



# RADA

**RURAL AGRICULTURAL  
DEVELOPMENT AUTHORITY**



© Can Stock Photo - csp7719032



# CLIMATE CHANGE AND AGRICULTURAL EXTENSION

*Presented by: Marina Young*  
*Principal Director/ Technical Services (Acting)*  
**Rural Agricultural Development Authority (RADA)**

*29<sup>th</sup> September, 2016*

# CLIMATE CHANGE CONTEXT...

- When we talk about *climate change*, we refer to changes in long-term averages of daily weather.
- ◉ Distinct changes in measures of climate (rainfall, temperature, wind speed, etc.) lasting for a long period of time due to human actions.

# IMPORTANCE OF AGRICULTURAL SECTOR

**Agriculture is the backbone of the Jamaican economy.**

**When agriculture grows, our economy grows.**

In 2015 the agricultural sector (excluding forestry) contribution to Gross Domestic Product (GDP) was estimated at only 5.71%, compared to its contribution of 6.60% in 2012.





# CHANGING CLIMATE LEADS TO CHANGING WEATHER AND EXTREME EVENTS.

- ◉ Jamaica's temperatures are increasing...
- ◉ A rising trend in mean temperature  
~ 0.1 ° C/decade
- ◉ By mid 2020s- mid 2030 every year (in the mean) will be warmer than hottest year felt to date. ▢ **Climate departure!!** *Mora et al. (2013) puts it at*
- ◉ Nature of Jamaican rain is changing (variable). Some places getting wetter, some getting drier.

# CLIMATE CHANGE RELATED TRIGGERS FOR INCREASE USE OF PESTICIDES

- ◉ Global warming impacts on increase of pest populations (weeds, invasive species, insects, and insect-borne diseases), *which will likely lead to large increases in the use of pesticides.*
- ◉ Due to higher temperature and/or humidity pests have shorter life cycle resulting in the increases in pest population and crop damage
- ◉ Altered wind patterns may change the spread of both wind-borne pests and
- ◉ Stressed plants are more susceptible to insect pests and diseases
- ◉ Some insect pests that are currently present at low levels, or that are not considered a threat at this time, may become more prevalent

# EXAMPLES OF PESTS TRIGGERED BY INCREASE IN THE MEAN TEMPERATURES THREAT TO LIVELIHOOD.

Pest	Image	Trigger for increase in pesticide use
<b>Coffee Leaf Rust</b> <i>(directly affect Blue Mountain Brand and market arrangements)</i>		Management of disease required IPM approach including application of costly fungicides
<b>Beet Armyworm</b> <i>(threatens food / environmental safety)</i>		Chemical control alone is not effective. Environmental impact. Use of IPM
<b>Citrus Greening</b> <i>(threatens unique diversity &amp; germplasm)</i>		Management of vector requires alternation of insecticides with different chemistries (costly)
<b>Black Sigatoka</b> <i>(affected prices / markets. Industry stopped export due to frequent hurricanes/ storms)</i>		Due to higher temperatures, disease adopted to cooler conditions, resulting in replacement of Yellow Sigatoka. Requires IPM

# IMPACT OF DISASTER AND CLIMATE CHANGE

Natural Disaster	Climate Change
<ul style="list-style-type: none"><li>▪ Sugar cane, fruits and vegetables are exposed to flood damage in low lying areas.</li><li>▪ Plantain, banana, cassava citrus and other tree crops are especially vulnerable to wind and flood damage.</li><li>▪ After impact of natural disaster and non-availability of crop host, pests tend to move to other crops/ population of minor pest might increase</li></ul>	<ul style="list-style-type: none"><li>▪ Expected increases of 1–2 degrees Celsius and rainfall changes of <math>\pm 10</math> percent are predicted to <b>lower productivity</b> of fruits and vegetables, corn and rice by <b>10 percent</b>.</li><li>▪ Banana, plantain, citrus and tree crops and vegetable crops face same threats as above.</li><li>▪ Shorter life cycle of insect pests</li></ul>

**Source:** Adapted from Martin and Manzano, 2010ther



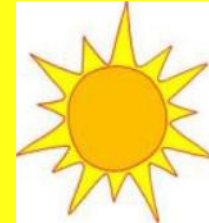
*"MANAGE PESTICIDES  
RESPONSIBLY:  
ADAPT TO CLIMATE CHANGE".*



# CLIMATE CHANGE & PESTICIDE EFFICACY

**HOTTER**

- **SUN RADIATION & HEAT - FASTER BREAKDOWN OF ACTIVE INGREDIENT & VOLATILIZATION**
- **MORE FREQUENT APPLICATION OF PESTICIDES AT SHORTER INTERVALS / FOOD SAFETY & COSTS**
- **PEST RESISTANCE/ NON EFFECTIVENESS OF PESTICIDE**
- **ENVIRONMENTAL POLLUTION (SOIL/AIR/ WATER BODIES/COSTAL)**
- **PLANT PHYSIOLOGY AFFECTED - LONGER PERIOD FOR ABSORPTION AND MOVEMENT OF SYSTEMIC PESTICIDES**
- **SHORTER SHELF LIFE**



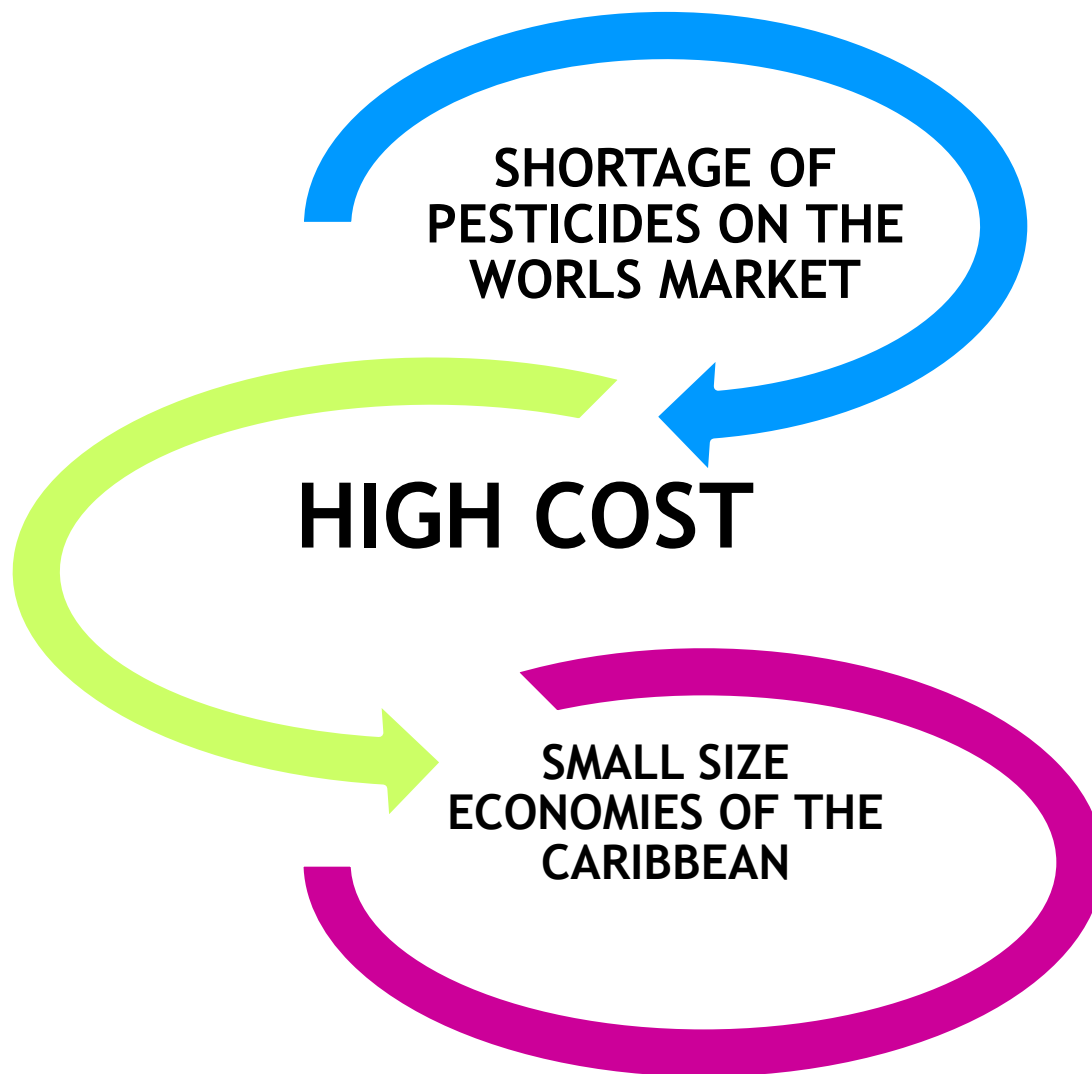
# CLIMATE CHANGE & PESTICIDE EFFICACY

**WETTER**

- WASHING OFF
- FASTER BREAKDOWN
- SPRAY COVERAGE COMPROMISED
- USE OF STICKERS
- INABILITY TO SPRAY
- TIMELINESS OF APPLICATIONS
- PEST POULATION BUILD UP



# EXTERNAL FACTORS TO BE CONSIDERED



# SMART STRATEGIES FOR EFFECTIVE USE OF PESTICIDES

Factors	Strategies
Temperature	<p>Apply pesticides during earlier morning or late afternoon</p> <p>Better leaf coverage</p> <p>Better chance to reach targeted pest and achieve better coverage</p> <p>Less volatilization</p>
Sun Radiation	<p>Apply <i>Bt formulations</i> in the late afternoon to reduce rapid product break down</p>
Wind	<p>Apply pesticides when sped of wind not exceeds 5 -7 km/hour to reduce drift</p>
Periods of Prolonged Wetness	<p>Do not apply contact pesticides/ Rely more on systemic</p> <p>Enter rainy season with low pest population to reduce pressure on pesticides</p> <p>Do not spray before rain or applying sprinkler irrigation</p> <p>Use stickers</p>
Effective dose rate	<p>Calibrate spray equipment according crop stage</p>
Good coverage	<p>Use proper spray nozzle (herbicides/ insecticides &amp; fungicides)</p> <p>Spraying technique</p>
Water Quality	<p>Use pH adjuster to ensure stability of spray mixture</p>

# SMART PESTICIDES

- ◉ Pest specific vs. **Broad spectrum**
- ◉ Lower dose rates
- ◉ Lower acute toxicity (Jamaica - Class III & IV)
- ◉ Less persistent in the environment
- ◉ Compatible with IPM systems
- ◉ Shorter Pre-harvest Interval (PHI)
- ◉ Less toxic to natural enemies and predators

*Importance of Local Research: Be guided by efficacy studies done under the local conditions*

# HOW CLIMATE CHANGE AFFECTS US?

- ◉ **TREMENDOUS STRESS ON FINANCIAL & HUMAN RESOURCES UNDER TIGHT FISCAL SPACE:**
- ◉ Frequent pest introductions and outbreaks
- ◉ High demand for research (IPM)
- ◉ Need to learn a new technologies at high frequency (*challenging to both, extension/ farmers*)
- ◉ Challenges to apply best practices in rain depended agri. sector
- ◉ Need to register new chemistries (small size of market share)
- ◉ Higher cost of production/ less competitive

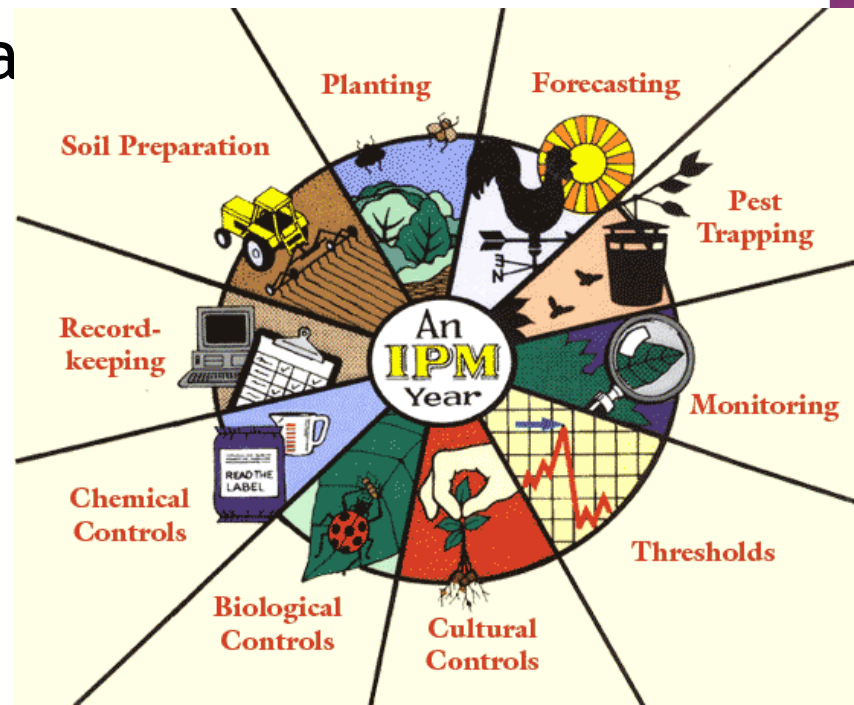
# CLIMATE-SMART AGRICULTURE

- Application of Integrated Pest Management practices
- Growing different types of crops to diversify their risks
- Use of protected agriculture systems



va

S



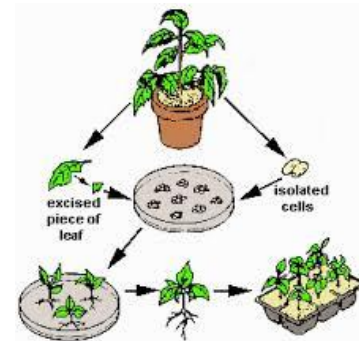
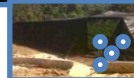


# TISSUE CULTURE TECHNOLOGY

(GINGER, BANANA, SWEET POTATOA, IRISH POTATOA)

## INSTITUTIONAL CAPABILITIES:

- R&D
- BIOTECHNOLOGY CENTRE, UWI
- SRC
- CHRISTIANA POTATAO GROWERS





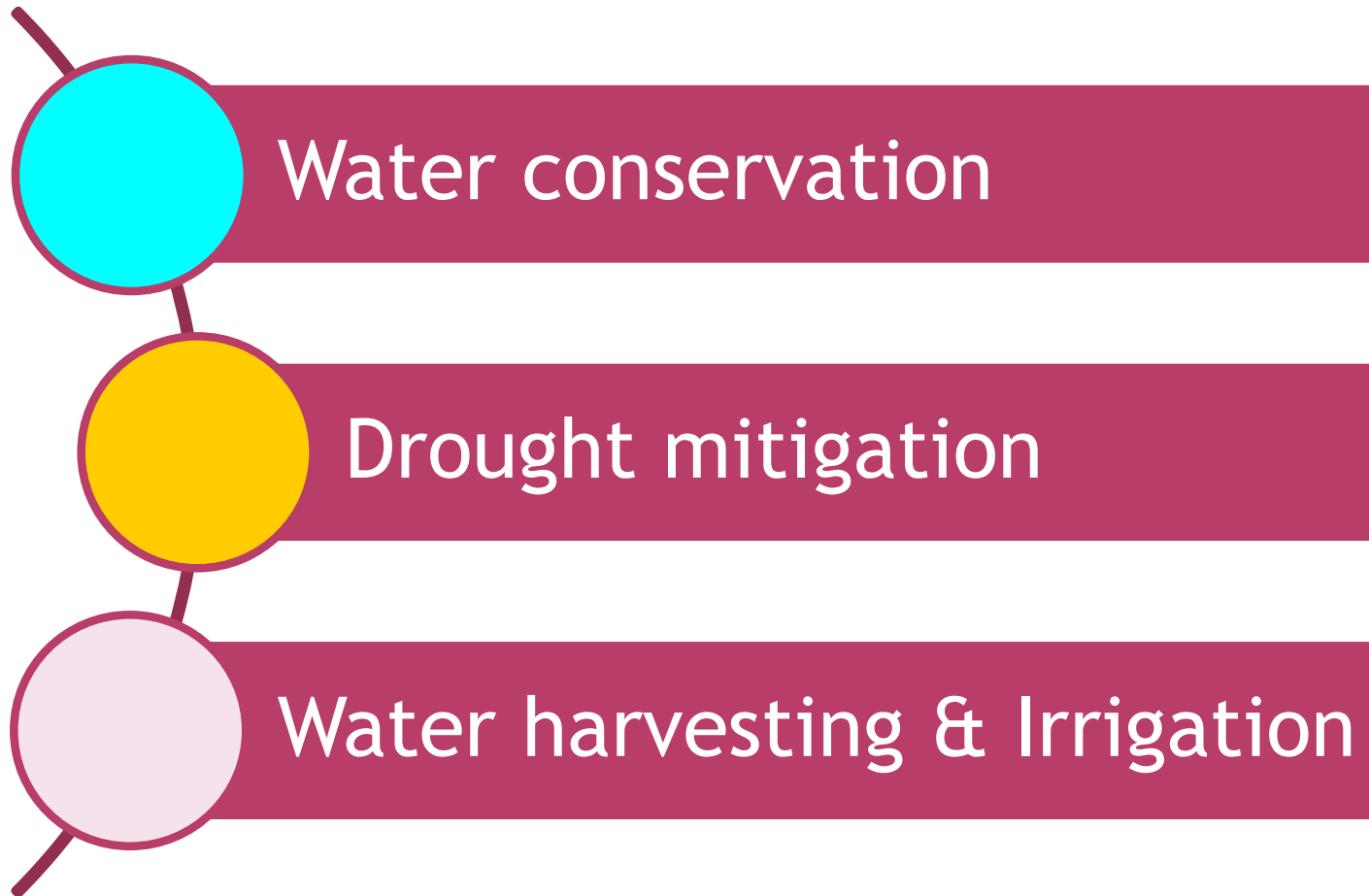
# PROTECTED AGRICULTURE



RADA PROVIDES FULL  
COMPLEMENT OF  
SPECIALIZED  
EXTENSION SERVICES  
TO GREEN HOUSE  
FARMERS



# ON FARM WATER MANAGEMENT





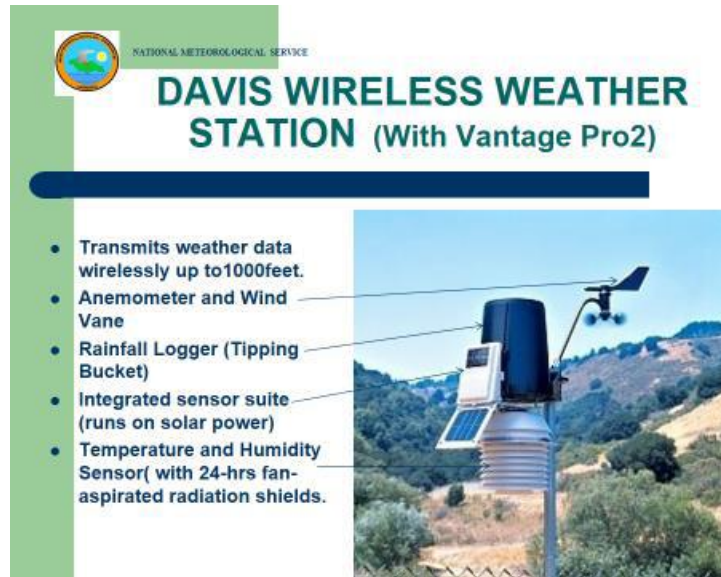
# WATER HARVESTING



# CLIMATE SERVICES

## AGRO METEOROLOGY

### PROTECTING LIVES AND LIVELIHOODS



- DIGITAL WEATHER STATIONS IN 10 MAJOR PRODUCTION AREAS (2016)
- STAFF CAPACITY BUILDING INITIATIVES (2013-2014)
- AGRICULTURAL FORECAST (MET OFFICE)
- INTERPRETATION OF WEATHER FORECAST FOR FARMERS (RADA)
- FARMER FORUMS
- INTERAGENCY COLLABORATIONS





# ICT PLATFORMS

## PEST FORECASTING



# DEMAND FOR NEW SERVICES FOR FARMERS & SKILLS FOR EXTENSION

- ◉ Climate information/ Agro meteorology
- ◉ Agroforestry
- ◉ Crop Insurance
- ◉ Precision agriculture (soil/crop nutrition; water management)
- ◉ Extension skills in participatory methodology (Farmer Field School)
- ◉ Gender sensitive agriculture
- ◉ Higher demand for land husbandry interventions



# FARMER FIELD SCHOOL - PARTICIPATORY LEARNING TOOL

## **FFS IN JAMAICA:**

- **HORTICULTURE**
- **COCOA PRODUCTION**
- **ONION IPM**
- **MANAGEMENT OF BEET ARMYWORM**
- **HOT PEPPER IPM**
- **AGROFORESTRY**
- **LAND HUSBANDRY (PREPARATORY STAGE)**



Extension and advisory services now embrace rural issues that go beyond agriculture alone.

This calls for well-equipped advisors, who are networked at national, regional and international levels and can facilitate learning and innovation.”

- ⦿ That is why climate smart extension services are so important.

# THANK YOU FOR YOUR ATTENTION

