NATIONAL AGRICULTURAL RESEARCH AND EXTENSION INSTITUTE

Mon Repos, East Coast Demerara

ANNUAL REPORT 2025

Office of the Chief Executive Officer

Research

Crop Development and Support Services

Plant Nurseries

National Plant Protection Organisation

Mangrove Restoration and Management

Annual Report 2025

VISION STATEMENT

To ensure food security and the empowerment of farming communities, and to enhance their livelihoods through improved and environmentally friendly technologies.

MISSION STATEMENT

To advise, develop, and transfer appropriate systems to promote balanced, diversified, and sustained agricultural production through adaptive and investigative research using a market-driven approach and a range of regulatory services to the sector.

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ACRONYMS/ABBREVIATIONS

AIEP	**Agricultural and Innovation Entrepreneurship Program**
AIS	Agriculture Information System
CARDI	Caribbean Agricultural Research and Development Institute
CARICOM	Caribbean Community
CATIE	Tropical Agricultural Research and Higher Education Center (Centro Agronómico Tropical de Investigación y Enseñanza)
CDSS	Crop Development and Support Services Department
DFT	Deep Flow Technique
CFF	Carambola Fruit Fly
DWC	Deep Water Culture
FAO	Food and Agriculture Organization
FVOC	Fruits, Vegetables, and Other Crops
GAP	Good Agricultural Practices
GDF	Guyana Defence Force
GOG	Government of Guyana
GRDB	Guyana Rice Development Board
GSA	Guyana School of Agriculture
GuyMIS	Mangrove Monitoring System
HCIL	Hope Coconut Industries Limited
HQCF	High-Quality Cassava Flour
IAEA	International Atomic Energy Agency
ITC	International Trade Centre
KJWA	Koronivia Joint Work on Agriculture
LCDS	Low Carbon Development Strategy
MOA	Ministry of Agriculture
MMAN	Mangrove Management Action Network
NAREI	National Agricultural Research and Extension Institute
NFT	Nutrient Film Technique
NIS	National Insurance Scheme
NPPO	National Plant Protection Organization
PCR	Polymerase Chain Reaction

PGRFA	Plant Genetic Resources for Food and Agriculture
PPE	Personal Protective Equipment
SPU	Special Project Unit
TERI	The Energy and Resources Institute
UG	University of Guyana
UNFCCC	United Nations Framework Convention on Climate Change
USAID-CAPA-IESC	United States Agency for International Development- Caribbean Agricultural Productivity Improvement Activity- Improving Economies for Stronger Communities
WUSC	World University Service of Canada

CHAIRMAN'S FOREWORD

I have the honour of writing the Chairman's Foreword for the 2025 Annual Report, and I do so on behalf of the Board of Directors of the National Agricultural Research and Extension Institute (NAREI). The year marked a period of continuing progress and strategic advancement for NAREI as we implemented our mission to strengthen Guyana's agricultural sector (Crops, except rice and sugar) as outlined in VISION 2030, through innovation, research, and impactful extension services.

In 2025, NAREI demonstrated an unwavering commitment to its mandate by promoting national food security, advancing sustainable agricultural practices, and enhancing the livelihoods of our farming communities. Our research team boldly tackled emerging challenges, developing technologies and practices that promote productivity and environmental stewardship. Simultaneously, our extension services ensured that these innovations reached the fields where they mattered most, directly in our farmers' hands.

NAREI also benefited from the strong engagement of its Board of Directors, whose Programme Advisory Committees played a central role in improving oversight across key areas, including governance, research, quarantine operations, extension services, financial management, digitization of data and records, and the monitoring of projects within both the administrative and mangrove departments.

Among our achievements this year, special mention must be made of the successful implementation of climate-smart agricultural initiatives and enhanced plant protection measures. These efforts culminated in the commissioning of the Composting Unit, the Ant Bait Production Facility, the Biotechnology and Plant Tissue Culture Laboratory, and the expansion of shade houses and hydroponic facilities throughout Guyana. These milestones are a testament to the substantial investments made by the Government of Guyana, the dedication of NAREI's staff, the collaboration of our partners, and the unwavering support of the Board of Directors.

The foregoing achievements, through strategic collaboration with both local and overseas partners, expanded the Institute's technical capabilities and unlocked new avenues of support. NAREI saw productive partnerships with national agencies, including the New Guyana Marketing Corporation (New GMC), the Guyana Lands and Surveys Commission, the National

Drainage and Irrigation Authority, the Guyana Livestock Development Authority, the University of Guyana, Hope Coconut Industries Ltd, the Guyana School of Agriculture, the Environmental Management Consultants, the Guyana Rice Development Board, and the Regional Agricultural Committees. These partnerships helped drive joint research initiatives, specialized training, improved land-use planning, germplasm development, and innovation in climate-smart agriculture.

At the Regional and international level, NAREI's work was further enhanced through active cooperation with the following agencies.

- Food and Agriculture Organization;
- Inter-American Development Bank;
- Inter-American Institute for Cooperation on Agriculture;
- Tropical Agricultural Research and Higher Education Centre;
- Caribbean Agricultural Research and Development Institute; and
- The Energy and Resources Institute (India).

These partnerships contributed to significant advancements in pest and disease management, sustainable production systems, technology transfer, and a range of capacity-building programmes that directly benefited farmers and NAREI's own technical team throughout the year.

Importantly, NAREI continues to uphold the highest standards of accountability. The Institute remained fully compliant with governance requirements, ensuring its financials are audited. As of the end of 2025, NAREI's financial audits were completed up to 2022, and the financial statements for 2023 and 2024 have been submitted to the Permanent Secretary, Ministry of Agriculture, and to the Auditor General's Office.

NAREI's emphasis on capacity building, research advancement, strengthened stakeholder engagement through farm visits, training programmes, enhanced communication - including use of the social media, and collaboration with local, Regional, and international agencies and institutions, positions the Institute to play an increasingly pivotal role in the diversification and transformation of the agricultural sector to satisfy Guyana's food and nutrition needs and to increase its export capacity and value chain to contribute to the requirements of the Region.

These achievements would not have been possible without the collective effort of our CEO and management team, research staff, extension officers, administrative staff, and field staff. I also extend sincere gratitude to His Excellency the President, Dr Mohamed Irfaan Ali who is the focal point for Caribbean Food & Nutrition Security and architect of VISION 2030, to the Honourable Minister of Agriculture, Zulfikar Mustapha for his leadership of the Ministry, and to the many partners, including our hard-working farmers - many of whom are females and youth, who have shared in our consultations, planning, and implementation throughout this year.

Looking ahead, we remain committed to excellence, guided by innovation, and strengthened through collaboration. The strategic initiatives outlined in this Annual Report reflect our continuing endeavour to ensure that NAREI delivers on its mandate and strengthens all mechanisms to achieve deliverables efficiently, in keeping with VISION 2030.

Joseph G Singh
Major General (retd)
Chairman, Board of Directors
National Agricultural Research and Extension Institute
December 2025

CHIEF EXECUTIVE OFFICER'S STATEMENT

In 2025, NAREI strengthened its position as Guyana's premier agricultural research and extension institute by increasing the production of other crops by 10% (981,376 MT in 2024 to 1,079,029 MT in 2025). While there was overall growth in the sector, some crops performed exceptionally well, including coconut (21%), hot peppers (24%), beans and cereals (27%), bora (27%), root crops (18%), cocoa (41%), and coffee (21%). Crops like lettuce, cabbage, and carrots also grew by 12%, 11%, and 19%, respectively. Concurrently, imports of lettuce, cabbage, and carrots decreased during the period under review.

The achievements of the other crops sector occurred within the context of the Government of Guyana's agricultural diversification agenda, CARICOM's Regional food security initiatives, and an increased emphasis on climate resilience and environmental sustainability.

Importantly, the Institute functioned as a vital technical arm of the Ministry of Agriculture, providing science-based research, practical extension services, and policy-relevant advice to farmers and decision-makers. This would not have been possible without the collaboration of many key stakeholders.

I wish to sincerely thank the Chairman and members of the Board of Directors for their guidance, support, and confidence throughout this period. I also extend my profound appreciation to the Honourable Minister of Agriculture for his leadership and continued commitment to the development of the agricultural sector. I am equally grateful to all farmers, partners, and staff whose dedication and hard work made the 2025 achievements possible. Your collective support has been invaluable, driving the success of the Institute and the Other Crops Sector.

The Institute's work spanned crop research and development, soil and plant diagnostics, nursery and planting material production, pest and disease management, climate-smart agriculture, capacity building, farmers' training, and institutional strengthening.

Crop research remained a cornerstone of NAREI's work in 2025 with continued focus on adaptive and applied research aimed at improving yields, resilience, and profitability for farmers. Emphasis was placed on both traditional crops and emerging priority commodities

identified under the national import substitution and diversification strategies. Research on integrated crop management practices, including fertilizer regimes, planting density, and water management, contributed to the development of improved production guidelines.

During the year, three major projects were completed that will significantly boost our support to farmers: the Biotechnology Plant Tissue Culture Laboratory, the Ant Bait Production Facility, and the Composting Unit. These initiatives will strengthen NAREI's capacity to provide quality planting materials, effective pest management solutions, and sustainable soil fertility options for the farming community. The Soil Chemical Services Laboratory, commissioned in 2024, provided soil testing, fertilizer recommendations, and advisory services to farmers.

Researchers and Extension staff cooperated throughout the year on pest and disease management and plant health diagnostics. Emphasis was placed on Integrated Pest Management (IPM) approaches supported by farmer education, safe pesticide handling, and detection of nutrient deficiencies, pest infestations, and disease outbreaks to enable timely and targeted responses. Concurrently, efforts continued to modernize laboratory operations by enhancing equipment utilization, staff training, and data management.

Extension services were among NAREI's most visible and impactful functions in 2025. Through the implementation of an aggressive extension service mix, research findings were transferred to stakeholders. Training programmes addressed crop production techniques, integrated pest management, fertilizer application, post-harvest handling, and basic farm management. Farmer responsiveness and adaptation rates reflected the relevance of the advice provided and the trust built through consistent engagement.

All 11 nurseries across the country produced seedlings and propagules for vegetables, fruits, and other crops, supporting both commercial and household-level farming. The expansion of nursery operations also contributed to the Institute's income generation, enhancing sustainability while meeting farmers' demand.

Climate variability continued to influence agricultural performance in 2025, reinforcing the importance of climate-smart practices. NAREI promoted adaptive measures, including improved drainage, mulching, crop diversification, and resilient varieties. One hundred and

Ninety-three shade houses were constructed, bringing the total for the period 2021 to 2025 to 796. In addition, the construction of three large hydroponic farms, one each in Regions 2, 5, and 10, was completed. NAREI, in collaboration with the Guyana School of Agriculture (GSA) and the Environmental Management Consultants (EMC), conducted two Climate Smart Agriculture training workshops.

Progress continued in strengthening NAREI's digital systems, including the electronic farmer register and internal data management tools. The Agriculture Information System (AIS) assisted in planning, monitoring, and reporting, while supporting more targeted service delivery. Enhanced data availability also supported policy dialogue and coordination within the Ministry of Agriculture.

The Institute continued to invest in training and capacity building, while increasing staff capacity to support expanded activities, particularly in tissue culture, vermicomposting, and other emerging programme areas. Efforts to strengthen internal coordination, security, and administrative systems further contributed to improved operational efficiency, effectiveness, and accountability**.**

NAREI operated within approved budgetary allocations while striving to maximize impact and efficiency. Prudent financial management ensured the continuity of core services and supported priority investments in research, extension, and infrastructure. Revenue-generating activities, including nursery sales and specialized services provided to external clients, complemented public funding and contributed to the Institute's financial sustainability.

Collaboration with farmers, private sector actors, Regional institutions, and development partners enhanced NAREI's reach and effectiveness. These partnerships facilitated knowledge exchange, resource mobilization, and innovation, including collaboration with IICA, FAO, CARDI, CABI, the University of Guyana, and other sister agencies under the Ministry of Agriculture.

Looking ahead, NAREI is well-positioned to build on the gains of 2025. Strategic priorities for 2026 include scaling successful technologies, further strengthening laboratory and extension services, expanding import substitution crops, and deepening climate resilience.

In conclusion, 2025 was a year of consolidation, progress, and strategic alignment for NAREI. Through dedicated service, technical excellence, and institutional stewardship, the Institute continued to play a vital role in advancing Guyana's agricultural development. The year's achievements provide a strong foundation for future growth and impact in support of farmers, food security, and national development.

Jagnarine Singh
Chief Executive Officer
National Agricultural Research and Extension Institute

INTRODUCTION

Welcome to the 2025 Annual Report of the National Agricultural Research and Extension Institute (NAREI). This year marks a period of significant progress and strategic achievement as we continue to advance Guyana's agricultural sector in alignment with VISION 2030. Through dedicated research, innovative extension services, and strong partnerships both locally and internationally, NAREI has reinforced its role as the country's leading institution in crop development, sustainable practices, and food security.

In 2025, NAREI demonstrated an unwavering commitment to its mandate by promoting resilient agricultural systems, supporting farmers, and expanding its technical capacities. Our collective efforts have resulted in notable milestones, from the commissioning of vital facilities such as the Biotechnology Plant Tissue Culture Laboratory, the Ant Bait Production Facility, and the Composting Unit, to the expansion of climate-smart initiatives, all aimed at fostering sustainable and productive farming communities.

This report highlights our achievements, strategic initiatives, and the collaborative efforts that have driven our success. It reflects our dedication to innovation, accountability, and the continuous pursuit of excellence as we work to transform Guyana's agricultural landscape for the benefit of our farmers, our nation, and the wider Region.

BOARD OF DIRECTORS' ACTIVITIES

Several activities were successfully carried out in 2025. The activities of the Corporate Secretary in 2025 are as follows:

- In January, the Board of Directors approved the Procurement Guidelines 2024, replacing the 2019 version.
- Coordinate and implement the Statutory Meeting of the Board of Directors for the period January 2025 – December 2025.
- Carry out secretarial functions during the Board of Directors meetings.
- Organize activities on behalf of the Board of Directors.
- Coordinate visits by the Chairman of the Board to NAREI's locations across the country.
- Coordinate meetings between members of the Board of Directors and NAREI's stakeholders.
- Notify the respective Heads of the Department of various decisions emanating from the Programme Advisory Committees and Board of Directors.
- Draft internal reports on behalf of Management and provide legal guidance for the day-to-day activities of NAREI.
- Prepare and review contracts between NAREI and Stakeholders.
- The Board of Directors held discussions with NAREI's management team on the alignment of the proposed 2026 Budget with NAREI's 2026 Work Programme.

Directors

The following persons were appointed to serve on NAREI's Board as Directors from December 8, 2023 - December 7, 2025:

1. Major General (retd) Joseph Singh, Chairman
2. Mr. Jagnarine Singh, CEO / Ex-Officio Member
3. Mr. Ricky Roopchand
4. Ms. Natasha Beerjit-Deonarine
5. Dr. Garvin Cummings
6. Dr. Gomathinayagam Subramanian

7. Mr. Gavindra Ramnarain
8. Ms. Sarah Browne-Shadeek
9. Mr. Suresh Amichand
10. Mr. Javed Shadick
11. Ms. Anjanie Seebaran
12. Mr. Kuldip Ragnauth
13. Mr. Porandatt Narine
14. Mr. Lesley Ramlall, Representative of the Guyana Manufacturing and Service Association

Committees of the Board

Section 7(1) of the National Agricultural Research and Extension Institute Act provides for the appointment of three Programme Advisory Committees, while Section 7(2) of the aforementioned Act allows the Board to "appoint any other committee as it sees fit." As of 2024, the following Committees operated under the supervision of the Board:

1. Appointments Committee

- Major General (retd) Joseph Singh, Chairman of the Board of Directors and of the Appointments Committee
- Mr. Gavindra Ramnarain - Director
- Mr. Kuldip Ragnauth - Director
- Mr. Suresh Amichand - Director
- Mr. Porandatt Narine - Director
- Mr. Jagnarine Singh - CEO

2. Research Programme Advisory Committee

- Mr. Gavindra Ramnarain - Chairman, Research Programme Advisory Committee
- Dr. Garvin Cummings - Director
- Dr. Gomathinayagam Subramanian - Director
- Mr. Suresh Amichand - Director
- Mr. Jagnarine Singh - CEO

3. Crop Protection Programme Advisory Committee

- Mr. Suresh Amichand - Chairman, Crop Protection Programme Advisory Committee
- Dr. Gomathinayagam Subramanian - Director
- Mr. Ricky Roopchand - Director
- Mr. Lesley Ramlall - Director
- Mr. Jagnarine Singh – CEO

4. Extension Programme Advisory Committee

- Mr. Kuldip Ragnauth - Chairman, Extension Programme Advisory Committee.
- Mr. Ricky Roopchand - Director
- Ms. Anjanie Seebaran - Director
- Ms. Sarah Browne-Shadeek - Director
- Mr. Jagnarine Singh - CEO

5. Finance and Administrative Programme Advisory Committee

- Mr. Porandatt Narine - Chairman, Finance and Administrative Committee
- Ms. Anjanie Seebaran - Director
- Ms. Natasha Beerjit-Deonarine - Director
- Mr. Lesley Ramlall - Director
- Mr. Jagnarine Singh - CEO

6. Procurement Advisory Committee

- Mr. Javed Shadick- Director
- Ms. Natasha Beerjit-Deonarine - Director
- Mr. Gavindra Ramnarain - Director
- Mr. Kuldip Ragnauth - Director
- Mr. Jagnarine Singh - CEO

1.0 RESEARCH DEPARTMENT'S ACHIEVEMENTS

The 2025 research endeavors of NAREI's various departments have significantly advanced Guyana's agricultural development, sustainability, and resilience. From soil management and plant biotechnology to pest surveillance and ecosystem restoration, the year was marked by innovative projects, strategic partnerships, and capacity-building initiatives. These efforts have not only improved crop productivity, disease management, and resource conservation but also fostered regional collaborations and community engagement. As a result, NAREI continues to position Guyana at the forefront of sustainable agriculture, supporting national goals for food security, climate-smart practices, and economic diversification. The following section summarizes key research achievements and ongoing projects that exemplify NAREI's commitment to scientific excellence and transformative agricultural solutions. The Research Programme Advisory Committee skillfully guided the works of this department and ensured that the government's policy priority directives were achieved as follows:

1.1 Soil Management and Farm Mechanization (SM&FM)

During 2025, the SM&FM Department continued to strengthen its role in supporting sustainable agricultural development through enhanced laboratory services, applied research, digital innovation, and strategic partnerships. Emphasis was placed on improving soil fertility assessment, promoting efficient nutrient management, supporting value-added inputs, and expanding access to soil information for farmers, entrepreneurs, researchers, and policymakers. Key initiatives included water analyses for nutrient elements and carbon dioxide, national soil mapping, collaborative soil surveys, and targeted support to farming communities, NGOs, and agribusinesses. These efforts collectively contributed to improved decision-making, increased production efficiency, and the promotion of climate-smart and sustainable land management practices across Guyana.

Key Achievements

a) **Soil Chemical Services Laboratory (SCSL):** The enhanced capacity of this laboratory allowed the evaluation of soil fertility status and made recommendations benefitting farmers, researchers, entrepreneurs, and policy makers. The SCSL analyzed 1,113 soil samples and provided limestone and fertilizer recommendations for judicious fertilizer use in crop production. analyses to farmers. A total of 305 clients were serviced and 7,226 analyses were completed.

b) **Seedling Soil Organic Waste Mixture S-SOWMix:** The department produced 4,615L S-SOWMix. A water-harvesting and washing facility was constructed, and storage tanks were installed, thereby enhancing the production efficiency of this product.

c) **Rhizobia Inoculant (RI):** 30kg of rhizobia inoculant were produced for distribution to legume farmers.

d) **Digital Soil Database:** A total of 36 (c.f. to 41 in 2024) soil maps (parts of Regions 1, 2, 5, 6, 7, and 10) were added to NAREI's digital soil database. As a new initiative, seventy-four (74) digital soil maps were uploaded to the NAREI website for easy access to users.

e) **Guyana Soil Surveys (GSS):** The GSS was initiated in collaboration with UWI, and the Partnership Initiative for Sustainable Land Management (PISLM) of FAO under phase one of the Soil-Care Project. Soil sample collection is completed for 317 of 319 sample locations.

f) **Support to NGO's:** Based on the MoU between NAREI and FAO for the piloting of the Sustainable Land Development and Management Project in Regions 4 and 10. All deliverables were achieved, which included: 25,000 vetiver seedlings, 12 biochar kilns, 12 shade houses, 7 of 42 vermicompost bins and shed; the production of Manuals on: Shade House Cultivation, Production and Use of Vermicompost, and Production and Use of Biochar.

g) **Onions Pilots:** 1.75ha of onions were cultivated and harvested at Mon Repos, ECD and Long Creek, Soesdyke Linden Highway. Demonstration plots were established at Regions 5 and 6 Model Farms, and 4ha were cultivated on a farmer's plot in Region 2.

1.2 Intermediate Savannahs Field Research Unit (ISFRU- EBINI)

Conservation of Plant Genetic Resources for Food and Agriculture (PGFRA), which was systematically collected and established *in situ*, was the main focus of ISFRU-EBINI. Soil fertility testing for pH, management of Acoushi ants, threshing of red pea, and ensuring potable water supply to residents were actions executed to maintain the viability of the station and crop production efforts in the Intermediate Savannahs.

Key Achievements

Notable research and development achievements at ISFRU-EBINI included:

1. **FAO-NAREI Sustainable Land Development and Management Project:** The acquisition of a 6.7m ×9.1m shade house; one biochar kiln; and a dragon fruit plot with 50 trellises.

2. **New Crops Introduced:** Nine crop types were established in the field gene bank, sorghum - tall variety, hot pepper, coffee, 4 corner plantain, corilla (long variety), Feijou, pumpkin, and bora (long variety).

3. **Crops in conservation:** Five crop types (bora, red pea, peanut, sorghum, and ochro) represented by 15 accessions were put in conservation with records of 100 seed weight and germination percentages.

4. **Accessions regenerated:** Twenty red pea accessions from farmers' (Flemming, Reece, Richards, Sigman, Da Silva, Leacock, Morris, Kippins, and M. Mitchel) collections were taken out of conservation after nine months and regenerated. Pod lengths (16.6cm & 21.3cm), number of peas/pod (13 & 16), and number of pods per plant (8 & 12) were recorded. Also, peanut varieties (Ak 62, Jumbo, *and GN92*), maize CARDI 001.

5. **Extension Services:** Fifty soil samples were tested for pH, and recommendations were provided to farmers. Ninety-six farmers received 388 packs of ant bait and 33,759kg of red peas threshed for 55 farmers in Ebini and its environs.

6. **Seed Multiplication:**
    a. **Corn** (CARDI 001) 180 kg
    b. **Peanuts** (*Ak* 62)300 kg
    c. **Red peas (MINICIS IV)** 458 kg

1.3 Plant Biotechnology and Genetic Resources (PB & GR)

The Plant Biotechnology and Genetic Resources (PB & GR) programme advanced significantly during the reporting period through strengthened tissue culture and molecular biology

capabilities. With technical support from the Energy and Resource Institute (TERI), NAREI enhanced staff capacity, commissioned a new state-of-the-art tissue culture facility, and expanded micropropagation and molecular research activities. These interventions improved access to disease-free planting material, elite germplasm, and molecular data to support crop improvement, plant breeding, and sustainable agricultural development in Guyana and the wider Caribbean.

1.3.1 Tissue Culture

NAREI continued to benefit from technical assistance from The Energy and Resource Institute (TERI) through the presence of its Tissue Culture Consultant, Mr. Vijay Thakur, at the Institute. The consultant facilitated staff training in the use of the upgraded equipment acquired for the new tissue culture facility and in the optimization of micropropagation crop protocols. For the first time in Guyana, a micropropagation protocol was developed for the mass production of sugarcane. This initiative will provide disease-free plantlets to the Guyana Sugar Corporation (GuySuCo) for clonal propagation of economically important breeding lines to improve sugar production. Throughout the year, continuous acquisition, multiplication, and distribution of economically important crops: pineapple, plantain, sweet potato, cassava, and breadfruit were facilitated.

In October 2025, the PG & BR Department commissioned the new Biotechnology and Plant Tissue Culture Laboratory, which has a potential annual production of one million (1,000,000) plantlets. This momentous achievement has the capability to catapult access to elite germplasm for farming systems and plant breeding programs in Guyana and the Caribbean Region.

TERI's assistance was enhanced with a two-week attachment in November of four of its technicians who facilitated training on equipment installation, calibration, and use in the new facility.

Key Achievements

Fifteen Thousand Seven Hundred and Sixty-One plantlets were produced using developed protocols for plantain (2,038 plantlets), breadfruit (3,093 plantlets), sweet potato (1,941), and pineapple (6,262 plantlets), all of which are currently in production. The protocol for sugarcane (2,427 plantlets) is completed; however, crop development is being monitored in the field.

1.3.2 DNA Laboratory

TERI assisted the molecular laboratory with the installation and calibration of a range of molecular equipment to support essential molecular workflows, enabling reliable sample processing, quality assessment, and data generation for plantlets produced in the tissue culture laboratory. The equipment include: Lyophilizer, Fume Hood, Deep Freezer (-80), Deep Freezer, Centrifuge, Electrophoresis power supply, Mini Centrifuge, Gradient Thermal Cycler, Gel Documentation (with laptop), Hot water Bath, Ice Maker, Ph Meter, Conductivity Meter, Homogenizer, Electric balance, Magnetic stirrer, Nanophotometer, Power stabilizer, External probe with stand, and Hot plate.

Also, the DNA Laboratory collaborated with AGROSAVIA (an entity that uses molecular characterization to increase productivity and sustainability) in Colombia. Forty sweet potato accessions were sent for genotyping-by-sequencing (GBS), marker identification, and preparation of results for further research applications. Agrosavia will conduct bioinformatics analysis results expected in the first Quarter of 2026. This initiative aims to strengthen Regional research capacity and foster knowledge exchange between NAREI and AGROSAVIA. The data generated will help in future breeding programmes to improve sweet potato varieties in Guyana.

Key Achievements

Three in-house practical training sessions were conducted in collaboration with the University of Guyana, Tain - Berbice Campus (UGBC) for researchers from NAREI and GRDB. Trainees successfully isolated high-quality DNA from rice leaf tissue and visualized and analyzed it using agarose gel electrophoresis to assess its integrity.

1.4 Plant Pathology, Entomology, and Weed Science (PPEWS)

The PPEWS Department played a central role in strengthening national pest and disease management through innovation, applied research, surveillance, and direct support to farmers and agricultural stakeholders.

A new Acoushi Ant Bait Production Facility was commissioned, featuring an efficient, semi-automated production system that integrates milling, pelletizing, and drying (not reliant on solar drying) into a single continuous process. Concurrently, a new corn-based Acoushi Ant

Bait was formulated and validated, ensuring compatibility with the new system and supporting sustainable production.

PPEWS delivered free diagnostic laboratory services, technical support, and training to farmers and national agricultural programmes. Also, it contributed to human resource development by providing hands-on training opportunities for students at the Guyana School of Agriculture (GSA). Collectively, PPEWS' interventions strengthened national biosecurity, promoted sustainable agricultural practices, and reinforced NAREI's mandate to deliver science-based solutions to agriculture.

1.4.1 South American Palm Weevil Pest Surveillance

In collaboration with NPPO, PPEWS department continued surveillance and monitoring of the South American Palm Weevil. Monitoring activities included routine field inspections and the use of pheromone and other types of traps for early detection. Data collected from these activities showed that a total of 6,482 weevils were captured over the 12-month period.

Key Achievements

a. Produced 10,401 packets of Acoushi Ant Bait.
b. Serviced 208 farmers with diagnosis and recommendations for major insects, nematodes, and diseases affecting crops.
c. Produce three batches of solid formulation Trichoderma spp., for long-term preservation.
d. Identification 6 natural enemies and two potential parasitoids for the biological control of whiteflies.
e. Determined the mode of transmission of Plant Parasitic Nematode affecting Coconut.
f. Managed mealybugs in different crops using the entomopathogenic fungus *Beauveria bassiana.*
g. Optimized tomato seedling growth using green cocopeat substrates amended with urea, rock phosphate, and organic inputs.
h. Managed anthracnose in passion fruit seedlings through treatment of planting substrate with Trichoderma and Fungicide.
i. Managed fungal diseases in coconut palms through axillary application of systemic fungicides.

1.5 Fruits, Vegetables and Other Crops (FVOC)

The FVOC Department has made substantial progress in advancing agricultural research, promoting sustainable farming practices, and strengthening farmer engagement across Guyana throughout 2025. Our initiatives have focused on crop evaluation, coconut nursery development, diversification, organic farming, pest management, and capacity building, all aimed at enhancing productivity, resilience, and market competitiveness.

Key Accomplishments

a) Bell Pepper (*Capsicum annuum*) Variety Evaluation

Over the past two years, FVOC conducted a comprehensive evaluation of six bell pepper varieties to assess their growth performance, yield, and market preferences under open-field conditions across different seasonal environments. The study revealed that seasonal dynamics significantly influence crop performance: the 2024 wet season favoured vegetative growth due to favourable photoperiods, while the 2025 dry season favoured fruiting and higher yields. Among the varieties tested, Polaris emerged as the top performer, yielding 30.7 tons per hectare (t/ha) and demonstrating consistent growth and productivity, making it ideal for maximizing total yield. Sunsation ranked second in yield but produced the heaviest individual fruits, making it well-suited for markets that demand larger peppers. These findings provide valuable insights for farmers, indicating that Polaris is preferable for overall yield maximization, while Sunsation is better suited for market segments prioritizing larger peppers. This research equips farmers with critical information to make informed decisions on variety selection aligned with seasonal conditions and market demands.

b) Coconut (*Cocos nucifera*) Nursery

FVOC successfully produced 4,450 coconut seedlings, surpassing expectations. Regular monitoring of Brazilian coconut seedlings across Regions 2, 3, 4, 5, and 10 ensured healthy growth and early management interventions. In collaboration with the Crop Development and Support Services (CDSS), the department updated the coconut database, capturing essential data including farmer details, plantation size, age, and monthly production metrics, thereby enhancing research and development efforts. Maintenance activities included caring for 120 mature coconut palms and planting 50 dwarf coconut palms to diversify varieties and support ongoing research at Mon Repos.

c) Sweet Potato (*Ipomoea batatas* (L.) Lam.) Evaluation

The department also evaluated 41 sweet potato accessions at Mon Repos and Kairuni, with the Beauregard accession reaching a notable 1.9 kg per plant. To further assess their performance, 24 accessions were replanted across various locations. Additional activities involved pest monitoring to ensure healthy growth and molecular analysis of leaf samples to better understand genetic traits, contributing valuable insights toward crop improvement.

d) Composting Initiatives

On October 14, 2025, NAREI established a composting unit at Mon Repos to promote sustainable waste management practices. The unit consists of ten bins, each measuring approximately 3 meters in length, 1.2 meters in width, and 0.9 meters in height. It is anticipated that vermicompost production will increase from 2,000 kg to 10,000 kg annually. The vermiculture process will produce approximately 15 kg of worms (*Eisenia fetida*), with one bin designated for experimental purposes. Additionally, thermophilic composting is projected to increase from 5,000 kg to 15,000 kg annually. In 2025, the unit yielded a total of 5,609 kilograms of vermicompost and 365 kilograms of thermophilic compost, demonstrating the effectiveness of these systems in generating nutrient-rich organic matter vital for sustainable agriculture. The vermiculture component harvested approximately 4.5 kg (11 lbs.) of worms.

e) Crop Diversification

FVOC advanced its diversification efforts by introducing new varieties. These included white and orange watermelons (*Citrullus lanatus*), canary melons (*Cucumis melo*), and honeydew melons (Cucumis melo), which were cultivated across Regions 2, 3, and 6, expanding the diversity of locally available fruits. The department successfully pot-planted 14 Hass avocado (*Persea americana* cv.Hass) seedlings imported from the USA and handed them over to the nursery for hardening and further development.

f) Farmers' Outreach and Training

FVOC conducted targeted training sessions to empower farmers with sustainable practices. The department conducted composting workshops for 60 farmers at Kairuni and 20 at Mon Repos. Four compost bins were established in Amelia's Ward and a demonstration bin at Kairuni, serving as practical models to promote organic waste management and soil fertility enhancement within communities.

g) Sweet Potato Slips Distribution

To bolster local sweet potato cultivation, FVOC distributed 20,000 slips to farmers, supporting food security initiatives and income diversification efforts across Regions.

Table 1: Vegetable Seed Production Data

Seed	Variety	Projected (G)	Produced (G)
Bora	Yard long	25,000	30,191.0
Okro	Clemson Spineless	25,000	42,820.0
Korilla	Green	5,000	1,843.0
Hot Pepper	Tiger Teeth, CAB 1, Pigmenta Arara, Pigmenta Dandara and Miwiri Red	2,000	2,184.5
Boulanger	Long Purple	1,000	464.0
Red beans	Minica IV	1,000	700.0
TOTAL		**59,000**	**78,202.5**

Table 2: Seed Distribution Data

No.	Seed Type	Regions										Quantity	
		1	2	3	4	5	6	7	8	9	10	Packs	Gram
1	Asparagus	-	-	20	-	-	-	-	-	-	-	**20**	80
2	Beet	-	787	380	103	-	690	-	-	-	5	**1,965**	11,708
3	Bora	423	718	440	2,367	1,598	1,128	881	183	626	162	**8,526**	111,970
4	Boulanger	763	436	885	2,619	372	3,758	347	210	697	215	**10,302**	41,248
5	Broccoli	2	-	515	803	350	1,028	-	-	-	13	**2,711**	10,922
6	Butternut squash	-	-	-	7	40	-	-	-	-	-	**47**	470
7	Cabbage	391	184	430	2,020	305	1,977	320	110	270	100	**6,107**	25,188
8	Cantaloupe	-	400	1,000	485	-	-	-	-	-	5	**1,890**	18,900
9	Carrot	231	115	20	998	25	1,386	100	-	50	5	**2,930**	17,856
10	Cauliflower	-	-	1,029	11	31	940	-	-	-	-	**2,011**	8,200
11	Celery	427	350	1,568	2,172	607	1,495	292	165	385	202	**7,663**	31,472
12	Coriander	-	-	2	76	-	-	-	-	-	-	**78**	526

13	Corilla	80	-	535	336	-	453	-	-	-	-	**1,404**	14,040
14	Cucumber	536	207	1,446	2,163	307	852	287	155	640	207	**6,800**	66,957
15	Eschallot	216	102	339	315	111	43	109	-	25	63	**1,323**	5,292
16	Guava	-	10	-	10	-	-	-	-	-	-	**20**	350
17	Hot pepper	685	1,338	3,691	3,079	519	705	270	175	442	280	**11,184**	54,888
18	Kale	-	-	-	93	-	-	-	-	-	-	**93**	390
19	Korilla	186	122	218	1,586	160	1,536	120	5	50	92	**4,075**	47,180
20	Lettuce	386	406	434	3,259	619	1,003	407	155	718	150	**7,537**	30,148
21	Millet	-	-	-	-	-	5	-	-	-	-	**5**	2,500
22	Mustard	5	481	450	427	-	601	45	10	25	5	**2,049**	8,196
23	Ochro	670	431	804	2,828	522	2,250	444	200	690	197	**9,036**	90,310
24	Onion	319	163	476	2,526	210	183	140	-	100	45	**4,162**	16,648
25	Pak Choy	613	2,726	4,295	3,569	483	2,817	464	92	441	172	**15,672**	62,688
26	Papaw	-	-	20	-	-	-	-	-	-	-	**20**	1,700
27	Papaya	-	10	-	12	-	-	-	-	-	-	**22**	1,136
28	Parsley	391	265	3,019	2,215	292	1,719	288	180	512	242	**9,123**	36,492
29	Passion fruit	-	-	-	20	-	-	-	-	-	-	**20**	200
30	Peanuts	-	-	-	-	-	-	39	-	-	-	**39**	28,105
31	Poi	371	553	98	2,129	131	771	102	65	470	67	**4,757**	46,508
32	Pumpkin	137	1,852	1,175	3,989	2,434	1,562	50	10	860	-	**12,069**	113,252
33	Radish	-	-	20	2	30	920	-	-	-	-	**972**	5,920
34	Red beans	-	5	11	62	3	6	10	-	5	-	**102**	1,921,670
35	Spinach	-	-	-	4	-	-	-	-	-	-	**4**	40
36	Squash	-	1,835	-	1,258	2,340	600	615	5	-	-	**6,653**	55,330
37	Sweet Corn	357	327	236	2,053	215	603	219	121	545	123	**4,799**	43,276
38	Sweet Pepper	490	761	557	2,288	426	818	432	165	613	435	**6,985**	27,920
39	Tomato	472	943	1,640	2,307	459	1,175	292	215	430	223	**8,156**	32,382
40	Watermelon	250	529	1,182	3,184	630	403	255	55	460	75	**7,023**	69,730
41	Zucchini	-	-	-	10	20	-	-	-	-	-	**30**	300
Total		**8,402**	**16,058**	**26,938**	**51,389**	**13,244**	**31,433**	**6,535**	**2,284**	**9,063**	**3,093**	**168,384**	**3,062,088**

1.6 Special Projects Unit

1.6.1 Spices

Presently, spices like turmeric, ginger, black pepper, nutmeg, etc. are grown in Guyana in an organized way. The climatic and soil conditions prevailing in the country are conducive to

these commodities. The country's hinterland Regions are better suited to spice cultivation. However, within recent years, farmers on the coastland have begun planting spices.

Key Achievements

1.6.1.1 Turmeric: *Curcuma longa* L.

- Data collected from scientific experiments established in 2024 were statistically analyzed, and the results are used to update the existing brochure.
- A total of 1,600lbs of turmeric planting materials were distributed to 23 farmers of Regions1,3 and 4.
- As of December 26, 2025, farmers from Regions 1, 3, and 4 harvested 189,767kg of fresh turmeric rhizomes.
- 129,104lbs of fresh turmeric rhizomes were supplied to NAREI by 32 farmers. They were processed at the Hosororo spice facilities.
- A total of 10,947lbs of processed turmeric were sold to E.B. Beharry.
- Three turmeric heat pump drying machines were transported to the spice facilities at Hosororo, Region 1, for installation.
- Foundation work commences for the building that will house the three turmeric heat pump drying machines.
- NAREI supplied farmers' groups from Kamwatta, White Water, and St. Dominic with 450-gal water tanks, tillers, sprinkler hose, PCV pipes, and water pumps to establish a two-acre plot with turmeric.

1.6.1.2 Ginger: *Zingiber officinale*

- Data collected from scientific experiments established in 2024 were statistically analyzed and the results are used to update the existing brochure.
- NAREI supplied farmers' groups from Kamwatta, White water, and St. Dominic with 450-gal water tanks, tillers, sprinkler hose, PCV pipes, and water pumps to establish two (2) acres plot with ginger.
- A total of 3,450lbs of ginger planting materials were distributed to 63 farmers from Regions 1, 2,3,4 and 6.
- Three buildings were constructed at Parika, Region 3, Hosororo, Region 1; and Four Miles Port, Kaituma Region 1, to house the three complete ginger lines procured from HENAN GELGOOG, CHINA.

- One complete ginger line was successfully installed at Parika, and two were transported to Hosororo and Port Kaituma.
- At the ginger facility at Parika, a security guard hut was built, GWI installed approximately 600 feet of water lines, and GPL installed a lantern post and electrical connections.

1.6.1.3 Turmeric and Ginger Germplasm

The turmeric and ginger rhizomes from both *in situ* and *ex situ* germplasm conservatory will be harvested in February 2026. The harvested rhizomes will be treated with carbendazim and triazophos, stored in a ventilated room, and used as planting material for the continuous conservation of germplasm.

1.6.1.4 Black Pepper: *Piper nigrum* L.

A total of 12,000 black pepper cuttings were generated in the nurseries at NAREI, Mon Repos, and Hosororo, Region 1, using the serpentine method of multiplication. NAREI distributed 1,463 black pepper cuttings to farmers from Regions 1,3 and 4. These black pepper cuttings were used for expanding black pepper cultivation. NAREI also provides farmers with live standards (*Gliricidia sepium*) sticks for trailing the black pepper vines.

1.6.1.5 Nutmeg: *Myristica fragrans*

A total of 2,200 nutmeg seedlings is in the nursery at Hosororo, Region 1. NAREI distributed 109 nutmeg seedlings to farmers, and 97 were planted in the demonstration plot at Hosororo, Region 1. The plants will take approximately 5-7 years to start fruiting.

1.6.1.6 Cinnamon: *Cinnamomum verum*

A total of 5,976 cinnamon seedlings were collected and conserved in the nursery at NAREI Mon Repos. These seedlings will be distributed to farmers in 2026 to expand cinnamon cultivation in Guyana. NAREI distributed 28 cinnamon seedlings to four farmers from Regions 2, 3, 4 and 6.

1.6.1.7 Mint: *Mentha spicata*

A total of 1,500 mint cuttings were generated in the nursery at NAREI Mon Repos. These cuttings will be distributed to farmers to expand mint cultivation.

1.6.2 Cassava

Cassava (*Manihot esculenta* Crantz) is a root crop grown across all 10 Administrative Regions of Guyana. Cassava is among the major root crops designated by the Ministry of Agriculture as a strategic crop for Guyana, given its significant contribution to the economic development of Guyanese farmers, especially in hinterland communities. Although traditionally associated with subsistence farming, the crop is gradually becoming an industrial crop, processed into value-added products such as flour, bread, and mash.

Over 3,000 hectares of cassava were cultivated during the 2025 cropping season, with an average yield of about 30 t/ha. The number of hectares and yield are expected to increase significantly in the coming years. Sustainable agricultural production is imperative to curb food insecurity, reduce poverty, and improve the livelihoods of smallholder farmers.

Key Achievements

1. Yield increases significantly from 20 t/ha in 2020 to 35 t/ha in 2025.
2. Over 100 hectares of cassava were cultivated on new plots of land across the country.
3. Established cassava nurseries at Parika Backdam and Salem, Region 3, which allowed over 100 farmers to access healthy, disease-free planting materials.

1.6.2.1 Projects:

1) Production of High-Quality cassava Flour (HQCF) in Guyana- NAREI, through the Government of Guyana, launched a project to process excess cassava produced by farmers in Parika, East Bank Essequibo, and surrounding areas. A five-ton cassava flour production factory was purchased from China. Installation at the factory began several months ago and is about 95% complete. An electrical engineer and a food scientist were awarded contracts to install and provide regular progress updates.

1.6.3 Corn and Soybean

In an effort to enhance food security, support the livestock industry, and reduce reliance on imported stockfeed, Guyana initiated a programme to promote corn and soybean cultivation from 2022 to 2025. This initiative was supported by government funding, increased participation from the commercial sector, and a strong focus on self-sufficiency. In 2024, agricultural acreage in Guyana expanded to over 12,000 acres due to substantial investments in infrastructure, including roads, storage, drying facilities, and mechanization. The sector

attracted new investors, boosting production capacity and contributing to a more reliable local feed supply.

By 2025, corn and soybeans have become vital components of the country's agricultural diversification strategy. The increased local supply has strengthened the stockfeed sector, reducing its exposure to global price fluctuations. Historically, livestock feed imports averaged approximately US$40 million annually. Since investor-led cultivation commenced, Guyana has recorded a progressive reduction in feed imports, resulting in foreign-exchange savings and improved sector resilience. In 2025, four investors cultivated corn and soybeans.

Table 3: Total Area of Corn and Soybean Cultivation and Production in 2025

Corn and Soya Cultivation		
Commodity	**2025**	
	Acres	**Production (MT)**
Soya	11,800	14,102
Corn	2,780	14,658
Total - Corn and Soya	**14,580**	**28,760**

Table 4: Total Area of Soybean Cultivation and Production by Investor in 2025

Soya Cultivation		
Investors	**2025**	
	Acres	**Production (MT)**
Tacama Gold (David Fernandes)	7,500	8,183
Farmland Inc. (Ms. Abigail Welch)	1,500	2,065
Japarts & Nand Persaud (Mr. Terry Singh)	2,800	3,854
Total	**11,800**	**14,102**

Table 5: Total Area of Corn Cultivation and Production by Investor in 2025

Corn Cultivation		
Investors	**2025**	
	Acres	**Production (MT)**
Japarts & Nand Persaud (Mr. Terry Singh)	200	275
Yucatan Reis New Frontier (Ms. Teneisha)	500	1,255
Ireng Int. Farm (Johil) (Mr. Marcello Claudio)	310	778
Small farmers	1,770	12,350
Total	**2,780**	**14,658**

1.6.4 Cocoa

In 2023, an agreement was made with NAREI, IICA and CATIE for CATIE to supply cocoa stem cuttings and provide technical assistance in the form of training on cocoa propagation. Currently, NAREI has the capacity to grow 5,000 rootstocks per year. NAREI is helping to construct a shade house in Hosororo, Region 1 for the propagation of cocoa. This is being done in collaboration with local farmers.

1.6.5 Coffee

In February 2024, NAREI received its first batch of coffee seeds from CATIE. Under the agreement with CATIE, NAREI has received approximately 42,000 coffee seeds. Because of the recalcitrant nature of coffee seeds, 10,000 plants were obtained. Afterward, NAREI sought to acquire local landraces of *coffea liberica* from Wakapoa, which gave 4,000 plants. In addition, NAREI bought 20,000 more seeds of *coffea liberica* from CATIE that will be sown at Mon Repos and Hosororo.

In addition, to increase our diversity in coffee species and quality, in February 2025 NAREI, in collaboration with GDI, sought the technical advice of two coffee experts from Colombia on the cultivation of Coffea *arabica* in Regions 1 and 8. The two experts visited the Regions and submitted a technical report. The experts advised that coffee arabica can be grown in these Regions.

To safeguard these valuable genetic resources, small germplasm plots were established at Mon Repos and Ebini. At these locations, varieties and accessions of coffee and cocoa will be planted. This will also serve as a source of plant propagation material.

1.6.6 Horticulture Department

The horticulture department typically involves the production, cultivation, management, and care of orchard saplings, vegetable crops, and ornamentals. NAREI operates 11 plant nurseries throughout Guyana that sell plants (seedlings and grafted) to the public at subsidized prices. This ensures farmers have access to low-cost, high-quality planting materials to aid in sustainability, enhance productivity, and their income. The horticulture department also utilizes the science and art of various propagation techniques to develop high vigor food crop genetic materials through research.

1.6.6.1 Plant Nurseries:

- **Nursery Production:** In 2025, the 11 plant nurseries collectively produced 283,692 mixed orchard saplings and distributed to farmers at a subsidized cost. Revenue generated from plant sales amounted to $45,901,960 in 2025**.**

Table 6: The Total Mixed Orchard Saplings Produced in 2025.

Production as of December 2025 (Saplings)	Sold to farmers (December 2025) (Saplings)	Free Distribution as of December 2025 (included in sales)
283,692	201,351	29,686

Citrus Production: A total of **102,514** citrus saplings were produced in 2025, of which **57,996** saplings were distributed to farmers/school/householders across the 10 Administrative Regions. In 2026, an additional **40,803** citrus saplings will be available for distribution.

Table 7: Citrus Production for the Year 2025.

Production as of December, 2025 (Saplings)	Citrus saplings available for sale as of December 2025	Citrus saplings in processing (Hardening, budding stages) as of December 2025	Sold to farmers (December, 2025) (Saplings)	Free Distribution as of December, 2025 (included in sales)
102,514	8,096	40,803	57,996 (47783+10213)	10,213

Research Summary Report 2025

Projects:

1. **Vegetative propagation of Citrus rootstock by stem cuttings.**
2. **Optimizing Tomato Seedling Growth Using Green Cocopeat Substrates Amended with Urea, Rock Phosphate, and Organic Inputs**
3. **Efficacy of Trichoderma and Fungicide in Composted Cocopeat and NAREI Nursery Substrates for Anthracnose Management in Passion Fruit Seedlings**
4. **The Propagation of Cut Roses using the Cloning Kit**

1.6.6.2 Rose Project

The Fresh-cut Roses Project was conceptualized by His Excellency, President Dr. Mohamed Irfaan Ali, as a strategic initiative aimed at creating employment opportunities while reducing Guyana's import bill. Launched in 2022, the project is currently in its fourth year of operation and continues to demonstrate its viability.

Since its inception, the project has attracted significant interest from businesses and individuals with entrepreneurial aspirations, highlighting its potential as a viable agro-enterprise. In the reporting year, total cut-rose production amounted to 3,101 stems. Sales trends indicated a clear increase during special occasions, with peak sales recorded in February (440 stems), followed by April and July (362 stems each). These increases coincided with major celebrations such as Valentine's Day, International Women's Day, Easter, and Mother's Day.

Revenue generated from the sale of roses totaled $1,112,300, reflecting strong market demand for locally produced fresh-cut flowers. In addition, 164 roses, valued at $83,000, were donated in support of various activities and initiatives. Overall, the Fresh-cut Roses Project continues to contribute meaningfully to employment creation, local production, and agribusiness development in Guyana.

1.6.7 Shade House

In 2021, the Government of Guyana, through the Ministry of Agriculture, embarked on a programme to encourage farmers, entrepreneurs, and graduates in Agricultural Science to adopt protected agriculture practices in response to the adverse effects of climate change, which continue to threaten global and Regional food security.

The Government adopted a proactive approach by leading the *25 by 2025* Vision, which seeks to reduce the Regional food import bill by 25 percent while ensuring adequate food and nutrition security within the CARICOM Region. Owing to emerging Regional and global challenges, this target has since been revised to *25 by 2025 plus five*.

Through NAREI, the Ministry of Agriculture has been at the forefront of this initiative, providing critical support to farmers, schools, farmers' groups, religious organizations, and non-governmental organizations. The primary intervention has been the provision of shade houses, as the initial establishment cost remains the greatest barrier to adoption. In addition, tools and equipment, drip and sprinkler irrigation systems, and training and support are provided to ensure successful implementation and sustainability.

In 2025 alone, a total of 193 shade houses were constructed, while 796 shade houses were established during the period 2021 to 2025 as part of NAREI's climate-smart agriculture agenda. Beneficiaries included schools, orphanages, farmers, and community-based organizations. The equitable distribution of these shade structures across the Regions underscores the Government's commitment to inclusive agricultural development and provides meaningful opportunities for young and emerging agri-entrepreneurs.

Table 8: Summary of Shade Houses 2021 -2025 @ 31/12/2025

SUMMARY BY BENEFICIARIES 2021 - 2025							
	2021	**2022**	**2023**	**2024**	**2025**	**TOTAL**	**%**
Schools	8	13	34	21	27	103	12.9
Farmers groups	10	14	30	67	52	173	21.7
Farmers	125	43	38	96	101	403	50.6
Orphanage/Children's Home		2	1	1	1	5	0.6
AIEP		54		25	3	82	10.3
GSA		0			6	6	0.8
Roses		4				4	0.5
Strawberries/Blueberries, etc		2				2	0.3
Plant nurseries			4	6	3	13	1.6
Cocoa/Coffee			2	3		5	0.6
TOTAL	**143**	**132**	**109**	**219**	**193**	**796**	**100.0**

1.6.8 Agricultural Innovation Entrepreneurship Program (AIEP)

The Agricultural Innovation Entrepreneurship Program (AIPE) is the brainchild of His Excellency Dr. Mohamed Irfaan Ali, President of the Cooperative Republic of Guyana. The programme involves modern agricultural practices that directly support President Ali's vision of reducing Guyana's, as well as CARICOM's food import bill by 25%**.**

Through skills development, technology adoption, and youth engagement, AIEP continues to contribute meaningfully to national food security and economic resilience. At the end of 2025, from initiation, AIEP had engaged 650 participants**.** These participants are from Regions 2, 3, 4, 5, 6, and 10, and are actively involved in shade-house and Hydroponic cultivation. The programme engages in fresh crop production under shade houses and hydroponics facilities, and agro-processing.

AIEP officially launched its pepper jelly product on June 9, 2025 at Massy Mega Store, Movietowne**.** This launch directly supported His Excellency the President's initiative to promote youth-led agribusiness, agricultural innovation, and greater youth ownership across agricultural value chains. Through this activity, AIEP demonstrated the potential of agro-processing as a viable pathway for

Commissioning of the Composting Unit

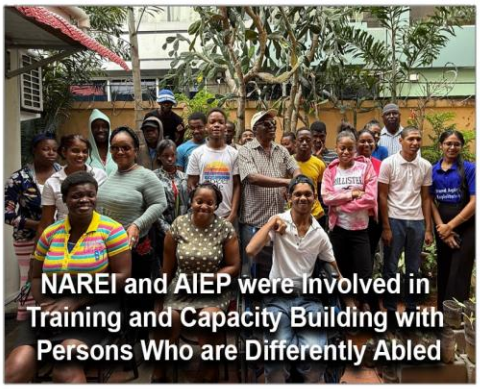

Vermicompost Bin in Linden


Thermophilic Compost


NAREI Continues to Provide Assistance to Hinterland Farmers


Farmers Benefitted From a Field School Session Conducted on a Coconut Farm in Clonbrook Backdam


NAREI Delivered Several Agri-Inputs to Bladen Hall Multilateral School


NAREI and AIEP were Involved in Training and Capacity Building with Persons Who are Differently Abled


Members of the Newly Established Farmers' Group in Berbice River


Professor Ibrahim of IICA Receives Warm Welcome at NAREI


Participants of the 35th West Indies Agriculture Economic Conference Visited NAREI


NAREI Provided Support to Green Enterprise Women's Group


Students of Aurora Secondary School, Region 2 Benefitted From Budding and Grafting Demonstration


The Result From the Practical Demonstration of Air Layering Method of Propagation on Citrus (Lime)


Kitchen and Container Gardens Established in Homestead by Staff of the National AIDS Programme Secretariat, MOH


Commissioning of Biotechnology Plant Tissue Culture Laboratory


Dividing Cuttings to Develop Plantlets.


Chairman of NAREI's Board, visited our Biotechnology Plant Tissue Culture Laboratory


Region 5 MoA Hydroponics Facility

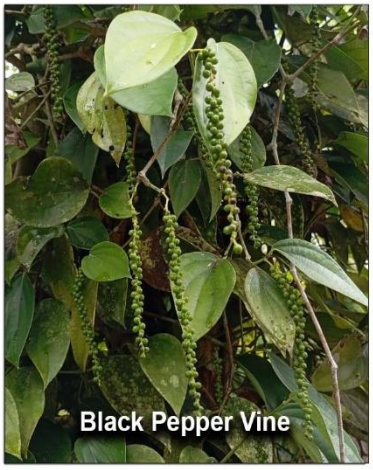

Making Pepper Jelly


Launching of AIEP's Pepper Jelly at the Massy Mega Store


Delegation From Neighbouring Suriname Visited Our AIEP Farm

AIEP's Pepper Jelly


Ginger and Turmeric Farmers Visited NAREI's Spice Factory at Hosororo.


Black Pepper Vine

Varieties of Spices Cultivated in Region 1 on Display


Corn and Soya Cultivation in Tacama, Berbice River.


Sweet Cassava Value Added Products

Commissioning of the
Acoushi Ant Bait Production Facility

NAREI's Acoushi Ant Bait

Chairman of NAREI's Board,
visited our
Ant Bait Production Facility

Winners of the Mangrove Trivia
Participate in the
Discover Mangroves Tour

Honey From Guyana's
Mangrove Forests on Display

Mangrove Awareness Library Corner
at Abram Zuil Secondary School.

Students get Creative
on the Pages of the 'Wonderful World
of Mangroves" Activity Book

Colombia, Region 2, 195m Groyne

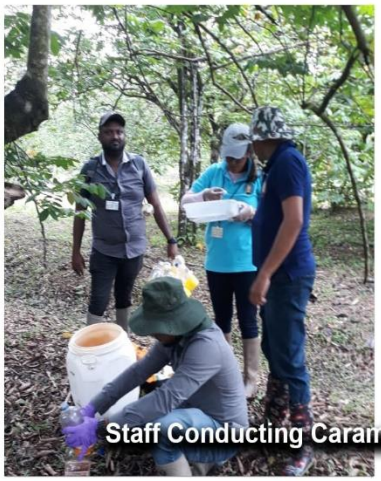
Hydroponics Training

Farmers Toured
Mon ReposFacility

Donation of Deep Flow Technique
Hydroponics System to Berbice Education Institute

Distribution of Fertilizers, Plants and Seedlings to Farmers

Shade House Certification



Staff Conducting Carambola Fruit Fly Exercise

World Food Day Observance at Albion Sports Complex, Region 6

GUYEXPO 2025

Health Fair at Mon Repos

NAREI Participated in Region 6's Job Fair at the University of Guyana Tain Campus

Open Day and Exhibition Activity at the Model Farm, Region 5.

Collection,Shredding,Washing and Drying of Green Coconut Fiber to Make Seedling Substrate

Effects of Thricoderma on Growth Parameters for Passion Fruit Plants

Effects of Cocopeat Substrate Inoculated With Thricoderma to Suppress Fungal Disease in Passion Fruit Seedlings

Social Activities That Bring Staff Together

youth entrepreneurship and income generation. The Agro-Processing Unit successfully produced 2,101 jars of pepper jelly.

In 2025, AIEP introduced Hydroponics as a new programme initiative, marking a significant step toward expanding the use of modern, climate-smart agricultural technologies in Regions 2, 5 and 10. Each location has one greenhouse with an NFT system and two greenhouses that use drip-to-waste technology. This initiative was designed to complement existing shade-house production while promoting efficient, soil-less cultivation systems that support increased productivity, resource conservation, and year-round production.

By 2025, the total production of fresh crops had grown to 20,459 kg. Growth was overwhelmingly led by poi/callaloo (14,555 kg) and pak choi (2,307 kg), confirming a strong emphasis on leafy vegetables that are well suited to and shade-house systems, have shorter harvest cycles, and enjoy consistent local demand.

1.6.9 NAREI's Hydroponics

The 2025 Hydroponics Programme focused on strengthening research, capacity building, and the adoption of hydroponic technologies across Guyana. Programme activities were implemented in Regions 2, 3, 4, 5, 6, and 10, benefitting farmers, educational institutions, government agencies, and developmental partners. The programme aligned with national priorities to promote climate-resilient agriculture, enhance production efficiency, and expand opportunities for agri-entrepreneurship.

Key Achievements

a) Research and production trials evaluated two new leafy vegetables. Dill demonstrated excellent adaptability in the Deep-Water Culture (DWC) system, while cabbage adapted well to the Dutch Bucket System. Repeated production cycles of celery, lettuce, pak choy, and kale across Dutch Bucket, Nutrient Film Technique (NFT), Deep Water Culture (DWC), and Deep Flow Technique (DFT) systems strengthened technical recommendations and improved production consistency.

b) Royal Star sweet pepper and Mongol tomato were successfully cultivated in the Dutch Bucket system, with flowering and fruiting observed within 22–25 days. Average yields of 3.8 kg per plant for sweet pepper and 4.0 kg per plant for tomato.

c) Significant progress was made in strengthening technical resources and planning tools. Four awareness videos were produced, covering system installation and cultivation practices, along with a national awareness feature in collaboration with NCN. The hydroponics manual and system-specific brochures were reviewed, and training materials for the EMC shade house programme were updated.

d) Extensive knowledge transfer and direct technical support were delivered throughout 2025. A total of 934 farmers, students, technicians, and stakeholders across Regions 2, 3, 4, 5, 6, and 10 benefitted.

2.0 MANGROVE RESTORATION AND MANAGEMENT DEPARTMENT

2.1 Major achievements 2025

Through an integrated programme that combines ecological restoration, green–grey coastal engineering, scientific monitoring, and community engagement, the Mangrove Restoration and Management Department directly contributes to national priorities in disaster risk reduction, food security, and sustainable development.

In 2025, the Department advanced this mandate through targeted infrastructure investments, strengthened monitoring systems, expanded education initiatives, and livelihood development activities aimed at improving long-term socio-economic resilience in coastal communities.

2.3 Programme Overview and National Context

Between 2020 and 2025, the country recorded a net increase of approximately 6,028 hectares of mangroves, reflecting sustained national investment in restoration, monitoring, and coastal resilience.

Regional analysis shows strong natural regeneration in some areas alongside localized fluctuations driven by erosion, hydrological pressures, and sediment dynamics. Region 1 recorded the largest gains, while Regions 3 and 4 demonstrated steady recovery linked to shoreline stabilization. Conversely, Regions 2, 5, and 6 exhibited more dynamic conditions, reinforcing the need for targeted engineered support to facilitate mangrove establishment in high-energy environments. These findings informed restoration priorities during 2025 and guided the selection of intervention sites.

2.4 Advancing Green–Grey Coastal Protection

A major focus of the Department in 2025 was the implementation of hybrid green–grey infrastructure designed to work with natural coastal processes by reducing wave energy, promoting sediment accretion, and creating enabling conditions for natural mangrove regeneration.

Two interventions were completed along the Essequibo Coast in Region 2:

- **Three rubble mound groynes totalling 195m at Colombia**
- **Two groynes totalling 120m at Reliance**

2.5 GGGI Coastal Resilience Project- Region 5

The Coastal Resilience and Mangrove Restoration Project, implemented by the Global Green Growth Institute (GGGI) in partnership with NAREI, executed preparatory activities in 2025 to protect and restore approximately 6 kilometres of shoreline between Dantzig and DeHoop, Region 5. Technical progress included a field visit and a preliminary design validation workshop with international consultants to assess site conditions and guide the selection of appropriate nature-based engineering solutions, such as timber breakwaters and brushwood groynes.

2.6 Monitoring and Evidence-Based Management

Monitoring and evaluation remain central to the Department's restoration strategy. A structured framework has been adopted to track shoreline response, sediment dynamics, and mangrove regeneration through repeat elevation surveys, vegetation assessments, photographic records, and drone-based monitoring over a five-year period.

Preparatory work also progressed on Guyana's Blue Carbon initiative. During 2025, pilot soil sampling, drone mapping, ground-truthing exercises, and community training were completed, with full implementation scheduled for 2026.

2.7 Community Livelihoods and Capacity Building

The Department continued to integrate livelihood development into restoration programming, recognizing that sustainable mangrove management is strengthened through community participation and economic opportunity.

- **14 persons trained in mangrove-associated apiculture**
- **17 persons certified in tour guiding**

2.8 Public Awareness, Education, and National Outreach

Mangrove Library Corners were installed in 10 secondary schools and multiple Regional libraries, expanding access to environmental learning resources. The Mangrove Centre continued to function as a national hub for awareness, hosting 59 tours and engaging 2,961 participants during the year.

2.9 Governance and Strategic Partnerships

The Mangrove Management Action Network (MMAN) convened six meetings during 2025 to review programme progress, strengthen technical collaboration, and guide strategic priorities for the national mangrove restoration agenda.

3.0 CROP DEVELOPMENT AND SUPPORT SERVICES DEPARTMENT (CDSS)

In 2025, the Crop Development and Support Services (CDSS) Department of NAREI continued to work with farmers to realize the Government of Guyana's goal of food and nutrition security. With the increasing demand for food coupled with the goal of reducing CARICOM's food import bill by 25% by 2025+5, CDSS increased the provision of extension services, training and support to farmers and other key stakeholders. Throughout the year, CDSS collaborated with other Government Ministries, and Regional and International Organizations such as FAO, IICA, WFP, CARDI, and WUSC to bring relief to local crop farmers.

3.1 Extension Services

The department continued registering crop farmers in the central Agriculture Information System (AIS) of the Ministry of Agriculture, allowing those registered to benefit from programmes such as the National Fertilizer Distribution programme.

Extension staff carried out daily routine field visits; conducted Farmers' Field Schools and training programmes; established demonstration plots, and participated in outreaches and exhibitions, which enabled the transfer of technologies to stakeholders. Although the targeted number of field visits was not met, the number of farmers visited exceeded the target. This is a result of Extension staff's involvement in the verification process required for a functioning AIS.

CDSS worked with farmers to increase production and productivity through the provision of critical services, such as soil, water, pest, and disease analysis, and offered necessary recommendations. Moreover, farmers received support with much-needed agricultural inputs, including seeds, seedlings, pesticides, Acoushi ant bait, farm tools, and implements.

3.2 Farmers' Training

The CDSS Department continued to provide training to farmers, extension officers, schools, and other institutions across the country. The number of beneficiaries of these programmes increased. Notably, more training sessions were conducted in the hinterland Regions for 2025 than in previous years.

Training sessions covered all aspects of crop production, including soil nutrient management, crop nutrient management, pest and disease identification and management, drainage and irrigation management, and post-harvest management. Farmers were also trained in social aspects such as financial management, stress management, and anger management.

To encourage agriculture at an early stage, CDSS also provided training for students from public and private schools. Members of several institutions benefited as well. Training for Extension Officers was conducted to transfer knowledge to our farmers. The CDSS Department also collaborated with the Hydromet Department to provide farmers with training on weather and climate.

3.3 Support to Farmers' Group

One of the benefits of working with groups is that it enables effective networking among farmers. NAREI, through the CDSS Department, supports farmers in organizing themselves into groups. Apart from group formations, CDSS also visited groups to assess their functionality and provided guidance to enhance their performance. CDSS facilitated group exchange visits to afford farmers the opportunity to observe other farmers' practices, with the aim of transferring these practices to their farms to boost production and productivity. Please refer to *Table 3* below for achievements for the CDSS Department for 2025.

Table 9: Crop Extension Targets and Achievements of CDSS Department of NAREI for 2025.

Activities	Target	Actual	% Ach
Visit to Remote/Riverain Communities	1,055	1,095	**103.8**
Field Visits	42,439	21,855	**51.4**
Farmers Visited	65,000	67,708	**104.2**
Farmers' Open Days	1,105	927	**83.9**
Meetings/Outreach Programs – Planned	1,270	1,059	**83.4**
Meetings/Outreach Programs – Unplanned	162	283	**174.7**
Farmers' Field Schools	120	83	**69.2**
Demonstration Plots	180	135	**75.0**
Soil Sample Collection	693	776	**112.0**
Water Sample Collection	1,025	2,672	**260.7**
Pest and Disease Sample Collection	290	580	**200.0**
Acoushi Ant Management	30,000	9,570	**31.9**
Number of farmers benefitting from non-cash assistance	30,652	24,683	**80.5**
Number of New Shade Houses Constructed	200	193	**96.5**
Amount of Seeds distributed to farmers (kg)	70.0	72	**103.1**

Table 10: Training Targets and Achievements of CDSS Department of NAREI for 2025.

Activities	Target	Actual	% Ach
Training Sessions for Farmers	344	498	**144.8**
Farmers Trained	5,160	11,273	**218.5**
Training Sessions for Extension Officers and Other Staff	80	93	**116.3**
Officers Trained	1,200	2,242	**186.8**
Sessions with Schools and Institutions	47	97	**206.4**
Students Trained	705	3,099	**439.6**
Sessions with Women and Youth	84	70	**83.3**
Women & Youths Trained	1,260	1,386	**110.0**
Support to Hydromet and ClimSA	18	9	**50.0**

Farmers and Staff Benefitting	645	190	**29.5**
Total Sessions	**573**	767	**133.9**
Total Attendance	**8,970**	18,190	**202.8**

Table 11: Farmers' Group Support targets and achievements of CDSS Department of NAREI for 2025.

Activities	Target	Actual	% Ach
Farmers' Group Formation and Strengthening	32	22	**68.8**
Farmers' Group Meetings	132	70	**53.0**
Group Exchange Visits	28	11	**39.3**

3.4 Model Farms

In 2025, the Model Farms in Regions 2, 5, 6, and 10 made notable progress in agricultural education, sustainability, and community engagement. The farms conducted crop demonstrations on sweet peppers, celery, and onions, highlighting best practices, pest management, and sustainable farming techniques. A wide variety of crops were cultivated for both educational and food production purposes, including citrus used for practical training in grafting, air layering, and budding.

The farms played an important educational role by hosting visits from secondary schools and numerous farming groups, providing hands-on learning and encouraging knowledge sharing. Sustainable practices were reinforced through vermicomposting, which recycled organic waste into compost. Open Days and Exhibitions further strengthened community ties, attracting diverse participants and facilitating the distribution of seeds and seedlings.

3.5 Coconut Research Unit

In 2025, the Coconut Research Unit of NAREI advanced its mandate to strengthen coconut production, nursery systems, and sustainable resource use across Guyana. The Unit's work focused on improving the quality of planting material, enhancing disease and pest management, promoting the valorization of coconut waste, and supporting industry partnerships for national agricultural development.

Research activities during the year demonstrated the effectiveness of composted cocopeat-based substrates for seedling production, with improved germination, survival, and growth recorded in tomato, passion fruit, and coconut nursery trials. The integration of biological control agents, particularly indigenous *Trichoderma* species, reduced disease incidence and improved seedling vigor, supporting the development of more resilient and environmentally sustainable nursery systems.

Significant progress was made in the management and valorization of coconut waste. Surveys and field assessments in Region 4 quantified large volumes of coconut husk waste and identified infrastructure gaps at key markets. Technical and economic evaluations confirmed the viability of recovering coconut fiber and fiber dust for use in nursery substrates and soil amendments, supporting circular economy initiatives and reducing environmental pollution.

Field monitoring and varietal evaluation activities continued nationwide. Brazilian Green Dwarf, Malayan Dwarf, and Surinamese Dwarf coconuts were monitored across multiple Regions, with early nut production observed in several locations. Seed-nut selection, mother-palm marking, and germination-optimization trials strengthened the national seedling production programme. Routine fertilization, pest and disease monitoring, and database updates improved farm-level management and national planning capacity.

The Unit also strengthened surveillance of key pests through collaboration with the National Plant Protection Organization and the Plant Pathology Entomology and Weed Science department, resulting in expanded monitoring coverage for the South American palm weevil.

Collaboration with Hope Coconut Industries Limited (HCIL) remained strong throughout the year. Overall, the 2025 programme reinforced NAREI's role in supporting sustainable coconut production, improving nursery and research systems, and advancing value-added utilization of coconut resources in Guyana.

Projects:

1. **Optimizing Tomato Seedling Growth Using Green Cocopeat Substrates Amended with Urea, Rock Phosphate, and Organic Inputs.**
2. **Efficacy of Trichoderma and Fungicide in Composted Cocopeat and NAREI Nursery Substrates for Anthracnose Management in Passion Fruit Seedlings.**

3. **Coconut Waste Management**
4. **Estimation and Recovery of Coconut Husk and Fiber Dust**
5. **Control of Foliar Diseases by the Axillary Application of Systemic Fungicides in Coconut Palms**
6. **Monitoring Brazilian Green Dwarf Coconut Variety**
7. **Coconut Mother Palm Identification and Marking**
8. **Optimizing Coconut Germination (Suriname Brown Dwarf)**

3.6 Other notable activities of the Coconut Research Unit for 2025:

3.6.1 Coconut Palms at Ogle Seawall

All palms were fertilized at the Ogle seawall. Unwanted, severely damaged, and diseased palms were removed. Pest and disease monitoring and management were also conducted throughout the year.

3.6.2 Updating Coconut Database

Updating the coconut database continued in 2025, capturing all coconut farmers, including those from abandoned and new estates. This activity includes field visits in the Pomeroon River and Supenaam Creek. This process will continue in 2026.

3.6.3 Coconut Palm Weevil Survey

The Coconut Unit continued surveillance and monitoring of the South American Palm Weevil in collaboration with NPPO and the PPEWS department. Monitoring activities included routine field inspections and the use of pheromone and other types of traps for early detection. Data collected from these activities showed that 6,482 weevils were captured over the 12-month period.

Varieties of coconut and number of seedlings sown at NAREI Coconut Nursery for 2025:

1. Brazilian Green Dwarf: - 6,500
2. Malayan Green and Yellow Dwarf: - 550
3. Surinamese Green Dwarf: - 700

4.0 NATIONAL PLANT PROTECTION ORGANIZATION (NPPO)

The NPPO's programmes in 2025 contributed substantially to the growth of agricultural exports, both Regionally and internationally. The provision of high-quality quarantine and plant protection services remained central to departmental operations. Quarantine officers diligently executed their duties at Ports of Entry to ensure that all imported and exported produce met the highest phytosanitary standards for trade. Meanwhile, Plant Protection officers conducted field surveys and surveillance to determine Guyana's pest and disease status, and implemented control and eradication programmes wherever necessary.

4.1.1 Plant Quarantine Services

Throughout the year, NPPO provided critical quarantine services. They are recorded in the table below.

Table 12: Shows the various services

Indicators	Target 2025	Reported 2025	% Achievement in 2025
Number of inspections of imports	80,000	94,911	119%
Number of import permits issued	1,800	1,808	100.4%
Number of inspections of ships	3,300	3,480	105%
Number of flights monitored (passenger, cargo, etc.)	4.300	3,761	87%
Number of vehicles inspected at ports of entry	100,000	117,921	118%
Number of rice fumigation conducted (containers, etc.)	6,400	5,261	82%
Number of export inspections	75,000	92,781	124%
Number of phytosanitary certificates issued	4000	3,923	98%
Number of farms inspected for certification	500	721	144%
Number of farms certified	250	250	100%
Number of visits/ meetings from trading partners	8	8	100%
Number of enquiries answered	24	59	246%
Number of comments, reviews and/ or questionnaires submitted to WTO/ IPPC	16	17	106%

Number of PRAs conducted	45	132	293%
Number of Regions surveyed	8	10	125%
Number of traps monitored	2000	2,813	141%
Number of CFF (fiber board) control monitor	10000	15021	150%
Number of traps distributed and monitored	200	525	263%
Number of dry coconuts treated	1,200,000	1,573,775	131%
Number of meetings, etc.	120	149	124%
Number of workshops, training	50	444	888%
Number of in-service staff sessions	30	34	113%

4.1.2 Trade Negotiation

In 2025, the NPPO worked closely with NPPOs from other countries to strengthen trade relations and ensure the smooth movement of traded commodities.

4.1.3 WTO/SPS & IPPC Enquiry and Notification Points

The Institute, through the NPPO, continues to ensure that Guyana meets its international obligations under the WTO/SPS and IPPC by serving as the focal point for all queries and notifications, and by providing answers and clarifications on agricultural trade-related issues to trading partners and other stakeholders.

4.1.4 Number of Notifications to WTO/ IPPC

Guyana notified the WTO/IPPC of our intention to commence issuing electronic phytosanitary documents through the National Single Window System. Additionally, three draft SPS Notifications have been prepared and are awaiting approval for posting to the WTO/SPS and IPPC, as part of our country's obligations. They are: 1) The Draft Plant Protection Regulations (2023); 2. The Food Safety Amendment Bill (2023), and 3. The Animal Health Amendment Bill (2023).

4.2 PLANT PROTECTION

NPPO conducted surveys and surveillance activities for pests and diseases of quarantine importance within all 10 Administrative Regions. These activities were geared towards establishing baseline data

on pest presence and status within the respective Administrative Regions of Guyana, and for updating and maintaining Guyana's pest status information.

4.2.1 Carambola Fruit Fly (*Bactrocera carambolae*)

The Carambola Fruit Fly is a polyphagous pest listed by IPPC as a major threat to tropical fruit production. It infests a wide range of hosts, causing severe yield losses and trade restrictions. Surveillance and integrated control measures are vital to reduce prevalence and safeguard Guyana's fruit exports.

Activities:

- Implemented Male Annihilation Technique (fiberboard blocks).
- Deployed McPhail and Jackson traps across all 10 Administrative Regions.
- Applied SPLAT and Anamed to host trees.
- Collected and destroyed infested fruits.
- Conducted public awareness campaigns with farmers and residents.

Accomplishments:

- Region 1: 1,927 CFF captured.
- Region 2: 1,014 CFF captured.
- Region 3: 7,233 CFF captured (2,071 on Wakenaam).
- Region 4: 8,474 CFF captured (Timehri–Friendship, Hill Foot–Long Creek).
- Region 5: Localized outbreak contained (1 CFF).
- Region 6: 986 CFF captured; Orealla & Siparuta reduced populations.
- Region 7: 9,338 CFF captured.
- Region 8: 4,120 CFF captured (Mahdia); 31,107 in North Pakaraimas.
- Region 9: 10,160 CFF captured; new detections in Aishalton, Gomes Landing, Baitoon.
- Region 10: 1,913 CFF (Kwakwani/Ituni); 11,775 CFF (Linden/Rockstone).

4.2.2 Fruit Sampling

Fruit sampling is a core surveillance method for fruit flies, enabling host verification and mapping pest distribution. By rearing larvae from collected fruits, NPPO can identify species and assess risks. This supports evidence-based decisions for quarantine measures and trade negotiations. The

department investigated 125 fruit samples from Regions 3 and 4, and tested hosts including carambola, citrus, mango, guava, tamarind, and others.

Accomplishments:

- 1,068 pupae emerged.
- 961 fruit flies emerged: 689 *Bactrocera* spp, 272 *Anastrophe* spp, 0 *Ceratitis* spp.
- 10% pupal mortality recorded.

4.2.3 Red Palm Mite (*Raioella indica*)

The Red Palm Mite is a serious invasive pest of coconut and other palms, recognized by the IPPC as a quarantine pest of economic importance. It causes leaf yellowing, reduced photosynthesis, and yield decline. Effective quarantine and fumigation measures are essential to prevent its spread across Guyana's coconut industry.

Activities:

- Conducted quarantine actions/treatments, fumigation visits to Wakenaam.
- Applied Weevil-Cide fumigant tablets to dried coconuts, water coconuts, and brooms destined for local markets.
- Coordinated with NPPO Region #2 and CDSS teams.
- Collected weekly data on Pomeroon water, coconut bottling, and sales.

Accomplishments:

- 1,496,600 dried coconuts processed for export.
- 1,573,775 dried coconuts fumigated for local markets.
- 13,948 brooms and 292,416 water coconuts fumigated.
- 1,665,000 coconuts bottled in Pomeroon; 3,561,500 sold locally.
- Farmers cooperated, ensuring compliance with phytosanitary measures.

Pests not detected:

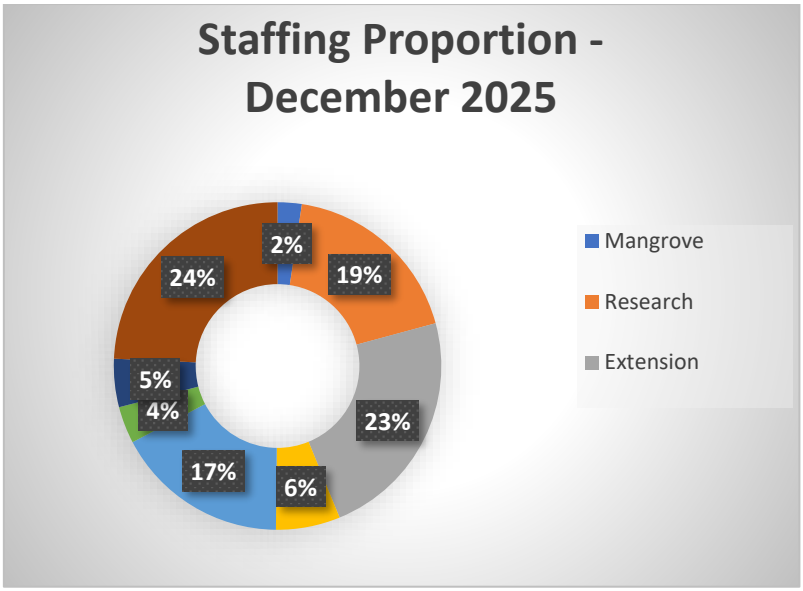
1. Red Palm Weevil (*Rhynchophorus ferrugineus*)
2. South American Palm Weevil (*Rhynchophorus palmarum*)
3. Mediterranean Fruit Fly (*Ceratitis capitata*)

5.0 HUMAN RESOURCES REPORT

As of December 2025, the Institute's staff complement stood at 633 employees.

Department	Dec 2025
Mangrove	15
Research	116
Extension	145
NPPO	40
Admin	108
One Guyana - AIEP	23
One Guyana -Other Projects	30
General Worker	153
Contracted Employees	**630**
Extension Agents	**3**
Total	**633**

Actions	No. of Staff
Recruitment	103
Resignation	11
Dismissal	3
Voluntary Withdrawal of Service	9
Termination	2
Non-renewal of contract	8
Promotion	7
Transfer	7
Death	4
Non-Contracted Employees	3
Staff who graduated from NAREI's study leave	3
Staff who are beneficiaries of paid study leave	13
Staff on no-pay study leave	1
Staff on NAREI's scholarship	3



In 2025, the Human Resources Department facilitated the strengthening NAREI's institutional capacity by promoting employee engagement, enhancing workplace safety, supporting staff welfare, and encouraged continuous professional development across the Institute. The Department's initiatives were guided by the objective of fostering a motivated, skilled, and cohesive workforce aligned with NAREI's strategic mandate.

Employee induction and orientation were prioritized to ensure effective integration of new staff into the Institute. The Department also conducted several outreaches and engagement visits to nurseries, research stations, extension offices, NPPO locations, and other operational sites across the country. Workplace safety and occupational health remained a core focus area. Employees from various departments participated in safety and emergency preparedness training, including fire safety and first aid.

The Department also coordinated a range of staff engagements, wellness, and cultural activities aligned with national observances and institutional values. These initiatives promoted inclusivity, cultural appreciation, teamwork, and morale, contributing to a positive organizational culture and strengthening interdepartmental collaboration.

Professional development and capacity building remained integral to the Department's work in 2025. A substantial number of employees benefited from training programmes and short courses across a broad range of disciplines, including leadership and supervisory management, project management, professionalism and ethics, customer service, cybersecurity awareness,

occupational safety and health, procurement, diversity and inclusion, and specialized technical areas. Participation in Regional and international training opportunities further enhanced staff competencies and institutional performance.

In support of employee welfare and work–life balance, the Institute implemented initiatives recognizing academic achievement among employees' children and facilitated access to public health interventions within the workplace in collaboration with national health authorities. These initiatives underscored NAREI's holistic approach to employee support and social responsibility.

The year concluded with staff appreciation and engagement activities that provided opportunities for reflection, recognition, and strengthened relations between management and employees. Overall, the Human Resources Department's activities in 2025 contributed significantly to the development of a resilient, engaged, and high-performing workforce, thereby supporting NAREI's continued effectiveness in delivering its research, extension, quarantine, and support services in Guyana's agricultural sector.

6.0 COMMUNICATIONS UNIT

During 2025, the Communications Unit provided accurate, timely, and effective dissemination of information, ensuring that NAREI's vision, mission, goals, and objectives were clearly communicated to the public. Through regular updates on the activities and achievements of the Institute's departments, the Unit significantly enhanced NAREI's visibility, credibility, and public image.

Collaboration remained central to the Unit's operations. Close coordination with technical and administrative departments ensured that all communication outputs were aligned with NAREI's strategic priorities. The Communications Unit also supported NAREI's participation in key outreach events, including Regional Science Fairs and the Ministry of Agriculture's Open Day/World Food Day observances. These engagements provided valuable opportunities

to interact with the public, raise awareness, and showcase NAREI's contributions to national agricultural development.

Recognizing the importance of digital engagement, the Unit placed strong emphasis on leveraging technology to broaden its reach and improve stakeholder interaction. NAREI's digital presence was strengthened through the strategic use of social media and multimedia content across platforms such as Facebook, TikTok, and Instagram. These platforms were used to organically promote NAREI's products, services, and initiatives, while highlighting the tangible impact of the Institute's work.

Key Achievements

Website Development: NAREI's website that is continually being developed remained live and accessible throughout the year. The website recorded approximately 3,000 clicks and served as an important information hub, particularly for accessing import permits and other documentation-related activities of the National Plant Protection Organization (NPPO).

Public Interaction and Content Creation: The Communications Unit prioritized digital content development, resulting in the production and circulation of several videos for the website and social media platforms, aimed at public education and institutional promotion.

The Unit managed the Institute's communications mobile line and hotline, facilitating public access to information and directing inquiries to the appropriate departments. The Unit also actively monitored NAREI's social media platforms, ensuring that comments, questions, and feedback, including criticisms, were promptly referred to relevant departments for action. This proactive engagement contributed to improved public responsiveness and institutional perception. The Institute has 1,059 followers on TikTok, 22,000 followers on Facebook, 1,956 on Instagram, and 134 Subscribers on YouTube.com.

Print and Design: The Unit compiled and printed NAREI's 2024 Annual Report and produced retractable banners for activities during Agriculture Month. Additionally, design services were provided for signboards at various plant nurseries and Agricultural Innovation and Entrepreneurship Programme (AIEP) locations.

Container Gardening Competition: The Unit coordinated the Container Gardening Competition for Grades 5 and 6 students nationwide. This initiative, conceptualized by the Chairman of the Board, Major General (Ret'd) Joseph Singh, was implemented in collaboration with the Horticulture Department, which provided technical support by producing a container gardening instructional video and assessing participants' entries. The competition received participation from students in Regions 4, 5, and 10.

Event Planning and Coordination: The Unit provided support in planning and executing several major institutional activities, including the commissioning of the Composting Unit, the Ant Bait Production Facility, and the Biotechnology Plant Tissue Culture Laboratory.

7.0 INFORMATION TECHNOLOGY DEPARTMENT

The Information Technology (IT) Department continued to play a critical role in supporting NAREI's operations and national agricultural initiatives throughout the year ending 2025. The Department focused on strengthening digital infrastructure, improving cybersecurity, enhancing data management systems, and providing technical support across departments and Regions. Key achievements during the year are outlined below.

7.1 Farmer's Database

During 2025, the IT Department worked closely with the Central Planning Department of the Ministry of Agriculture to migrate the existing Farmer's Database to the Agriculture Information System (AIS). This transition significantly enhanced Extension Services' data analysis, reporting, and monitoring capabilities.

The AIS platform, which was officially launched by the Honourable Minister of Agriculture, Mr. Zulfikar Mustapha, in October 2024, continued to be rolled out and utilized throughout 2025. Comprehensive training sessions were conducted for Extension Officers across Regions 1, 2, 3, 4, 5, 6, 9, and 10, using both in-person and virtual modalities. These sessions ensured that staff were proficient in using the AIS and equipped to verify farmer records effectively.

As a result of these efforts, approximately 15,000 farmers were verified in 2025, thereby improving data accuracy and strengthening national-level agricultural planning and decision-making.

7.2 Digital Soil Maps

In collaboration with the Soils Department, the IT Department supported the digitization of 69 soil maps, converting them into an interactive digital format that can be easily viewed using Google Earth. These maps were subsequently published via a Google Site, making them publicly accessible to farmers, researchers, planners, and other stakeholders.

This initiative significantly improved access to soil information, enhanced usability for land-use planning and agricultural decision-making, and promoted transparency by providing the public with easy access to authoritative spatial data.

7.3 New Farmer Mobile Application

From October 2025, NAREI's IT Department provided technical input and full support to the Planning Department and the National Data Management Authority (NDMA) in the conceptualization and design of a new Farmer Mobile Application. This initiative focuses on placing technology directly into the hands of farmers by enabling easier access to critical agricultural information and services.

The IT team played an important role in gathering technical requirements, advising on system architecture, data integration, and cybersecurity considerations, while ensuring alignment with national digital transformation and data governance standards. This project represents a major step toward improving farmer engagement, information dissemination, and service delivery through modern digital platforms.

7.4 Mangrove Information System Application

During 2025, the IT Department provided technical support for the development of the revised Mangrove Information System (MIS) Application. The application is being enhanced to support researchers, environmental agencies, and other key stakeholders involved in mangrove conservation, monitoring, and management.

The IT team contributed to system design discussions, data structure and integration, application architecture, and security considerations to ensure that the platform supports accurate data collection, analysis, and reporting. The revised MIS application is intended to improve access to mangrove-related information, facilitate evidence-based environmental decision-making, and support national and international conservation initiatives.

7.5 Server and Network Infrastructure

In October 2024, a second UniFi Dream Machine Pro Firewall was successfully integrated with the Dell EMC R550 Server, further strengthening the security of data stored on NAREI's File Server. Throughout 2025, continuous improvements were made to the server and network environment to enhance system performance, reliability, and user experience.

Several upgrades and security enhancements were implemented during the year, including:

- Improved internet speeds and network stability;
- Enhanced protection against viruses, malware, and unauthorized access;
- Controlled and selective access to the File Server, ensuring that sensitive and essential documents are accessible only to designated personnel;
- Improved communication and data sharing across departments and NAREI locations nationwide.

Additionally, the system actively identifies potential cybersecurity threats, such as malicious websites and rogue devices, monitors software and web applications consuming network bandwidth, and supports secure cloud-based access to the Farmer's Database. These improvements collectively strengthened NAREI's cybersecurity posture and operational efficiency.

7.6 Support Services

Throughout 2025, the IT Technical Team provided extensive on-site and remote support to departments and Regions across NAREI. Key support activities included:

1. Providing full IT support to ensure the new Biotechnology Laboratory was fully computerized, including the deployment of four (4) laptops and two (2) desktop computers.

2. Delivering comprehensive computer support to AIEP, including the installation of two (2) desktop computers and three (3) laptops.

3. Replacing approximately 50 desktop computers and 30 laptop computers, along with associated hard drives, monitors, and UPS units.

4. Upgrading approximately 150 computer systems to improve performance and support newer software applications.

5. Updating Wi-Fi routers across multiple departments to implement more advanced networking technologies.

6. Installing three (3) new antennas to improve internet connectivity for the Biotechnology Laboratory and the Horticulture Department.

7. Increasing File Server connectivity by an additional 10%, bringing overall connectivity to approximately 95% of NAREI's computers.

8. Continuing to provide IT support to GLDA, which does not have dedicated IT staff. This support included system setup, hardware repairs, network monitoring, and assistance with cybersecurity practices.

9. Assisting GSA with the implementation of a new network infrastructure and File Server.

8.0 INTERNAL AUDIT DEPARTMENT

Internal Audit is an independent and objective assurance and advisory function designed to add value and improve the organization's operations. It supports the achievement of institutional objectives by evaluating and strengthening risk management, internal control, and governance processes.

Although operating within the organization, the Internal Audit Department remains independent of day-to-day management functions. The Department conducts systematic reviews of financial and operational activities to ensure compliance with policies, procedures, applicable laws, regulations, and management directives, with reports sent to the Board of Directors.

During 2025, the following activities were conducted:

- **Safeguarding Assets** – Physical verification of assets was carried out twice during the year to ensure that they were accounted for and operational. A list of inoperable assets was prepared and submitted for disposal in accordance with established procedures.
- **Ensuring Accuracy of Records** – Accounting records, financial statements, and transactions were reviewed monthly to verify accuracy, completeness, and compliance with relevant laws, regulations, internal policies, and management directives.
- **Improving Operational Efficiency** – Operational processes were assessed, and recommendations were made to enhance efficiency, effectiveness, and internal controls across departments.
- **Fraud Prevention and Detection** – Ongoing reviews included monitoring for irregularities or suspicious transactions. No instances of fraud or material irregularities were identified during the reporting period.
- **Reporting and Follow-Up** – Audit findings were documented in monthly reports and submitted to the Board of Directors. Where necessary, recommendations were provided to strengthen internal control systems and ensure timely corrective action.

Overall, the Internal Audit function plays a critical role in promoting accountability, transparency, and continuous improvement within NAREI, while supporting sound financial management and the safeguarding of the Institute's assets.

9.0 FINANCIAL STATEMENT

Draft Accounts

NATIONAL AGRICULTURAL RESEARCH & EXTENSION INSTITUTE
STATEMENT OF FINANCIAL POSITION
AS AT 31 DECEMBER, 2025

	Note	31.12.2025	31.12.2024
Assets			
Non Current Assets			
Property, Plant & Equipment	3	944,022	710,594
Total Non Current Assets		944,022	710,594
Current Assets			
Cash and Cash Equivalents		1,507,719	233,278
Accounts Receivables	4	31,283	20,411
Inventory	5	101,585	108,438
Total Current Assets		1,640,587	362,127
Total Assets		2,584,609	1,072,721
Equity & Liabilities			
Shareholders' Equity			
Grant from Foreign Sources		51,897	51,897
Government fo Guyana Contribution		-	-
Revaluation of Stock		342	342
General Reserves		851	856
Accumulative Surplus/(Deficit)		2,511,885	924,002
Total Shareholders' Equity		2,564,975	977,097
Non Current Liabilities			
Ministry of Public Works		5,607	5,607
Total Non Current Liabilities		5,607	5,607
Current Liabilities			
Payables	6	14,027	90,017
Total Current Liabilities		14,027	90,017
Total Equity & Liabilities		2,584,609	1,072,721

On Behalf of the Board of Directors

Chairman | Director

The accompanying notes form an integral part of these financial statements.

DRAFT ACCOUNTS

NATIONAL AGRICULTURAL RESEARCH & EXTENSION INSTITUTE
STATEMENT OF COMPREHENSIVE INCOME
FOR THE YEAR ENDED 31 DECEMBER, 2025

	Note	31.12.2025	31.12.2024
		$	$
REVENUE			
Government of Guyana Subvention		2,736,430	2,563,708
Income from Operations		59,426	55,611
Rental of houses		150	2,990
Other Income		1,960,918	310,068
Interest Earned		6,943	840
Total Revenue for the Year		4,763,867	2,933,217
Expenditure			
Depreciation	2	63,757	60,343
Employment costs		2,151,403	1,909,458
Field materials & Supplies		216,863	158,620
Fuel & Lubricant		26,008	34,532
Maintenance of Infrastructure		1,341	2,930
Mangrove Expenses		12,913	2,533
Old Age Pension		881	929
Other Goods & Services		44,492	25,028
Other Operating Expenses		83,467	69,420
Project Expenses		713,207	324,033
Rental & Maintenance of Buildings		117,827	208,535
Security services		17,492	17,918
Training		11,159	13,653
Transport, Travel & Postages		79,418	91,209
Utility Charges		49,519	50,085
Total Expenditure for the year		3,589,747	2,969,226
(Deficit)/Surplus		1,174,120	(36,009)

10.0 APPENDIX

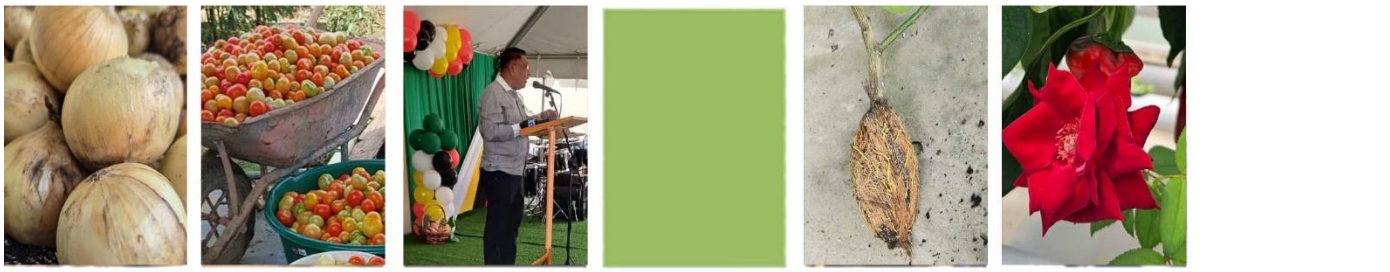
10.1 RESEARCH PAPERS

1. Evaluation of seed viability at various storage temperatures for different types of seeds
   https://www.scirp.org/journal/paperinformation?paperid=142497

2. Performance Evaluation of Two Soybean Varieties (*Glycine max (L.) Merr.)* for Growth and Yield on Frontland Clay Soil in La Grange, Region 3, Guyana
   https://www.scirp.org/journal/paperinformation?paperid=144007

10.2 TECH PACKS DEVELOPED

1. Dutch Bucket System
2. Vertical and Horizontal Nutrient Film Technique System (Hydroponics)
3. Vertical and Horizontal Deep Flow Technique System (Hydroponics)
4. Deep water culture system (Hydroponics)
5. Container Gardening/ Container Agriculture
6. Black Sigatoka Disease in Bananas and Plantains.
7. Evaluation of organic and inorganic fertilizers on the growth and yield of sweet potatoes
8. Pest and Disease management for fruits and vegetables under shade house management
9. The use of sweet potato sprouts as planting materials.
10. Horticulture- Air Layering
11. Ginger Production in Guyana
12. Sweet pepper production in the open field, Guyana
13. Agriculture Innovation and Entrepreneurship Program
14. Guidelines for Farm Certification.
15. The use of Pheromone for the control of sweet potato weevil.
16. Pest of coconuts.
17. The use of sweet potato sprouts as planting materials for increased production.



National Agricultural Research
and Extension Institute

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GUYANA

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ANNUAL REPORT 2025