



เสนอคัดเลือกอาจารย์ดีเด่น

ด้านบริการวิชาการ

มหาวิทยาลัยวลัยลักษณ์ 2564

นวัตกรรมเพื่อยกระดับการเรียนการสอนใน

ศตวรรษที่ ๒๑ และ SDG

Assoc.Prof.Dr. Krisanadej Jaroensutasinee

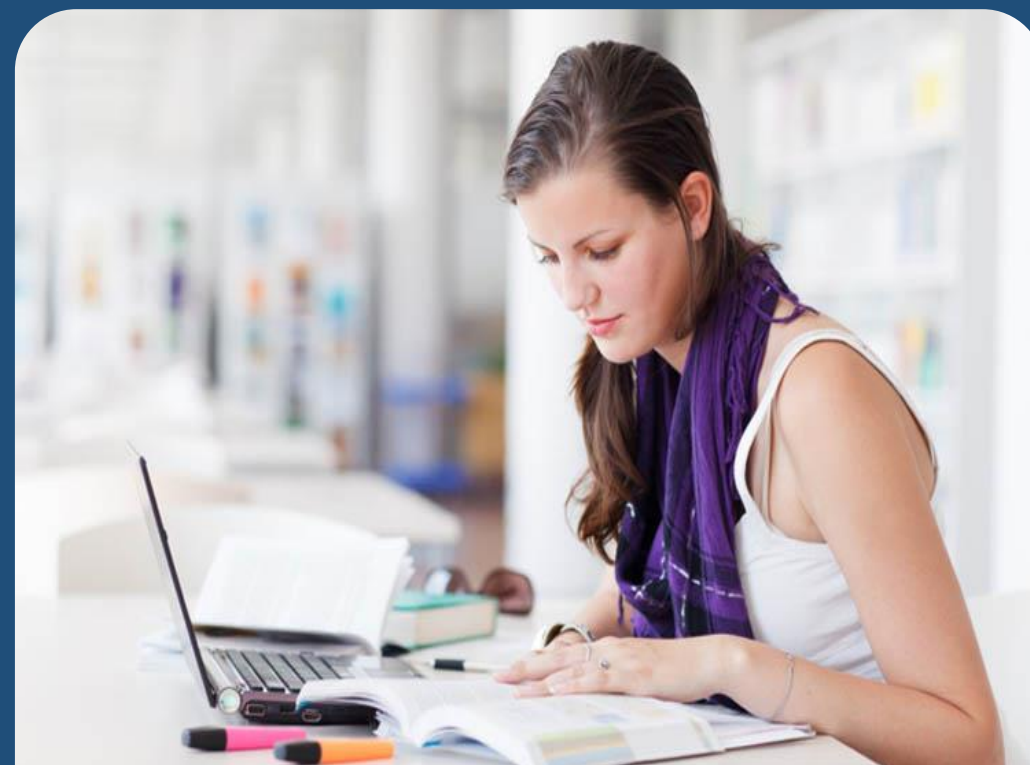
School of Science, Walailak University

10 Y Research Projects

Awards



30 ลป



34
Projects



8 Awards





GLOBE STAR Award 2019 for Scientist สสวท. (30 กันยายน 2562)

หอเกียรติยศ พสวท. DPST Hall of Fame ประจำปีพ.ศ. 2560

โล่เชิดชูเกียรติจากมหาวิทยาลัยวลัยลักษณ์ โครงการ GLOBE ภาคใต้ ด้านบริการวิชาการประจำปีงบประมาณ พ.ศ. 2557

โล่เชิดชูเกียรติจากมหาวิทยาลัยวลัยลักษณ์ ด้านบุคลากรดีเด่นด้านการวิจัย ประจำปีงบประมาณ พ.ศ. 2557

โล่เชิดชูเกียรติจากสถาบันส่งเสริมการสอนวิทยาศาสตร์และเทคโนโลยี (สสวท.) ด้านผู้สร้างคุณประโยชน์และชื่อเสียงให้ สสวท. และส่วนรวม พ.ศ. 2556

โล่เชิดชูเกียรติจากสถาบันส่งเสริมการสอนวิทยาศาสตร์และเทคโนโลยี (สสวท.) ด้านผู้สร้างคุณประโยชน์และชื่อเสียงให้ สสวท. และส่วนรวม พ.ศ. 2565

รางวัลประเภทเชิดชู โครงการดีเด่นด้านการบริการวิชาการเด่นประจำปีงบประมาณ 2558 โครงการการถ่ายทอดเทคโนโลยีการฟื้นฟูแนวปะการังด้วยระบบนิเวศ มหาวิทยาลัยวลัยลักษณ์ (28 มีนาคม 2559)

รางวัลผลงานดีเด่นด้านการบริการวิชาการ ผลงานเรื่อง “โครงการสำรวจความหลากหลายและภูมิปัญญาสมุนไพรสำหรับสุขภาพระดับชุมชน จังหวัดนครศรีธรรมราช” ผลงานดีเด่นตามภารกิจหลักของมหาวิทยาลัยวลัยลักษณ์ ประจำปีงบประมาณ 2563

International
User

National
User

Regional
User

Local
User

Workshop



Innovation

**Science &
Technology**

**21st Century
Competency**

**SDG 2, 3, 4, 13, 14,
15, 17**

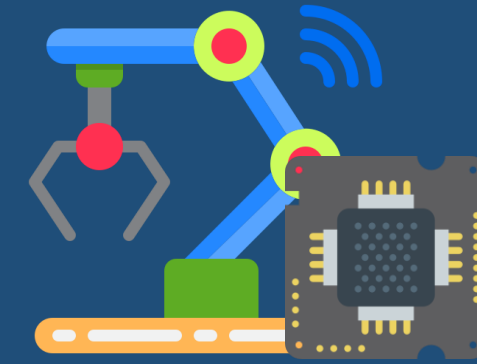
นวัตกรรมเพื่อยกระดับการเรียนรู้การสอนในศตวรรษที่ ๒๑ และ SDG



Online learning Module



Smart Farming

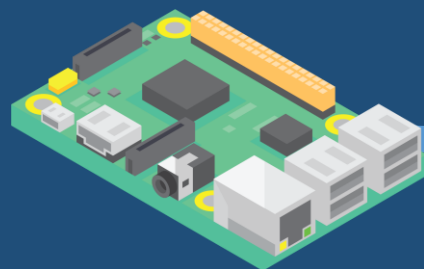


Big Data, AI,
Machine Learning

Mosquito App



Sensors



Internet of Things



Data Visualization

ผลกระทบต่อเศรษฐกิจ

ECONOMIC IMPACT OF DENGUE



IT IS ESTIMATED THAT EVERY YEAR DENGUE COSTS THE AMERICAS

US\$ 2.1 BILLION



AND IN SOUTHEAST ASIA ECONOMIES COULD LOSE

US\$ 2.36 BILLION

DUE TO THE DISEASE*



STUDIES CARRIED OUT IN 8 COUNTRIES SUGGEST THAT THE OVERALL COSTS OF A NON-FATAL AMBULATORY CASE AVERAGED

US\$ 514**



AND NON-FATAL HOSPITALISED CASE AVERAGED

US\$ 1,394***



Hospitalised cases cost **3** times of what an ambulatory case costs



On average **45%** of health costs are borne by the patient or the family*



Between **14.8** and **18.9** days are lost in productivity for patients and families**



The costs of dengue can be **2** times, or even **3** times, the average monthly income of a family***



NASA GLOBE OBSERVER

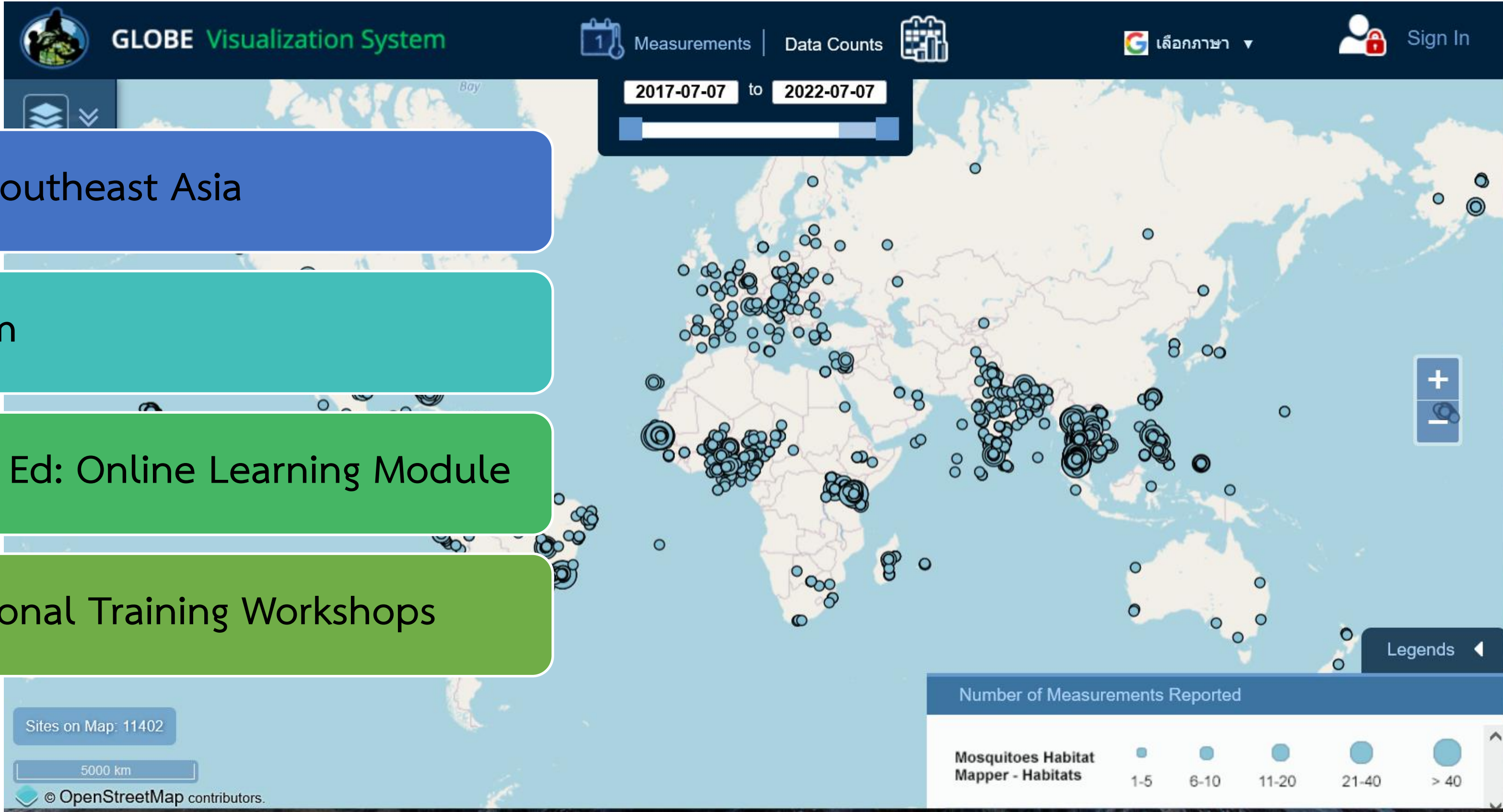


MOSQUITO HABITAT MAPPER APP



- 10000++ sites
- 20000++ containers
- 1,000,000 mosquito larvae
- Million USD

ผลกระทบด้านสังคม/ชุมชน



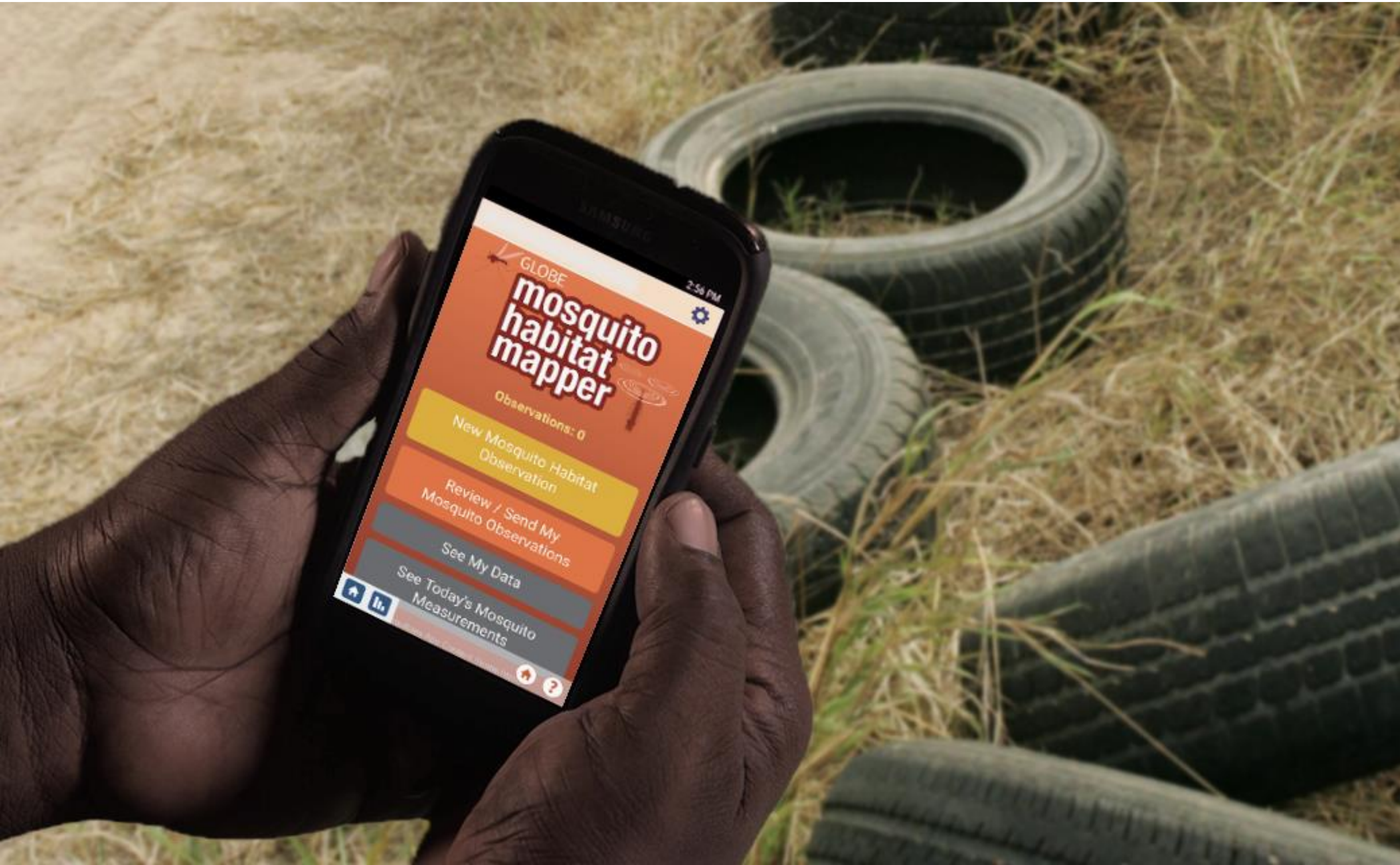
Dengue Free Southeast Asia

GLOBE Program

SEAMEO STEM Ed: Online Learning Module

TICA: International Training Workshops

ผลกระทบต่อทรัพยากรสิ่งแวดล้อม



- Mosquito Habitat Mapper App กำจัด ภาชนะเก็บ
- ทำลาย แก้วพลาสติก ก่อังโฝม ขวดน้ำ พลาสติก ที่เป็นแหล่ง เพาะพันธุ์ยุง
- ลด Microplastics ใน ทะเล

ผลกระทบต่อการศึกษาและวิชาการ



200 Schools



400 Teachers



20,000 Students



200 Projects

โครงการพัฒนาต้นแบบ การส่งเสริมการทำงานวิจัยสิ่งแวดล้อมในโรงเรียน

ดำเนินการอบรมเชิงปฏิบัติการ GLOBE STEM ผ่านระบบออนไลน์

- ให้ความรู้ภาคบรรยายโดยการแนะนำโครงการ GLOBE
- ให้ความรู้ภาคบรรยายพร้อมกับการแนะนำการใช้ App NASA GLOBE Observer
- การฝึกปฏิบัติการการใช้ App NASA GLOBE Observer
- การลงพื้นที่เก็บข้อมูลและส่ง Data Entry
- การฝึกเขียนโครงงานวิจัย โดยที่วิทยากรที่มีความเชี่ยวชาญในแต่ละด้าน

อาจารย์ผู้รับผิดชอบโครงการ

- รศ.ดร.กฤษณะเดช เจริญสุธาสินี
- รศ.ดร.นลินีลา เจริญสุธาสินี
- ผู้ช่วยอธิการบดี และคณาจารย์

การติดตามและประเมินผลความสำเร็จในการทำงานวิจัยของนักเรียน

- โรงเรียนวิทยาศาสตร์จุฬาลงกรณ์ราชวิทยาลัย ต.วังน้อย จ.พระนครศรีอยุธยา
- โรงเรียนสาธิตมหาวิทยาลัยศรีนครินทรวิโรฒ ปทุมวัน กรุงเทพมหานคร

หัวข้อวิจัยชนะเลิศ WINNER FOR THE ASIA AND PACIFIC REGION

หัวข้อวิจัย "A Study of Microplastic Contamination in Water and White Shrimp"

ตัวอย่างหัวข้องานวิจัย

- Effects of Breeding of Mosquito Larvae on High and Low Tourist Temples in Krabi, Thailand using GLOBE Observer Habitat Mapping App.

การส่งข้อมูล Data Entry (รวมทั้งสิ้น 966 ข้อมูล)

ยุง 407 ข้อมูล	ต้นไม้ 118 ข้อมูล	เมฆ 441 ข้อมูล
โรงเรียน 12 โรงเรียน	คุณครู 47 คน	นักเรียน 96 คน
		โครงการ 10 เรื่อง

โรงเรียนวิทยาศาสตร์จุฬาลงกรณ์ราชวิทยาลัย ต.วังน้อย จ.พระนครศรีอยุธยา

ขอแสดงความยินดีกับ

was selected as the drawing

WINNER FOR THE ASIA AND PACIFIC REGION

in the 2022 GLOBE International Virtual Science Symposium (IVSS).

จากผลงาน Study of Microplastics Contamination in Water and White Shrimp (*Litopenaeus vannamei*) from Shrimp Farming in Songkhla Province, Thailand.

นางสาวพรพรรณ อดทน

นายกันตพงศ์ วงศ์พาณิชย์

นางสาวพิรวัสส์ ชัยวัฒน์

นางศุภมาสรา พันธ์นระสูณี

2022 GLOBE International Virtual Science Symposium

Effects of Breeding of Mosquito Larvae on High and Low Tourist Temples in Krabi, Thailand using GLOBE Observer Habitat Mapping App.

GPS as an Aid to Understanding Tourists Spatial Behavior

Ship Classification Tool for Environmental Management and Safety with Deep Learning

Traditions and cultures of Buddhism in Thailand that consists of incense, candles, and combustion that leads to air pollution

Innovation to Reduce Mosquitoes (MOSSKEYTO)

Study on the effect of water pH on survival rate and life cycle of Aedes spp.

The oil filter tank separates oil from contaminated wastewater using natural filter materials.

acts of beach cleanup on marine debris and microplastic levels in touristic coastline area in Krabi, Thailand

The study of salinity, water temperature and soil quality on diversity of fiddler crabs in mangrove saline hot springs, Hat Chao Mai National Park, Trang Province.

The study of water quality and phytoplankton which affect to the survival and growth rates of *Crasostrea belcheri* in the coastal area of Trang Province.

Weather data collector to study local weather conditions.

A study of microplastic contamination in water and white shrimp (*Litopenaeus vannamei*) in shrimp ponds in Songkhla Province, Thailand.

2022 GLOBE International Virtual Science Symposium

INNOVATION TO REDUCE MOSQUITOES (MOSSKEYTO)

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ผลกระทบต่อการศึกษาและวิชาการ

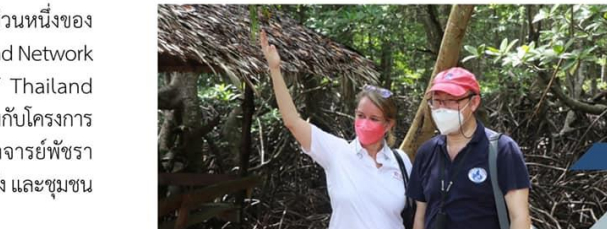


ศาสตราจารย์ ดร.สมบัติ ช่างธัญวงศ์ รักษาการแทนอธิการบดี มหาวิทยาลัยวลัยลักษณ์ พร้อมด้วย รองศาสตราจารย์ ดร.มัลลิกา เจริญสุธาสินี คณบดีสำนักวิชาวิทยาศาสตร์และ รองศาสตราจารย์ ดร. กฤษณะเดช เจริญสุธาสินี ประธานสาขาคอมพิวเตอร์ ศูนย์สวอน.มหาวิทยาลัยวลัยลักษณ์ ร่วมแสดงยินดีกับ นายธีร เทมจินดา นักเรียนโรงเรียนเบญจมราชูทิศ 'ได้รับรางวัลเหรียญทองและรางวัล"คะแนนสูงสุดภาคใต้" และนายชยพัทธ์ ครุฑนัม นักเรียนโรงเรียนวิทยาศาสตร์จุฬาราชวิทยาลัย นครศรีธรรมราช ได้รับรางวัลเหรียญทองแดง จาก... See more



ม.วลัยลักษณ์ แสดงความยินดีกับนร.ศุภณัฐ สวอน.ม.วลัยลักษณ์
คว้าเหรียญทองคอมพิวเตอร์โอลิมปิกระดับชาติ

รศ.ดร.กฤษณะเดช เจริญสุธาสินี Center of Excellence for Ecoinformatics หัวหน้าสถานวิจัย สำนักวิชาวิทยาศาสตร์ มหาวิทยาลัยวลัยลักษณ์ เป็นนักวิทยาศาสตร์ ที่เลี้ยงให้กับโครงการ The Extension of GLOBE Research Program and Network to Strengthen Local Wisdoms in Rural Areas of Thailand ประเทศไทย ได้จัดค่าย GLOBE โรงเรียนบ้านมดตะนอย จังหวัดตรัง โดยมี Ms. Deborah Mak รองผู้ช่วยทูตฝ่ายวัฒนธรรมและการศึกษา สถานเอกอัครราชทูตสหรัฐอเมริกาประจำประเทศไทยมาเป็นประธาน ในพิธีเปิดกิจกรรมการเรียนรู้สิ่งแวดล้อมผ่านการตรวจวัดสิ่งแวดล้อม และการทำงานวิจัยครั้งที่ 4 ณ โรงเรียนบ้านมดตะนอย อำเภอกันตัง จังหวัดตรัง ในวันที่ 20 พฤษภาคม 2565 กิจกรรมนี้เป็นส่วนหนึ่งของ โครงการ The Extension of GLOBE Research Program and Network to Strengthen Local Wisdoms in Rural Areas of Thailand ประเทศไทย โดยนักเรียนและครูโรงเรียนบ้านมดตะนอยจะร่วมกับโครงการ GLOBE ประเทศไทย สวท. มหาวิทยาลัยวลัยลักษณ์ อาจารย์พัชรา พงศ์มานะวุฒิ โรงเรียนวิทยาศาสตร์จุฬาราชวิทยาลัย ตรัง และชุมชน ในการเรียนรู้สิ่งแวดล้อมท้องถิ่นผ่านกิจกรรม GLOBE



Walailak NEWS ข่าวมหาวิทยาลัยวลัยลักษณ์
June 20 at 4:20 PM · 🌐

เช้าวันนี้ (20 มิ.ย.'65)ศาสตราจารย์ ดร.สมบัติ ช่างธัญวงศ์ รักษาการแทนอธิการบดี มหาวิทยาลัยวลัยลักษณ์ พร้อมด้วย รองศาสตราจารย์ ดร.มัลลิกา เจริญสุธาสินี คณบดีสำนักวิชา... See more

Amonsak Sawusdee is at โรงเรียนเบญจมราชูทิศ นครศรีธรรมราช.
June 16 at 2:31 PM · Nakhon Si Thammarat · 🌐

ศูนย์บริการวิชาการ ม.วลัยลักษณ์ ขอร่วมแสดงความยินดีกับ นายวิชชุดม นาคะศุณย์ นักเรียนโรงเรียนเบญจมราชูทิศ ผู้ได้รับรางวัล Grand Award, Fourth Place Award in Phy... See more

Assoc. Prof. Dr. Krisanadej Jaroensutasinee

Smart Agriculture, AI, IoT, ML Expert



Assoc. Prof. Dr. Krisanadej Jaroensutasinee

Applying sensor technology to agriculture (precision and smart farming), sensor technology (IoT) and medical applications (smart health, BIG data and Machine Learning) are also my ongoing research interest.



Assoc. Prof. Dr. Krisanadej Jaroensutasinee

My current research is on scientific computing and informatics in the marine sensor network (coral, wetland, estuaries and seagrass marine systems), especially on ecology (Ecoinformatics). This sensor network helps us monitor changes in the fragile ecosystem in near real-time online.



Assoc. Prof. Dr. Krisanadej Jaroensutasinee

Research Interests on education includes STEM education, inquiry based learning, problem and research based education, active learning, creative learning including innovation and impacts of Social Media and Technology.

Expert on dengue and Zika Prevention

GLOBE Mosquito Project



Meet the Team

Click the link to each team member's bio to learn more and to add him or her as a friend on the GLOBE website!

GLOBE Implementation Office Team

If you have any questions on who to contact for an inquiry about this project, please contact Mindi or send an email to globemosquitoes@ucar.edu. Thanks!

Tony Murphy, PhD



Dr. Tony Murphy is the Director of GLOBE, and also serves as the Project Manager of the Mosquito Project.

Mindi DePaola, MSPH



Mindi DePaola is a Program Specialist and the main point of contact for the Mosquito Project at the GLOBE Implementation Office.

GLOBE Trainer Team

Mullica Jaroensutasinee



Mullica Jaroensutasinee is a GLOBE trainer. She is a professor at Walailak University in Thailand.

Krisanadej Jaroensutasinee



Krisanadej Jaroensutasinee is a GLOBE trainer. He is a professor at Walailak University in Thailand.

GLOBE Mosquito Project

[Why Study Mosquitoes?](#)

[The GLOBE Observer App](#)

[Collecting and Using Data](#)

[Resources For Students and Teachers](#)

[For Country Coordinators and Trainers](#)

[Apply for a Local Mosquito Workshop](#)

[Community Resources & Discussion Forums](#)

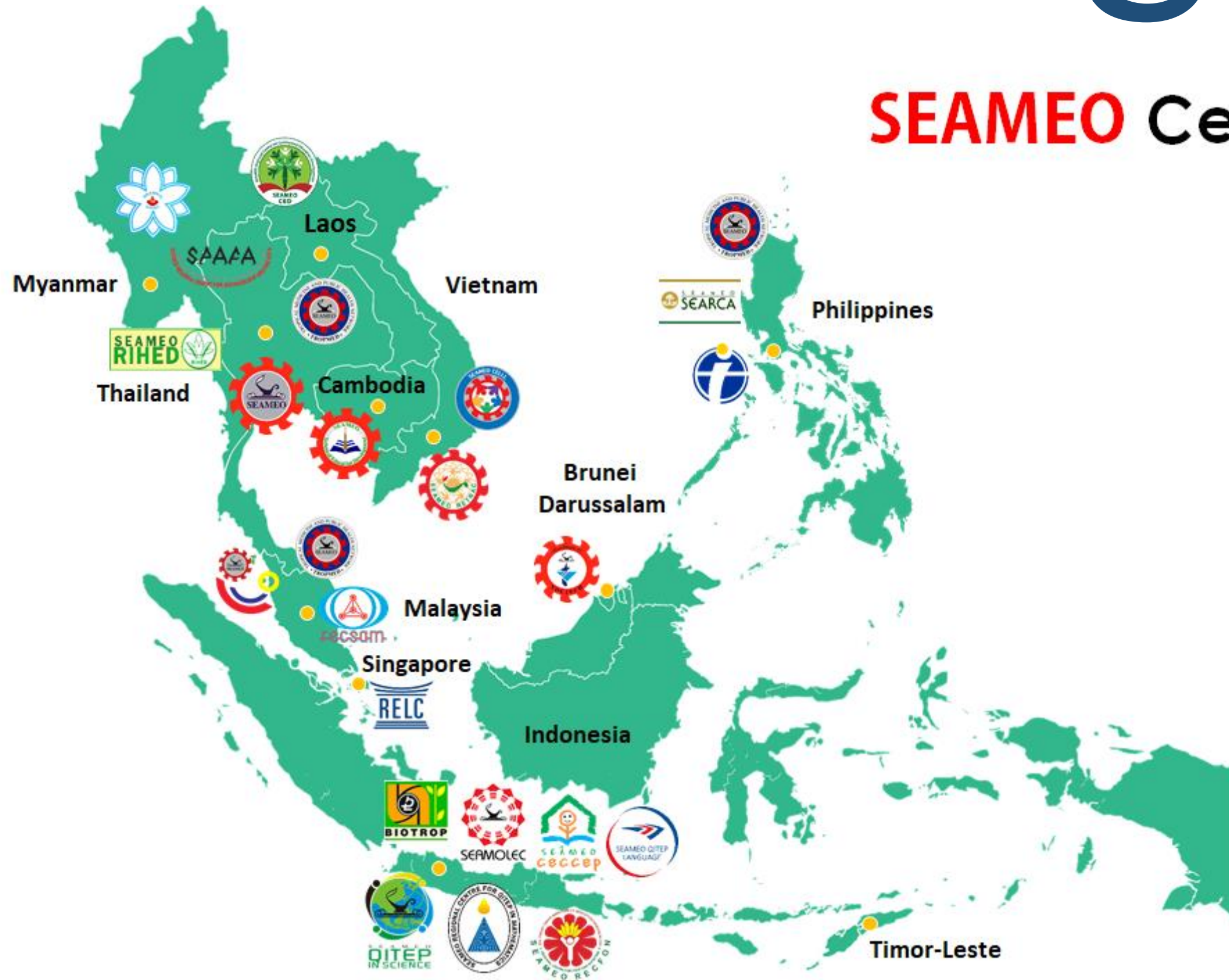
[Meet the Team](#)

[Events](#)

[FAQs](#)

[GLOBE Virtual Exchange Toolkit Pilot Program Information](#)

[IVSS and Zika Project](#)



SEAMEO Centres



Brunei Darussalam



Indonesia



Malaysia



Singapore



Democratic Republic of Timor-Leste



Socialist Republic of Vietnam



Cambodia



Lao PDR



Philippines



Thailand



Union of Myanmar

Module 1 and 2

- 2 Zero Hunger
- 3 Good Health & Well-being

SDG Goals



Module 1

Module 1. Smart Agriculture using Sensors and IoT

- L1: Sensor Technology
- L2: Practical Sensor Technology
- L3: Precision Agriculture
- L4: Basic AI and Machine Learning for STEM
- L5: Drone Mapping

Module 2

Module 2. Dengue Free Southeast Asia

- L1: Innovation and STEM
- L2: Climate Changes and Its Impact
- L3: Dengue and Zika Risk, Control and Prevention
- L4: NASA App for SDGs
- L5: Digital Media for Dengue and Zika Free Southeast Asia

Module 1: Climate Smart Agriculture using Sensors, AI and IoT

Goal 1

Goal 1: Increase children's technological literacy

Goal 2

Goal 2: Increase high school educator's abilities to teach "Climate Smart Agriculture using sensors, AI and IoT to their students.

Goal 3

Goal 3: Increase the number of schools in the SEAMEO country members that include agriculture at the high school level

Goal 4

Goal 4: Conduct research and assessment to expand the first three goals and contribute knowledge about precision agriculture teaching and learning at the high school level

Engineering for children

Children are fascinated with building and taking things apart to see how they work

STEM projects integrate other disciplines

Smart Agriculture and AI foster problem solving skills: problem formulating, iteration, testing of alternative solutions

Agriculture embraces project-based learning, encompasses hand-on construction and sharpen children's abilities to function.

Increase student's awareness and access to scientific and technical careers

How to use this module

Grade level

Basic students
G7-9

Advanced
students G10-12

Materials

Simple

Inexpensive
materials

Assessment

Activity sheets

Rubric

Answer keys

Provide each
activity

Open-end
questions will not
have answer keys

Other materials

Videos

Kahoot

Padlet

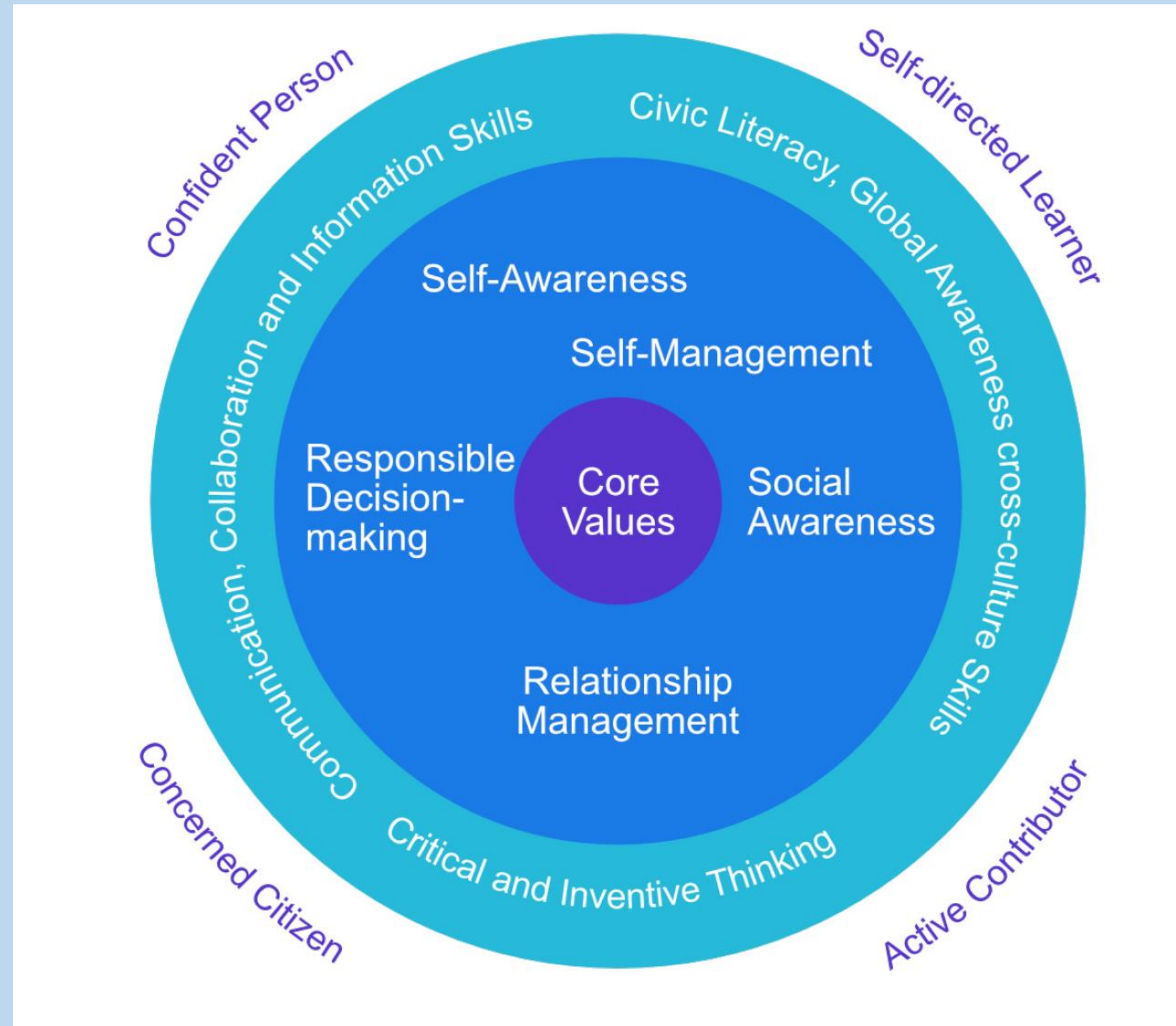
Tello application

Droneblocks application

WeatherLinnk website

Wolfram Cloud

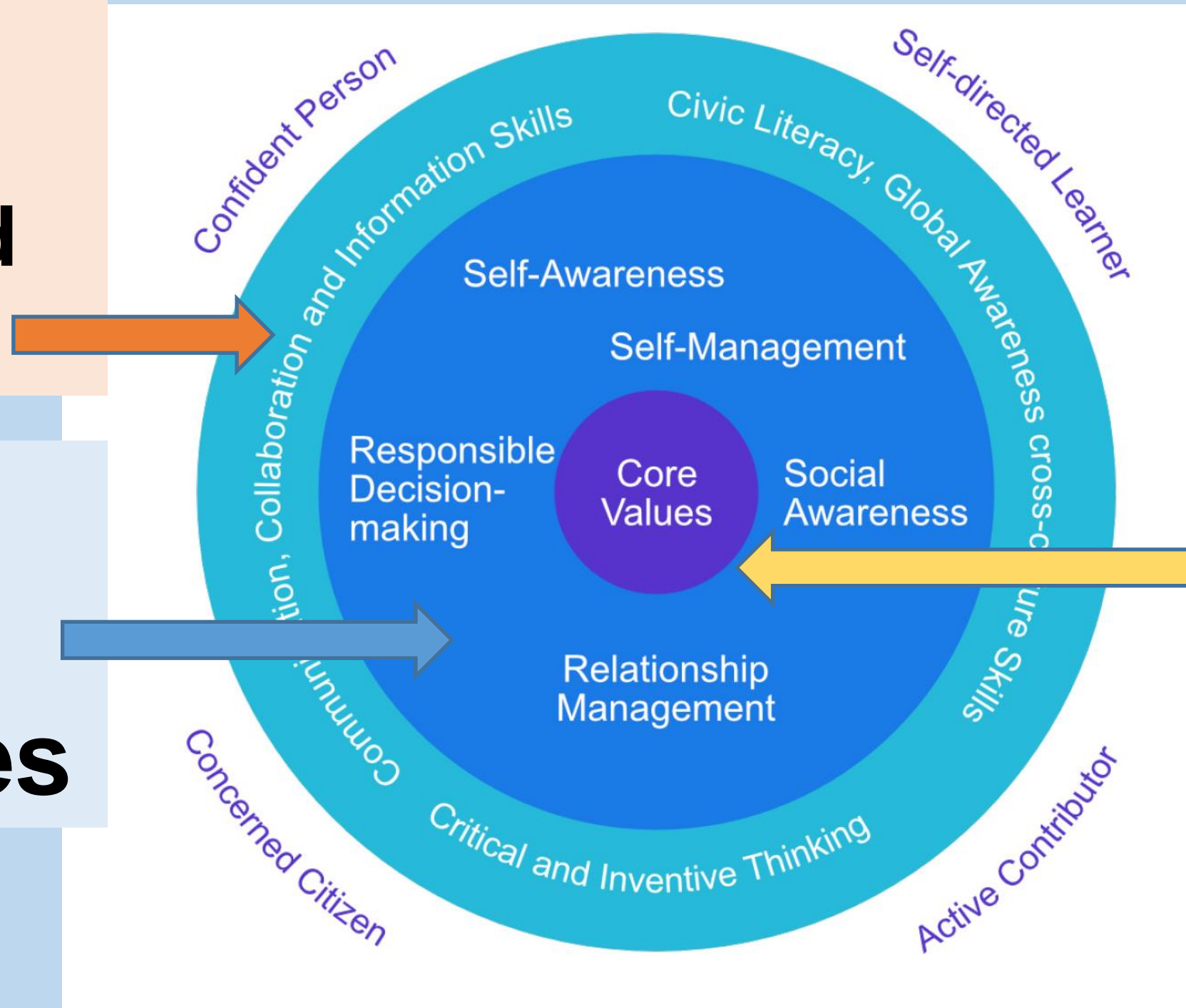
21st Century Competencies and student outcomes



21st Century Competencies and student outcomes

21st Century Competencies for a globalized world

Social Emotional competencies



Respect

Responsibility

Resilience

Integrity

Care

Harmony

Innovation

Training courses

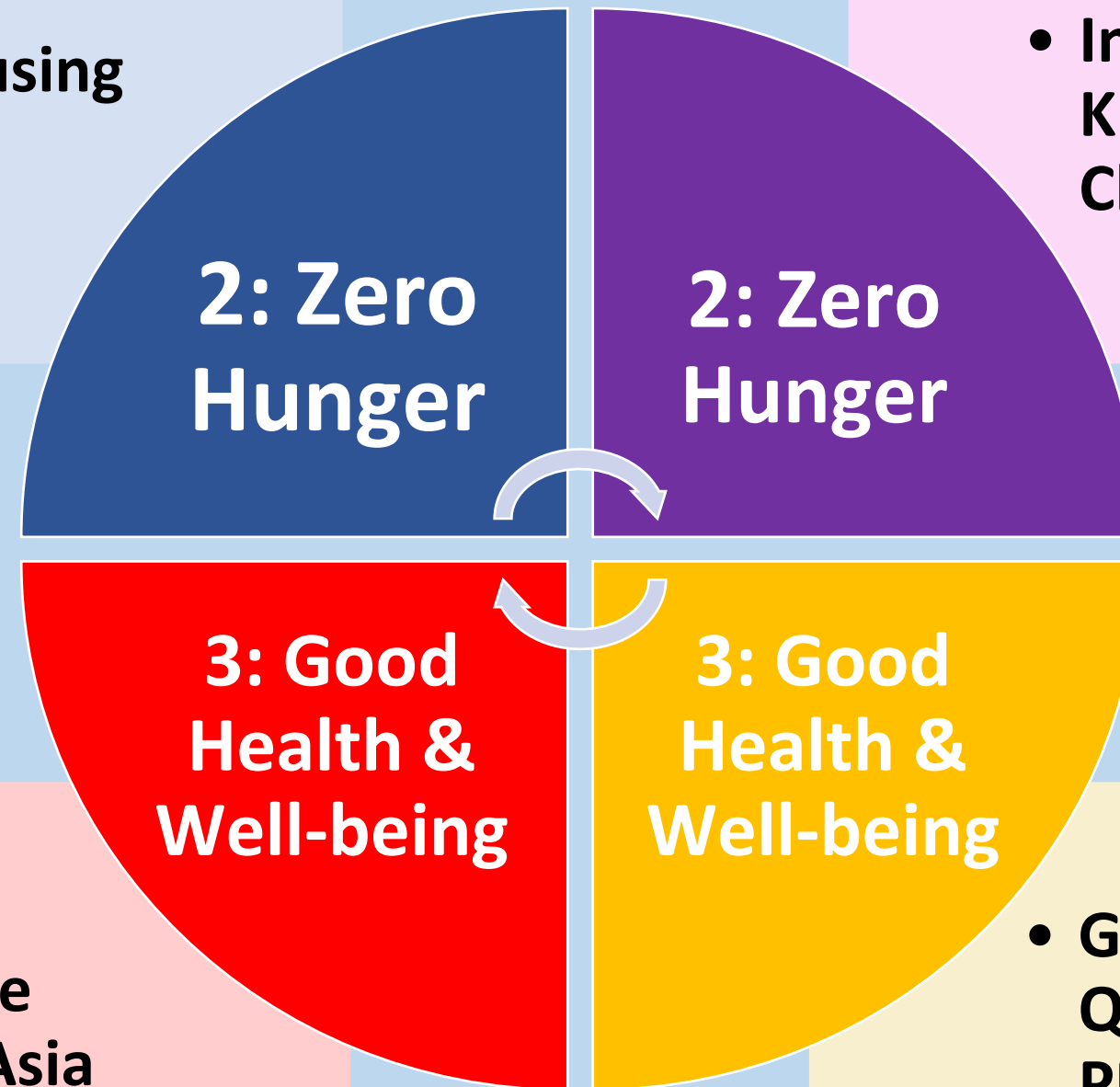
SDG



SEAMEO STEM Education for SDGs



- **Smart Agriculture using Sensors, AI & IoT**



- **Indigenous Knowledge for Climate Change**



- **Dengue Free Southeast Asia**

- **Good Air Quality with PM2.5 sensors & IoT**



STEM education on Goal 2: Zero Hunger

 SUSTAINABLE DEVELOPMENT GOALS



2 ZERO HUNGER


Avoid throwing away food.
Over 1/3 of the world's food is wasted.

Goal 2: Zero Hunger



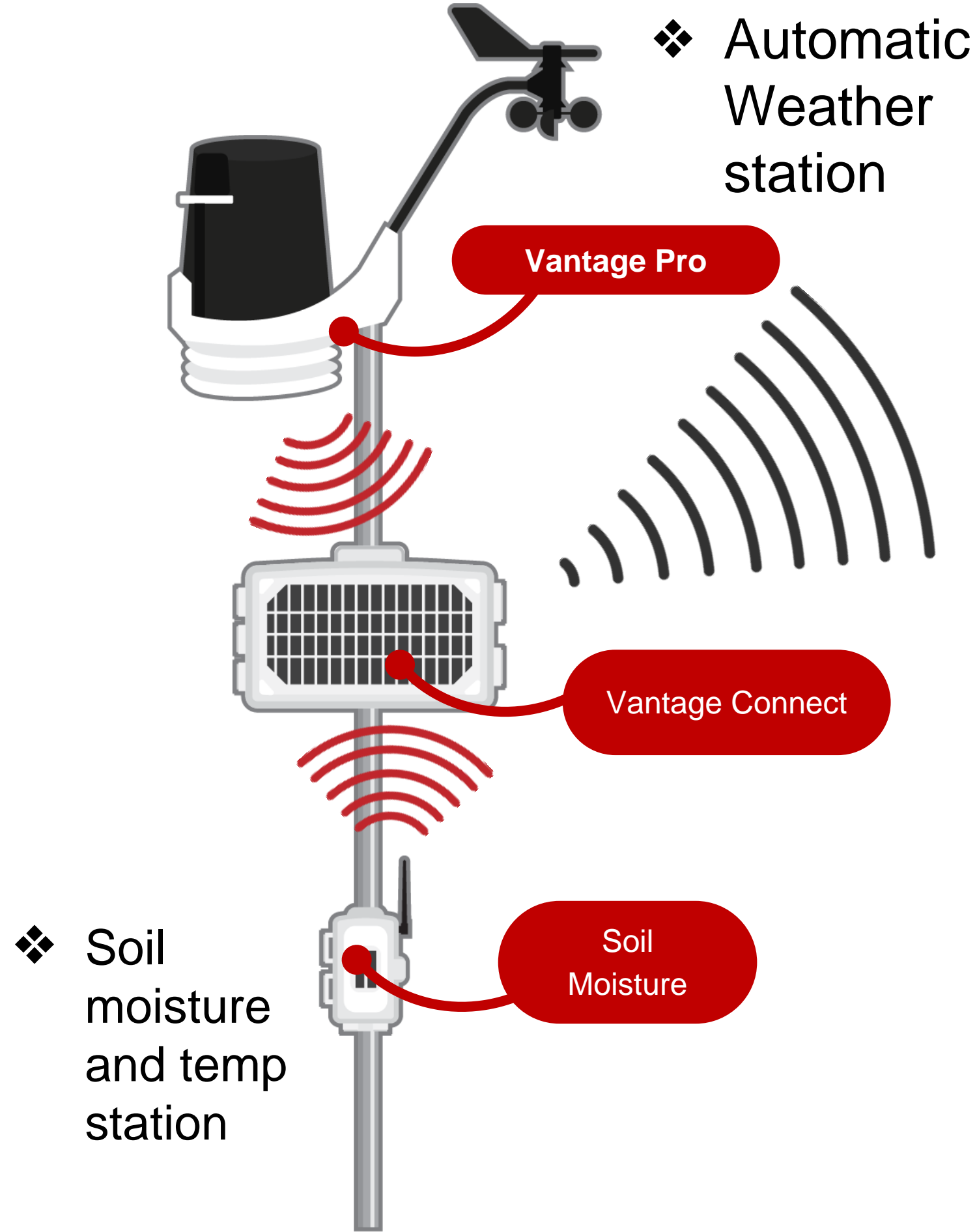
2. Smart agriculture using Sensors, AI & IoT

(2.1a) Increase production and quality

(2.1b) Strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters

Smart Agriculture

Weather Station



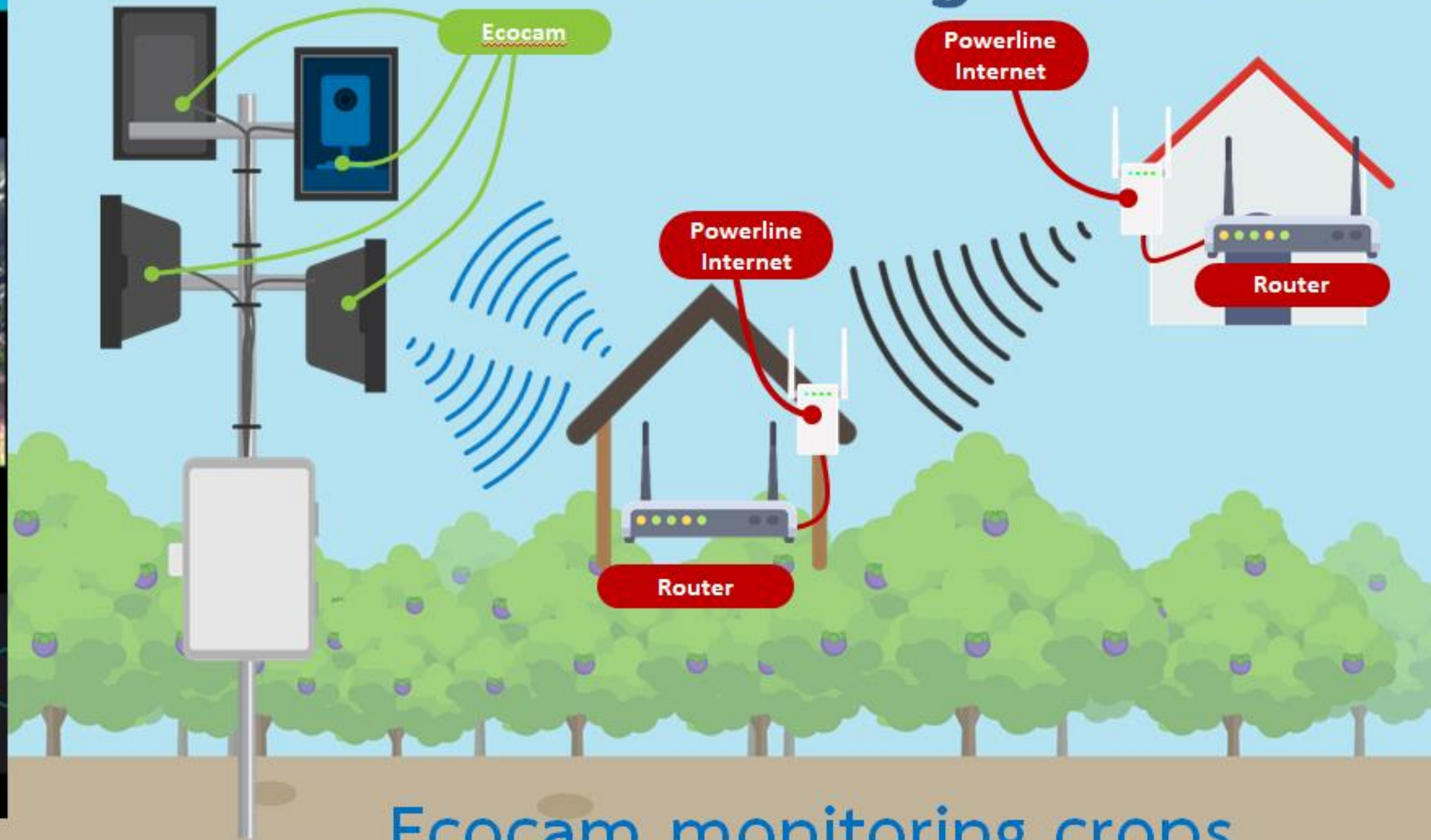
Smart Agriculture Drone Mapping



**Real time
Monitoring**



Smart Agriculture



Ecocam monitoring crops

Module 1. Smart Agriculture using Sensors & IoT



Teacher's Guide

Module 1:

Climate Smart Agriculture
using Sensors, AI and IoT

Southeast Asian Ministers of Education Organization
Regional Centre for STEM Education (SEAMEO STEM-ED)
Center of Excellence for Ecoinformatics, Walailak University



L1: Sensor Technology

**L2: Practical Sensor
Technology**

L3: Precision Agriculture

**L4: Basic AI and Machine
Learning for STEM**

L5: Drone Mapping

L1: Sensor Technology

ACTIVITY SHEET

Name: _____ Date: _____

A ACTIVITY 1.1 Vocabulary List
Sensor Technology (Chapter 11)

Direction: Find each word in Chapter 1.1 and write down its definition.

- Sensor (p. 5)
- Enclosures (p. 7)
- Power Supply (p. 8)
- Meteorological Station (p. 12)
- Mechanical Sensors (p. 16)

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Walailak University

Lesson 1
Sensor Technology

ACTIVITY SHEET

Name: _____ Date: _____

B ACTIVITY 1.1 Vocabulary List
Sensor Technology (Chapter 11)

Direction: Match each word to the correct definition listed below.

Optical Sensors	Electrochemical Sensors	Air Flow Sensors	Turbo Meter
Weatherlink	Vantage Pro	Vantage Vue	WeatherLink Live

-: A sensor suite paired with the iconic Davis console. The console includes quick-view icons, graphing, and forecasts.
-: Clay, organic matter, and moisture content of the soil can be determined by optical sensors.
-: This hand-held device reads wind speed in miles/hour, knots, feet/minute, or meters/second.
-: Help collect, process, and map soil chemical data. Electrochemical sensors provide the information needed for precision agriculture—soil nutrient levels and pH.
-: For the ultimate in weather monitoring, link any Davis weather station to an IBM-compatible PC or Macintosh.
-: Measure soil air permeability.
-: WeatherLink Live connects to 80+ sensors at a time and live-streams data over Wi-Fi or Ethernet directly to the Weather Link Cloud.
-: An accurate and reliable weather station that's tough, sleek, and sets up in minutes.

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Lesson 1
Sensor Technology

Chevron Enjoy Science Project
SEAMEO STEM-ED

ACTIVITY SHEET

Name: _____ Date: _____

A ACTIVITY 1.3 Best Place to Plant Coffee Trees
(Chapter 13)

Direction: Search weather data from the WeatherLink.com/map

1. Best Place to Grow Coffee Trees

Students are asked to search data from weatherlink.com/map. The required weather data can be observed.

- Search for WeatherLink.com/map
- Click on target area (circle bottom) to find out more important information (i.e. Temperature, Humidity, Wind, Daily Rain, etc.)

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Walailak University

Lesson 1
Sensor Technology

ACTIVITY SHEET

Question :

Select four coffee grown-regions to grow coffee from the list of eight countries (regions) which are 1. USA, 2. Italy, 3. South Korea, 4. Vietnam, 5. New Zealand, 6. Ethiopia, 7. Brazil, and 8. Mexico.

1. Fort Funston SF, USA Temperature: 57 °F Humidity: 94 % Wind: 10 mph Barometer: 29.91 in Hg	2. Liceo, Italy Temperature: 60 °F Humidity: 66 % Wind: 1 mph Barometer: 29.88 in Hg	3. EDS, South Korea Temperature: 63 °F Humidity: 51 % Wind: 1 mph Barometer: 29.56 in Hg	4. Xe Katam Estate, Vietnam Temperature: 70 °F Humidity: 77 % Wind: 0 mph Barometer: 29.52 in Hg
8. Grow weather, Mexico Temperature: 63 °F Humidity: 85 % Wind: 1 mph Barometer: 30.25 in Hg	7. Tristar Gold, Brazil Temperature: 66 °F Humidity: 69 % Wind: 1 mph Barometer: 29.94 in Hg	6. KunZia, Ethiopia Temperature: 69 °F Humidity: 64 % Wind: 2 mph Barometer: 29.98 in Hg	5. Portland, New Zealand Temperature: 51 °F Humidity: 86 % Wind: 3 mph Barometer: 30.36 in Hg



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Walailak University

Lesson 1
Sensor Technology

ACTIVITY SHEET

Name: _____ Date: _____

A ACTIVITY 1.2 Weather Station (Chapter 12)

Direction: Identify the different parts of the Wireless Vantage Pro2 Plus. Write the names in the blank boxes:



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Walailak University

Lesson 1
Sensor Technology

ACTIVITY SHEET

Name: _____ Date: _____

B ACTIVITY 1.2 Weather Station (Chapter 12)

Direction: Staying connected to your weather conditions is critical. wide array of data collection options to keep the data coming. Match the parts to the job.

 WeatherLink Live	<ul style="list-style-type: none"> Job: Connect the console to a computer running WeatherLink Computer Software.
 Vantage Connect	<ul style="list-style-type: none"> Job: Collect data from your weather station and a network of indoor and outdoor sensors.
 EnviroMonitor Gateway	<ul style="list-style-type: none"> Job: Perfect for collecting weather and sensor data in remote locations.
 EnviroMonitor IP Gateway	<ul style="list-style-type: none"> Job: Perfect for building a flexible network with multiple sensors.
 WeatherLink USB/Serial	<ul style="list-style-type: none"> Job: Collects all essential data from EnviroMonitor Nodes.

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Lesson 1
Sensor Technology

Chevron Enjoy Science Project
SEAMEO STEM-ED

ACTIVITY SHEET

Name: _____ Date: _____

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Direction: Search weather data from the WeatherLink.com/map

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Students are asked to search data from weatherlink.com/map. The required weather data can be observed.

- Search for WeatherLink.com/map
- Click on target area (circle bottom) to find out more important information (i.e. Temperature, Humidity, Wind, Daily Rain, etc.)

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Arabica coffee's optimal temperature range is 18–21°C with a mean annual temperature of 24°C.



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Walailak University


Lesson 1
Sensor Technology

ACTIVITY SHEET

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Select four coffee grown-regions to grow coffee from the list of eight countries (regions) which are 1. USA, 2. Italy, 3. South Korea, 4. Vietnam, 5. New Zealand, 6. Ethiopia, 7. Brazil, and 8. Mexico.

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8. Grow weather, Mexico Temperature: 63 °F Humidity: 85 % Wind: 1 mph Barometer: 30.25 in Hg	7. Tristar Gold, Brazil Temperature: 66 °F Humidity: 69 % Wind: 1 mph Barometer: 29.94 in Hg	6. KunZia, Ethiopia Temperature: 69 °F Humidity: 64 % Wind: 2 mph Barometer: 29.98 in Hg	5. Portland, New Zealand Temperature: 51 °F Humidity: 86 % Wind: 3 mph Barometer: 30.36 in Hg



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Note: Weather data search on the 1st July, 2021

Students do real-time search for one more location using WeatherLink.com/map, copy the location and paste it in the box below.

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Lesson 1
Sensor Technology

Chevron Enjoy Science Project
SEAMEO STEM-ED

L2: Practical Sensor Technology

ACTIVITY SHEET

Name: _____ Date: _____

A ACTIVITY 2.1 Practical Sensor Technology (Chapter 2.1)

Direction: Suppose a farmer after installing the Automated Weather stations in a corn field, has recorded the daily rainfall for the month of June, 2021. The June 2021 calendar is showing the daily rainfall of June recorded by the weather station. By examining the table carefully, answer the following questions.

JUNE 2021 CALENDAR

SUN	MON	TUE	WED	THU	FRI	SAT
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

43 mm = Accumulated Daily Rainfall

No mm = No Rainfall

Week 1: (Date 1 - 7 June)
 Week 2: (Date 8 - 14 June)
 Week 3: (Date 15 - 21 June)
 Week 4: (Date 22 - 31 June)

- Questions:
- How many rainy days are for week 1 in June?
 - Saturday and Sunday are holidays in June, calculate the number of rainy days during holidays?
 - Compare and find the difference between the number of rainy days in April and June. Which month has received more rainfall?

ACTIVITY SHEET

Name: _____ Date: _____

A ACTIVITY 2.2 Vocabulary List Crop Rotation & Intercropping (Chapter 2.2)

Direction: Find each word in Chapter 2.2 and write down its definition.

- Crop rotation : (p 2)
- Soil organic matter : (p 10)
- Cover crops : (p 11)
- Integration : (p 21)
- Intercropping : (p 21)
- Plant architecture : (p 26)

ACTIVITY SHEET

Name: _____ Date: _____

B ACTIVITY 2.1 Practical Sensor Technology (Chapter 2.1)

Direction: Suppose a farmer, after installing the Automated Weather stations in a corn field, has recorded the daily rainfall for the month of April, 2021 as given

APRIL 2021 CALENDAR

SUN	MON	TUE	WED	THU	FRI	SAT
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

20mm = Accumulated Daily Rainfall

No mm = No Rainfall

- Questions:
- Calculate the total rainfall of April ?
 - How many rainy days are in April?
 - Which week has received the highest rainfall in April? Calculate the total rainfall of that week?
- Week 1: (Date 1 - 7 April)
 Week 2: (Date 8 - 14 April)
 Week 3: (Date 15 - 21 April)
 Week 4: (Date 22 - 30 April)

ACTIVITY SHEET

Name: _____ Date: _____

B ACTIVITY 2.2 Vocabulary Definition Crop Rotation & Intercropping (Chapter 2.2)

Direction: Match each word to the correct definition listed below.

Deep rooted cover crops	Enterprise diversification	Farm scaping
Growing a hay crop in a rotation	Microbial community	

- _____ draw up nutrients such as potassium and phosphorus from deep in the soil profile, making these nutrients available for subsequent shallow rooted cash crops.
- _____ can result in improved tilth and bulk density. When a hay crop is ploughed in, the soil will be loose and have a good granular structure and tilth.
- _____ supported by rotating crops with a high carbon to nitrogen ratio (such as corn) with low carbon to nitrogen ratio crops (such as soybeans).
- _____ stability of income and yield are two of the reasons people diversify their crop and livestock systems.
- _____ diversity can be increased again by providing more habitat for beneficial organisms with borders, windbreaks, and special plantings for natural enemies of pests.

ACTIVITY SHEET

Name: _____ Date: _____

A ACTIVITY 2.3 Practical Sensor Technology (Chapter 2.3)

Direction: Based on your understanding of the sensors and their applications.

A ACTIVITY 2.3 Practical Sensor Technology (Chapter 2.3)

- Direction: Based on your understanding of the sensors and their applications.
- Which sensors are you going to deploy in the field during intercropping?
 - Which factors will you consider before deploying your sensors?
 - Which weather data are you planning to collect for your field?



Installing soil sensors needs investment. Suppose a farmer has a field of 49 hectares. According to field requirements, he needs to install 7 soil sensors per hectare of the field. The cost of a single sensor is 300 baht.

- How much will be the cost of sensors per hectare of the field?
- What will be the total cost of deploying sensors in the whole field?



ACTIVITY SHEET

Name: _____ Date: _____

B ACTIVITY 2.3 Practical Sensor Technology (Chapter 2.3)

Direction: Introduce the Planting Calendar to the Student.

B ACTIVITY 2.3 Practical Sensor Technology (Chapter 2.3)

- Direction: Introduce the Planting Calendar to the Student.
- How the circle represents the calendar year with the seasons on the outermost ring. (Summer, Winter, Autumn, Spring)
 - Every other circle will represent the cash crops which can be grown in a season as intercrop. (List of the crops available is given below)
 - As an example, for the summer season, the calendar is highlighting the intercropping of cereals (Exhaustive crops) with Beans (Restorative crop), in order to preserve the nutrient profile of the soil and to take control of the insects/pests.
 - Instruct students to pick the combination of the crops of their own choices from the list given and complete the calendar. Keep in mind the concept of intercropping before going for the pick
 - Ask the reasons for their pick.



INTERCROPPING SCHEME

Direction: The scheme discussed below is an example to complete the circular activity. The intercropping for the summer season is already filled in. Fill in the appropriate crops from the available crops above, for the rest of the seasons. Write down the selected crops in the circular activity above as already filled for the summer.

	Summer	Autumn	Winter	Spring
RICE (Exhaustive crop)				
BEANS (Restorative crop)				
BEANS (Restorative crop)				

L3: Precision Agriculture

ACTIVITY SHEET

Name: _____ Date: _____

A ACTIVITY 3.1 Vocabulary List Precision Agriculture (Chapter 31 - 32)

Direction: Find each word in chapter 31-32 and write down its definition.

Chapter 31

1. Precision agriculture (PA): (p.3)
2. Decision support system (DSS): (p.3)
3. Topographic maps: (p.5)
4. Crop science: (p.8)
5. Environmental protection: (p.8)
6. Prescriptive planting: (p.10)

Chapter 32

7. Geolocation: (p.3)
8. Predictive approach: (p.5)
9. Aerial or satellite remote sensing: (p.6)
10. Remote sensing: (p.6)

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ACTIVITY SHEET

Name: _____ Date: _____

B ACTIVITY 3.1 Vocabulary Definitions Precision Agriculture (Chapter 32)

Directions: Match each word to the correct definition listed below

Precision Agriculture	Robots	Smartphone Application	
Satellite Imagery	Internet of Things	Machine Learning	Drone

1. _____: The computer then processes this information and sends the appropriate actions back to these devices.
2. _____: An unmanned aerial vehicle used to help optimize agriculture operations, increase crop production, and monitor crop growth.
3. _____: The network of physical objects outfitted with electronics that enable data collection and aggregation.
4. _____: Automate tasks for farmers, boosting the efficiency of production and reducing the industry's reliance on manual labor.
5. _____: Satellite images is near real-time data and can cover a large area in a short time
6. _____: There are also applications made dedicated to various agriculture applications
7. _____: A farming management concept based on observing, measuring and responding to inter and intra-field variability in crops.

ACTIVITY SHEET

Name: _____ Date: _____

A ACTIVITY 3.3 Technologies for Smart Dairy Farm (Chapter 3.3)

Directions: Let's watch the "Modern Cow Dairy Farming" video in Google classroom. In this video, What do students think are the technologies for precision farming? (p.5)
What do students think are the technologies for precision farming?

Technologies	Technologies
1. _____	7. _____
2. _____	8. _____
3. _____	9. _____
4. _____	10. _____
5. _____	11. _____
6. _____	12. _____

ACTIVITY SHEET

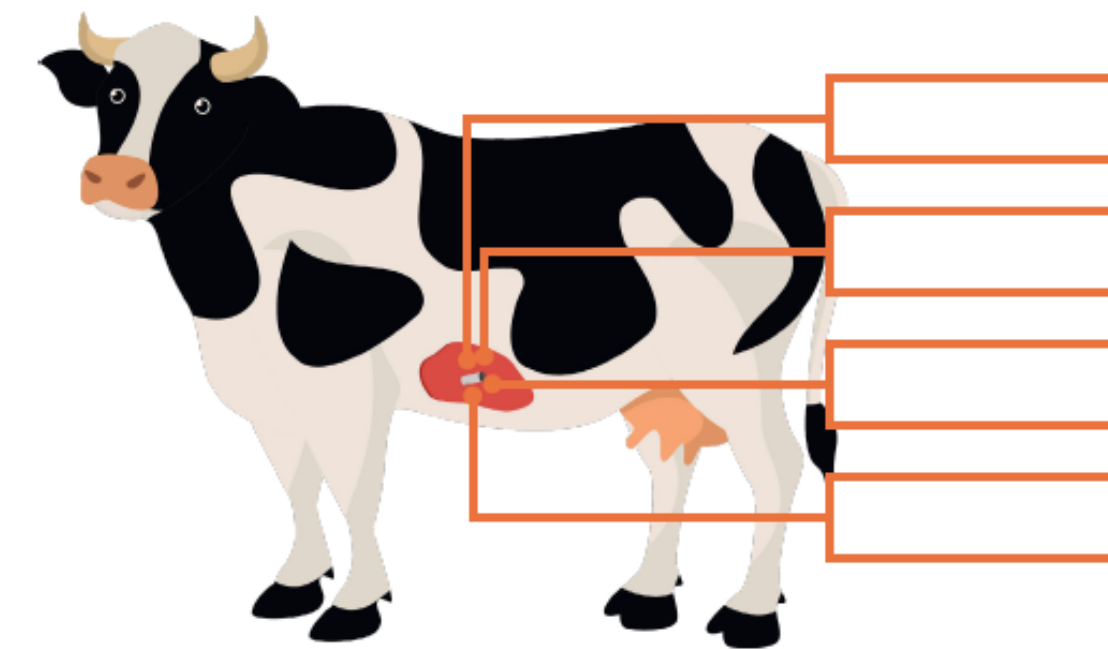
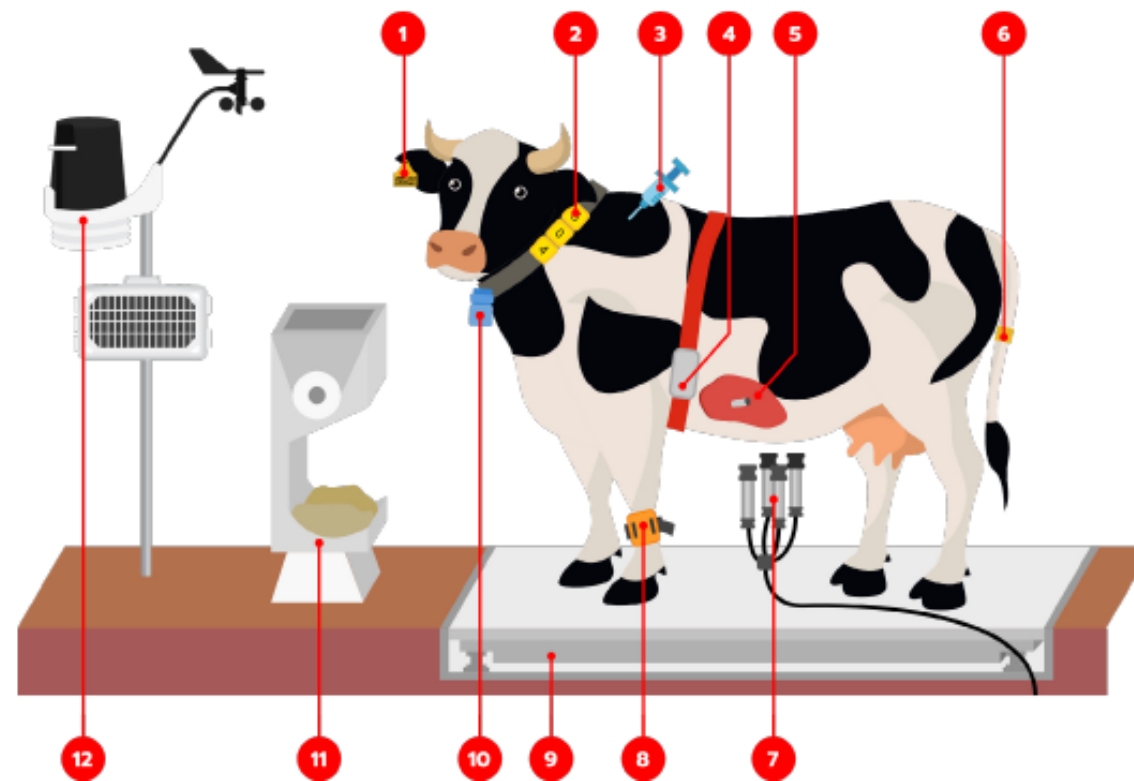
Name: _____ Date: _____

B ACTIVITY 3.3 Technology for Smart Dairy Farm (Chapter 3.3)

Directions: Match each word to the correct picture listed below of function for rumen bolus sensor.

Body Temperature	Movement	Behavior	Water Spraying
Rumen pH/ Temperature	Milking Information	Feed Intake	Metabolic Rate

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ACTIVITY SHEET

Name: _____ Date: _____

A ACTIVITY 3.2 Technology for Precision Agriculture (Chapter 3.1)

Directions: Economic and Environmental Impacts has lots of parts. The pictures represent some of the parts of the system. Match the parts to the job or jobs that each part does.

	Job: Grow in the direction of sunlight
	Job: The place where the roots of plants can hold on
	Job: Satellite navigation system
	Job: Imagery from satellite for Precision Agriculture
	Job: Labor-saving tool (e.g. soil preparation, machine maintenance and machine harvester)

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ACTIVITY SHEET

Name: _____ Date: _____

B ACTIVITY 3.2 Technology for Precision Agriculture (Chapter 3.2)

Directions: Which of these things are examples of Technologies for Precision Agriculture? Circle all of the items that you think are technologies.

What is YOUR definition of the word "Technology"?

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L4: Basic AI and Machine Learning for STEM

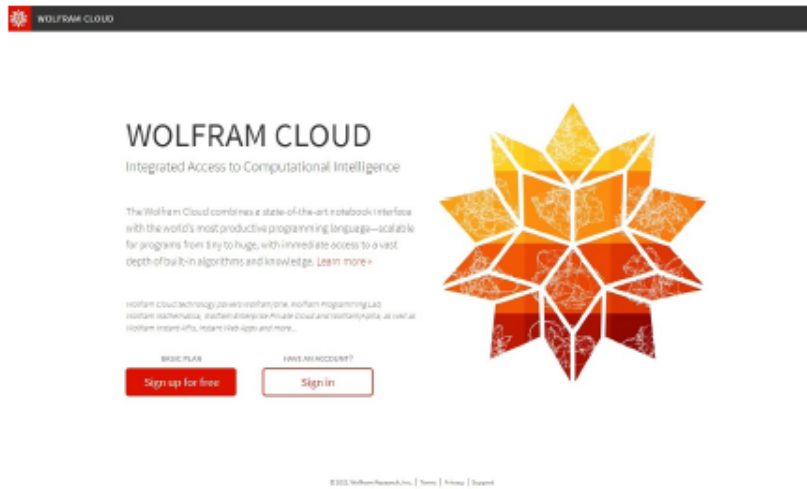
ACTIVITY SHEET

Name: Date:

A ACTIVITY 4.1 Create Your First Cloud Computing Account **B**

- Directions:
1. Open an Internet browser and create an account on wolframcloud.com using a free subscription.
 2. Check your email and verify your account by clicking the confirm link in the email.
 3. In the newly opened window, log in wolframcloud.com to start using Cloud Computing.
 4. Type "1+1" and press SHIFT+ENTER to compute.
 5. Results will return from the Cloud Computing Server in a few seconds.
 6. You can start exploring by following a demonstration or an online lesson on the screen for further learning experience. Welcome to the world of Cloud Computing.

Webpage (wolframcloud.com) and sign up for WOLFRAM CLOUD

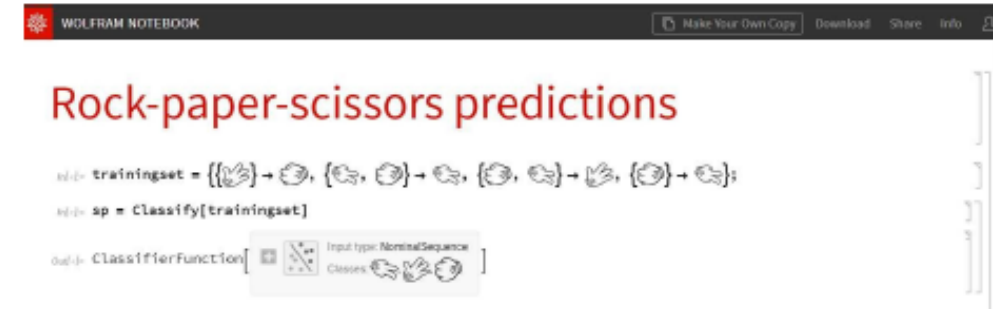


ACTIVITY SHEET

Name: Date:

A ACTIVITY 4.2 Rock-paper-scissors Predictions **B**

- Direction:
- In this activity, students put on ten training sets of "Rock, Paper and Scissors" to train the machine. Then students predict the next element of a new sequence, obtain a random next element according to the preceding distribution, predict the most likely next element and reuse this intermediate guess to predict the following element.



ACTIVITY SHEET

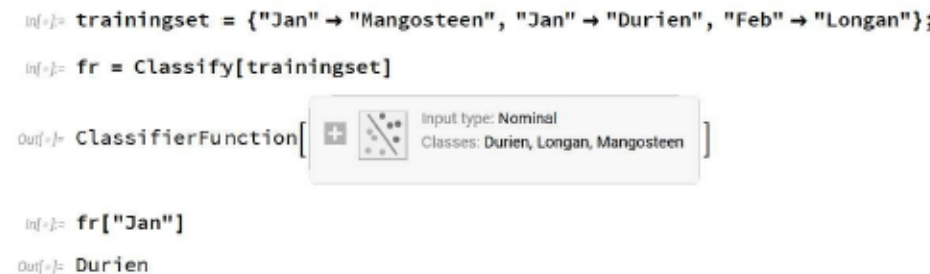
Name: Date:

B ACTIVITY 4.2 Seasonal Fruit Prediction **B**

- Direction:
- Students put on 10 months and types of fruits that are available during that month in the training set to train the machine such as "Jan: Mangosteen, Durian" and "Feb, Longan". Students then predict the next element of a new sequence, obtain a random next element according to the preceding distribution, predict the most likely next element and reuse this intermediate guess to predict the following element.



Agriculture Example



ACTIVITY SHEET

Name: Date:

A ACTIVITY 4.3 Into the world of AI and Machine Learning **B**

Preparation:

- Check the internet connection by visiting the Google Meet session
- Check the YouTube clips for availability
- Visit the Kahoot session
- Have all students join the Meet session
- Read two powerpoint files

Directions:

1. Students google search YouTube video on Deep Learning, AI and Machine Learning, select the best video, copy the YouTube link of that video and paste the YouTube link of that video in a Google slide with a brief summary.
2. Students play a Kahoot quiz as a formative assessment on fundamentals of AI and Machine Learning. In each answer, students explore the misconceptions that they might have by creating a Padlet session for the class and discuss them in detail to improve student understanding. Students submit their Kahoot scores by capturing screens and uploading the image to this Google

ACTIVITY SHEET

Name: Date:

A ACTIVITY 4.4 Using ML Technology in your STEM project **B**

Directions:

1. Students work in a group of 4 students and formulate a STEM project using ML technology in agriculture.
2. Students present their STEM project to their classmates using shared google slides.
3. In the Q & A session, students have a chance to answer questions and also ask questions when attending their friend's presentations.
3. Teachers play facilitators and provide some constructive feedback on student STEM projects.
4. Students reflect their learning experience in the Google Sheet provided in this activity.

L5: Drone Mapping

ACTIVITY SHEET

Name: _____ Date: _____

A Activity 5.1 Vocabulary List Drone Application in Agriculture (Chapter 5.1)

Direction: Find each word in chapter 5.1 and write down its definition.

- Land use: (p3)
.....
.....
- Remote sensing: (p4)
.....
.....
- Aerial photography: (p5)
.....
.....
- Drone: (p6)
.....
.....

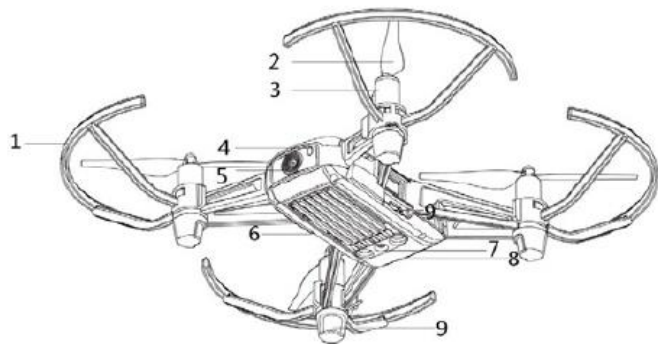
157

ACTIVITY SHEET

Name: _____ Date: _____

A Activity 5.2 Knowing your Tello (Chapter 5.2)

Directions: Identify the different parts of the Tello.



-
-
-
-
-
-
-
-
-

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ACTIVITY SHEET

Name: _____ Date: _____

B Activity 5.1 Vocabulary Definition (Chapter 5.1)

Direction: Find each word in chapter 5.1 and write down its definition.

Pollen Drone Sprayer

Drone Tree Seed Planter

Drone Mapping

Drones for Spraying Insecticides

- This practice involves acquiring hundreds of aerial images and then 'stitching' them together digitally with specialized mapping software to make a larger more accurate composite image.
- This with a very innovative idea of using their drone sprayer to pollinate crops.
- An agricultural drone in a field performing the task of crop spraying.
- Drone Seed is looking to corner the market on precision forestry. Not only can it do a potentially dangerous job of planting trees on the slopes of steep inclines but it can also potentially do it faster than by workers on foot.

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Name: _____ Date: _____

B Activity 5.2 Flight Mode on Tello App. Tello for STEM (Chapter 5.2)

Direction: Use the Tello drone flight mode and shoot themselves in video 360 mode and submit the work in this worksheet.

Preparation:

- 1 Tello drone
- 3 Full batteries
- 1 Battery charger
- Smartphone with Tello app installed

- Insert the battery into the aircraft as shown.
- Press the power button once to turn on the aircraft.
- Enable Wi-Fi on your mobile device and connect to the Tello-XXX network.
- Then launch the Tello app. Connection has been established when the Aircraft Status Indicator blinks green and the live camera view is shown on your mobile device.
- Record a short video while spinning around yourself for 1-2 minute.
- Students export your video from the app by pressing Play video (Top right corner) and uploading the video to this Google Classroom assignment.

ACTIVITY SHEET

Name: _____ Date: _____

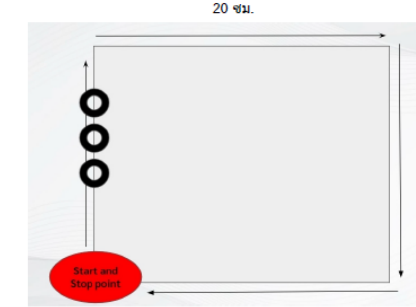
A Activity 5.3 Droneblocks Drone blocks Application (Chapter 5.3)

Direction: Use the Tello drone flight mode and shoot themselves in video 360 mode and submit the work in this worksheet.

Preparation:

- 1 Tello drone
- 3 Full batteries
- 1 Battery charger
- Smartphone with Tello app installed

- Insert the battery into the aircraft as shown.
- Press the power button once to turn on the aircraft.
- Enable Wi-Fi on your mobile device and connect to the Tello-XXX network.
- Then launch the Tello app. Connection has been established when the Aircraft Status Indicator blinks green and the live camera view is shown on your mobile device.
- Record a short video while spinning around yourself for 1-2 minute.
- Students export your video from the app by pressing Play video (Top right corner) and uploading the video to this Google Classroom assignment.



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ACTIVITY SHEET

Name: _____ Date: _____

A Activity 5.4 Flight Mode on Tello App. Tello for STEM (Chapter 5.2)

Direction: Use the Tello drone flight mode and shoot themselves in video with glass and submit the work in this worksheet.

Preparation:

- 1 Tello drone
- 3 Full batteries
- 1 Battery charger
- Smartphone with Tello app installed

- Insert the battery into the aircraft as shown.
- Press the power button once to turn on the aircraft.
- Enable Wi-Fi on your mobile device and connect to the Tello-XXX network.
- Then launch the Tello app. Connection has been established when the Aircraft Status Indicator blinks green and the live camera view is shown on your mobile device.
- Record a short video while spinning around your glass in 1-2 minute.
- Students export video from the app by pressing Play video (Top right corner) and uploading the video to this Google Classroom assignment.

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ACTIVITY SHEET

Name: _____ Date: _____

B Activity 5.3 Droneblocks Drone blocks Application (Chapter 5.3)

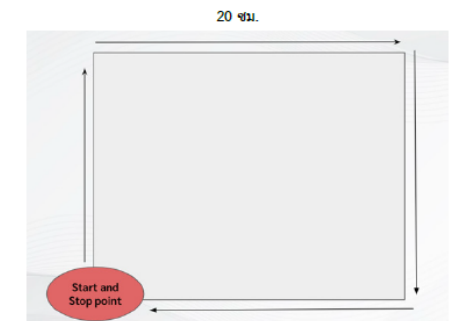
Direction: Use the Tello drone flight mode and shoot themselves in video 360 mode and submit the work in this worksheet.

Preparation:

- 1 Tello drone
- 3 Full batteries
- 1 Battery charger
- Smartphone with Tello app installed

- Insert the battery into the aircraft as shown.
- Press the power button once to turn on the aircraft.
- Enable Wi-Fi on your mobile device and connect to the Tello-XXX network.
- Then launch the Tello app. Connection has been established when the Aircraft Status Indicator blinks green and the live camera view is shown on your mobile device.
- Record a short video while spinning around yourself for 1-2 minute.
- Students export your video from the app by pressing Play video (Top right corner) and uploading the video to this Google Classroom assignment.

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ACTIVITY SHEET

Name: _____ Date: _____

B Activity 5.4 Flight Mode on Tello App. Tello for STEM (Chapter 5.2)

Direction: Use the Tello drone flight mode and shoot themselves in photo by yourself and submit the work in this worksheet.

Preparation:

- 1 Tello drone
- 3 Full batteries
- 1 Battery charger
- Smartphone with Tello app installed

- Insert the battery into the aircraft as shown.
- Press the power button once to turn on the aircraft.
- Enable Wi-Fi on your mobile device and connect to the Tello-XXX network.
- Then launch the Tello app. Connection has been established when the Aircraft Status Indicator blinks green and the live camera view is shown on your mobile device.
- Record a short photo of you with 5 picture actions.
- Students export video from the app by pressing Play video (Top right corner) and uploading the pictures to this Google Classroom assignment.

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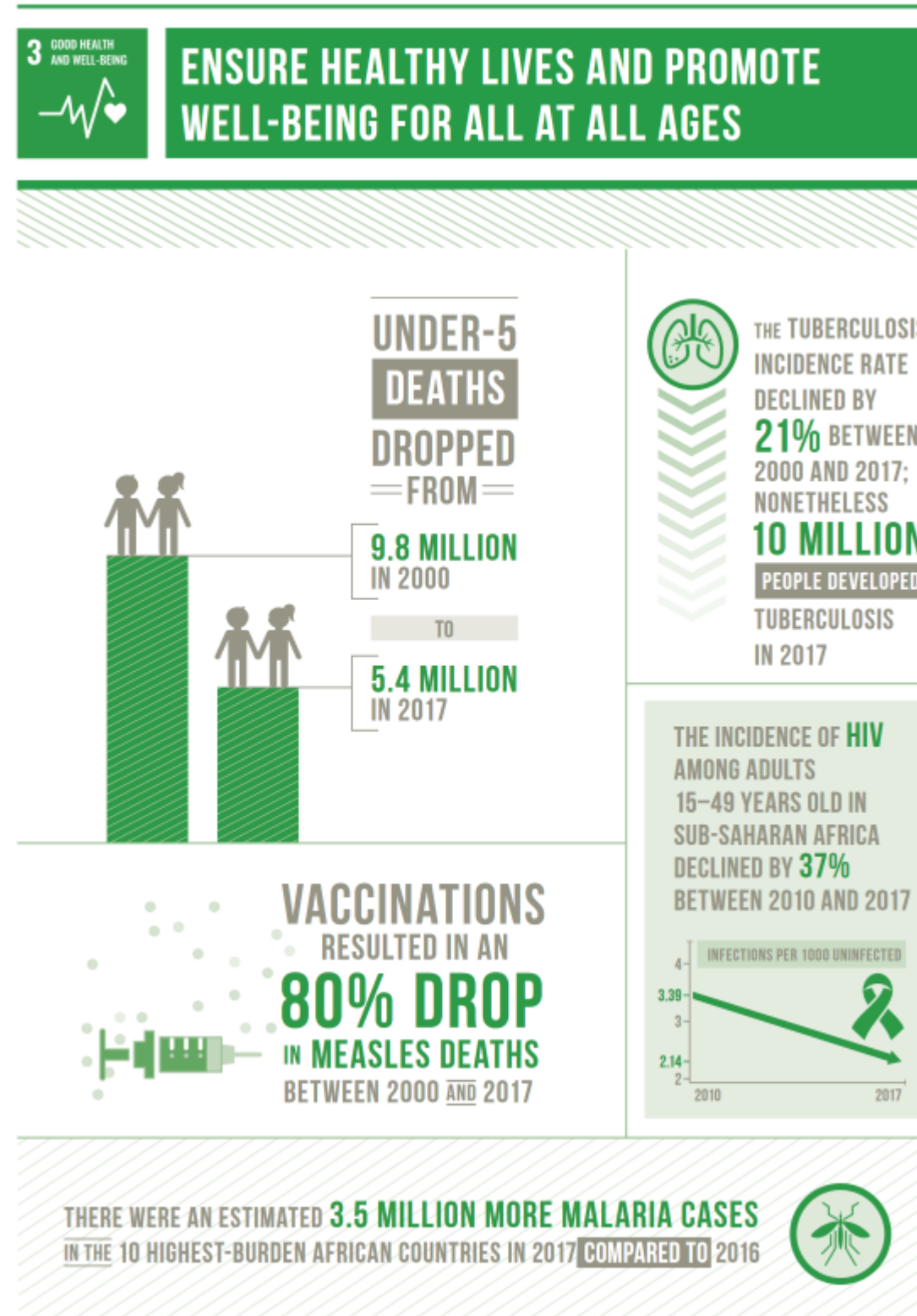
STEM education on Goal 3: Good Health & Well-being

 SUSTAINABLE DEVELOPMENT GOALS



3 GOOD HEALTH AND WELL-BEING

Vaccinate your family to protect them and improve public health.



3.D Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks.

- GLOBE Observer: Mosquito Habitat Mapper App
- Prevent malaria, Dengue, Zika

Goal 3: Good Health and Well-Being

Module 2. Dengue Free Southeast Asia



Teacher's Guide

Module 2:

Dengue-Free Southeast Asia Educator Resources for K7-12 Students

Southeast Asian Ministers of Education Organization
Regional Centre for STEM Education (SEAMEO STEM-ED)
Center of Excellence for Ecoinformatics, Walailak University



- **L1: Innovation and STEM**
- **L2: Climate Changes and Its Impact**
- **L3: Dengue and Zika Risk, Control and Prevention**
- **L4: NASA App for SDGs**
- **L5: Digital Media for Dengue and Zika Free Southeast Asia**

L1: Innovation and STEM

ACTIVITY SHEET

Name: _____ Date: _____

A ACTIVITY 1.1 Ovitrap Design

Direction:

- In this activity, students will design an ovitrap and test their ovitraps indoor and outdoor locations.
- Students compare the number of mosquito larvae in ovitraps placing indoor and outdoor locations?

Equipment:

- 2 Bottles (1.5 L)
- 1 Scissors
- Nylon netting
- Rubber band
- Mosquito larvae
- Safety equipment as required (goggles, apron, gloves)

Methods:

- Cut the top of a 1.5 L bottle.
- Add 200 ml in a bottle.
- Invert the bottle top into the bottle.
- Wrap on it with nylon net.
- Drill a hole in the side of the bottle for the water outflow.
- Place ovitraps indoor and outdoor of your house.
- After 10 days, bring ovitraps in the laboratory, count the number of mosquito larvae in each ovitrap and compare them.

ACTIVITY SHEET

Picture of your Ovitrap design:

Ovitrap design

Picture of your Ovitrap design:

Location	Number of mosquito larvae
Indoor	
Outdoor	
Total	

ACTIVITY SHEET

Name: _____ Date: _____

A ACTIVITY 1.2 pH Affecting Mosquito Larvae

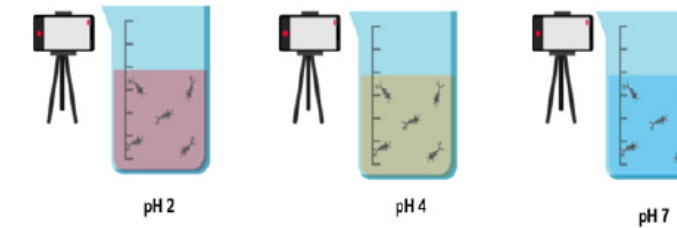
Direction:

In this activity, students will investigate the following question:
How water pH of 2, 4 and 7 are affecting mosquito activity?

Equipment:

- 3 Beaker or Glass
- Water
- Vinegar
- Litmus paper, pH meter
- Rubber band
- Mosquito larvae
- Safety equipment as required (goggles, apron, gloves)

Diagram: The set-up of the experiment.



Exercise:

- Pour 100 ml of water in three 250 ml beakers, adjust the water pH in 3 beakers into 2, 4 and 7 by adding vinegar. Use litmus paper or pH meter to measure water pH while adjusting them.
- Place 5 mosquito larvae in each beaker and wait 5 minutes for mosquitos to acclimate with water pH.
- Set a camcorder using smartphone or a camera to videotaping mosquitoes
- After 5-minutes acclimation time, tap the beaker with a pen and start recording a video to observe how many second 5 mosquitoes going up to breathe at the water surface.
- Repeat taping and videotaping 3 times.
- Watch the video and write down how long it takes for all 5 mosquito going up to breathe at the water surface.
- Write down your results in the Table 1 and plot a graph in the Figure 1.

ACTIVITY SHEET

Results:

Table 1: Time (seconds) taken by mosquito larvae going up to breathe at the water surface after tapping at three water pH levels

Mosquito larvae	Time (second)											
	pH 2				pH 4				pH 7			
	Rep. 1	Rep. 2	Rep. 3	Mean	Rep. 1	Rep. 2	Rep. 3	Mean	Rep. 1	Rep. 2	Rep. 3	Mean
1												
2												
3												
4												
5												

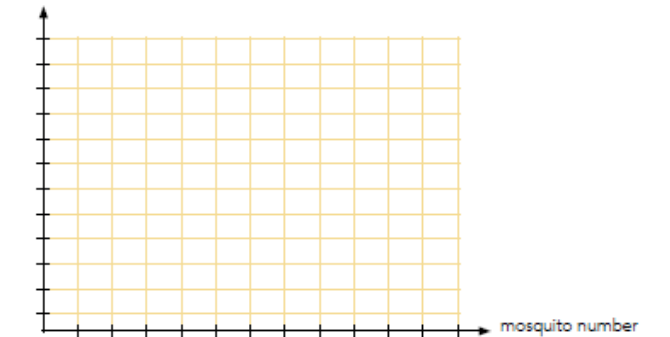


Figure 1. Time (seconds) that mosquito larvae going up to breathe at the water surface after tapping at three water pH levels.

Discussion

.....

.....

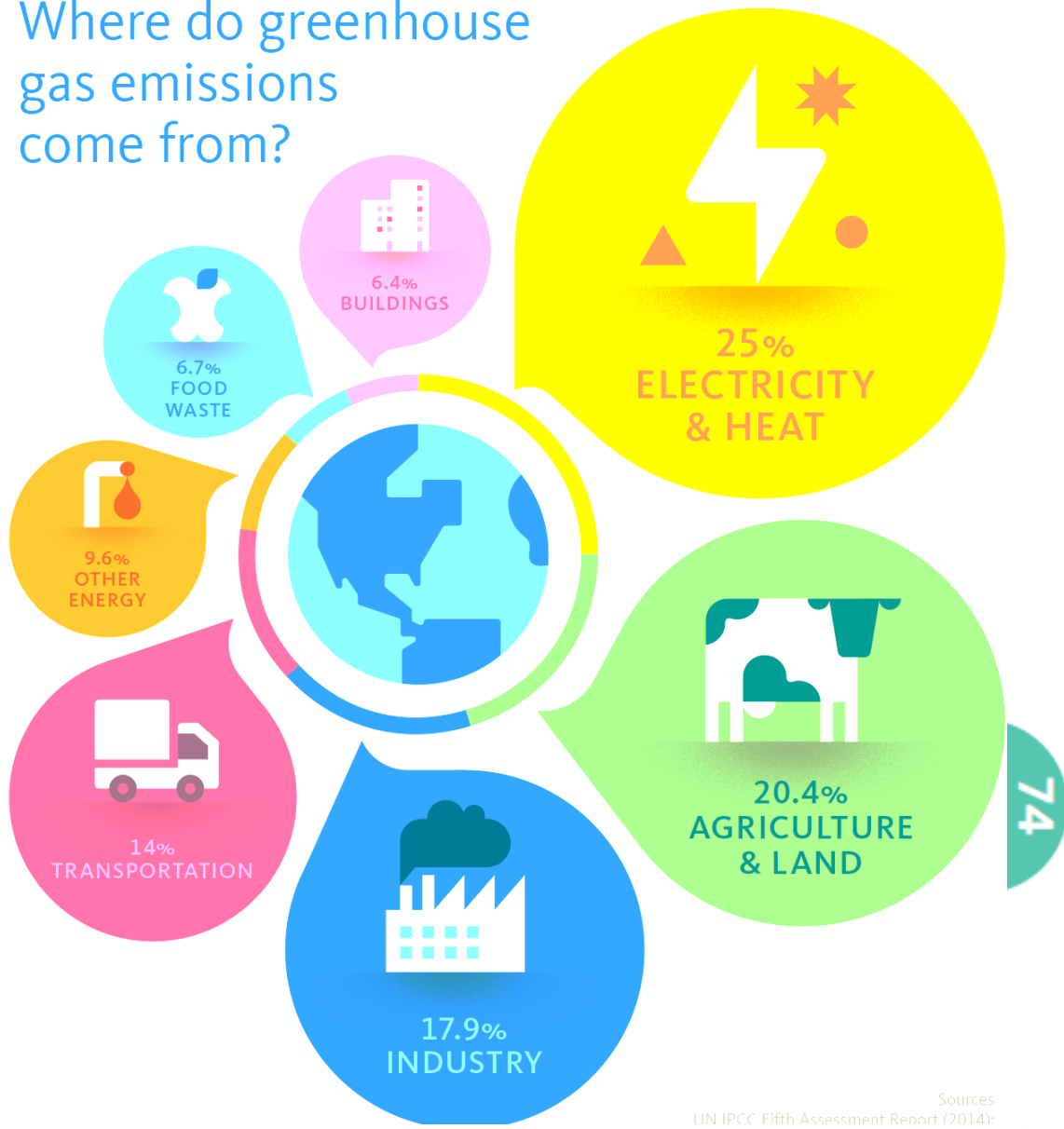
.....

.....

.....

L2: Climate Changes and Its Impact

Where do greenhouse gas emissions come from?



Sources: UN IPCC Fifth Assessment Report (2014)

ACTIVITY SHEET

Name: Date:

A ACTIVITY 2.1 Greenhouse Effect - What is that?

Direction:

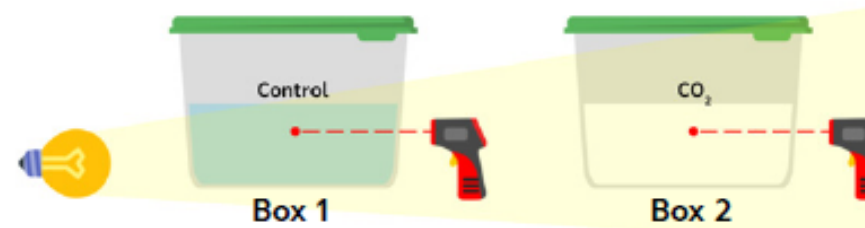
- In this activity, students will study how CO₂, a "greenhouse gas", can affect the air temperature in a closed environment.
- You will investigate the following question: How does atmospheric CO₂ affect the Earth's temperature?

- Vinegar
- Baking powder
- Ice cubes (optional)
- 2 Boxes with plastic lid
- 2 Infrared Thermometer (± 0.2 °C precision)
- 1 Led corn bulb (> 100 watt)

Health & safety: The boxes and led corn bulb must be handled carefully. Avoid touching the heat lamp.

Exercise: In this exercise you will investigate the temperature inside two boxes; one box serves a control box (box 1) and the other contains CO₂ (box 2). Before starting your experiment, make a prediction about which box will retain the most heat.

Diagram: The setup of the experiment: one box contains CO₂ and the other serves as a control.



- Pour 100 ml of water in a plastic box with sealed tight lid. Put 5 g of baking powder and 20 ml of vinegar in another plastic box with 100 ml of water, stir and close the lid. Close the two boxes with lids.
- Place these two boxes at 10 cm from the 40 watt light bulb. Be sure that these two boxes receive the same amount of light. The boxes and light bulb should NOT be moved while the experiment is running.
- Take temperature reading using IR thermometers.
- Record the initial temperature of each IR thermometer.
- Turn the 40 watt light bulb on.
- Take the temperature reading every 2 minutes 8 times with total duration of 16 minutes.
- Record your data in the Table 1 and plot a graph in Figure 1.

ACTIVITY SHEET

Results:

Table 1: Water temperatures in Box 1 (Control experiment) and Box 2 with CO₂ with time exposed to 40 watt light bulb at 15 cm distance.

Time	Temperature (°C) in Box 1	Temperature (°C) in Box 2 with CO ₂
0 min		
2 min		
4 min		
6 min		
8 min		
10 min		
12 min		
14 min		
16 min		

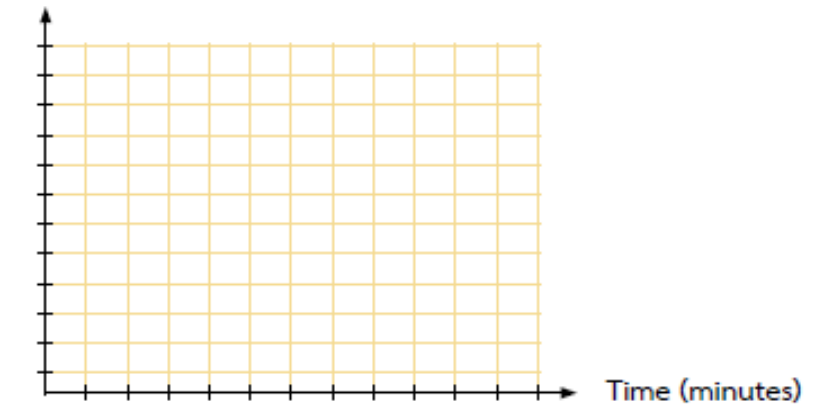


Figure 1: Water temperatures in Box 1 (Control experiment) and Box 2 with CO₂ with time exposed to 40 watt light bulb at 15 cm distance.

Questions:

- Compare the results of the two boxes. Do the results agree with your predictions?

- Explain your results.

- CO₂ is a greenhouse gas released through natural processes and through human activities. Explain in your own words what the greenhouse effect is.

L2: Climate Changes and Its Impact



ACTIVITY SHEET

Name: Date:

A ACTIVITY 2.2 Sea Water Rising

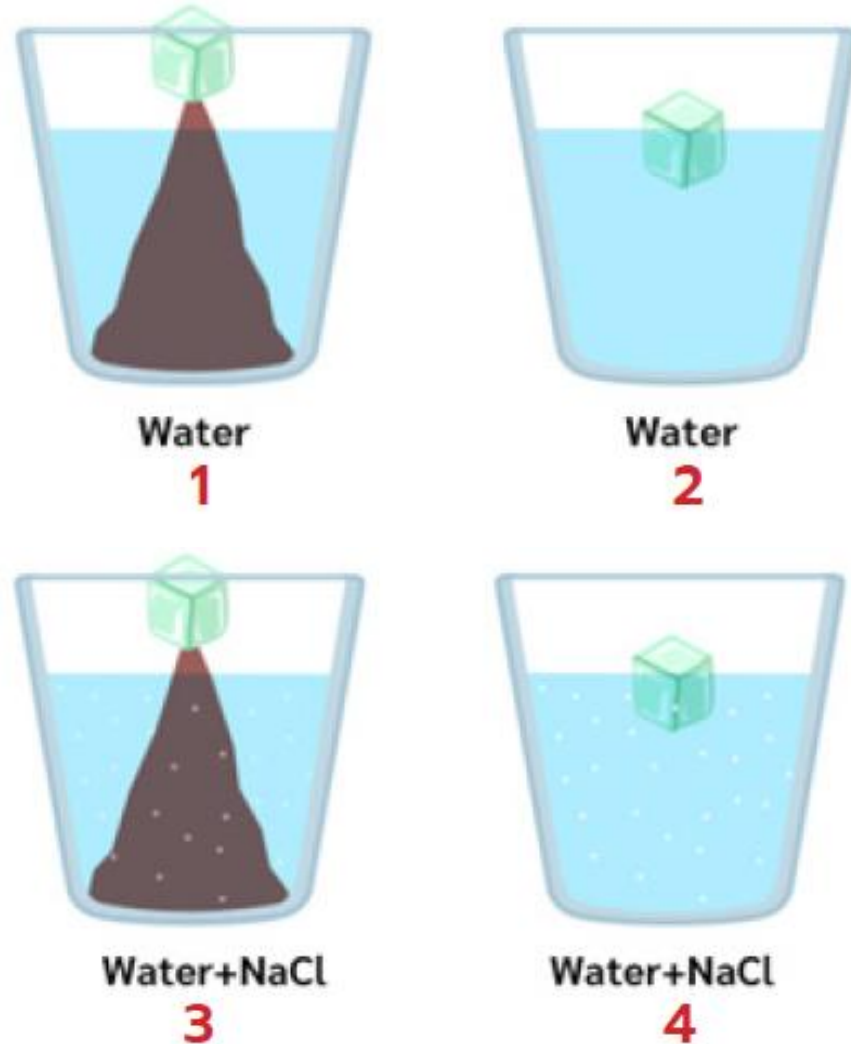
Direction: In this activity, students will investigate the following question:

1. What will be the effect on sea levels if sea ice and land ice (for example, glaciers) melts?
2. What will be the effect on sea water and fresh water if sea ice and land ice (for example, glaciers) melts?

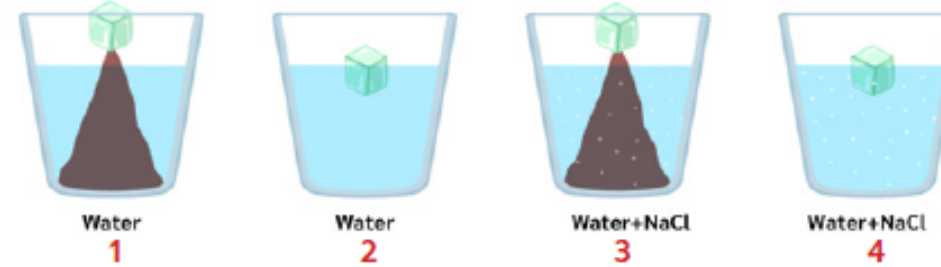
Equipment:

- 4 plastic cups
- 2 Plasticine blocks
- Marker pen
- Timer
- Colored ice cubes
- IR - thermometer
- Tea-spoon or spatula to stir with
- Table salt (NaCl)

Diagram: Experimental Setup.



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Exercise:

1. Add 150 ml of tap water to plastic cup 1 and glass 2. Put a plasticine mountain shaped-block in the plastic cup 1. Mark the water level on the side of both plastic cup 1 and 2.
2. Take two identical colored ice cubes out of the ice box.
3. Place one ice cube on top of the plasticine mountain shaped-block in the plastic cup 1 and carefully place the other ice cube into the water in the plastic cup 2. Identify the kind of ice that you think is represented in the plastic cup 1 and in the plastic cup 2.

Plastic cup 1: Plastic cup 2:

4. Once again, mark the water levels on the side of both plastic cup 1 and 2. This is the "Starting level."
5. Start a timer and measure the timing duration from starting point of placing the ice cube in until the ice cube completely melt.
6. Carefully observe what happens as the ice cubes melt. How does the melting water behave in the water?
7. In the table, below register how long it takes for each ice cube to melt completely. While you wait, answer the following question: What do you expect to happen to the water level in the different beakers?

ACTIVITY SHEET

8. Repeat the experiment but this time with "Sea Water" in plastic cup 3 and plastic cup 4. Sea water has an average salt content of 3.3% NaCl. Again, it is very important to mark the water levels and to carefully observe what happens in the water during the melting of the ice cubes.

Results:

Table 1: Starting and completely melt time and water level changes

	Plasticine	NaCl %	Starting time	Completely melt time	Water level change (mm)
plastic cup 1					
plastic cup 2					
plastic cup 3					
plastic cup 4					

Questions:

1. Do the ice cubes in the plastic cup 1-4 melt at the same time? Explain your results.

.....
.....

2. What happened to the water levels in the plastic cup 1-4? Are the results similar to your predictions?

.....
.....
.....

3. Compare your observations of the plastic cup 1-2 with your observations of the plastic cup 3-4. Explain any differences.

.....
.....
.....

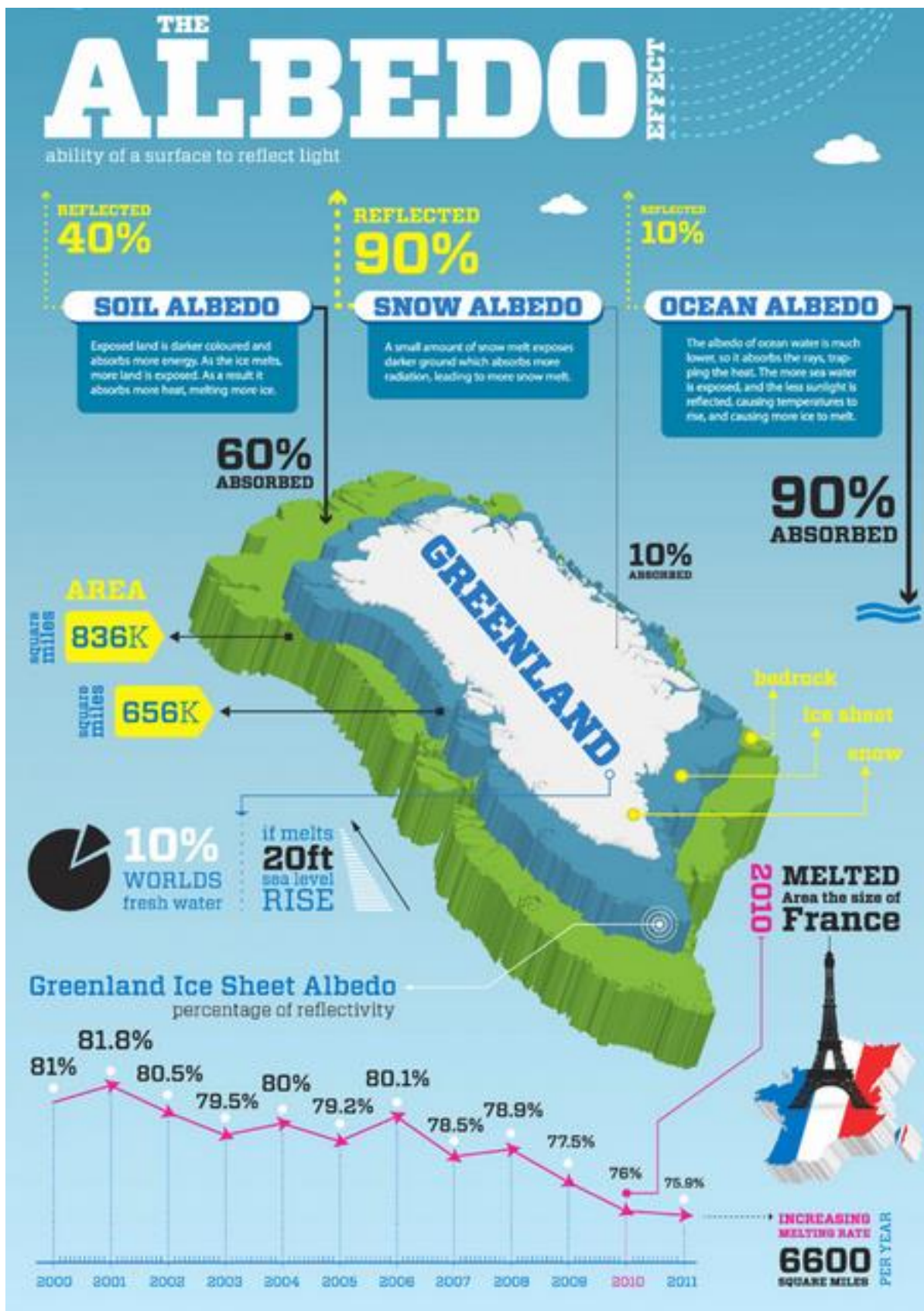
4. Based on your results try to answer the introductory questions:

What will be the effect on sea levels when sea ice and land ice (for example, glaciers) melts?
What will be the effect on sea water and fresh water if sea ice and land ice (for example, glaciers) melts?

.....
.....
.....

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L2: Climate Changes and Its Impact



ACTIVITY SHEET

Name: Date:

A ACTIVITY 2.3 Albedo Affecting the Climate

Direction:
The reflectivity of different surfaces is known as their albedo. It plays an important role in the Earth's climate. In this experiment, you will investigate the following questions:

How does a surface color influence the temperature of the surfaces?

Equipment:

- 3 600-ml plastic bottles
- Black, white, brown papers
- Timer
- IR - thermometer

Health & safety: The boxes and led corn bulb must be handled carefully. Avoid touching the heat lamp.

Exercise:

1. Place a piece of white, black, or brown paper wrapping around a 600-ml plastic bottle and place them in the Sun (or under a lamp that radiates heat).
2. Use an IR thermometer to take a temperature reading at each bottle surface every 5 minutes interval for 30 minutes.
3. Be aware not to cast a shadow on the paper when taking the measurements.

Diagram: Experimental Setup.

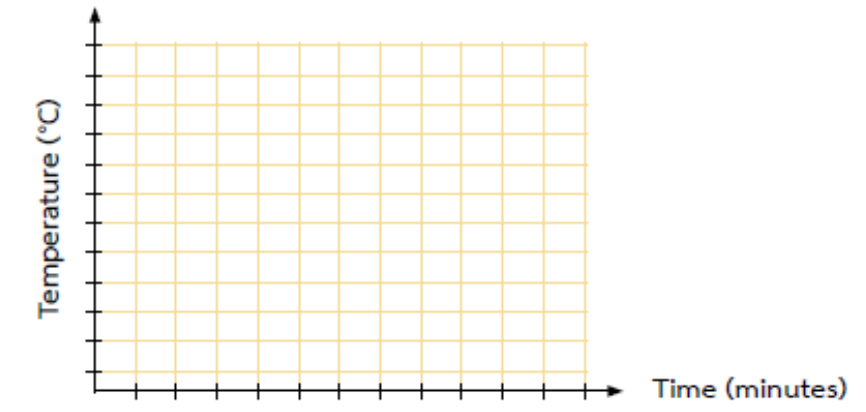


ACTIVITY SHEET

Results:

Table 1: Temperature of three colored surfaces (white, black and brown).

Color Surface	Temperature (°C)					
	5 min	10 min	15 min	20 min	25 min	30 min
White						
Black						
Brown						



Questions:

1. Based on your results from Exercise 2.3 A, what can you conclude between the colors of a material, the temperature and its albedo?
.....
.....
2. If an increase of 1°C in global temperatures causes the Arctic Ocean to remain ice-free for two additional weeks each year, how will it affect the ocean's albedo? Why?
.....
.....
3. Discuss what effect the melting of sea ice, glaciers and ice sheets will have on albedo and thus on global warming.
.....
.....

L3: Dengue and Zika Risk, Control and Prevention

ACTIVITY SHEET

ACTIVITY SHEET

ACTIVITY SHEET

ACTIVITY SHEET

Name: _____ Date: _____

Name: _____ Date: _____

Name: _____ Date: _____

Name: _____ Date: _____

A ACTIVITY 3.1 Mosquito Borne Diseases (Chapter 3.1)

B ACTIVITY 3.1 Mosquito Borne Diseases (Chapter 3.1)

A ACTIVITY 3.3 Mosquito Control (Chapter 3.3)

B ACTIVITY 3.3 Technology for Smart Dairy Farm (Chapter 3.3)

Direction: Map mosquito picture with their name and diseases. Write the names and diseases in the blank boxes:

Directions: Find each word in Chapter 3.1 and write down its definition.

Directions: Match the picture to the correct word by drawing a line.

Directions: Circle all the mosquito control methods.

Name	Aedes spp.	Anopheles spp.	Culex spp.		
Disease	Dengue	Encephalitis	Chikungunya	Zika	Malaria

- Dengue: (p.3)
- Chikungunya: (p. 14)
- Zika: (p. 22)
- Malaria: (p. 31)
- Lymphatic filariasis: (p. 34)

Name: Aedes spp.

Diseases:

Name: _____

Diseases:

Name: _____

Diseases:



Fly-killing device



Empty water container



Mosquito net



DDT



Mechanical traps



Biocontrol



Herbicides



Ovillanta



Larvicide



Trapper cage



Empty water containers



Fly-killing device



Hygieostatic bat roost



Metarhizium anisopliae

120
611

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ACTIVITY SHEET

ACTIVITY SHEET

Name: _____ Date: _____

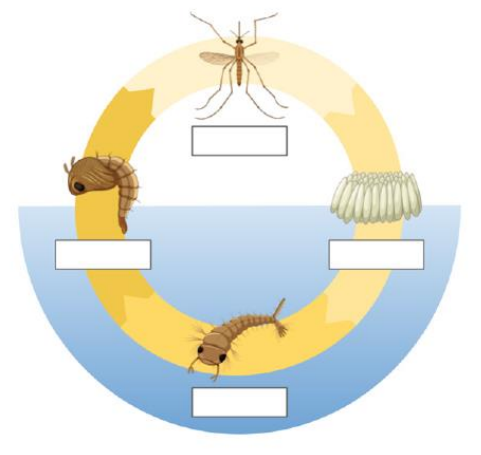
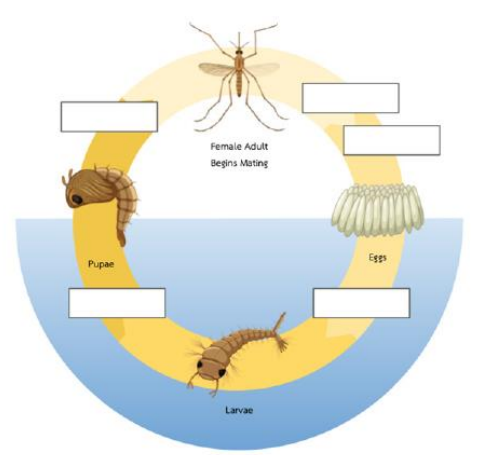
Name: _____ Date: _____

A ACTIVITY 3.2 Mosquito Life Cycle (Chapter 3.2)

B ACTIVITY 3.2 Mosquito Life Cycle (Chapter 3.2)

Directions: Write down the number of days that mosquito takes in the blank boxes in the order to complete its life cycle.

Directions: Write the mosquito life cycle stage in the blank boxes.



L4: NASA App for SDGs

ACTIVITY SHEET

Name: _____ Date: _____

A ACTIVITY 4.1 Mosquito Larva Identification (Chapter 4.1)

Directions: Classification of these 20 mosquito larvae into four genera: *Aedes*, *Armigeres*, *Culex* and *Toxorhynchites* and write down the photo numbers in the box below.



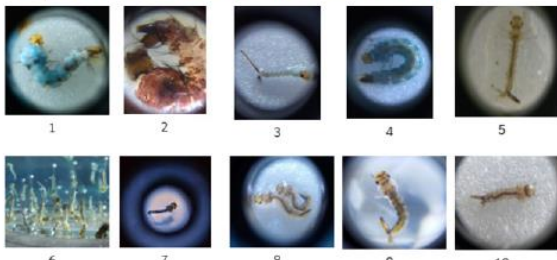
Aedes spp.	Armigeres spp.
Culex spp.	Toxorhynchites spp.

ACTIVITY SHEET

Name: _____ Date: _____

B ACTIVITY 4.1 Mosquito Larva Identification (Chapter 4.1)

Directions: Classification of these ten mosquito larvae into four genera: *Aedes*, *Armigeres*, *Culex* and *Toxorhynchites* and write down the photo numbers in the box below.



Aedes spp.	Armigeres spp.
Culex spp.	Toxorhynchites spp.

ACTIVITY SHEET

Name: _____ Date: _____

A ACTIVITY 4.3 Mosquito Larva Index

Direction: Calculate the Houses and Container Indices of the given data set:

House Index = $[\text{Numbers of Positive Houses} / \text{Total Houses}] \times 100$

Container Index = $[\text{Numbers of Positive Containers} / \text{Number of Total Containers}] \times 100$

House ID	Numbers of Positive Containers	Total Containers
House A	5	10
House B	2	10
House C	0	10
House D	6	10
House E	8	10
Total	21	50

ACTIVITY SHEET

Name: _____ Date: _____

B ACTIVITY 4.3 Mosquito Larva Index

Direction: Calculate the Houses and Container Indices of the given data set:

House Index = $[\text{Numbers of Positive Houses} / \text{Total Houses}] \times 100$

Container Index = $[\text{Numbers of Positive Containers} / \text{Number of Total Containers}] \times 100$

House ID	Numbers of Positive Containers	Total Containers
House A	5	10
House B	2	10
Total	7	20

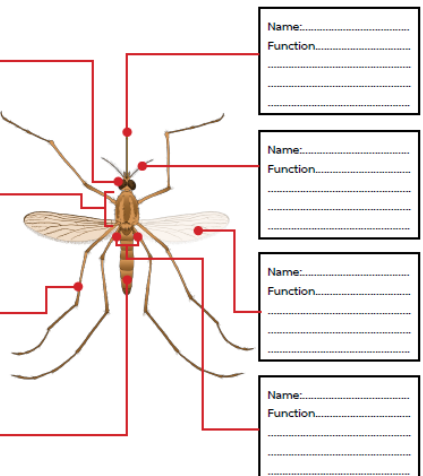
Answer:

ACTIVITY SHEET

Name: _____ Date: _____

A ACTIVITY 4.2 Adult Mosquito Parts and Functions (Chapter 4.2)

Direction: Label the parts of adult mosquito. Write the names in the blank boxes:

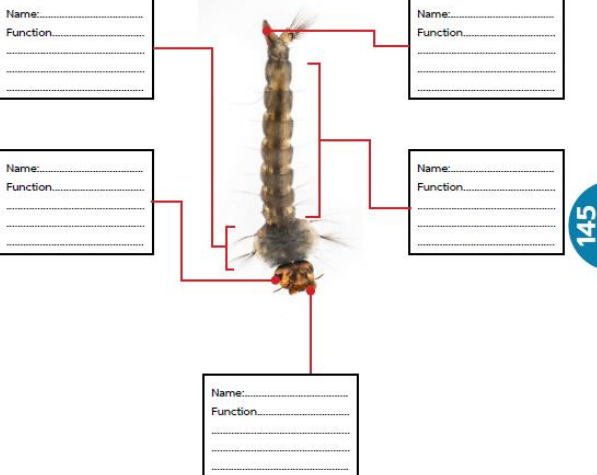


ACTIVITY SHEET

Name: _____ Date: _____

B ACTIVITY 4.2 Mosquito Larva Parts and Functions (Chapter 4.2)

Direction: Label the parts of mosquito larva. Write the names in the blank boxes:



ACTIVITY SHEET

Name: _____ Date: _____

Answer:

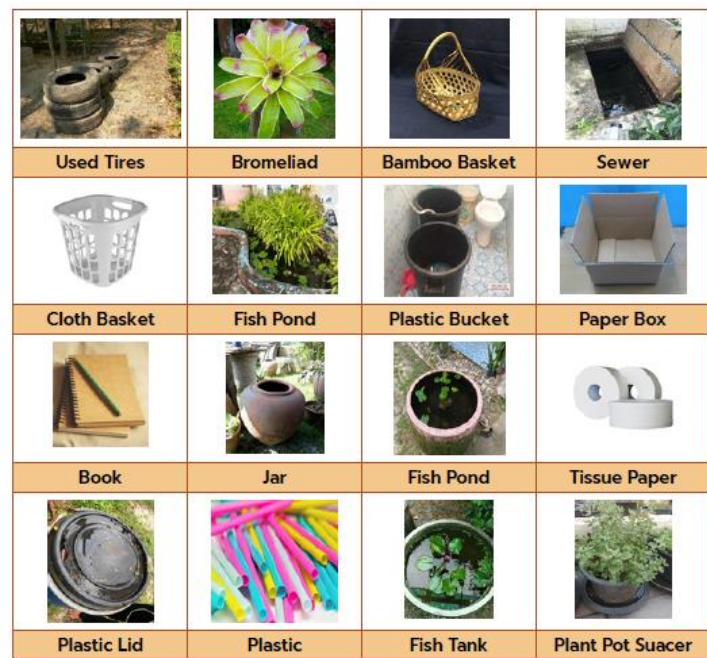
L5: Digital Media for Dengue and Zika Free Southeast Asia

ACTIVITY SHEET

ACTIVITY SHEET

A Activity 5.1 Mosquito Breeding Site (Chapter 5.1)

Direction: Circle pictures of mosquito breeding sites



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B Activity 5.1 Mosquito Breeding Site (Chapter 5.1)

Direction: Match the picture to the correct word by drawing a line.



- Bromeliad
- Plastic Bucket
- Jar
- Plant Pot Saucer
- Used Tires

Scene	Page															
<table border="1"> <thead> <tr> <th>Shot #</th> <th>Shot #</th> <th>Shot #</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td>Action</td> <td>Action</td> <td>Action</td> </tr> <tr> <td>Dialogue</td> <td>Dialogue</td> <td>Dialogue</td> </tr> <tr> <td>FX</td> <td>FX</td> <td>FX</td> </tr> </tbody> </table>	Shot #	Shot #	Shot #				Action	Action	Action	Dialogue	Dialogue	Dialogue	FX	FX	FX	
Shot #	Shot #	Shot #														
Action	Action	Action														
Dialogue	Dialogue	Dialogue														
FX	FX	FX														

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ANSWER KEY

Name: _____ Date: _____

A Activity 5.2 Dengue Free Campaign Video (Chapter 5.2)

Direction:

I. Write a storyboard on the Dengue Free Campaign Video

A storyboard is a visual representation of how a story will play out, scene by scene. It's made up of a chronological series of images, with accompanying notes.

Step 1: Create a Video Storyboard Template

SCENE	PAGE															
<table border="1"> <thead> <tr> <th>SHOT #</th> <th>SHOT #</th> <th>SHOT #</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td>ACTION</td> <td>ACTION</td> <td>ACTION</td> </tr> <tr> <td>DIALOGUE</td> <td>DIALOGUE</td> <td>DIALOGUE</td> </tr> <tr> <td>FX</td> <td>FX</td> <td>FX</td> </tr> </tbody> </table>	SHOT #	SHOT #	SHOT #				ACTION	ACTION	ACTION	DIALOGUE	DIALOGUE	DIALOGUE	FX	FX	FX	
SHOT #	SHOT #	SHOT #														
ACTION	ACTION	ACTION														
DIALOGUE	DIALOGUE	DIALOGUE														
FX	FX	FX														

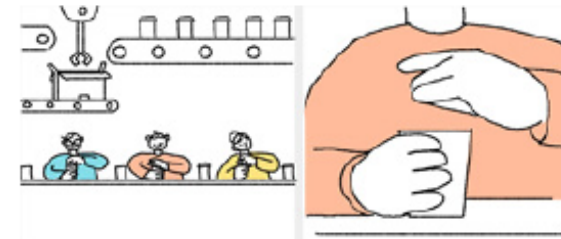
Action: The primary activity happening in a shot.

Dialogue: Any speech that is heard throughout a video.

FX: Technical details that explain how the shot is created in production and post-production (e.g. aspect ratio, camera angles, camera movement, shot type, sound effects, special effects)

Step 2: Add the Script

Under each rectangle, write the line of script or dialogue that corresponds to that scene. Think about layering (foreground: area closest to the viewer, middle ground: area in the center of a frame, and background: area furthest from the viewer).



Step 3: Sketch out the Story

Choose a time of day! Adding in staging elements and color helps convey the mood you are after, but should not distract from the story. Character is king. Vary your shot types and camera angles.

Step 4: Add Notes

Finally, add in any notes about each scene. This might include a description of what is happening, camera angles or movement, and any special effects. Do not forget about audio like music or sound effects.

II. Shoot a video on Dengue Free Campaign.

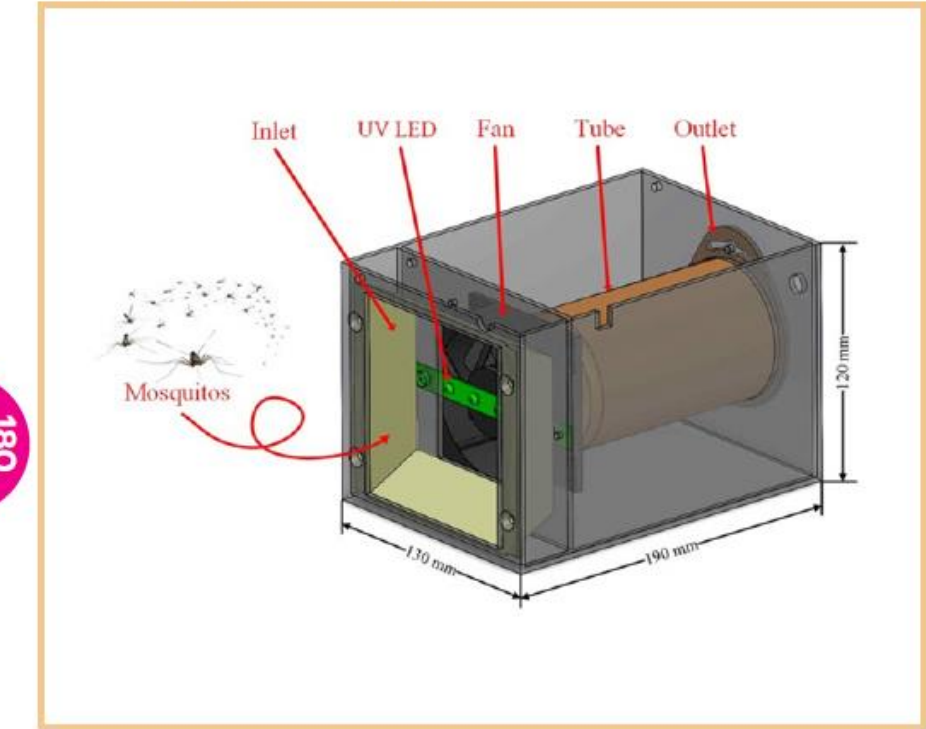
III. Upload your video on the YouTube and copy the YouTube Link and paste it on your Google classroom assignment.

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Name: _____ Date: _____

A Activity 5.3 Design Ovitrap (Chapter 5.3)

Directions: Design an adult mosquito trap in the box below



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Name: _____ Date: _____

B Activity 5.3 Design Ovitrap (Chapter 5.3)

Directions: Design an adult mosquito trap in the box below



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GLOBE Mosquito Habitat Mapper App



Assoc. Prof. Dr. Krisanadej
Talent Mobility
Associate Dean on Research



Mosquito App



Data Visualization

International

User

GLOBE



112+
Countries



100+
million
Measurments



30,000+
Schools



136+
million
Total Data Enter



500+
*Student
Projects*



3 GOOD HEALTH AND WELL-BEING

Vaccinate your family to protect them and improve public health.

Goal 3: Good Health and Well-Being

3.D Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks.

- GLOBE Observer: Mosquito Habitat Mapper App
- Prevent malaria, Dengue, Zika

GLOBE MOSQUITO PROTOCOL

COLLECTION

MOSQUITO LARVAE AND CONTAINER TYPES

WHY SHOULD WE DO THE GLOBE MOSQUITO PROTOCOL?

MOSQUITOS AND HUMAN DISEASES
Mosquitos are main vectors for many human diseases

Dengue haemorrhagic fever

Malaria

Filariasis

Chikungunya

Japanese encephalitis

Indoor/Outdoor containers

Artificial/Natural containers

Earthen/Plastic containers

Containers with/without lids

Dark/Light-colored containers

MOSQUITO LIFE-CYCLE
Mosquitoes undergo complete metamorphosis (egg → larva → pupa → adult)

MOSQUITO IDENTIFICATION

EGGS

LARVA

PUPA

ADULT

Palps Long

Palps Short

GLOBE MOSQUITO DATA ENTRY

INTEGRATED HYDROLOGY

MOSQUITOS

CONTAINER

KRISANADEJ JAROENSUTASINEE, PH.D.

Center of Excellence for Ecoinformatics, Walailak University
222 Thaiburi, Thasala District
Nakhonsithammarat, Thailand 80161
Tel (+66) 075672005-6 Fax (+66) 075672004
Email: krisanadej@gmail.com

MULLICA JAROENSUTASINEE, PH.D.

Center of Excellence for Ecoinformatics, NECTEC-WU Walailak University
222 Thaiburi, Thasala District
Nakhonsithammarat, Thailand 80161
Tel (+66) 075672005-6 Fax (+66) 075672004
Email: mullica.jn@gmail.com

REBECCA A. BOGER, PH.D.

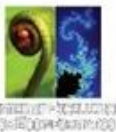
Earth and Environmental Sciences
Brooklyn College
Location: 451 Ingersoll Hall
Phone: 718.951.5000 x2159
Fax: 718.951.4753
Email: beckyboger@gmail.com

ELENA SPARROW, PH.D.

IARC Education Outreach Director and Research Professor
The International Arctic Research Center, University of Alaska Fairbanks
location: 203 F Akasofu Building
email: esparrow@alaska.edu
phone: (+1)907-474-7699

RUSSANE LOW, PH.D.

Russanne Low, Ph.D.
Senior Earth Scientist for Education and Public Outreach
Institute for Global Environmental Strategies
Arlington, VA, USA
Email: russtny_low@strategies.org



Why MHM App?

Free App

- GPS location
- No. mosquito larvae
- Visualize data

Prevent dengue outbreak

- Identify key breeding sites
- Eliminate mosquito larvae

For everyone

- Citizen scientists
- Students

Time and Location

Enter the local date and time of the observation:

Jul 7, 2016

9:28 AM

Enter location coordinates:

Latitude: 34.1244

Longitude: -117.7491

Next



Eliminate Breeding Grounds

Step 4 - Eliminate Breeding Grounds

Thank you for recording your observations. Please review or add any comments you'd like us to know about this observation.

Comments from earlier are already listed here. User can add to modify/delete contents.

Step 4 eliminates mosquito breeding grounds. By dumping or treating water, you can significantly decrease the spread of mosquitoes. Public health officials in your area may have suggestions on how to treat water that cannot be dumped.

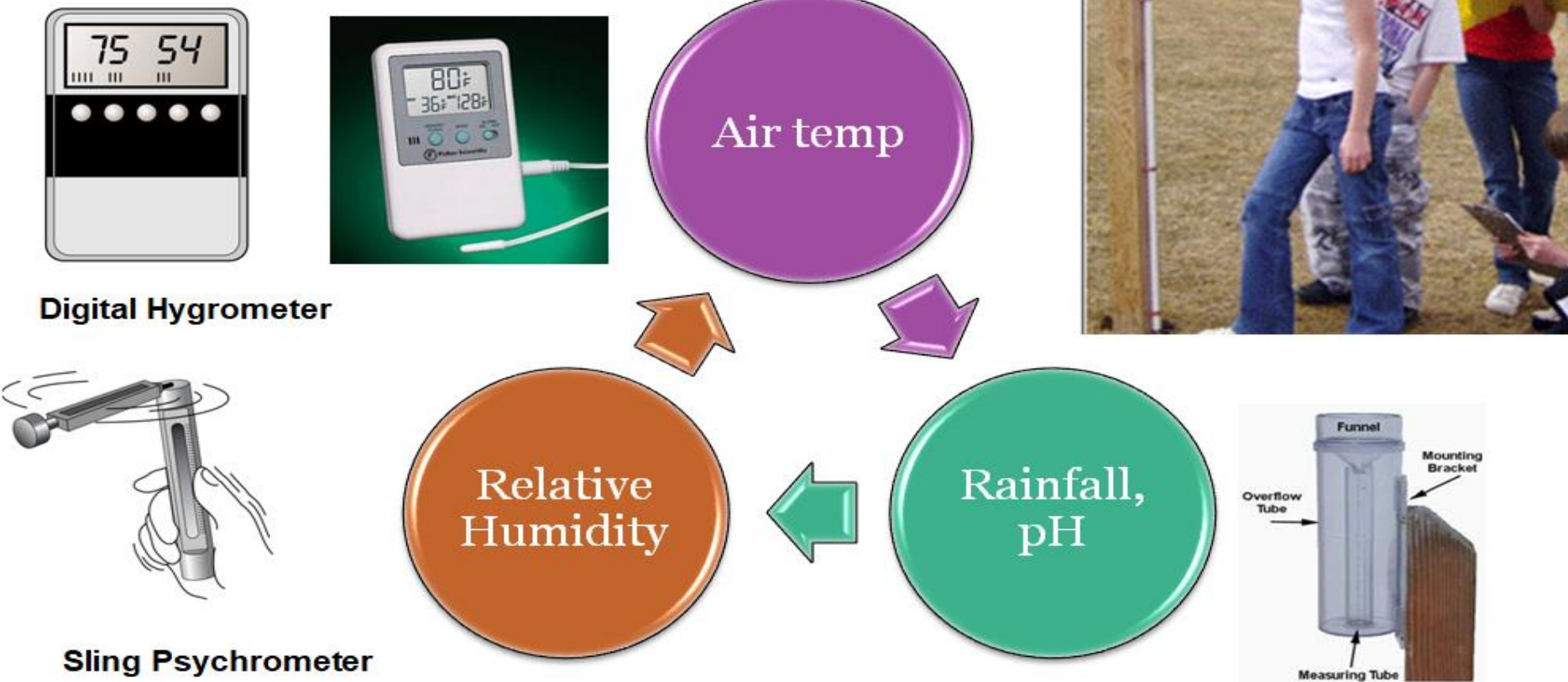
Did you dump out the water?

Yes No

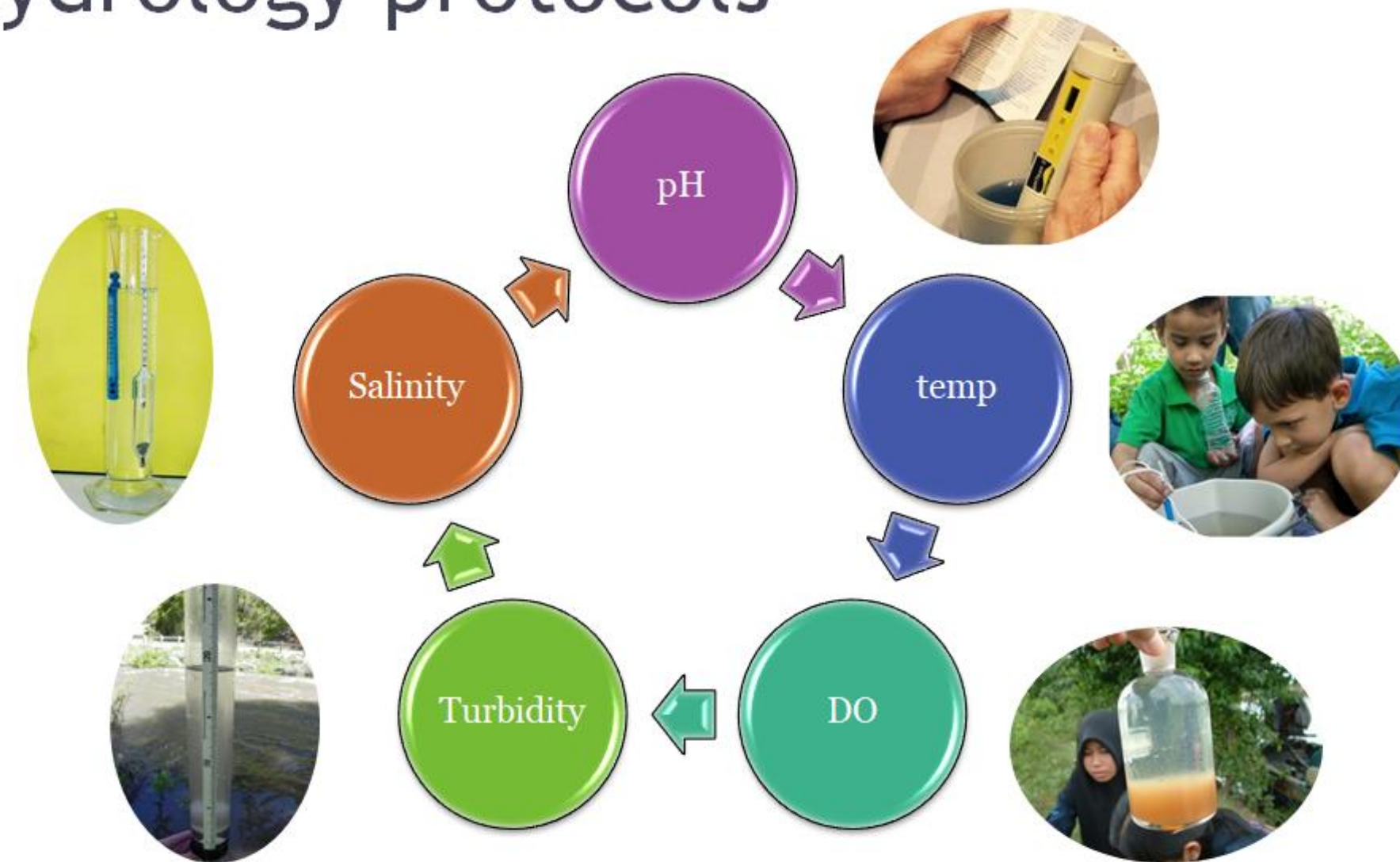


Dengue & Zika Free SE Asia

Atmosphere protocol



Hydrology protocols



Possible research questions

Indoor/Outdoor containers



Containers with/without lids



Dark/Light-colored containers



Earthen/Plastic containers





Choose your protocol:



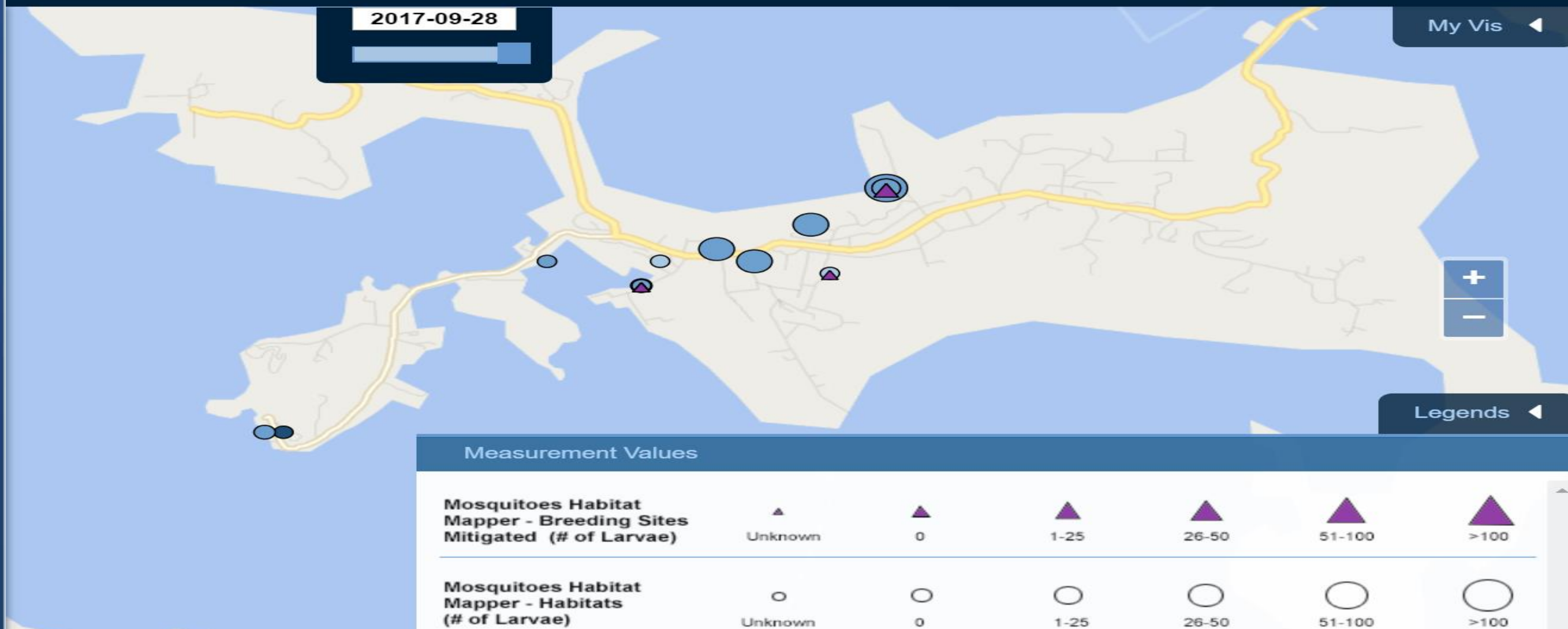
Measurements

Data Counts



Welcome Krisanadej Jaroensutasinee

Sign Out



Time and Location

Enter the local date and time of the observation:

Jul 7, 2016

9:28 AM

Enter location coordinates:

Latitude: 34.1244

Longitude: -117.7491

Next

Identify

Photograph Larva

Take up to 3 photographs of the full body of the larva. Your goal is to get a picture similar to the pictures below.

+ Photo + Photo + Photo

Finished Taking Photos

Observe and Count

Step 2 - Observe and Count Larvae

Would you like to sample larvae and perform a count?

You will need to carefully scoop or suction larvae from the water source.

Yes

No - I'm done

Eliminate Breeding Grounds

Step 4 - Eliminate Breeding Grounds

Thank you for recording your observations. Please review or add any comments you'd like us to know about this observation.

Comments from earlier are already listed here. User can add to modify/delete contents.

Step 4 eliminates mosquito breeding grounds. By dumping or treating water, you can significantly decrease the spread of mosquitoes. Public health officials in your area may have suggestions on how to treat water that cannot be dumped.

Did you dump out the water?

Yes No

**MHM App likes a game.
Go, find, eliminate them all.**

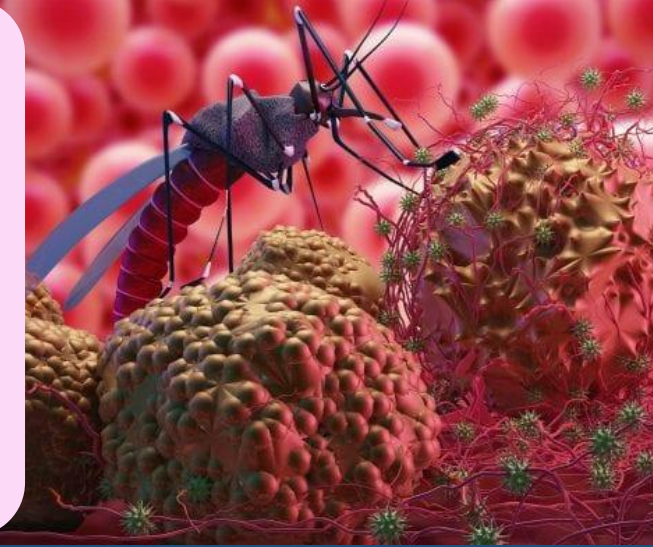


AITC 2566-68 for Public Health



13:
Climate
Action

- Atmosphere
- Hydrosphere
- Mosquito borne disease (dengue)



3: Good
Health &
Well-being

17:
Partnerships
for the Goals

- Dengue & Zika
Prevention
Campaign



SDG 3: Good Health & Well-being

SUSTAINABLE DEVELOPMENT GOALS

3 GOOD HEALTH AND WELL-BEING

Vaccinate your family to protect them and improve public health.

3 GOOD HEALTH AND WELL-BEING

ENSURE HEALTHY LIVES AND PROMOTE WELL-BEING FOR ALL AT ALL AGES

UNDER-5 DEATHS DROPPED FROM 9.8 MILLION IN 2000 TO 5.4 MILLION IN 2017

VACCINATIONS RESULTED IN AN 80% DROP IN MEASLES DEATHS BETWEEN 2000 AND 2017

THE TUBERCULOSIS INCIDENCE RATE DECLINED BY 21% BETWEEN 2000 AND 2017; NONETHELESS 10 MILLION PEOPLE DEVELOPED TUBERCULOSIS IN 2017

THE INCIDENCE OF HIV AMONG ADULTS 15-49 YEARS OLD IN SUB-SAHARAN AFRICA DECLINED BY 37% BETWEEN 2010 AND 2017

THERE WERE AN ESTIMATED 3.5 MILLION MORE MALARIA CASES IN THE 10 HIGHEST-BURDEN AFRICAN COUNTRIES IN 2017 COMPARED TO 2016

3.D Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks.

- **GLOBE Observer: Mosquito Habitat Mapper App**
- **Prevent malaria, Dengue, Zika**

Goal 3: Good Health and Well-Being

AITC: Public Health



3 Good Health & Well-being
13 Climate Actions
17 Partners for Goals

Training Courses

20 participants
15 Days training course
Asia, Africa, Pacific, Latin America, Caribbean

Walailak University

SDG Goals

- **Dengue & Zika Prevention Campaign**

Developing Countries

- Accommodation
- Laboratories
- Field trips to orchards, Farm
- Cultural Tours
- Project Proposal
- Implementation

DENGUE AND ZIKA PREVENTION CAMPAIGN

2-20 August 2021

Center of Excellence for Ecoinformatics,
School of Science, Walailak University,
THAILAND

- Impact of climate change on dengue and Zika incidences
- GLOBE Mosquito Habitat Mapper App
- Social media on dengue and Zika prevention campaign.
- Capacity development for dengue and Zika prevention



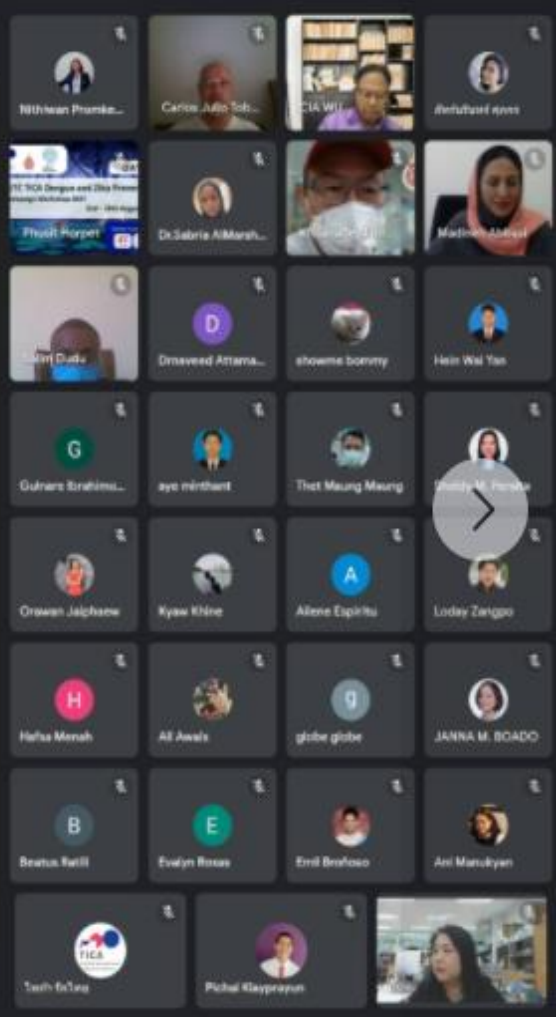

Apply/More info




TICA : Global Partnership
for Development



Dr. Hataichanok Siriwardhanakul
Human Resources Development Cooperation Division,
Thailand International Cooperation Agency (TICA), MFA





AITC Dengue and Zika Prevention Campaign




Name : Ms. Janna M. Boado
Country : Philippines
Position : Assistant Professor II
Interests : Health Research, Public Health
Others :

34




AITC Dengue and Zika Prevention Campaign




Name : Mrs. Sheldy M. Peralta
Country : Philippines
Position : Assistant Professor I
Interests : Public Health; Mental Health
Others :

35




AITC Dengue and Zika Prevention Campaign




Name : Ms. Charity Fenella Carungay
Country : Philippines
Position : Instructor I
Interests : Maternal and Child, Public Health
Others :

36



AITC Dengue and Zika Prevention Campaign



Name : Dr. Evalyn A. Roxas
Country : Philippines
Position :

- Clinical Associate Professor, Division of Infectious Diseases, Department of Medicine, University of the Philippines-Philippine General Hospital (UP-PGH)
- Associate Professor, Department of Medical Microbiology, College of Public Health, University of the Philippines, Manila

 Interests : Infectious diseases and Public health
 Others :

- Clinician, academician and researcher
- Practicing Infectious Diseases Specialist (IDS)
- Master of Public Health


37

33


34

35

36




AITC Dengue and Zika Prevention Campaign




Name : Mrs. Ailene Espiritu
Country : Philippines
Position : Senior Health Program Officer
Interests : Public Health; Policy Making; Advocacy
Others :

38




AITC Dengue and Zika Prevention Campaign




Name : Mr. Emil Broñoso
Country : Philippines
Position : College Instructor
Interests :
Biological Science / Biology Education / Educational Foundationist
Others : Bonsai lover

39




AITC Dengue and Zika Prevention Campaign




Name : Mrs. Pushpa Dharmakanthi Kodithuwakku
Kankanamge
Country : Sri Lanka
Position : Special Grade Nursing Officer, Hospital service, Health Department, Sri Lanka.
Interests : Research and innovations.
Others : Hard working for improve the public Health.

39



AITC Dengue and Zika Prevention Campaign



Name : Mr. Showmiyan Kanagaraja
Country : Sri Lanka
Position : Government Teacher
Interests : social services /researchs/entrepreneur activities
 Others : I am a humble person with flexible nature. Flexibility is life and rigidity is death. As a little baby's body is very flexible but when one dies one's body become rigid. The most beautiful thing about me is I am always ready to accept good changes in me. And I also believe that the environment and people around a person bring changes in his personality. I do not look down upon any cultural or religion. But I only respect good people without gender discrimination. I am not a religious extremist.

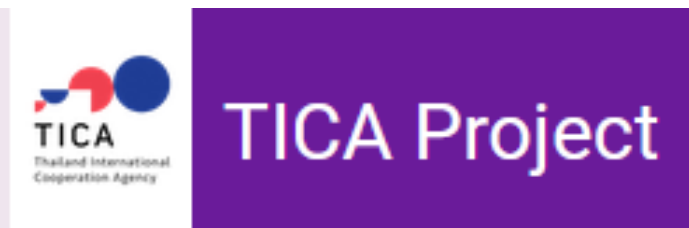
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Dengue and Zika Prevention Campaign

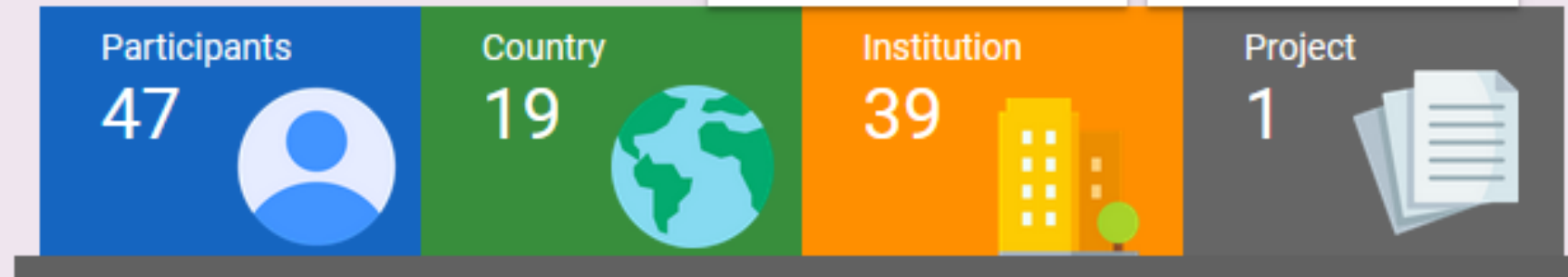


สรุปข้อมูลโครงการการอบรมครู

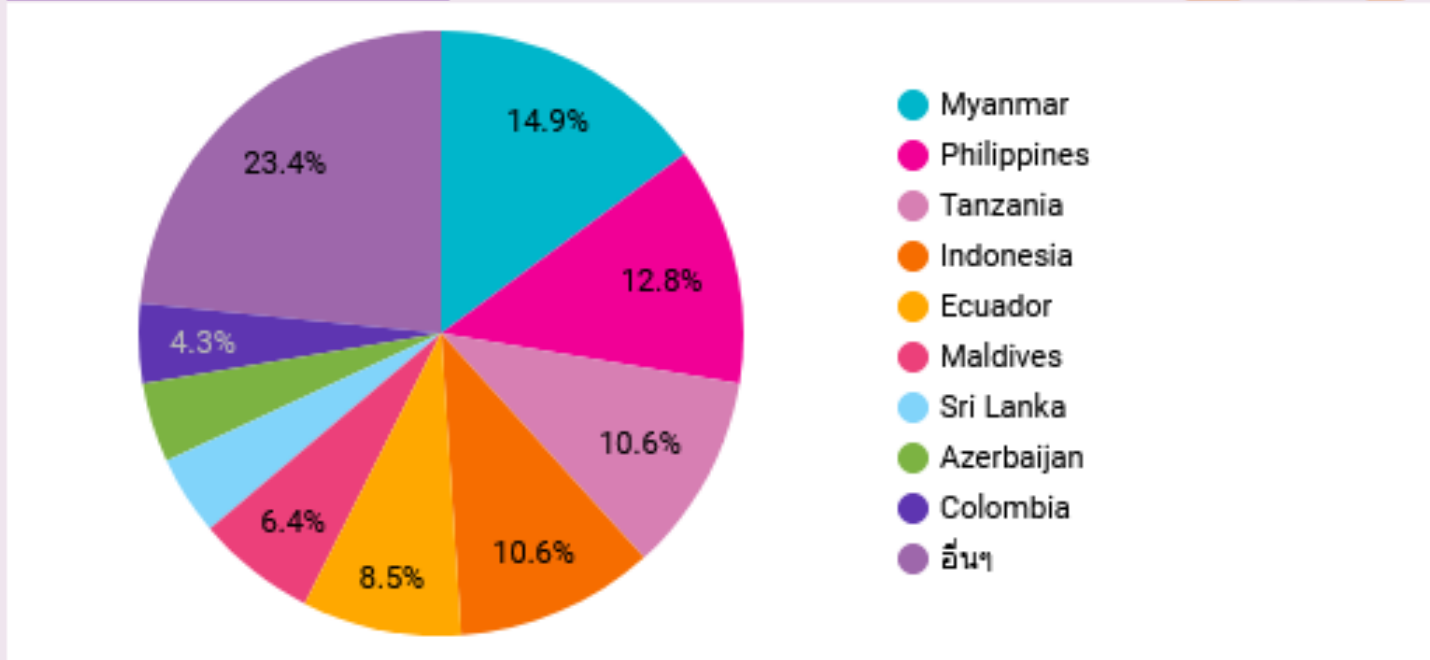
ศูนย์ความเป็นเลิศด้านนิเวศวิทยาพยากรณ์และการจัดการ
มหาวิทยาลัยวลัยลักษณ์



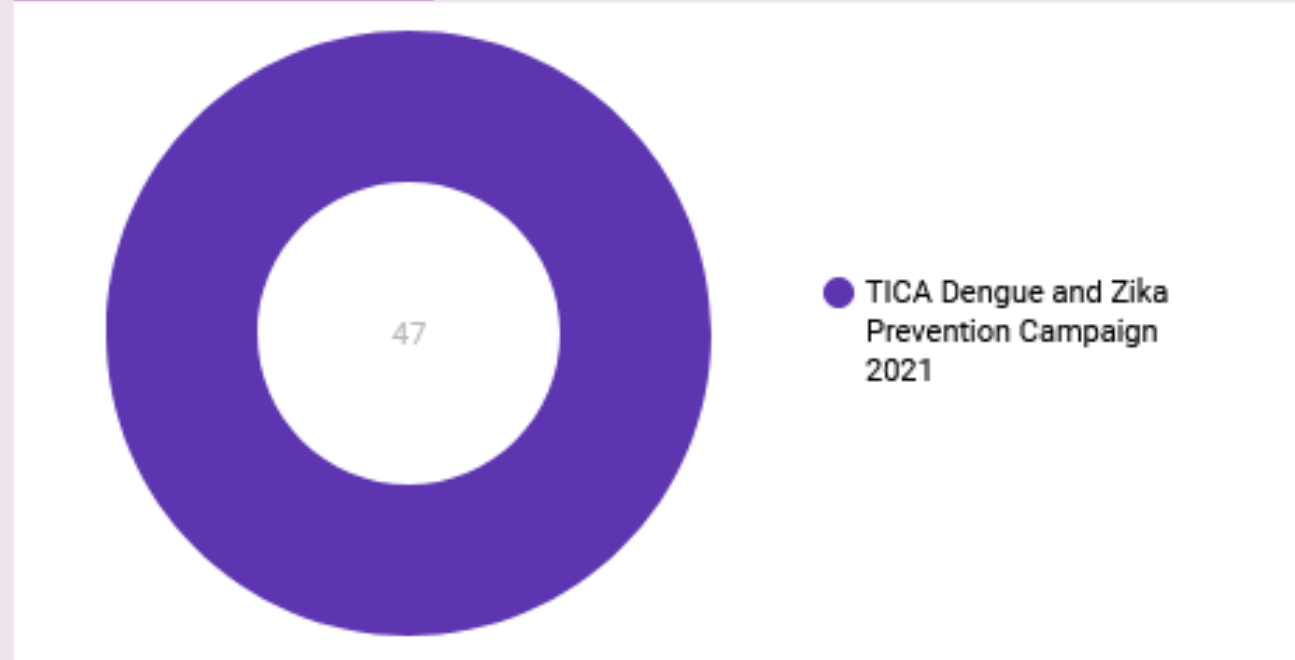
Country ▾ Project... (1) ▾



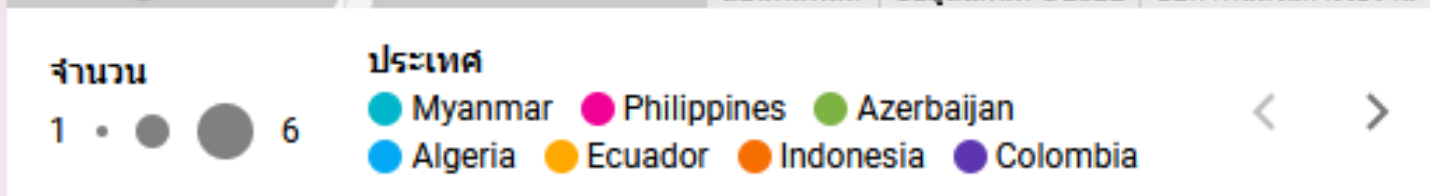
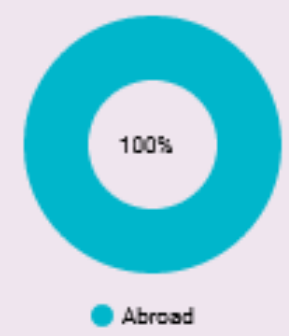
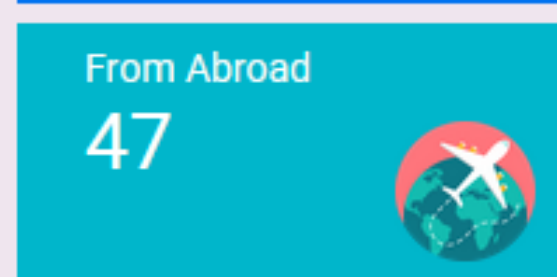
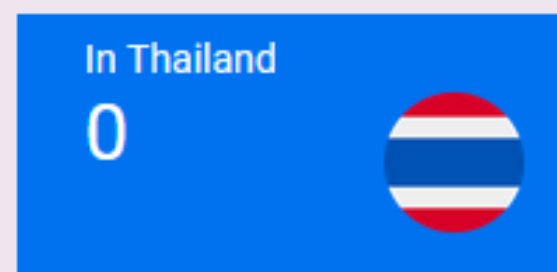
Country



Project



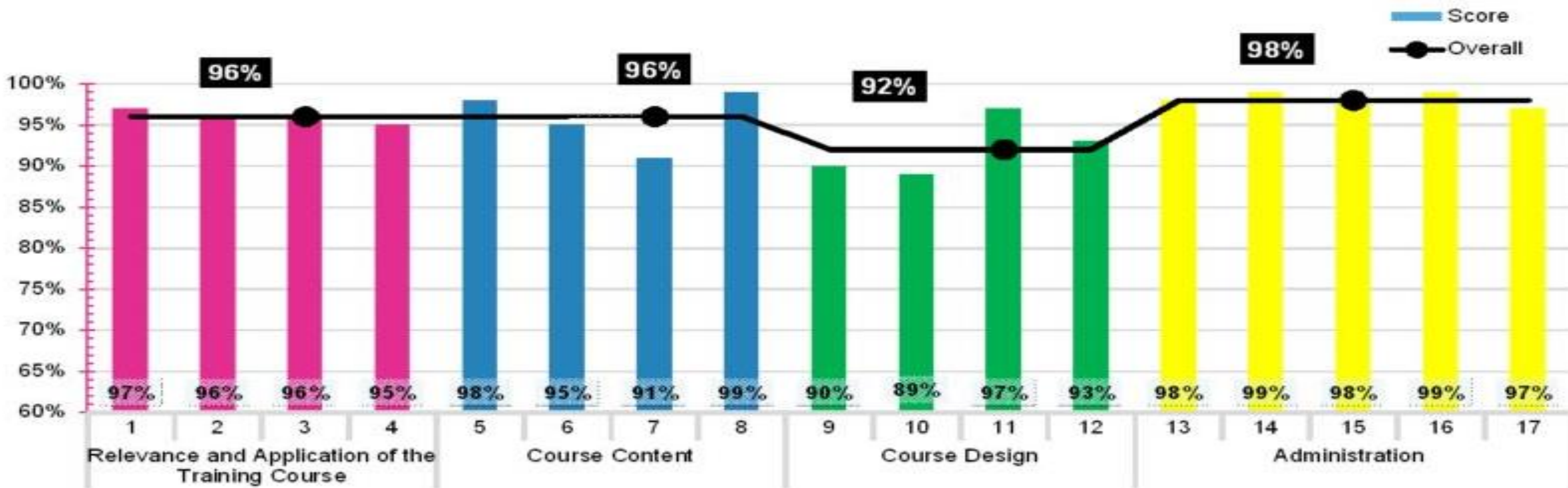
Participants



Name	Institution	Country	Project
1. Dr. Ani Manukyan	NCDC Armenia	Armenia	1
2. Ms. HAYAT ALIYEVA	Azerbaijan Medical Univ...	Azerbaijan	1
3. Mr. Loday Zangpo	Vector-Borne Disease C...	Bhutan	1
4. Mr. ALISETH KATHERINE GUE...	Area Andina	Colombia	1

Country	Count
1. Myanmar	7
2. Philippines	6
3. Tanzania	5
4. Indonesia	5
5. Ecuador	4
6. Maldives	3
7. Azerbaijan	2
8. Colombia	2

Institution	Country	Teacher Count
1. Defence Services Medical Academy	Myanmar	6
2. DMMMSU	Philippines	2



1. This training is appropriate for my level of experience

2. The topics covered are relevant to my work

3. This training experience is useful to my work

4. My expectation of the training course was fulfilled

5. The objectives of the training are clearly defined

6. The content is well organized and easy to follow

7. The content is practical and relevant to your country's development agenda

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9. The training method (device, internet, application) is appropriate

10. Time allocation and duration of the course is appropriate

11. The trainers/lecturers are knowledgeable about the training topics and well prepared

12. The overall course design is appropriate

13. The course detail was provided clear and sufficient information for your registration.


14. The coordinator/coordinating team of the training course is helpful

15. The announcement of the training program is available for everyone to access

16. The information of the training program (course outline, registration form, etc.) is accessible

17. The overall administration is appropriate

AITC Dengue and Zika Prevention Campaign



Name : Dr. Evalyn A. Roxas
Country : Philippines
Position :

- Clinical Associate Professor, Division of Infectious Diseases, Department of Medicine, University of the Philippines-Philippine General Hospital (UP-PGH)
- Associate Professor, Department of Medical Microbiology, College of Public Health, University of the Philippines, Manila

Interests : Infectious diseases and Public health
Others :

- Clinician, academician and researcher
- Practicing Infectious Diseases Specialist (IDS)
- Master of Public Health

37

AITC Dengue and Zika Prevention Campaign



Name : Mrs. Sheldy M. Peralta
Country : Philippines
Position : Assistant Professor I
Interests : Public Health; Mental Health
Others :

35

AITC Dengue and Zika Prevention Campaign



Name : Ms. Janna M. Boado
Country : Philippines
Position : Assistant Professor II
Interests : Health Research, Public Health
Others :

34

2 General Information of the country

- The Philippines is an island country of within the Southeast Asia in the western Pacific Ocean near the equator that forms an archipelagic shape
- **Capital:** Manila
- **Current Population:** 110,258,854
- **Major Languages:** Filipino and English

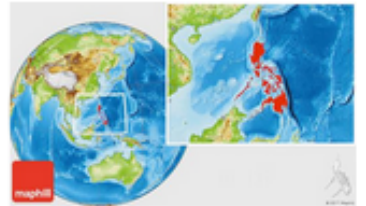


8

2 General Information of the country

Climate:


- **Tropical and strongly monsoonal** (i.e., wet-dry).
 - Rain-bearing winds blow (SW): from May to October
 - Drier winds (NE): from November to February.
 - Dry season: December and ends in May.
 - Wet season: rainfall is heavy in all parts of the archipelago except for an area extending southward through the center of the Visayan group to central Mindanao and then southwestward through the Bulu Archipelago; rain is heaviest along the eastern shores facing the Pacific Ocean.
- From June to December tropical cyclones (typhoons) often strike the Philippines.
 - Most of these storms come from the southeast, their frequency generally increasing from south to north; in some years the number of cyclones reaches 25 or more.



5

3 Historical Background of the Subject Related to the Training Course


- Dengue was first detected in the Philippines in the 1950s.
- 1953 - first dengue hemorrhagic fever outbreak
- Zika virus: 1953, 2012, and 2016.
 *** frequent travel exchange between Yap (Island in Federated States of Micronesia) and the Philippines could be a possible transmission route, no data on Zika virus infection were recorded in the Philippines between 1953 and 2012



6

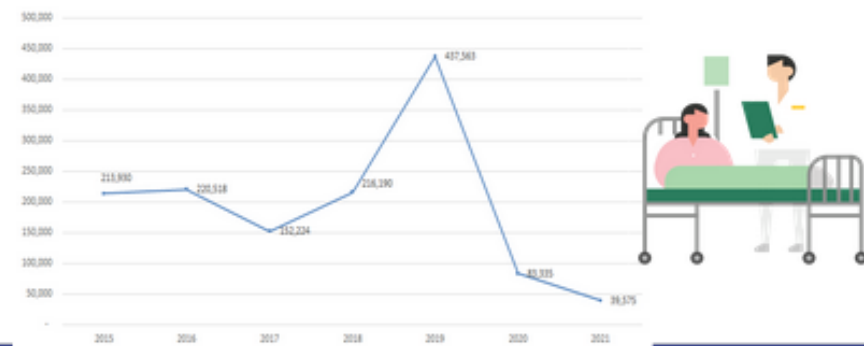
3 Historical Background of the Subject Related to the Training Course

- Dengue: major public health threat
 National Dengue Epidemic - August 6, 2019
 Total # of cases: 437,563 / Total # of deaths: 1,689
- Zika
 2017 - 57 cases
- Chikungunya
 2018 - 2900 cases / 1 death
 2021 - 62 cases as of July 31, 2021
- Malaria
 3/81 provinces reporting indigenous cases (Palawan, Mindoro Oriental, and Sulatan Kudarat)
- Enhanced 4S strategies



7

Philippine Data Trends: Cumulative Number of Dengue Morbidities (2015-2021)



8

Comments (Dengue and Zika)

Over all the training was well organized. The training was absolutely superb and I genuinely enjoyed every moment of this training. Look forward to attend future trainings if given the opportunity. Thank you so much.

Very grateful for this excellent training. We are so fortunate to be participants

I express my deep gratitude to all the organizers and all the members of the team.

The workshop is very interesting and informative. Great job everyone! hoping to have future workshops again with you!

AITC 2566-68 for Climate Change & Environmental Issues



- **Climate Smart Agriculture: Smart Farming**

2: Zero Hunger

13: Climate Action

- **Good Air Quality with PM 2.5 Sensors and IoT**



3: Good Health & Well-being

17: Partnerships for the Goals

- **Dengue & Zika Prevention Campaign**



SDG 2: Zero Hunger

 SUSTAINABLE DEVELOPMENT GOALS



2 ZERO HUNGER

Avoid throwing away food.
Over 1/3 of the world's food is wasted.



Goal 2: Zero Hunger

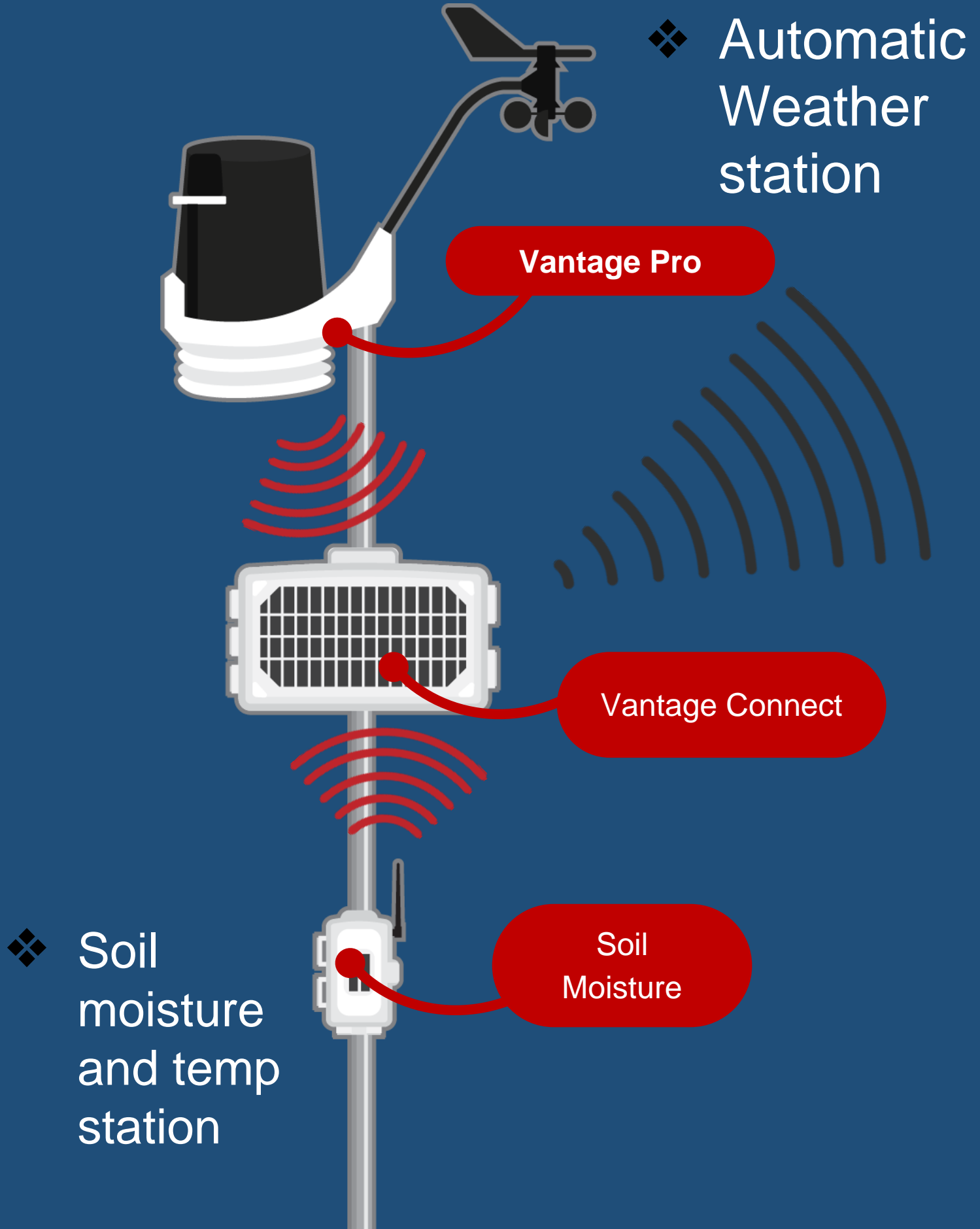


2. Smart agriculture using Sensors, AI & IoT

(2.1a) Increase production and quality

(2.1b) Strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters

Weather Station



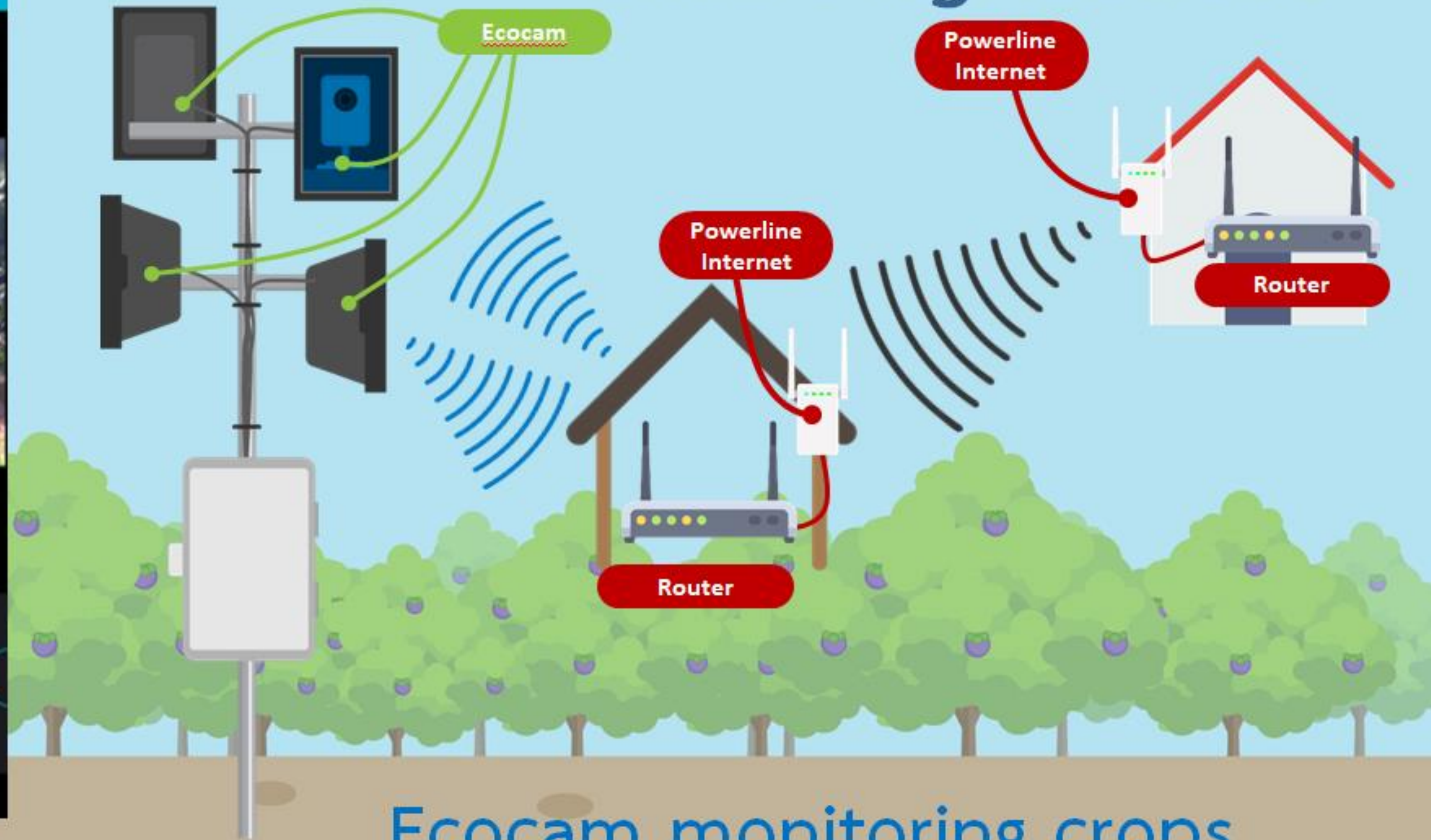
Smart Agriculture Drone Mapping



**Real time
Monitoring**



Smart Agriculture



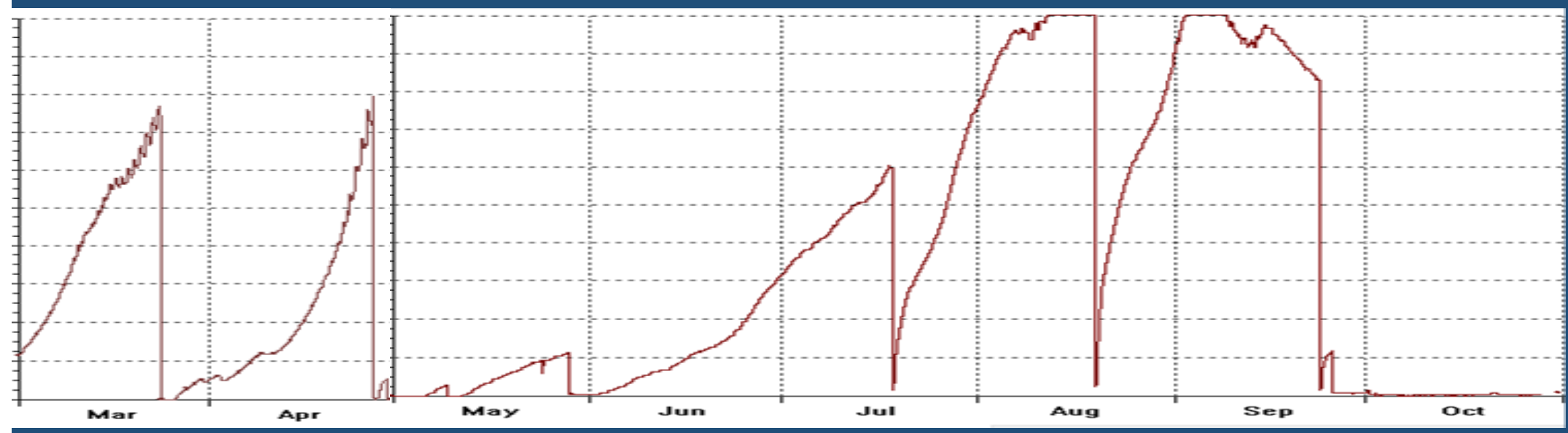
Ecocam monitoring crops

Smart Agriculture in Mangosteen



Soil Moisture at 15 cm. depth

Root Pressure (cb)



SDG 3: Good Health & Well-being

 SUSTAINABLE DEVELOPMENT GOALS



3 GOOD HEALTH AND WELL-BEING



Vaccinate your family to protect them and improve public health.

Goal 3: Good Health and Well-Being

3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination

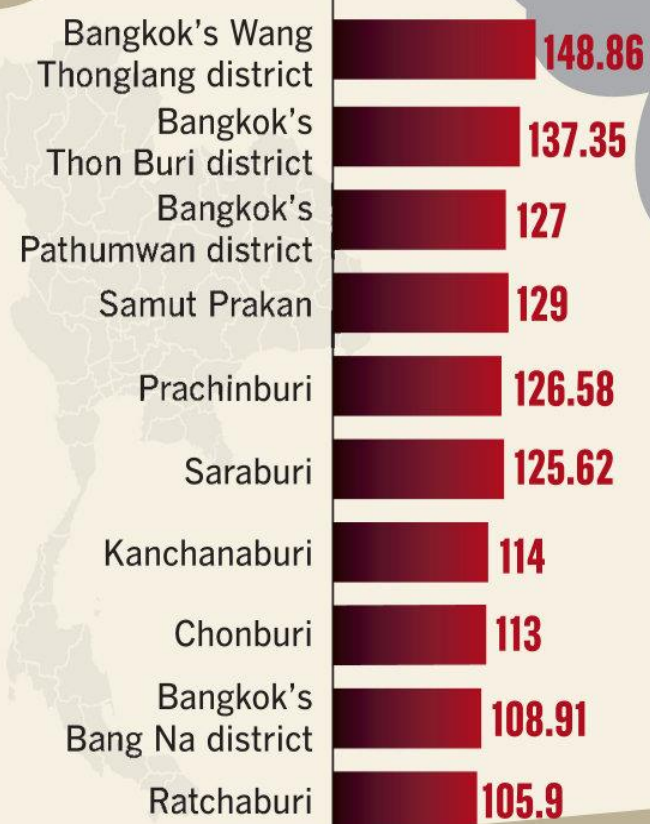
- PM2.5 sensors with IoT
- Reduce illness from air pollution



ALARMING LEVELS OF PM2.5



Air-pollution levels in Bangkok and other major cities in Thailand are on the rise again since Wednesday, with the top-10 worst areas for hazardous PM2.5 levels yesterday seen below.



■ Milligrams (Red: Unhealthy)



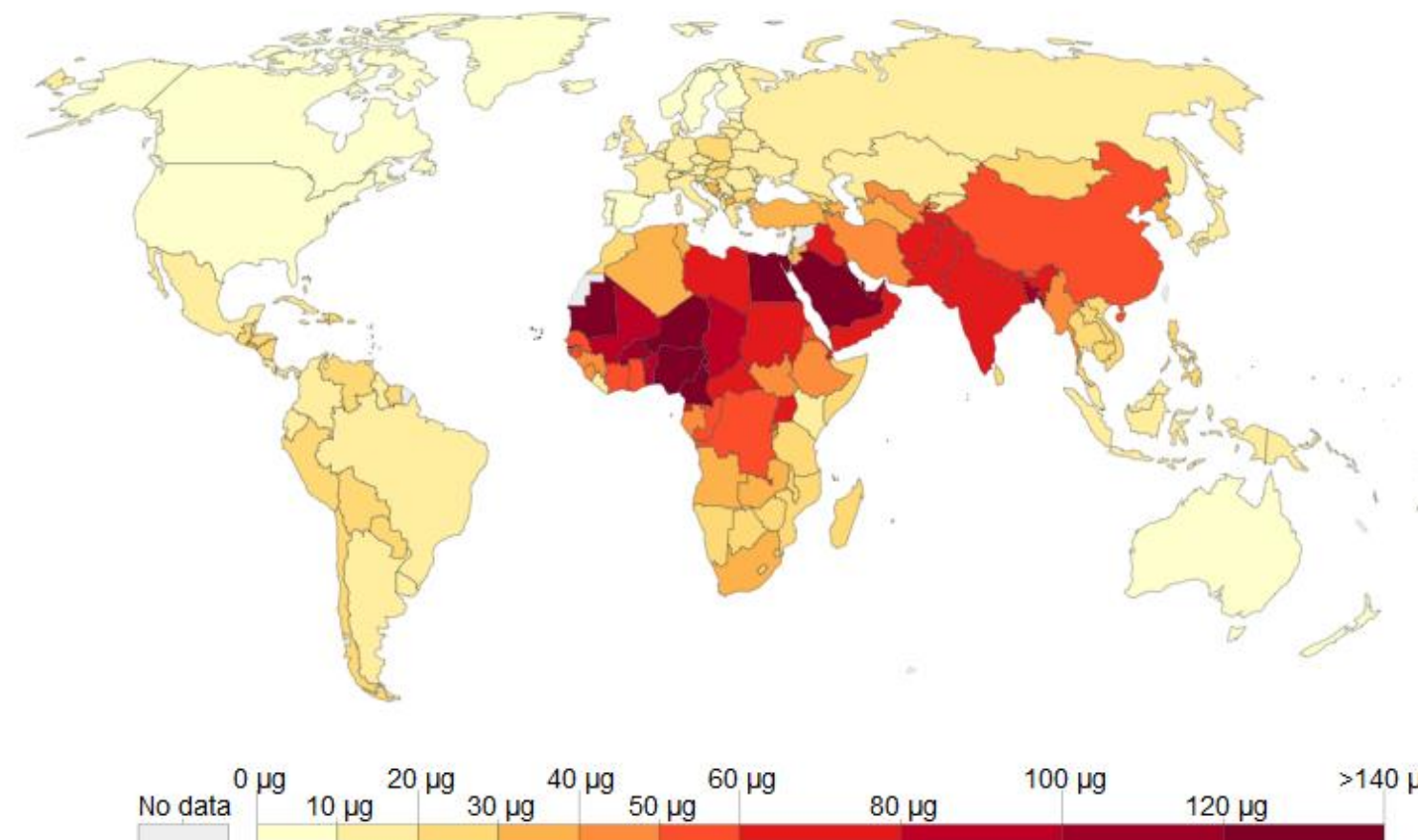
Source: Pollution Control Department

NATION GRAPHICS

PM2.5 air pollution, mean annual exposure (micrograms per cubic meter), 2016

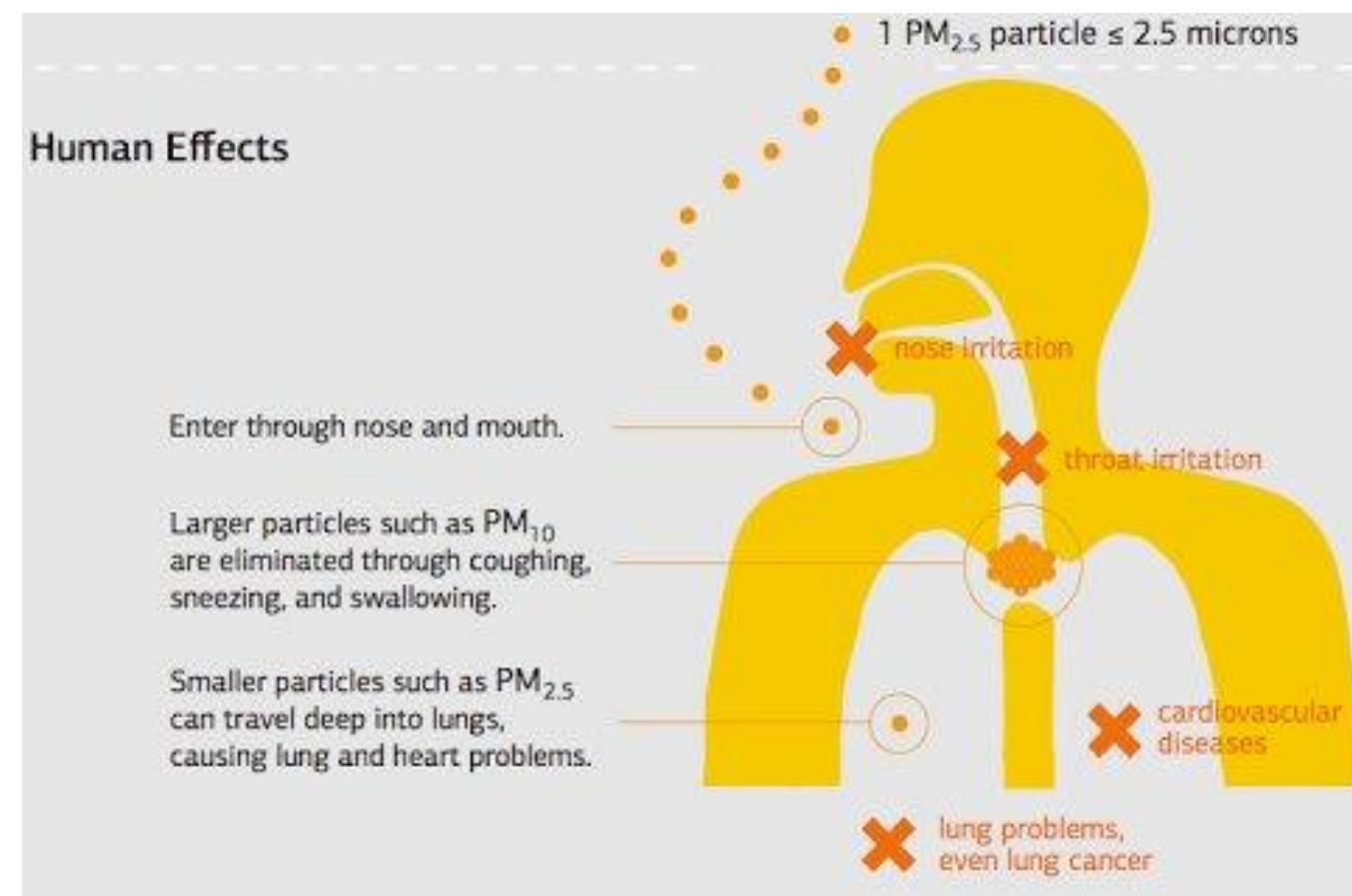
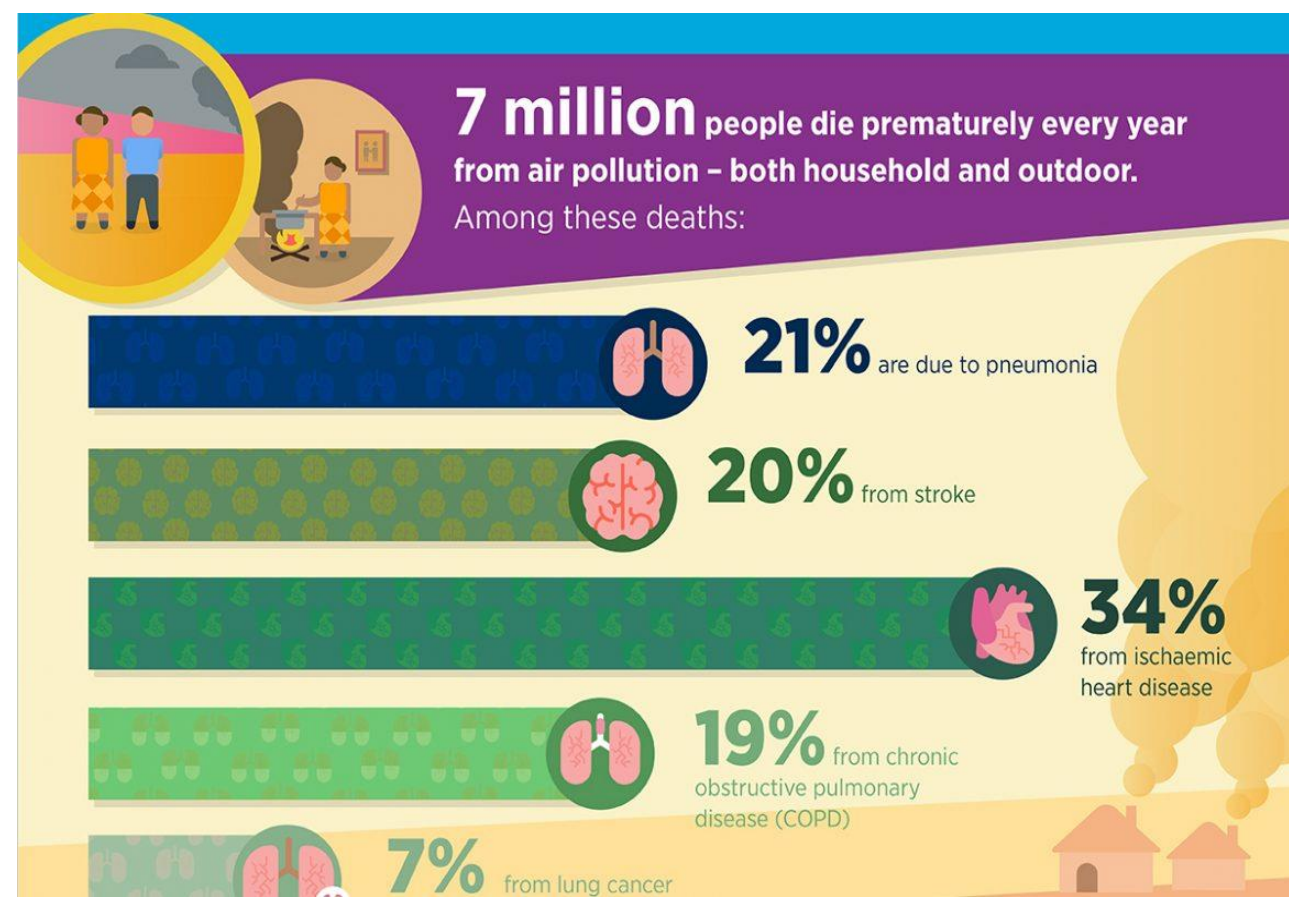
Our World in Data

Population-weighted exposure to ambient PM2.5 pollution is defined as the average level of exposure of a population to concentrations of suspended particles measuring less than 2.5 microns in diameter. Exposure is measured in micrograms per cubic metre (µg/m³).



Source: World Bank

OurWorldInData.org/air-pollution/ • CC BY



AITC: Climate Change and Environmental Issues



2 Zero Hunger
3 Good Health & Well-being
13 Climate Actions
17 Partners for Goals

Training Courses

20 participants
15 Days training course
Asia, Africa, Pacific, Latin
America, Caribbean

Walailak University

SDG Goals

- 1. Climate Smart Agriculture: Smart Farming Practices
- 2. Good Air Quality with PM 2.5 Sensors and IoT
- 3. Dengue & Zika Prevention Campaign

Developing Countries

- Accommodation
- Laboratories
- Field trips to orchards, Farm
- Cultural Tours
- Project Proposal
- Implementation

AITC: Climate Change and Environmental Issues



Google classrooms
Kahoot quiz/Padlet
Google slide/spreadsheet
Mind Map
Pooleverywhere

**Walailak University
Lecturers**

20 participants
15 Days training course
Asia, Africa, Pacific, Latin
America, Caribbean

**Assessment &
Implementation**

Teaching Methods

**Online
Onsite
Hybrid**

• Expert in Smart Agriculture
Climate Change Mitigation
Soil Expert
Assoc. Prof. Dr.
UKPSF (Senior Fellow)

**Participant in
Developing
Countries**

- Formative/Summative assessment
- Country report
- Capacity development for climate-smart agriculture and climate-risk insurance
- Research Project writing/presentation



Apply/More info





Climate Smart Agriculture: Smart Farming Practices

5-23 July 2021

Center of Excellence for Ecoinformatics, School of Science,
Walailak University, THAILAND

- Food security and climate change.
- Water and soil management
- Climate smart agriculture innovative practices
- Climate-smart fisheries and aquaculture.
- Capacity development for climate- smart agriculture.







Climate Smart Agriculture: Smart Farming Practices



Name : Mr. Harutyun Daveyan

Country : Armenia

Position : Head of Agricultural Resource Use Division

Interests : Soil degradation, Effective land management, Water resources sustainable use

Others :



1





Climate Smart Agriculture: Smart Farming Practices



Name : Mr. Masego Serema

Country : Botswana

Position : Principal Technical Officer

Interests : Climate Smart Agriculture – Putting science into practice. Climate Smart Interventions for small scale farming enterprises. Mitigating climate change through social forestry.

Others : Conservation Agriculture, Natural Resources Management.



2





Climate Smart Agriculture: Smart Farming Practices



Name : Mokganedi koobonye

Country : Botswana

Position : Agricultural Research Officer

Interests : Environmental protection in relation to Agriculture with focus on fodder crops

Others :



3





Climate Smart Agriculture: Smart Farming Practices



Name : Kemmony Motlhagodi

Country : Botswana




Position : Agricultural Research Officer IBSc Animal Health

Interests : (Livestock Climate Smart Agriculture Technologies)


Others : Research more on locally available resources to produce cheap locally made feeds



4

Climate Smart Agriculture: Smart Farming Practices



Name : Nedelka Noella Rodriguez Rivas


Country : Panamá

Position : Supervisor and advises small agricultural and livestock producers

Interests : One of the objectives is to learn new concepts, climate-smart agriculture practices that we can put into practice, since nowadays traditional or empirical techniques are applied with very little technology implemented.

on many occasions the absence of these tools causes losses in food production systems

Others : support to improve the quality of life, looking for those new generational relays that are interested in sustainable agriculture, at the same time teaching them new ideals to develop intelligent agriculture know other cultures and other methods of how to work agriculture



36





Climate Smart Agriculture: Smart Farming Practices



Name : Araceli Salinas

Country : Paraguay


Position : Agricultural consultant

Interests : Integrated pest management (IPM) and Good Agricultural Practices (GAP)


Others : Fertirrigation



37


Climate Smart Agriculture: Smart Farming Practices




Name : Arnel C. Cruz

Country : Philippines

Position : Science Research Specialist II

Interests :

Others : Technology transfer



38





Climate Smart Agriculture: Smart Farming Practices



Name : ALEXANDER JOHN D. BORJA

Country : PHILIPPINES

Position : SCIENCE RESEARCH ANALYST

Interests :

Others : Sustainable Agriculture; Disaster Risk Reduction and Impact on Agriculture



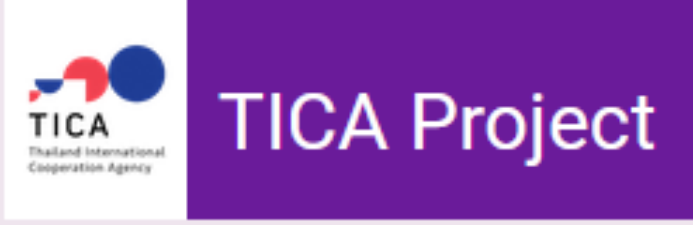
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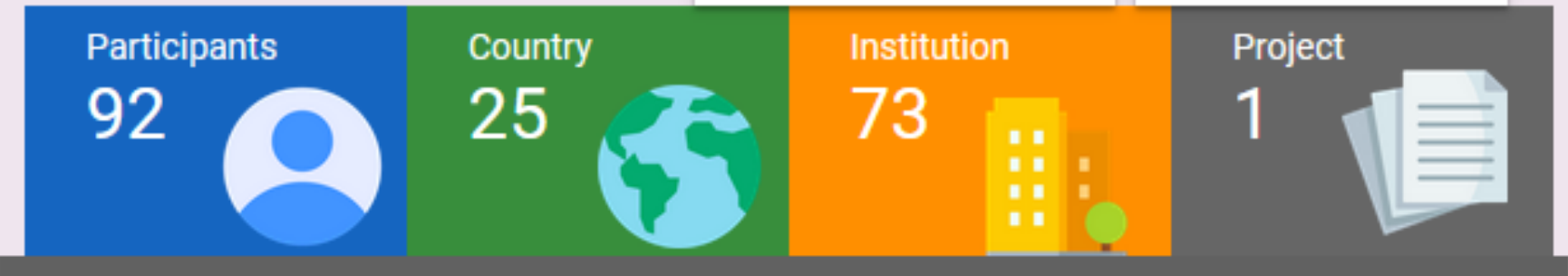
Climate Smart Agriculture: Smart Farming Practices

สรุปข้อมูลโครงการการอบรมครู

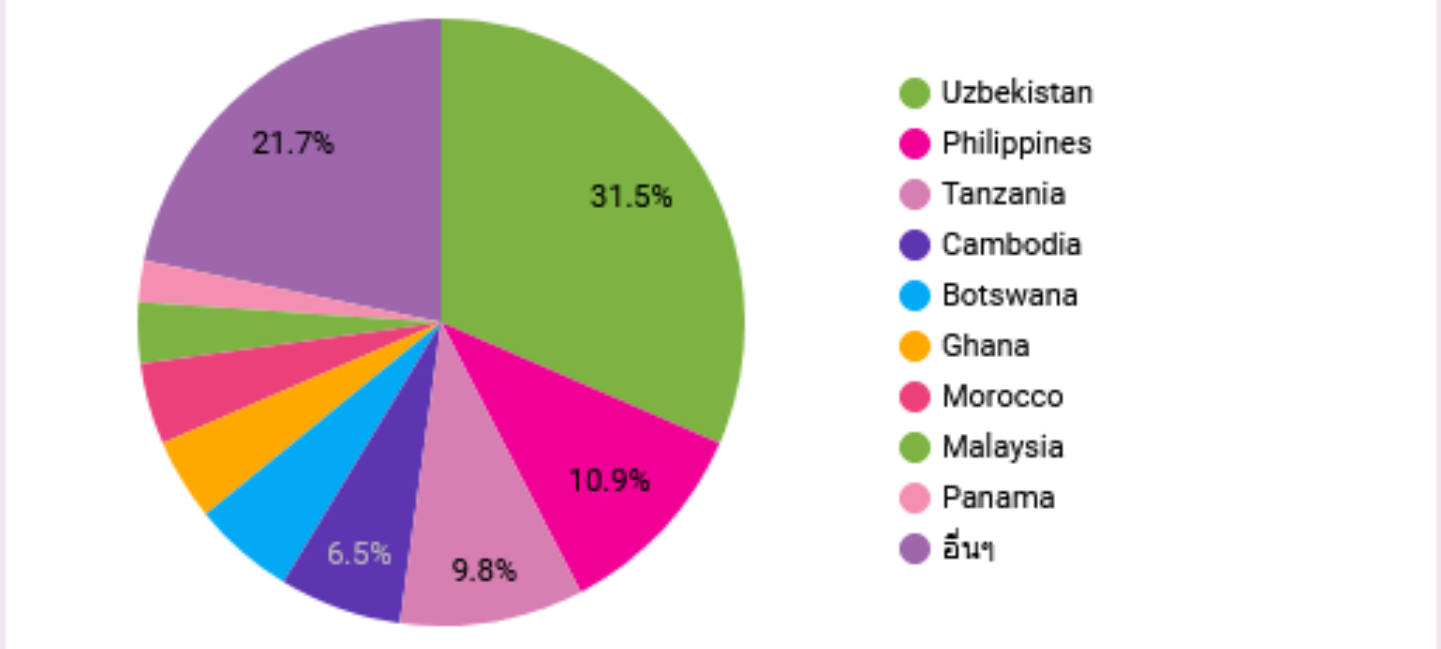
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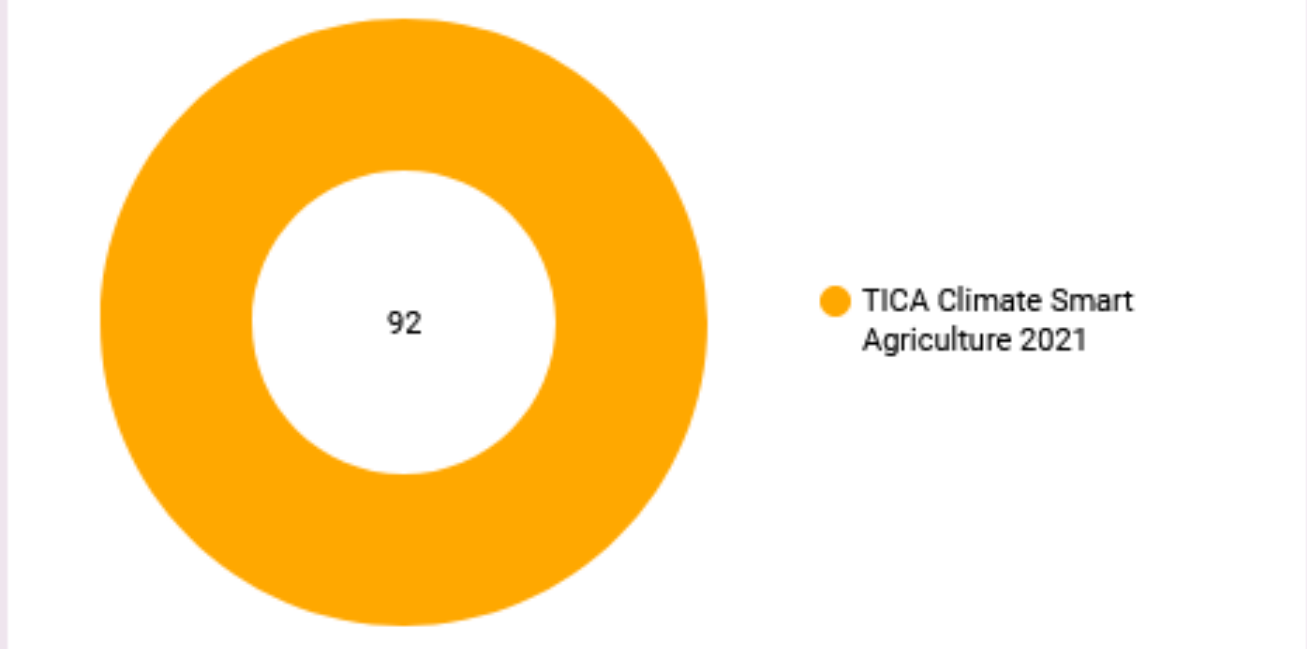
Country ▾ Project... (1) ▾



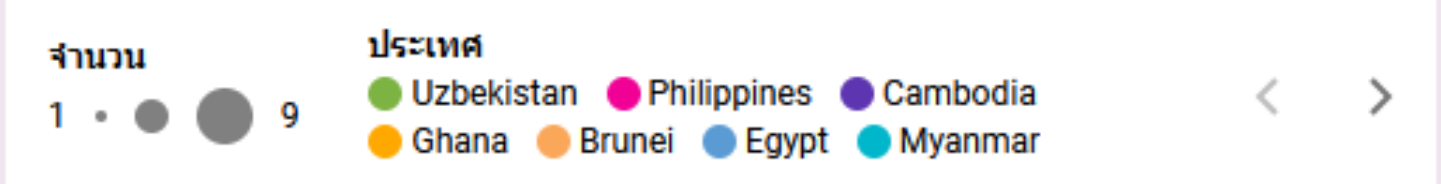
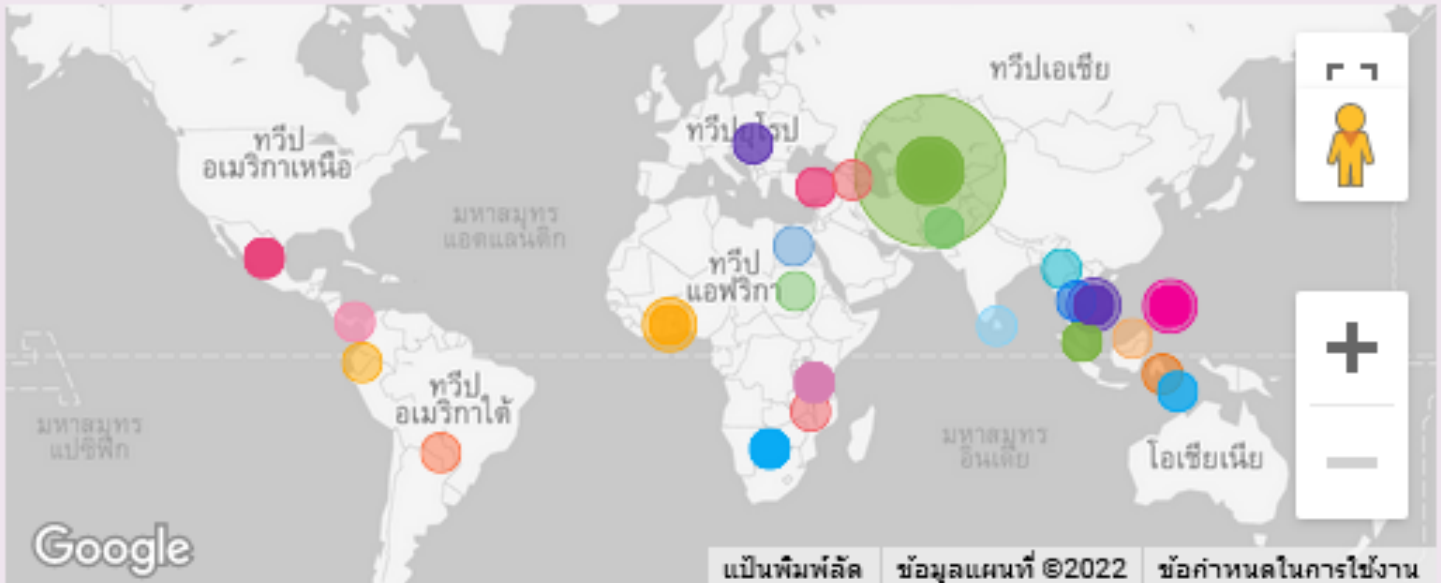
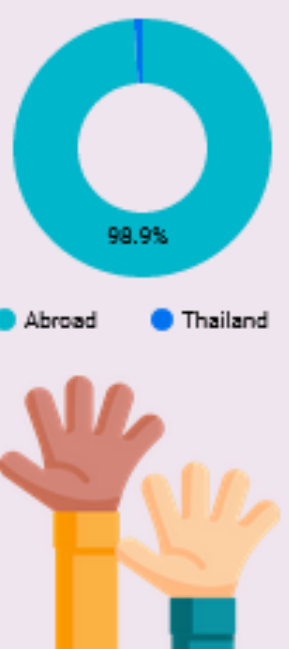
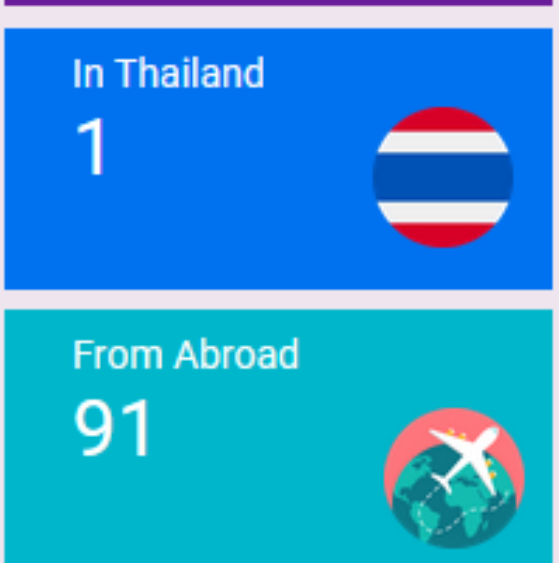
Country



Project



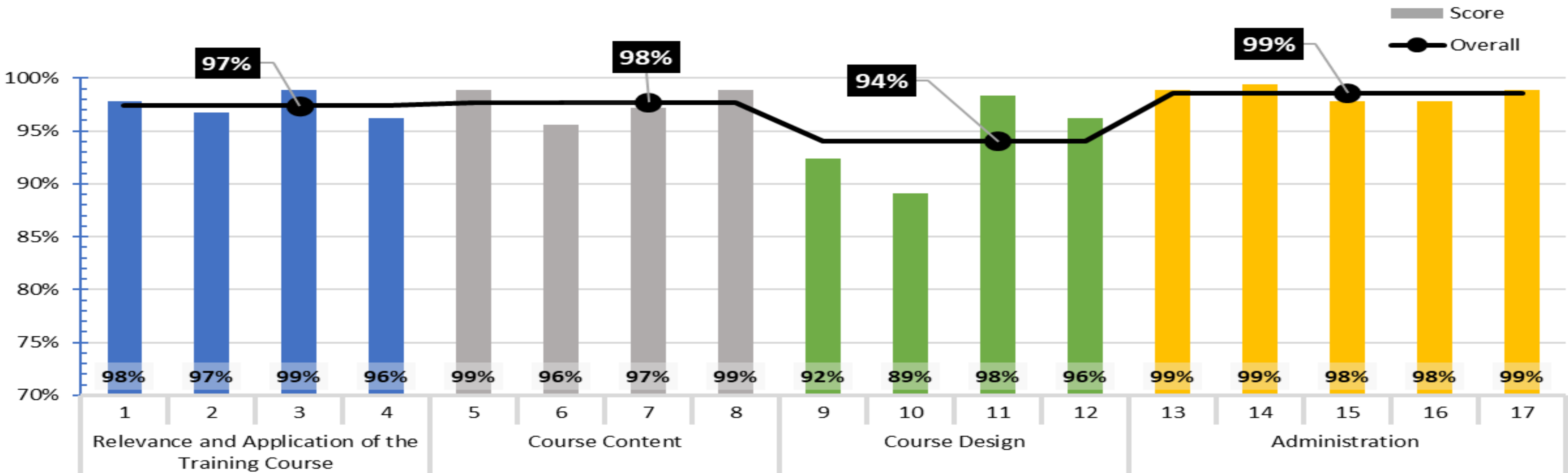
Participants



Name	Institution	Country	Project
1. Mr. Mokganedi Koobonye	Department of Agricultur...	Botswana	1
2. Mr. Molefe Majafe	Ministry of Agriculture/ ...	Botswana	1
3. Mr. Motlakaleso Mosheti	Department of Agricultur...	Botswana	1
4. Ms. Farah Ani Haji Gapor	Department of Agricultu...	Brunei	1

Country	Count
2. Philippines	10
3. Tanzania	9
4. Cambodia	6
5. Botswana	5
6. Ghana	4
7. Morocco	4
8. Malaysia	3
9. Pakistan	2

Institution	Country	Teacher Count
1. Tashkent State Agrarian University	Uzbekistan	9
2. Tashkent state agrarian unverdity	Uzbekistan	3



1. This training is appropriate for my level of experience

2. The topics covered are relevant to my work

3. This training experience is useful to my work

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17. The overall administration is appropriate

Comments (Climate Smart Agriculture)

Congratulations to Walailak University for hosting the 2021 AITC TICA Climate Smart Agriculture Workshop. The knowledge learned from this workshop are really helpful in applying the best practices to adapt and mitigate the effects of climate change in our country. Kudos!

I really liked the classes the way of presenting, it is different from how it is given in my country, the presentation was not overloaded with text. what about course materials excellent put to remember.

The workshop is very worthwhile and significant. had i known that we can attend as many topics possible, i should have enrolled all. Thank you to TICA and Walailak University for the wonderful experience. To our Professors thank you for the learnings. I wish to attend more trainings times to come. Blessings and hugs !



**Thailand International Cooperation Agency (TICA)
and Walailak University**

presented this certificate to

Mr. Harutyun Daveyan

in recognition of successful completion of the Online International Training Course on

"Climate Smart Agriculture: Smart Farming"

5 - 23 July 2021

Conducted by **Center of International Affairs,
and Center of Excellence for
Ecoinformatics, School of Science,
Walailak University**

Give on **30 July 2021**

(Mrs. Ureerat Chareontoh)
Director - General,
Thailand International Cooperation Agency

(Prof. Dr. Sombat Thamrongthanyavong)
President,
Walailak University



Impacts: SDG 13: Climate Action



5-25% reduces crop lost b/c of climate changes.
Increase crop quality and quantity.
Reduce pesticide and fertilizer uses.



SDG 3: Good Health
Good Air Quality with PM
2.5 sensors with IoT



750 Million illiterate. **2/3 are women.** Help women to understand physics and choose career in STEM is a must

SDG 2: Zero Hunger
Climate Smart Agriculture:
Smart Farming

2.2 out of 7 million people were premature death due to air pollution

SDG 4: Quality Education
SDG 17: Partnerships for the Goals

Impacts: Public Health



Millions of lives lost due to mosquito borne diseases worldwide

SDG 13: Climate Action
SDG 17: Partnerships for the Goals



SDG 3: Good Health
Dengue & Zika Prevention Campaign

● 25 schools*40 students*10 containers/month*10 mosquitos/container *12 months*20 countries

24 Million mosquitos killed



750 Million illiterate. **2/3 are women**. Help women to understand how to get rid of water containers (mosquito breeding sites) can reduce dengue and zika risks.

SDG 4: Quality Education