Sustainable Production Practices at the Community Level in Barbados and the Eastern Caribbean

A. Environmental Sustainability

1. Soil Management

2. Water Management

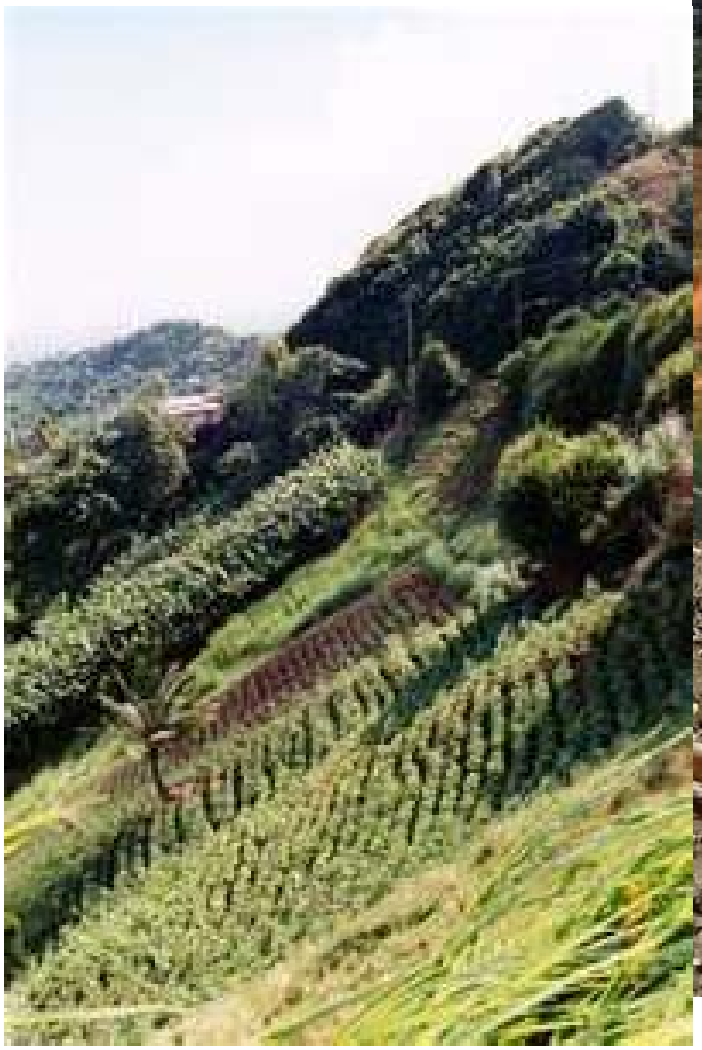
Background

- Soil Management analyzed via 18 interrelated criteria including:
  - original and seasonal land clearing methods
  - land preparation
  - soil protection
  - quality enhancement
  - soil water management

1.1 Land Clearing

- Eastern Caribbean States are not engaged in significant farmland expansion
  - *Isolated instances recorded of unsustainable use of bulldozers and subsequent burning*
- St. Lucia
  - Slash and burn
  - Herbicide application
  - Slash/cutting up
  - Mechanization

Soil Conservation Practices



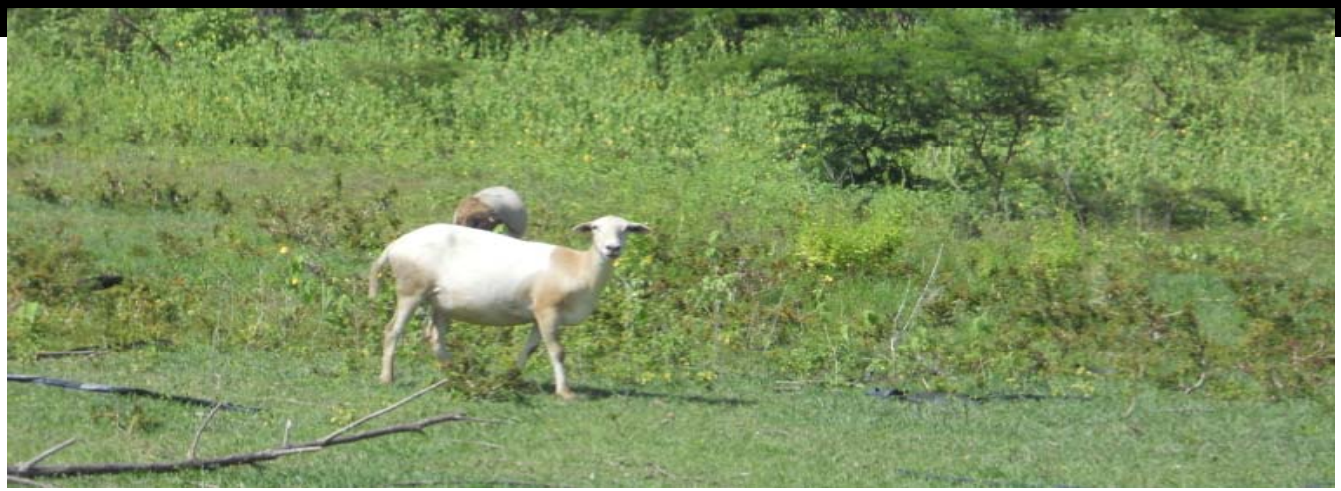
Soil Conservation

- Low soil exposure
- In less-mountainous islands
  - holding moisture
  - improving fertility
  - avoiding wind erosion
- Improved drainage to reduce soil loss by water

Soil Conservation

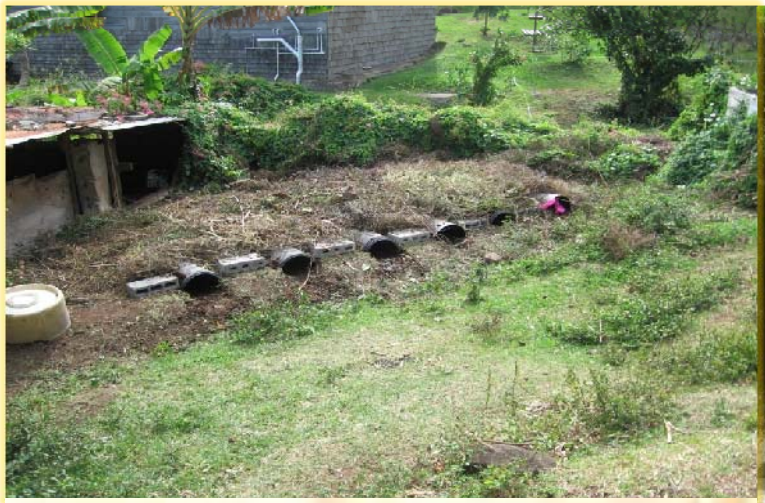
COUNTRY	CONSERVATION METHOD
St Kitts and Barbados	Contour ploughing and terracing variations with
St Vincent and the Grenadines	Contour ploughing and planting (19/35)
Barbados	Contour planting, fruit trees for soil stabilization
Grenada and mountainous Windward Islands	Selective thinning and planting of spreading crops, green cover, windrowing and cut vegetation to reinforce contour protective bunds

1.3 Soil Amelioration



- Ameliorants used to improve soil quality:
  - Green manures such as guinea grass
  - Nutrient recycling (animal / green manures)
  - Manure incorporation:
    - on-farm collection and subsequent spreading
    - animal droppings whilst grazing (= weed control)

Composting and Vermiculture



1.4 Crop Rotation

- 'Textbook' crop rotations in several cases with choices reflecting:
  - different nutrient uptake regimes
  - differing feeding depths and dissimilar pest profiles
- Soil measurably improved due to fertility increases, lowered pest loads and improved friability (looseness of soil)

1.4 Crop rotation (cont'd)

CROPS/SEQUENCE in St. Vincent and the Grenadines

- Melons → Peanuts → Ochroes
- Carrots → String Beans → Cabbage
- Tomatoes → Sweet Potatoes →Yams
- Cucumbers → Tomatoes →Lettuce
- Cucumbers→ Carrots → Eddoes → Cabbage
- Sweet Potatoes → Yams → Eddoes
- Sweet Potatoes → Tomatoes → Yams
- Yams & Eddoes → Tomatoes → Ginger
- Tomatoes & Cabbage → Eddoes → Yams →Tannias
- Sweet Potatoes → Yams → Eddoes

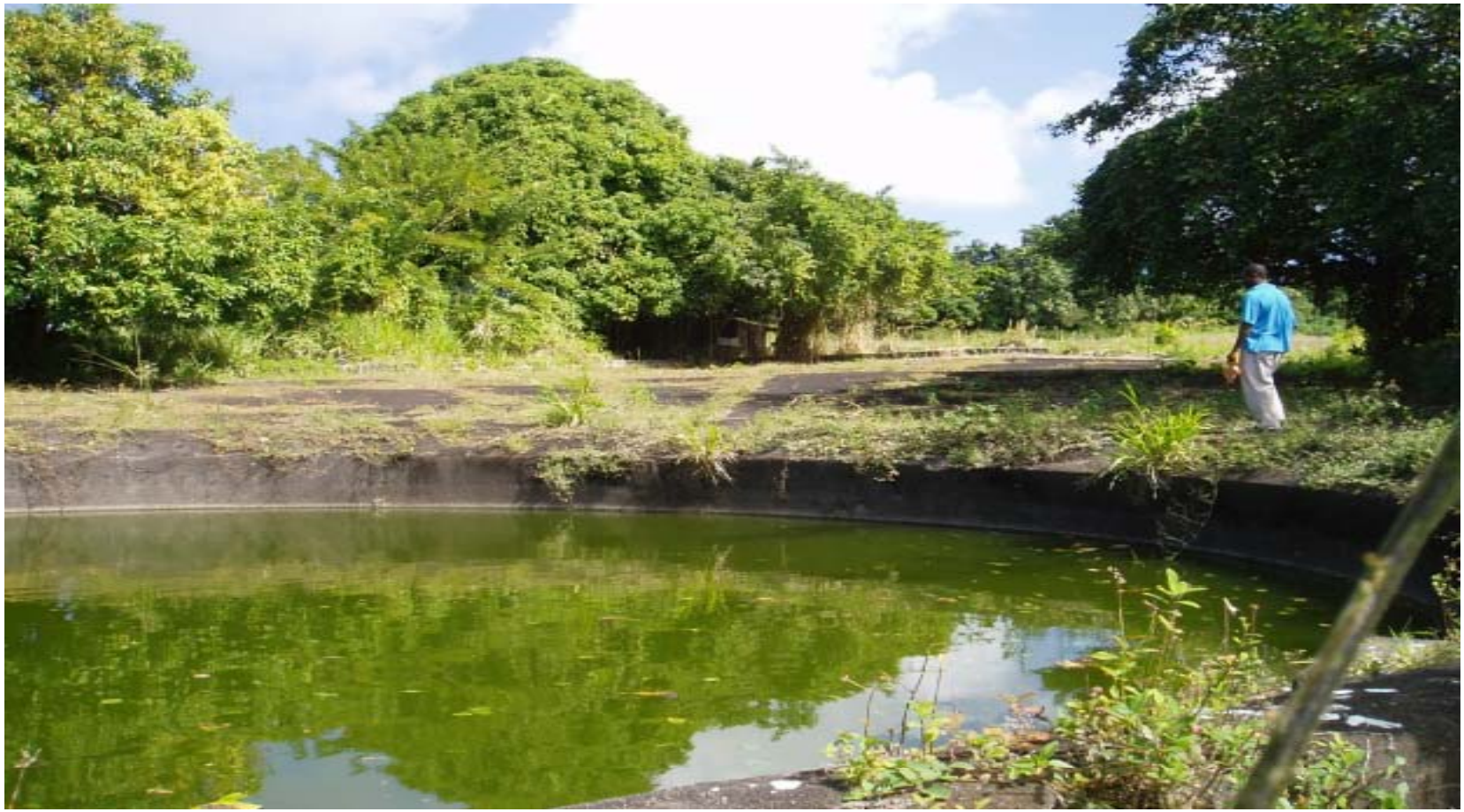
1.4 Crop Rotation (cont'd)

- St. Kitts/Nevis and St. Lucia
  - Significant evidence that rotations based more on economic factors than on crop husbandry
  - Same family rotations as a means to cash in on high value crops ("rotated" crops had similar pest/ disease and nutrient profiles)
  - Expected agronomic /soil improvement gains not obtained

1.5 Tillage

- Varied from minimum to sub-soil
- Often used with other operations such as deep planting, fallow and manual land clearing
- Antigua and Barbuda:
  - Two farms (sandy loam soils) used ploughing every 3 years
- Barbados:
  - Most 'organic' farmers routinely minimize tillage/ compaction by using small hand-push tillers
- St Kitts/Nevis, St Lucia, Grenada, St Vincent/Grenadines:
  - Direct planting, limiting soil disturbance & reduced tillage in cucurbits, papaya, roots and tubers, plantain, and banana

2. Water Management

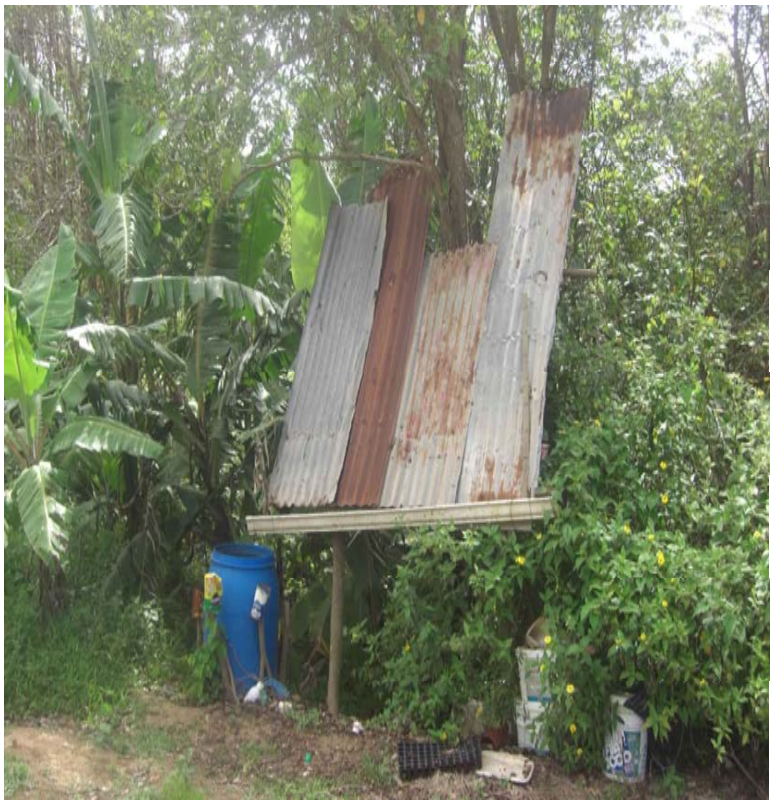


Rainwater Harvesting

- Barbados
- St Kitts
- Antigua and Barbuda
- St Lucia

- Well water
- Ponds and wells
- Ponds and dams
- Water course protection

2.1 Rainwater harvesting (cont'd)



2.2 Irrigation

- St Lucia:
  - 80% of farms in Regions 7 and 8 are rainfed
  - most other regions:
    - 10% of holdings source gravity flow water (stream/river)
    - 15% use drip
    - 80% of protected agriculture uses overhead systems

Water Conservation

COUNTRY/PRODUCTION SYSTEM	METHOD USED
Antigua	Sprinkler irrigation (sprinkler systems deemed sustainable for pest management (e.g. disrupting adult diamond-back moths from settling on crops)
Barbados	Drip irrigation
	Mulching – entire area or strips, inorganic /mainly plastic common; organic include cured coconut fibre/green waster from solid waste plant
Pastures	Solar powered sprinklers

4. Land Tenure

- Security of tenure: one of the root determinants of sustainability
- Long-term lease/free-hold/well-monitored rental agreement foster sustainable agribusiness models
- Farmers without secure title:
  - Unable to make long-term choices, take short-term gains
  - Lack of access to/availability of financial resources (e.g. bank loans) to capitalize operations

CONCLUSIONS
Soil Management

- Concern for environmental dimension of sustainability
- Improvement of soil quality appears to be lagging behind
- Composting remains a largely misunderstood concept

CONCLUSIONS
Water Management

- Water harvesting and conservation:
  - Low flow irrigation techniques
  - Potable water used directly from State mains
  - On-farm conservation often lacking when state water used
  - Head-end leaks in drip systems
  - Overwatering using drip
  - Need for remedial interventions

CONCLUSIONS
Water Use

- Water reuse / recycling needs consideration
- Sustainability concerns should be assessed prior to farm building construction
  - directed rainwater runoff and
  - storage from guttering

RECOMMENDATIONS
Soil Management

- Minimum soil disturbance/loss when preparing site
- Windrow and/or compost cut vegetation
- Properly constructed terraces on slopes of 15 percent or less
- Direct planting of fruit trees on sloping land
- Use of contour drainage
- Maintain appropriate green cover during fallow

RECOMMENDATIONS
Soil Quality

- Promote use of green manures
- Crop rotations that involve less closely-related plants e.g. Cucumbers-tomato-lettuce that proportionately utilize different nutrients and have different pest complexes.
- Appropriate/Minimum tillage
- Effective composting

RECOMMENDATIONS
Water Management

- On-farm storage of rainwater
- Effective use of low flow emitters, drip irrigation
- Use of green/artificial mulch
- Practical soil moisture tests (e.g. 'feel tests' with auger)
- Low-flow tap to wash equipment/produce/ machinery
- Adequate drainage to avoid water-logging
- Solar-powered sprinkler systems for pastures and soiling grasses

Remember…

- *The reintroduction of Good Agricultural Practices with a focus on Climate-smart agriculture could, in one fell swoop, ensure the viability of the sector in a comprehensive way*

Thank You