



# PROMOTING STUDENTS' SUSTAINABILITY AWARENESS AND ACTION THROUGH STEM-ESD PROJECT

Ari Widodo

Universitas Pendidikan Indonesia

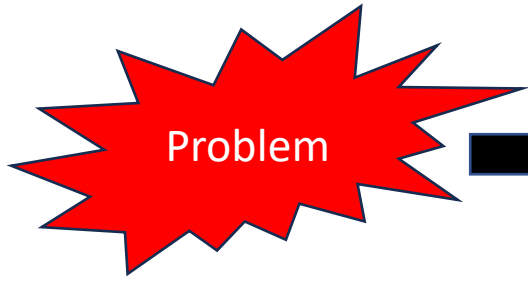


# Outline of the presentation

1. What is STEM/STEAM?
2. What is Education for Sustainable Development (ESD)?
3. What are the benefits of STEM-ESD?



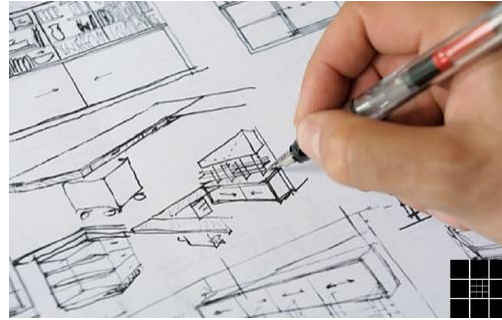
# **STEM or STEAM**



Think of  
Solutions



Design



Re-design



Test



Create



Sequence of  
STEM Teaching



# STEM

Science



## Scientific processes

- Identify problems
- Design investigation
- Conduct investigation
- Analyse data
- Communicate

Technology



## Engineering Processes

- Identify problems
- Think of technological solutions
- Design a technology
- Create a prototype
- Test a prototype
- Re-design



# Characteristics of STEM Lessons

- ✓ Integrated
- ✓ Real-life problem solving
- ✓ Project-based
- ✓ Scientific and engineering processes
- ✓ Collaborative



# Education for Sustainable Development (ESD)



# What is SDGs?

A blueprint for **peace and prosperity** for **people and the planet**, **now and into the future**.



# Sustainable Development Goals (SDG's)





# What is ESD?

Education that encourages **Changes**  
**in knowledge, skills, values and attitudes** to  
enable a **more sustainable and just society**  
**for all**



# Environment Education vs ESD

Environment Education	ESD
Preserving environment	Sustainable life style (environment, economy, and social)
Single disciplined	Integrated (multidisciplined)
Content-oriented	Action-oriented

Vs



# Key ESD competencies

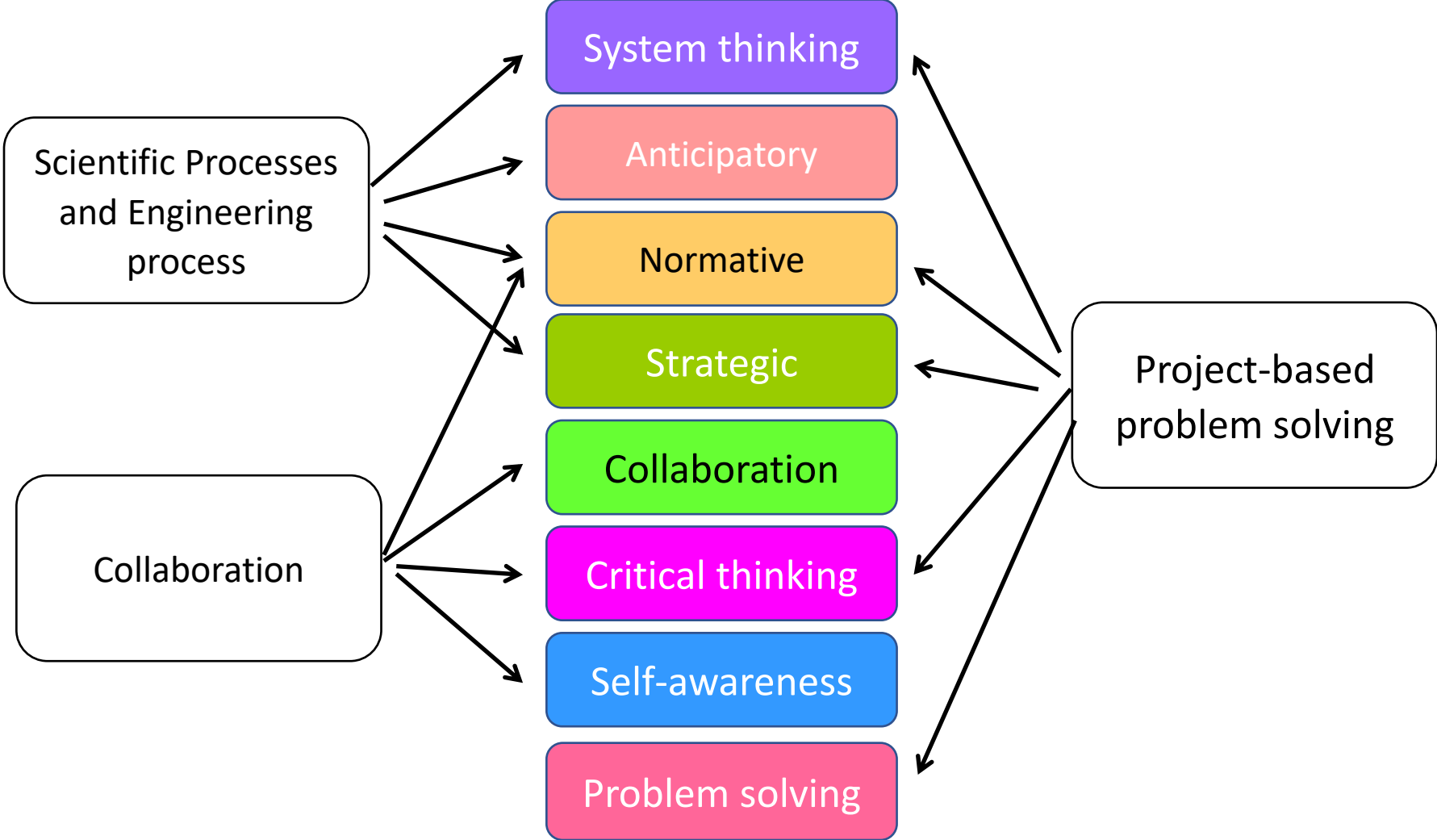
1. System thinking
2. Anticipatory
3. Normative
4. Strategic
5. Collaboration
6. Critical thinking
7. Self-awareness
8. Integrated problem solving



# Integrating STEM and ESD



# STEM for ESD



# OUR PROJECT



## STEM-ESD Projects

Food Preservation

Grey Water & Rain Water  
Harvesting

Waste to energy

Food lost/Food Waste & Mindful  
Eating

40 Days Challenge on Climate  
Change Action

Phytoremediation



## Awareness and Action

SDG 2  
Zero Hunger

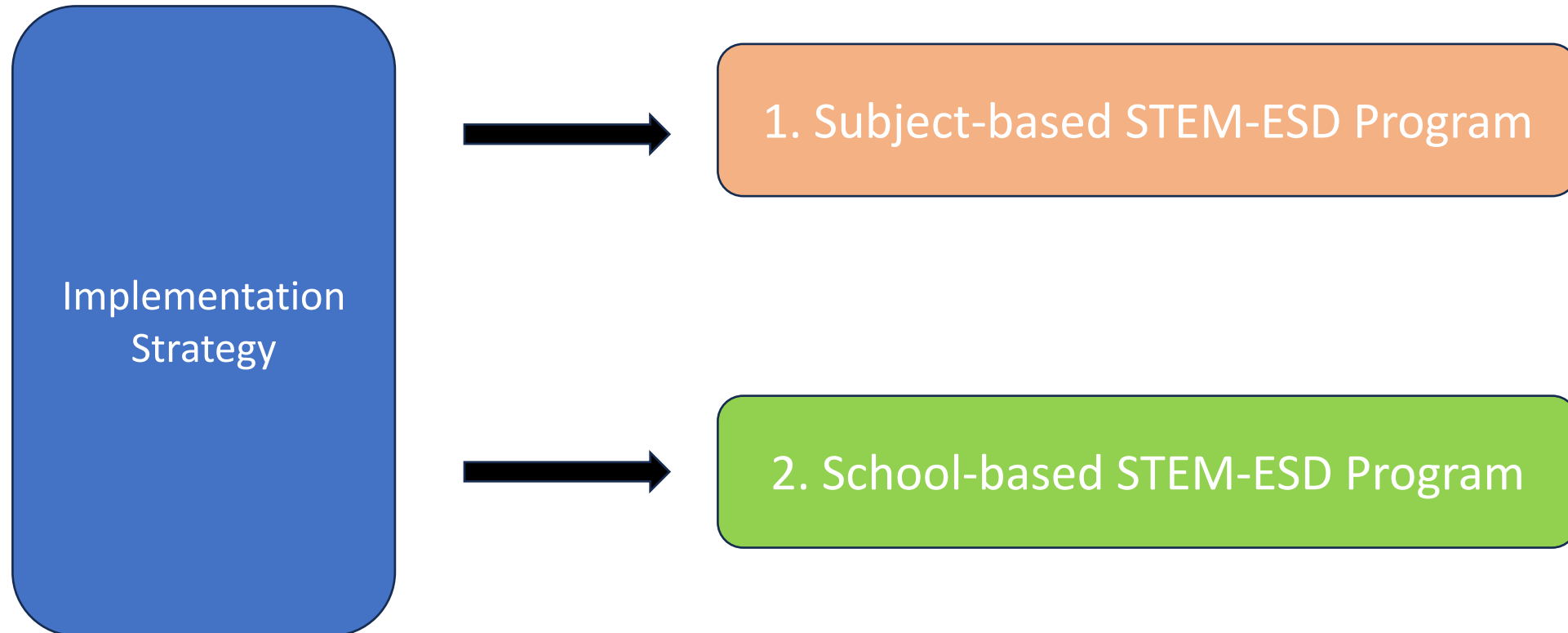
SDG 6  
Clean Water and Sanitation

SDG 7  
Affordable and Clean Energy

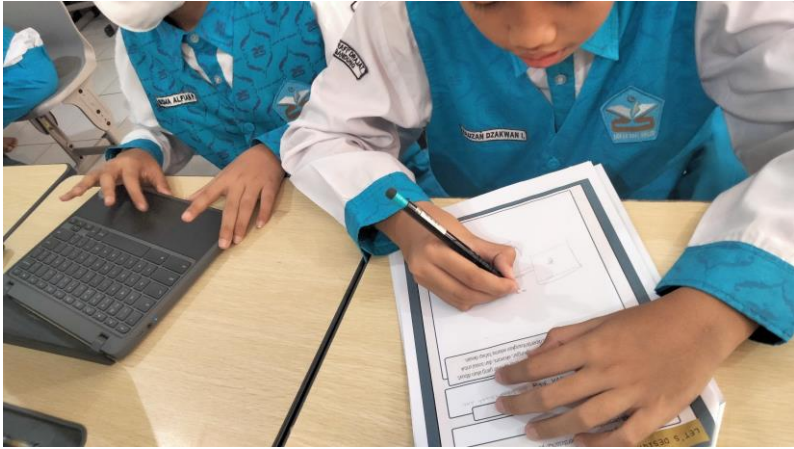
SDG 12  
Responsible Consumption  
and Production

SDG 13  
Climate Action

SDG 14  
Life Below Water



# 1. Subject-based STEM Program in Science Lessons



Design



Make



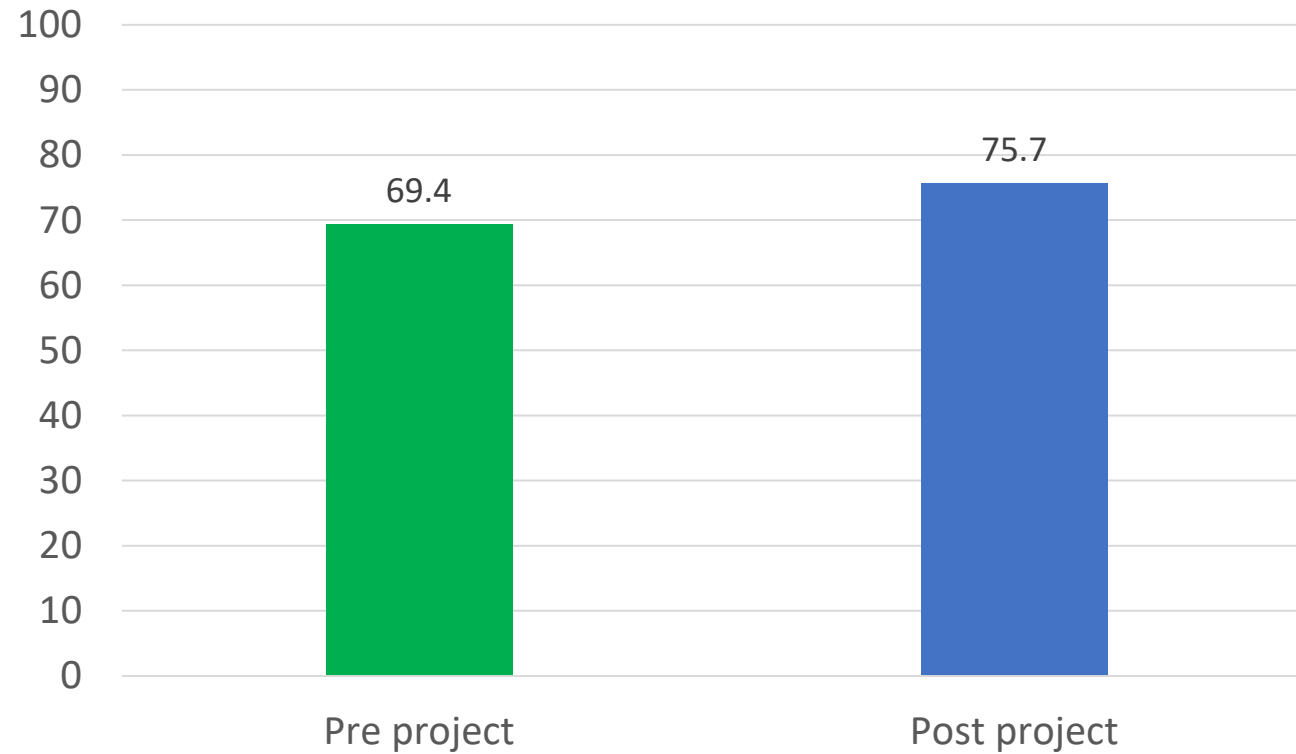
Re-design



Test



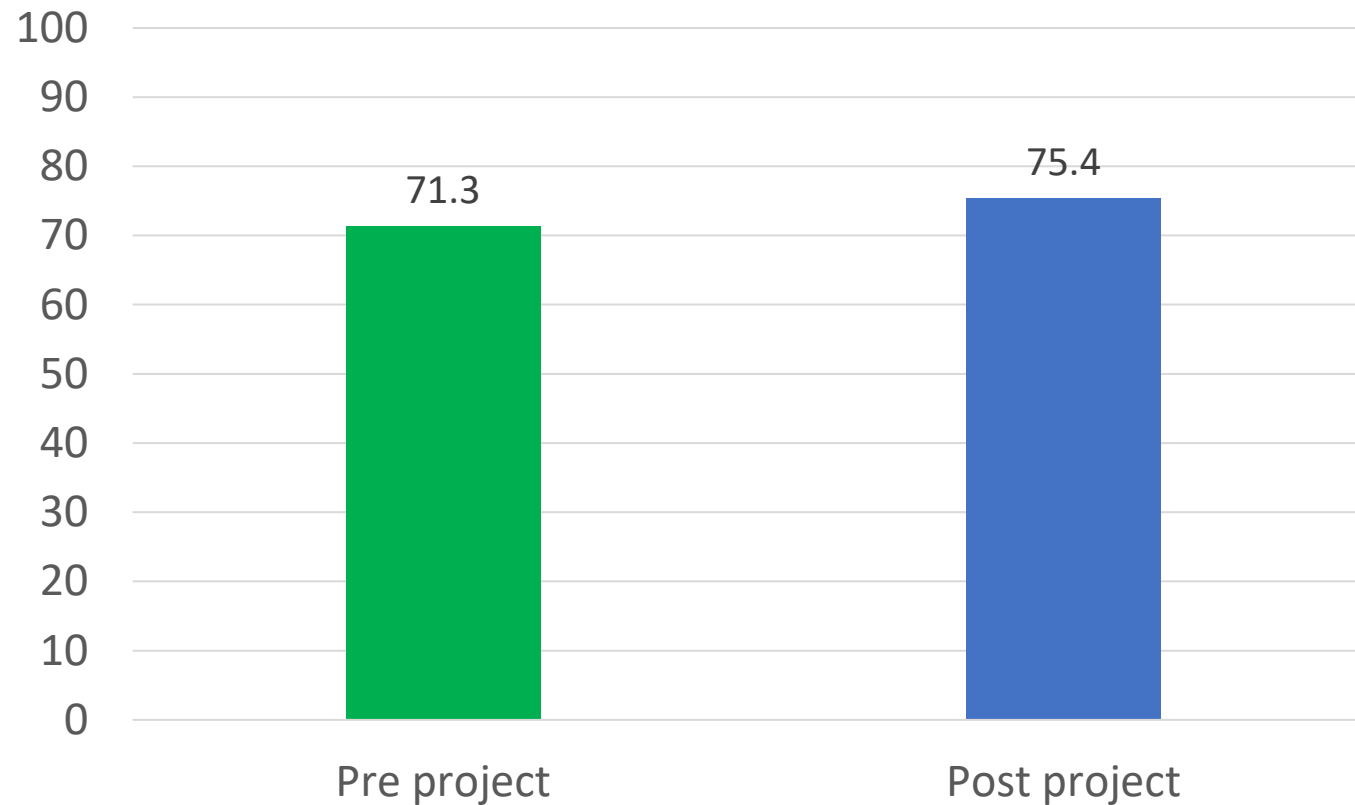
# Results --- Awareness



There is a slight improvement of students' sustainability awareness



# Results --- Action



There is a slight improvement of students' willingness to act on sustainability



## 2. School-based STEM-ESD Program

- a. Non-curricular program --- 40 Days Challenge for Sustainability
- b. School-wide action

The screenshot shows a web browser window with the URL [esdindonesia.id](http://esdindonesia.id). The website has a navigation menu with items: Beranda, Tentang Kami, Berita dan Program (highlighted), Sumber Daya dan Publikasi, Galeri, and Hubungi Kami. There is also a language dropdown menu set to 'Id'. The main content area features two news articles, each with a date of 18-03-2023 and a green upward arrow icon at the bottom right.

**40 Days Challenge for Sustainability: SMKS Miftahul Ulum Muncar**  
Pelaksanaan lomba 40 Days Challenge for Sustainability sudah berlangsung! Kini, para peserta mulai melaksanakan implementasi ide dari rancangan-ran...

**40 Days Challenge for Sustainability: SMPN 5 Kota Tangerang Selatan**  
Pelaksanaan lomba 40 Days Challenge for Sustainability sudah berlangsung! Kini, para peserta mulai melaksanakan implementasi ide dari rancangan-ran...

The browser's taskbar at the bottom shows the Windows Start button, a search bar, and several application icons including Edge, File Explorer, and Microsoft Office. The system tray on the right shows the time as 12:00 PM on 6/27/2023.

# Participating Schools



+



37

Junior High Schools

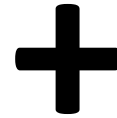
16

Senior High Schools

# Participating Individuals



657  
Students

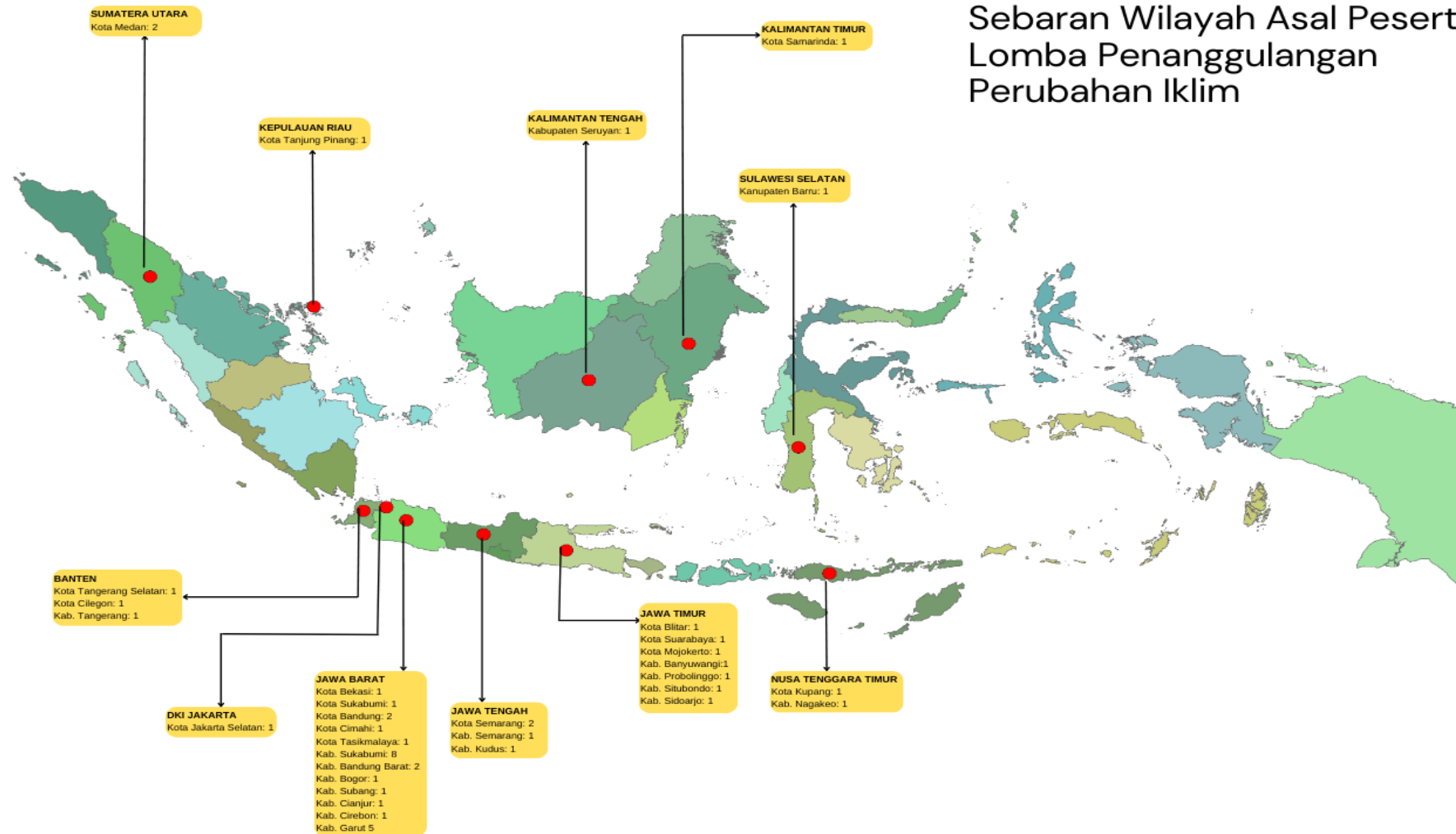


84  
Teachers

# Participating Schools

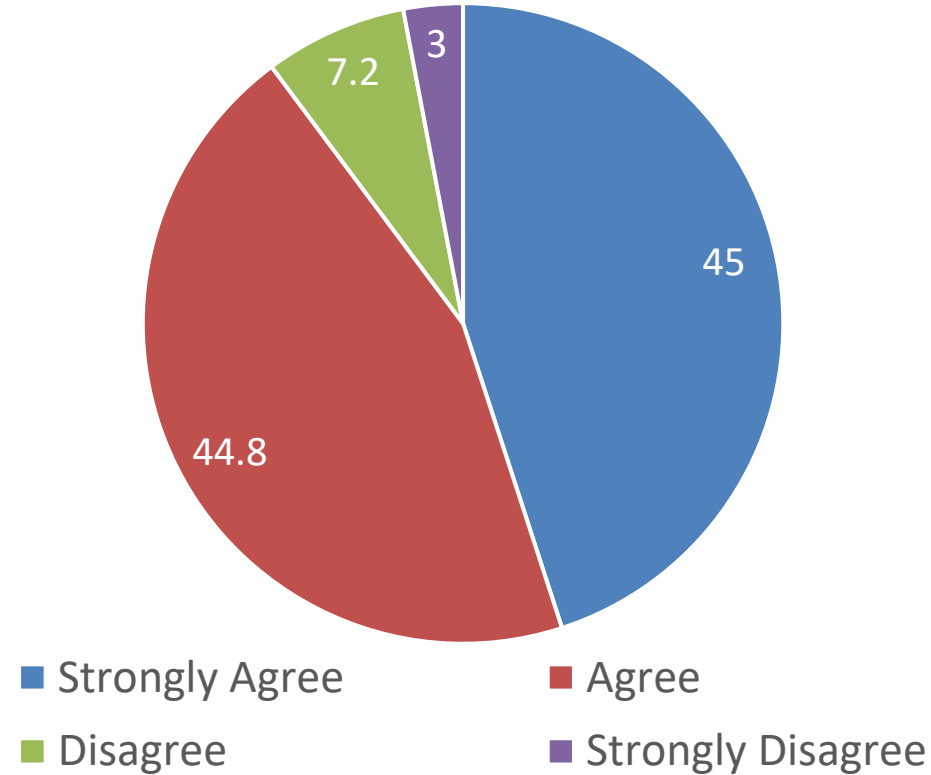


Sebaran Wilayah Asal Peserta  
Lomba Penanggulangan  
Perubahan Iklim





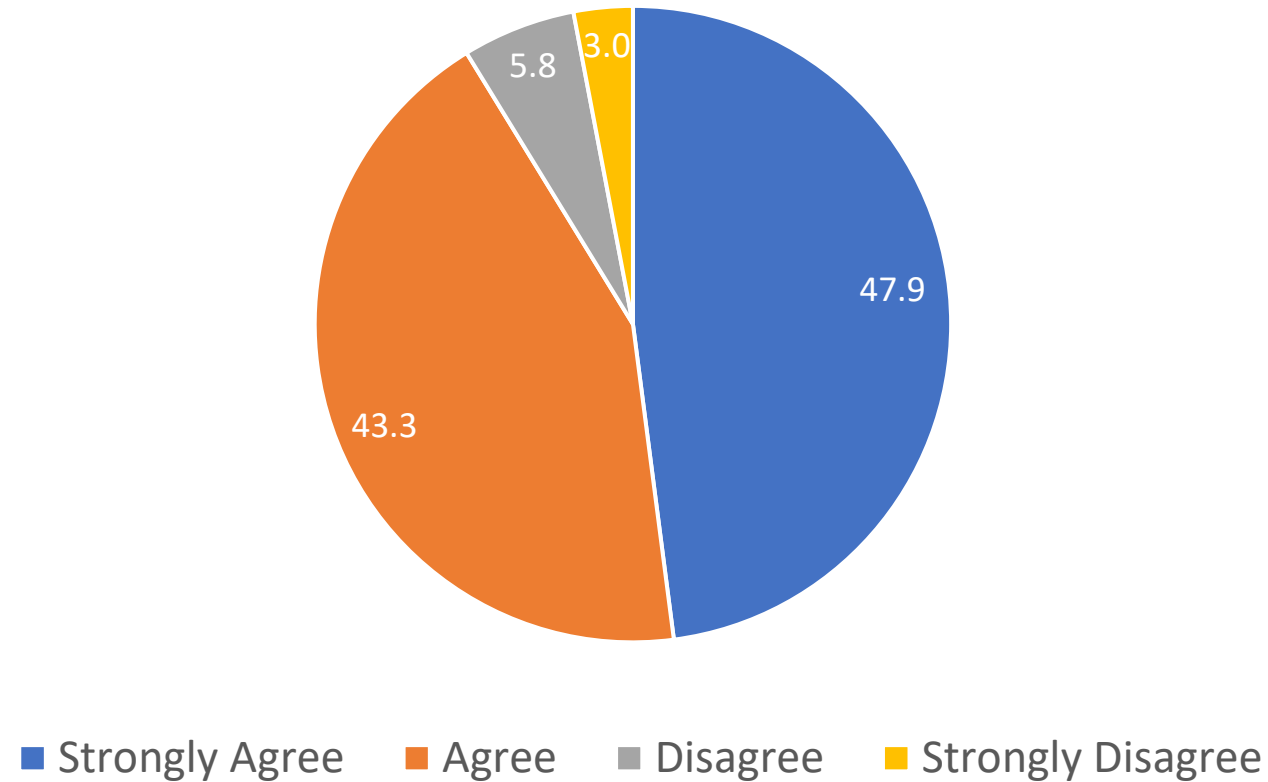
# Results --- Knowledge



Almost 90% of the participants said that participation in the program improve their knowledge about climate change



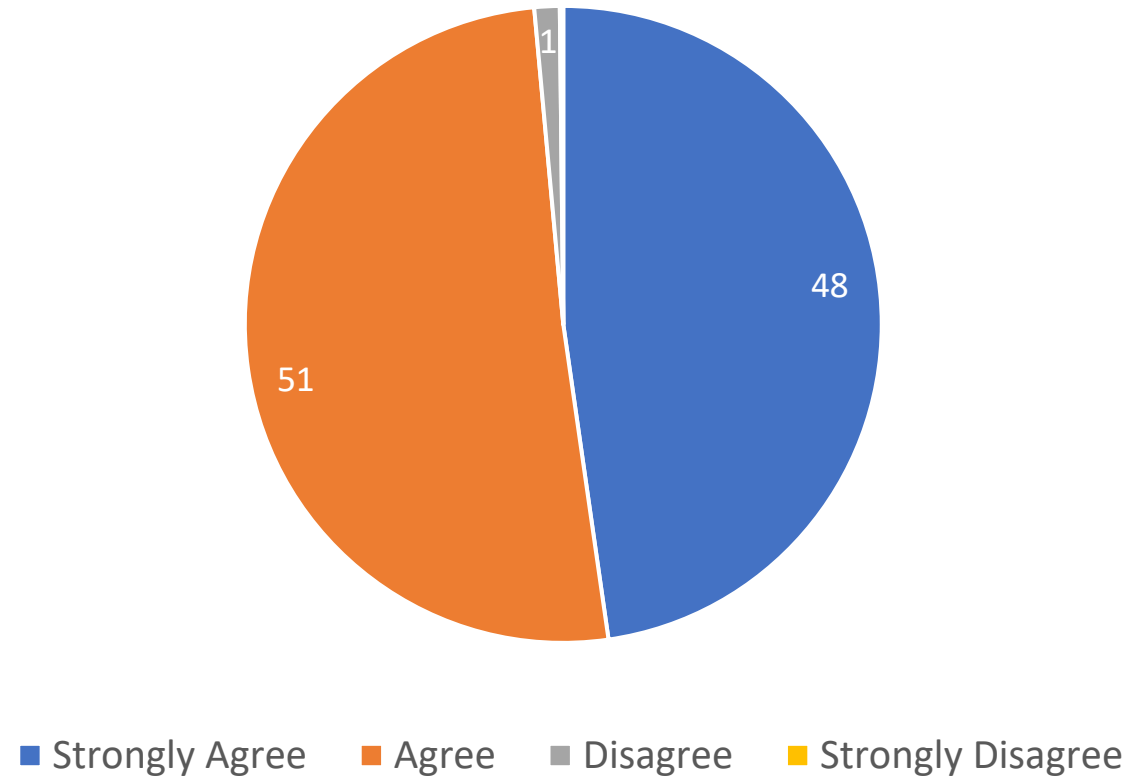
# Results --- Awareness



More than 91% of the participants said that participation in the program improve their awareness of climate change



# Results --- Action



Almost 100% of the participants said that participation in the program promote their willingness to act on climate change



# What learning benefits does STEM-ESD bring to children?



Integrated knowledge of Science, Technology, Arts, and Mathematics



Creativity



Literacy in science, technology, and mathematics



Collaborative skills



Sustainable lifestyle

Thanks for your attention  
Thanks for the opportunity to learn