



Social media: CARDIcaribbean
Website: www.cardi.org

Caribbean Agricultural Research and Development Institute

About CARDI

- Established in 1974, present in 14 CARICOM countries, serving a collective population of approximately 6.2 million
- Headquarters in Trinidad and Tobago, University of the West Indies
- Conducts research and development (R&D) that seeks to improve the competitiveness and sustainability of the Regional agricultural sector
- CARDI Board of Directors and the Ministers of Agriculture of Member countries
- CARDI support Ministries and Partners



- o Antigua & Barbuda
- o Bahamas
- o Barbados
- o Belize
- o Cayman Islands
- o Dominica
- o Grenada
- o Guyana
- o Jamaica
- o St. Kitts & Nevis
- o St. Lucia
- o St. Vincent & the Grenadines
- o Monsterrat
- o Trinidad & Tobago



About CARDI Scientific and Technical Capability

- Each country has a CARDI Unit an or Office with at least one scientist working as the CARDI representative and supporting the regional work as a scientist in their specific professional trained area.
- Scientists and technicians are giving the change to update knowledge in specialty training and research institutes exchanges
- Each Unit leads research development area

CARDI SCIENTIFIC TEAM

- Animal Scientists
- Animal Nutritionists
- Plant Biotechnologists
- Agronomists
- Climate Change and Climate Smart Specialist
- Water Management Specialist
- Policy and Marketing specialists
- Seed production and Germplasm management specialist
- Entomologists
- Plant Health specialist
- Crop modelling specialist
- Biometrician
- Value Chain Specialist



CARDI SCIENTIFIC TEAM

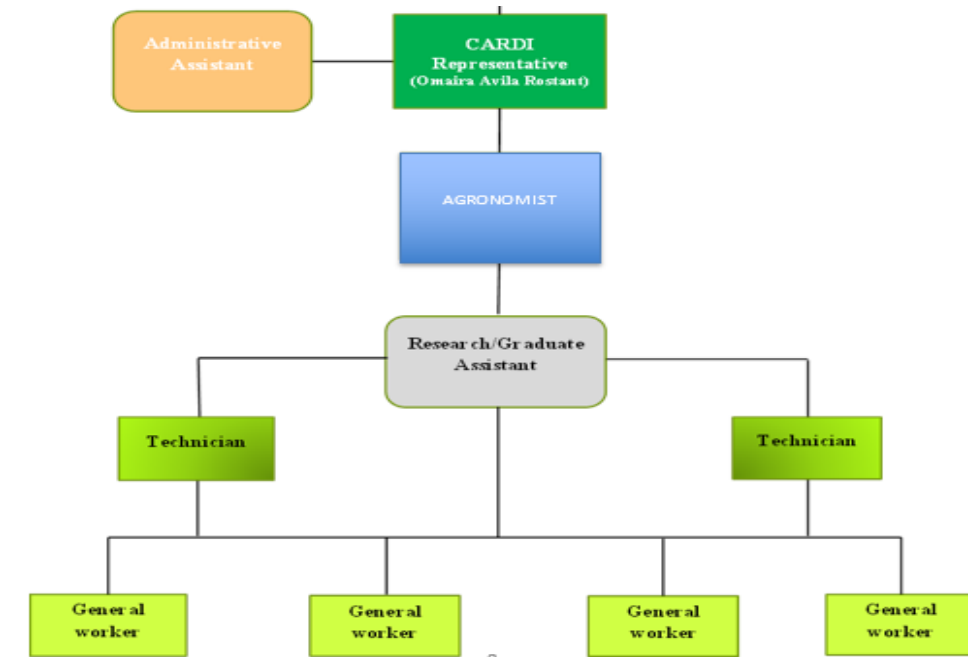
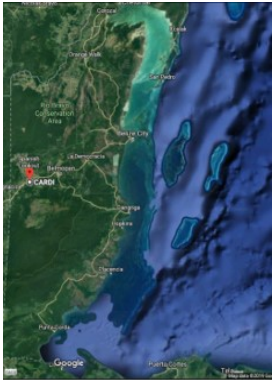
Lead By Director of Research, Development and Innovation –
Mr Ansari Hosein / Animal Scientist

CARDI UNITS LEAD WORK

- **Antigua and Barbuda** – Bulk seed for Scotch bonnet pepper and pumpkin
- **Barbados** – Pepper Breeding and Stock seeds for units to reproduce commercially
- **Belize** – Bulk seed production of open pollinated corn, beans, soybean and hot peppers moruga and west indies red, and maintenance of its Germplasm collection
- **Jamaica** – Small ruminants breeding (conventional and biotechnology based)
- **Grenada** – Fruit trees reproduction and *In situ* Germplasm management
- **St Kitts and Nives** – New Climate smart technologist and water harvesting technology trials
- **Trinidad and Tobago** – Cassava and Sweet Potato Germplasm management, animal nutrition, Biometrician
- **St Vincent and the Grenadines**- Root crops and tissue culture
- **St Lucia** – Breadfruit, sorrel and Tissue culture

About CARDI Belize

- CARDI Belize office was officially established in 1982, 2021 marks 49 years of CARDI presence in Belize
- Belize leads the regional work in seed production of open pollinated corn, beans, soybean and hot peppers moruga and west indies red, and maintenance of its Germplasm collection



CARDI BELIZE
Organisational Chart



**Caribbean Agricultural Research
and Development Institute**

Improving lives through agricultural research

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CARDI BELIZE UNIT

CARDI, Central Farm,
Cayo District, Belize, C.A.

P.O. Box 2, Belmopan,
Belize, C.A.

Tel: (501) 824.2934/
(501) 824.2936
Cell: (501) 615.4903
Email: cardi@btl.net

CARDI BELIZE Achievements



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CARDI'S STRATEGIC GOAL

Contributing to Food and Nutrition Security through the development of innovations that contribute to sustainable, climate resilient value chains.



**VALUE CHAIN
SERVICES**



**INSTITUTIONAL
STRENGTHENING**



**PARTNERSHIPS AND
STRATEGIC ALLIANCES**



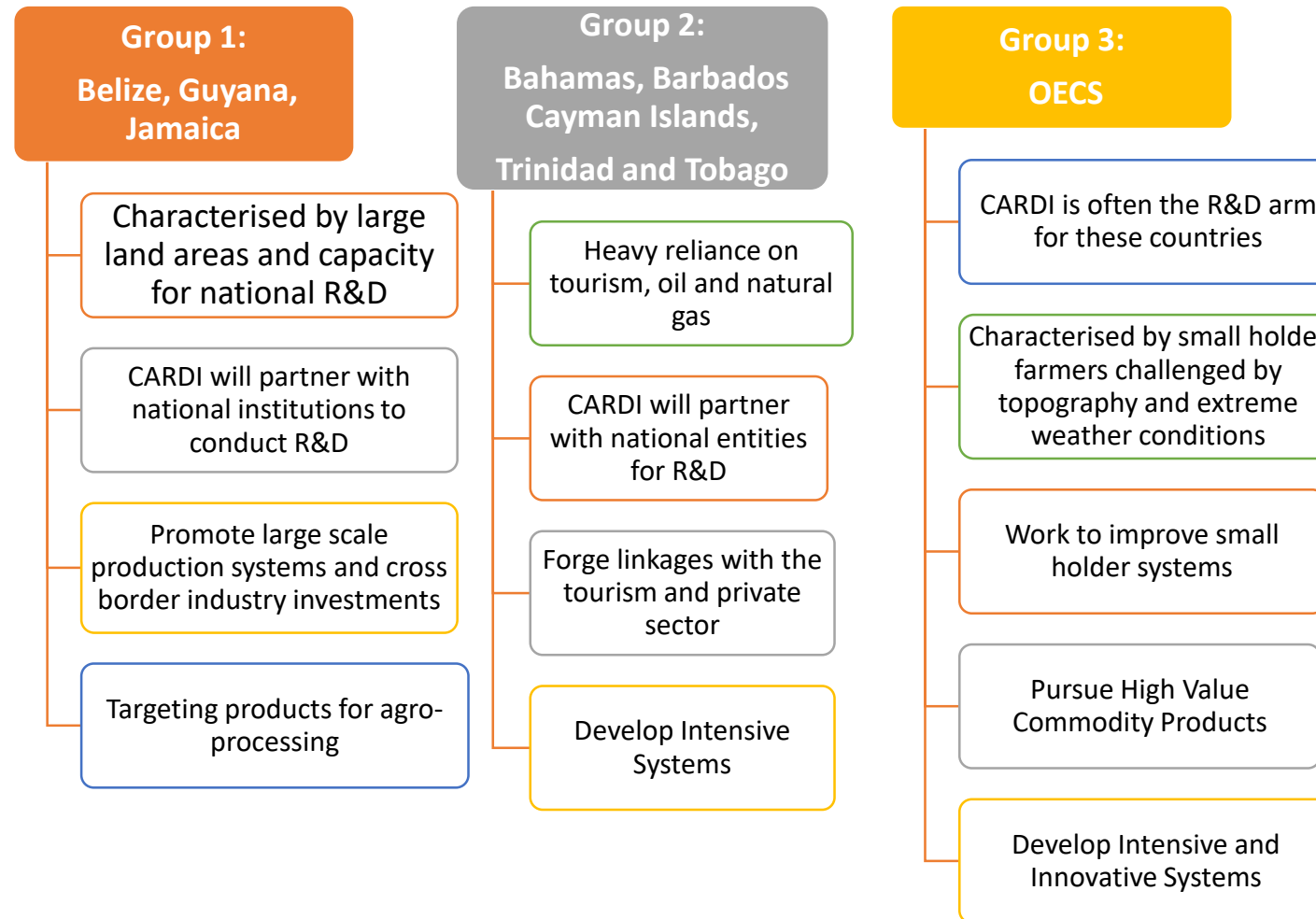
**POLICY AND
ADVOCACY**

Implementing the Strategic Plan



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4. Implementation of differentiated strategy for member states

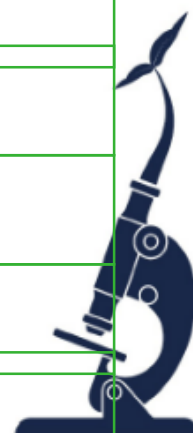




Agriculture

The overall goal of this policy is to increase, diversify and sustain agricultural production, food security, income and employment generation in Belize. This goal will require increasing farm-level capacity, improving technology and innovation, raising labor productivity, and being regionally competitive.

FOOD SECURITY	Import replacement and substitution, export expansion and strengthening the linkages of tourism with our local productive sectors
TAX CUT	Review the entire tax system and enact reforms to have a simplified, fair, efficient and development-driven system
TRADE	Review and improve our trade policy agreements in our region
EXPORTS	Work with the associations of the 4 traditional exports, i.e. sugar, citrus, banana and shrimp
FINANCING	Affordable financing for farmers
DIVERSIFICATION	Diversification and innovative climate-smart systems
RESEARCH	Research and Development partnerships with renowned universities
GROW MORE	Grow and produce more of what we eat and promote more consumption of what we grow.
TEACH	Teaching of agriculture and agri-business in schools.
STORAGE	Improving storage and logistic facilities
NEW MARKETS	Improve our trade and market intelligence for international access and find niche markets for the export of the non- traditional commodities



Strategic Plan

BUILDING A PRODUCTIVE AND RESILIENT REGIONAL AGRICULTURE SECTOR

2018-2022

Vision Mission

Vision A Centre of Excellence delivering innovation and technologies for the Region's food and agricultural sectors

Mission To contribute to the sustainable development of the Caribbean by the co-generation, diffusion and application of knowledge, through agricultural research for development

Strategic Programmes



VALUE CHAIN SERVICES

Improved production and productivity of key commodities
Increased incomes
Increased contribution by agriculture to GDP



INSTITUTIONAL STRENGTHENING

Enhanced institutional infrastructure that supports research excellence and efficiency
Increased infrastructural and human resource capacity
Increased level of available resources
Improved internal and external coordination systems



Partnerships & Strategic Alliances

Increased partners and partnerships for conducting relevant high quality agricultural research
Aligned to more research networks engaged in new and emerging areas of agricultural research for development



Policy and Advocacy

Recognised for excellence in tropical agricultural, research, development and training
Increased awareness of CARDI nationally, regionally and internationally
Development of supportive policies for strengthening agriculture value chains

Cross-cutting Issues



ICTs



Results Based Management



Financial Sustainability



Resource Mobilisation



Climate Change

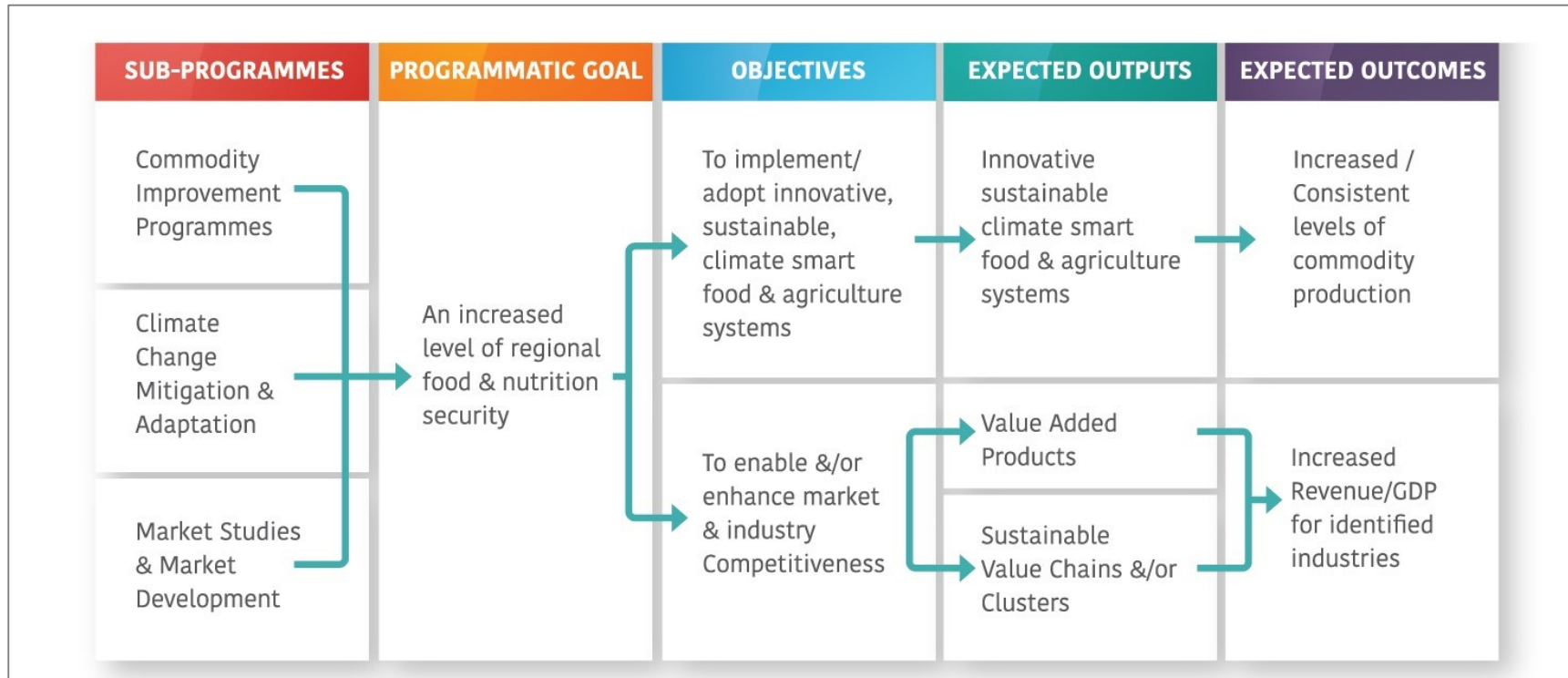


Inclusion and Equity



Youth and Gender

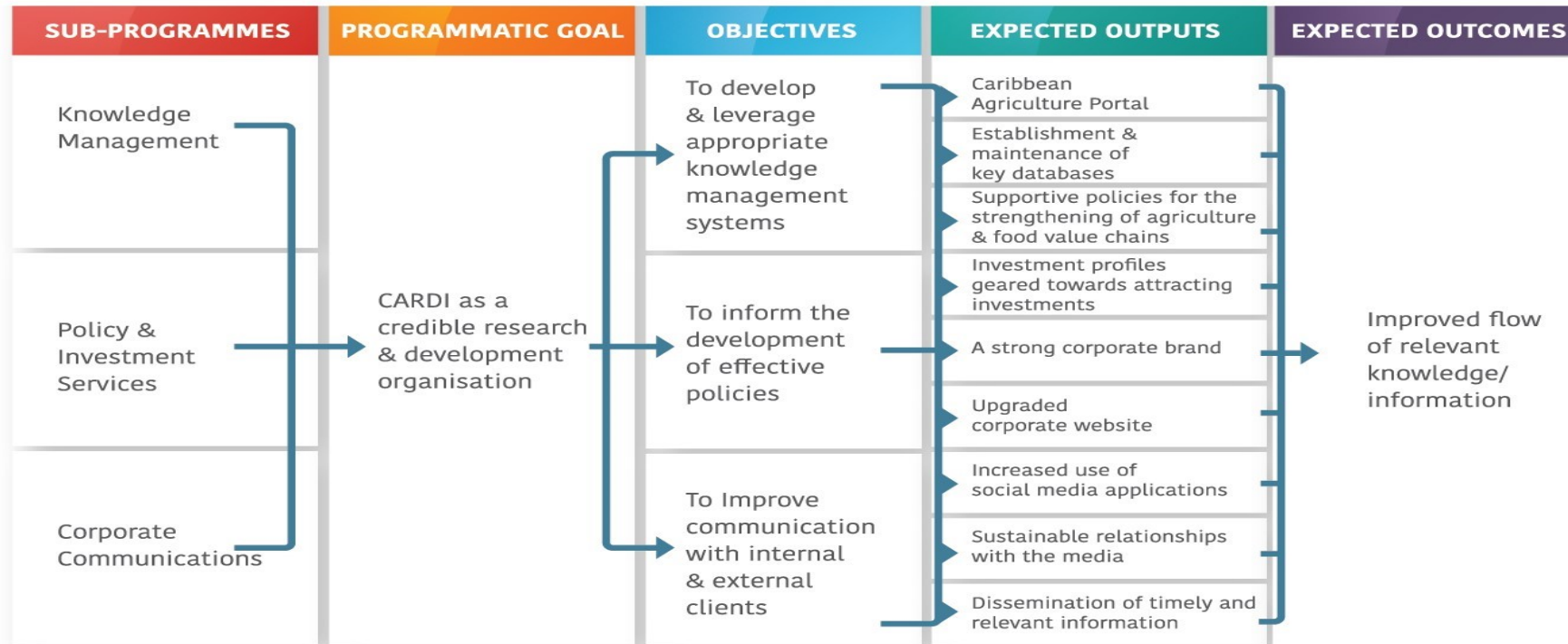
Strategic Programme 1: Value Chain Services



Intervention Areas

- Technology transfer
- Integrated Pest Management
- Value Added Product Development
- Value Chain Analysis
- Market Studies
- Agricultural Health and Food Safety Systems
- Soil and water management
- Agro-ecological, organic and sustainable agriculture systems (Green Economy)
- Genetic Resources, Variety and Breed Improvement
- Renewable Energy Systems

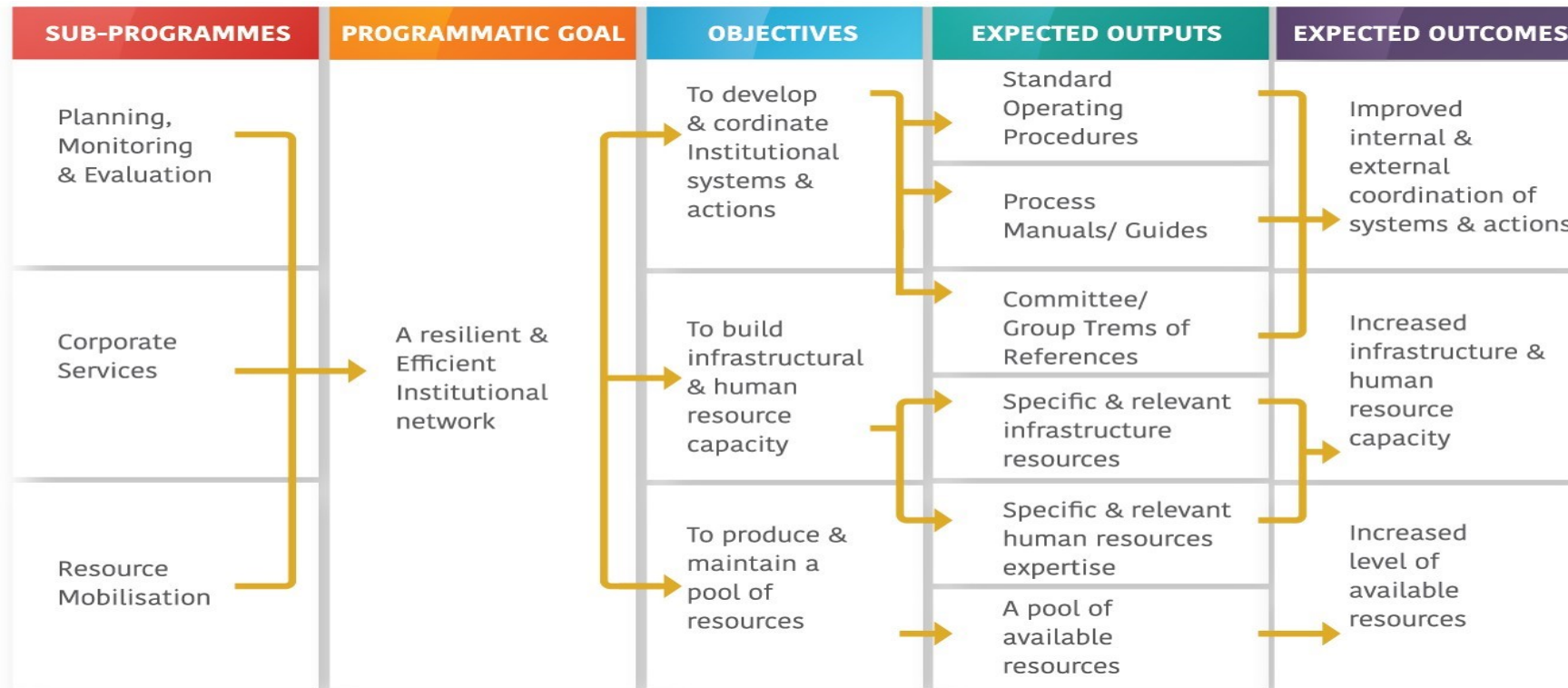
Strategic Programme 2: Policy and Advocacy



Intervention Areas

- Policy Guidance
- Development of Investment Profiles
- Investment Promotion
- Industry Plans
- Trade Facilitation
- Stakeholder consultations
- Public Seminars
- Caribbean Agriculture Portal
- Virtual Library
- Training and Learning Platforms
- Traditional and Social Media
- Upgraded corporate website
- Media Relations
- Corporate and technical publications

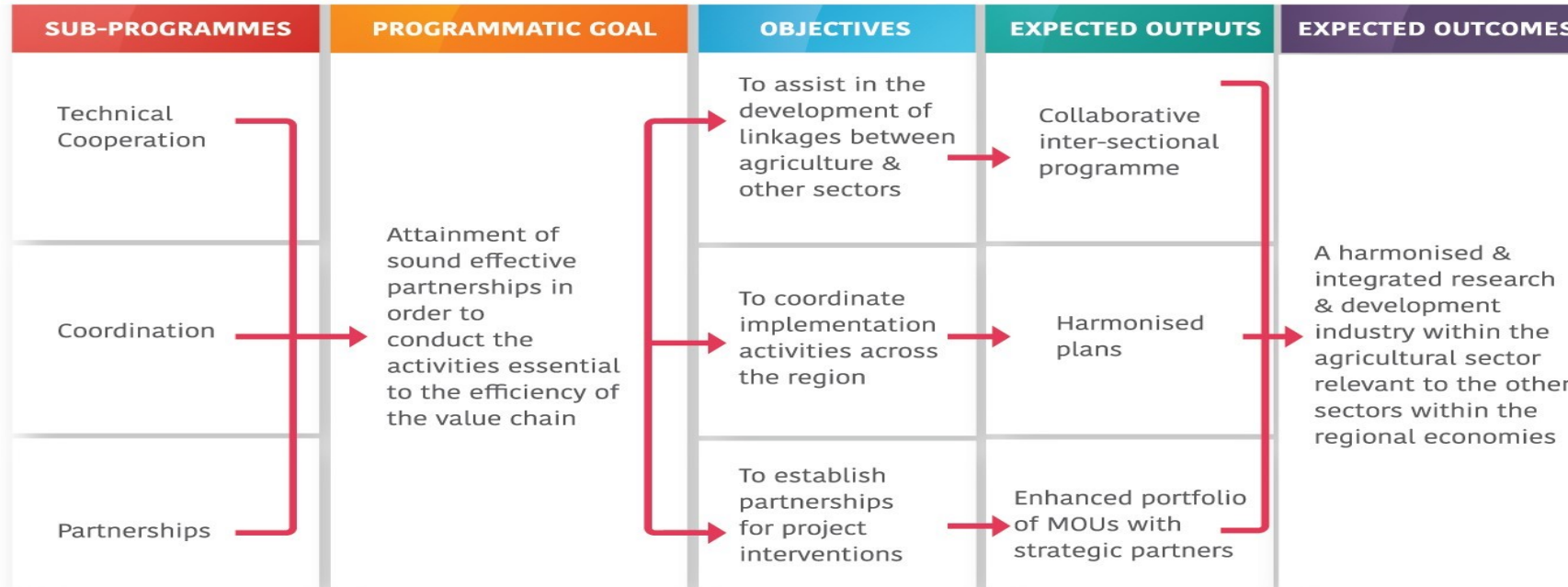
Strategic Programme 3: Institutional Strengthening



Intervention Areas

- Research and Project Management Systems
- Quality Assurance
- Digital Management Information Systems and Database Management
- Financial Management Information Systems
- Professional Development Systems (staff exchanges, on the job training, etc.)
- Self Financing/Sustainable Financing Mechanisms
- Institutional Guiding Frameworks/Documents (SOPs ISOs etc.)
- Technology Platforms
- Human Resource Management Systems

Strategic Programme 4: Partnerships and Strategic Alliances



Intervention Areas

- Innovation Platforms
- Regional and National Coordinating Mechanisms
- National, Regional and International Joint Actions
- Technical Assistance Services
- Capacity Building Initiatives



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CARDI

CARIBBEAN AGRICULTURAL RESEARCH AND DEVELOPMENT INSTITUTE Belize Unit

CARDI Belize
was assigned the Centre of Excellence for cereals and grain legumes in the Region

TECHNICAL ASSISTANCE
Provides technical support to other organizations in the agricultural sector:

- ★ MNRA
- ★ Belize Agricultural Health Authority
- ★ Pesticide Control Board
- ★ FAO
- ★ IICA

TECHNOLOGY TRANSFER

- ★ Demonstration plots
- ★ Field days
- ★ Workshops
- ★ Exhibitions

SEED PRODUCTION

- ★ Corn
- ★ Soybean
- ★ Hot pepper
- ★ Beans
- ★ Seed paddy
- ★ Peanut

TECHNOLOGY GENERATION

- ★ Recommended improved crop production technologies, resulting in increased yields and improved quality of corn, beans, cassava, rice, peanut, black-eye peas and hot pepper.
- ★ Developed technological packages for production of corn, beans, soybean, blackeye peas, pigeon pea (gungo pea), ginger, garbanzo, hot pepper.

COLLABORATION

- ★ MNRA
- ★ IICA
- ★ FAO
- ★ Farmers

VALUE CHAIN SERVICES

CARDI Belize Services to farmers and value chain stakeholders

Achievement



Rental of tractor services to farmers within close proximity to CARDI

1) Supported
Land preparation for 50
small farmers

Ploughing
Harrowing
Beds for drainage



40TH
ANNIVERSARY

SARAWAK AGRICULTURAL RESEARCH AND DEVELOPMENT INSTITUTE
722, 724, 726, 728, 730, 732, 734, 736, 738, 740, 742, 744, 746, 748, 750, 752, 754, 756, 758, 760, 762, 764, 766, 768, 770, 772, 774, 776, 778, 780, 782, 784, 786, 788, 790, 792, 794, 796, 798, 800, 802, 804, 806, 808, 810, 812, 814, 816, 818, 820, 822, 824, 826, 828, 830, 832, 834, 836, 838, 840, 842, 844, 846, 848, 850, 852, 854, 856, 858, 860, 862, 864, 866, 868, 870, 872, 874, 876, 878, 880, 882, 884, 886, 888, 890, 892, 894, 896, 898, 900, 902, 904, 906, 908, 910, 912, 914, 916, 918, 920, 922, 924, 926, 928, 930, 932, 934, 936, 938, 940, 942, 944, 946, 948, 950, 952, 954, 956, 958, 960, 962, 964, 966, 968, 970, 972, 974, 976, 978, 980, 982, 984, 986, 988, 990, 992, 994, 996, 998, 1000

CERTIFICATE OF PHYSICAL ANALYSIS OF EGG KINNEY BEAN

Lot No: 4818
Date of sample received: 18th October, 2012
Date of analysis: 20th October, 2012
Crop: Egg Kinney Bean

Color Group	Red
Weight/ha	55.7%
Moisture content	12.7%
Whole grain	95.43%
Total defect	45.50%
Foreign material	0.11%

* High percentage of broken seeds - 41.29%

Certified by: *[Signature]*
Date: 27 October 2012

Empowering lives through agricultural research
Unit of Agricultural Extension, Sarawak Agricultural Research Institute, Kuching, Sarawak

- Seed laboratory providing analysis of seed germination, seed purity and soon to include seed vigour
- Certificate of NON-GMS for CARDI seeds for export markets

2) 30 certificates since
2018 have been produce
for local grain exporting
companies accessing the
service of purity test

3) 100 certificates since
2018 have been produce
germination test

CARDI Belize Services to farmers and value chain stakeholders



Achievement

Drying services access for
20000lbs

Bean

6000lns peanuts

4000lbs sorrel

50000 lbs corn

- CARDI has a capacity of drying 50000 Lbs of grains in
- 4 mobile dryers each capable of drying 4,000 Lbs
- 1 Fix Unit drying 10,000 lbs
- small scale drying

CARDI Belize low cost technology development



Low cost Seed storage system



Mobile seed germination chamber

CARDI Belize Regional Germplasm management and seed production development programme



CORN CARDI YC-001 (yellow corn)

Avg. plant height: 210 cm
Avg days to tasselling: 48 days
Avg. days to silking: 52 days
Ear height: 125 – 130 cm
Average Days to maturity: 110 days
Yield potential: Between 1360 kg to 1810 kg in optimal conditions
Colour of seed: yellow
 Open Pollinated

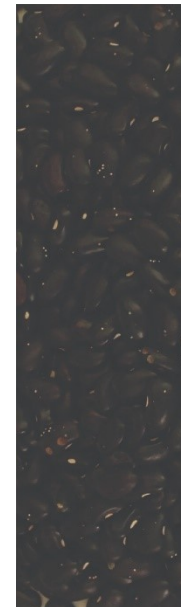
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CORN NB-6 (white corn)

Avg. plant height: 230 cm
Avg days to tasselling: 48 days
Avg. days to silking: 52 days
Ear height: 130 cm – 135 cm
Average Days to maturity: 105 days
Yield potential: Between 1600 kg to 2040 kg under optimal conditions.
Colour of seed: white
 Open Pollinated

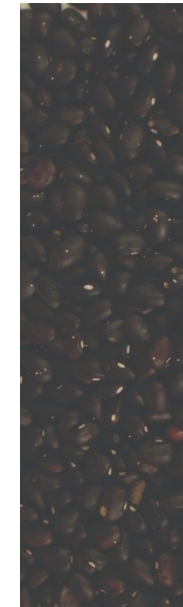
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BLACK BEANS JALACTE BLACK

Avg. plant height (cm): 54.7 cm
Avg. days to flowering: 40 days
Avg. pods per plant: 12 – 13
Avg. seeds per pod: 5
Avg. days to maturity: 77 days.
Yield potential: 450 kg to 660 kg under optimal conditions

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BLACK BEANS ICTA LIGERO

Avg. plant height (cm): 42.1 cm
Avg. days to flowering: 33 days
Avg. pods per plant: 14 – 15
Avg. seeds per pod: 5
Avg. days to maturity: 70 days.
Yield potential: 540 kg to 730 kg under optimal conditions

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RED BEAN CENTA PIPIL

Avg. plant height (cm): 47 cm
Avg. days to flowering: 38 days
Avg. pods per plant: 12 – 13
Avg. seeds per pod: 5
Avg. days to maturity: 83 days
Yield potential: 400 kg to 540 kg under optimal conditions.

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RED BEAN JALACTE RED

Avg. plant height (cm): 50 cm
Avg. days to flowering: 34 days
Avg. pods per plant: 13 – 14
Avg. seeds per pod: 4
Avg. days to maturity: 70 days
Yield potential: 450 kg to 640 kg under optimal conditions

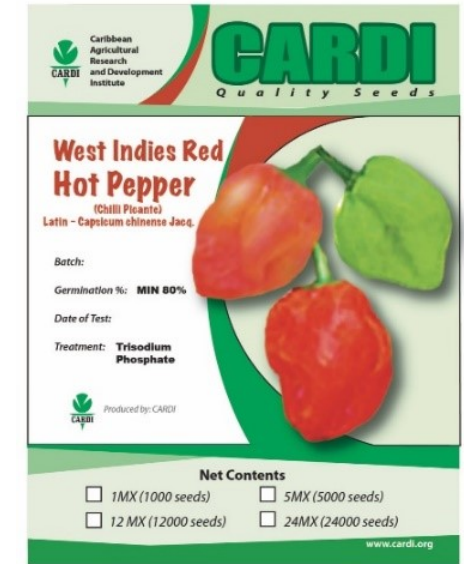
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Achievement

Seed	Sold locally (Lbs)	Sold Caribbean (Lbs)	Capable of planting (Acres)	Available
NB6 white corn	160		8	yes
CARDI YC 0001	2000	3000	100	yes
Red Bean	300			yes
Black Bean	300			yes

Regional Hot pepper plant genetic programme conservation and promotion

- As part of its Value Chain Services, CARDI is the source of good quality seed for several crops identified under its Commodity Improvement Programmes
- **Hot peppers**
 - Varieties have been **purified, stabilised and released** for commercial production
 - CARDI Barbados, **maintains breeder seeds and produces foundation seeds** for the Moruga Red, West Indies Red and Scotch Bonnet varieties
 - CARDI obtained Scotch Bonnet seeds from Jamaica for offshore **safeguarding and to supplement** commercial seed production
 - More than **100 accessions of hot pepper varieties** collected across the Region stored at CARDI Barbados



CARDI Germplasm conservation efforts are

b) Active collection CARDI regionally manage

1) Guandú - Pigeon peas (*Cajanus cajan*) 15 to 20 accessions – Tobago Field Collection, seed collection

2) Sweet potato (*Ipomea sp*) 50 to 100 accessions around the region Main collection, St Vincent and Trinidad and Tobago

Replicate in Tissue culture in St Vincent and Trinidad

3) Cassava collection (– 50 accessions Jamaica, Trinidad and Tobago , Belize

4) Peanuts – 12 accessions

5) Red and Black Beans – 16 accessions

Biodiversity: Enhance and conserve biodiversity.



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1) Production of open pollinated seeds

2) Adaptability trials for new crops

Biofortified beans / Castor Oil

3) World vegetable Center – open pollinated Tomatoes, sweet peppers, pumpkins

4) Collection management



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Belize



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Belize



Biodiversity: Enhance biodiversity-

open pollinated

cardicaribbean
Barbados



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Jamaica



Adaptability trials: 57 accession of biofortified beans



Belize other collections of Genetic Resources

- **Peanuts**

- In Belize, a seed collection of 12 varieties *is maintained*. Tennessee Red is the preferred variety that is still produced for the local peanut market

- **Corn**

- CARDI Belize mass produces yellow corn, CARDI YC-001, for local and regional export markets.
- The corn production programme focuses on developing small farmers' capacity in creating their own seed security by safekeeping and mass producing open pollinated varieties



CARDI has identified CARDI YC-001- yellow, NB-6 white and purple corn as open pollinated varieties, with good yielding and drought tolerant characteristics.

CARDI's germplasm banks - *Vegetative planting material*

Crop	Planting material	AB	BAH	BDS	BZE*	CAY	GND	MON +	SLU	SKN*	SVG
Sweet potato	Stem/Vine cutting (slips)	✓	✓	✓		✓	✓	✓	✓	✓	✓
Cassava	Stem cuttings (stakes)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Plantain	suckers										✓
Bluggoe (Macaboo)	Suckers								✓		
Banana	Suckers										✓
Guinea grass (animal feed)	Stem cuttings	✓						✓			
Mulberry (animal feed)	Stem cuttings	✓		✓				✓			
Dasheen	Corms/ Suckers										✓

*Germplasm maintained by CARDI, distribution done in collaboration with the Ministries of Agriculture and other Agencies

+ Germplasm distributed through the Ministry of Agriculture and/ or satellite farmers

CARDI has been involved in the management of select **invasive pests** through both local screening of natural enemies as well as introduced natural enemies. Examples:-

Agent and pest	Introduction	Screening of natural enemies locally	Monitoring of natural or introduced biological control agents
The parasitoid, <i>Cotesia flavipes</i> for the control of Sugarcane stem borer (<i>Dairaea saccharalis</i>) and other borers	x		x
The parasitoid, <i>Anagrus kamali</i> for the control of the invasive Hibiscus mealybug (<i>Maconellicoccus hirsutus</i>) regionally	x		
The parasitoids, <i>Cephalonomia stephanoderis</i> Betrem, <i>Prorops nasuta</i> Waterston and <i>Phymastichus coffea</i> La Salle for the control of the coffee berry borer (<i>Hypothenemus hampeii</i> Ferrari) in Jamaica			x
Parasitoids for the brown citrus aphid , <i>Toxoptera citricida</i> (Kirkaldy) and Asian citrus psyllid <i>Diaphorina citri</i> Kuwayama		x	
Natural enemies for the red palm mite , <i>Raoiella indica</i> Hirst		x	
Parasitoids for eggs of citrus root weevils , <i>Exopthalmus</i> spp. and <i>Pachneus citri</i>		x	

CARDI's role in Plant Genetic Resources

- **Grains**
- **Characterize, evaluate and develop** improved varieties and landraces for productivity and suitability for value added products.
- Three **soybean varieties** (3296, S-15 and S-88) are mass produced as seed and grains and made available to small and medium farmers.
- **Evaluation of red and black beans** (*Phaseolus vulgaris* L.) germplasm, with a view to marketing the commodity to the neighbouring Central American Countries.



The S-88, is preferred by the Mennonite farmers in the north of Belize as best growth habit for mechanized harvesting

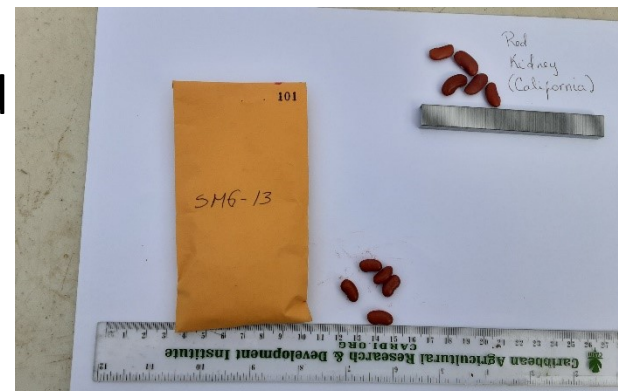
PROJECT – Iron Biofortified beans

Partners: CARDI, IICA, MAFSE, CIAT, Harvesting Plus

- Seeds of red beans, black beans of various lines are maintained at CARDI Belize
- Yield trials are conducted and commercial production is in response to market demand. Currently, 8 varieties of small black beans and 8 varieties of small red beans and 12 peanut lines, are being evaluated.
- Observation Yield Trials 1 for Biofortified beans are ongoing in Belize. 37 lines of red and black beans were evaluated in 2020.
- Observation Yield Trials 2 for Biofortified beans are ongoing in Belize. 54 lines of red and black beans are being evaluated.



Biofortification trial plot, Belize



Improved infrastructure under some CARDI implemented projects

- Under the Agriculture Policy Programme (APP) and the Pilot Programme for Climate Resilience (PPCR) the seed lab at the Bodles Agricultural Station refurbished and new equipment such as seed extractor, convection oven, laminar flow hood, growth chamber donated
- Seed batch dryers, to be stationed in Jamaica, Antigua and Belize, supplied under PPCR
- CARDI's grain and seed laboratory in Belize is the only one capable of conducting a standard grain purity analysis and germination tests. Upgrading of the laboratory facilities has begun towards compliance to ISO-27001.

•

Plant Genetic Resources

- **Capacity building**
 - 2 CARDI staff members along with 2 representatives from MICAFA and 1 representative from NAREI were trained in seed science and technology at the Iowa State University under the PPCR.
 - Personnel from 12 countries, visited CICY Mexico for training in tissue culture of coconuts.
 - The Institute continues to build capacity and in 2019 its seed specialist and senior technician were trained at CYMMIT in seed handling and seed store systems for reduction in post-harvest losses for small farmers
 - CARDI Belize technician retrain in seed laboratory management



CARDI's work in safeguarding Animal Genetic Resources



Training in poultry production, The Bahamas



Nubian Stud buck, Jamaica



Mixed farming with coconuts, Suriname



Mulberry forage bank, Antigua



Training in fish silage making, Barbados



Pelleted rations made from Trichanthera, Trinidad and Tobago



Introducing new hives in Barbuda, post hurricane Irma

Call to action to safeguard Animal Genetic Resources in the future

- **A regional Animal Genetic Resource Centre** should be established in at least 3 countries to manage and conserve germplasm and include a semen/embryo bank and breed registry.
- Include **forage germplasm in plant genetic resource conservation** efforts such that a forage repository is maintained.
- Review, approve and **implement the regional protocol** for the intraregional movement of live animals, embryos and semen.
- Deliberate efforts to **build human resource capacity** in *animal breeding, genetics and biodiversity management*.

CARDI Water management programme



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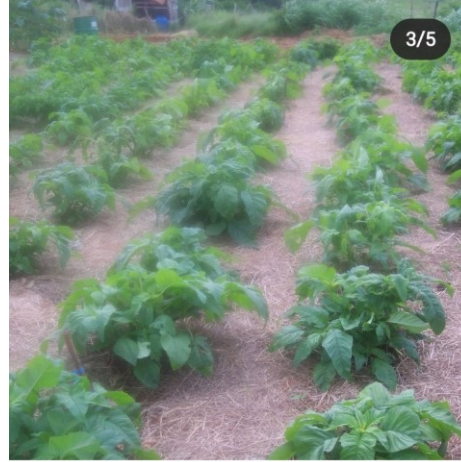
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Drip irrigation



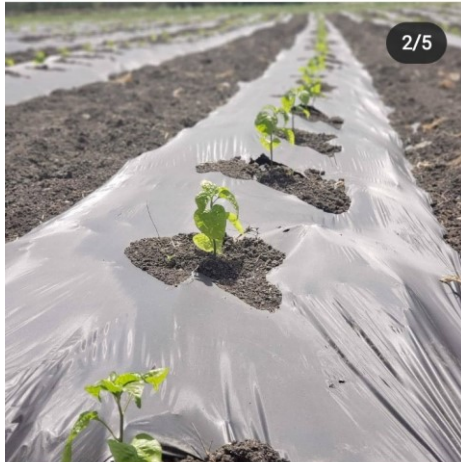
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Mulching



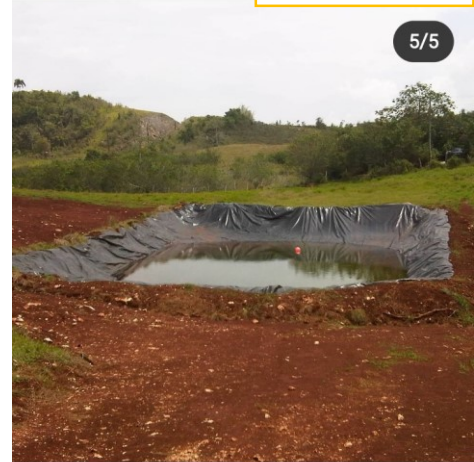
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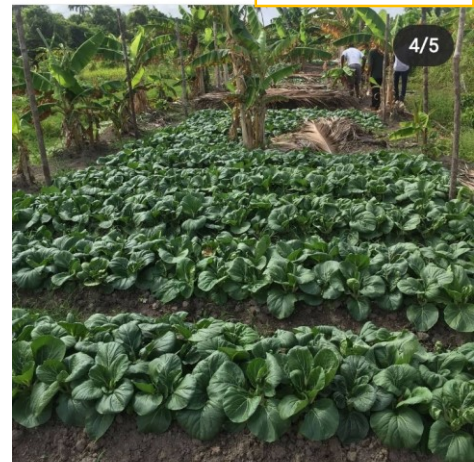
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Water harvest



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intercropping



CARDI Belize member of the task force to the control of the Asian Bean Thrip recently identify in Belize and causing great damage



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- 1) Implement Integrated pest management in all production programmes
- 2) Partner with national and regional institute to test and recommend alternatives for the pest control
- 3) Test the efficiency of biocontrols (SIRDI/ OIRSA/PCB)



Chrysoperla release in the Bio-fortified bean trial plot in Yo Creek had very good control after the first release,



5. CARDI Leading the Agriculture data collection for the 2018- 2020



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Greenhouse gas inventory

- 1) Agroforestry
- 2) Long term crops
- 3) Energy production and use from cleaner sources
- 4) Consume local
- 5) Capacity building on the use of waste as secondary source of income in a value chain
- 6) Efficiency in value chain linkages





Arundo donax



Crops being tested Wild cane Species

RESEARCH PROJECT/ DEMONSTRATION PLOT

“Pilot Demonstration of the Generation of Electrical Energy
through the use of
Arundo donax as a supplemental
feedstock in cogeneration” in Belize

Implemented by:



Caribbean Community
Climate Change Centre

Executed by:



Caribbean Agricultural Research
and Development Institute

Financed by

Belize Electricity Limited



Gynerium sagittatum

(Native to Belize)



***Arundo donax*: a Renewable Biomass Fuel or Belize**

Gap in GCF Financing:

- No provision to determine how to cultivate the *Arundo donax* to maximize yield
- Funding for Full Project Development- Commercial scale cultivation

BEL Project: ***“Pilot Demonstration of the generation of electrical energy through the use of *Arundo donax* as a supplemental feedstock in cogeneration in Belize”***

- Collaboration with CARDI and SIRDI to design, establish, and analyze results of Agronomic (research) Trials with *wild cane*.
- Identify the species available and suitable for the development of the fuel.

Arundo donax (not in Belize)



Gynerium sagittatum (Native to Belize)





**PHASE I
COCONUT INDUSTRY DEVELOPMENT PROJECT
PROGRESS IN BELIZE**



Alliances for Coconut Industry Development for the Caribbean



Impact and lessons learnt

COCONUT WATER

A Gift of Nature



Coconut water is delicious, natural and safe for everyone to drink.

It contains bioavailable nutrients beneficial for human health, including vitamins, electrolytes (minerals like calcium, potassium and magnesium), amino acids (like arginine) and fibre.

HEALTH ENHANCER

The electrolyte profile of coconut water is similar to human blood, so it can replace body fluids. It is particularly useful for:

- young children suffering malnutrition
- pregnant and lactating mothers
- elderly people and convalescents

HYDRATION, CLEANSING AND DETOXIFICATION

The mineral salts speed up the absorption of water in the gut to rehydrate the body, flush out toxins and support the function of the liver and kidneys – the detoxifying organs.

REPLENISHES ELECTROLYTES

The electrolytes regulate muscle and nerve function, support heart health, and maintain blood pressure and blood pH.

REDUCES STRESS AND MUSCLE TENSION

The magnesium and calcium help maintain muscle relaxation and boosts the formation of serotonin, the 'feel good hormone'. The arginine helps the body to recover from stress, such as after heavy exercise.

BLOOD PRESSURE

Coconut water is high in potassium. This counteracts the effect of sodium in the body, balancing blood pressure and possibly even helping to lower it.

The arginine helps to relax blood vessels and improve blood circulation.

REDUCES CHOLESTEROL

Electrolytes help to maintain heart health by decreasing total cholesterol and LDL 'bad' cholesterol. Calcium and arginine help muscles (including heart muscles) to relax, lowering the risk of heart attacks.

DIGESTION

Fibre is important for stomach health. It supports bowel function and speeds up a slow metabolism.



USES OF THE COCONUT TREE

IN THE CARIBBEAN

The coconut palm is as useful as it is beautiful. Every part of the coconut tree is used in the Caribbean and there are still many more potential uses to be explored. The coconut palm is truly the 'tree of life'.

THE TREE

- Aesthetics – symbolizes our tourism product of sun, sea and sand
- Coastal management – protects our coasts and inland areas from erosion and stabilizes soil
- Agriculture – intercropped with other plants, planted as windbreaks and used in agroforestry systems



THE NUTS

- Seed material
- Water
 - natural health drink and sport beverage
 - processed coconut water with flavourings
 - vinegar
 - coconut cassareep
- Coconut meat
 - culinary use
 - cream
 - milk
 - grated/shredded (frozen or desiccated)
 - jelly bits
 - gluten-free flour
 - animal feed
 - oil
 - * refined, unrefined
 - * biodiesel
 - * cosmetics
 - * soaps
 - * pharmaceuticals



THE SHELL

- Activated carbon
- Charcoal
- Handicraft
- Utensils
- Planting medium



THE FLOWERS

- Pollen (collected and used in hybridization)
- Vinegar
- Sugar
- Rum



THE HUSK/COIR

- Rope
- Matting
- Coarse cloth
- Horticulture (potting medium)
- Brushes
- Biofuel
- Mosquito repellent
- Compost
- Cushion filler
- Particle board



THE LEAVES

- Thatch roofing
- Handicraft (woven into baskets, mats and hats)
- Brooms



THE TRUNK

- Building construction
- Flooring
- Furniture



BENEFITS OF COCONUT OIL

Coconut oil is high in fats, called medium-chain triglycerides, which are responsible for many of its health benefits.



COOKING

Stable and resistant to oxidation and free-radical formation, which damage cells.



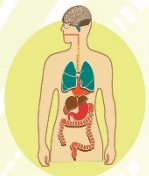
HAIR CARE

Nourishes and conditions hair, promotes growth and protects against damage.



SKIN CARE

Improves the moisture content of the skin and delays the appearance of wrinkles. Treats skin infections and protects skin from external dust, fungi, bacteria and viruses.



DIGESTION

Helps in the absorption of vitamins, minerals, and amino acids. Antimicrobial properties help in dealing with various bacteria, fungi and parasites that can cause indigestion.



HEART HEALTH

Helps to increase the HDL 'good' cholesterol that maintains heart health.



BLOOD SUGAR

Improves insulin secretion and promotes the effective utilization of blood glucose, thereby controlling blood sugar and lessening the effects of diabetes.



IMMUNITY

Strengthens the immune system through its antifungal, antibacterial and antiviral properties.



WEIGHT LOSS

Increases the body's metabolic rate, thereby burning more energy and aiding in weight loss. Supports the healthy functioning of the thyroid system that regulates the body's metabolism.



BONES AND TEETH

Improves the absorption of calcium and magnesium, which are necessary for the development of strong bones and teeth. Reduces dental plaque formation and plaque-induced gingivitis.

REGIONAL IMPACT TO DATE

11 National Stakeholder Platforms, integrated by more than **200** representatives from the public and private sector, formed in each project country to guide the implementation of project activities.

Over **1,700** farmers/SMEs benefitted from **500** trainings on nursery management, integrated pest management (IPM), crop production, processing and group dynamics. Over **30%** were females.

Targeted training for **over 460** extension officers in crop production systems across the Region.

37 seedling nurseries established produced over **106,000** seedlings to date, servicing **5,000+** farmers across the Region. More than **2,100** farmers obtained plants and training in nursery establishment and management.

More than **30** demonstration plots established, enabling learning and replication of support systems and new techniques for coconut and associated crops.

Technical cooperation and in-kind contributions with more than **60** private and public local institutions across the region.

11,000 in vitro plantlets sourced from the Yucatan Center for Scientific Research (CICY), Mexico.

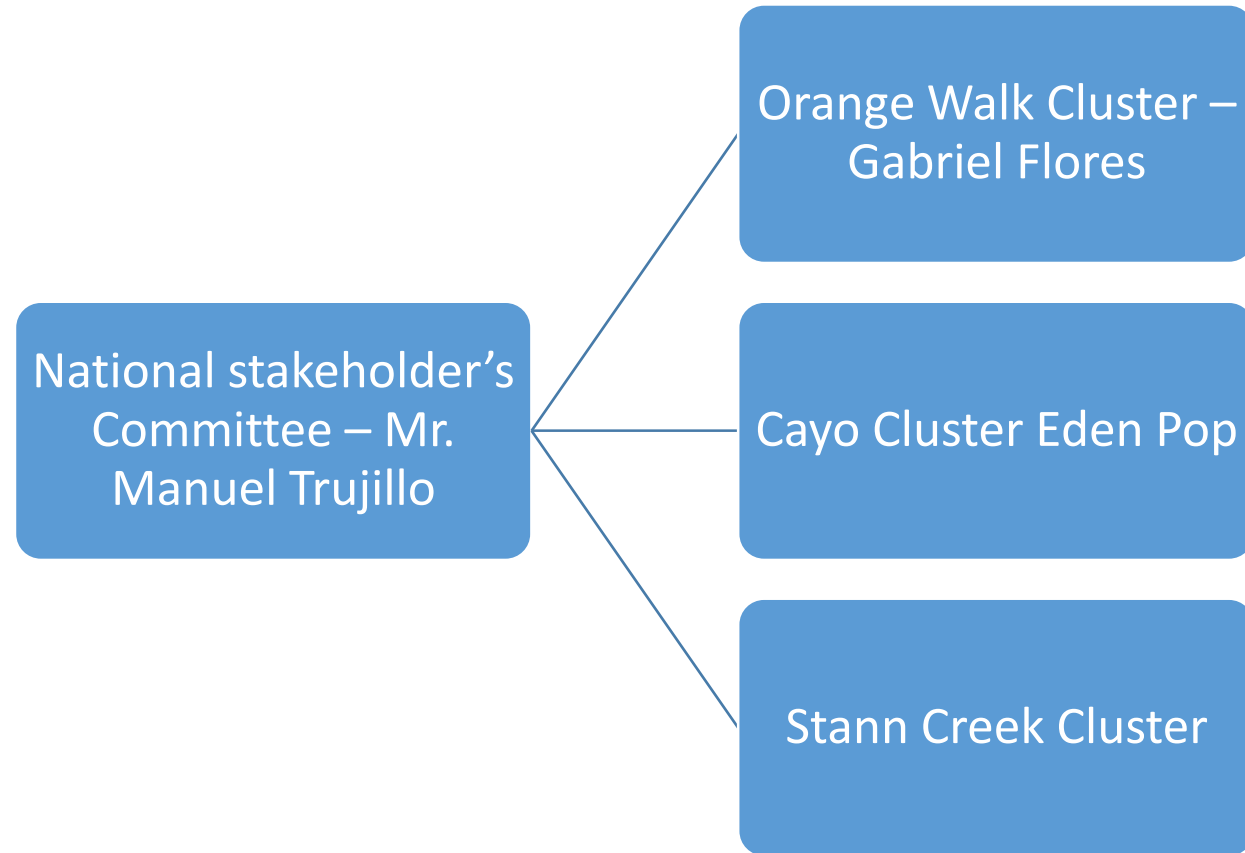
21 IPM plots in **10** countries established and monitored for coconut pests and diseases.

Transfer of knowledge and improvements in technical cooperation among numerous regional and international partners such as CICY, CIRAD, EMBRAPA, INIFAP, India, Sri Lanka and the Philippines.

In collaboration with the CARICOM Regional Organisation for Standards and Quality (CROSQ), the existing **CARICOM Regional Standard: Specification for packaged natural coconut water is being standardized.** This will facilitate easier trading between countries and guarantee a safer quality product for consumers.

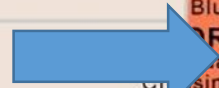
Since the project began in 2014, over **10,000** acres of coconut has been planted, with a further **250,000** acres projected to be established over the next 5 years.

Created a Coconut CLUSTERING GROUP IN BELIZE

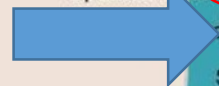


BELIZE Clusters

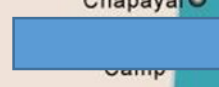
Cluster 1



Cluster 2



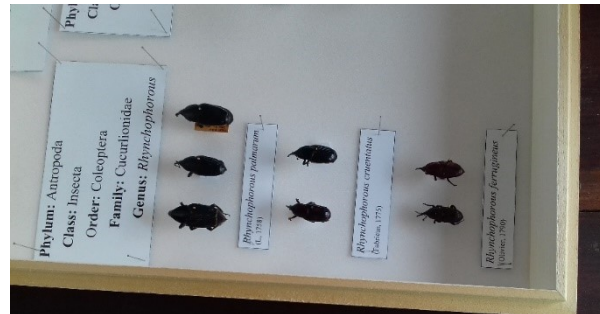
Cluster 3



Stablished the National Stakeholders



Coconut Pest Identification Training for MoA Officers – 42 officers trained



Belize coconut trend

- Water (?)
 - Oil
 - ✓ Food consumption
 - ✓ Cosmetics
 - Waste
 - ✓ Mulch
 - ✓ Compost
 - ✓ biochart
 - ✓ Isolation products for houses
 - ✓ Construction with concrete
 - Planting material
- ✓ Pulp use: Milk, flakes, cocktail

Belize Impact to Date

- **298** farmers and **42** extension officers with capabilities improved with trainings on nursery management, IPM, crop production
- Locals exposed to in processing, trade, finance and group dynamics;
- Lobby and supported the sector governance for improved with more public and private stakeholders with more of the >60% represented by smallholder farmers / industry)
- **3** nurseries established and/or supported servicing farmers in the Belize
- **3** agro-processors with improved capacity and linkages with smallholder farmers
- Technical cooperation and in-kind contributions with more than **60** private and public local institutions across the region
- Transfer of knowledge and improvements in technical cooperation among numerous regional and international partners such as CICY, OIRSA, IICA, TEXBEL, EMBRAPA, INIFAP, BELTRADE, BBS, BDC
- Establishment of the Regional Coconut Commodity Innovation Platform
- Revision of regional standard of Coconut Water and Oil

PHASE 2 – “Alliances for Coconut Industry Development Expansion and Enhanced Support for the Caribbean”.

- 1st August 2019 – Projected started date
- The second phase of the initiative, It is an European Union (EU) funded action, supported through the 11th European Development Fund (EDF),
- In alignment with the Caribbean Regional Indicative Programme (CRIP) which is under the auspices of the CARIFORUM Secretariat.
- It is valued at Five Million, Eight Hundred and Eighty Thousand Euros (€5,880,000) and is being implemented over four years in 12 CARIFORUM Member States, of which your country will be a beneficiary in receipt of public goods.

Alliances for Coconut Industry Development for the Caribbean

– Phase II –

Overall Objective Enhance the efficiency, volume and inclusiveness in coconuts value chains in the Caribbean

Outcomes and Outputs

1. Enhanced competitiveness of the coconut farmers

- 1.1: Improved multiplication and distribution of quality declared varieties in a climate smart way
- 1.2: Improved pest and disease management for coconuts and associated crops
- 1.3: Improved farming practices to increase production and income for coconuts and associated crops
- 1.4: Improved technical capacity of lead farmers, producer groups and associations on climate smart agriculture
and adherence to environmental practices
- 1.5: Improved sector information and innovation
- 1.6: Improved effectiveness of applied research, development and extension support services

Alliances for Coconut Industry Development for the Caribbean

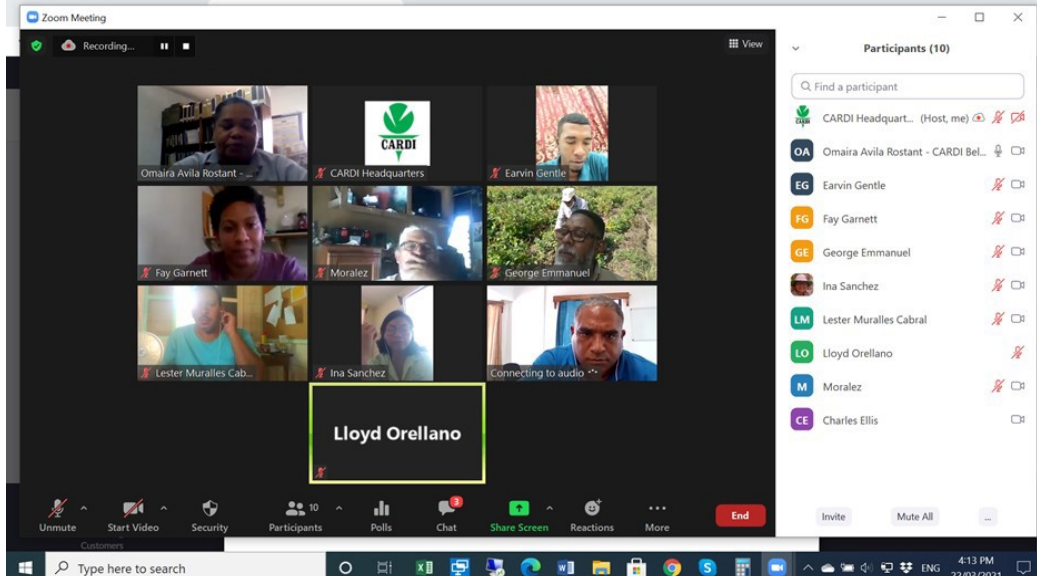
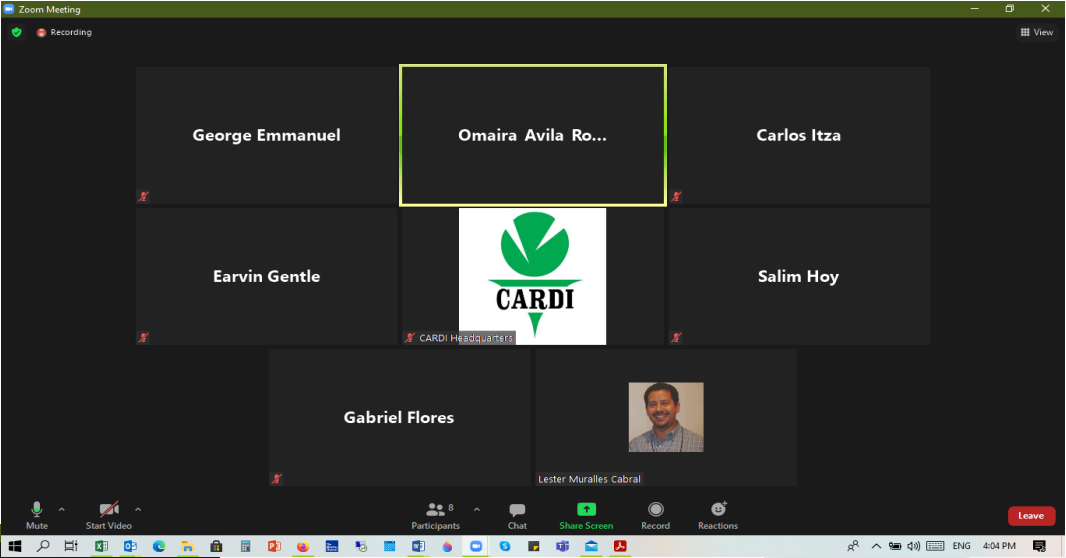
– Phase II –

Overall Objective Enhance the efficiency, volume and inclusiveness in coconuts value chains in the Caribbean

2. Strengthened and integrated coconut value chains.

- 2.1: Portfolio of relevant concrete market opportunities (when relevant including investment) identified and value chain alliances formed
- 2.2: Support services for farmer groups, processors, buyers, finance institutions, investors and technical collaborators enhanced
- 2.3: Improved access to adapted support service packages, including affordable finance and investment, for lead farmers and processors in the Alliances
- 2.4: Improved sector coordination, collaboration and sharing of good practices at local, national and regional level
- 2.5: Enhanced understanding of the environmental implications for the sector and policy recommendations for sustainable development

Open discussion regarding Belize voting for the approval of the CrosQ regional coconut water standard –3 days



CARDI BELIZE partnership



Social media: CARDIcaribbean
Website: www.cardi.org

International partners

- FAO
- OIRSA
- ITC
- EU
- CIAT
- IICA
- Harvesting Plus



Local partners

- MAFSE
- BAHA
- PCB
- UB
- SIRDI
- CCCCC
- NCCO
- Met Office
- Humana People to People



Thank you/ gracias



**Caribbean Agricultural Research
and Development Institute**
Improving lives through agricultural research



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