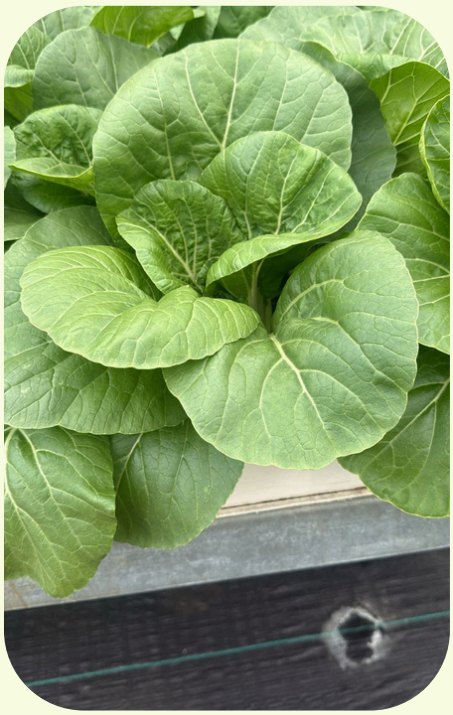






Climate Smart Agriculture Toolkit for Young Farmers

Growing Food, Protecting the Planet, Building the Future

Developed by The Esimaje Foundation
Young Farmers Club Programme



Welcome to the Young Farmer Challenge

Your Mission

Throughout this guidebook you will find activities and challenges. Earn points as you go:

Activity	Points
Brainstorm Box	5
Quiz Challenge	10
Home Investigation	15
Farming Experiment	20
Climate Champion Project	50

Can you earn 200 points and become a Climate Smart Agriculture Champion?

Dear Future Farmer,

Have you ever wondered where your food comes from?

Every fruit, vegetable, grain, and animal product starts with agriculture. Yet today, farmers face many challenges including climate change, droughts, floods, pests, and rising food prices.

The good news is that young people like YOU can be part of the solution.

This guidebook will introduce you to Climate Smart Agriculture—a modern approach to farming that helps protect the environment, strengthen food security, and create opportunities for future careers and businesses.

By completing the activities, challenges, and projects in this guidebook, you'll gain valuable knowledge while becoming a champion for sustainable agriculture.



CHAPTER 1: WHAT IS CLIMATE SMART AGRICULTURE?

What is Climate Smart Agriculture?

Climate Smart Agriculture (CSA) is a way of farming that helps farmers grow food while adapting to climate change and protecting the environment.

Climate Smart Agriculture focuses on three main goals:

Produce More Food

Farmers must produce enough food for growing populations.

Adapt to Climate Change

Farmers need strategies to cope with droughts, flooding, rising temperatures, and extreme weather.

Protect the Environment

Farming should conserve natural resources, reduce pollution, and protect biodiversity.

Think of Climate Smart Agriculture as farming smarter, not harder.

Tips & Tricks

- Water plants early in the morning.
- Use mulch to keep soil moist.
- Collect rainwater whenever possible.
- Plant crops suitable for your climate.

Real-Life Example

A farmer notices that rainfall has become less predictable.

Instead of watering crops using a hose every day, they install a drip irrigation sstem that delivers water directly to plant roots.

Results:

- ✅ **Less water used**
- ✅ **Healthier crops**
- ✅ **Lower costs**
- ✅ **Better yields**

Fun Fact

Did you know that agriculture uses approximately 70% of the world's freshwater supply?

Climate Smart Agriculture helps reduce water waste.

🧠 Brainstorm Box

What challenges do farmers face in Trinidad and Tobago?

- ☐ **Flooding**
- ☐ **Drought**
- ☐ **High temperatures**
- ☐ **Pests**
- ☐ **Limited land**
- ☐ _____
- ☐ _____

CHAPTER 2: CLIMATE CHANGE IN TRINIDAD & TOBAGO

What is Climate Change?

Climate change refers to long-term changes in weather patterns caused by increased greenhouse gases in the atmosphere.

Greenhouse gases trap heat around the Earth and contribute to global warming.

Examples include:

- Carbon Dioxide (CO_2)
- Methane
- Nitrous Oxide

How Does Climate Change Affect Trinidad & Tobago?

🌡️ Hotter Temperatures

Extreme heat can affect crops and livestock.

🌧️ More Flooding

Heavy rainfall can damage farms and wash away crops.

☀️ Longer Dry Seasons

Droughts reduce water availability for farming.

🌪️ More Extreme Weather

Storms can destroy crops and agricultural infrastructure.



Real-Life Example

A vegetable farmer loses part of their crop after heavy flooding damages planting beds.

To adapt, the farmer builds raised beds and drainage channels.

True or False Quiz

1. **Climate change only affects polar bears.**
2. **Climate change affects food production.**
3. **Young people can help combat climate change.**

🌍 Climate Detective Challenge

Interview:

👵 Grandparent

👴 Parent

👩 Teacher

Ask:

"How has the weather changed since you were my age?"

Record their responses.

Challenge



CHAPTER 3: WHY FOOD SECURITY MATTERS

🛒 Supermarket Challenge

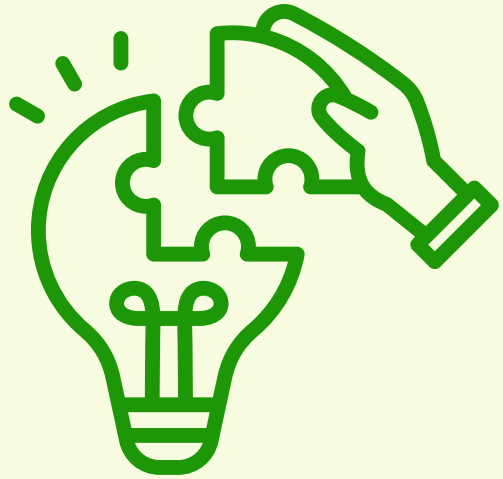
Visit a grocery store and count:

Product	Local	Imported
Tomatoes		
Lettuce		
Cucumbers		

Which category appears more often?

Did You Know?

Many Caribbean countries import a significant percentage of their food. Supporting local farmers helps improve food security.



What is Food Security?

Food security means everyone has access to enough safe, nutritious, and affordable food at all times.
There are four pillars of food security:

Availability
Is enough food being produced?
Access
Can people afford food?
Utilization
Is the food healthy and nutritious?
Stability
Will food continue to be available in the future?

Why Is It Important?

When countries produce more of their own food, they are less vulnerable to supply chain disruptions and price increases.

Example

If a hurricane damages shipping routes, imported food may become scarce.
Local food production helps communities remain resilient.

CHAPTER 4: HYDROPONICS EXPLAINED

What is Hydroponics?

Hydroponics is a method of growing plants without soil.
Instead, plants receive nutrients through water.
The roots may be suspended in water or supported by materials such as coconut coir, gravel, or clay pellets.

Benefits of Hydroponics

💧 Uses less water
🌱 Faster growth
🏡 Requires less space
🪱 Fewer soil-borne pests



Quiz Time

Why is hydroponics climate-smart?
A. Uses less water
B. Can grow in limited space
C. Produces crops efficiently
D. All of the above

Real-Life Example

Students at Young Farmers Clubs monitor hydroponic systems and track plant growth using nutrient solutions.

Fun Fact

NASA has researched hydroponic farming for future space missions.

Build Your Own Mini Hydroponic System

Materials:

- Plastic bottle
- String
- Water
- Lettuce seeds

Can you grow your own food at home?

🐟 CHAPTER 5: AQUAPONICS EXPLAINED

What is Aquaponics?

Aquaponics combines fish farming and hydroponics.
Fish produce waste.
Beneficial bacteria convert waste into nutrients.
Plants absorb nutrients and clean the water.
The clean water returns to the fish tank.





Benefits

- ✔ **Produces fish and vegetables**
- ✔ **Conserves water**
  Uses natural nutrient cycles
- ✔ **Reduces fertilizer needs**

🔄 Aquaponics Matching Game
Draw lines to match each item to its job.

Item	Job
FIsh	Cleans the water
Plants	Produces waste
Bacteria	Carries nutrients
Water	Converts waste into nutrients

☔ CHAPTER 6: RAINWATER HARVESTING



What is Rainwater Harvesting?

Rainwater harvesting is the collection and storage of rainwater for future use. Water can be captured from roofs and stored in tanks or barrels.

Why Is It Important?

- 💧 **Reduces water bills**
- 💧 **Conserves water**
- 💧 **Supports farming during droughts**
- 💧 **Improves sustainability**



School Investigation

Walk around your school.
Where could rainwater be collected?
Draw your ideas.

Challenge

Estimate how much water your school roof could collect during one rainfall event.



☀ CHAPTER 7: SOLAR POWERED AGRICULTURE

What is Solar Agriculture?

Solar agriculture uses energy from the sun to power farming systems.

Solar panels convert sunlight into electricity.

Examples

- ☀ **Water pumps**
- ☀ **Irrigation systems**
- ☀ **Fans**
- ☀ **Lighting**
- ☀ **Sensors**

Why Use Solar Energy?

- **Renewable**
- **Environmentally friendly**
- **Reduces electricity costs**
- **Works well in sunny climates**

Solar Detective Activity

Find three solar-powered devices in your community.

1. _____

2. _____

3. _____



🌿 CHAPTER 8: SHADE HOUSES & PROTECTED AGRICULTURE

What is a Shade House?

A shade house is a structure covered with special mesh material designed to protect crops.

The mesh helps regulate sunlight, temperature, airflow, and pests.

Benefits

- 🌱 Healthier plants
- 🌱 Reduced pest damage
- 🌱 Protection from extreme weather
- 🌱 Better crop production

Real-Life Example:

Students at Russell Latapy Secondary and Malick Secondary use shade houses to learn modern farming techniques



Design Challenge

Draw your dream shade house.

Include:

- ☐ **Crops**
- ☐ **Water source**
- ☐ **Compost area**
- ☐ **Tool storage**
- ☐ **Walkways**



♻ CHAPTER 9: COMPOSTING & WASTE REDUCTION

What is Composting?

Composting is the natural process of recycling organic materials into nutrient-rich fertilizer.

Tiny organisms break down materials over time.

Compost Materials

YES

- 🍌 Fruit peels
- 🍃 Leaves
- ☕ Coffee grounds
- 🥬 Vegetable scraps

NO

- ❌ Plastic
- ❌ Glass
- ❌ Meat
- ❌ Oils

Compost Treasure Hunt

Find:

- ☐ **Dry leaves**
- ☐ **Fruit peel**
- ☐ **Vegetable scraps**
- ☐ **Grass clippings**



🚜 CHAPTER 10: YOUTH IN AGRICULTURE

Why Are Young People Important?

The future of agriculture depends on innovation.
Young people bring:
- 📘 **Technology**
- 💡 **Creativity**
- 🤖 **Innovation**
- 🌍 **New ideas**

Modern Agriculture Uses

- **Drones**
- **Artificial Intelligence**
- **Mobile Apps**
- **Sensors**
- **Hydroponics**
- **Robotics**

Career Match Challenge

Can You Match the Career to the Description?

Draw a line or write the correct letter next to each career.

Careers

A. Agronomist
B. Veterinarian
C. Agricultural Engineer
D. Food Scientist
E. Agribusiness Entrepreneur
F. Environmental Scientist
G. Agricultural Technician
H. Agricultural Extension Officer

Descriptions

___ Studies crops and helps farmers grow healthier plants while improving harvests.

___ Cares for animals, diagnoses illnesses, and helps keep livestock healthy.

___ Designs and improves farming equipment, irrigation systems, greenhouses, and agricultural technology.

___ Studies how food is produced, processed, packaged, and kept safe for people to eat.

___ Owns or manages an agriculture-related business such as a farm, greenhouse, food company, or agricultural supply store.

___ Works to protect natural resources, reduce pollution, and find solutions to environmental challenges.

___ Assists with operating and maintaining agricultural equipment, hydroponic systems, and farm technology.

___ Visits farmers and communities to provide advice, training, and technical support on farming practices.

🌟 CHAPTER 11:
CASE STUDY – THE ESIMAJE FOUNDATION YOUNG FARMERS CLUB & SHADE HOUSE PROJECT

Growing Leaders, Farmers and Entrepreneurs

The Young Farmers Club was established to provide students with hands-on agricultural experiences while developing leadership, teamwork, entrepreneurship, and climate-smart farming skills.

Students from:

🏫 Malick Secondary School

🏫 Russell Latapy Secondary School

participate in practical learning activities that bring agriculture to life.



What Students Learn

🌱 **Hydroponics**

🌾 **Crop Production**

💧 **Irrigation Management**

📈 **Data Collection**

💰 **Entrepreneurship**

🤝 **Leadership**

♻️ **Sustainability**

Successes

Students have:

✅ **Developed club logos**

✅ **Managed crop production**

✅ **Harvested produce**

✅ **Sold crops**

✅ **Learned business skills**

✅ **Promoted sustainable**

Your lettuce crop begins to wilt.
What should you investigate first?

☐ **Nutrients**

☐ **Water Quality**

☐ **Temperature**

☐ **Pests**

Explain your answer.

Agriculture Lessons Learned

Good farming requires:

- **Planning**
- **Teamwork**
- **Observation**
- **Patience**
- **Problem-solving**



Young Farmers Innovation Challenge

You have been given TT$500 to improve your school shade house.
Create a budget.

Item	Cost
Seeds	
Fertilizer	
Equipment	
Marketing	



Tips from Young Farmers

- ⭐ Monitor crops daily.
- ⭐ Keep records of plant growth.
- ⭐ Work as a team.
- ⭐ Learn from mistakes.
- ⭐ Experiment with new ideas.





🚀 CHAPTER 12: START YOUR OWN SCHOOL AGRICULTURE PROJECT

Five Steps to Success

1. Build a Team
2. Choose a Location
3. Select Crops
4. Develop a Budget

Start Growing



Project Planner

Club Name:_____

Goal:_____

First Crop:_____

Expected Harvest Date:_____

🎓 CAREERS IN AGRICULTURE

Agriculture is more than farming.
Career opportunities include:

- 🌱 Agronomist
- 🐄 Veterinarian
- 💻 Agricultural Technologist
- 🚜 Agricultural Engineer
- 🌎 Environmental Scientist
- 💰 Agribusiness Manager
- 🥗 Food Scientist
- 📊 Agricultural Economist



FINAL CLIMATE CHAMPION PROJECT

Choose ONE project:

Option 1

Design a Climate Smart School Garden

Option 2

Create a Food Security Awareness Campaign

Option 3

Build a Mini Hydroponic System

Option 4

Produce a Climate Change Awareness Video

Option 5

Create a Business Plan for Selling Produce from Your School Garden

APPENDICES
Climate Smart Agriculture Toolkit for Young Farmers

The Esimaje Foundation

The appendices provide additional activities, worksheets, answer keys, and resources that teachers, facilitators, and students can use throughout the programme.

APPENDIX A
GLOSSARY OF TERMS

TERMS	DEFINITION
Agriculture	The science and practice of growing crops and raising animals for food and other products.
Aquaponics	A system that combines fish farming and hydroponics.
Climate Change	Long-term changes in weather patterns caused by natural and human activities.
Climate Smart Agriculture	Farming methods that increase productivity while adapting to climate change and protecting the environment.
Compost	Organic material that has decomposed and can be used as fertilizer.
Drought	A long period with little or no rainfall.
Food Security	Having access to enough nutritious food at all times.
Greenhouse Gas	Gases that trap heat in the Earth's atmosphere.
Harvest	The process of collecting mature crops.
Hydroponics	Growing plants without soil using nutrient-rich water.
Irrigation	Artificially supplying water to plants.
Mulch	Material placed around plants to reduce water loss and improve soil health.
Renewable Energy	Energy from sources that naturally replenish, such as solar energy.
Shade House	A structure that protects crops while allowing sunlight and airflow.
Sustainability	Meeting today's needs without harming future generations.

ANSWER KEY FOR ACTIVITIES

Chapter 2: True or False Quiz

1. Climate change only affects polar bears.
2. ❌ FALSE
3. Climate change affects food production.
4. ✅ TRUE
5. Young people can help combat climate change.
6. ✅ TRUE

Chapter 4: Hydroponics Quiz

Why is hydroponics climate-smart?

A. Uses less water

B. Can grow in limited space

C. Produces crops efficiently

D. All of the above

✅ **Answer: D. All of the above**

Chapter 5: Aquaponics Puzzle Challenge

1. Fish produce _____

✅ **Waste**

1. Helpful bacteria turn waste into _____

✅ **Nutrients**

1. Plants absorb the _____

✅ **Nutrients**

1. Plants help clean the _____

✅ **Water**

1. Clean water returns to the _____

✅ **Fish Tank**

Bonus Answer:

Aquaponics uses less fertilizer because fish waste naturally provides nutrients for plants.

Chapter 5: Aquaponics Matching Game

Fish → Produces waste

Plants → Cleans water

Bacteria → Converts waste into nutrients

Water → Carries nutrients

ANSWER KEY FOR ACTIVITIES

Chapter 6: Rainwater Harvesting

Possible Answers:

- **Roofs**
- **Gutters**
- **Storage tanks**
- **Rain barrels**

Students' answers may vary.

Chapter 8: Shade House Design Challenge

Answers will vary.

Students should include:

✅ **Crops**
✅ **Water source**
✅ **Walkways**
✅ **Compost area**
✅ **Storage area**

Chapter 10: Career Match Challenge

Agronomist →
Studies crops and helps farmers grow healthier plants.

Veterinarian →
Cares for animals and livestock.

Agricultural Engineer →
Designs agricultural equipment and systems.

Food Scientist →
Studies food production and safety.

Agribusiness Entrepreneur →
Owns or manages agriculture-related businesses.

Environmental Scientist →
Protects the environment and natural resources.

Agricultural Technician →
Operates agricultural equipment and technology.

Agricultural Extension Officer →
Provides training and support to farmers.

ANSWER KEY FOR ACTIVITIES

Chapter 11: Problem Solving Scenario

Possible Answers:

Students may select:

✅ **Water Quality**

✅ **Nutrients**

✅ **Temperature**

✅ **Pests**

Explanation should show understanding that all factors affect plant health.

USEFUL RESOURCES

Trinidad and Tobago Resources

- **Ministry of Agriculture, Land and Fisheries**
- **The Esimaje Foundation**
- **The University of the West Indies**

Educational Topics to Explore

🌱 **Hydroponics**

🐟 **Aquaponics**

♻️ **Composting**

☀️ **Solar Energy**

🌧️ **Rainwater Harvesting**

🌎 **Climate Change**

🥕 **Food Security**

💰 **Agricultural Entrepreneurship**

FINAL CHALLENGE SCORECARD

ACTIVITES	POINTS EARNED
Brainstorm Activities	
Quizzes	
Investigations	
Design Challenges	
Group Activities	
Final Project	
Total Score	

ANSWER KEY FOR ACTIVITIES

Climate Champion Levels
🌱 Seedling Farmer: 0–50 Points
🌿 Growing Farmer: 51–100 Points
🌾 Future Agricultural Leader: 101–150 Points
🏆 Climate Smart Agriculture Champion: 151–200+ Points
This appendix section would add approximately 10–15 pages to the guidebook and make it a complete student workbook that teachers can use for classroom instruction, Young Farmers Club meetings, camps, and agricultural outreach activities.



