

Executive Brief:

In response to the dynamic needs of the Bicol Region and the evolving global landscape, Bicol University proudly presents its Revised Bicol University Research Development and Extension (RDE) Agenda for 2024-2028. This comprehensive roadmap for the University's RDE thrusts aligns with various legal mandates and compelling rationales, paving the way for impactful and relevant research and extension undertakings in the next four years.

By aligning with legal mandates, addressing compelling rationales, and involving key stakeholders, the Revised Bicol University RDE Agenda 2024-2028 positions the University as a leader in driving impactful research and development efforts that contribute to the progress and well-being of the Bicol region and the Philippines as a whole.

The revision of the research agenda aims to update the existing themes and agenda, prioritization of research programs and projects, ensure responsiveness to regional needs, balancing faculty expertise and community needs, and have an impactful and utilized research.

The research agenda for 2024-2028 are the following: (1) Agriculture, Aquatic, and Natural Resources (AANR); (2) Industry, Energy, and Emerging Technology; (3) Health and Health Systems Management; (4) Climate Change Adaptation and Disaster Risk Reduction and Management; and (5) Inclusive Education and Lifelong Learning.

Rationale:

In response to the dynamic needs of the Bicol Region and the evolving global landscape, Bicol University proudly presents its Revised Bicol University Research Development and Extension (RDE) Agenda for 2024-2028. This comprehensive roadmap for the University's RDE thrusts aligns with various legal mandates and compelling rationales, paving the way for impactful and relevant research and extension undertakings in the next five years.

By aligning with legal mandates, addressing compelling rationales, and involving key stakeholders, the Revised Bicol University RDE Agenda 2024-2028 positions the University as a leader in driving impactful research and development efforts that contribute to the progress and well-being of the Bicol region and the Philippines as a whole.

Major Legal Bases:

- **Board Resolution No. 594, s. 2020:** This resolution lays the groundwork for the revised RDE Agenda, building upon the previously proposed research and extension themes.
- **Harmonized National Research and Development Agenda (HNRDA) 2022-2028 (DOST):** Bicol University's RDE Agenda adheres to the national framework set forth by the Department of Science and Technology (DOST), ensuring alignment with national research and development priorities.
- **Philippine Development Plan 2023-2028 (NEDA):** The RDE Agenda is strategically aligned with the national development plan crafted by the National Economic and Development Authority (NEDA), contributing to the overarching goals for the Philippines.
- **Bicol Regional Development Plan 2023-2028 (RDC):** The RDE Agenda addresses the specific needs and development aspirations of the Bicol Region, as outlined by the Regional Development Council (RDC).
- **Sustainable Development Goals (SDGs) 2030:** Bicol University recognizes its role in achieving the global SDGs, and the RDE Agenda incorporates these goals into its framework, promoting responsible and sustainable development.

Objectives:

- **Updating existing themes and agenda**

The revised RDE Agenda reflects the latest trends in the research, extension and development arena at international, national, and regional levels, ensuring the University remains at the forefront of innovation and consistent with the University's vision of becoming a "A University for Humanity characterized by productive scholarship, transformative leadership, collaborative service, and distinctive character for sustainable societies."

- **Prioritization of research programs and projects**

The RDE Agenda serves as a guide for allocating resources and funding toward the most impactful research areas over the next four years.

- **Responsiveness to regional needs**

The agenda prioritizes concerns for poverty alleviation and regional productivity, ensuring research and extension efforts directly address the challenges faced by the Bicol community.

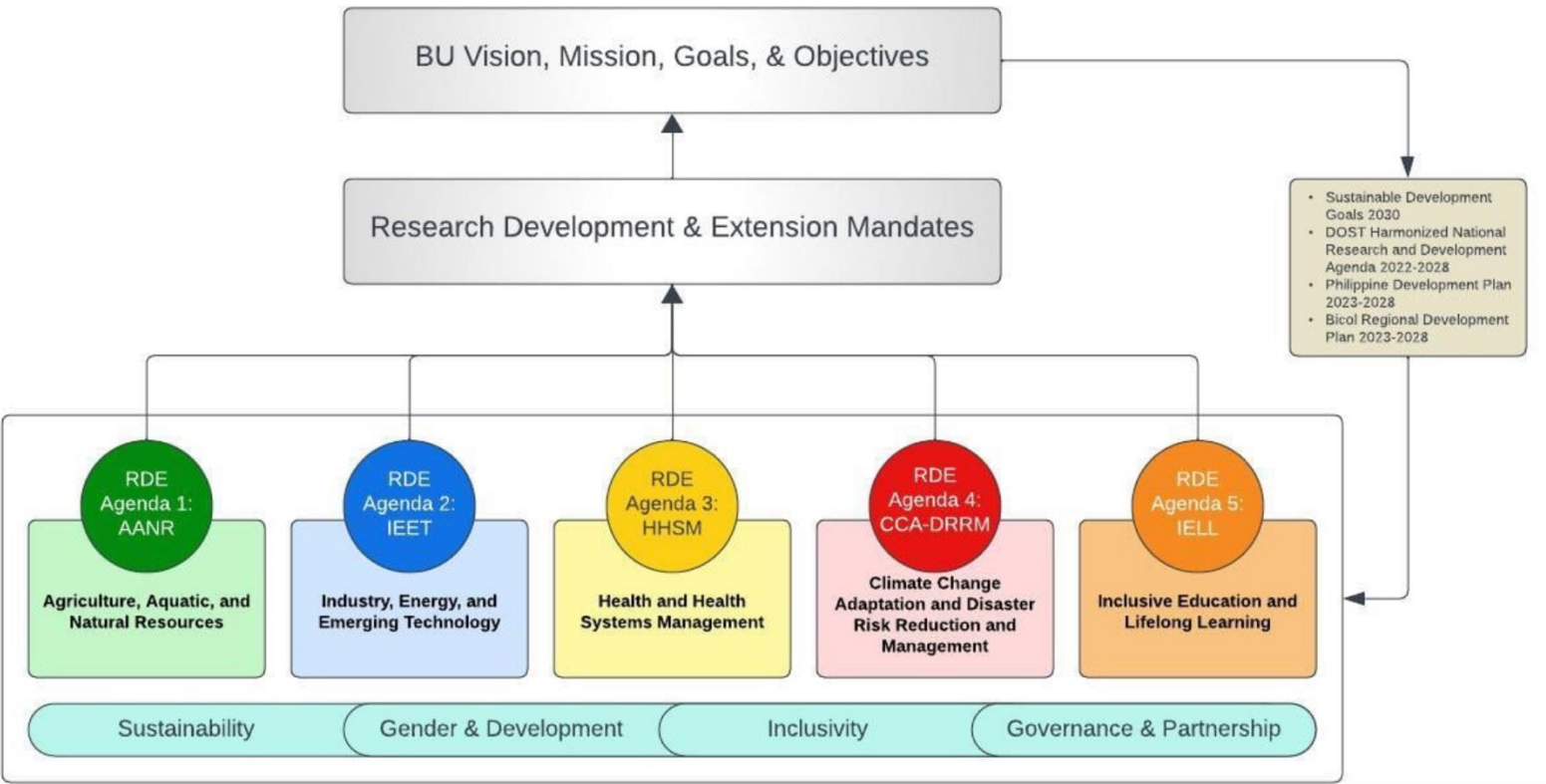
- **Balancing faculty expertise and community needs**

The RDE Agenda strives to establish a balance between the research interests of faculty and the critical needs of the international, national, regional, and local communities.

- **Impactful and utilized research**

The agenda emphasizes the translation of research findings into practical applications, ensuring science, technology, and innovation efforts contribute directly to economic and social well-being.

Framework of Bicol University Research Development and Extension (BU RDE)
Agenda 2024-2028



BICOL UNIVERSITY RESEARCH DEVELOPMENT AND EXTENSION (BU RDE) AGENDA (2024-2028)

RDE AGENDA	SDG	SUB-AGENDA	PRIORITY AREAS
<u>RDE Agenda 1</u> Agriculture, Aquatic, and Natural Resources (AANR) This agenda integrates research in topics ranging from food production and processing to markets and distribution, consumption patterns, food safety dynamics, human nutrition and agricultural sustainability. A key aspect will be adding value to current and future research through greater coordination to improve the design, delivery and translation of research across many disciplines comprising agriculture, fisheries and natural resources. This further aims to determine and improve environmental issues that affect the land, air and water in the region. It will apply ridge to reef approach, valuation studies, biological remediation, and development of technologies for mitigation and waste utilization.	SDG 1, 2, 3, 6, 8, 12, 13, 14, 15 & 17	Food Security and Food Systems	1. Evaluation, conservation, utilization, and management of priority, native, and new commodities 2. Breed development and genetic improvement of priority, native, and new commodities 3. Cultural management practices (water, soil, and nutrient management) 4. Production systems and technologies at all phases of production 5. Nutrition, feeds, and feeding system 6. Reproductive biotechniques for priority species 7. Disease monitoring, control, and management of priority and native commodities 8. Postharvest technologies and product development 9. Mechanization and automated systems 10. Production and management decision support systems 11. Architectural support for eco-friendly agriculture and fisheries, including urban agriculture-ready designs 12. Sustainable designs for food systems and production. 13. Industrial designs for food packaging, nutrition, and sanitation promotion. 14. Sustainable and smart aquaculture
		Environment and Natural Resources	1. Conservation, sustainable utilization, and management of biodiversity in terrestrial, freshwater, and marine ecosystems 2. Sustainable inland and coastal watershed management and utilization 3. Management and rehabilitation of degraded and polluted environment 4. High-value product development from agricultural and forest wastes 5. Resource and ecosystems assessment and monitoring 6. Habitat management for fisheries and ecosystem sustainability 7. Terrestrial and marine environmental management 8. Application of innovative monitoring and management systems and technologies for environment and natural resources management 9. Sustainable ecotourism management 10. Development of a blue economy, including the application of innovative technologies in the fisheries and aquatic sector and assessment of ecological limits and other sustainability parameters 11. Natural capital accounting 12. Assessment of natural resource carrying capacity/ecological limits

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			13. Earth system science researches
		Technology Transfer and Commercialization	1. Innovation and improvement of traditional extension modalities for the efficient transfer of technologies to end-users 2. Upscaling and outscaling of agricultural technology transfer and commercialization through various modalities 3. Leveraging technologies for building resilience and supporting economic recovery
		Socioeconomics, Policy and Governance	1. Agriculture and resource economics studies, including market research, agrarian/asset reform, environmental valuation, and economies of scale/collective farming 2. Supply/value chain development of selected AANR industries and other agribusiness-related initiatives 3. Impact assessment of mature technologies, AANR programs, and projects 4. Policy research and advocacy on natural resources/environment-related issues, agricultural trade, supply chain/value chain-related issues, standards and regulations, compliance to standards across the value chain, and R&D governance and other crosscutting policy concerns 5. Integrating gender and development (GAD) in AANR programs and projects 6. Software technologies towards better foresight and strategic insights
		Oceanography	1. Physical, chemical, geological, biological oceanography
<u>RDE Agenda 2</u> Industry, Energy, and Emerging Technology This agenda is a response to the global market's increase in sophistication and consumers increasing demand for innovative products and services. This aims to grow sophistication of businesses and industries, and improve quality standards to ensure that	SDG 4, 5, 8, 9, 10, 11, 16 & 17	ICT Innovations	1. Industry 4.0 2. Internet of Things (IoT) 3. Artificial intelligence 4. Smart cities 5. Smart analytics 6. Emerging technologies 7. AI in marine science
		Engineering, Energy, and Minerals	1. Construction and construction materials 2. Machining and fabrication 3. Metal casting 4. Transportation 5. Materials for energy 6. Renewable energy

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acceptable products will be available to domestic and international consumers. It further aims to increase renewable energy for the regions making it more affordable and sustainable. The theme will intensify the culture of competitiveness, focus interventions in key industry areas, enhance firm-level support to MSMEs, expand industry cluster development, increase market access, and improve supply chains of basic and prime commodities.			7. Utilities - Soil and water management 8. Water and wastewater management 9. Mining 10. Ocean green energy: green ports and green vessels
		Advanced Materials and Electronics	1. Additive manufacturing 2. 3D printing 3. Nanotechnology 4. Photonics 5. Emerging materials
		Culture, Arts, and Creative Industries	1. Textiles 2. Furniture 3. Crafts 4. Games, animation, and film 5. Entertainment
		Service and Manufacturing	1. Financial inclusion and rural development 2. Cooperative development 3. Strengthening MSMEs and service delivery
		Technology Transfer and Commercialization	1. Startup development 2. Technology business incubation 3. Foster innovation and entrepreneurship
		Socioeconomics, Policy and Governance	1. Policy innovation for business development 2. Entrepreneurship development and inclusive growth 3. Consumer behavior and welfare analysis 4. Accountancy standards and corporate governance 5. Digital transformation and inclusive governance 6. Governance of emerging technologies 7. Sustainable industrial practices and environmental governance 8. Public-private partnerships for socioeconomic development 9. Economic growth and development

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			10. Macroeconomic modeling and forecasting 11. Gender and development 12. Good governance and sustainable development
RDE Agenda 3 Health and Health Systems Management This agenda is guided by the PCHRD and BCHRD thrust and priorities on emerging and re-emerging health concerns and other international concerns. It aims to provide evidence-based solutions to pressing health problems brought by changing lifestyle of the populace.	SDG 3, 5, 10, 11, 16, & 17	Drug Discovery and Development	1. Basic studies on potential sources of natural products from endemic and indigenous species 2. Screening and toxicity assessment of biologically active (bioactive) extracts 3. Development of standardized herbal drugs for infectious and non-communicable diseases 4. PharmaSea: Bioprospecting marine resources for discovering active and novel compounds 5. Discovery of new drugs from local terrestrial and marine sources for development up to the clinical stage (<i>Tuklas Lunas</i>) for infectious and non-communicable diseases
		Food Safety and Nutrition	1. Assessment of physical, chemical, and biological hazards in food 2. Smarter tools and approaches for prevention and outbreak response 3. Mitigation steps to reducing contamination during food production and processing 4. Nutritional assessments of vulnerable individuals and nutrigenomics on personalized diets 5. Eating disorders, and prevalence and efficacy of fad diets 6. Development of innovative, safe, beneficial, and accessible functional foods and ingredients from locally available natural products for the national and global market
		Diseases and Diagnostics	1. Novel therapeutics and drug delivery systems against emerging and re-emerging diseases 2. Epidemiological research on infectious and non-communicable diseases 3. Preventive interventions against emerging and re-emerging diseases 4. Early warning, patient support, and biosecurity, biopreparedness systems/platforms against emerging and re-emerging diseases 5. Development of rapid, cost-effective, and minimally invasive diagnostic kits/devices/tools/tests for early detection and monitoring of communicable/infectious diseases, non-communicable diseases, and neglected tropical diseases in the Philippines 6. Development of personalized/precision medicines, diagnostics, therapeutics, and other technologies using OMIC technologies 7. Improvement of health service delivery system
		Biomedical Devices Engineering for Health	1. Technology-assisted surgical innovations for patient safety 2. Innovations in local implant development 3. Devices for postoperative/rehabilitative/assistive care, health emergency preparedness and response, and in support of Universal Health Care 4. Tissue engineering

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			5. Artificial intelligence in healthcare and healthcare applications empowered by data analytics 6. Assessment and development of ICT-enabled health delivery services
		Mental Health	1. Social determinants for health 2. Inventory and evaluation of mental health interventions 3. Standardization of mental health services 4. Evaluation and improvement of existing web and mobile-based applications for mental health 5. Diagnostics and omics technology for mental health 6. Evaluation and development of treatments for mental illnesses and neurologic disorders
		Fitness and Wellness	1. Sports sciences 2. Exercises 3. Therapeutic value of buildings 4. Gender and Development
RDE Agenda 4 Climate Change Adaptation and Disaster Risk Reduction and Management This agenda is about how we as a region are able to mitigate and adapt to the “new normal” characterized by increased global temperature aggravated by anthropogenic activities affecting not only natural resources system functioning but also our current “way of life.”	SDG 6, 7, 11, 12, 13, 14, 15 & 17	Understanding the Dynamics of Weather and Climate, and Disaster Risks	1. Basic research on the controls, dynamics, and patterns of weather and climate 2. Observation and monitoring networks and the dimensions of resilience 3. Technology development and application for monitoring 4. Modeling and simulation for improvement of monitoring and forecasting 5. Hazards, vulnerability, and risk assessment
		Communicating the Disaster Risks	1. Policy research 2. Risk communication 3. Disaster reporting
		Investing in Developing STI Solutions to Address Preventable Disasters	1. Technology development and application for climate change adaptation and mitigation 2. Technology development and application for disaster risk management 3. Resilient building design
		Creating designs resilient to the impacts of climate change	1. Implementation of climate-proof designs for structures and facilities. 2. Development of disaster-resilient water management systems. 3. Integration of clean energy solutions into building designs, alongside climate-responsive infrastructure for transportation and human connectivity. 4. Fusion of climate-proofing and restorative management in built cultural heritage.
		Marine Science and climate change	1. Sea level rise and sea surface temperature increase

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			2. Ocean acidification and other impacts of climate change to ocean and coastal water chemistry 3. Harmful algal bloom and other climate change-driven ocean phenomena 4. Coastal erosion, disturbances and developments
RDE Agenda 5 Inclusive Education and Lifelong Learning	SDG 4, 5, 8, 16, & 17	Access, Equity, and Inclusivity in Education	1. Assessment of the extent of attainment of SDG goals 2. Development of strategies for gender equality in education 3. Development of distance education and alternative modalities of learning 4. Development of strategies on adult education 5. Assessment of needs of education systems affected by conflict, national calamities, and instability 6. Research on Special Education (SPED), Indigenous People Education (IPEd), and Alternative Learning System (ALS) 7. Gender and Development
		Effectiveness of Education across Levels	1. Evaluation of curricular programs, instructional materials, and device 2. Development of information and communication technologies to help achieve SDG goals 3. Documentation of best practices in teaching 4. Case studies and other innovations in education from pre-K through university 5. Program Evaluation and/or Impact Assessment of Graduates
		Relevance and Quality of Education	1. Evaluation of instructional processes, programs, and initiatives 2. Development of educational innovations such as curriculum, materials, tools, devices, and programs 3. Assessment of status, morale, and professionalism of teachers to determine strategies for educational development 4. Performance assessment of students in different disciplines 5. Improved understanding of how, why, and when individuals learn across their lifespan in multiple settings and contexts 6. University-Industry Collaboration
		Efficiency in Educational Governance and Management	1. Documentation of best management practices of educational leaders in managing educational environments and resources 2. Assessment of the interface of basic education and higher education institutions 3. Development of partnership strategies of higher education institutions and employers 4. Development of continuing education programs for teachers and educational leaders

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		Global Citizenship Education	1. Fostering intercultural exchanges, learning, and understanding as a powerful and productive way to build a more just and peaceful world 2. Determine and analyze the importance of diversity and inclusiveness in our policies, programs, organizations, and public outreach efforts 3. Expanding the role of young people in leadership and the decision-making processes 4. Integrating intercultural learning and global citizenship education into national agendas and public school curriculums
		Pedagogy and Perspectives in Learning and Teaching	1. Educational change through technologies 2. Educational policy, leadership, and management 3. Curriculum and innovation 4. Professional concerns, training, and development 5. Student learning and learner diversity 6. Educational trends and issues in the context of diversity, volatility, uncertainty, complexity, ambiguity, and disruption (this includes pandemics and other crises that may impact education and educational delivery) 7. Innovative pedagogies
		Culture, Arts, and Language Education	1. Documentation of initiatives towards the promotion of a culture of peace and unity and regional identity 2. Festivals, activities, and products that promote and preserve Bicol heritage and culture 3. Songs, dances, and performances 4. Rituals and traditions 5. Documentation and protection of the way of life of communities, including indigenous people and other marginalized sectors of the society 6. Development of curriculum that integrates cultural concepts across levels 7. Promotion of languages and literature (local to global) 8. Studies on the way of life (history, philosophy, culture, and the arts) of communities, including indigenous people and marginalized sectors of society 9. Promotion and protection of tangible and intangible heritage (living heritage) 10. Multicultural education 11. Mapping and assessment of Bicolano architectural heritage. 12. Implementation of local knowledge and culture-sensitive designs in heritage preservation.