Protected Agriculture in the CARICOM Region:
The Current and Future Role of CARDI




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"Improving lives through agricultural research"

Outline

- Why Protected Agriculture (PA)
- Status of PA in the CARICOM Region
- Critical components for ensuring the sustainability of the PA industry
- CARDI's interventions into the Regional PA industry
- Considerations for advancing the industry

Background

- Thrust within the Region to achieve food and nutrition security

- Production system
  - –Small farmers with <1 ha
  - –Low input production technologies

- Regional vegetable imports

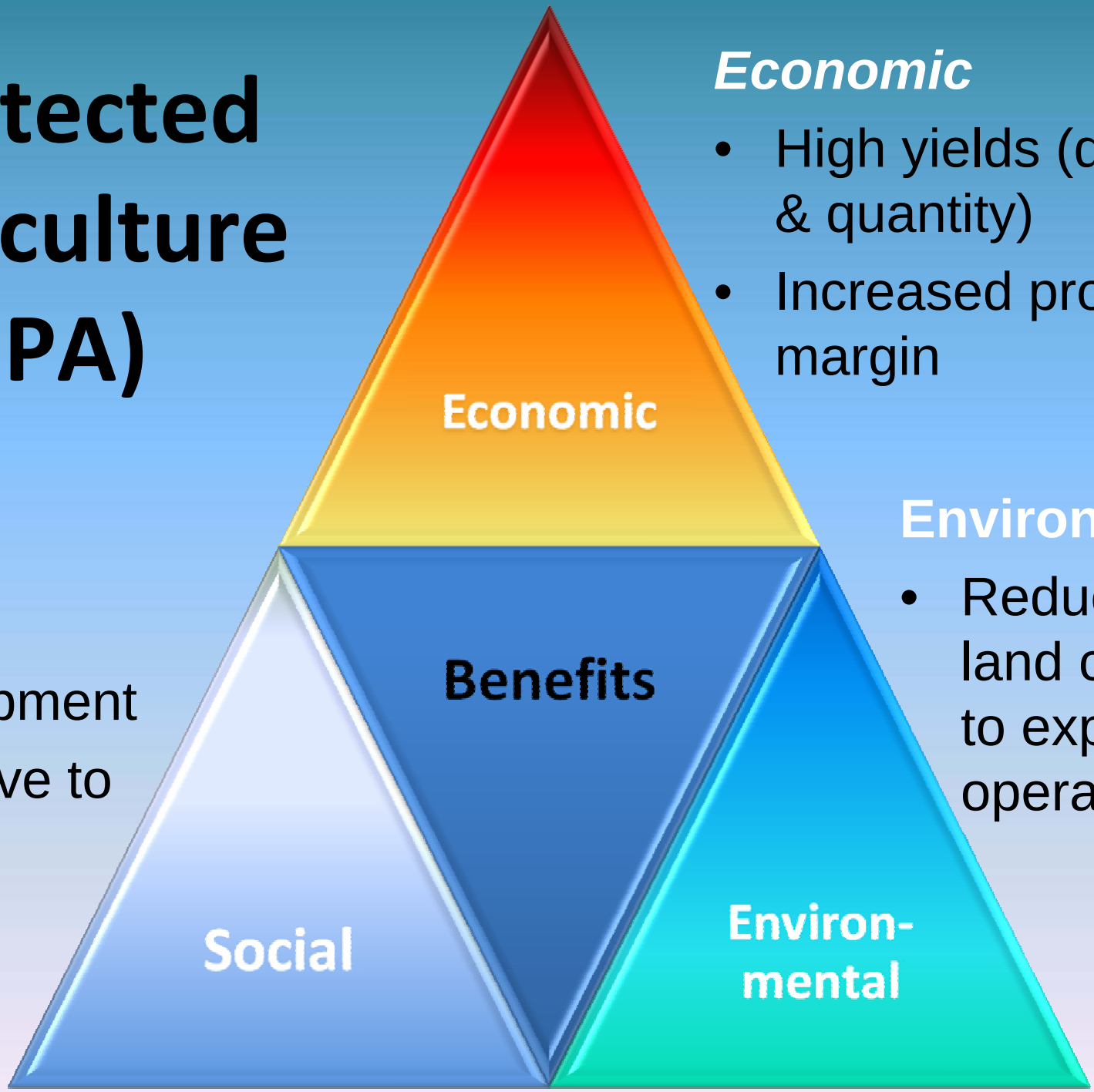
  - US$36M (2002-2007, FAO Stat 2009).

Protected Agriculture

"modification of the natural environment to achieve controlled or improved plant growth"

(Jensen and Malter 1995)

Protected Agriculture (PA)



Economic

- High yields (quality & quantity)
- Increased profit margin

Social

- Rural development
- Attractive to youths

Environmental

- Reduction in land clearing to expand operations

Protected Agriculture: Status CARICOM

Structures

Country	# Protected Structures	Origin	Predominant Designs
Dominica	220 (<70% in production)	American, French , Spanish, Israeli	Tunnel, plastic roof with saran netting
Jamaica	240	Israeli, Spanish	Tunnel, completely covered plastic roof, mesh sides with double ridge vent
St. Lucia	246 (~65% in production)	French	Tunnel, plastic covering with open side
Trinidad & Tobago	65	Spanish, Israeli, French	Tunnel-half arc, completely covered plastic roof, mesh sides with single ridge vent

Protected Agriculture: Status within CARICOM

Structures

Country	# Protected Structures	Origin	Predominant Designs
Barbados	NI	European, American, Israeli	Tunnel-half arc, completely covered plastic roof, mesh sides with single ridge vent
Grenada	18 (~30% in production)	NI	Tunnel, plastic roof with saran netting and middle vents.
St Vincent & the Grenadines	130 (~50% in production)	European, American, Local	Tunnel, plastic covering with open side

Protected Agriculture : Status within the Region

Investments

Country	Investment Cost ($US)	Dimensions (m)	Size (m^2)	Cost per m^2 (US$)
Dominica	4,450	18.1 X 9.0	163	27.30
Jamaica	9,461	31 X 9.0	279	33.91
St. Lucia	5,870	18.3 X 9.3	170	29.11
St Vincent & the Grenadines	6,000	18.3 X 9.3	170	35.29
Trinidad & Tobago	19,048	40 X 12	480	39.68

Protected Structures

Growing Systems

Crops

Protected Agriculture : Status within the Region

Cost of Production and Returns

Fully Enclosed System – Jamaica

(Christiana Potato Growers Cooperative Association Ltd)

Crop	Yield/year (kg)	Total Cost of Production (US$)	Total Sales (US$)	Profit Margin(%)
Tomato	11,118	10,433	20,383.00	49
Sweet Pepper	5,718	9,711	16,073.93	40
Cucumber	13,500	9,401	19,800.00	53
AVG	**10,112**	**9,848**	**20,598.52**	**48**

Protected Agriculture : Status within the Region

Cost of Production and Returns

Semi-Enclosed System (St Lucia)

Crop	Yield/plant (kg)	Total Cost of Production (US$/kg)	Total Sales (US$/kg)	Profit Margin(%)
Tomato	9.8	0.52	1.24	>100
Sweet Pepper	2.2	1.36	2.96	>100
Cucumber	2.7	1.20	1.50	25

Major Constraints - Production

Sub-optimal and/or inconsistent yields

- Unsuitable growing conditions (high temperatures and RH)

- High levels of pests

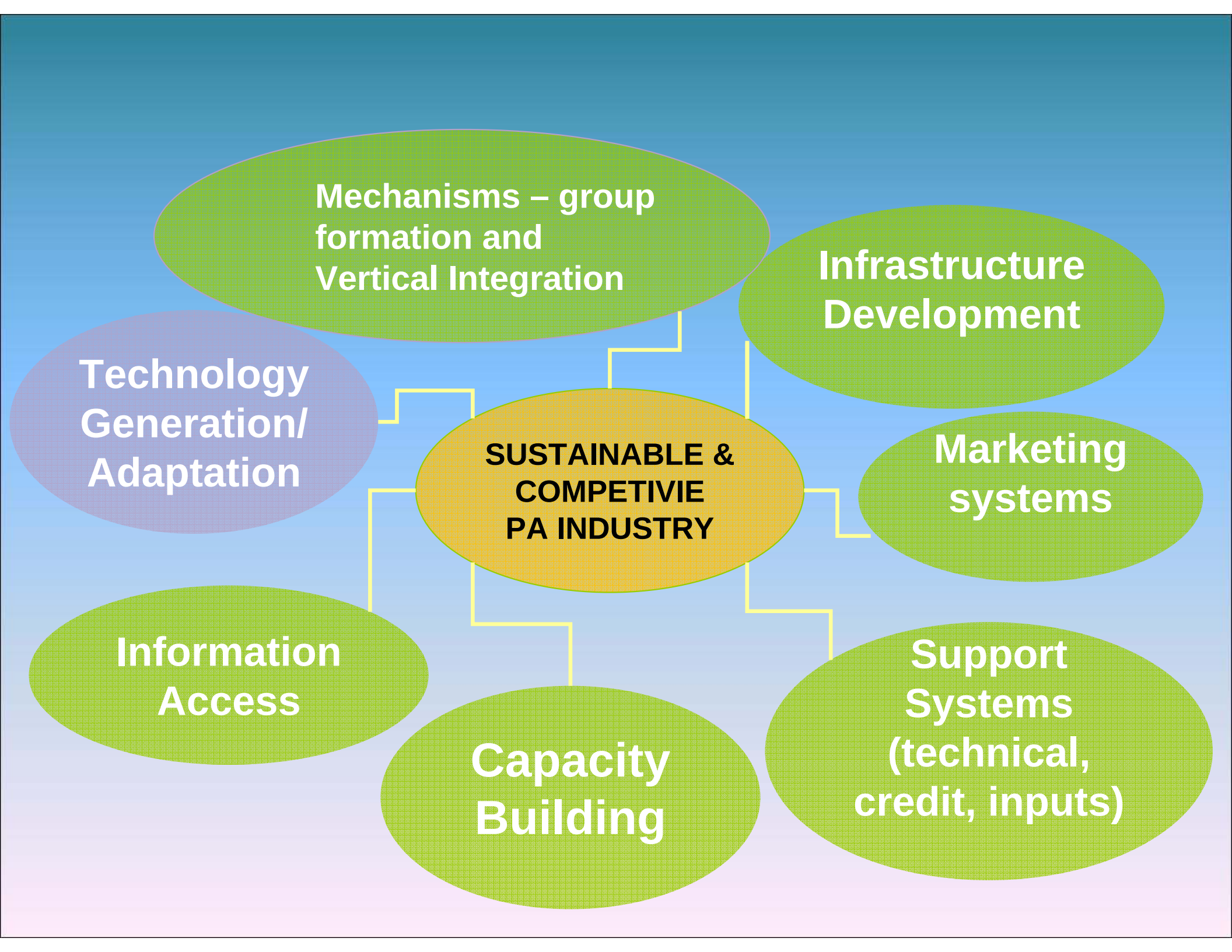
Use of inappropriate structures

Major Constraints - Production

- Limited knowledge and skill of producers
- Inadequate technical support
- Inadequate and inappropriate management practices
- Heavy reliance on imported inputs – variable availability and prices.

Major Constraints - Marketing

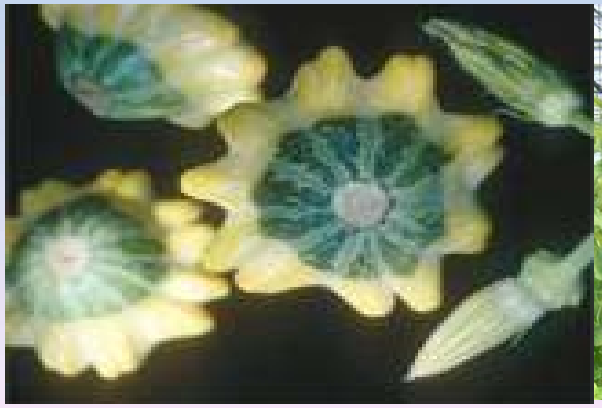
- Inconsistent supply
- Poor record keeping – cost of production
- Limited knowledge of the market (demand, supply)
- Poor market differentiation
- Few PA producer groups
- Weak linkages among stakeholders along the value chain


Mechanisms – group formation and Vertical Integration
Infrastructure Development
Technology Generation/ Adaptation
SUSTAINABLE & COMPETIVIE PA INDUSTRY
Marketing systems
Information Access
Capacity Building
Support Systems (technical, credit, inputs)

Current and Future Role

GOAL

Facilitate the development of a sustainable protected agriculture industry through the development/demonstration of production, handling and marketing technology practices and strengthening key industry support systems.

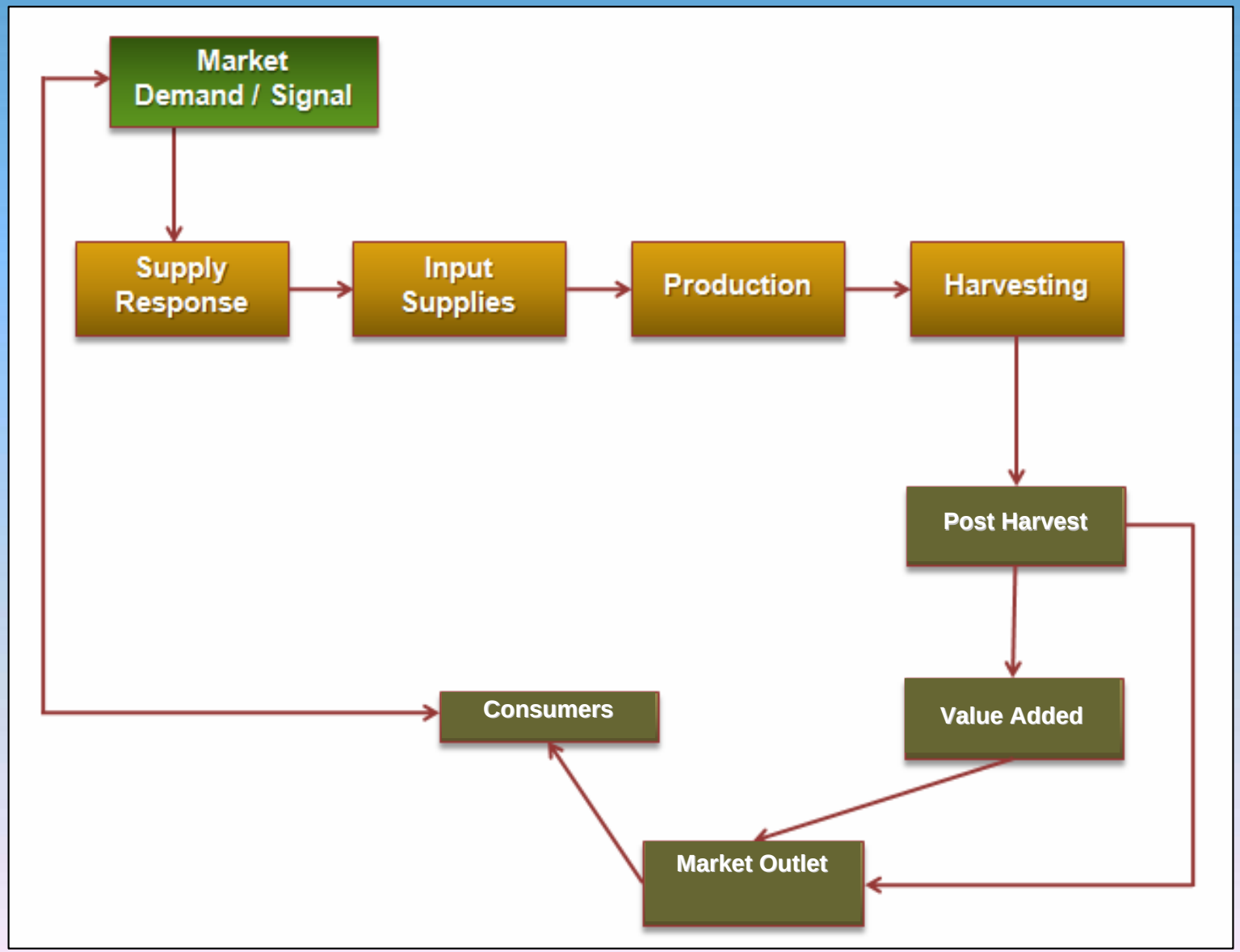


Current and Future Role

OBJECTIVES

- To assist with the development of market information systems and strengthen trading linkages.
- To develop technologies and practices to optimize the production of selected crops under various protected agriculture systems.
- To facilitate the development of an enabling environment in which potential investment opportunities can be realized.

Commodity Development Chain



Interventions – Value Chain

Market

- Enhance marketing and trading systems so as to create substantive and transparent business linkages

Inputs

- Evaluate new varieties – heat and pest tolerant
- Develop media (emphasis on local materials)

Interventions – Value Chain

Production

- Determine production and productivity indices
- Develop low cost structures
- Identify suitable ventilation systems
- Validate fertility management strategies
- Develop/validate appropriate IPM strategies

Harvest & Post Harvest

- Develop low input post harvest methods

Production Indices

Cucumber Production (CARDI St Lucia)

Production Parameter	Open Field Agriculture (US$)	Low Tech Protected Agriculture (US$)
Yield per plant (kg)	1.5	2.7
Cost of production (per kg)	1.32	1.18
Net returns (US$/ha)	4,477	17,648

Technologies

- Media development from local by-products

Coconut and compost based media gave comparative germination and seedling growth to commercial product

Technologies

- Low-cost structures suited for growing traditional crops of the Caribbean

Amaranthus sp (callaloo) cultivated under protected structure. Investment: US$2,000 - 270m^2 ($7.40 per sqm). net profit as a percentage of revenue represents ~36.7%.

Technologies

- Determination of suitable ventilation systems for low altitudes

Protected structure designed to optimize growing conditions and exclude pest infestations

Technologies

- Determination of suitable ventilation systems for low altitudes

Fertigation system is solar-powered by photovoltaic cells

Center vent, cooling fan, sidewalls with combination of antiviral mesh and shade cloth

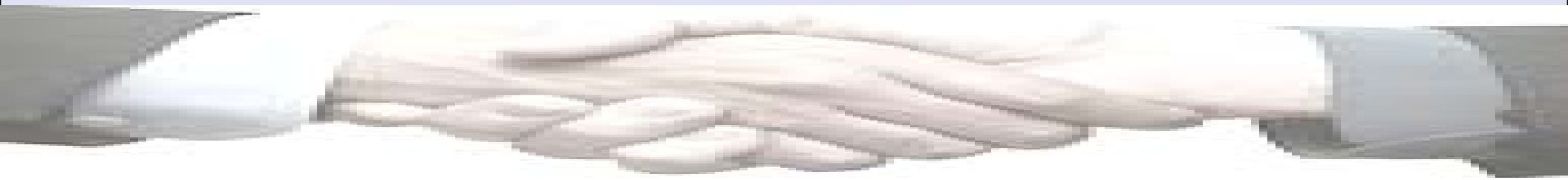
Guttering system to facilitate rainwater harvesting

Enabling Environment
Interventions to Support Value Chain

Tech Transfer	• Train producers and other key industry stakeholders
Tech Support	• Develop capacity of technical personnel to support the industry
Prod Gp /Cluster	• Strengthen producer groups and clusters to ensure vertical integration along the value chain.
ICT	• Develop a data base to improve information access

Partners

- Ministries of Agriculture
- Agribusiness Associations
- Private sector /NGO
- Universities
- Regional & International Agencies
- Farmers' Groups /Associations
- Research and Development Agencies



FUNDING

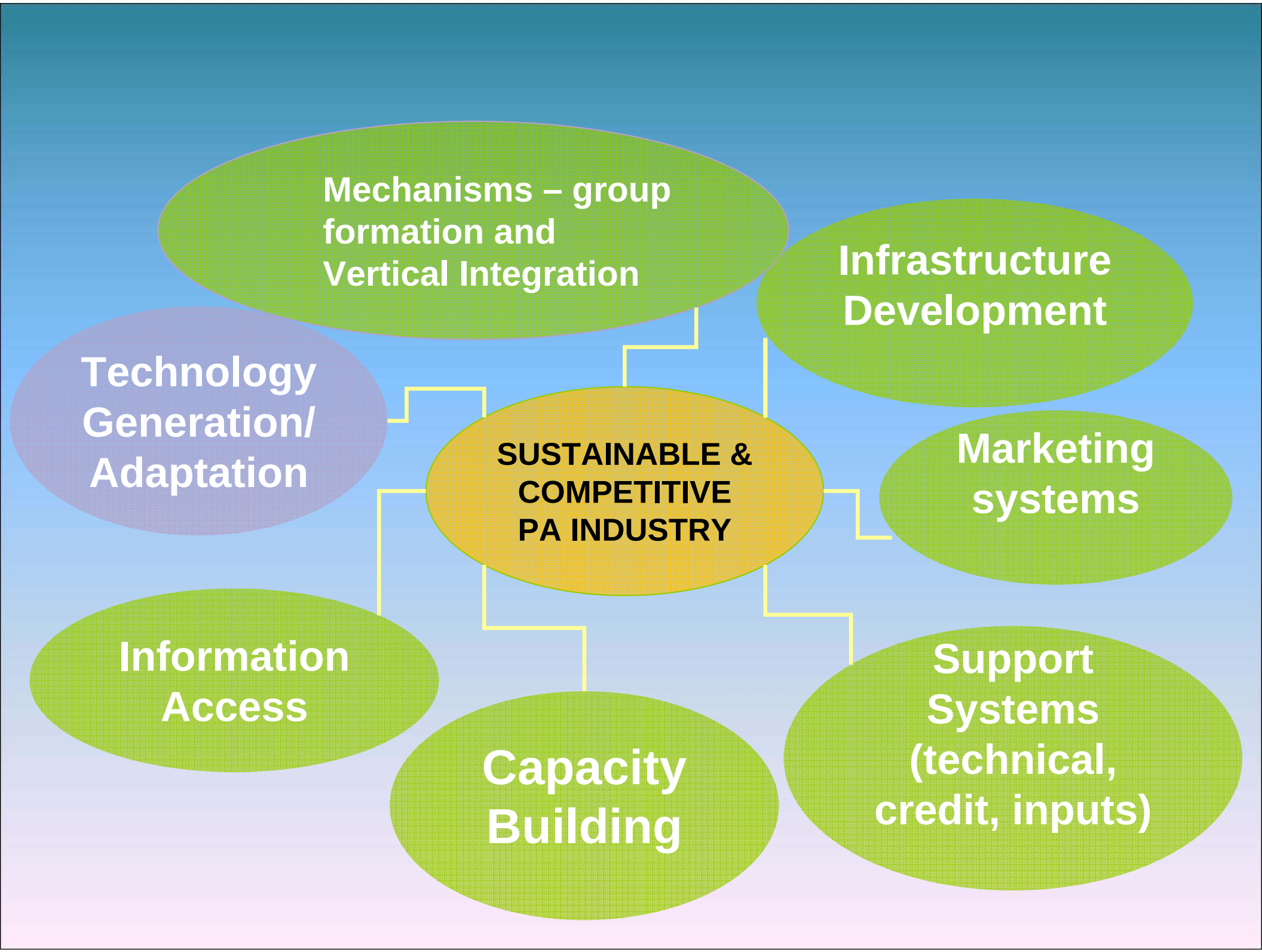
- Governments of the Region
- Common Fund for Commodities (CFC)
- European Union
- Food and Agriculture Organization (FAO)
- Inter-American Institute for the Cooperation on Agriculture (IICA)

Potential Impact of Interventions

- Improve the production and productivity of vegetables
- Enhance the availability and accessibility of vegetables
- Improve livelihoods along the value chain.
- Strengthen cross-sectoral value-chain complementarities

Considerations for Advancing the PA Industry

- Focussed and coordinated approach to current initiatives (nationally and regionally).
- Need to improve north-south linkages with countries where PA industry is advanced.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Support Systems (technical, credit, inputs)

Conclusions

- There is rapid adoption of PA technology in the CARICOM Region.
- Returns on investments are being obtained but, there is the need to improve productivity, reduce operating costs and capitalize on market opportunities.

Conclusions

- CARDI's interventions seek to assist in the development a competitive and sustainable PA industry through the provision of technologies and the strengthening of support systems and services that facilitate an enabling environment.

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Sources of Information:

- Ministries of Agriculture
- Trinidad Agri-Business Association, TABA,
- Greenhouse Growers Associations (Jamaica, Trinidad and Tobago)
- CARDI Offices
- *Reports:* Mirza 2008, Murray 2009

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