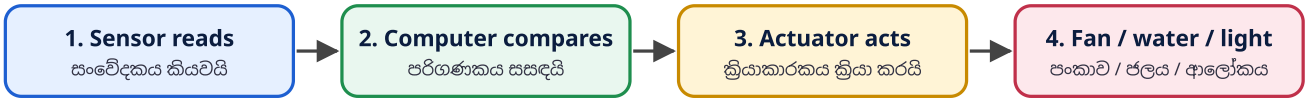
G.C.E. O/L Grade 11 ICT · Lesson 6

6.3 ICT in Agriculture: Greenhouses, Virtual Markets and Smart Farming

Syllabus 15.3. Farmers use ICT to grow more food with less work and less waste. Computers control **greenhouses**, farmers **search for information** and sell in **virtual markets**, and ICT helps with **pest control**, **fertilizer** and **weather prediction**. This raises **productivity**.

1. Computer-controlled greenhouses

A **greenhouse** is a glass or plastic house for plants. **Sensors** measure temperature, soil moisture, light and humidity. A **computer** compares each reading with a set value. Then it switches **actuators** such as fans, water sprinklers and lights ON or OFF. No person needs to watch all night.



Sensor → computer → actuator: the control loop in a greenhouse.

Rules used here: if temperature > 30 °C, switch the fan ON. If soil moisture < 40 %, switch the water ON.

Time	Temperature °C	Soil moisture %	Computer action
06:00	24	55	No action
10:00	29	38	Water ON
13:00	34	45	Fan ON
16:00	32	30	Fan ON + Water ON

💡 Think of the computer like a careful gardener who never sleeps: it checks, decides and acts again and again.

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2. Other ways ICT helps farmers



ICT gives farmers weather, pest and fertilizer information and a place to sell.

Use	How ICT helps
Information searching	Find the best seeds, prices and methods on the Internet or a phone app. Sri Lanka: 1920 Govi Sahana Sarana call centre.
Virtual market	Sell crops online straight to buyers, without many middle men, so the farmer earns more.
Pest detection and control	Take a photo of a sick leaf; an app names the pest and the right treatment. Drones spray only where needed.
Fertilizer optimisation	Soil sensors show what the soil needs, so the farmer uses the right amount – less waste and less pollution.
Weather prediction	Computers process satellite and weather station data. Farmers plan planting and harvesting. Sri Lanka: Department of Meteorology.

3. Productivity

Productivity means how much you produce for the work, land and money you use. ICT raises productivity: more harvest from the same land, less water and fertilizer wasted, and fewer crops lost to pests and bad weather.

> NEW 2026 2026: **smart farming** uses Internet of Things (IoT) sensors, **drones** with cameras, and **AI apps** that spot plant diseases from a phone photo. Weather warnings come as SMS so farmers can protect crops before heavy rain.

Key Words

Greenhouse – A glass or plastic house where plants grow in a controlled climate.

Sensor – A device that measures temperature, moisture or light.

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Actuator – A device such as a fan or pump that the computer switches on or off.	**Control loop** – Measure, compare and act, again and again.
Set value – The target reading the computer compares with.	**Virtual market** – An online place to buy and sell crops.
Information searching – Finding farming facts on the Internet or by phone.	**Pest detection** – Finding insects or diseases on crops, often with an app or camera.
Fertilizer optimisation – Using exactly the fertilizer the soil needs.	**Weather prediction** – Using computers and data to tell future weather.
Productivity – How much is produced for the land, work and money used.	**Drone** – A small flying machine with a camera or sprayer.

Sample Q&A

1. How does a computer control a greenhouse?

> **Answer:** Sensors measure conditions, the computer compares them with set values and switches actuators such as fans and water ON or OFF.

2. At 16:00 the temperature is 32 °C and moisture 30 %. What does the computer do?

> **Answer:** Fan ON + Water ON – both rules are broken.

3. What is a virtual market?

> **Answer:** An online place where farmers sell crops directly to buyers.

4. How can ICT help with pests?

> **Answer:** An app can name a pest from a photo; drones can spray only where needed.

5. Why is weather prediction useful to farmers?

> **Answer:** They can plan planting and harvesting and protect crops before storms.

6. What is productivity?

> **Answer:** How much is produced for the land, work and money used.

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MCQ

1. In a greenhouse, the device that measures soil moisture is a

A. sensor
B. router
C. actuator
D. printer

2. A fan switched ON by the computer is an

A. LMS
B. input device
C. actuator
D. sensor

3. Temperature 34 °C, moisture 45 %. Rules: fan if > 30, water if < 40. Action?

A. Fan ON
B. Fan ON + Water ON
C. Water ON
D. No action

4. Selling vegetables on a website directly to buyers uses a

A. CAT scanner
B. virtual market
C. firewall
D. greenhouse

5. Soil sensors help farmers to

A. pay taxes
B. watch movies
C. use the right amount of fertilizer
D. print bills

6. Which Sri Lankan service gives farmers advice by phone?

A. e-thaksalawa
B. NEMIS
C. 1990 Suwa Seriya
D. 1920 Govi Sahana Sarana

7. ICT raising the harvest from the same land means higher

A. piracy
B. eye strain
C. productivity
D. digital divide

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8. Weather prediction mainly uses

A. CAD drawings
B. music software
C. barcode readers
D. satellite data processed by computers

9. Which term means: “A glass or plastic house where plants grow in a controlled climate”?

A. Fertilizer optimisation
B. Greenhouse
C. Control loop
D. Virtual market

10. Which term means: “A device that measures temperature, moisture or light”?

A. Sensor
B. Weather prediction
C. Information searching
D. Set value

11. Which term means: “A device such as a fan or pump that the computer switches on or off”?

A. Pest detection
B. Actuator
C. Virtual market
D. Productivity

12. Which term means: “Measure, compare and act, again and again”?

A. Drone
B. Information searching
C. Control loop
D. Fertilizer optimisation

13. Which term means: “The target reading the computer compares with”?

A. Set value
B. Greenhouse
C. Weather prediction
D. Pest detection

14. Which term means: “An online place to buy and sell crops”?

A. Fertilizer optimisation
B. Sensor
C. Productivity
D. Virtual market

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15. Which term means: “Finding farming facts on the Internet or by phone”?

A. Actuator
B. Information searching
C. Drone
D. Weather prediction

Structured Questions

1. Explain how a computer-controlled greenhouse works. Name one sensor and one actuator. *(4 marks)*

> Sensor measures and computer compares with set value (1); computer switches actuator (1); sensor e.g. temperature sensor (1); actuator e.g. fan or pump (1)

2. Using the rules (fan if > 30 °C, water if < 40 %), give the action at 10:00 (29 °C, 38 %) and at 06:00 (24 °C, 55 %). *(2 marks)*

> 10:00: Water ON (1); 06:00: No action (1)

3. Give two benefits of a virtual market for farmers. *(2 marks)*

> Sell directly without middle men so earn more (1); reach more buyers (1)

4. Explain how ICT helps with pest control and fertilizer. *(3 marks)*

> App identifies pest from a photo (1); drones spray only where needed (1); soil sensors give the right fertilizer amount (1)

5. What is productivity? Give two ways ICT raises it. *(3 marks)*

> Output for the land, work and money used (1); less waste of water and fertilizer (1); fewer crops lost through weather prediction (1)

Summary

- Greenhouse: sensor → computer → actuator, again and again.
- Sensors measure; actuators act.
- Farmers search information online or by phone (1920).
- Virtual market = sell crops online, fewer middle men.
- Apps and drones help detect and control pests.
- Soil sensors give the right fertilizer amount.
- Weather prediction helps plan planting and harvest.
- ICT raises productivity; 2026 smart farming uses IoT and AI.

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MCQ answer key – 6.3

1. **A** – Sensors measure.
2. **C** – Actuators do the action.
3. **A** – Only the temperature rule is broken.
4. **B** – Online market = virtual market.
5. **C** – That is fertilizer optimisation.
6. **D** – 1920 is the farmer call centre.
7. **C** – More output for the same input.
8. **D** – Computers model the weather.
9. **B** – Greenhouse – A glass or plastic house where plants grow in a controlled climate.
10. **A** – Sensor – A device that measures temperature, moisture or light.
11. **B** – Actuator – A device such as a fan or pump that the computer switches on or off.
12. **C** – Control loop – Measure, compare and act, again and again.
13. **A** – Set value – The target reading the computer compares with.
14. **D** – Virtual market – An online place to buy and sell crops.
15. **B** – Information searching – Finding farming facts on the Internet or by phone.

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