

Overview of the impact of climate change on the non-sugar agricultural sector in Mauritius and strategies for adaptation



M. A. ATAWOO
Senior Research Scientist
Agricultural Research and Extension Unit
(AREU)

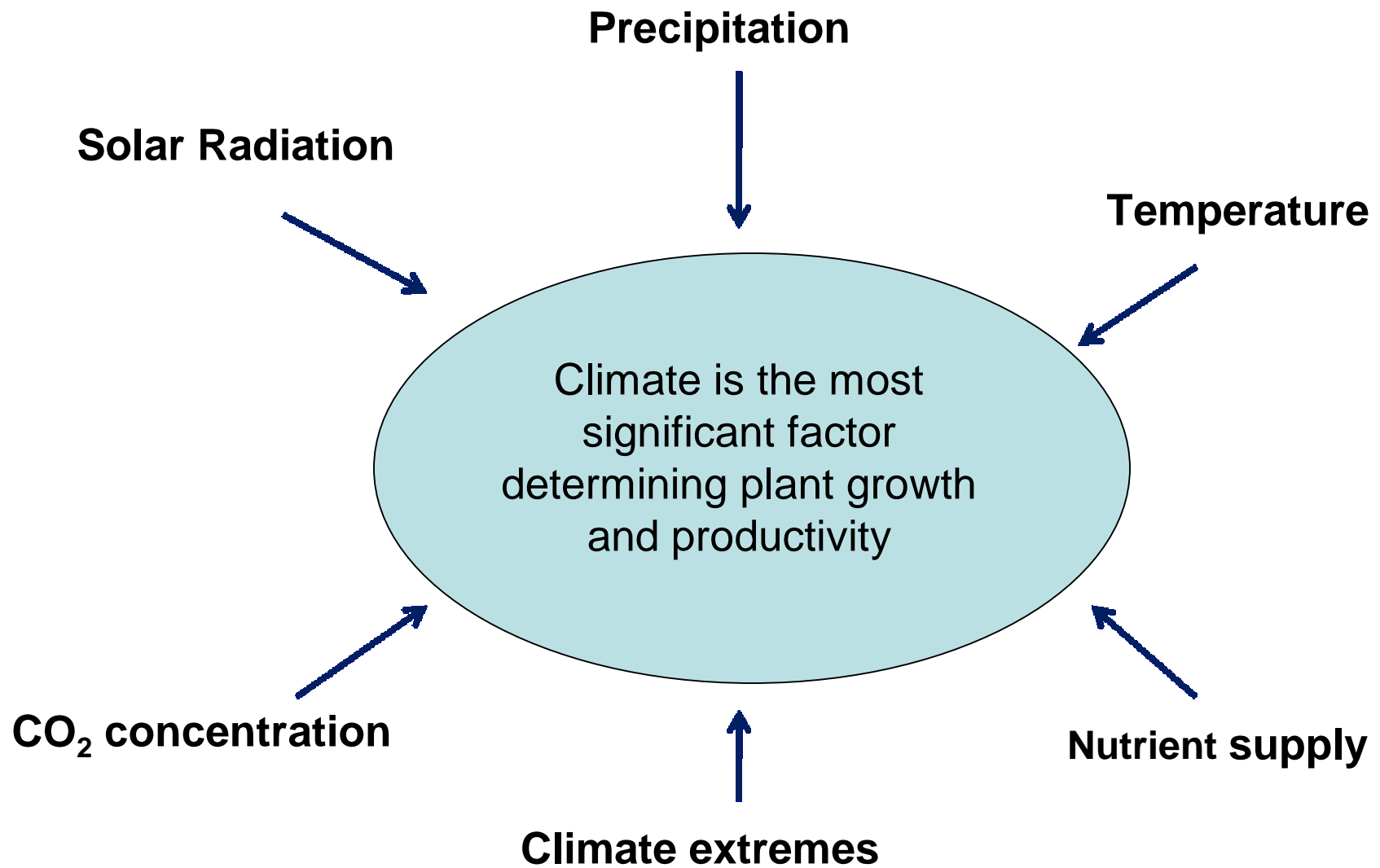
Awareness Week on climate Change
University of Mauritius
July 2011

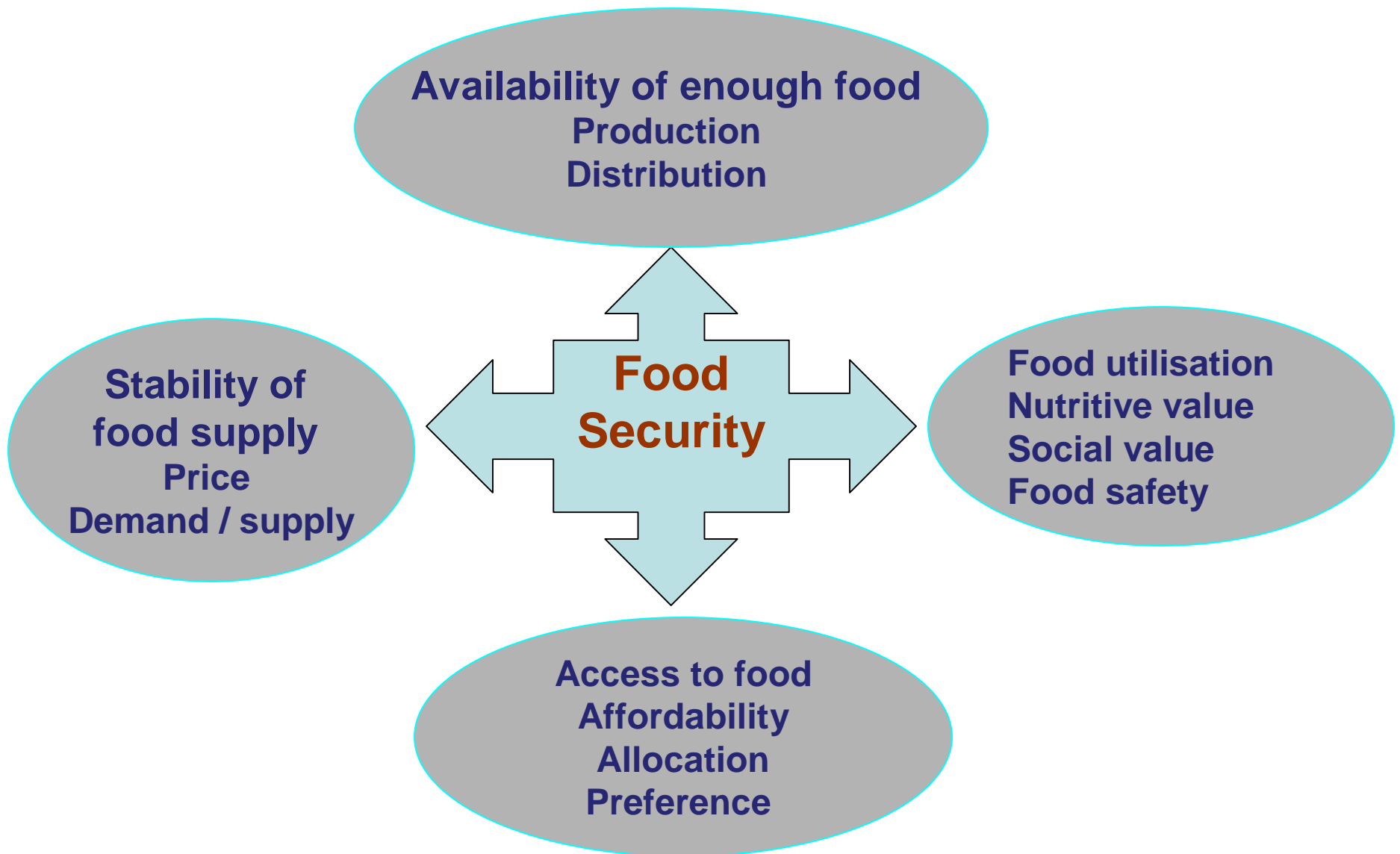
‘Global Warming is already palpable in Mauritius’ (Meteo. Services, 2010)

Observed impacts include:

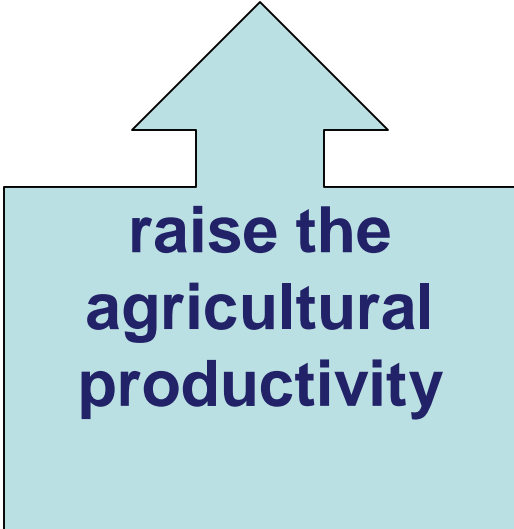
- **Average temperatures are rising (1.15⁰C per decade)**
- **Decreasing trend in annual rainfall (about 8% compared to 1950s)**
- **Sea level rise (2.1 mm/year for the last decade at Port Louis)**
- **Lengthening of the intermediate dry season**
- **Shift in the start of the summer rains**
- **The number of consecutive dry days is increasing/ No. of rainy days decreasing**
- **Increase in heavy rainfall events**
- **Increase in frequency of extreme weather events**
- **More frequent heat waves in summer (temperature rise)**

Climate and agriculture



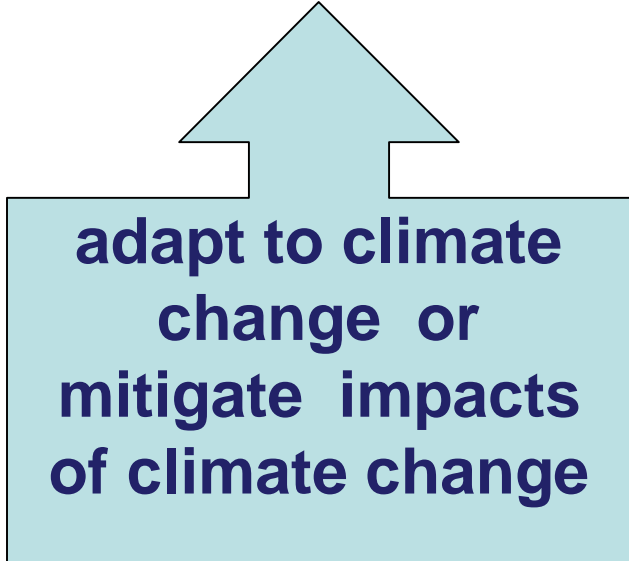


Future Food Security in Mauritius will depend on how we



**raise the
agricultural
productivity**

Food Security Fund
Strategic Plan 2008-2011



**adapt to climate
change or
mitigate impacts
of climate change**

Adaptation Strategy to
reduce vulnerability to
climate change risk

Impacts of Climate Change on the non-sugar Agricultural Sector in Mauritius

Impacts of climate change on the food crop and fruit sector

Increase in Temperatures

- **Change in cropping zones for some crops from lowlands to higher altitude.**
- **Cropping calendars, flowering and productivity of some vegetable and fruits are being affected.**



Impacts of climate change on the food crop and fruit sector

Increase in Temperature

Vegetable crops needing a cold climate for bulking may be affected.

Crop cycle may shorten, leading to reduction in yields.



Impacts of climate change on the food crop and fruit sector

Increase in Temperature

Warmer temperatures and milder winters are favoring higher incidence of pests and diseases.



Increase in extreme weather events

- Production are affected by more frequent and severe droughts as well as cyclones and heavy rains
- Coastal land are affected by more frequent storm surge destroying crops and affecting soil quality and productivity



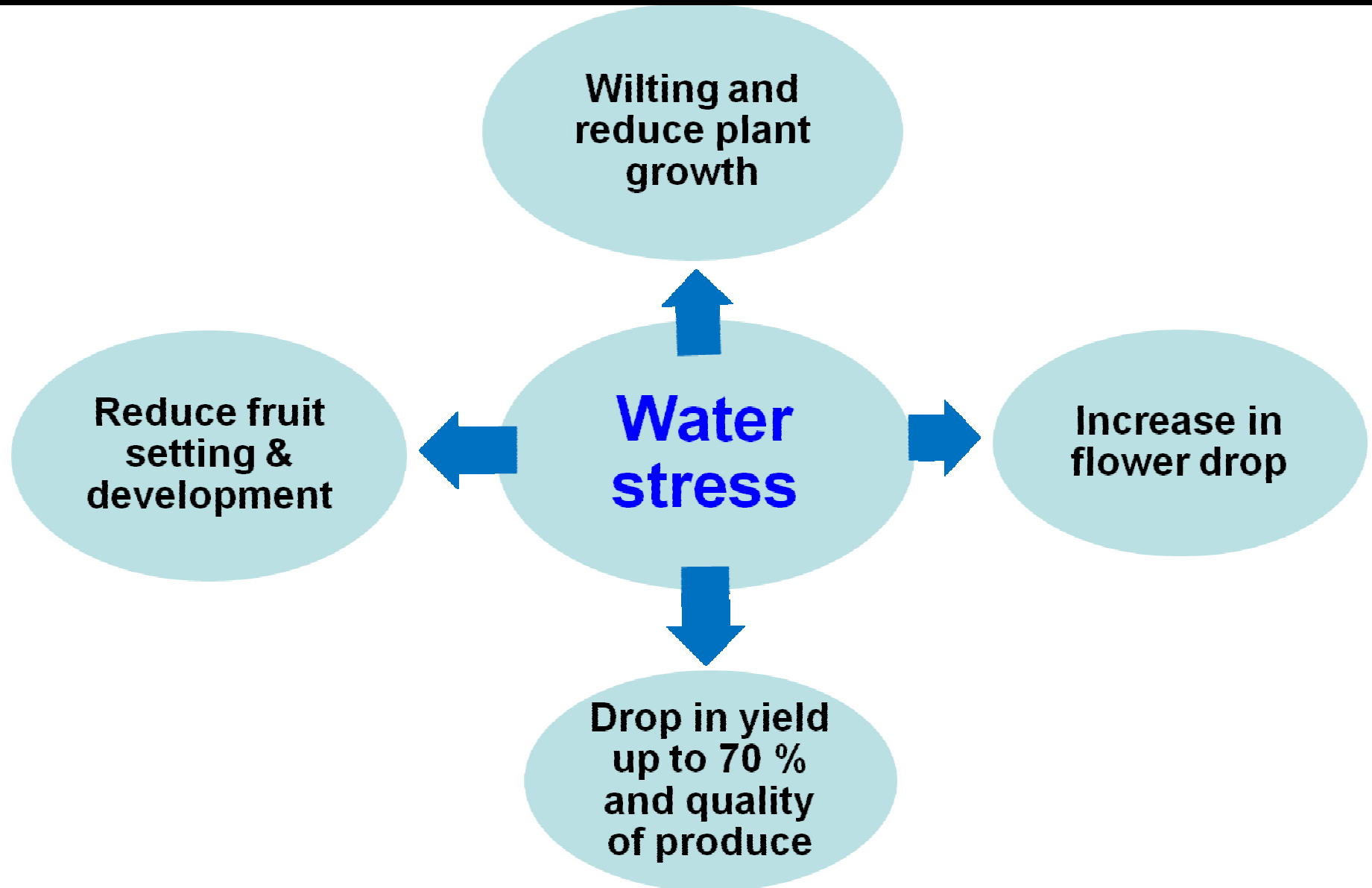
Impacts of climate change on the food crop and fruit sector

Problems associated with flooding

- Water logged condition/submerging of fields
- Soil compaction, asphyxiation of plant root systems
- Soil erosion/ loss of fertile topsoil/ siltation
- Washing away of crops



Impacts of climate change on the food crop and fruit sector



Impacts of climate change on the food crop and fruit sector

Reduced rainfall and increasing drought

Rainfed areas are severely affected

Scarcity of water is affecting irrigation schemes, especially in the northern and western areas



Impacts of climate change on the food crop and fruit sector

Increase in torrential rains

Soil erosion on sloping cultivated lands are increasing, leading to a decrease in soil fertility and an increase in off-site impacts.



Impacts of climate change on the livestock sector

Effects are related mainly to

- heat stress in animals
- low feed quality
- shortage of water
- cyclonic conditions.



Impacts of climate change on the livestock sector

Impacts of temperature Increase

- **Decrease feed intake leading to low productivity (e.g. low milk yield)**
- **Lower productivity in poultry and increase mortality rate**



- **Lower fodder productivity in the lowlands (e.g. lower carrying capacity in deer ranching)**
- **Higher pest and disease incidence**

Impacts of climate change on the livestock sector

Effects of Cyclones

- **Increased damage to livestock housing**
- **Loss of animals**
- **More attention to the needs of animals**



Response and Adaptations Measures

Aim: Increase resilience to impact of climate change and ensure stability in agricultural production

What are being done?

Response and Adaptation Measures

Food crop and Fruit sector

- **Introduction and Evaluation of crop varieties /lines to different agro climatic conditions of Mauritius**
- **Breeding of new varieties (e.g. onion, bean, colocasia)**
- **Introduction of new crops (e.g. Soya bean)**



Response and Adaptation Measures

Evaluate varieties suitable for changing agro-climatic conditions (drought, heat stress, high salinity, disease-resistance, etc)

Evaluation and promotion of crop production under protected culture (greenhouse, shade house, hydroponics)



Response and Adaptation Measures



Use of drip irrigation system

- Water applied directly to root zone
- No wind drift
- Reduced evaporation
 - It uses 40-50 % less water than sprinkler irrigation
 - Promotes crop yield & quality (15-30% increase)
- Fertilisers can be applied through the system (fertigation)



Response and Adaptation Measures

Adoption of cultural practices to conserve soil moisture and reduce water loss

Minimum tillage

Minimise soil disturbance so as to reduce evaporation

Weeding - Removal of weeds prevent competition for water

Use of organic matter

Manure, scum & compost - improve soil moisture holding capacity



Response and Adaptation Measures

Adoption of cultural practices to conserve soil moisture and reduce water loss

Use of organic or plastic mulch
Reduce 50-80% water loss through evaporation from soil surfaces





Rainwater Harvesting in Ponds and from rooftops



Response and Adaptation Measures

Water Saving Technologies

➤ Use of Hydrogels (water absorbent polymers)

Help to retain moisture at the rootzone level
(e.g- Agrostockosorb applied at 12-15 kg/ha)

➤ Use of soil surfactants

Enables water to be evenly distributed throughout the rootzone, making it more available to the plant and improve crop productivity

(e.g, Hydretain , IrrigAid Gold- under evaluation at AREU)

Drought Management Strategies

Grow Drought Tolerant Varieties

Crops	Drought tolerant varieties
Tomato	Dania, Lerica, Ballade
French beans	Long Tom, Royalnel, Corico, Rocco, Watch, Hellas, Violaine, Victory
Eggplant	Zebrina , F1 Obala
Hot pepper	PP9656-06, PP9656-08 (AVRDC Lines)
Cucumber	Poinsett
Lady's Finger	Emerald
Watermelon	Showing F1, National Glory
Melon	Omega
Pumpkin	Local

Other drought adaptation measures

- Use of tensiometer for irrigation scheduling so as to optimise water use and prevent over-irrigation
- Review plantation schedule
- Use of seedlings raised in nursery
- Use of windbreak



Response and Adaptations Measures

Promote Sustainable Agricultural practices
(soil conservation, integrated plant nutrient management , integrated pest management etc)



Response and Adaptations Measures

Developing an “early warning system” so that precautionary measures can be taken at all level (e.g. disease forecasting and alert by SMS)

Optimise use of fertilisers to minimise leaching and nitrous oxide emissions

Exploit the beneficial effect of climate change



Response and Adaptations Measures

Livestock Sector

- **Modify the environment to minimise heat stress (e.g. cooling, shading, etc)**
- **Provide adequate water**
- **Promote fodder production and feed supplement**
- **Advice on improved livestock housing (cyclone resistant + cooling)**



Response and Adaptations Measures

Livestock Sector

- **Lower stocking densities (e.g. less poultry head/m²) to minimise mortality.**
- **Provide better quality feed (additives and mineral supplements)**
- **Breeding for breeds resistant to heat stress**



Agriculture = Part of the problem

Account for 1/3 of global greenhouse gas emission

- **Release of carbon through tillage**
- **NO₂ emission through fertiliser use**
- **Methane from livestock**



Agriculture = Part of the solution

- **Practice minimum tillage**
- **Advise on judicious use of fertilisers**
 - **Nutrient budgeting**
 - **Integrated plant nutrition system**
- **Improve livestock feed and feeding strategy**
- **Efficient management of manure**
 - **Composting of wastes**
 - **Digester**

Everyone Effort Counts



Thank You For Your Attention