

## **Policy Brief Title: The Importance of Education for Coping with Climate Change**

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### **Executive Summary**

Education is an essential element of the global response to climate change. It helps people understand and address the impact of global warming, increases “climate literacy” among young people, encourages changes in their attitudes and behavior, and helps them adapt to climate change related trends. The objectives of this policy brief are to provide the evident why education is important for climate change and also recommend some options for policy makers, curriculum developer, and school educator in the context of climate change education. The most important solution is to mainstreaming the climate change into the education system in order to contribute to adaptation and mitigation opportunity. Educating the present and future generations about climate change, and teaching them to act with a critical mind and a hopeful heart, is essential for the future of humanity. Science education must meet the challenge, especially through the use of an inquiry-based and interdisciplinary pedagogy, with the global scientific community playing an essential role in its implementation and improvement.

### **Introduction**

Climate Change refer to “any significant change of state in climate system such as precipitation, temperture, solar radiation, humidity or wind for an extended period in decades or longer. It’s a result of human activities include: industrielize evolution, fossile fuel burning, deforestation, land use and land use change, urbannization, etc and natural process for instance volcanic eruption, change in solar cycle, or atmosphere sytem change, etc” (FAO, 2016; IPCC, 2014; UNFCC, 1992). There are two actors in contributing to climate change: natural system and human activities (Doran & Zimmerman, 2009; McMichael *et al.*, 2006; Parmesan & Yohe, 2003; Schipper & Pelling, 2006). Human has been burning fossil fuels for a long time ago which is the main source of greenhouse gas. The Earth is surrounded by greenhouse gases, which act as the glass keeping the sun’s heat and stopping it from dripping back into the atmosphere. This Phenomenon called **Greenhouse gas effect**. Most of the greenhouse gases happen naturally, but human activities are increasing the concentration of the main gases in the atmosphere, which contribute rapidly to climate change. The greenhouse gases include Carbon dioxide, Methane, Nitrous oxide, and fluorinated gases (Kuze *et al.*, 2009; St. Louis *et al.*, 2000). When trees are cut, the carbon storage is lost and spread into the space which contributing a large amount of Carbon dioxide as one of the main greenhouse gas. The majority of Methane gas come from agricultural activities especially livestock farming. While degist their food, these animal produced huge amount of Methane to the atmosphere. Using chemical fertilizer is a part of making greenhouse gas predominantly Nitro dioxide because fertilizer comprises of Nitrogen. Fluorinated gas is very dangerous in term of greenhouse gas since its effect is greater than Carbon dioxide and it comes from using air-conditioner or refrigerator, etc.

Climate Change is real and requires understanding the impact, adaptation, and mitigation. In this process, schools have an important educate students with an effective understanding of climate change and skills to deal with the challenges it will bring to their lives. Therefore, climate change sustainable development should become a goal for all nations to support educational systems to prepare future citizens to cope with current and emerging sustainable development challenges.

## **Background**

Climate Change is real and requires understanding the impact, adaptation, and mitigation. In this process, schools have an important educate students with an effective understanding of climate change and skills to deal with the challenges it will bring to their lives. Therefore, climate change sustainable development should become a goal for all nations to support educational systems to prepare future citizens to cope with current and emerging sustainable development challenges.

Climate change affects many sectors, including agriculture, coasts, ecosystems, energy, forest, society, transportation, and water resources (IPCC, 1996). Agriculture sector is very vulnerable to climate change and it is very important for the people around the world in terms of food security. Crops and livestock are main food for us and they are depending highly on climate. Increasing temperature can reduce the crops yields (Challinor & Wheeler, 2008; Rosenzweig & Parry, 1994). In the same ways, farmers could pose challenges if changing severity and frequency of flood, drought, and pest outbreak and food safety could be threaten (Kundzewicz *et al.*, 2008). If compare to the past, climate change already made it harder and harder to cultivate crop, catching fish, or raise animals. Additionally, Climate Change is likely leading to rise in the prices of food especially agricultural productions in many region of the world (Burton *et al.*, 1995; Laugesen & Meads, 1991). In developing countries, climate change impact is projected to be a major concern in the future since most of population are poor and vulnerable (Mendelsohn & Dinar, 1999; Vairavamoorthy *et al.*, 2008). Children, women, elders, and indigenous people are considered as vulnerable group due to low adaptive capacity.

### **Box01: The Impact of Climate Change on Various Sectors**

Climate change will most impact human wellbeing in low-income countries. The most vulnerable groups include: the urban poor, the elderly and children, traditional societies, subsistence farmers and those living on the coast (Blaikie *et al.*, 2004; Costello *et al.*, 2009; McMichael *et al.*, 2007).

- **Education:** Children are the most affected in the event of natural or man-made disasters. Schooling and learning systems are disrupted, affecting their right to education and inducing stressful situations. Developmental gains in education are reversed with the damage or destruction of school facilities or use of school facilities as refuge centres, the prolonged disruption of education and limited access to learning opportunities.
- **Agriculture:** Including decreased livestock and crop production from heat stress, droughts and flooding and climate-induced pest and disease migration.
- **Food security and safety:** Greater risk of food shortages, and access to safe food due to air and sea temperature changes and increased contact between pest species and food.
- **Malnutrition:** Increased malnutrition and resulting illnesses, with impact on child growth and development.
- **Coastal systems:** Including sea level rise, loss of coastline land, coastal flooding, extreme storms, water pollution, the destruction of human settlements and local resources (e.g. fisheries and biodiversity) and forced migration.
- **Water security and safety:** Reduced drinking water, and increased and more severe droughts, due to lower availability and quality of water; and increased spread of water-related diseases and water contamination.
- **Human settlements and infrastructure:** Human settlements and vital infrastructure at risk from rising sea level, extreme weather events and desertification, which could result in forced migration.
- **Climate-induced disasters (e.g. storms, floods, droughts, fires and heat waves):** Injuries, deaths and damage to housing, livelihoods and settlements, population displacement, impact on food production, malnutrition, infectious diseases and respiratory diseases and water contamination.
- **Economic and socio-cultural resources:** Reduction in income from tourism and agricultural production; and destruction of traditional, cultural and spiritual sites.
- **Women:** Women are typically responsible for food production and ensuring water and energy supplies, and typically have fewer economic resources than men which means that they are less able to use finance to mitigate the impact of climate change.

## **Problem**

Humanity faces a serious climate crisis, which will impact the whole world during the 21st century and beyond. Dealing with this crisis will depend heavily on the young people who are today in schools and could become ‘agents of change’. The international legal framework to tackle climate change, i.e. the United Nations Framework Convention on Climate Change (UNFCCC, 1992) and the Paris Agreement (UN, 2015), recognize this point by stating that “The development and implementation of education and training programmes ... in particular for developing countries”

(UNFCCC, Art. 6.b.ii) and “Parties should take measures ... to enhance climate change education” (Paris Agreement, Art.12). Understanding the Earth’s climate, the impact of greenhouse gas emissions on the system, as well as perceiving the strategies for mitigation (‘fighting against the causes’) and adaptation (‘coping with the effects’), from global to local levels, requires scientific knowledge and critical thinking. Climate science brings together specific issues that are currently not widely recognized by science curricula in schools and universities.

### **Solution/Recommendation**

Interventions need to be developed for the mitigation of, and adaptation to climate change to minimise impact and ensure resilience. To mitigate impact, immediate action is required (Adger *et al.*, 2005; Adger *et al.*, 2003; King, 2004). Conversely, impacts are cumulative over time and will disproportionately impact future generations. Education is integral to any strategy to create a resilient generation who will advocate for action and be resilient to change. Education was recognised for its ability to empower, inform and motivate those engaged, the wider community and government to take action on climate change. Education has a necessary role to play in said shift, helping to develop a workforce with the knowledge, skills and drive to develop a sustainable, green economy. Education was discussed as a critical tool for change, both for understanding and empowerment. Contributors emphasised the need for integration of climate change education throughout the lifecycle — in early childhood, primary, secondary and post-secondary education, and beyond — and through formal, informal and non-formal education. Education was seen as essential for not only youth, but equally as important in the wider community, industry and government. It was argued that education provides an understanding of climate change and its root causes, tackles climate apathy and distortions, and promotes advocacy and action for climate mitigation and adaptation. It was also highlighted as helping to bridge differences in responsibility and in severity of impacts towards a common goal, acting as a seed for change. Education propels an individual to action, and as a collective, promotes widespread change by fostering a climate conscious and active society and stimulates governments into action. It can play an important role in preparing people to deal the complexities of climate change, build resilience, and enhance innovation and collaboration in mitigation and adaptation. The dynamic interrelationships between climate change, economic activity and education were central throughout the discussion. The influence of economic activity on climate change has been growing since the start of the industrial revolution, precipitating in the climatic changes currently being felt, and growing in magnitude. Low-carbon, green growth was presented by various contributors as essential for climate change mitigation, and to building human resilience and capacity to adapt to the changing environment. Education was discussed as a necessary enabler of, and vehicle for green growth; in shaping a workforce with the skills, knowledge and desire needed to transition to a green economy and for sustainable livelihoods.

It is vital that countries develop strategies to build resilience against climate change, and education is key to this. It is not only a matter of mitigating the effects of climate change, but also of addressing, through educational resources, adaptation measures that are country specific. Currently, regions with large numbers of youth have low resilience to the effects of climate change and typically have social and political instability and low levels of governance. Additional pressure will be placed on governments due to a combination of the increasingly negative impacts of climate change, and social, economic and political difficulties which could result in social unrest,

instability and even conflict. Under the right environment where their economic and social needs are met (for example through the provision of education and training), the youth population can act as agents of economic growth. However, without this environment, youth may resort to violence which can further destabilise political environments and enhance vulnerability to climate change. Due to the non-discriminatory and wide-ranging impacts of climate change, education has a crucial role to play in raising awareness about the urgency of addressing climate change programmes, including ways to be more energy efficient. Formal and non-formal education are essential to educate citizens of all ages. For the youngest and future generations who will be most impacted by climate change, positive influences during the stages of an individual's early life can contribute to a society that is equipped with the understanding, values, knowledge and skills to tackle the causes and impact of climate change.

#### **Box02: Generic approaches to promote sustainable development in education**

- **Curriculum:** Climate change education integrated into the curricula at all levels which is tailored to local contexts – this could include:
  1. Information on key climate change related subjects.
  2. Practical measures of mitigation and adaptation that students can utilise in their home lives and future careers, and resilience skills to prepare them for the challenges of climate change, such as migration (including the role of ICT).
  3. Opportunities for students to apply their knowledge to real life situations through climate change projects and problem solving activities.
- **Extra-curricular activities:** Opportunities to attend field trips and visit environmental sites.
- **Teacher training:** Include climate change in teacher education (e.g. disaster risk reduction education, and aspects of policy, planning and implementation) to ensure educators can effectively communicate its significance to students, with professional development opportunities to ensure up to date knowledge.
- **Green school policies:** Promote environmentally friendly behaviour through schools which embody the values they teach through ensuring they are environmentally sustainable and carbon neutral.
- **Adaptation plans for schools:** To protect students from heatwaves, dust storms, floods, mudslides, hurricanes and storms.
- **Mitigation plans for schools:** Use of green renewable energy, waste management, insulation and efficient energy use, healthy low energy food and drink, physical activity and green transport.

Educating the present and future generations about climate change, and teaching them to act with a critical mind and a hopeful heart, is essential for the future of humanity. Science education must meet the challenge, especially through the use of an inquiry-based and interdisciplinary pedagogy, with the global scientific community playing an essential role in its implementation and improvement, therefore; the policy maker, curriculum developer, and school educator should be:

1. Acknowledge that climate change education, for mitigation as well as for adaptation, must become a prime component of science education at all educational levels;
2. Develop whenever possible the use of well-demonstrated inquirybased pedagogy;
3. Facilitate the preparation of teachers and professors – key actors in educating the present and future generations – through a number of initiatives, such as curricula changes that include interdisciplinarity, professional training sessions, making available varied and specific resources, distance learning, etc.;
4. Organize the necessary support and provide the financial resources for these initiatives, all of which require creativity and innovation by the scientific community;
5. Empower students to act with creativity and hope in their schools, families and communities, to address social and economic issues related to sustainability, and to understand how science education will help them make decisions based on evidence and critical thinking;
6. Have a special focus on vulnerable communities – especially in the developing world – exposed to floods, droughts, hurricanes, and other extreme weather events;
7. Consider actions that would be carried out in parallel with the IPCC periodic reports, in order to provide ‘Resources and Tools for Teachers’ at a global scale, in cooperation with local actors to make the necessary adaptations to the diversity of local situations

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