# The Role of Science Education in Sustainable Development Goals (SDGs)

Dr. Mohd Nor Syahrir Abdullah
Department of Mathematics and Science Education
Faculty of Education, Universiti Malaya

Home of the Bright, Land of the Brave Di Sini Bermulanya Pintar, Tanah Tumpahnya Berani



## Introduction

- Importance of science education in achieving SDGs
- Focus areas: Climate change, clean water issues, and quality education
- How science education can address global challenges?



## SUSTAINABLE G ALS





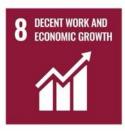


































## Introduction

- Climate change is a pressing issue affecting ecosystems, livelihoods, and biodiversity.
- Approximately 110 million people in Southeast Asia alone lack access to safe drinking water, an essential human right (Geall, 2019).

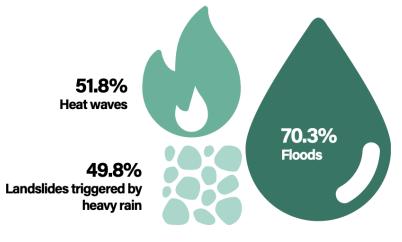


### Issues



### **TOP THREE MOST SERIOUS CLIMATE IMPACTS**

Floods (70.3%), heat waves (51.8%), and landslides triggered by heavy rain (49.8%) are the three most serious climate change impacts according to Southeast Asians.



Percentage of respondents who ranked each impact among the top three

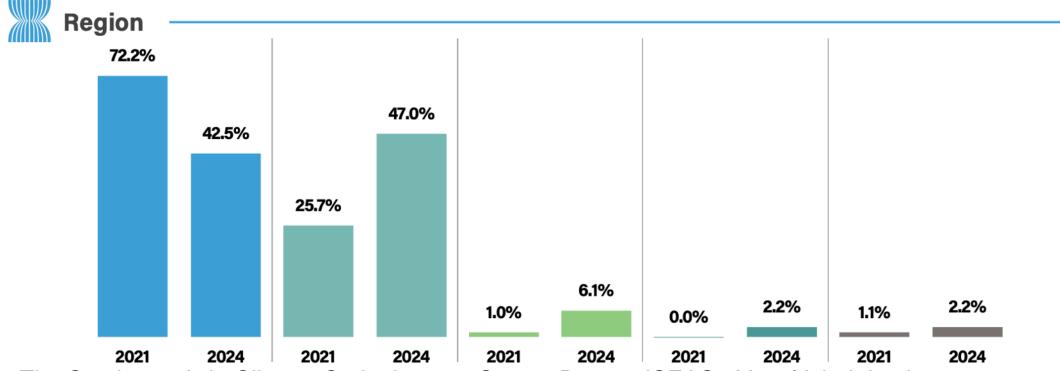
Source: The Southeast Asia Climate Outlook: 2024 Survey Report, ISEAS - Yusof Ishak Institute

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The number of people who consider climate change an important issue that requires monitoring, as well as those who deny climate change, increased notably in year 2024



Source: The Southeast Asia Climate Outlook: 2024 Survey Report, ISEAS - Yusof Ishak Institute www.iseas.edu.sg

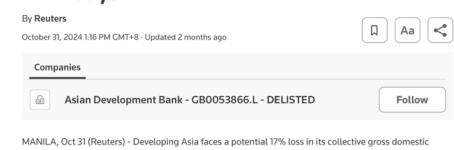


## Issues





### Inaction on emissions could cut developing Asia's GDP by 17% by 2070, ADB says



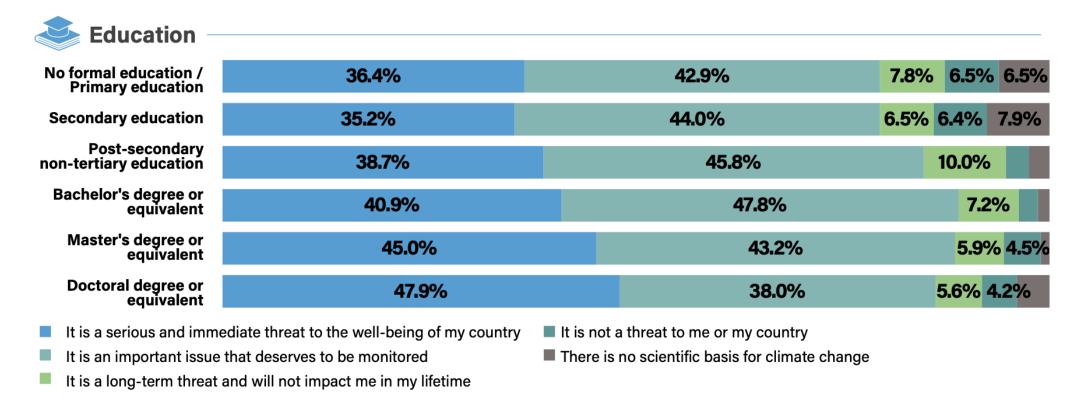
product (GDP) by 2070 if high emissions persist, the Asian Development Bank (ADB) said on Thursday, underscoring the urgency for stronger and more ambitious climate action.

While mitigation efforts have gained momentum, they remain insufficient to meet global targets, the ADB said in its inaugural climate report.

The ADB counts 46 Asia-Pacific countries as developing Asia, stretching from Georgia to Samoa and excluding Japan, Australia and New Zealand.



# South East Asians opinion on climate impace based on Education level





## Nexus Between Science Education and SDGs

- Science education is not just about teaching formulas and facts. It is about empowering students to think critically, analyze complex problems, and develop innovative solutions.
- Scientific literacy to understand climate change phenomena
- Empowering students through inquiry-based learning



## **Empowering Students as Change Agents**

- Students are not just learners; they are changemakers.
- inspires them to take ownership of environmental issues



## Science Education and Quality Education

- Importance of quality education in achieving SDG 4.
- Addressing barriers: Access, resources, and teacher training.
- Innovative programs.



## Strategies to Integrate Climate Change and Clean Water Issues into Science Education

- Integrate climate change related education to science learning through inquiry-based learning.
  - » investigating the effect of greenhouse gases,
  - » the carbon dioxide role play,
  - » modelling the melting of icebergs,
  - » modelling the melting of glaciers,
  - » investigation of renewable and non-renewable energy that students use in their homes.



## Strategies to Integrate Climate Change and Clean Water Issues into Science Education

- Understanding water scarcity and pollution through science.
- Integrating clean water topics into the curriculum.
- Hands-on activities: Water quality testing and filtration systems









Some example of activities with students and teachers





### International Journal of Science Education

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http://www.tandfonline.com/loi/tsed20

### Enhancing Primary School Students' Knowledge about Global Warming and Environmental Attitude Using Climate Change Activities

Mageswary Karpudewan<sup>a</sup>, Wolff-Michael Roth<sup>b</sup> & Mohd Nor Syahrir Bin Abdullah<sup>a</sup>

#### Climate Change Education in Primary Schools. A Project on Transferring Knowledge on Climate Change to the Teachers and Students in Kerian District

Mageswary Karpudewan<sup>1</sup>, Najeemah Mohd Yusof<sup>1</sup>, Mohd Nor Syahrir Abdullah<sup>1</sup>, Chang Fui Seng<sup>1</sup>, Muhammad Khalil Abdullah<sup>2</sup>

<sup>1</sup>School of Educational Studies, Universiti Sains Malaysia, <sup>2</sup>Pejabat Pendidikan Daerah Kerian, Perak

\*Corresponding author: kmageswary@usm.my

#### Abstract

Climate change is a phenomenon that frequently increases the incidences of natural disasters such as droughts, bushfires, floods, and extreme weather. Climate change requires timely and urgent attention specifically from the educators. This is because climate change is accelerated by human activities. Hence, it is imperative to educate the children as early as primary level on the causes, effects and ways to address the climate change. However, teachers were identified with minimal pedagogical knowledge to teach about climate change. This project was undertaken to educate the teachers on ways to teach climate change effectively and subsequently aimed at increasing teachers' and students' awareness and attitude on this issue. So that ultimately these teachers and students are encouraged to perform more climate conserving behaviours. For this purpose 50 primary school teachers from 50 schools in Kerian District and 190 students from three schools in the same district have participated. The quantitative survey and qualitative interviews and observations suggest implementation of the project teachers acquired better knowledge on teaching climate change. Both teachers and students had improved knowledge and attitude about the issue as well as behaviour towards conserving the climate.

**Keywords:** Attitude; Behaviour; Climate Change Education; Knowledge; Primary School; Teaching Climate Change.

#### 1. Introduction

Climate change refers to a broad range of changes in weather and climate. These changes predominantly happen due to burning of fossil fuels which emit heattrapping gases (greenhouse gases) to the earth's atmosphere. The increasing trend of global temperature results from constant burning of fossil fuel causes global warming (McCright & Dunlap, 2011). Besides fossil fuel burning various other human activities also contributes to climate change and subsequently to global warming. This includes illegal logging activities where the logs were used to manufacture furniture for the local and export use. Enormous deforestation activities frequently executed to make way for agricultural development. Additionally, among the households, open burning is rampant. Agricultural waste at some instances were openly burned to dispose them. These activities accumulatively results in the increase of greenhouse gases in the atmosphere. These circumstances suggest that people generally lack the awareness and knowledge on the adverse consequences of their actions. This in turn suggest that there is an urgent need to educate the people on conserving the climate through controlling the actions.

Some studies suggested that being knowledgeable about climate change issues tend to create a greater concern among



<sup>&</sup>lt;sup>a</sup> School of Educational Studies, University Sains Malaysia, 11800 Penang, Malaysia

<sup>&</sup>lt;sup>b</sup> Applied Cognitive Science, University of Victoria, MacLaurin Building A557, Victoria, BC, Canada V8 W 3N4 Published online: 12 Sep 2014.

## Promote interdisciplinary approaches

- Humanizing STEM Approach integrate social science with STEM Education (Geography and Science subjects)
- Eco-wudu' (integrate with Islamic education)



## **Community Engagement**

Partner with local governments and NGOs to involve students in real-world projects, such as reforestation initiatives to protect watersheds or campaigns to reduce water pollution.



## Challenges

- Integrate climate change and water issues in science curriculum.
- Lack of teacher training and resources for sustainability topics.
- Inequities in access to quality science education, especially in rural areas.



## Role of Educators and Policymakers

- Provide teacher training and resources for sustainability education.
- Advocate for policy support and funding for green schools.
- Promote international collaboration to share best practices.



### **Call to Action**

- Science education as a catalyst for sustainable development
- Prioritize science education as a driver of sustainability.
- Empower students to address climate challenges and environmental issues.
- Together, we can create a sustainable future through education



## Thank you!

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