

Land and Water Management – some insights from the Seychelles

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Outline of presentation

- Introduction
 - Agricultural background information
- Land and water current Status
 - SAA irrigation schemes
 - On-farm irrigation/ SLM methods
- Land and Water conservation practices
- Summary



Agricultural Background Information

- Total of 566 farmers on GOS land and 147 on private land.
- Farm sizes ranges between 0.5-2 ha
- Main crops grown are vegetables, fruits, root crops and spices/herbs
- 8600 households involved in some form of farming activity
- Agriculture is done using both rainfed and irrigation farming



Soils of the Seychelles

- Out of the total land area is 452 km² (45 450 hectares) it has been estimated of the total 6 000 hectares of potential agricultural land, 600 hectares are under arable agriculture and 600 ha under intensive agriculture, where each farm are on average 0.5-2 hectares.
- Approximately two thirds of the available land resources are mountainous and are unstable for agricultural activities. 75% of the total cultivated land is found on the coast averaging about 2 m above the mean seal level. The remaining 25% consist of cultivated land with slopes in excess of 15%.



Soil Characteristics

- There are two main soils in the Seychelles, the Seychelles Red Earth and the Shioya Series.

Seychelles red earth

- Predominant soil type in the granitic islands. characteristic red colour, which is due to the presence of iron
- Almost the only soil types in the highlands and the slopes of the granitic islands. Not very rich and most of the minerals, exposed during weathering are quickly, washed away. Minerals lost in this way are potassium, sodium, calcium and Magnesium.



Soil Characteristics

Shioya soils

- Found along the coastal region of granitic islands. The parent material of Shioya soil is coral sand. Predominant mineral is calcium.
- Rapid interaction of calcium with other minerals essential for plant growth such as Iron and Manganese, called Lime Induced Chlorosis. crops, which suffer from this chlorosis, are cassava, sweet potatoes, yams and tomatoes.



Introduction

Role of Seychelles Agricultural Agency

- The Irrigation unit within the Research and Development Section is responsible for the management of all irrigation water for farmers on Mahe and Praslin Island
- Responsible for the maintenance of the irrigation systems which consist of barrage, reservoir and the irrigation network to the farmers
- The Research Unit is responsible for undertaking trials in the determination of irrigation crop water requirements and to promote and encourage the use of water conservation practices and technologies
- Sustainable land Management in face of climate change

The current Status

- 90's with the emergence of more specialized cultivation e.g. (Lettuce, Chinese Cabbage, Cabbage, Tomato and Capsicum)
- Mini and micro-sprinklers made their apparition
- Government of Seychelles to seek financial assistance to fund various high pressured irrigation water project. Two of the project were sponsored and funded by IFAD and EDF.
- New barrages were built on Mahe (the main island) and on Praslin (the second largest island). They were all installed with all the necessary facilities required to perform sound agricultural activities.
- Project ...positive impact on the farmers...benefited from high pressure irrigation water, facilitate anyone of them to use any irrigation method available locally.
- Irrigation water projects are filtered which also makes it versatile to any irrigation method.

Current Irrigation status

Irrigation requirement

- The two major soil types have low water holding capacity.
- Hence soils need to be irrigated frequently
- Most farmers irrigate daily
- High water demand and use for irrigation particularly leafy and high value vegetable crops
- Productivity of irrigated land is more than three times that of un-irrigated land



Current Irrigation Status

SAA Irrigation schemes

- SAA manages 10 irrigation schemes
- Consist of a network of barrages/small dams, reservoirs, sedimentation tanks, filtration systems and distribution pipes
- Collects and extract water from different river catchments
- Many farmers invest in individual projects for their farms.

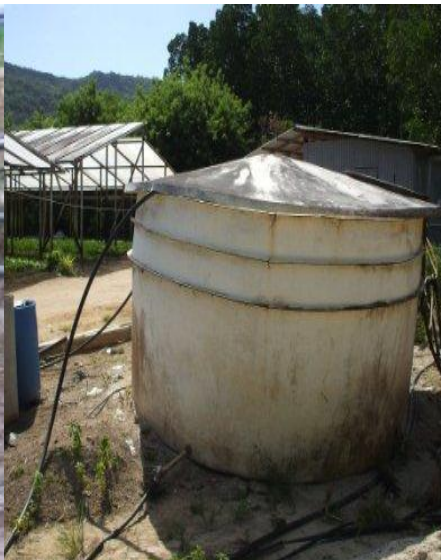
Reservoir/ Barrage	Capacity / m ³
La Gogue / North Mahe	134.4
Mont Posse Bonne Espoir / South, East Mahe	3750
Mont Posse (Lower)/ South East Mahe	46,876
Hermitage / South West Mahe	Approx. 135
Barbarons /West Mahe	144
Val Dendore/ South Mahe	576
Port Glaud/ West Mahe	450
Au Cap	
L'Amitie/ Praslin Isand	3750
Cap Samy/ Praslin Island	- 10

Current Irrigation Status



Current Irrigation Status

- SAA irrigation schemes supplies water to only about 35% of the total farmers
- Other 65% have to source their own irrigation water:
 - Extract from nearby rivers and streams (using pumps or gravity fed)
 - Bore Holes
 - Rain Water Harvesting (Run-off) into water tanks or on-farm dams



Current Irrigation Status

On-farm Irrigation Methods

- **Drip lines**
 - High value vegetable crops eg: Tomato, Sweet Pepper
- **Micro Sprinklers**
 - Leafy vegetables eg: Lettuce, Chinese cabbage
- **Over head Sprinklers**
 - Root crops and fruit trees
- **Watering Cans**
 - Seedlings in nursery
- **Open ended Hose**

Current Irrigation Status

On-farm Irrigation Methods



Water conservation practices and technologies

- A leading concern facing the future of agricultural production is the availability of water
- It is expected that climate change will cause more extreme climate events including droughts and floods and shifts in plant growing zones
- As populations grow, more efficient use of water in growing food will be of key importance
- It is imperative that farmers adopt good water conservation practices and technologies



Water conservation practices and technologies

Use of Drip or Micro-Irrigation

- Delivers water (and fertilizer) either on the soil surface or directly to the root zones through systems of plastic tubing with small holes and other restrictive outlets.
- Conserves 50 to 70 percent more water than traditional methods while increasing crop production by 20 to 90 percent.
- Water and fertilizer are also more easily absorbed by the soil and plants, reducing the risks of erosion and nutrient depletion.



Water conservation practices and technologies

Adoption of drought tolerant varieties

- Varietal screening carried out by R&D to identify best varieties under local conditions
- Encourage farmers to adopt seeds that are heat and drought tolerant and are adapted to local conditions



Water conservation practices and technologies

On-Farm Water Storage

- Farmers are encouraged to have storage for at least three days so as to store irrigation water for the farm
- Rain water harvesting-harvested on a small scale to grow fruit trees, water small livestock
- Collected water can be stored in small tanks above or below ground, in drums, or in small reservoirs.
- Mitigate the impact of water shortages



Water conservation practices and technologies

Use of Black Plastic Mulch and Organic Mulches

- Can save up to 25% in crop water requirements
- Organic mulches such as grass clippings, leaves helps to conserve moisture
- Also add organic matter to the soil, improves soil structure and enhance soil water retention
- Green mulch or cover crops can also help to conserve soil moisture



Water conservation practices and technologies

Organic Farming

- Use of crop rotations, manure fertilizer, cover crops, and residues help to protect the soil and increase organic matter content
- Organic soils absorb water and store it better
- Good soil structure with macro pores allows the water to go deep into the soil where it can be accessed by roots and is less prone to evaporation



Response to soil and water salinity

1. Irrigation practices

- (a) soil water measurements, (b) water balance calculations, and
- (c) plant stress sensing
- Importance of root zone drainage
- Quantifying root zone drainage

2. Agronomic practices

- Tillage practices, crop rotation and residue incorporation

3. Soil Practices

- Permanent raised beds, gypsum application and organic manures

4. Drainage development

- Surface and subsurface drainage

SLM

- Nutrient management:

Use of poultry and cattle manure only for growing leafy crop



On –Farm trial

- Adaptability potential of sweet potato and cassava varieties in sandy soil and red soil on Praslin



Effect of different types of manure on yeild of chinese cabbage and lettuce in red soil



Control of eggplant fruit and shoot borer using: -

1. Bio pesticide



2. Pheromone traps



Control of leaf miner using biological pesticide



Cultural practices to manage fungal diseases in parsley



Thank You for your attention..

