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As we envision a sustainable future for our people and the rest of the world, our Lasallian community continues to strengthen its partnerships in research and innovation. Through bold steps and impactful works that are geared toward a circular economy and a safe environment, we allow ourselves to rediscover our full potential and recover things from the past, including memories and history, as we renew life around us.

QUESTIONS

QUESTIONS is a publication of De La Salle University featuring research projects and creative endeavors by its faculty.

QUESTIONS supports De La Salle University's vision-mission to be "a leading learner-centered and research university, attuned to a sustainable Earth, bridging faith and scholarship in the service of society, especially the poor and marginalized."

QUESTIONS

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What can significantly boost the Philippine economy?

Using historical analysis and empirical evidence, DLSU School of Economics Distinguished Professor and Angelo King Institute of Economic and Business Studies Director Dr. Jesus Felipe offers a fresh outlook on the development of an innovative economy and the role of the government and private sector in shaping it.







What can significantly boost the Philippine economy?



With a 5.5% growth rate in 2023, the Philippines painted a steady recovery past the global pandemic. For this year, the government expects the economy to grow between 6% and 7% amid anticipated world economic slowdown.

While the expected growth rate is lower than the 6.5%-7.5% projection made last December, the government tries to be optimistic, with the country's economic managers setting their goal for 2025: an upper middle-income status (which is at least USD 4,256 gross national income per capita). Government officials list the following to achieve the target: a low inflation, a labor force with access to more and better jobs, a stronger fiscal standing, and a dynamic and innovative economy.

But are these enough to allow the Philippines to be on par with its more developed Asian neighbors?

In order to answer this complex question, Dr. Jesus Felipe, Distinguished Professor of the De La Salle University School of Economics and director of the Angelo King Institute of Economic and Business Studies, traces the journey to the innovation and industrialization. South Korea is a good case study of a country he considers the best example in the region.

"First, we expect at the School of Economics that growth in 2024 will be about 5.6%, significantly below the government's expectations. Growth will pick in 2025 and 2026, when we expect it will reach 6.3 and 6.0%, respectively. We think this is the most the Philippine economy can grow today. It does not have the capacity to grow faster, much less for a long time," Felipe shares.

On the broader question of what a successful nation like South Korea did back in the 1960s, President Park Chung Hee realized that industrialization through manufacturing was his country's ticket out of poverty. "Manufacturing is a sector with special properties. Once you learn how to make certain products within the electronics cluster, for example, you develop some capabilities that you can redeploy to make many other products. The same thing happens when you make it into the automobile or chemical sectors. You create linkages with other sectors of the economy, and learn by doing, which increases your productivity and reduces your costs. All this is much harder in traditional agriculture and in many services-think of waiters in restaurants or sales personnel in department stores," Felipe says.

"South Korea realized that the world is very large. It was producing manufacturing products, not just for the South Korean consumers but for the world." he points out.

A second element of industrialization is the role of exports. South Korea's rapid export expansion also began in the 1960s and this accelerated their process of development. Exports played two fundamental roles. First, it forced companies to compete with the world economy. This means that they had to become better as time passed by. That is, they had to compete not just in price but also, and more important in the long run, in terms of product quality and sophistication. Korean cars improved in quality very quickly. Second, a developing country needs to import all those goods that are necessary for its development, in particular capital goods (machinery) that help transform the economy. These goods have to be paid in a foreign currency, typically US dollars. These have to be earned via exports.

Felipe also notes that other countries like Japan, Taiwan, Singapore, China, and Vietnam, even with differing economies, have also applied the same model. "That's the essence of what development is about—once you start manufacturing products, you move up the ladder. You start manufacturing and exporting very simple products, then you end up manufacturing very complex cars, machines, electronics, and chemical products."

Unlike its neighbors, the Philippines followed a completely different economic path, relegating its manufacturing sector to a small sector, in particular from the employment side. Felipe notes: "Historically, we do not know of any nation that has attained high income per capita without developing a significant manufacturing sector. Where do you think innovation comes from? Manufacturing. You may have some type of innovation in the service sector but it is, one way or another, always linked to what you do in manufacturing."

When asked about the chances of the Philippines to catch up in the industrialization train, Felipe says, "There are always opportunities out there in terms of niches. In the manufacturing sector, it is a big aggregate that, in reality, is thousands of products. And I'm familiar with manufacturing companies in the Philippines in most of the sectors, including chemicals. So, the challenge is how to multiply that experience in the next few years, in the next couple of decades, to be able to develop some niches where we may have opportunities.'



To make various stakeholders understand the state of the Philippine economy, Dr. Jesus Felipe and the DLSU School of Economics have initiated various seminar-lectures that feature international speakers and faculty researchers tackling topics such as short- and long-run growth, inflation, fiscal consolidation, investment, and economic structure. Part of these public engagements is the event titled "Economic Briefing on The State of the Philippine Economy: Is the Glass Half Full or Half Empty?" on July 8, 2024 at the Makati Diamond Hotel.

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He adds that the key is for the Philippines to have very competitive, meaning productive, firms that will both produce for the domestic market and export and compete in the world economy.

Likewise, Felipe emphasizes the vital role of the government. "It is absolutely fundamental. Without a government directing the economy in the right direction, it is going to be very difficult for the economy to progress. The government must have a clear national vision and must work with the private sector, which is composed of thousands of firms. The government must indicate the overall direction."

The thrust on industrialization should be at the center of the country's policy agenda, he says, adding that the work needs strong collaboration between the private and public sectors, from academe to media to the general public.

"How do we become an industrial nation? How do we strengthen the niches that are going to help us?" He notes that for the country "to achieve higher wages and higher capita income, it needs to create a wide base of domestic industrial companies that produce the myriad of basic products across the whole manufacturing spectrum that support national development. This is something that everybody needs to be aware of."

How are our corals and coral reefs doing?

Researchers from De La Salle University's Br. Alfred Shields FSC Ocean Research Center (DLSU SHORE) have partnered with the International Union for Conservation of Nature (IUCN) to evaluate the extinction risks of stony corals. Their collaborative undertaking offers a direction for the creation of policies and regulations and encourages collective conservation action to sustain corals and marine life.



How are our corals and coral reefs doing?



Contrary to what many people think, corals are animals that build reefs. A coral is composed of a colony of polyps with calcium carbonate skeleton and symbiotic algae residing algae that reside in their tissues. These microscopic algae provide food to the corals through photosynthesis, which means that corals also need sunlight in order to grow. Water quality is likewise important for corals; they need clear waters to survive and build reefs.

For many communities living along coastlines, coral reefs are crucial to their livelihood and way of life. As massive geological structures, they provide protection along coastlines against big waves or tsunamis. They are also habitats to a myriad of marine organisms such as invertebrates and fishes. Coral reefs are also carbon sinks that can draw down carbon dioxide (CO2) from the atmosphere.

Recognizing the crucial role of corals in the entire marine ecosystem is why we need to know if they are in peril or close to extinction.

In 2008, the Coral Specialist Group of the International Union for Conservation of Nature (IUCN) conducted the first extinction risk assessment of corals for the Global Red List. To date. IUCN is considered to be the most comprehensive and reliable reference for the extinction risks of animals, plants, and fungi.

It was in 2019 when the IUCN gathered the scientists again and began the second global Red List assessment for corals, and it was done in three installments-the first was in the UK in 2019, then Germany in 2022, and then the Indo-Pacific region in 2023.

Results of the assessment of Atlantic corals reveal that their extinction risk has doubled since 2008, and this is why scientists have begun efforts to raise awareness on this pressing issue.

To work on the assessment of Indo-Pacific corals last year, Dr. Katrina Luzon, a postdoctoral Research Fellow at De La Salle University's Br. Alfred Shields FSC Ocean Research Center (DLSU SHORE), joined 20 other scientists in Singapore to work on 400 species assessments of corals. The group finalized the assessment recently, and she stressed on the importance of such efforts from a collective standpoint.

Locally, Luzon, together with the team from DLSU SHORE headed by University Fellow and leading marine scientist Dr. Wilfredo Licuanan, has been pushing for a National Red List initiative through the Philippine Aquatic Red List Committee (PARLC) under the National Fisheries Research and Development Institute (NFRDI) of the Bureau of Fisheries and Aquatic Resources (BFAR).

Dubbed as Project TRAIN (Taxonomy and Reef Assessment Methods for Initiating a National Monitoring System), the project seeks to establish a systematic

coral reef monitoring system by developing permanent monitoring sites and plots that will be regularly assessed by BFAR personnel-incharge in the region. Monitoring will be set up in 50 reef sites along 12 coastal regions in the country, which were first surveyed in the National Assessment of Coral Reef Environments (NACRE) program in 2014-2017. To achieve this, the DLSU SHORE team will help develop the capabilities of BFAR personnel to recognize threatened coral species, monitor the state of the reefs, and process the data collected from the monitoring. This will help track



The team, with its partner El Nido Resorts, through Whether it is about giving corals some time off from tourists and other chronic threats or improving water quality to make sure that these marine organisms will have clear water to survive, regulations and concrete collective conservation action need to be set in place so that we can ensure the survival of our whole ecosystem, she adds". The impact that we are observing now on coral reefs and the world is the result of our collective actions and choices that we made in the past. We need an effective body of leadership like governments ensuring that our conservation actions are indeed synchronized, complementary, and relevant," Luzon points out.

its sustainability office Ten Knots Group Sustainability, is monitoring a colony of rare and endangered species of coral in one of the resort's coves in Palawan. The team has placed sensors around the colony to monitor light, temperature, and pH levels in the area, and regularly visits the site to take a series of photographs of the coral to recreate 3D models of the colony and measure growth rate. "The changes in environmental factors are crucial in determining how they affect the organism...like what are the sensitivities of each coral species," Luzon says.

population distributions and decline rates in coral cover over time.

While DLSU SHORE is working to make this proposal happen, other campaigns are also taking place, such as the citizen science initiative Philippine Coral Bleaching Watch. "People from all over the country who have been snorkeling or diving can report to the Facebook page of the Philippine Coral Reef Bleaching the extent of the bleaching and what species and growth forms they observe to be bleaching or are starting to bleach," Luzon says.

What's a sweeter future for our cacao farmers and chocolatiers?

With the support of the De La Salle University Biological Control Research Unit, local producers of cacao are creating a new technology that could protect their farms from pest infestations. From this technology, they ultimately seek to develop a more sustainable farming system for their families and communities.



What's a sweeter future for our cacao farmers and chocolatiers?

In the 1980s, being the first country in Asia to grow cacao in a plantation type, the Philippines became the highest producer of cacao in Southeast Asia. Those were indeed sweet, abundant years for the local farmers—until around the end of that decade when pests and diseases, particularly cacao pod borer, hit the major cacao estates in the country. In the early '90s, the industry was almost wiped out.

Today, the local cacao producers have regained momentum as the world takes notice once again of the country's delectable, premium chocolate products at global fairs.

From the lessons of the past and in order to further push the revival of the cacao farmers' sector, Dr. Divina Amalin, University Fellow, professor of De La Salle University and member of the Biological Control Research Unit, has embarked on a research focusing on the development of BIOCOAT-Z, a particle film technology that protects the cacao pods from particular pests, thus helping produce more quality beans for chocolate-making. It is the research unit's mission to develop bio-based pest control management strategies to aid agriculture and medical fields.

Dr. Amalin says that while Davao is the popular region for the business, other areas such as Isabela in northern Luzon and areas in the Visayas have started investing in the production of high quality cacao beans.

Cacao thrives in a tropical climate, ideally 20 degrees north and south of the equator where the temperature is the right balance of humidity, heat, and moisture. The Philippines, given its abundant seasons, has the perfect climatic conditions for cacao beans to grow and flourish. With this gifted soil and climatic conditions, the farmers' greatest liability remains to be the pests.

Farmers' welfare

Dr. Amalin shares that currently, farmers use techniques of chemical control and plastic sleeving that are not only laborious, but also have consequences for the beans, their health, and the overall wellness of their environment.

In order to lessen the burden on the ones taking care of the plants and beans, the research team identified the gaps in protecting the cacao plants from pests while ensuring that the high quality of beans and farmers would not be endangered in the process.

To put it simply, Dr. Amalin explains that "BIOCOAT-Z is a coating agent with the use of clay particles, the zeolite. We call it bio because we added an entomopathogen—this is a pathogen or a microbe that can kill the insect of interest." Zeolite is an abundant and accessible clay mineral. It acts as a deterring agent for the two specific attackers of cacao pods—the cacao pod borer and the cacao mirid bug.

BIOCOAT-Z has been presented and recognized for its valuable contribution to the farmers and the agricultural sector. Dr. Amalin shares that their team is currently working with an industry partner on the structure of the zeolite for it to be used by farmers in a sprayable manner. She adds that the research team is also developing ways to use the same technology on other crops.



Distinctly Filipino, global brand

Today, a good number of local artisans are championing Philippine chocolates in a slow but steady strategy. Some local chocolate brands had breakthroughs in placing the country beside global chocolatiers. The roadmap to boosting cacao production is made possible by protecting the crops, the farmers, and their communities.

ng Dr. Amalin says that her research team's hope is to see local farmers continue producing cacao beans, which have their distinct flavor, to sell to fellow Filipino chocolatiers. The production targets may still be far from the cacao farmers' goal, but with the right strategy partnered with the right pest management program, it is not impossible.



Can an app make women safer in their commute?

Manila, Philippines, has one of the most dangerous transport systems in the world for women, with at least 80% of women commuters reporting harassment or sexual assault, according to a Thomson Reuters Foundation Report. This has prompted a team of De La Salle University researchers to turn to AI for a solution.

Can an app make women safer in their commute?



Philosophy faculty member and gender studies expert Dr. Hazel Biana found that technology such as safety apps exists but that the majority of these put the burden on women to protect themselves, with suggestions such as staying alert and traveling with weapons. Biana also found that existing apps do not tackle the underlying issues of violence against women or take into account the functions that women want. She wondered if it was possible to design a safety app that could empower women while being powered by women.

With colleagues at the DLSU Social **Development Research Center**, which includes Center Director and Psychology faculty member Dr. Homer Yabut, Philosophy faculty member Rosallia Domingo, and Sociology and Behavioral Sciences Professor Dr. Melvin Jabar, Biana focused on women transit users'

lived experiences and stated needs and the group soon came up with the SafeHer App.

"We found a call for submissions for Al-inclusive algorithms and Alinclusive programs by the Feminist Artificial Intelligence Research Network, in cooperation with the Technologico de Costa Rica and the International Development Centre of Ottawa, Canada, and decided to submit a proposal for an artificial intelligence-driven application for women who are in transit. The proposal was approved, we got to work, and now we have SafeHer," says Biana.

The project's research reveals that women feel safe knowing they are in the company of other women. Hence, one of the most important features of SafeHer is that it lets the user know if there are other women commuters around them

via the app's live location-sharing feature. Its buddy system feature also allows women to detect other solo commuters.

Apart from these, the app has an SOS alert and scream detection feature. Other features for future development include best-route recommendations and crash detection.

"I think the difference that this project has from other artificial intelligence projects is that it began with thinking, really considering what women commuters need. It also integrates a lot of community interaction and is collaborative. We have a team of developers and UBX designers, psychologists, sociologists, and artificial intelligence experts working together on this," Biana shares.



This research work is part of the Incubating Feminist AI project of the f<a+i>r Feminist AI Research Network under the <A+> Alliance for Inclusive Algorithms carried out with the aid of a grant from the International Development Research Centre, Ottawa, Canada.

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The app, which is in the prototype stage, had an alpha launch in 2023 and will undergo pilot testing in the coming months, where it will be deployed in areas around the University and the metro. The team is coordinating with government agencies, including the Philippine National Police, the Philippine Commission on Women, the Light Railway Transit Authority, and local government units, to address incidents of gender-based violence in transit systems.

Biana considers the project's greatest challenges to be getting feedback from the community and keeping up with the ever-changing AI technology.

"We must ensure it's integrated into the local government unit systems and existing infrastructure. Its development also needs to be fast because technology changes so quickly. While we're developing the app, new technologies are coming up, so it's really a race for time and to make sure that we're up-to-date with the latest Al technologies," she shares.

Overall, the app aims to empower women, challenge victim-blaming norms, and raise awareness of women's safety concerns in transit. Ultimately, the SafeHer team hopes data from their app can be used to influence policies that make public transit safer for women.



What are the ways to uplift the lives of smallholder farmers?

Many smallholder farmers remain in inadequate living conditions and locked in an almost perpetual cycle of debt. Utilizing a theoretical sample approach, an emerging study by a faculty member from the De La Salle University Ramon V. del Rosario College of Business may hold the key to understanding smallholder farmer upliftment and providing support for our local producers.

What are the ways to uplift the lives of smallholder farmers?



Providing 90% of the world's rice food supply. smallholder farmers are a basic and critical part of our civilization's sustenance. The aggregated farms of the world's smallholders form only 12% of the world's total farmland, but the food produced in Asia and sub-Saharan Africa accounts for an estimated 80% of the world's food production and 90% of rice food supply.

"Technically, smallholder farmers are those working on plots of land which are 3 hectares and below. In the Philippines, however, majority of the farmers are working on less than a hectare of land, which is actually not enough for the farmers to support their livelihood," says Beata Maria de Ocampo, Financial Management vice chair from the De La Salle University Ramon V. del Rosario College of Business.

De Ocampo recently conducted a series of studies focusing on Filipino smallholders' resilience against socio-economic and environmental-related challenges. The study gathered first-hand experiences of the Philippines' local smallholder rice farmers to help identify possible upliftment models for more sustainable solutions.

"My research is about poverty alleviation. So, how did it all start? From the Catholic social teachings we have, we are called to have preferential love

for the poor and the vulnerable," shares de Ocampo, who is also a catechist for the youth. "This is something very close to my heart. My dream is to enrich farmers, one community at a time."

Her research collected data from selected rice farming communities in the provinces of Quezon, Iloilo, Laguna, and Pangasinan. It shows that a major challenge to local smallholder farmers is their being caught in a seemingly inescapable cycle of debt. "It's a very complex issue; social, political, economic, and environmental factors are all affecting the livelihood of farmers," she points out.

She cites, for instance, the use of genetically modified seeds (GMO) that are high-yielding, but require fertilizers and pesticides and, thus, farmers need to buy all the farming inputs for every planting season. She also notes from her study the experiences of CARP (Comprehensive Agrarian Reform Program) grantees who shifted from being tenants to being instant landowners, and eventually were forced to take out loans as they lack the additional and entrepreneurial knowledge to handle the business. They also needed irrigation such that in one interview, the farmers preferred infrastructure support rather than the piecemeal government cash dole-outs (better known locally as 'ayuda').

Farmer upliftment models

De Ocampo's study has identified four farmer upliftment models that could support inclusive growth. The first two models center on the individual farmer's own improvement, while the other two require a community 'bayanihan' approach to help improve the farmers' conditions.

The first upliftment model (Empowered Farmer) promotes a resilient independent farmer brought about by having a viable source of other income."I look back at the story of Mang Tino, a proud farmer. Aside from farming, he has poultry and piggery. He freely makes decisions about his farm free from debt, and no one is controlling him," she explains. On another note, MASIPAG—an

agricultural network composed of nongovernmental organizations. scientists, and farmers across the country, promotes viability in farming by providing free organic seeds that are not dependent on expensive farming inputs, e.g., GMO seeds, fertilizers, and pesticides. Such organic seeds can be passed on from generation to generation.

mindset that promotes not finish grade school but whose



A sustainable way of farming

The End-to-End Value Chain Model is the fourth upliftment model, which requires the adequate attention and full support of the local government. The LGU provides the initial capitalization, assets, and staffing to assist the farmer association in production, research, development, and product marketing. This provides a more businessenabling environment for the local farmers by eliminating the use of intermediaries who dictate farmgate prices. This also gives them the opportunity to sell types of crops according to seasonal demand as coordinated by the Department of Agriculture to meet contractual obligations for produce at a reasonable price.

De Ocampo believes that the emphasis on sustained farming support, entrepreneurial education, financial literacy, and contractual obligation are what our smallholder farmers need to gain a better understanding of a more resilient and sustainable way of farming.

"It is very important for the youth to still be interested in agriculture. It's been a problem not just in the Philippines but in the world. That's why many governments incentivize the youth to engage in agribusiness. The children just need to see that this is viable and it gives them dignity. But it really starts with uplifting the condition of the family, especially the farmers," she further adds.

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In the second model (Farmer-Entrepreneur), smallholder farmers develop a more entrepreneurial innovativeness, risk-taking behavior, and proactiveness. She shares the story of another farmer who did

entrepreneurial orientation has led him to move into the vegetable

business. "He put his own money through a "paluwagan"—this is a system of lending in the Philippines, wherein people in the community would put in money and at certain months of the year, each one would be getting the amount."

Her third upliftment model (Contract Farming) is a more community-driven approach through a cooperative endeavor among community members. As a cooperative, they deal with entities, whether government or NGOs which assures the existence of a market. Fulfilling individual contractual obligations ensures the survival of each member and the group endeavor overall.

How can abandoned mines be a new home for our people?

A team of professors from the DLSU Gokongwei College of Engineering has teamed up with international partners to bring new hope to an abandoned mining site in Benguet, a province in the northern region of the Philippines. Through transdisciplinary measures that underscore the local community's knowledge and practices, they are creating a model of a sustainable environment for legacy and active mines across the globe.



How can abandoned mines be a new home for our people?



"Mining the critical minerals will play an important role if we want to sustain what we call our 'modern world.' From smartphones to e-vehicles, we need them," says Dr. Michael Angelo Promentilla, professor of the Department of Chemical Engineering and head of the Waste and Resource Management unit of the DLSU Center for Engineering and Sustainable Development Research.

Promentilla is also part of the Bio+Mine Project, which is currently working on how to mitigate the impacts of mining toward making an abandoned mine site livable and thriving again, especially for the indigenous communities affected by past mining activities.

For the Bio+Mine Project which is being conducted at the legacy mine in Santo Niño, Tublay, Benguet, he and his fellow Chemical Engineering professors Dr. Arnel Beltran and Dr. Aileen Orbecido serve as co-lead researchers from DLSU. Their team works in collaboration with the Natural History Museum (NHM), Imperial College London (ICL), Mindanao State University-Iligan Institute of Technology (MSU-IIT), and University of New South Wales Sydney (UNSW).

"When we first came to Tublay, the people were very hesitant to work with us. They thought we were working for the reopening of the mine," Beltran shares. The local community's fears were not unfounded. At the time, they were experiencing the harmful effects of mining, particularly the acid mine drainage that had threatened both their health and the environment. Their water resources had also become scarce, especially during summer.

Beltran adds that after several focus group discussions, interviews, and community validations with the help of the local government, the people realized that the nature of the research by the Bio+Mine team was to assist in rehabilitating the place by understanding the problems and looking at potential solutions.

The work of the multidisciplinary scientists for the Bio+Mine project involves gathering social, biological, environmental, and geochemical data toward the development of a full-scale system of interventions for the succeeding years.

Regaining the community's trust

Since the start of the project in 2022, one of the teams has already conducted drone imaging activities to map and assess the topography and biodiversity of the area. Another group has investigated its vegetation to study the presence of mining pollutants, and another team has studied the mineral deposits in soil, rocks, and water. At the same time, another team has handled the social component of the project, seeking dialogues with the residents to determine their perceptions and aspirations as they work together to revive the place.

Beltran recalls the first visit of their UK partners in 2022, when a typhoon struck the region.

The team pushed through with their fieldwork, undaunted by the challenges posed by the terrain and the weather. For the community, it was a kind of assurance that the Bio+Mine proponents were bent on seeking sustainable solutions for them.

"They said many came but never returned. That's why we really ensure that once we're done with the data collection, we go back and provide them with the necessary outputs of the project," he shares.

The DLSU team focuses on the water component and the social engagement part of the project. Beltran also shares about the

Toward social acceptability

"We as engineers believe that mining is a vital industry in the Philippines," Promentilla says. He notes how the country is the world's second-largest exporter of nickel and one of the top 5 with the largest mineral reserves, yet it continues to face a lack of investors for the sector.

He links the relevance of the mining sector to UN Sustainable Development Goals. "Why is this relevant today? To reach this vision of a clean energy system, we would use metals like nickel, which is important for electric vehicles and batteries." He further stresses the need for the country to look into the social acceptability of the sector and push for sustainable mineral resource management.

"Bio+Mines was conceived to demonstrate how we could rehabilitate legacy mines. Hopefully, it's a success story of a transdisciplinary research," he says.

Promentilla points out that by making the locals not merely beneficiaries but also co-designers and co-developers of their own communities, it is viable to create a plan that is nature-positive. He ends by saying the work ahead should be transdisciplinary, science-informed, and futuristic enough to believe that mining areas can turn into sustainable landscapes.

research being conducted by another DLSU professor, Dr. Renan Tanhueco from the Department of Civil Engineering. The latter's study focuses on rainwater and its potential to sustain the community's water needs for their households and farming, especially during dry season.

"Our recent activity was last March when we went to the community again to showcase several assessments of the secondyear activity. *Nakakatuwa*—they asked a lot of questions on how to move forward. Their rehabilitation is really science-based," Beltran quips.



EDCOM II-backed research projects by a team of DLSU professors and researchers seek to strengthen the implementation of the Antibullying Act in schools while also addressing other areas to improve the quality of basic education in the country.

Is bullying getting normalized in Philippine schools?



It was 2013 when Republic Act No. 10627, or the Anti-bullying Act, was signed under the presidency of Benigno Aguino III. However, despite the legislative measures in place, bullying incidents continue to rise and remain a priority problem in the country. The Programme for International Student Assessment (PISA) 2018 and 2022 results have shed light on an alarming trend in the Philippines: high rates of bullying incidents among students. Is bullying getting normalized in Philippine schools?

According to the PISA 2018 report, 65% of students in the Philippines reported being bullied at least a few times a month. This percentage is significantly higher than the Organization for Economic Cooperation and Development countries' average of 23%. Although the percentage went significantly down by 2022 because of the pandemic, this data still showcases the pervasive nature of bullying in Philippine schools and the urgent need for effective strategies to address this issue.

Partnership with EDCOM II

In June 2023, the Senate of the Philippines and De La Salle University (DLSU) signed an agreement for the Second Congressional Commission on Education or EDCOM II, a three-year comprehensive assessment and evaluation of the performance of the education sector.

University Fellow and Distinguished University Professor Dr. Allan B.I. Bernardo was tasked to oversee priority research areas, which include bullying in Philippine schools. Among the topics are: a) mapping the regions where bullying is most rampant; b) characterizing these hotspots; c) reviewing factors associated with bullying among Filipino students; d) developing policies related to addressing bullying; and e) generating proposals for a framework for a safe and supportive school environment.

Other DLSU studies for EDCOM II look into the following areas: curriculum congestion in basic education; availability of infrastructure for tech-mediated learning resources in developing foundational and digital literacy; professional development programs for Filipino teachers; career destinations of labor market outcomes for teacher education graduates; and factors that shape the research productivity of Philippine higher education institutions. Bernardo shares that among those who are part of EDCOM II are faculty members from the Br. Andrew Gonzalez FSC College of Education, College of Computer Studies (CCS), College of Liberal Arts (CLA), and School of Economics (SOE), as well as researchers from the Office of Lasallian Center for Inclusion, Diversity, and Well-Being and the Office of Counseling and Career Services.

A stride toward safer learning spaces

The percentage of bullying incidents in the country, according to Bernardo, is based on how students perceive bullying as part of the social norm. "It seemed like it was something very normal that people even just shrug it off. In a sense, that was alarming to us researchers."

Focusing on the characteristics of the school environment, the team of Dr. Thomas Tiam-Lee of CCS used a machine-learning approach to identify a typology of schools based on the levels of bullying and related school environment variables. The results, which present the complex interplay between

school environments and bullying within the Philippine context, are considered for the design of antibullying programs/interventions and policies related to creating safe school environments.

For his part, CLA Department of Psychology Associate Professor Dr. Rene Nob identified several predictors of bullying exposure. One of the findings showcased that bullying is more common in public schools, where there is a large number of students per teacher.

Tiam-Lee and Nob's study noted that bullying happens most where teachers tend to be discriminating



Reflecting on the presence of bullying in schools, Bernardo notes how it has contradicted deep-rooted values in Philippine culture. "We are very sensitive to the needs of other people. It makes me think that maybe there are moments that we, Filipinos, tend to forget these values of pakikipagkapwa-tao [or] empathy to other people."

Through their work in EDCOM II, the team expressed hope to address this problem as well as other priority areas of the Philippine education sector, highlighting the need for policymakers and various stakeholders to strengthen their collaboration.

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and where there is less perceived competition and a lower disciplinary climate. Adult support was also found to be an essential predictor of bullying: children with parents demonstrating lesser emotional support tend to become a bullies.

The researchers have drafted an initial set of recommendations, such as injecting amendments to the Anti-bullying Act with revisions in the Implementing Rules and Regulations, mandating legislative projections, conducting a followthrough in schools, and seeking help from media on how bullying should be portrayed in popular culture.



How can we better monitor TB cases among our children?

A project led by De La Salle University's IT faculty sought to develop a system that collects data on TB cases among Filipino children. Funded by USAID through URC, it is envisioned to support medical professionals as well as local government units across the country toward the effective management of the disease.

How can we better monitor TB cases among our children?

"Tuberculosis is a curable disease, but in the Philippines, it still persists due to difficulties in diagnosing and limited health facilities," notes Dr. Michelle Ching, chair of the De La Salle University Department of Information Technology and head of the Pediatric Tuberculosis Clinical Decision Support System (PedTB-CDSS) Project.

A project under DLSU's Center for ICT for Development (CITe4D) and De La Salle Medical and Health Science Institute Center for Tuberculosis Research (DLSMHSI-CTR) with support from USAID through URC's TB platforms, PedTB-CDSS aims to address the heightened health risks for children under 15 years old.

For this endeavor, Ching is working with another IT faculty member from DLSU, Oliver Malabanan; junior developers and BSIS students Raymond Matthew Intervalo Miguel Josh Perez, Carlo Jose Reyes, and Jerry Ezequiel Santos; Virgilio Linis of the Animo Labs; and Dr. Maria Marisa Golia and John-Ernand Velleta of the DLSMHSI-CTR.



De La Salle Medical and Health Science Institute Center for 'uberculosis Research (DLSMHSI-CTR) offers cutting-edge DOTS services and advanced research. Center for ICT Development (CITe4D) osters collaboration in ICT4D research and innovation.





Develop a pediatric TB clinical decision support system (PedTB-CDSS) to aid diagnosis, eligibility assessment for preventive reatment, and patient monitoring. Assess TB diagnostic practices Perform comparative analysis on available DSS options
Develop and pilot a standalone pedi TB clinical decision support system.

SYSTEM DEVELOPMENT

The pediatric TB clinical decision support system simplifies diagnosis for presumptive pediatric TB patients with its user-friendly interface and one-click diagnosis feature. It analyzes patient records, follows Department of Health guidelines, and incorporates expert





She shares that the project was conceived during her discussions with Dr. Elmer Soriano of CIVIKA and Mr. Virgilio Linis on how they could help manage records of TB health cases. While pursuing her master's degree at DLSU, she was exploring a health-related topic and Open Data.

In the course of her research, she has noted that TB has remained one of the deadliest diseases in the country. "Children are the most prone to having lifelong threatening effects of tubercolosis" Ching points out.

For the Clinical Decision Support System through rule-based algorithm, the research team used the Department of Health's existing Guidelines for the National Tuberculosis Control Program Manual of Procedures, which provides the basis for assessing a patient's symptoms. If a person shows all four of the cardinal symptoms, that person will be presumed to have TB.



With the system, it will be more efficient to collect and generate data across the archipelago. "In the local setup, since we have several islands, not all have the healthcare facilities or physicians available, especially in far-flung areas," she notes.

"So, even with the TB dots, even with the free medicines available, if you cannot detect it, you cannot treat it. And it's easily spreadable because it's an airborne disease. Actually, before I studied tuberculosis, I did not know that it's that serious," she shares.

With the collective data, the system can determine probable areas affected by tuberculosis. The team has made test runs in the areas of General Trias, DLS-MHSI, and Trece Martires in Region IV-A using a rule-based algorithm decision tree system. This system is based on different combinations of data, such as the symptoms of the patient, lab results, and medical history, to name a few. The team has already generated over 11,000 combinations.

According to Ching, the system can be implemented with encoders who do not need to be medical professionals. It is envisioned to be deployed in healthcare facilities like barangay health centers, where midwives and volunteers are tapped when doctors are not available. The pediatric TB clinical decision support system simplifies diagnosis for presumptive, active, and latent pediatric TB patients with its user-friendly interface and one-click diagnosis feature. It analyzes patient records, follows Department of Health guidelines, and incorporates physicians' practices for accurate diagnoses.

Initial iterations of the clinical decision support system showed promising improvements in diagnosis accuracy and treatment recommendations. User feedback during testing informed enhancements, leading to a streamlined Version 4.0 with a more intuitive interface for healthcare providers, marking ongoing progress in refining the system for better TB diagnosis and treatment decisions.

Looking forward to the next phase of the project, Ching shares that DOH has expressed support for introducing the software at a wider scale, covering the whole of Region IV-A.

"Technology is rather not a replacement, but a tool or an aid that can help healthcare professionals clinically diagnose patients effectively," Ching says. "A single expert can only do as much. But when we combine all of our expertise, we can create a great impact."



How can stroke rehab be enhanced in the community healthcare system?

A UK Research and Innovation-National Institute for Health and Care Research-Global Health Policy Research funded research implemented by the De La Salle University through the Institute of Biomedical Engineering and Health Technologies brings together experts from various fields to codesign a community-based self-management stroke rehabilitation manual to empower survivors, carers, and their communities.

How can stroke rehab be enhanced in the community healthcare system?



Staying true to its mission of leading change and innovation for the Filipino community in the field of healthcare, the De La Salle University-Institute of Biomedical Engineering and Health Technology (DLSU-IBEHT) has been conducting groundbreaking research that underscores collaboration and community empowerment.

DLSU-IBEHT, together with the University of Plymouth, is currently implementing the TULAY (Tulong, Ugnayan ng Lingap at Gabay: Co-designing Philippine Community Physical Rehabilitation) project. This four-year research project in the Philippines is funded by the National Institute for Health and Care Research–Global Health Policy Research using aid from the UK Government.

Since May 2022, when the TULAY project proposal was accepted for funding, it has evolved into a nationwide initiative that extended its previous goals into something more community-driven and in the service of more Filipinos.

Focusing on the creation of a self-management stroke rehabilitation manual within the community to empower stroke survivors, carers, and their communities, the TULAY project proponents underscore the need to tailor-fit it to the Filipino context, considering cultural variations across the different islands of the country.

The goal of the project is to improve the availability of stroke rehabilitation services and promote resilience and wellbeing among stroke survivors. A lot of Filipinos, especially those residing in remote areas, lack access to basic healthcare and specialized rehabilitation services.

"There are doable solutions to these health service delivery challenges, and with TULAY through the co-design approach, we will be able to craft and implement it together," says Dr. Sharon Linog, sub-lead for field operations. Currently in its second year, the TULAY Project has achieved significant milestones that are making a positive impact on stroke management and community healthcare. Since the project launch last February 2023, the proponents have and mobilized a dedicated team that would ensure effective collaboration throughout the project's execution.

Aside from participating in different training sessions and global conferences, the team from the Philippines also participated in a comprehensive program in London that focused on improving their skills in research, community engagement, and strategic planning.

The TULAY team has visited various communities in the NCR, Region IV-A, Region VI, Region VII, and Region X to introduce the TULAY program and outline the assistance needed from the local government. Community visits are a crucial part of the co-design process, enabling meaningful connections with stakeholders and setting the foundation for collaborative initiatives to create customized solutions for stroke management at the grassroots level. To date, the project proponents have completed a comprehensive scoping review of existing literature on stroke management, synthesizing key findings to inform the project's research objectives and methodologies. TULAY was also granted permission by the Single Joint Research Ethics Board (SJREB) to initiate a nationwide data collection and carry out in-depth interviews with patients, carers, and healthcare professionals. These interviews will offer essential qualitative data and narratives needed to begin the co-design process. The data collection is already complete, with more than 2,000 participants providing valuable information for a comprehensive stroke management database in the Philippines. The data gathered is currently being analyzed using different quantitative and qualitative approaches.

These milestones capture the project's commitment to advancing stroke care through research, community engagement, capacity building, and being the changemakers toward the overarching goals of improving communitybased healthcare for the people.

For its next phase, the TULAY program will continue pursuing its research and operational goals and will be prepared to initiate the codesign implementation by late 2024, targeting the six identified implementation sites across the five major regions.





Are you building on good soil?

A De La Salle University-led project conducts a geotechnical mapping of Metro Manila subsoil to help the construction industry determine the most suitable foundation type and soil improvements.



Are you building on good soil?



Civil Engineering Professor Dr. Jonathan Dungca, who concurrently serves as DLSU vice president for Laguna Campus and dean of the School of Innovation and Sustainability, is currently working on a project that aims to help members of the construction sector in building a strong foundation for their projects.

Called Geotechnical Mapping of Metro Manila Subsoil (GEMMMS), the project is a 3D map of Metro Manila's subsoil. With funding from the Department of Science and Technology under its Grants-in-Aid (GIA) Program, Dungca serves as the project lead, with DLSU's geotechnical engineering professors from the Department of Civil Engineering as his co-proponents, namely, Dr. Mary Ann Adajar, Dr. Erica Elice Uy, Dr. Irene Olivia UbayAnongphouth, Dr. Joenel Galupino, and Engr. Miller Cutora. "The Philippine construction industry is expected to surge in 2024, fueled by government investments and increased bank loans. To ensure the safety and stability of new structures, reliable data about the ground beneath them is crucial. This data helps determine the most suitable foundation type and any necessary soil improvements to prevent future hazards," Dungca says.

Currently, information about Metro Manila's subsoil is scattered across various agencies. This makes it difficult to get a clear picture of the ground conditions across the entire region.

GEMMMS project aims to address this challenge. It will create a

centralized, digital map containing information on the geological and geotechnical properties of Metro Manila's subsoil.

According to Dungca, GEMMMS leverages the power of 3D GeoVisionary software. This software will transform the borehole data provided by partner agencies like the Department of Public Works and Highways (DPWH) and the Philippine Institute of Volcanology and Seismology (PHIVOLCS) into a 3D map.

Dungca says this 3D map will serve as a valuable reference for geotechnical surveyors, allowing them to pinpoint areas for investigation, determine optimal borehole depths, and choose the most effective sampling methods. This translates "faster and more cost-effective site assessments."





Currently, GEMMMS focuses solely on Metro Manila. The researchers will analyze Standard Penetration Test (SPT) data to create a digital map encompassing groundwater elevation, soil classification, and SPT N-values.

Dungca shares that while GEMMMS lays the groundwork for a comprehensive understanding of Metro Manila's subsoil, it excludes factors like liquefaction-induced subsidence for this initial phase. This is something that can be considered in future research.

To ensure project feasibility, GEMMMS utilizes data from existing borehole logs compiled by government agencies and experts. Collecting direct borehole data across the entire region would be a significant undertaking.

The project follows a four-step workflow: data collection, which refers to gathering borehole data from partner agencies; data cleansing, which means ensuring data accuracy and consistency; delineation, or creating the 3D map using 3D GeoVisionary software; and validation, which is verifying the accuracy of the final 3D map.

"This project will empower geotechnical professionals with a powerful tool, ultimately contributing to safer and more sustainable construction practices in Metro Manila," Dungca stresses.

How can history and memory rebuild a home ravaged by a typhoon?

Award-winning poet, University Fellow, and Literature Professor Dr. Dinah Roma has released her first collection of essays, *Weaving Basey: A Poet's History of Home* (KATIG Writers Network, Inc., 2024). Conceived following the profound devastation of her hometown by typhoon Yolanda in 2013, the book is a partly personal, partly historical journey toward healing and finding home. Her initial manuscript was selected as one of only three proposals from among 69 entries that received a trust fund grant from the National Book Development Board (NBDB) in 2015. QUESTIONS magazine asks her about her experiences writing the book.

How can history and memory rebuild a home ravaged by a typhoon?

Please give a short background of how this book came about. Why did you embark on this project?

I always trace the origins of Weaving Basey back to November 8, 2013, the day typhoon Yolanda devastated Eastern Visayas. A few days later, I contracted dengue and was hospitalized for it. While impatiently enduring the IV drips, I passed the time watching television. It was there that I saw survivors of Yolanda sharing their heart-wrenching stories in Waray, my mother tongue.

During this time, a friend sent me a New York Times article about Basey, where approximately 300 bodies were discovered scattered throughout the coastal town.

Many survivors had sought refuge in the colonial church of St. Michael the Archangel Parish. This news forged a profound connection with my hometown, stronger than ever before. It marked the beginning of my journey to learn more about Basey, driven by the fear that I might not have another opportunity should another calamity strike. In 2015, the National Book Development Board offered a writing grant under its Local History and Culture category. Seizing this opportunity, I knew I could finally embark on fulfilling this journey.

Can you tell us about the experience of the personal and the historical coming together in this story of homecoming?

In Weaving Basey, personal and historical narratives are closely interwoven as I delve into my roots in a town shaped by its historical and cultural heritage, natural resources, and the catastrophic forces of nature. My return to Basey, prompted by the damage of typhoon Yolanda, transcended a mere physical journey—it was an emotional and historical pilgrimage.

As I dug into the town's past and unearthed stories of my family within it. I realized how intricately personal identities are enmeshed

in our collective histories. This homecoming embodies a narrative of reconnection and an endeavor to shape one's geography, where fragments of personal memory and communal history coalesce into a landscape marked by both resilience and vulnerability.



How would you describe reconciling the memory of "there's nothing there" to finding "the gift it truly is" in reference to Basey?

Reconciling the memory of "there's nothing there" with the realization of "the gift it truly is" marked a transformative shift in perception during my return to Basey. Initially, my sparse childhood memories depicted Basey as a place of little significance. Whenever I mentioned my intention to visit Basey after a long absence, my mother would respond with skepticism and would caution, "There's nothing there," or in our mother tongue, "Waray gad maski ano didto."

Yet, as I immersed myself in Basey's post-Yolanda landscape and studied its rich history, I began to recognize the depth of its cultural fabric and the strength of its community. By locating its role in historical events like the 16th-century Moro slave trades, the Pulahanes uprisings, and the Balangiga Massacre, I realized how these events are intertwined into the broader narrative of the Philippines, linked to Yolanda's historic landfall in Eastern Visayas. Despite the catastrophic events it has endured. Basey stands resilient. This journey profoundly transformed my understanding. converting perceived emptiness into a deep appreciation for Basey's resilience and beauty. I've learned that often, the true value of a place is revealed through its trials and our renewed engagement with it.

During the launch, you made mention of the historian Joseph Amato and his concept of home shaping history. Can you explain this in relation to your work?

In my work, I draw upon historian and scholar Joseph A. Amato's concept that 'home shapes history' to examine how the physical and emotional landscape of Basey has influenced its historical narrative. Amato's idea underscores the belief that personal and communal histories scaffold the geographical and cultural settings of our homes. In Weaving Basey, I examine how the town's unique characteristics—its natural environment, traditional crafts, and community resilience—have not only shaped the experiences of its residents but have also been molded by historical events like typhoon Yolanda. This interplay highlights how places can influence personal and collective identities, anchoring historical understanding in the physical and metaphorical space of home.

How has the spirit of the poet driven this narrative of home?



Can you share some memorable moment/s in the writing of this book?

One of the most memorable aspects of writing this book was the opportunity to physically immerse myself in Basey again. With ample time, I immersed myself in the town's life, connecting with its history and people in a way that enriched my writing. Particularly poignant was the warm reception from older residents who fondly remembered my father, the town's former municipal treasurer back in the late 1960s. Their personal anecdotes provided a touching link to Basey's communal history.

Interviewing Yolanda survivors was profoundly impactful. Hearing their stories of resilience and courage in the face of devastating adversity provided valuable material and significantly influenced my views on human strength and community spirit. These experiences were foundational, transforming my understanding of my hometown and enriching the narrative of Weaving Basey.

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The spirit of the poet in this narrative has been pivotal, not only in documenting the story of Basey but in charting an inner map where Basey serves as a key landmark in my poetic imagination. This approach allows me to explore the coastal town's landscape as both a physical and metaphoric space, revealing layers of meaning that transcend the visible.

As a poet, I realize that Basey has long inhabited my earlier poems to probe the deeper currents of memory and identity, portraying the town not just in terms of its historical facts but as a canvas for emotional and existential exploration. The narrative weaves through these personal and collective dimensions, illustrating how our sense of home shapes and is shaped by our inner lives. In this way, Basey becomes more than a place—it becomes a part of the internal compass that guides my poetic expression. allowing me to navigate through the complex terrains of heritage and personal history.



DLSU faculty among the world's top 2% researchers based on impact

Top researchers based on cumulative career statistics







Dr. Raymond Tan

Dr. Kathleen Aviso Dr. Luis Razor

De La Salle University faculty researchers are included in the 2023 list of the world's top 2% researchers across all disciplines, in a paper published by a team led by Stanford University statistician John Ioannidis.

Three faculty members are included based on their cumulative career statistics. There are 29 locally-based researchers, but only 11 are affiliated with HEIs.







Dr. Raymond Tar





Dr. Aristotle Ubando Dr. Fides del Castillo

Dr. Alvin Culaba

Six faculty members are among the leading researchers in the world based on single recent year data per citations received in 2022.

There are a total of 50 locally-based researchers listed, with 32 from Philippine HEIs.



Scan to know more

National Academy of Science and Technology (NAST)

Outstanding Young Scientist

- Dr. Angelo Earvin Choi (GCOE)
- Dr. Jerome Cleofe (CLA)
- Dr. Jose Isagani Janairo (COS)

Outstanding Book

2024 Awardees

- Luzon, Katrina S., Verdadero, F.X.D., Mendoza, Ysadora, Licuanan, Wilfredo
- Mabaguiao, Jr., Napoleon
- Teehankee, Julio, C., Calimbahin, C.A.A

Outstanding paper

- Bautista, R., Dui, R., Jeong, L.S., Paredes, M.
- Borja, A.L.A.
- Mallari, R.A.N., Garciano, L.E.O., Peñarubia, H.C.

Competition Finalists

- Dr. Neil Patrick del Gallego (TSYS; CCS)
- Dr. Ivan Henderon Gue (NESA; GCOE)

DLSU leads PHL's research productivity in 2024

Based on records in the Scopus database (covering publications such as journal articles, conference papers, and book chapters) as of June 2024, DLSU has been the most productive research institution in the Philippines since 2019.

Scopus is the largest abstract and citation database of peer-reviewed literature: scientific journals, books, and conference proceedings.

> First Quartile Publication 42.9% of DLSU publications are in Q1 journals

International Collaboration 33.2% of DLSU publications have international collaborations (1 out of 3 papers from DLSU has a non-Filipino co-author)



50

DLSU professors with recently published works in premiere scientific journals *Nature* and *Science*:

Prof. Dr. A.S.F. Chiu was part of a multi-country team whose paper "Country-specific net-zero strategies of the pulp and paper industry" was published in Nature.

Faculty Accomplishments

Prof. Dr. J.J. Joaquin and Prof. Dr. Hazel Biana coauthored the short paper "When authors play the predatory journals' own game" published in Nature.

Prof. Dr. R.R. Tan, Prof. Dr. K.B. Aviso, and Ph.D. student M.V. Migo-Sumagang coauthored the short paper "Philippines must commit to carbon mitigation" published in Science.

These papers are the first publications from DLSU at this level since 2008.

Recipients of major awards for their scientific research:

Prof. Dr. Charlle L. Sy (Department of Industrial and Systems Engineering, GCOE) — 2023 Underwriters Laboratories ASEAN-US Science Prize for Women

Prof. Dr. Michael Angelo B. Promentilla (Department of Chemical Engineering, GCOE) — DOST 2023 Outstanding Research and Development Award (Julian A. Banzon Medal)

Mark Edward Gonzales (BS/MS Computer Science), 2nd place; Cristina Beatrice Mallari (BS Industrial and Systems Engineering); and Caitlyn Danielle See (BS Chemical Engineering) - NAST 2023 Magsaysay Future Engineers and Technologists finalists

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for our people? Ruby Carlos

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How can we better monitor TB cases among our children? Alaric Lopez de Leon

How can stroke rehab be enhanced in the community healthcare system? Karen Escamillas

Are you building on good soil? Roy Monarch Sy

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