Climate Smart Agriculture (An intro)

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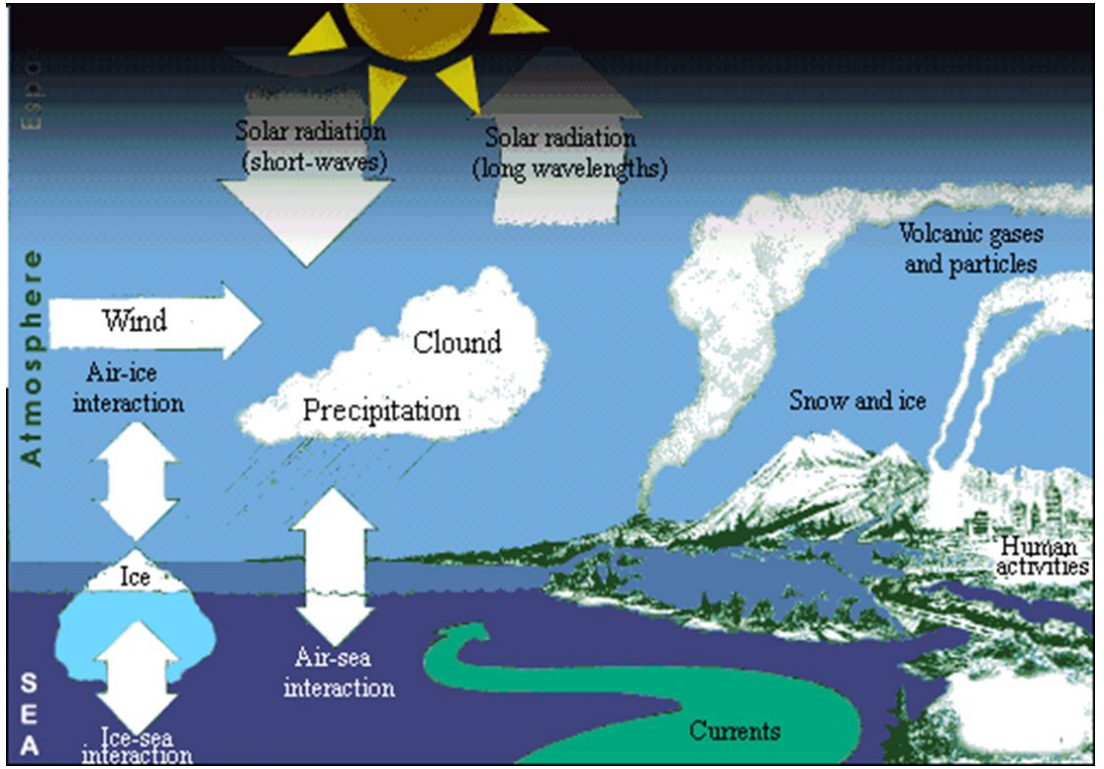
Outline of Presentation

- Overview of climate change
- Effects of climate change
- Climate change and agriculture
- Addressing climate change impacts
- Climate smart agriculture & production systems
- Thinking Climate Smart
- Climate Smart Businesses

Climate and climate factors

- Climate is the long-term pattern of weather in a particular area.
- Key factors: Temperature and Precipitation



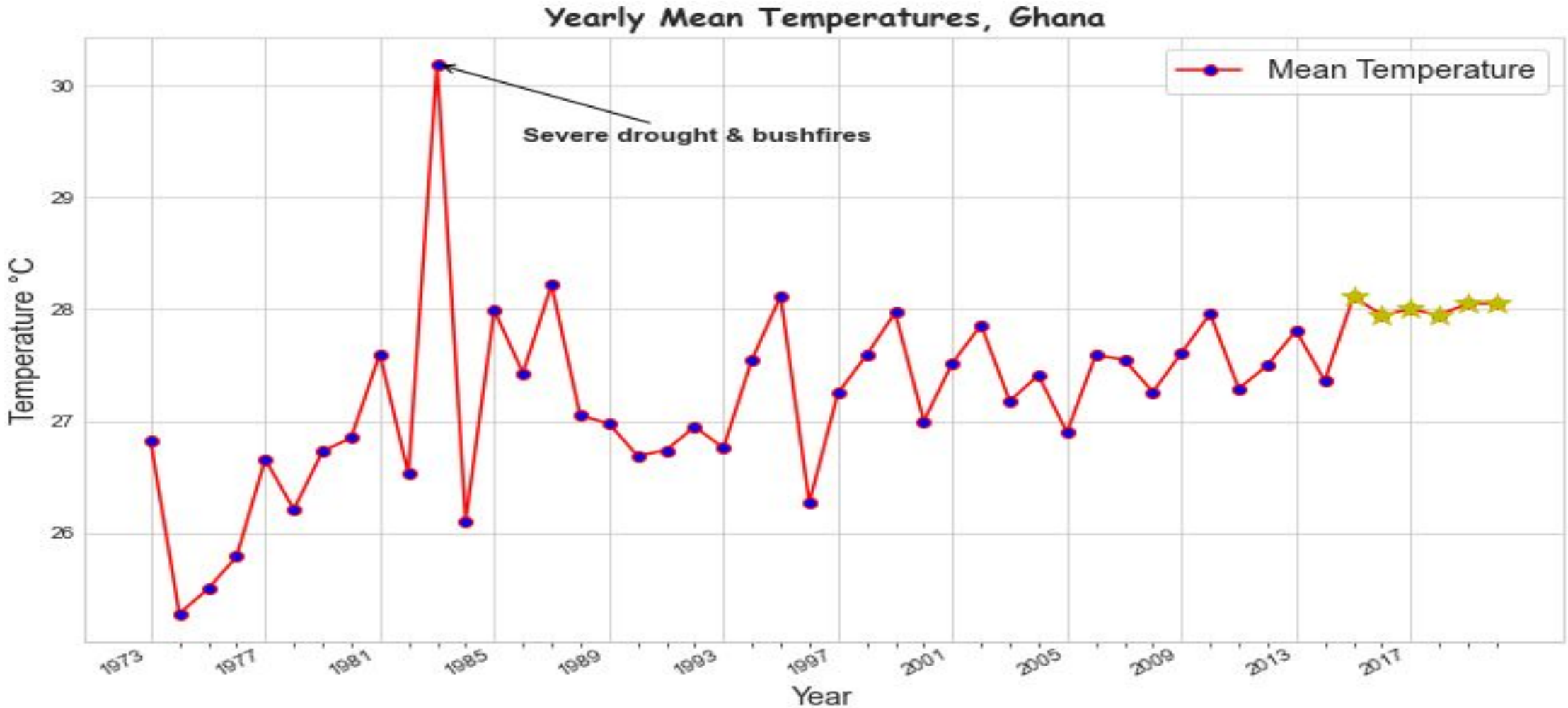
Overview of Climate Change

- Climate change refers to long-term shifts in weather patterns and average temperatures, primarily caused by human activities.

- Primarily driven by human-induced activities, e.g., burning fossil fuels, transportation, industrial processes, deforestation, agriculture, and land-use changes.

- Gases: CH_4, CO_2, N_2O
- Wide-ranging impacts on both global and regional scales. It affects ecosystems, water resources, agriculture, human health, and economies.

Features of Climate Change in Ghana - Temperature



Effects of Climate Change

How climate change could impact the world

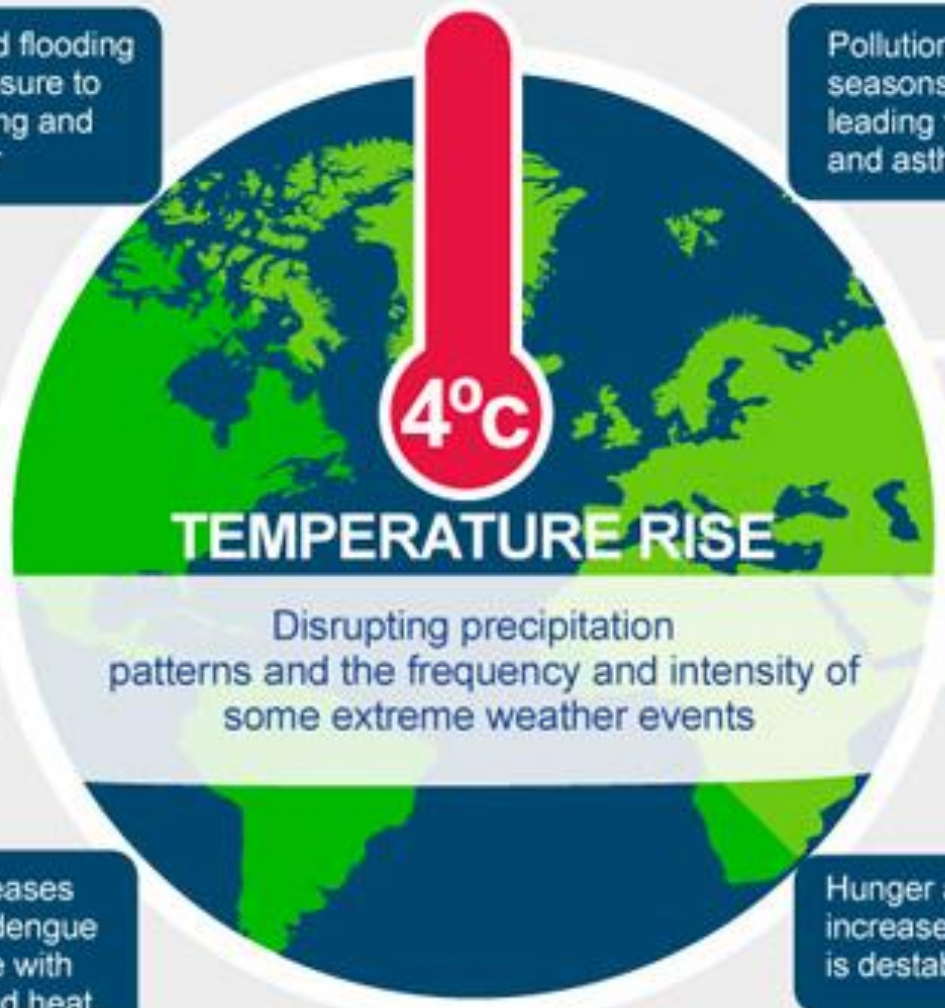
Warmer water and flooding will increase exposure to diseases in drinking and recreational water

Pollution and pollen seasons will increase, leading to more allergies and asthma

250,000

DEATHS FROM DISEASE BY 2030

Mainly due to malaria, malnutrition, diarrhoea and heat stress



7million

DEATHS FROM AIR POLLUTION

$2-4bn

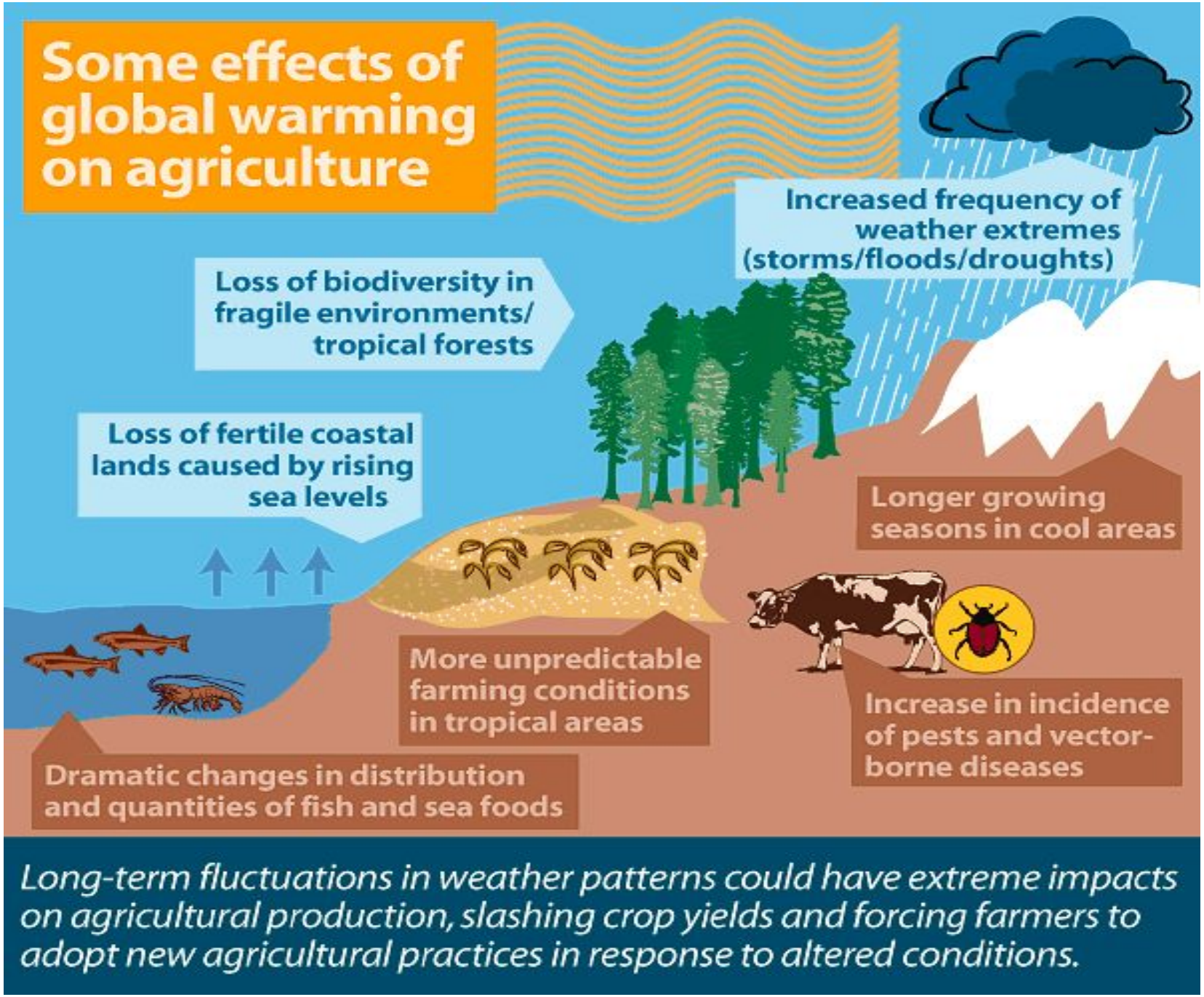
COSTS BY 2030

Vector borne diseases like malaria and dengue virus will increase with more humidity and heat

Hunger and famine will increase as food production is destabilised by drought

Source: WHO

Credit: Rebeccah Robinson/LSHTM


Some effects of global warming on agriculture
Increased frequency of weather extremes (storms/floods/droughts)
Loss of biodiversity in fragile environments/ tropical forests
Loss of fertile coastal lands caused by rising sea levels
Longer growing seasons in cool areas
More unpredictable farming conditions in tropical areas
Increase in incidence of pests and vector-borne diseases
Dramatic changes in distribution and quantities of fish and sea foods
Long-term fluctuations in weather patterns could have extreme impacts on agricultural production, slashing crop yields and forcing farmers to adopt new agricultural practices in response to altered conditions.

Climate change and the SDGs

Definition: CSA

- *"Agriculture that <u>sustainably</u> increases productivity, resilience (adaptation), reduces/removes GHGs (mitigation), taking into account the growing world population, and enhances achievement of national food security and development goals" (FAO, 2013)*

Sustainability

Key Issues:

- The need to continue producing food within the landscape to feed communities
- The need to protect the livelihoods of the **local people (**present population), without compromising future generations

Climate-smart production systems & Practices

1. Soil and nutrient management
2. Conservation agriculture
3. Water harvesting and use
4. Pest and disease control
5. Genetic resources (Crops and Livestock)
6. Harvesting, processing and supply chains

Soil and nutrient management

- Integrated soil fertility management practices (ISFM)
- Use of soil amendment practices (compost, biochar, green manure, covercropping) to
  - increase soil carbon uptake
  - Improve soil structure
  - Increase water holding capacity

Conservation Agriculture

- Minimal soil disturbance
- Crop rotations
- Alley cropping
- Fallowing
- Permanent soil cover

Water harvesting and Use

- Interventions that make water accessible to crops
  - Rainwater harvesting and storage
  - Wastewater re-use
  - Contour cropping
  - Supplementry small scale irrigation (boreholes, dugouts, dams, ponds)

Pest and disease control

- Use of Integrated Pest and disease management principles
  - Use of natural enemies of pests
  - Monitoring and controlled application of pesticides

Harvesting, processing and supply chains

- Achieving resilient supply chains include:
- Strategic and tactical decisions on where and how to build or operate manufacturing or processing facilities, warehouses and designing/packaging products

Livestock production systems

- Breeding more productive animals
- Better manure management e.g.(composting)
- Better herd health management to improve output
- Better management of grasslands

Agroforestry

- Specie specific
- Ecology-based edible tree crops e.g Shea, mango
- Ecology-based non-edible tree crops e.g Teak

Fisheries and aquaculture

- For capture fisheries- reducing excess capacity and ensuring fishing follows approved/improved methods

- For aquaculture – use of fully integrated systems for sustainable production (aquaponics)

Thinking Climate Smart?

Weather Smart

- Seasonal weather forecasts
- ICT-based agro-advisories
- Index-based insurance
- Climate analogue sites

Water Smart

- Aquifer recharge
- Rainwater harvesting
- Community Management of water
- Laser-leveling
- On-Farm water management

Carbon Smart

- Agroforestry
- Conservation tillage
- Land-use systems
- Livestock management

Nitrogen Smart

- Site-specific nutrient management
- Precision fertilizers
- Catch-cropping/ Legumes

Energy Smart

- Biofuels
- Fuel efficient engines
- Residue management
- Minimum tillage

Knowledge Smart

- Farmer-to-Farmer learning
- Farmer networks on adaptation technologies
- Seed and Fodder Banks
- Market information
- Kitchen Gardening

Energy smart innovations

AgroCold Ghana Ltd.

- Seeks to minimize post-harvest losses and climate change by providing **solar-powered** cold chain management system for fruits and vegetables

Energy Smart: residue management

KODU Technology

- Use of banana and plantain fibre for sanitary pads to address period poverty.

- **Reduction of CO_2 emission** into air, sparing atmosphere of about 38,000kg.

WEATHER SMART INNOVATIONS

AquaMet

- With a mobile app, farmers can monitor their water quality with a smart probe, estimate their feed, keep their records and obtain expert real time advisory on key management practices.

PlantAide

- PlantAide Ghana provides farmers with a mobile app that connects them with extension officers, enabling them to detect and diagnose crop diseases, access up-to-date resources, and increase productivity and profitability.

WATER SMART INNOVATIONS

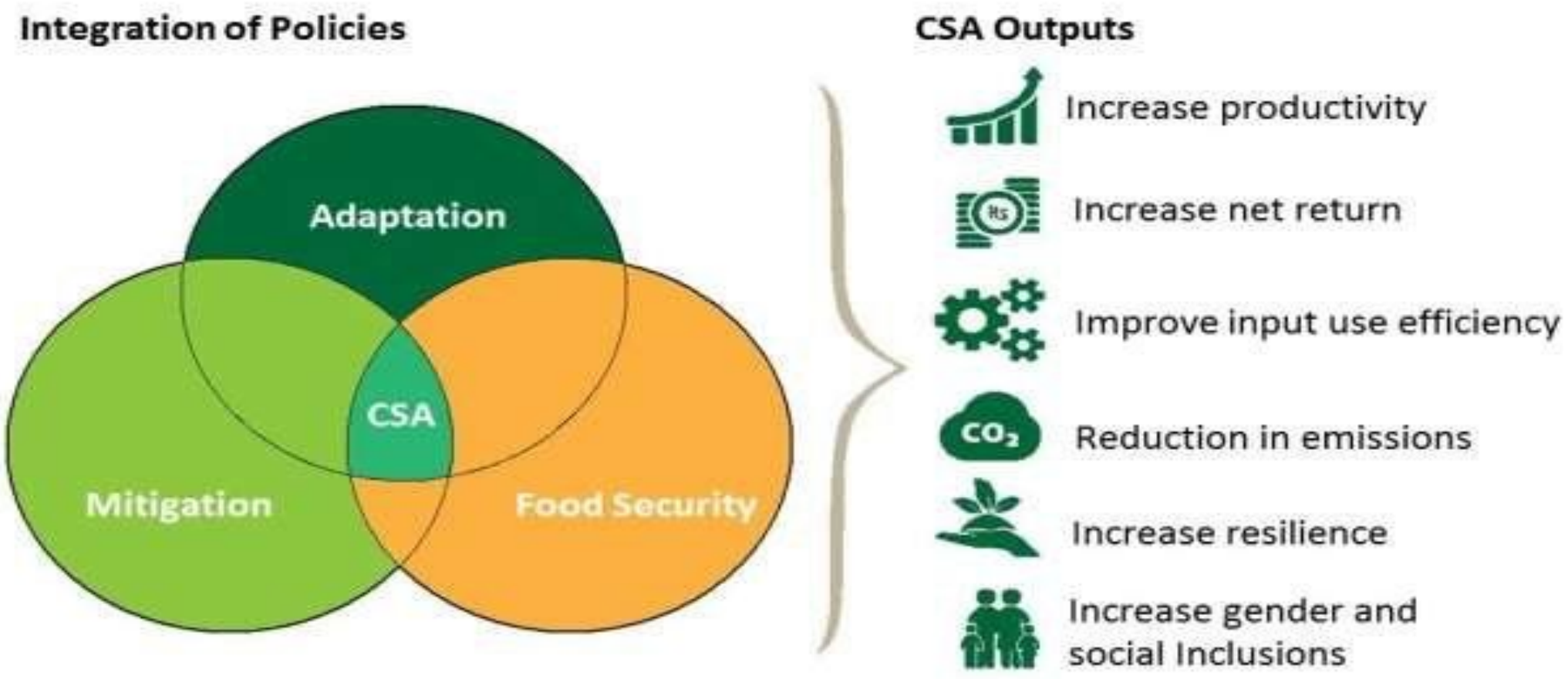
VeggieTECH

- Equipping farmers with aquaponic technology and partnering with them to supply markets with organic vegetables

Conclusion?

- **In your business ideas, think SMART!**
- Solutions to mitigate the contribution of agriculture to greenhouse gas emissions
- Solutions to feed an ever-increasing global population

An integrated approach to CSA



Thank you for your attention!

Questions?