

**INTERSESSIONAL PANEL OF THE UNITED NATIONS COMMISSION
ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT (CSTD)**

**Geneva, Switzerland
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Contribution by Philippines

to the CSTD 2021-2022 priority themes on “Industry 4.0 for inclusive development”
and “Science, technology and innovation for sustainable urban development in a
post-COVID world”

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INPUTS FROM THE PHILIPPINES
Department of Science and Technology

PRIORITY THEME 1:
Industry 4.0 for inclusive development

United Nations Commission on Science and Technology for Development
(CSTD)

Dear CSTD member,

As you are aware, the CSTD 24th annual session selected "Industry 4.0 for inclusive development" as one of the priority themes for its 25th session (2021-22 period).

This priority theme is directly relevant to SDG 9 on industry, innovation and infrastructure. As highlighted by the Technology and Innovation Report 2021, we live at the beginning of a new technological revolution around Industry 4.0 technologies such as AI, robotics, Internet of Things, and blockchain. The way to be prepared to benefit from Industry 4.0 is by promoting the use, adoption, adaptation, and development of technologies associated with this new technological wave. This priority theme will focus on the challenges and prospects for developing countries to pursue an industrialization path considering the emergence of Industry 4.0. This may include the possibility of bypassing intermediate stages of technology that other countries have historically passed in their development process, often referred to as "leapfrogging". The priority theme will cover the impact of this new technological revolution on the traditional channels for technological learning, and innovation in developing countries, including FDI and participation in Global Value Chains. It will examine the opportunities for "leapfrogging". It will also consider the role of public policies in enabling vulnerable groups and communities to benefit from Industry 4.0, including through better and more equitably accessible jobs.

Questions to be addressed include: How can developing countries take advantage of the window of opportunity presented by the Industry 4.0 technologies for technological upgrading and catch up? What can countries do to ensure that Industry 4.0 does not increase inequality? What is the role of international cooperation in facilitating this process?

The CSTD secretariat is in the process of drafting an issues paper on the theme to be presented at the CSTD inter-sessional panel meeting on 17-19 November 2021. In this context, we would like to solicit inputs from the CSTD members on this theme. We would be grateful if you could kindly answer the following questions based on your experience from your country or region.

1. What are the national strategies, policies, laws, programmes and initiatives concerning Industry 4.0 in your country?

President Rodrigo Duterte has signed a law that would harness innovation efforts to help the poor and the marginalized and enable micro, small and medium enterprises (MSMEs) to be part of the domestic and global supply chain. The Philippine Innovation Act or Republic Act 11293 mandates the government to promote local innovation through relevant provisions, which will push the country towards more significant progress. Enabling the country's MSMEs with skills and technology to sustain their business also means propelling the nation to rise with and above the neighboring countries in Southeast Asia. Another related law is the Innovative Startup Act or Republic Act 11377 which aims to create initiatives that will provide benefits and incentives to startups and startup enablers in the country. Some of its provisions include full or partial subsidy on the use of facilities, office space, and equipment/services provided by government or private enterprises/institutions, and grants for research, development, training, and expansion projects.

The Department of Trade and Industry (DTI), a consistent government partner of the DOST in innovative programs and activities, is also at the forefront of the Inclusive Innovation Industrial Strategy (i3S). In 2017, the government upgraded the Comprehensive National Industrial Strategy (CNIS) framework and released the Inclusive, Innovation-led Industrial Strategy (i3S, "i-cube"). It retains goals in the CNIS framework, i.e., strengthening domestic supply chains, deepening participation in GVCs, and removing

obstacles to growth to attract investments. But building an inclusive innovation ecosystem is listed as an additional goal, underscoring the importance of innovation in the industrial strategy and ultimately in transforming the economy, especially as we move towards Industry 4.0. Accordingly, the CNIS framework was revised, adding Industry 4.0 as one of the external factors affecting industry growth. The fourth industrial revolution will pose new challenges and opportunities, and to take part and survive, the Philippines must build an innovative ecosystem. Hence, the government has put innovation at the heart of the industrial strategy (Aldaba 2017).

The Department of Science and Technology (DOST) leads different initiatives to push forward the country's transitioning into Industry 4.0. The DOST, through its attached agency, the Advanced Science and Technology Institute (DOST-ASTI), conducts various programs and projects that are aligned with the national priorities and R&D agenda. One of the pillars of AmBisyon Natin 2040, *Kaunlaran*, is focused on increasing potential growth. In support of this, one of the outcomes identified in the Philippine Development Plan 2017-2022 to address the country's potential growth is to build the foundation for a globally competitive knowledge economy where accelerated technology adoption and stimulated innovation are at the forefront.

We are in an opportune time to embrace what Industry 4.0 has to offer. The DOST-ASTI is not lagging behind its counterparts in Asia and the Pacific in terms of its efforts in having critical S&T infrastructures and undertaking R&D in ICT and Electronics that would effect change in our society. The three (3) flagship programs of the DOST-ASTI below are crucial to drive and spearhead the S&T sector towards Industry 4.0:

- a. Emerging Research and Applications (ERA)
- b. Environment for Extreme Computing Performance, Networks and Data (EXPAND)
- c. Intelligent Systems Innovation for the Philippines (ISIP)

Other DOST initiatives in support of Industry 4.0 includes, but are not limited to, the following:

- Launching of the DOST Artificial Intelligence Programs and Technologies: AI for Better Normal
- Development of capability-building efforts like Learning at Scale program, AIPinas, and SPARTA since 2016 to increase the country's competitiveness and ensure the maximum economic and social benefits of AI
- DOST's implementation of programs and initiatives to capacitate and upskill MSMEs in the industry, researchers, and other communities.
 - Small Enterprise Technology Upgrading Program (SETUP) – a nationwide strategy to encourage and assist SMEs to adopt technological innovations to improve their operations and thus boost their productivity and competitiveness. SETUP provides micro small and medium enterprises with equipment and technical assistance to enable MSMEs to increase sales and production, streamline and improve overall company operations, upgrade the quality of products and services, conform to national and international standards of excellence, and be competitive in their respective fields. The DOST is transitioning to SETUP 2.0, to help the MSMEs in digitalization and automation aspects. The DOST is enhancing the implementation of SETUP to align with the industry 4.0.
 - Science for Change Program (S4CP) - was created to accelerate STI in the country in order to keep up with the developments in our time wherein technology and innovation are game changers. Through the Science for Change Program (S4CP), the DOST can significantly accelerate STI in the country and create a massive increase in investment on S&T Human Resource Development and R&D.
 - Niche Centers in the Regions (NICER) for R&D – establishes R&D centers in the regions to promote regional development
 - R&D Leadership (RDLead) Program – engages R&D experts to lead in strengthening the research capabilities of the Higher Education Institutions (HEIs) and Research Development Institutions (RDIs)
 - Collaborative Research and Development to Leverage Philippine Economy (CRADLE) Program – creates synergistic academe-industry relationship to invigorate Philippines R&D
 - Business Innovation through S&T (BIST) Program – facilitates the acquisition of strategic and relevant technologies by Filipino companies to support R&D activities

Below is a list of other different policies, laws, programmes and initiatives in the Philippines that are related to Industry 4.0:

Advancing R&D

- Republic Act (RA) 11035 An Act institutionalizing the Balik Scientist Program
- Harmonized National R&D Agenda of DOST
- RA 10055 Technology Transfer Act of 2009
- Intellectual Property Act

Connectivity

- RA 10844 DICT Act of 2015 – ICT Development Agenda
- National Broadband Plan
- RA 10173 Data Privacy Act of 2012
- National Cybersecurity Plan
- RA 10173 Data Privacy Act of 2012
- National Cybersecurity Plan

Industrial Policies

- E-commerce Act AO 001 series of 2008
- Manufacturing Resurgence Program
- Comprehensive National Industrial Strategy (CNIS)
- 13S (Inclusive, Innovation-led Strategy)
- RA 11032 Ease of Doing Business and Efficient Government Service Delivery Act of 2018
- RA 9485 Anti-Red Tape Act of 2007

Fostering Competition

- RA 10667 or Philippine Competition Act of 2015

Higher Education

- RA 10931 Universal Access to Quality Tertiary Education Act
- RA 10647 Ladderized Education Act of 2014
- Executive Order 330, 1996 Expanded Tertiary Education Equivalency and Accreditation

2. What are the key industries that are pioneer Industry 4.0 innovation in the country? List the key actors in the national ecosystem of innovation related to Industry 4.0 in your country (firms, universities, financial institutions, regulators)? What are the key networks of the ecosystem in your country (including online networks, innovation hubs, forums, etc.)?

The key industries of the Philippines that are pioneer Industry 4.0 innovation are:

- | | |
|--|---|
| • Smart Manufacturing | • Tool, Die, Iron and Steel |
| • Additive Manufacturing | • Shipbuilding |
| • Transport, Logistics, Construction, Tourism | • Furniture, Garments, and Creative |
| • Innovation, R&D | • Energy |
| • Climate change | • Smart agro-food / agribusiness and health |
| • Aerospace | • Mining and mineral processing |
| • Chemicals | • Shipbuilding |
| • Auto and Auto Parts | • Pharmaceuticals |
| • Electrical and Electronics, including semiconductors | |

For the three (3) flagship programs of DOST-ASTI mentioned in the previous item, the identified research areas are initially identified below:

ERA Program	EXPAND Program	ISIP Program
<ul style="list-style-type: none"> • Space Technology • Wireless Systems • Industrial Automation • Embedded Smart Systems 	<ul style="list-style-type: none"> • Advanced Networks • High Performance Computing 	<ul style="list-style-type: none"> • AI in: <ul style="list-style-type: none"> ◦ Creative Arts ◦ Computer Vision

<ul style="list-style-type: none"> • Autonomous and Intelligent Systems • Robotics and Vehicle Technology 	<ul style="list-style-type: none"> • Grid and Cloud Computing • Data Management and Analytics 	<ul style="list-style-type: none"> ○ Natural Language Processing ○ Weather Risk Reduction • Internet of Things (IoT) • Quantum Computing • Edge AI • Intelligent API • Blockchain for Governance
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The key actors of the ecosystem in the Philippines are the government such as through the Department of Science and Technology (DOST), academe and education (e.g., the State Universities and Colleges, Technical Education and Skills Development Authority), industry (e.g., food micro-, small-, and medium enterprises; private electronics and manufacturing companies), financial institutions (e.g., DOST SETUP Program, start-ups, Land Bank of the Philippines, Development Bank of the Philippines), and regulators (e.g., government agencies which are the Department of Trade and Industry and the Food and Drug Administration).

The DOST also has innovation hubs as part of the key networks of the ecosystem such as:
(Links embedded for description and background information)

- [DOST Food Innovation Center](#)
- [DOST's Modular Multi-Industry Innovation Center \(MMIC\)](#) or "InnoHub sa Pinas"
- [DOST's Advanced Manufacturing Center \(AMCeN\)](#)
- [DOST's Advanced Mechatronics, Robotics, and Industrial Automation Laboratory \(AMERIAL\)](#)
- [OneSTore](#), [OneExpert](#), [OneLab](#) of DOST

3. What are the challenges that your government have faced or may face for promoting Industry 4.0 in your country to contribute to national development priorities and accelerate the progress towards the SDGs?

- Through the improving prioritization given to research and development, the country is continuously striving to increase its budget and R&D expenditure which currently does not meet the 1% R&D expenditure as a proportion to the GDP, as recommended by UNESCO.
- There is a challenge to narrow the widening technological gap in the country. The large technological and economic inequalities among Filipinos were also seen as hurdles in the accelerated adoption of Industry 4.0 technologies.

The technologies that have the potential to disrupt the economy and society can come from different fields and areas. However, because of the rampant increase in technological "breakthroughs", we can find it very challenging to identify the technologies that will have a huge impact on the lives of the people in the future. Below are some indicators that can be observed in technologies to assess its potential to greatly impact our society and economy.

- Rapid advancement or Technological breakthroughs - Most of the disruptive technologies are fast improving in terms of price and performance relative to competition or other similar or alternative technologies. This is primarily because of the demand of the consumers in harnessing these technologies. This reason drives the developers and researchers in this area/technology.
- The scope of impact is wide - Disruptive technologies are usually influencing the flow of financial processes and transactions. Most of the time, this is due to the eagerness of the companies and industry to employ such technologies affecting production via rapid development of machines, products and services
- Another challenge is the unprecedented pandemic and its impact. The COVID-19 outbreak has somehow slowed down the rolling out of various Industry 4.0 plans and initiatives due to limitations on budget allocation and physical mobility restrictions.
- Many companies, manufacturing firms are still transitioning from Industry 2.0 to 3.0, and some are in 3.0.

- The innovation ecosystem still needs to be strengthened more. It needs to be more inclusive and promote tighter collaborations among the government, academe, and industry.

4. What should governments, the private sector, labour unions and other stakeholders do so that developing countries can benefit from these technologies?

The development of Industry 4.0 technologies-based solutions should consider addressing pressing national issues in developing countries. This may include food security, resiliency from occurrence of natural disasters, and delivery of public service to the underserved communities.

The government should invest in the Industry 4.0 technologies such as AI, robotics, the Internet of Things, and blockchain. The national innovation system should be strengthened and link to the entrepreneurship system. The stakeholders should work together and collaborate for the awareness and massive promotion of the said technologies.

More specifically, the different actors in the ecosystem may consider the following:

- Prepare SMEs for Industry 4.0
- Build Startup Ecosystem
- Link manufacturing with agriculture and services
- Participation in global value chains
- Promote research and commercialization
- Creation of new products, services, business models
- Use and adapt new technologies to strengthen competitiveness and sustainability of industries
- Simplification of processes through automation
- Power, logistics, infrastructure
- Upgrade of education curricula
- Skills training programs
- Improvement of digital skills

5. What actions can the international community, including the CSTD, take to help your country take advantage of Industry 4.0 for inclusive and sustainable development?

Multi-stakeholder and international partnerships and platforms such as the CSTD provide opportunities for capacity building and knowledge sharing. It can also promote collaboration among developed, developing, and least developed countries. Building norms, standards, and conventions would help facilitate the countries in taking advantage of Industry 4.0.

Through international cooperation, financial assistance may be extended to countries with limited R&D funding from the government.

There can also be diffusion of state-of-the-art technologies from countries like the US and China through scientists exchange programs, scholarships, sharing of best practices in the management of Industry 4.0 technologies, and other capacity building activities will also be beneficial.

It is important to note that strong partnership must be built in the international STI community which may begin with networking activities until the relationship may mature into the collaborative implementation of scientific activities.

6. Could you suggest some contact persons of the nodal agency responsible for projects/policies and international collaboration in this context as well as any experts (from academia, private sector, civil society or government) dealing with projects in this area? We might contact them directly for further inputs or invite some of them as speakers for the CSTD inter-sessional panel and annual session.

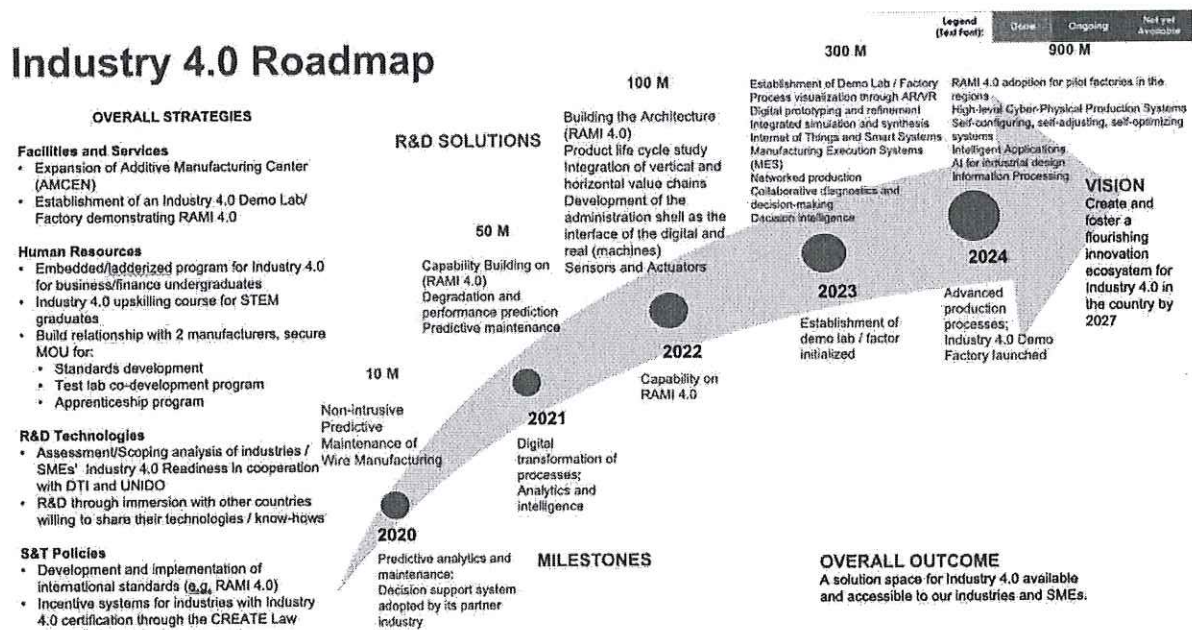
- Dr. Rowena Cristina L. Guevara, Undersecretary (Vice-Minister) for Research and Development, DOST rowena.guevara@eee.upd.edu.ph
- Dr. Leah J. Buendia, Assistant Secretary for International Cooperation, DOST leahbuendia@yahoo.com
- Dr. Enrico C. Paringit, Executive Director, Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD) enrico.paringit@pcieerd.dost.gov.ph

- Usec. Fita Aldaba, Department of Trade and Industry
- Rob Woodman, MOOG, Inc. (www.Moog.com) - email: rwoodman@moog.com
- Dr. Dan Lachica, SEIPI (dclachica@seipi.org.ph)
- Research Information Department, Philippine Institute of Development Studies (publications@mail.pids.gov.ph)
- Ionics, EMS, Inc. (<https://www.ionics-ems.com>)

7. Do you have any documentation, references, technological assessments, future studies or reports on the priority theme in your country or region?

Please refer to the DOST-PCIEERD Convergence of Emerging Technologies Towards Industry 4.0 https://pcieerd-my.sharepoint.com/:b:/g/personal/cgreyes_pcieerd_dost_gov_ph/ESb_HAhhcV9NqPwuxb43oy0BUVq5gZDpF1aX5bpNJG6VXw?e=f2zxod

DOST-PCIEERD's Industry 4.0 Roadmap (2020-2024) is summarized in the figure below:



FOR MORE INFORMATION, PLEASE VISIT THE DOST'S WEBSITE: www.dost.gov.ph.

Brief answers to questions mentioned in the introductory paragraph:

How can developing countries take advantage of the window of opportunity presented by the Industry 4.0 technologies for technological upgrading and catch up?

- Economic benefits –improved efficiencies
- Environmental benefits – less waste, lower resource consumption
- Social benefits – more inclusive labour market, higher value added activities

What can countries do to ensure that Industry 4.0 does not increase inequality?

- Accounting for differences in how industrial sectors are affected
- Preparing for impacts on the nature of work and polarized work opportunities
- Responding to ethical and legal issues
- Promote knowledge creation, commercialization, and skill building
- Ensuring the inclusion of youth, women, and promoting support for SMEs

What is the role of international cooperation in facilitating this process?

- Building norms, standards, and conventions
- Leveraging multi-stakeholder and international partnerships

Please send your responses and any further inputs on the theme to the CSTD secretariat (stdev@unctad.org) by 6 September 2021. We look forward to receiving your valuable inputs.

Sincere regards,

CSTD secretariat

INPUTS FROM THE PHILIPPINES
Department of Science and Technology

PRIORITY THEME 2:
STI for sustainable urban development in a post-COVID world

United Nations Commission on Science and Technology for Development (CSTD)

Dear CSTD member,

The 24th CSTD annual session selected "STI for sustainable urban development in a post-COVID world" as one of the priority themes for its 25th session (2021-22 period). This theme addresses SDG 11 on sustainable cities and communities.

Urbanization is a complex megatrend touching on various issues including economic transformation, environmental sustainability, inclusion and poverty eradication, and resilience to natural disasters, climate change, and public health emergencies like the COVID-19 pandemic. Cities also play a central role in shaping innovation and technological diffusion. In addition, peri-urban areas present increasing challenges in terms of poverty, sustainability, mobility, and economic performance. The 19th CSTD explored innovation and urban development in 2016. Since then, accelerating technological change and its deep impact on issues such as urban planning and management, critical systems' resilience, and citizen and community involvement make it advisable for the CSTD to update its findings and to examine and share emerging good practices and consider the latest trends in science, technology and innovation that can contribute to greener, more resilient, and more inclusive cities, particularly in light of the knowledge gained in developing innovative responses to the challenge of COVID-19.

The CSTD secretariat is drafting an issues paper on the theme to be presented at the CSTD inter-session panel to be held on 17-19 November 2021. In this context, we are seeking inputs from CSTD Member States. We would be grateful if you could kindly answer the following questions based on your experience from your country or region.

1. What are the concrete challenges that your country has encountered in transition towards sustainable urban development to make cities productive, inclusive, and liveable?

One of the major challenges in transitioning towards sustainable urban development is the limited funding provided to science and technology under the national budget.

Food security is also one of the challenges encountered by the country towards sustainable development. This is achieved "when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life", as defined during the 1996 World Food Summit.

2. How has the Covid-19 pandemic so far impacted on sustainable urban development, and what lessons could we draw from the Covid-19 pandemic on sustainable urban development?

The Covid-19 pandemic presented logistical challenges in implementing programs on sustainable urban development. Funds were redirected to address short-term and interim concerns like immediate aid, remote learning delivery, healthcare system support, vaccination, etc.

Another is food self-sufficiency. Food self-sufficiency is a primary thrust to revive the economy especially in the regions in the wake of the new normal. This means being able to meet consumption needs from our own production rather than by buying or importing.

With difficulties in global transport and distribution, there is now a greater demand to strengthen systems and develop technologies for local production, processing, and prolonging shelf-life of food for national consumption. Demand for healthy foods is also increasing to improve the nutritional status and overall

well-being of the growing population. With the Coronavirus Disease or COVID-19 outbreak that led to the lockdown of the country, difficulty in the movements of goods from the farms to the consumers are encountered. Results of the survey conducted by the Philippines' Inter-Agency Task Force (IATF) Technical Working Group (TWG) on Anticipatory and Forward Planning in the first month showed that 35% of the respondents were not able to sell their produce which led to wastage of produce and losses for the farmers. Although the government is assuring the people that there is enough food supply, bringing them to the consumers becomes a problem.

Thus, under the "new normal" it is expected that there would be greater emphasis on food security. There would be increased demand for health-related technologies and innovations. Innovative technologies on processing & packaging to increase the shelf-life of food is also anticipated to increase.

3. What projects/policies has your country implemented to use science, technology, and innovation to make cities productive, inclusive and liveable? What are the main outcomes? What are the main challenges confronted while trying to implement these projects/policies?

Smarter City and Human Settlement

Smart Sustainable Communities and Cities

The Department of Science and Technology (DOST) aims to address challenges of urban and regional life in cities through the use of science, technology and innovation to enhance opportunities and address challenges relating to sustainable urban development and smarter cities. The DOST Smarter City Framework aims to enhance research collaboration and to fund excellent research with lasting impact.

The specific objective is to fully maximize the potential of the regions talent pool and maximize the benefits of an innovation-led economy with the following perspectives:

- Integration of different dimensions of urban sustainability in the framework of the UN Sustainable Development Goals.
- Co-production – a way to extend research activities to bridge gaps between knowledge, understanding, and action.

The smart cities approach aims to achieve meaningful outcomes for the communities or stakeholders by leveraging the fundamental benefits that data and connected technology have to offer:

- Collaboration – Convergence of existing technologies and services developed enables communities to bring traditional and non-traditional partners together to collaborate.
- Transferability – When tools and technological approaches are opensource, transparent, and standardized, they can be used by communities across the country, no matter their size or capacity.
- Integration - Data and connected technology empower communities to break down silos that exist within local governments and public organizations. An inventory of the current technologies developed by DOST and available technologies being used by the Local Government Unit combined with socioeconomic analysis can help identify the priority sectors. These priority identification processes aim to harness co-creation and development of collective initiatives to spur ecosystems of smart solutions for sustainable communities and cities.
- Openness – When communities make their data truly accessible, transparent, usable, and secured, their decisionmaking processes become transparent, empowering citizens and strengthening the relationship between residents and public organizations. Making our data transparent and accessible would allow its utilization for planning, designing, and transforming services. Data is the new "oil" which drive smart cities today. Thus, there is also a need to protect it from cyberattacks.
- Shared Vision / Human Centric

The DOST, through the leadership of its (local) regional office, has also embarked on the the first-ever Smarter City Belt Project in the Philippines. The project is expected to nurture synergies and collaborations between and among cities and municipalities, pulling their resources toward a common goal that are seen to lead to smarter outcomes. Smarter City Belt is a collaborative project that aims to make cities in the regions future-ready. This can be done by using the latest technologies and innovations from DOST, the R&D outputs of the State Universities and Colleges (SUCs), and those from the Higher Education Institutes (HEIs). Furthermore, the project will also address challenges in the

region through the use of science, technology, and innovation (STI) to enhance opportunities relating to sustainable development.

Human Settlement and Planning

The DOST and the University of the Philippines launched the DOST-PLANADES Settlement Model Training Module in August 2020, an online training course for local government planners to help them project growth in their area.

The training module is an essential tool in identifying suitable locations for urban expansion, predicting future demand for housing and its financial requirements, and planning for the spatial development of these emerging areas. It offers an online course consisting of eight modules and is expected to be completed within 22 hours. The DOST-PLANADES Settlement Model Training Module is one of the DOST's initiatives to help local government planners to come up with data-driven, science-based plan for development.

Lastly, at the onset of the pandemic, the Philippines has implemented a 'Balik Probinsiya (Back to the province)' program to encourage people to go back to their home provinces and decongest key urban areas.

Innovative Mass Transport Solutions

The DOST continuously explores and develops innovative technologies that would address concerns related to mobility and transportation in the Philippines. Below are some of the concrete examples:

- DOST Hybrid Electric Train



Hybrid Electric Train in Philippine National Railway (PNR) tracks

The DOST-Metals Industry Research and Development Center (DOST-MIRDC) ventured into the local design and development of a five-coach Hybrid Electric Train (HET). It can accommodate a crush load capacity of 220 passengers per coach and runs on either diesel or electricity making it more fuel efficient and environment-friendly. Its development cost amounts only to One Twenty Million Pesos (Php 120M), cheaper by 50% than that of the imported one.

- DOST Hybrid Electric Road Train (HERT)



The Hybrid Electric Road Train (HERT) during a test run in Metro Manila

Designed by Filipino engineers and made with locally available parts, the 40-meter long train-like bus "DOST's Hybrid Electric Road Train (HERT)" is an alternative means of transportation and is being touted by the DOST as a possible answer to the mass transportation problem that is reaching crisis levels, especially in Metro Manila. The HERT is mainly powered by hybrid diesel fuel and electric-powered battery. Moreover, the train is designed to be energy-efficient, which means it does not need electricity and suspended cables to operate.

- DOST Automated Guideway Transit (AGT)



The Automated Guideway Transit (AGT) at the DOST-MIRDC

The locally-fabricated Automated Guideway Transit (AGT) costs cheaper than its imported counterparts like the LRT and the MRT. It also has slimmer dimensions and can be built along narrow streets. The AGT is lightweight and produces less noise because it runs on rubber tires. It is electricity-powered and has zero greenhouse gas emission. Commercialized use of the AGT will lessen travel time and will promote an environment-friendly mass transit. The AGT will enhance and upgrade Filipino capabilities in terms of transport technology ultimately leading to self-reliance and global competitiveness.

- Philippines' first Hybrid Trimaran



Hybrid trimaran in the Philippines

The DOST funded the 76-million project on the development of the first hybrid trimaran in the Philippines. The Department partnered with Aklan State University (ASU), Maritime Industry Authority (MARINA), local government officials of Aklan, and Metallica Shipyard. The construction of the hybrid craft will improve the country's maritime industry as it is projected to be a modern design, environment-friendly, safe and unsinkable. The cargo vessel is envisioned to carry 100 passengers, 4 vans, and 15 motorcycles. Steel will be used to build the vessel to ensure higher structure efficiency and better wave resistance.

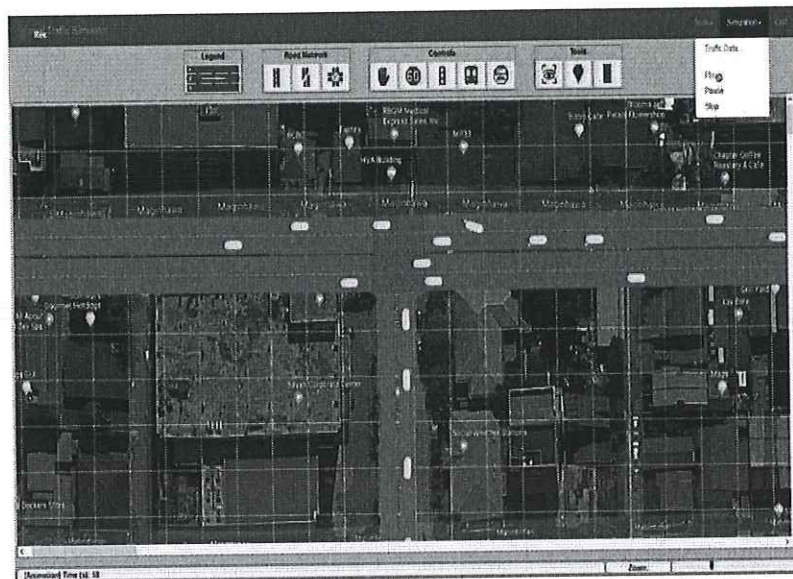
Wave energy double action hydraulic pumps will be integrated in the outriggers of the hybrid craft. The mechanical movements in the pumps will be converted to electrical energy that can be used to provide additional power to the vessel. The more waves that the vessel encounters, more power will be produced. This technology is expected to improve the vessel's energy efficiency, making it not only cost-efficient, but also environment-friendly. The vessel will utilize multi-engine technology that prevents it from encountering total engine failures while at sea, minimizing maritime accidents. It will also be constructed with a specifically engineered design to address the possibility of capsizing, making it practically unsinkable and able to withstand harsh environments at sea.

- Software Applications: LOCALSIM, DILAW, CATCH-ALL

LOCALSIM: Local Traffic Simulator

The DOST has also supported technologies on intelligent transport systems that can help increase urban mobility. One of these is the Local Traffic Simulator (LOCALSIM), a microscopic traffic simulation software, designed to be used by road and traffic engineers as a decision support system for traffic management.

LOCALSIM can be used for defining out transportation routes, traffic rules and ordinances, road improvements, and other transportation solutions deemed appropriate. It enables traffic managers to have evidence-based traffic analysis and evaluation of alternative schemes and minimizes the trial-and-error implementation of traffic schemes.

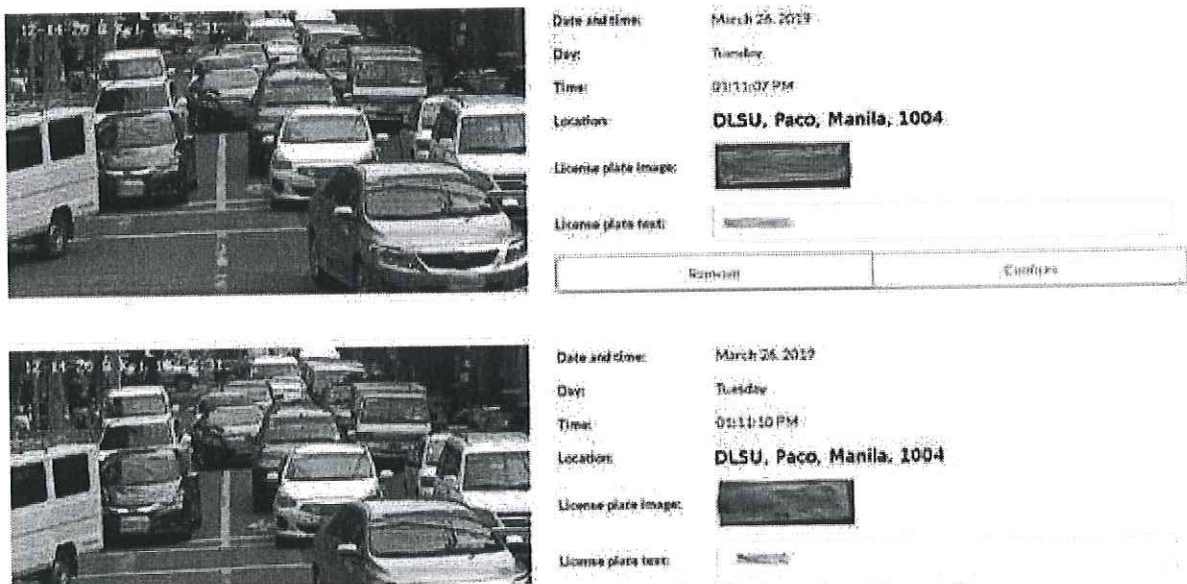


Screenshot of Local Traffic Simulator software (LOCALSIM)

DILAW: Detection and Identification of Legitimate Public Utility Vehicles

The Detection and Identification of Legitimate Public Utility Vehicles (DILAW) is a system that works by deploying handheld devices called 'motes' on the dashboard of PUVs. These devices then communicate through radio with the 'base stations' that are with traffic enforcers to allow them to detect if a passing PUV is colorum or not.

CATCH ALL: Contactless Traffic Apprehension software



Screenshot of CATCH ALL: Contactless Traffic Apprehension software

The Contactless Apprehension of Traffic Violators on 24-hours Basis, All Vehicle Detection System CATCH-ALL is a camera-based traffic management system for traffic violations detection. The system uses Artificial Intelligence (AI) in analyzing CCTV videos in traffic management agencies.

These initiatives reflect the application of STI to make cities productive, inclusive, and livable. The DOST, especially through its agencies such as the DOST-PCIEERD and DOST-MIRDC, will continue to find solutions to urban mobility in the Philippines through research and development and help ease the commuting experience in the country.

Disaster Risk Reduction and Mitigation

Geospatial Information Management and Analysis Project for Hazards and Risk Assessment in



the Philippines (GeoRiskPH - <https://georisk.gov.ph/>)

The GeoRisk Philippines is an initiative by the DOST and its attached agencies such as the DOST-PCIEERD and the Philippine Institute of Volcanology and Seismology (DOST-PHIVOLCS). The GeoRisk provides protocols and platforms to share hazards, exposure and risk information to help people, communities, local governments, and national agencies prepare and plan how to reduce the risks for natural hazards. It aims to be the Philippines' central source of information for accurate and efficient hazards and risk assessment to help the government increase the nation's resilience to natural hazards

It is composed of four (4) different platforms:



HazardHunterPH

- Quickly generates initial hazard assessments in your selected location for seismic, volcanic, and hydro-meteorological hazards



GeoAnalyticsPH

- Generates summaries of hazards and risk assessment and perform analysis and visualization of exposure and elements at risk to natural hazards



GeoMapperPH

- Collects hazard and exposure information from the office or field to ensure accurate and efficient updates in the database system



Map & Feature

- Acquire up-to-date and accurate information from mandated agencies with efficiency and ease

Food Sector

The DOST has already been implementing programs to address the challenge of food security. Some of these programs include the DOST Integrated Food Safety Program, the DOST Smart Food Value Chain Program for the New Normal, and the Food Innovation Program.

DOST Integrated Food Safety Program

This program has the following objectives in support of RA 10611 or the Food Safety Act of 2013:

1. To provide food safety related services to meet customer satisfaction;
2. To develop and implement effective systems, processes and protocols on food safety;
3. To develop and enhance human resource on food safety; and
4. To develop and institute strategies and mechanisms to sustain the food safety program.

As action plan to the strategies, the developed DOST Food Safety Program has four (4) major components: Research and Development, Enhancement of Testing Capabilities on Food Safety, Human Resource Development, and Technology Transfer and Policy Advocacy Program, with the overall vision towards safe food for everyone, by everyone, through science, technology, and innovation. Human Resource Development of capacity building food safety teams was completed in 2019 while the current projects implemented are on the following R&D aspects:

R&D to Support Risk Assessment in Philippine Foods

- Risk Profiling of Hazards in Philippine Food to Support National Risk Management
- Prevalence of Mycotoxin in Rice and Corn in the Philippines
- Prevalence of Heavy Metals and Pesticide Residues in Milled White Rice and White Corn Grits in the Philippines
- Exposure Assessment of Food Chemical Contamination in Metro Manila: A Pilot Total Diet Study Approach

R&D in Support to Food Industry

- Development of Food Safety Guidelines for the Food Service Sectors
- Development of Grading System for Adoption of Food Establishments in the Philippines

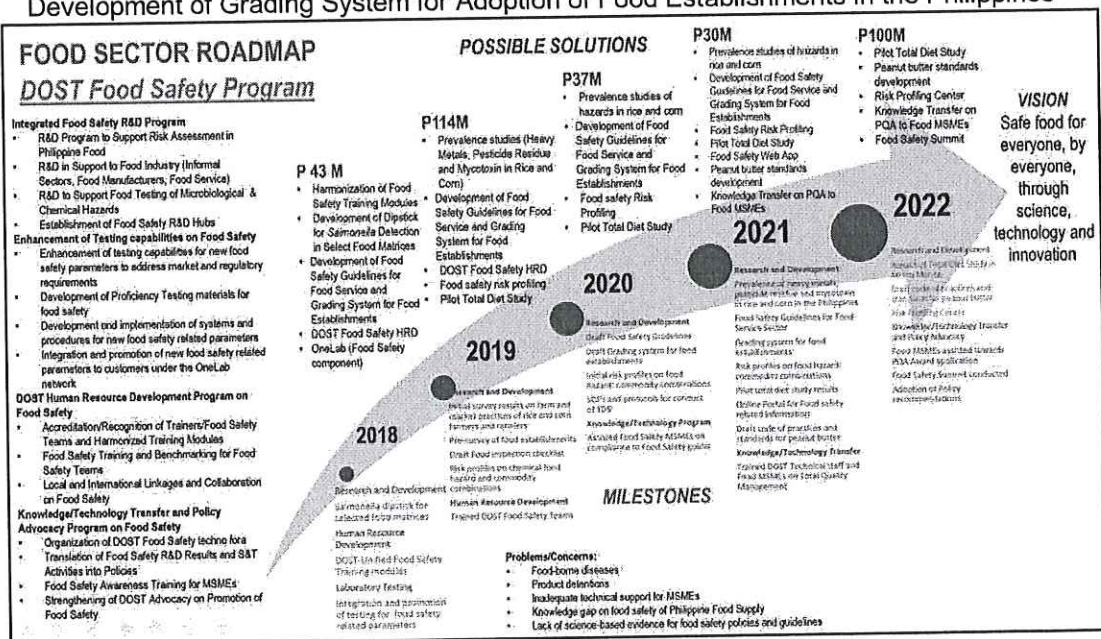


Figure 1. DOST Integrated Food Safety Program Roadmap

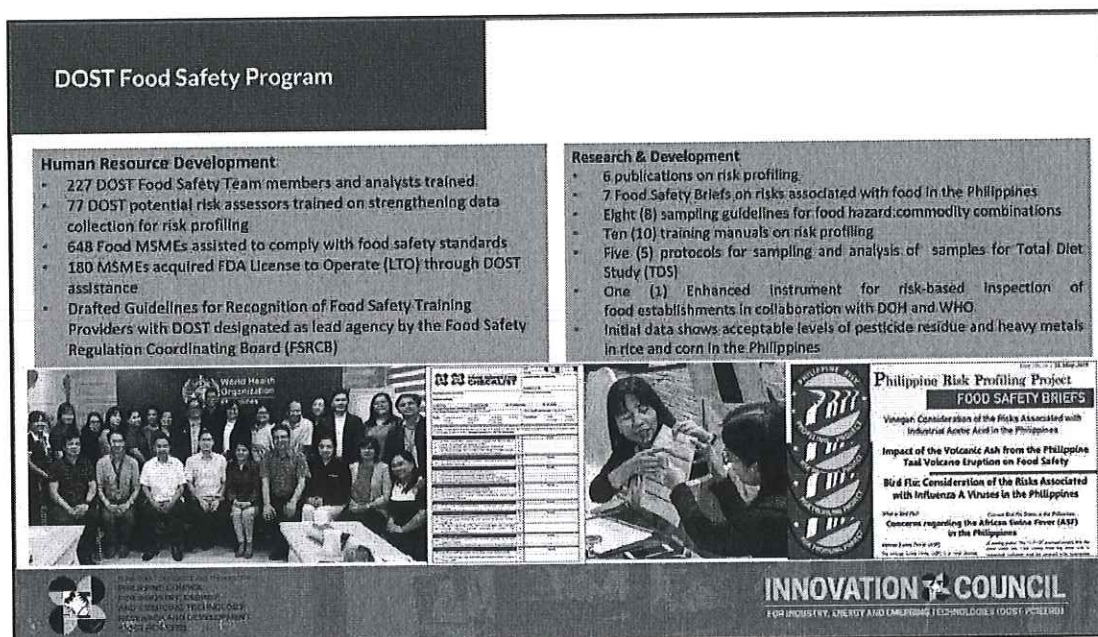


Figure 2. Milestones of the DOST Food Safety Program

DOST Smart Food Value Chain Program for the New Normal

The program aims to utilize smart and innovative technologies throughout the value chain- from production, processing, distribution up to consumption. Support activities that encompass the whole chain are Food Security, Supply Chain Management, Waste Management and Recovery, Human Resources Development, Technology Development and Deployment. Smart production systems, deployment of high yielding varieties, use of innovative technologies, application of ICT and data analytics are interventions that will be applied in the chain.

The Food Value Chain is a series of activities that build and create values from each stage, from agricultural production, processing & manufacturing, distribution up to the consumption. Following the Food and Agriculture Organization (FAO) concept, this program envisions to help establish the development of a sustainable food value chain (SFVC) in the country, defined as: the full range of farms and firms and their successive coordinated value-adding activities that produce particular raw agricultural materials and transform them into particular food products that are sold to final consumers and disposed of after use, in a manner that is profitable throughout, has broad-based benefits for society, and does not permanently deplete natural resources.

For this program, DOST and its sectoral R&D Councils will partner with State Universities and Colleges (SUC) to enhance the food value chain through support for innovations - from the agricultural production, processing, packaging all the way to food waste management. It involves the enhancement of the services and utilization of the existing DOST Technology Business Incubators (TBIs), Food Innovation Centers (FICs), Complementary Food Production Facilities, and possibly for the development and deployment of innovative, mobile food processing systems, and for the digital transformation of the different stages in the food value chain to achieve access to a greater market. These projects will run on a 2-year period. Priority will be given to SUCs with regional significant resource support coming from LGUs that could contribute either seed capital, manpower, logistics support or assured demand/sales.

The DOST, through its attached agencies, Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (DOST-PCAARRD), Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD), Industrial Technology Development Institute (DOST-ITDI), Food and Nutrition Research Institute (DOST-FNRI), and partner SUCs and HEIs have developed several technologies that could be adapted in the value chain. The DOST Regional Offices on the other hand will provide the link to the LGUs and partner industries in the regions. The program will identify and enhance three production chain that will link the DOST-PCAARRD TBIs with the FICs. It will establish a full link of the chain from production-processing-logistics-marketing. A processing schedule program will be established for each FICs based on the

availability and seasonality of raw materials. A supply chain management and resource management system will be developed which could be used not only by the TBIs and FICs but of the different processors in the regions as well

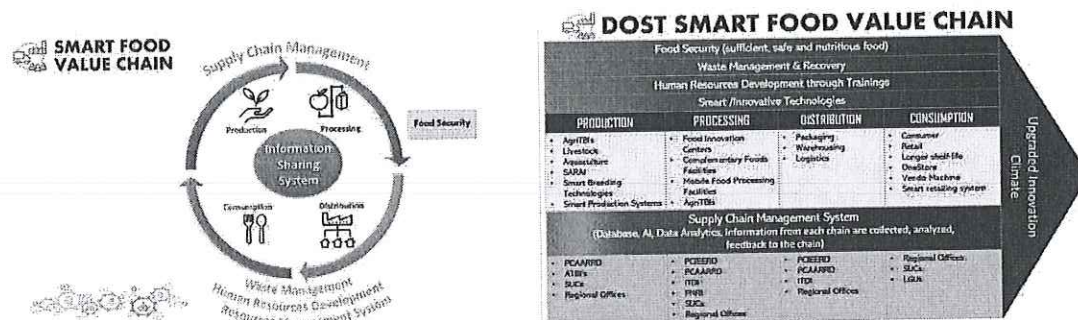


Figure 3. DOST Smart Food Value Chain

The program has the following components:

Titles	IMPLEMENTORS
Production	
1. Enhancing the Agri-Aqua Food Value Chain through Smart Technologies and Partnerships towards Food Resiliency in the New Normal - c/o PCAARRD	SUCs, ROs, LGUs
Processing	
2. Upgrading of Selected Food Processing Centers and Roll out of Technologies in the Regions <ul style="list-style-type: none"> Upgrading of Agricultural TBIs - c/o PCAARRD Upgrading of Selected FICs as Toll Processing Facilities Development and Rollout of Food Products in Complementary Food Processing Facilities 	SUCs, ROs, ITDI, FNRI
3. Smart Modular Mobile Food Processing Facility	ITDI
Distribution and Consumption	
4. Upgrading the Capability of Existing Distribution Centers /Trading Posts in the Delivery of Fresh and Semi-Processed Vegetables in the Supply Chain: Focusing on Packaging Technology and Logistics	ITDI
5. Integrated Food Value Chain Resource Management System (FVCRMS)	TBIs/Startups
6. Smart Retailing System	ROs, TBIs, Startups

Food Innovation Program

Innovation covers a wide range of activities that aim to translate ideas into useful new products, processes, and services. For the Food Sector, an array of possibilities exists for innovation - from the

sourcing of raw materials, processing, packaging, including marketing and distribution systems. In the Philippines, while there are large corporations operating in the country, majority of food manufacturers are still MSMEs. Thus, the challenge of introducing innovations by generating concepts and creating new products entail a level of risk that are usually too high to bear especially for micro and small entrepreneurs, particularly on access to processing technologies and facilities.

Several products and improved processes were developed under the Food Innovation program since 2017 as shown in Figure 4. In 2020, there were 36 proposals received under Food Innovation with the following new proposals approved for implementation in 2021:

- *Under Enabling Systems for Food Innovation*
 - Technical Support to DOST Food Innovation Centers
 - Development of FIC Competency in Moving New Products from Concept to Market Launch
 - Development of Competency on Establishment and Validation of Adequate Processes for Thermally Processed Food
 - Thermal Processing of Selected Materials Using Agitated-Type Retorts
- *Under Product Innovation*
 - Development of Innovative Food Products from Colored Philippine Tubers and Root Crops through the University of the Philippines Los Baños (UPLB) – DOST Food Innovation Center
 - Development and Field Testing of Retort Foods as Food Ration for Men in Uniform during Combat and High-Risk Operations

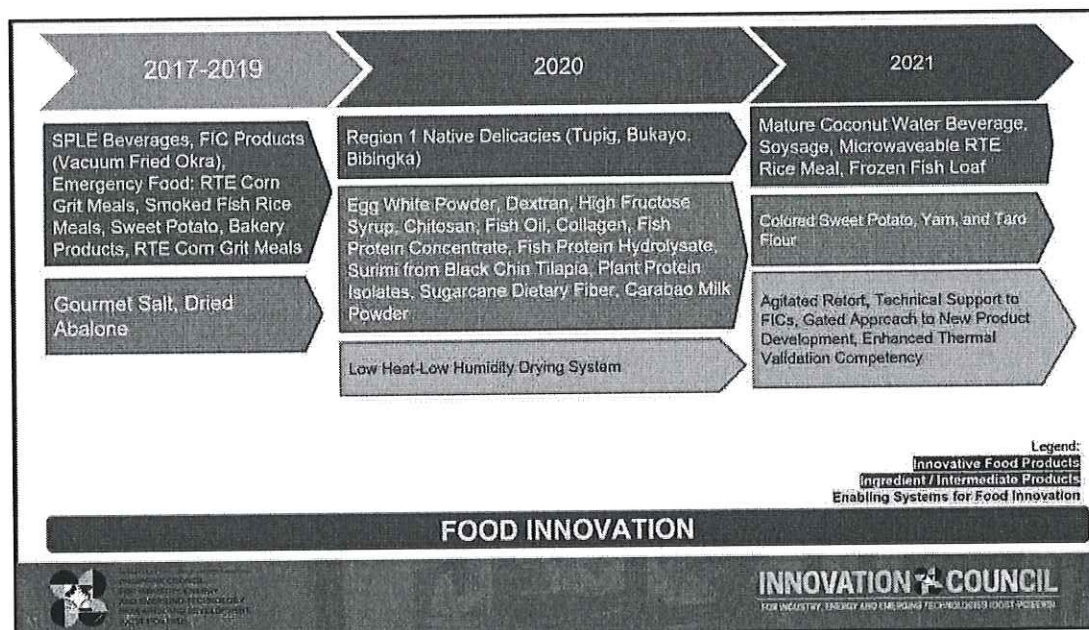


Figure 4. Priorities under the Food Innovation Program

The following are the common challenges in implementation of projects that lead to delays and extension:

- Delays in government procurement process for supplies and equipment
- Limited movement of personnel following health protocols in the new normal

Environment Sector

Most of the programs and projects under the Environment Sector are technologies on addressing environmental problems.

Innovative Solutions to Solid Waste Management

The Philippines' generation of solid wastes has been increasing directly proportional to the country's population with infrastructure development and modernization among other factors. In the **National**

Solid Waste Management Status Report for CY 2008-2018, basing on the per capita rate of 0.40 and annual projected population, the projected amount of waste generated in the year **2020 is 16,628,026 metric tons**. It must be noted that the data projection was pre-COVID-19 Pandemic and before the surge of consumer's shift to online shopping. The Department of Environment and Natural Resources (DENR) reports that the Philippines has endeavored to improve its management of solid waste through the passage of **RA 9003** or the **Ecological Solid Waste Management Act of 2000** which *provides for a systematic, comprehensive and ecological waste management program to ensure the protection of the public health and the environment*.

In the recently conducted Webinar on **EU-ASEAN: GreenTech & Innovation Mapping Dialogue: Green Technologies for Plastic Value Chain Management**, co-organized by the Philippines through the Department of Science and Technology, it was presented that currently, 52.31% of the wastes generated are Biodegradable wastes, 27.78% Recyclable wastes, 17.98% Residual wastes and 1.93% are special wastes. Residential contributes about 56.7% of the generated wastes, commercial establishments at 27.1%, Institutional establishments at 12.1% and the 4.1% comes from Industrial establishments. Meanwhile, the LGU's compliance rate to RA 9003 remains very low. Out of 42,000 barangays only 31% has established Material Recovery Facilities (MRF) despite the mandate of the law for every barangay to put up MRFs. While the country's compliance to sanitary landfill (SLF) is around 22-24% although increasing, still falling behind the mandate of RA 9003.

To address solid waste management concerns, the **National Solid Waste Management Committee (NSWMC)** initiates food waste management program, development of composting guidelines and energy recovery for the biodegradable wastes; Increase recovery for recycling wastes and promotion of recycling for recyclable wastes; initiatives for arts and crafts, alternative technologies (i.e., construction materials like hollow blocks, eco-bricks, lumber, roads) and energy recovery (RDF, Fuel, Electricity) for residual wastes; hazardous wastes management at City/Municipal Centers (DENR), medical waste management program (Department of Health) then treated and bulky waste management proper SLF disposal for special wastes.

Alongside, DOST-PCIEERD has been contributing for this endeavor and recently in coordination with other government agencies, provided technological interventions through the deployment of appropriate technologies during the rejuvenation of Boracay. Another workshop was also held to identify possible technological solutions to address solid waste problems, particularly in coastal areas on combating marine debris in the ASEAN Region. In connection, as Member States of the Association of Southeast Asian Nations (ASEAN), DOST-PCIEERD signified in joining the ASEAN Community Vision 2025, particularly the ASEAN Socio-Cultural Community (ASCC) Blueprint 2025 on Conservation and Sustainable Management of Biodiversity and Natural Resources, which reaffirmed the commitment of strategic measures to *"promote cooperation for the protection, restoration and sustainable use of coastal and marine environment, respond and deal with the risk of pollution and threats to marine ecosystem and coastal environment, in particular in respect of ecologically sensitive areas"*. However, despite the efforts and 21 years after RA 9003 was passed into law, solid waste management remains a major problem in the country especially in urban areas like megacities (e.g., Metro Manila, Cebu, Davao).

In 2015, a report was published by the Ocean Conservancy and McKinsey Center for Business and Environment where the Philippines ranked 3rd as the biggest source of plastics leaking into the oceans; China emerged as the top contributor, with an estimated 1.32-3.53 MMT going into the sea, out of a total 8.82 MMT mismanaged plastic waste a year. Indonesia is next, with an estimated 0.48-1.29 MMT of plastic marine waste annually, followed by the Philippines, with around 0.28-0.75 MMT of plastic waste. Studies explained that people on the limited incomes in the Philippines like most developing countries are pushed to buy cheap goods in small quantities, this practice is dubbed as "sachet economies".

Single-use plastics from products sold by conglomerates, such as bags, bottle labels, and straws end up not being recycled and worst, sometimes end up mismanaged. Every year, our country contributes 1.88 million tons of "mismanaged plastic waste".

Majority of the mismanaged plastic wastes are made of Polypropylene or PP. It is a heat-resistant plastic commonly used in food and beverage packaging. When it is dumped in the sea, over time it breaks down into small plastic particles or "microplastics". They can be divided into two main categories

according to their source: (1) *primary* - directly released in the environment as small particles and accounts to 15-31% microplastics found in the oceans and (2) *secondary* - originate from degradation of larger plastic objects such as plastic bags, bottles or fishing nets and accounts to 69-81% microplastics found in the oceans. Those smaller than five millimeters may settle on sea algae and can be consumed by small fishes. A study published in *Marine Pollution Bulletin* entitled “Microplastics in marine sediments and rabbitfish (*Siganus fuscus*) from selected coastal areas of Negros Oriental, Philippines” analyzed 120 rabbitfish (*Siganid fuscus*) bought from local fishermen in the cities of Dumaguete and Bais and in the towns of Manjuyod and Ayungon, all part of the Tañon Strait protected seascape, a major fishing area in the province of Negros Oriental. The study found that nearly half of the fish samples had microplastics present in their digestive systems. Therefore confirming, that microplastics have been introduced into human food chain. The impact of ingesting microplastics has yet to be determined.

Provided the study results, data and the current situation where every household is generating infectious wastes e.g., facemasks while online shopping is being highly practiced resulting to the influx in the volume of single-used plastics, it can be inferred that significantly, there is a predominant need for innovative, affordable and or compact technology solutions for solid waste management.

Below is the Sustainable S&T Solid Waste Management Roadmap as basis in crafting programs/projects under this thematic area:

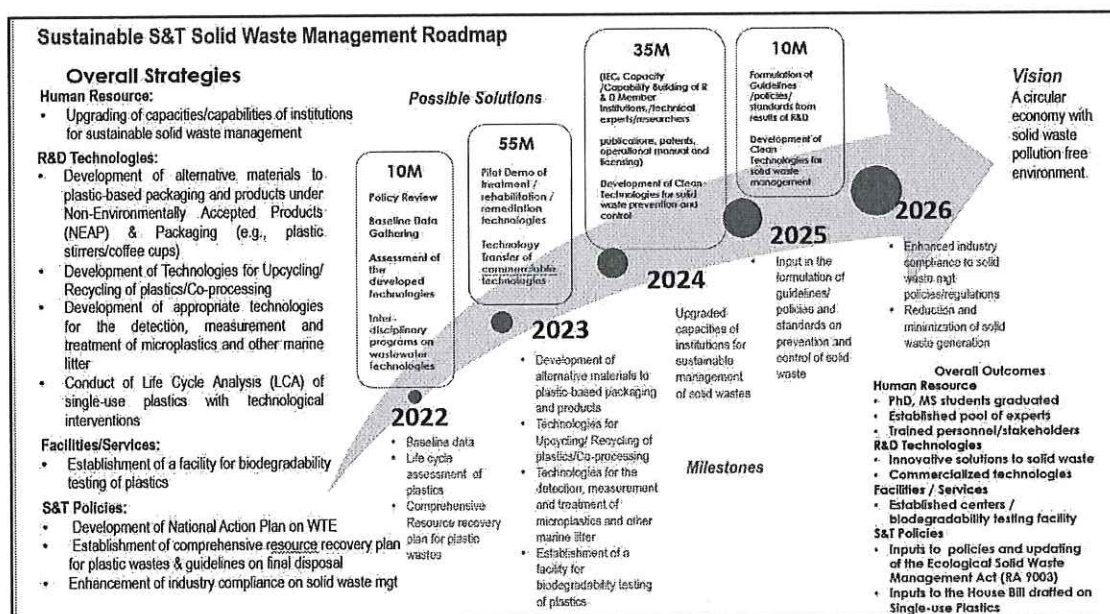


Figure 5. DOST Sustainable S&T Solid Waste Management Roadmap

Following the DOST's Harmonized National R&D Agenda, in consultation with stakeholders, DOST-PCIEERD spearheaded the development of the Sustainable S&T Solid Waste Management Roadmap with the vision of a Circular Economy with a Solid Waste Pollution-Free Environment.

To achieve this, 110 Million Pesos will be invested from 2022 to 2026 to deploy various strategies that experts in Solid Waste Management recommended. Guided by this Roadmap, it is intended to upskill Institutions with training programs for Sustainable Solid Waste Management, develop more technologies through R&D such as Alternative Materials to Plastic-Based Packaging, Upcycling and Recycling Innovations, and technologies for detection and treatment of Microplastics and other Marine Litter. We also see it essential to establish a facility for Biodegradability Testing of Plastics. To strengthen all our initiatives towards this cause, Policies must also be in place.

Some initiatives of the DOST-PCIEERD pertain to the following programs/projects implemented by our various stakeholders/researchers:

Priority Areas of R&D	Description	Outcomes
Development of alternative materials to plastic-based packaging and products under Non-Environmentally Accepted Products (NEAP) & Packaging (e.g., plastic stirrers/coffee cups)	<p>The DOST funded the economic and life cycle analysis (ELCA) for single-use plastics. The Joint Conference on Environment Friendly Plastic Substitutes R&D by the Department of Science and Technology, Department of Finance, Climate Change Commission, and the Department of Environment and Natural Resources is a pioneering effort to address the single-use plastic problem with a whole-of-government approach in dealing with the issue.</p> <p>This Joint Conference is a venue to see how the Philippines can move forward towards finding alternatives to single use plastics and see how it can provide solutions and opportunities to the industry and the Philippine society.</p>	Policy recommendations for SUPs
Development of Technologies for Upcycling/ Recycling of plastics/Co-processing	ENVITECS: Project 2. Production of Polymeric Carbon Nanodots from Waste Plastic for Gas and Microplastic Identification and Detection will use plastic wastes from Valenzuela City to produce Polymeric Carbon Nanodots and develop sensors.	Production of valuable material from plastic wastes.
Development of appropriate technologies for the detection, measurement and treatment of microplastics and other marine litter	A recently approved project co-funded by DOST and JST is UP-MSI's PlastiCount Pilipinas: counting and visualizing marine plastics pollution in the Philippines. This project will capture the wholistic view on the extent of plastics pollution in the country. Data will be used for crafting sound management and mitigation approaches.	<p>Adoption and further development of advanced technologies for monitoring both micro- and macroplastics in Philippine waters.</p> <p>Policy recommendation on plastics pollution in the Philippines and even the region</p>
IWASTO Project	<p>This project under the IM4ManilaBay Program defined existing conditions in the cities and municipalities comprising the Manila Bay watershed and is using this information as bases for technological solutions and policy recommendations.</p> <p>Waste characterization was also done ensuring that the technological solutions are appropriate and acceptable to the communities.</p>	Technological solution and policy recommendation.
Development and promulgation of resource recovery plan for the plastic wastes generated from the consumer's shift to online	Assessment and Profiling of COVID-19 Pandemic-Induced Wastes in General Santos City: Basis for the Development of Appropriate Solid	Come up with appropriate solid waste management technologies as tangible solutions to handle the

Priority Areas of R&D	Description	Outcomes
shopping strategic waste management program for household infectious wastes and hospital-use plastic-based medical and healthcare materials in Pandemic	Waste Management Technologies for the City	pandemic-induced wastes in General Santos City.
Baseline data gathering	<p>PUP Scoping Project was a systematic approach which examined and identified main concepts, theories, sources, and knowledge gaps.</p> <p>It included data gathering from related literature then industrial profiling and surveys from industrial plants. The data gathered was used to determine proper waste management technology appropriate for the national capital region.</p>	<p>The project was able to come up with one (1) Research paper focused on scoping and survey report with consolidated data gathered by the MMIERDC group - environmental problems (air, water, solid waste, etc.) common to plastic industries, interventions made by some plastic industries.</p> <p>The project was also able to submit one (1) NICER Program Proposal for possible technologies to be developed for the industries in NCR. The program was recently approved on May 18, 2021.</p>

4. **Can you provide examples of policies/projects/initiatives aimed at strengthening national STI capabilities for sustainable urban development? For example, how does your country build technology and innovative capabilities through investments in R&D and human capital? What institutional and regulatory arrangements are in place to stimulate R&D and innovation, and to effectively address unintended consequences of technological innovation, such as privacy, ethical, gender and other concerns?**

On investments in human capital, the DOST implements various Scholarship Programs such as the DOST's Engineering Research and Development for Technology for critical mass of engineers and scientists with advanced degrees to solve local problems through R&D. There is also the Balik Scientist Program wherein Filipino scientists, technologists, and experts are encouraged to return to the country and share their expertise in order to promote scientific, agro-industrial, and economic development, including the development of our human capital in science, technology and innovation. In June 15, 2018, the program was institutionalized through the signing of RA 11035 also known as the "Balik Scientist Act".

To further promote and stimulate innovation in the country, significant laws such as the Philippine Innovation Act (RA 11293), recognizing innovation as a vital component of the country's growth, along with the Innovative Startup Act (RA 11337).

Partnerships and coordination with regulatory agencies and other organizations are also highly encouraged early on during program development and stakeholders' engagement stages. Necessary documents are submitted such as Gender and Development (GAD) score during proposal evaluation while the appropriate clearances are secured for project implementation. These include Ethics clearance, prior informed consent, biosafety clearance, among others.

5. Could you share case studies of regional and international cooperation that have helped your country in strengthening STI capacities? Can you provide success stories in this regard?

The Philippines, through the DOST, has several success stories with regional and international partners. Some of the concrete case studies are as follows:

- Advanced Satellite Development and Know-How Transfer for the Philippines (ASP) Project's collaboration with United Kingdom-based company Surrey Satellite Technology Ltd. (SSTL) – **write up on success stories attached as Annex A**
- "Understanding Lightning and Thunderstorms for Extreme Weather Monitoring and Information Sharing" (ULAT) Project in partnership with Japan – **write up on success stories attached as Annex B**
- DOST-ASTI's collaboration with the Academia Sinica Grid Computing Center (ASGC) on e-Infrastructures – **write up on success stories attached as Annex C**
- DOST-ASTI's collaboration with the International Rice Research Institute on ICT – **write up on success stories attached as Annex D**
- The Philippines' success stories on space technologies through international collaborations – **write up on success stories attached as Annex E**
- Synthetic Aperture Radar (SAR) and Automatic Identification System (AIS) for Innovative Terrestrial Monitoring and Maritime Surveillance Project or the SARwAIS Project – **write up on success stories attached as Annex F**
- Philippine Research , Education and Government Information Network (PREGINET) – **write up on success stories attached as Annex G**

Lastly, for Food Safety, in 2016-2017 the DOST partnered with the Temasek Foundation of Singapore to conduct a capacity building program for strengthening national food control systems. This included participants from DOST, the Department of Agriculture and the Department of Health to benchmark the best practices of Singapore in terms of food safety. The training was structured to include participants from management level, middle management, and specialists. Through this program, the current priorities under the DOST Food Safety Program was strengthened and led to individual food safety interventions for each participating agency.

6. Could you suggest the contact person(s) of the nodal agency responsible for projects/policies or international collaboration related to the theme? We might contact them for further inputs.

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FOR MORE INFORMATION, PLEASE VISIT THE DOST'S WEBSITE: www.dost.gov.ph.

Please send your responses and any further inputs on the theme to the CSTD secretariat (stdev@unctad.org) by 6 September 2021. We look forward to receiving your valuable inputs.

Sincere regards,

CSTD secretariat