



Department of Science and Technology (DOST)
**Philippine Council for Agriculture, Aquatic and Natural Resources
Research and Development (PCAARRD)**

Updated Harmonized National Research and Development Agenda HNRDA-AANR 2022-2028

Presented by
Office of the Executive Director - Research and Development
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AANR Strategic R&D Thrusts

1. Food security
2. Value chain development for livelihood and income generation
3. Building resilience to climate change and other natural shocks
4. Sustainable environment and natural resources



Objectives of the HNRDA-AANR

1. Guide the national R&D system in the formulation of programs/projects to support AANR development
2. Encourage complementary and purposeful collaborations/partnerships
3. Mobilize and ensure effective and efficient use of resources
4. Provide a framework for developing R&D capacity and expertise

General Principles

1. The HNRDA-AANR adopts the whole-of-government approach. Addressing the agenda herein specified shall be the joint undertaking of public agencies involved in the development of the AANR sector, including the line departments and their concerned attached agencies, and research and development institutions (RDIs).

General Principles

2. This agenda espouses and/or supports all current strategies and/or initiatives of concerned government agencies, including the Science for Change Program of the Department of Science and Technology; the Plant, Plant, Plant Program and High Value Crops Program of the Department of Agriculture; the National Greening Program of the Department of Environment, the Agribusiness Roadmaps of the Department of Trade and Industry, among others.

General Principles

3. The HNRDA supports Agriculture 4.0 that is smart, green and S&T-based. Consistent with existing rules and regulations and cultural values, it shall support the following:
 - a. Different farming techniques such as smart farming, urban farming, urban forestry, organic farming, halal farming
 - b. Biotechnology and omics sciences such as genomics, transcriptomics, proteomics, metabolomics and viromics
 - c. Other frontier technologies such as nanotechnology, nuclear analytical techniques, artificial intelligence, drone technology, big data analytics, Internet of things technologies
 - d. Farm mechanization, as mandated by RA 10601, otherwise known as the Agricultural and Fisheries Mechanization Law

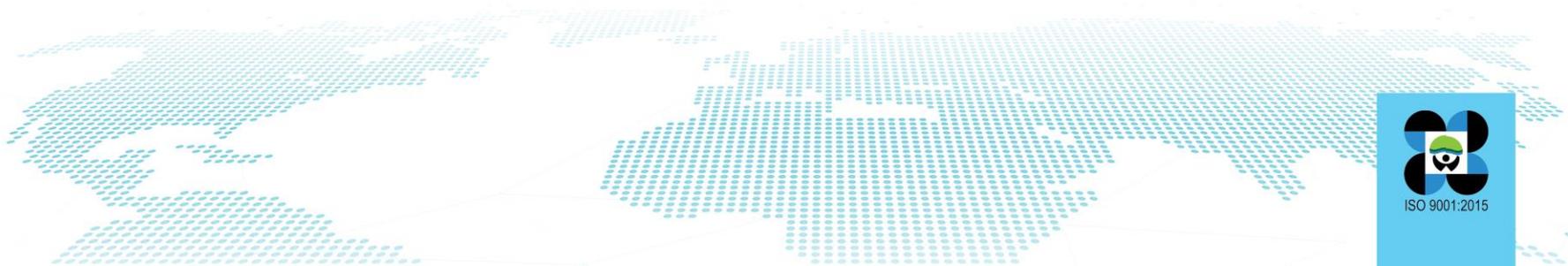


General Principles

4. The HNRDA-AANR supports regional R&D agenda to promote regional AANR productivity, competitiveness and sustainability in order to engender human, environmental and economic resilience.



The Harmonized National R&D Agenda in Agriculture, Aquatic, and Natural Resources



ISO 9001:2015

Crops R&D Agenda

1. Germplasm evaluation, conservation, utilization and management
2. Varietal improvement and selection
3. Production of certified good quality seeds and planting materials
 - a. Development/optimization of seed production protocols
 - b. Innovations in seed systems
4. Cultural management practices (pest, water, soil and nutrient management)
 - a. Optimization of nutrient and water management
 - b. Optimization of integrated pest and disease management
 - c. Organic Agriculture



Crops R&D Agenda

5. Crop production systems
 - a. Smart farming approaches
 - b. Off-season production and cultivation
 - c. Development of climate-resilient technologies
 - d. Decision support systems
6. Postharvest, primary processing and product development

Crops R&D Agenda

Priority Projects (2022-2028)

1. Crop improvement through conventional and new breeding techniques (NBT)
2. Field verification and adaptability trials of improved crop varieties and/or technologies
3. Surveillance and management of pests and diseases of selected crops
4. Postharvest innovations to extend the shelf life of priority crops
5. Product development and value addition
6. Smarter Approaches to Reinvigorate Agriculture as an Industry in the Philippines (SARAI)
7. Roll out of matured technologies



ISO 9001:2015

Livestock R&D Agenda

1. Breed development and genetic improvement
2. Reproductive bio techniques for priority livestock species
3. Nutrition, feeds and feeding system
4. Conservation and improvement of native animals
5. Vaccine, biologics and diagnostics development
6. Food quality and safety assurance
7. Disease control and anti-microbial resistance management
8. Production and management decision support systems
9. Product development and processing
10. Emerging technologies on breeding techniques



ISO 9001:2015

Livestock R&D Agenda

Priority Projects (2022-2028)

1. Native Animal R&D Program (Pig, Poultry (Itik Pinas, Muscovy duck, Chicken, Cattle)
2. Halal Goat R&D Program
3. Animal genetic improvement
4. Reproductive biotechnologies
5. ASF diagnostics, surveillance and vaccine development
6. Breed registry and traceability systems
7. Innovative food/feed product development
8. Forage and pasture development (varietal improvement of forage species)



ISO 9001:2015

Aquatic R&D Agenda

1. Application of genomics in the study of diseases of aquatic species and fish resistance to climate change; molecular phylogenetics; population genetics
2. Physiological and ecological studies of aquatic species
3. New species for culture
4. Culture systems (broodstock management, hatchery, nursery, grow-out)
5. Fish health, disease diagnostics and disease management
6. Nutrition, feeds and feeding system
7. Postharvest handling, processing and new product development
8. Mechanization and automated systems for feeding, water and culture management, and post production
9. Fish kill warning and mitigation systems
10. Production and management decision support systems

Aquatic R&D Agenda

Priority Projects (2022-2028)

1. Aquatic Genomics R&D
2. Pilot testing of technologies, systems and other products of aquatic research
3. Fish disease diagnostic tools and vaccines
4. Alternative feeds and feed additives for improved nutrition of aquatic species
5. Product development from various aquatic species (including marine toxins)
6. Rollout/commercialization of aquatic technologies



Forestry R&D Agenda

1. Physiological and ecological studies
2. Varietal improvement of priority agroforestry/non-timber and forestry species
3. Sustainable production, management and processing of priority agroforestry/non-timber and forestry species
4. Innovative product development
5. Decision support systems



Forestry R&D Agenda

Priority Projects (2022-2028)

1. Selection and production of superior genetic materials of selected agroforestry and forestry species
2. Livelihood opportunities for upland communities
3. Upland farming in urban setting
4. Sustainable agroforestry models including, but not limited, to silvopasture models
5. Sustainable agroforestry models
6. Innovative techniques for processing of timber and non-timber species
7. Industrial uses of bamboo, rubber and ITPs
8. Decision tools for forest tree plantation management and marketing



Natural Resources and Environment R&D Agenda

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 agricultural soils
4. High-value product development from agricultural and forests wastes
5. Strategies/decision management tools for climate change resilient environment
6. Resource and ecosystems assessment and monitoring

Natural Resources and Environment R&D Agenda

7. Habitat management for fishery and ecosystem sustainability
8. Marine environmental management (Harmful Algal Blooms, coastal integrity/erosion and eutrophication)
9. Fishkill warning and mitigation systems
10. Innovative management systems for unique landscapes and ecosystems
11. Ecotourism management

Natural Resources and Environment R&D Agenda

Priority Projects (2022-2028)

1. Biodiversity R&D Program
 - a. Conservation, sustainable utilization and management of endangered, threatened and endemic terrestrial and aquatic species
 - b. Biodiversity assessment of terrestrial and aquatic ecosystems
 - c. Genetic diversity conservation and dynamics in various ecosystems
2. Ocean studies (ocean currents, waves, dynamics, plate tectonics, hydrology)
3. Valuation and payment for ecosystem services of watersheds
4. Knowledge management for enhancing science, policy and practice of watersheds
5. Reef assessment, monitoring and conservation
6. Control and management of risks and hazards in water ecosystems



ISO 9001:2015

Climate Change Adaptation and Mitigation, and Disaster Risk Reduction

1. Mitigation and adaptation studies of vulnerable communities and ecosystems
2. Smart farming approaches and other climate-resilient agricultural production technologies
3. Strategies/decision management tools for climate change- and disaster-resilient environment
4. Sustainable development through lifescape – landscape/seascape approach



Climate Change Adaptation and Mitigation, and Disaster Risk Reduction

Priority Projects (2022-2028)

1. Technology development for resilient and adaptive communities and ecosystems
2. Enhancement of adaptation and mitigation capacity of vulnerable communities
3. Knowledge management portal for information and resources on climate change adaptation
4. S&T Action Frontline for Emergencies and Hazards (SAFE)
5. Online EWS (Early Warning Systems) for key agricultural commodities



Climate Change Adaptation and Mitigation, and Disaster Risk Reduction

Priority Projects (2022-2028)

6. Rehabilitation and climate change proofing of vulnerable agri-aqua and natural resource areas
7. Identification/Mapping/Biophysical Profiling of vulnerable ecosystems
8. Inclusive Science for Livelihood in the Agri-aqua Sector (ISLAs)
9. Quick response S&T- based assistance to AANR communities affected by hazards
10. Carbon neutral technologies
11. Role of forestry in disaster risk reduction

Technology Transfer R&D Agenda

1. Innovative 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

Technology Transfer R&D Agenda

Priority Projects (2022-2028)

1. Improving capacities in the AANR Sector on IP management and Technology Transfer
2. Agri-Aqua Technology Business incubators
3. S&T Community-Based Program for Inclusive Development
4. Science for the Convergence of Agriculture and Tourism
5. GALING-PCAARRD
6. Regional Agri-aqua Innovation System Enhancement (RAISE) Program
7. Technology commercialization programs



Socio-Economics, Policy Research, and Governance

1. Agriculture and resource economics studies such as but not limited to market research, agrarian/asset reform, environmental valuation, economies of scale/collective farming
2. Supply/value chain development of selected AANR industries and other agribusiness-related initiative
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 cross-cutting policy concerns



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Socio-Economics, Policy Research, and Governance

5. Integrating gender and development (GAD) in AANR programs and projects.
6. Software technologies towards better foresight and strategic insights.
7. Applied rural sociology studies covering but not limited to characterization and understanding rural communities; demographic and intergenerational changes of AANR stakeholders (e.g. farmers, fishers, indigenous people); social practices and behavior and their implications to technology adoption; role of social institutions and institutional arrangements.



ISO 9001:2015

Human Capital Systems R&D Agenda

1. Efficient and impactful AANR human development programs
2. Public engagement and communicating AANR R&D to build vibrant communities in a science-oriented nation
3. Systems approach to knowledge management and cross R&D collaborations



Priority Commodities

Agriculture (Crops)

1. Abaca and other fiber crops
2. Coconut
3. Rice
4. Corn and Other Grains
5. Fruit Crops
 - a. Mango
 - b. Banana
 - c. Other tropical fruits (e.g. durian, jackfruit, pummelo, papaya, pineapple, citrus)
6. Legumes (e.g. mungbean, peanut and soybean)
7. Natural Sources of Dye
8. Pili and Cashew
9. Ornamentals (e.g. cutflowers and foliage)
10. Medicinal Plants
11. Plantation Crops
 - a. - Cacao
 - b. - Coffee
 - c. - Oil Palm
 - d. - Rubber
 - e. - Sugarcane
12. Rootcrops (e.g. sweet potato, cassava)
13. Sericulture and Apiculture
14. Vegetables (e.g. tomato, white potato, mushroom)

Priority Commodities

Agriculture (Livestock)

1. Livestock

- a. Swine
- b. Goat
- c. Sheep
- d. Cattle (dairy and meat)
- e. Carabao (dairy and meat)
- f. Rabbit

2. Poultry

- a. Chicken (meat and egg)
- b. Duck (meat and egg)
- c. Quail

9. Native animals

- a. Chicken
- b. Duck
- c. Swine
- d. Goat

10. Feed Resources

Priority Commodities

Aquatic

1. Crabs
 - a. Mangrove crab
 - b. Blue swimming crab
2. Shellfish
 - a. Abalone
 - b. Mussel
 - c. Oyster
3. Finfishes
 - a. Milkfish
 - b. Tilapia
 - c. Endemic species
 - d. Sardines
 - e. Tuna
4. Shrimp
5. Seaweeds
6. Sea cucumber
7. Cephalopods
 8. - Cuttlefish, Octopus, Squid
9. Aquafeeds

Priority Commodities

Natural Resources and Environment

Timber

1. Tree plantations (e.g. yemane, falcata)

Non-Timber

1. Bamboo
2. Rattan
3. Sago
4. Tiger grass
5. Vines and other non-timber
6. Biodiversity
 - a. Ecosystem (e.g. mangrove, marine, freshwater)
 - b. Microbial
 - c. Flora and Fauna
 - d. Ecotourism
7. Climate change adaptation and disaster risk reduction

Funding Requirements and Sources

The agenda herein specified will be funded by the concerned agencies' annual General Appropriations, R&D allocations from policy pronouncements such as the use of the Coconut Levy Fund and intra-government agreements such as with the National Security Council on marine research, and grants from international R&D organizations.

The estimated funding requirement of the HNRDA-AANR 2022-2028 amounts to a total of **P402 B.**

Year	Amount in Million Pesos
2022	13,386
2023	22,022
2024	31,463
2025	44,992
2026	64,339
2027	92,005
2028	131,566
Total	401,755

Thank you!

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