## **Original Article**

# Impending Challenges of Climate Change Edification for Sustainability in Pakistan

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# Abstract

It can be difficult to spread knowledge and communicate about climate change; concepts relating to climate change are frequently misunderstood, according to researchers. Some people don't think that they will be affected by climate change in their own lives. Other issues could be people's inability to recognize subtle or the fact that there have been slow environmental changes and excessive consumption empowers and honors people, their weak connection to nature, and their propensity to act impulsively also solve environmental issues right away. The purpose of this study was to offer some research-based strategies for educating the public about climate change while providing concrete examples of the impacts of climate change on a local level and illustrative information, people can be persuaded that they still have an impact by environmental communication that are effectively designed on the phenomenon's scope and can connect mitigation efforts to people's positive desires or aspirations. Upcoming awareness, approaches of socioconstructivism, experiential learning, and community of change are some strategies that, when used in conjunction with one another in mitigation education, can correct learners' misconceptions and motivate them to take action. With the help of citizens and scientists, adaptation education could focus on a particular issue that could become more severe due to climate change. After analyzing the issue, suggestions for solutions could then be made and put into action and plan for the future sustainably.

**Keywords:** Climate Change, Environmental Changes, Climate Change Awareness, Sustainable Education

# **1. INTRODUCTION**

Climate change research is currently an active field of study that is growing rapidly; the study of local and global realities, the development of scenarios, the prediction of effects, the invention of concepts to describe their findings, such as vulnerability carbon sequestration, risk management and so on, and the consideration of solutions are all done by researchers in this field[1]. Numerous researchers have realized how crucial it is to share their findings with the public in order to make them well aware of the need to act quickly and empower people to take adaptation and mitigation measures. Hence, this is one of the most delicate and trickiest learning projects that education and communication have ever faced[2]. People of all ages and levels of scientific literacy are also involved in numerous political, social, and economic spheres making up the population that needs to be educated. Equally as ambitious are the educational goals, which include assisting citizens in better understanding difficult meteorological, and environmental, concepts and altering their routine lives[3].

Pakistan is suffering from climate changes effects[4]; Climate of Pakistan has changed in the past few years, like as other South Asian countries, with significant influence on both the people and



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environment[5]. Liquefy of glaciers ice in Himalayas mountains has had impacted some of Pakistan's crucial rivers as well increased heat, extreme weather and drought in some areas of country[6]. Pakistan ranked 5th among extreme weather effected countries caused by change in climate from 1999 to 2018[7]. Greenhouse Gas (GHG) outflow is less than 1% of total emissions in Pakistan, and at two tones annually, that is lesser to half of the average for the whole world. Pakistan's agriculture accounted for 43% of the country's total GHG emissions in 2015, while the country's energy sector which includes burning fuel for transportation, heating, and electricity production accounted for 46%[8]. Although the consequence of climate change[9] is highly zonal specific, in other words intensity of belief that surface heat is rising and utmost weather events would become more frequent in the future. These modifications will interfere with expected human activity and environmental processes. Regardless of the aspects which are thought to come up with climatic change can vary; in various areas of globe and also for various time spans, periodic and chaotic variations have been observed. India and Pakistan experienced acute torridity on May 2022 and the temperature was 51 °C. Such heat waves are hundredfold likely as result of climate change[10]. Heat waves which are severe than those occurred in 2010 that are forestalled to happen once in every 312 years before now days climatic change.

The IPCC (Sixth Assessment Report's) of climatic change projections for South Asian nations indicate that humid along with heat stress and heat waves will be more frequent severe, and also both summer and annual rainfall of monsoon will increase, with extra dissimilarity by year. As a result, it will show remarkable influence on the productivity and effectiveness of industries that rely on water more, like energy and agriculture. Like sea and atmospheric temperatures rise, extreme weather events like cyclones and intense monsoons are likely to become more frequent in Pakistan[11]. According to government predictions, extreme weather events will occur more frequently and more intensely, along with uncertain rains of monsoon which will result drought and more severe and frequent floods. In Pakistan, for instance, higher than 150 severe weather events were reported between 1998 and 2018; the nation had experience devastating floods in 2022[12]. As per National Institute of Oceanography, the rate of level of sea water increase beside the coast of Karachi was one mm every year (mm/year) between 1856 and 2000. Between 1901 and 2010, the average global sea level rose at a mean rate of 1 point 7 millimeters per year, and between 1993 and 2010, it increased at a mean rate of 3 point 2 millimeters per year. Two main procedures, defrost of icebergs, the thermal extension of oceans are considered to be responsible for this sea level change. Since there is a lack of data at the national level, it is challenging to foretell SLR for the whole country of Pakistan. Due to the higher population and former's flat tidal topography of former's, industrial activities besides coastal areas like as Karachi, the accountability of the Sindh coastal area is viewed as greater than that of the coastal areas of Balochistan. It is also anticipated the amount of soil disintegration beside coastal belt will quicken as a result of this rise in sea level. According to reports, the extensive damming of the Indus River[13] has resulted decrease of 80% in river sediment when compared to the early 20th century [14]. The delta experiences a natural collapse process that can range from lesser than one mm/year to above ten mm/year of "sinking". Because of groundwater and petroleum extraction, this rate is exceeded.

In this article, the authors summarize how people can meet demanding climate change educational goals that are crucial in a world where people are already experiencing several real effects of climate change [15]. The writers then addressed the social, psychological, and behavioral issues that might limit efforts to raise awareness and educate the public on the topic of climate change, and environmental changes. In order to improve citizen participation in mitigation and adaptation efforts, the authors lastly make some encouraging suggestions that draw on environmental education to overcome the communication gap.

#### **Current Perceptions of People about Climate Changes Issues**

Different researchers have surveyed people to find out what they believe about climate change; most people were aware that climatic changes were taking place. They had a non-alarmist interest in it at that time, but were aware about this issue could eventually get worse. Contrary to personal struggles and issues related to the economy, health, abortion, and other issues, this problem is not one of their daily priorities[16]. People have developed ideas over the past ten years that enable them to conceptualize and discuss climate change in their own unique ways. There are, however, a number of widely held beliefs that avoid themselves using scientific justification and are ineffective in encouraging solving the world's problems[17]. As a result, many people believed that the ozone layer hole or an atmospheric dust wall that helped to retain heat was to blame for the greenhouse effect. Most people were unaware of the relation among particular individual's behavior or conflate several environmental issues[18]. For

instance, some individuals thought that the use of aerosols, nuclear energy, war, insecticides, or solid waste presence had an effect on the climate. According to a lot of people, the effects of climate change won't be felt until after their lifetime and won't have much of an impact on people who live in urban areas or developed nations[19].

Most respondents who were asked to name the effects of climate change cited increased temperatures, the change from four to two seasons, unstable weather patterns, and the unfamiliar existence or absence of specific animal species. Because people appeared to have already seen indications of this issue in their surroundings, their conceptions were similar to those of scientists. Some people believed that climate change adaptation and mitigation measures needed to be implemented as soon as possible[20]. People argued to steps ought to have been taken already. Some people believe that officials and businesses are primarily accountable for the fight against climate change. Individuals have different perspectives on how well humans can handle the issue of climate change; humans are powerless to stop climate change because it is a natural phenomenon. Others are convinced that their actions can change things, but they worry about going it alone because they see resistance from other citizens[20].

People occasionally found it challenging to come up with effective ways to lessen the number of changes because they had limited knowledge of the causes of climate change[21]. The concepts of adaptation and mitigation are frequently mixed up in the minds of many people[22]. The use of aerosols should be reduced, and waste should be collected, according to many people. Most people stated that they were willing to use energy-efficient light bulbs or household appliances. These same individuals, however, had a lower propensity to ride their bicycles, take public transportation, or carpool[23]. First, there are many complicated environmental and climatic notions that must be understood in order to understand climate change[24]. How can one explain these notions, which are sometimes accurate and other times inconsistent with scientific ones and do not always compel environmental action? Some ideas are challenging too, since they call for expertise in a variety of scientific disciplines [25]. It can also be challenging for the average person to remember the precise terminology for each idea. Developing a vision of all the associations among the environmental factors concerned with the change of climate can be challenging for non-specialists[26]. In fact, these connections share characteristics with complex systems: a vast web of causal relationships between interdependent parts that have multiple interactions with one another. In the mitigation field, for instance[27], it can be difficult for individuals to comprehend the connection between consuming flesh from distant nations and the change in climate also.

Additionally, some current effects of climate change are challenging to sense the five senses, either due to concealed such as aquifer water levels falling[28], invisible to the naked eye or as they occur in distant locations where people have less knowledge of the living circumstances[29]. Lack of direct sensory perception of issues limits awareness, as a result, hands-on learning of climate change[30]. Through the academic discussion of researchers and through space station images or numbers difficult for the general public to decode, these realities can be indirectly accessed. This information must be gathered using transpositions and abstract thought, which are less powerful than the signs and indicators of the senses[31]. According to Seider when a person notices abrupt or intense transformation in their environment, their hypothalamus reacts by raising adrenaline levels and forcing the individuals to take action to avoid hazard[32]. When changes occur gradually, as with climate change, people are less conscious of them and begin to forget how things used to be. People neglect to act in a way that will solve the issue or protect them from impending dangers. It may be more difficult to mentally picture the effects of climate change since they differ greatly from most people's experiences, especially when it comes to extreme events[33].

#### 2. METHODOLOGY

To complete this case study, content analysis and review of available literature was done. To attain comprehensive and contextual insights into a real-world area under discussion, case study choice is an appropriate way of research. It facilitates examining the essential characteristics and consequences of the chosen case. In the field of social sciences and education researchers commonly use case study methodology, for detailed analysis of subject matter issues[34]. Keeping in view the nature of the problem, both primary and secondary sources were used to complete this study to find information from various sources i.e. instruments from different organizations, official communication, books, and journals.

#### **Challenges of Climate Change Awareness**

Issues related to contemporary lifestyle pattern and how human react to stressful situations may

restrict citizens' wish to take part in fight opposed to climate change[35]. Today's environment does little to promote awareness and reflection as human lives in a world which is disconnected from creation and moves at unnaturally fast pace[35]. Because Pakistani people are too busy with day to day tasks and trying to meet their needs immediately, people frequently lack the time and energy to plan for potential future events. Pakistani national's loss of connection with nature makes it harder to recognize climate change-related events that are accruing in ecosystems already. Spending time with nature is necessary to observe phenomena such as species extinction, different bird behaviors, and disparity in cycle of freeze-thaw, sea ice size changes, and other phenomena[36]. Today, technological tools like computer documents, television coverage, and maps that primarily show political and economic components are used to make most of our contact with physical realities[37].

Political instability, inflation in Pakistan and decision-making is also a result of an accelerated rhythm of life, so that those who make decisions, the time to use a planned and structured process is not taken by politicians, individuals or stakeholders[38]. Goal-setting is one example, outlining potential courses of action, assessing the effects on the environment and human health, using rigorous decision-making techniques, and keeping track of their decision-making process. Wealth, need to fit in or power are frequently driving factors in decisions; due to inadequate risk prediction, the knowledge gathered to aid in making decisions is frequently biased, incomplete, or constrained[39]. Similar to this, environmental issues only persist for a short period of time before being swiftly resolved, with people, including scientists, showing little interest in examining social causes or basing their research on factual facts[40]. In Pakistan, whenever confront anxiety inducing issues, like climate change, individuals will respond in a variety of process: as they will disregard the knowledge they are given; they will return to their own personal projects and forget the issues eventually; they will pretend as there is lot of work to be done to address the issues; they'll accuse the government or a specific group of people, or they'll say they'll handle it later[41].

Involving Pakistani people in mitigation and adaptation measures is the best goal of climate change education[42]; this goal present significant challenges because they call for altering individual and societal consumption and pollution patterns, which frequently gratify people's primal urges to have fun, acquire power, experience exciting stimuli, and find love. Therefore, overspending on home goods or cosmetics reflects a desire for enjoyment, to demonstrate one's dominance, or for love. It is difficult and takes a long time to change the behaviors linked to instinctual needs[43]. In addition, Pakistani people are diverted from the environmental risks they ought to be addressing by these needs[44]. They manifest themselves through conceit, resentment, and overzealous ambition emotions that undermine the shared motivation needed to tackle environmental issues.

So, the espousal of mitigation and adjusting etiquette may be hampered by psychological factors such as a lack of mathematical and scientific literacy, incorrect analytical thinking about challenge, ignorant or less understanding, also poor problem-solving and decision-making skills in Pakistani societies, where author want to increase awareness of and communicate about climate change. Other potential roadblocks might be a lack of time, money, or other resources; political pressure from an organization that is not committed to resource preservation[45]; a lack of cooperation and unity within the communities and even so. They may also be social, psychological, or behavioral, such as a lack of connection to nature, ignorance of the causes and effects of climate change, generally unfavorable values and behaviors, the conviction that one has little influence, and difficulties in changing behavior[46].

#### **Overcome the Communication Gap of Awareness**

Few communication experts have given writing and delivering messages on climate change some thought[47]. According to Hassol[48], the most crucial messages to convey are the following: (1) A real phenomenon that is getting worse is climate change; (2) This is unquestionably the case, according to scientists; (3) These changes are the result of people; and (4) The extent of the phenomenon must be reduced, and citizens can do so by taking immediate action. In Pakistan, following a few recommendations from environmental communication research can help messages. They can concentrate on the necessity of self-defense and the significance and effectiveness of individual initiatives[47]. They may inspire others to observe their surroundings[49]. People prefer to feel like they are part of a more significant movement because they can then clearly demonstrate the right course of action and report that others have begun to take it[50].

The messages must be instructive as well; the fundamental conception of climatic change, the global

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warming and connection to human behaviors, need to be clarified and distilled in the media on a regular basis[51]. Additionally, a timeline that starts in the past and moves to the present could be used to show specific changes and motivate people to take action in order to future betterment[52]. To increase awareness of the reality of these changes, tales of recent local impacts that have an impact on both humans and nature could be told[53]. In order to inspire hope, solutions, mitigation and adaptation must take center stage in climate change messages[53]. Due to the loyalty among family members, it's also important to refrain from judging or attacking families for their improper behavior. The public needs to be inspired by messages to show their pride and ingenuity in solving the issue. The prospect of creating a bright future regarding safety, wealth and well being should be mentioned. A compelling and morally appealing vision must also be developed over time[54]. To gradually instill social values that support these behaviors, illustrative believes of people who started to adopt environmentally conscious behaviors in their homes can be presented[55]. Simple actions like stopping idling, turning off electric gadgets, using luminous lights, lowering the thermostatic, and as even must be given initial preference in these tales. The desired behaviors may have advantages beyond the environment, which could be communicated[56]. Therefore, it is worthwhile to test whether improving residential neighborhoods through the implementation of green space or strengthen patriotism after early implementation of adaptations. Similar to this, it is possible to inform and inspire citizens by sharing the tale of adaptation initiatives that have been successfully implemented in various parts of the world[57]. Following figure number 1 represents how the positive changes occur in people by awareness;



Figure 1: People Awareness regarding Protection of Climate

A relationship between the people delivering the message and the people receiving it, is necessary for effective communication[58]. If the messenger uses knowledge or language which is complex, the audience will become bored, confused, or scared, which will make communication less effective[59]. The credibility of the climate change messengers among the target social groups using IoT[60], such as decision-makers, politicians, educators, etc, must be taken into consideration[61]. No matter what their audience's needs and interests is whether they relate to security, the economy, health, or anything else they must speak to them in a way that meets those needs and interests? Peoples having wide social contacts network, the skilled and taught individuals who quickly find answers to questions, and the people who can make things relevant and appealing are the first groups of people to persuade in the area of climatic change; this is in accordance with Gladwell's theories[62]. It's critical to pinpoint the locals who, once motivated, are more likely to launch a social movement than other groups to take action on environmental issues[63].

#### Discussion

When tackling the development or selection of pedagogical strategies in Environmental Education, one is rarely constrained to the techniques that will ultimately be utilized to impart knowledge[64]. It is popular in the field of environmental education that simply disseminating information will not motivate people to begin taking environmental action. Instead, a project in education is started while contemplate the five environmental education objectives: participation, state of mind, knowledge and capabilities. Typically, one considers how to build learners' capacities, such as their desire, ability, and knowledge to act. There are some solutions for how to inform and communicate about climatic change and mitigation in research. In order to better understand climate change and adaptation, research must be carried out.

It is more difficult to successfully implement this kind of education because researchers must invest the same amount of time in behavior modification, information dissemination, and motivational strategies as they would in mitigation education in order to make people ready to implement adaptation measures at local.

A community process should be established in order to educate people about climate change and adaptation[65]. The community's members are responsible for jointly analyzing current environmental issues, speculating on potential effects of climate change such as floods, drought and so forth, on their region, determining the degree to which their community is vulnerable, and resolving any issues that may arise. Even more information about adaptation and climate change needs to be disseminated or developed by natives. The writer develop the notion specifically about climate change as well as the endogenous scientific knowledge to social and ecological and problems locally, the information of local assets that may help with conversion, and the knowledge of conversion strategies. Additionally, reinforcing knowledge alone is insufficient if citizens are to be successful in implementing effective adaptation measures. Researchers need to consider how to foster in citizens a few sustainable competences. The authors have identified brain storming, foretelling future and threats, accountability analysis, and other flexible competences as being necessary to monitor, create , manage and implant effective adaptation measures in the field of climate change.

Environmental competences, according to Heimlich and Ardoin[66], can be acquired and enhanced through practice. The aforementioned competencies could be strengthened and developed in citizens through a pedagogical procedures run by developers and researchers from various areas. Citizens could receive assistance from these coaches from the time they begin to analyze a local issue until they propose and implement adaptation measures. In contrast to scientists, who would bring their practical information and serve as a role model for how to make decisions, solve problems, and plan initiatives, citizens would contribute their endogenous environmental knowledge. By discussing the state of the environment in their respective regions, choosing a topic that interests them, researching it, and discussing how it is currently affecting the lives of the citizens, scientists and citizens can work together to address the present. Following that, they could focus on the past by examining the attitudes, deeds, and regulations that have made the issue worse. Then they would begin to plan for the future by creating and disseminating hypothetical future scenarios. By deciding in relation to the research problem, what they desire and compiling a list of potential active or proactive adaptation actions, they would ultimately build the future.

Thus, by practicing, within the substructure of scientific instructions and with aid of pedagogical techniques to empower competences, individuals would gradually develop routine of acting and thinking, while enlarge their cognition of environmental and climate notions which are needed to implantation of conversions.

#### **3. CONCLUSION**

This study makes no claim to have addressed all of the difficulties associated with informing people about climate change and communicating that information. The type of education that is being promoted is complexity pedagogy because of the convolution and diversity of ideas related to climate change, according to the authors, climate change education can be carried out locally and with the help of experts. Experiential learning helps citizens become more aware, develops their skills, and makes it easier to teach complex concepts because, when applied in the real world, the concepts take on a meaningful meaning and are simpler to remember. The pedagogical work started during this process would be finished by a well-planned communication campaign that would convey messages like the need to act quickly and human capacity for problem-solving while illuminating and redo the required scientific clarifications. The issue of local climate change must therefore be fully understood by the populace, who must then research the changes and harness their creativity to find solutions.

#### Recommendations

Following are some recommendations;

- Prioritizing research in climate change education and communication is necessary.
- Diverse avenues should be investigated, including: experimenting with various message types; advancing research on behavioral modification.

- Looking at historical examples of the elements that ease citizens' capacity for adaptation to hazardous climatic situations.
- Developing and assessing pedagogical strategies effecting in reinforcing competencies like risk forecasting and accountability analysis.
- Developing new competencies which are related to the area of climate change would be comprehended and visualized by looking at scientists and citizens working in the field.

## **Competing Interests**

The authors did not declare any competing interest.

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