable offshoot from the AM training program is the ongoing establishment of the first-ever additive manufacturing research laboratory in Bataan Peninsula State University led by Dr. John Ryan C. Dizon, a graduate of the said training program.

With these capability opportunities made available, a better community of researchers and scientists working together for the development of the country can be foreseen.

The HRDP components are as follows:

<p>Visiting Expert Program</p>	<p>The program is open to institutions needing faculty/experts from another institution which possess the required expertise given that it falls within the PCIEERD sectoral priority areas/HRDA.</p>
<p>Faculty Immersion for R&D</p>	<p>The program is to provide assistance to academic institutions as well as scientific and professional organizations in the conduct of seminars, conferences, workshops, fora and trainings which aim to contribute in the development and enhancement of R&D capabilities in the industry, energy and emerging technology sectors. The program is open to faculty who wish to gain research experience by engaging in a research activity under a mentor in a PCIEERD delivering institution or recognized industry/organization provided that research area is within the PCIEERD sectoral priority areas/HRDA.</p>
<p>Research Attachment</p>	<p>This component is open to MS or PhD students, researchers, and project staff of a PCIEERD or DOST-funded project, in the science and engineering fields, who need to conduct their research in a host institution, including foreign universities and research institutions to avail of the host institution's facilities and research expertise.</p>
<p>Attendance in Seminars, Conferences, Trainings, Fora and Workshops</p>	<p>This component covers support to researchers, faculty and other S&T personnel of academic and research institutions for presentation of research results in referred scientific/technical conferences, for a, seminars, workshops, and trainings, etc.</p>
<p>Support for Conduct of Trainings, Seminar and Workshops</p>	<p>The program is to provide assistance to academic institutions as well as scientific and professional organizations in the conduct of seminars, conferences, workshops, fora and trainings which aim to contribute in the development and enhancement of R&D capabilities in the industry, energy and emerging technology sectors.</p>
<p>ASTHRDP/ERDT Graduate Scholarship</p>	<p>The program is open to individuals who wish to pursue M.S. and Ph.D. in the science and engineering fields.</p>

Collaborations in the Regions

PCIEERD Regional Consortia

National development growth can only be attained with collaborative efforts among the country's regions. These efforts would include the integration of each region utilized resources in addressing regional needs; however, each region struggles on how to effectively make use of their resources.

To battle against the status quo, PCIEERD initiated the building of partnerships in the regions through the establishment of the PCIEERD Regional Consortia.

PCIEERD believes that through its Regional Consortia the holistic development of the regions' resources through networking and collaborations among the member institutions from the academe, government and the private sectors will be sustained. Moreover, the pursuit of R&D and other scientific activities in the regions will be further strengthened.

[Testimonial from Mr. Ruel A. Pili, PCIEERD Consortia Secretariat and Coordinator]

“How significant is the establishment of the PCIEERD Regional Consortia?”

Presently, there are a total of sixteen (16) consortium which was able to draft an S&T Agenda addressing their respective regional concerns through the guidance provided by PCIEERD namely:

Region I - Ilocos Consortium for Industry and Energy Research and Development (I-CIERD)

Region II - Cagayan Valley Industry and Energy Research and Development Consortium (CVIERDEC)

Region III - Central Luzon Consortium for Industry and Energy Research and Development (CLIERDEC)

CAR - Cordillera Industry, Energy, and Emerging Technology Research and Development Consortium (CIERDEC)

NCR - Metro Manila Industry and Energy Research and Development Consortium (MMIERDEC)

Region IV-A - Southern Tagalog Consortium for Industry and Energy Research and Development (STCIERD)

Region IV-B - Southern Tagalog Islands Research and Development Consortium (STIRDC)

Region V - Bicol Consortium for Industry, Energy and Emerging Technology Research and Development (BCIERD)

Region VI - Western Visayas Consortium for Industry and Energy Research and Development (WVICIERD)

Region VII - Central Visayas Consortium for Industry and Energy Research and Development (CVCIERD)

Region VIII - Eastern Visayas Consortium for Industry and Energy Research and Development (EVCIERD)

Region IX - Western Mindanao Consortium for Industry and Energy Research and Development (WVICIERD)

Region X - Northern Mindanao Consortium for Industry and Energy Research and Development (NORMINCIERD)

Region XI - Davao Region Industry, Energy and Emerging Technologies Research and Development Consortium (DRIEERDC)

Region XII - Cotabato Region Industry and Energy Research and Development Consortium (CRIERDEC)

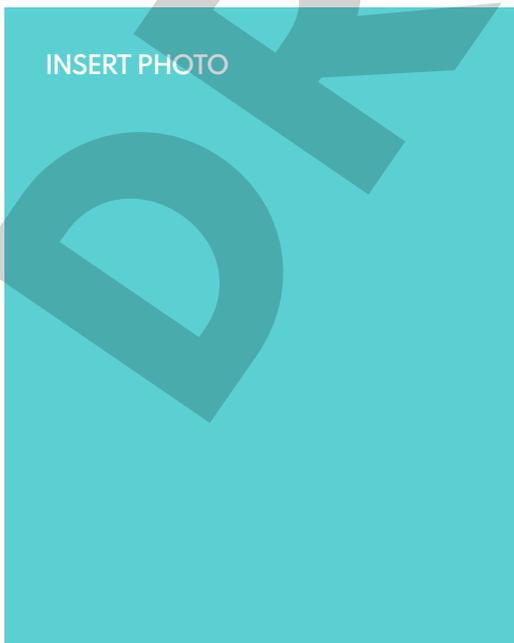
CARAGA - Eastern Mindanao Industry, Energy and Emerging Technology Research Alliance for Development (EMIEERALD)

During the 1st PCIEERD National Consortia Conference and General Assembly Meeting held last December 10-11, 2018, each regional consortium member presented their experiences, best practices and systematic approach in handling their consortium operations as well as their plans and programs.

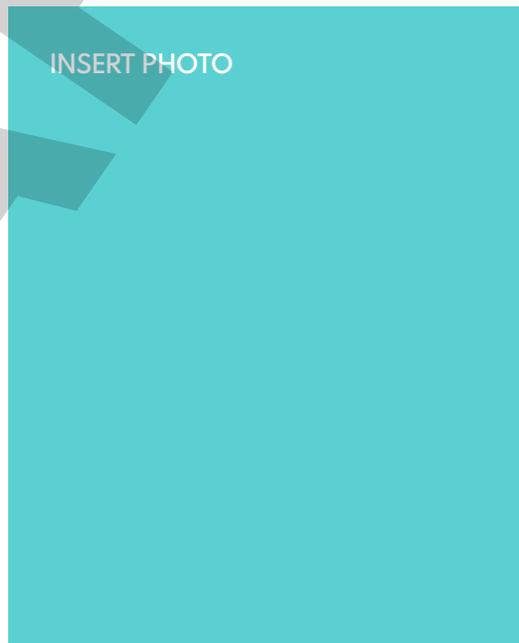
[Testimony of Consortia Member] (Name),
Chairperson of the Eastern Mindanao Industry, Energy and Emerging Technology Research Alliance for Development (EMIEERALD) expressed their gratitude saying, "Thank you PCIEERD for helping CARAGA grow," after their presentation.

The provision not only of research funding but also of appropriate guidance and directions to the consortium with regard to the Council's policies, priority thrusts and programs is continually promised by PCIEERD.

Further, it is hoped that through the continuous support in the development of the regional consortia, more initiatives of different regions will spur alliances with other institutions to put forward the realization of the country's research agenda.



 1st PCIEERD National Consortia Conference and General Assembly Meeting



 Strategic Planning/Writeshops

Going back to give back

Balik Scientist Program

A “brain drain” challenge is being faced by the country as there is a lack of human resources in the areas of research and development. The limited number of residing experts poses a serious problem not only in the field of science and technology but even in the country itself.

In an effort to counteract the so called “brain drain” challenge, the government through the Department of Science and Technology initiated the Balik Scientist Program (BSP). With the aim to strengthen the scientific and technological human resources of the academe, public and private institutions, the program was established in 1975.

The BSP was created to encourage highly-trained overseas Filipino scientists and technologists, experts and professionals to return to the Philippines and share their expertise to strengthen and accelerate the scientific, agro-industrial and economic development of the country.

[Engr. Almazan Testimony]
“Bakit po kayo bumalik? (What made you go back to the PH and take part in the program?)”

Engr. Leo M. Almazan contributed greatly in the field of Satellite Management and Design at three host institutions namely University of the Philippines UP-EEEI, Holy Angel University and at Hukbong Dagat ng Pilipinas.

[UP-EEI/HAU/HDP Host Institutions Testimonies]

Testimonial of Host Institution “How did the BS help your institution/ students/researchers? What was the most significant share of the BS?”

Another Balik Scientist who made a remarkable share during his term in the program is Dr. Ariel V. Melendres affiliated with Satellite Science & Technology Co. Ltd in China. His contribution to the field of Chemical Engineering and superabsorbent polymers were highly helpful at the Technological Institute of the Philippines saying, “[TIP Testimonial]”

[Dr. Melendres’ Testimony]
“Bakit po kayo bumalik? (What made you go back to the PH and take part in the program?)”

According to Engr. Ermie Bacarra, head of the Human Resource Institution Development Division (HRIDD) of PCIEERD, there were a total of 12 Balik Scientists who were approved to take part in the program. Some of their major contributions were on satellite management and design, chemical engineering, nanotechnologies, electronic science, artificial intelligence, robotics and among others.

Last October 24, 2018, the Department of Science and Technology through its three sectoral councils – PCHRD, PCAAARRD and PCIEERD recognized and honored all Balik Scientist Awardees of 2018.

“We would like to reduce inequality and one way of reducing inequality is to really capacitate the institutions and its people in the various regions of the country and we feel that this Balik Scientist Program can contribute to that,” said DOST Secretary Fortunato De la Pena.

It is hoped that with the expansion of the Balik Scientist Program through the enactment of RA 11035 or the Balik Scientist Act signed into law by President Duterte on June 15, 2018, more scientists will be encouraged to come home as the law provides bigger and more attractive benefits and incentives.

Our balik scientists do not only possess brilliant minds but even a fervent heart that is willing to give back and help on the country’s quest for the advancement of science and technology.

Indeed, once a Filipino always for Filipino. Balik Puso. Balik Pilipinas.

“Instant/Quick Info”

Who is a Balik Scientist?

A Filipino S&T expert or a foreigner of Filipino descent who is experienced in the research and has an outstanding contribution in field of specialization.

Becoming a Balik Scientist

It is important that his/her expertise is aligned with DOST S&T priority areas and is willing to address a problem that is mutually acceptable to DOST and host institution.

BSP Categories & Incentives (Table/Infographics)

BSP Categories	BSP Incentives
<p>Short-term Program Category – minimum of 30 days to a maximum of 90 days</p> <p>Long-term Program Category – minimum of 2 years to a maximum of 3 years</p>	<ol style="list-style-type: none"> Daily Subsistence Allowance (DSA) of USD 150 per day Free roundtrip international economy class airfare Roundtrip international economy class airfare for the BSP Awardee, spouse and two minor dependents Exemption from payment of travel tax Reimbursement of expenses for the surface shipment of personal and professional instruments, including one (1) motor vehicle, not exceeding 2 ½ tons volume weight. Grants-in-aid for research and development projects approved by the DOST Secretary Balik Scientists and their independents shall be granted special non-immigrant visas and exempted from the payment of visa, immigration and registration fees Assistance in securing a certificate of registration without examination or exemption from the licensure requirement of the PRC to practice profession, expertise or skill in the Philippines.

Laying a better groundwork for science

Infrastructure Development Program

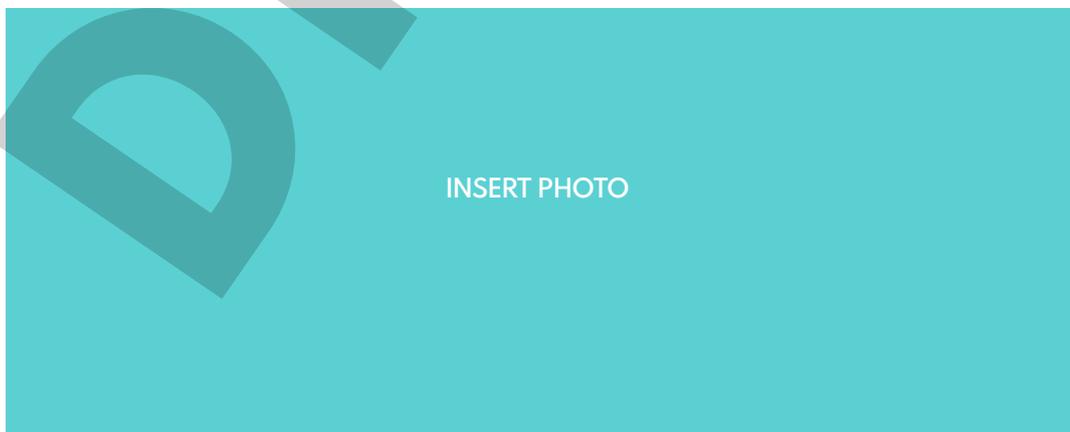
With the mandate of PCIEERD to further develop and promote R&D in the country, PCIEERD implemented the Infrastructure Development Program (IDP) which aims to provide support for the development of infrastructure for research of academic and research institutions.

Considering that academic and research institutions are being limited in coming up with quality research due to the lack of necessary resources i.e. equipment and laboratory, through the funding provision of PCIEERD's IDP, they will be able to set up or upgrade their laboratories and purchase

PCIEERD's IDP aims to upgrade and/or develop the research capabilities of the academic and research institutions and relevant DOST-attached agencies, through the development and/or upgrading of its research laboratories and facilities.

Launched in 2015, a total of 14 laboratories all over the country was helped and upgraded through the program. More than being able to purchase laboratory equipment including highly specialized software, these laboratories were also provided with small research grants for developing their research capabilities.

For 2018, the IDP provided grants to three (3) institutions as follows:



 Caption

Establishment of a Wind Turbine Development and Testing Laboratory

Central Philippines University

P 8,195,000.00

Being selected by the Department of Energy to be involved in the Affiliated Renewable Energy Center (AREC), Central Philippines University (CPU) had been involved in wind energy systems development specifically in the design, fabrication, and installation of both wind pumping and wind electric generation systems. The interest to further their knowledge and research on wind energy system led to initiatives of trainings and installation of various small-scale wind energy systems.

Through the project, the university's physical facilities for wind turbine research, development, testing, and training is being built. Also, the capability of faculty, staff, and students of the University is being enhanced. It is envisioned that through its facilities and pool of experts, the Laboratory will be able to provide various testing services for the evaluation and performance analyses of various types of wind turbines as well as other wind-related studies.

INSERT PHOTO

 Caption

Establishment of an Additive Manufacturing Research Laboratory

Bataan Peninsula State University

Php 5,990,000.00

Rapid progress on Additive Manufacturing (AM) also known as 3D printing has been gained because of its cheaper yet faster and high-quality print outputs. With the simplified prototype production of Additive Manufacturing, production costs are minimized without compromising the quality design of products. But since there are only a few materials for various applications, possible intervention is the development of new 3D printing materials which will be explored through researches in the Additive Manufacturing Laboratory.

The Additive Manufacturing Laboratory is envisioned to be the Regional Center for 3D Printing which mainly develops new materials and technologies and will serve as a facility for the Bataan State Peninsula Institute (BPSI) community to undertake research, create ideas and generate new products and projects. It will also be used for computer-aided design, computer-aided manufacturing and computer-aided engineering (CAD/CAM/CAE) as well as for rapid prototyping, tooling, and manufacturing.

The facility will be highly useful for the academe and industry in characterizing and testing their materials. In addition, the laboratory will work hand in hand with the Industry, Business Community, LGUs, and various government and non-government institutions.



 Caption

Acquisition of Laboratory Equipment in Support of the Facility for Nanotechnology R&D in Central Luzon State University

Central Luzon State University
Php 7,300,000.00

The Central Luzon State University has initially ventured on undertaking researches on nanotechnology and modest equipment have been procured. It has also already secured collaborations with established nanotechnology R&D institutions and has trained personnel to undertake R&D using nanotechnology. To push for greater initiatives on nanotechnology on R&D, a facility was established in CLSU.

However, the utilization of the current facility is not being maximized due to the lack of needed equipment. Through the grant provided, needed equipment (i.e. BET Surface Analyzer, FTIR, Transformer and Electrochemical Impedance Spectroscopy (EIS)) will be acquired and will be used to undertake R&D for the advancement not only of agriculture and fisheries, but also of the food and energy sectors in Nueva Ecija particularly in Central Luzon Region and the country.

Moreover, the facility will be used towards greater cooperation and collaboration with other SUCs and other R&D institutions in capacity building and sharing of resources.

PCIEERD believes that with such support, universities and other research institutions will be enabled to perform better quality research and development.

INSERT PHOTO

Caption