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A Study on Climate Change Awareness among Undergraduate Students of Western Odisha

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Sasmita Beriha
Dr. Ujjala Singh

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A STUDY ON CLIMATE CHANGE AWARENESS AMONG UNDERGRADUATE STUDENTS OF WESTERN ODISHA

Sasmita Beriha[1] and Dr. Ujjala Singh[2]

[1]Student, Department of Education and Education Technology, School of Social Science, University of Hyderabad,

Correspondence mail: berihasasmita@gmail.com

[2]Assistant Professor, Department of Education and Education Technology, School of Social Science, University of Hyderabad

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To my loved Parents,

with a heart full of love and immeasurable gratitude, I dedicate this work to you. Words will never be enough to express what you mean to me and what you have done for my life. Your unconditional love, endless sacrifices, and unwavering belief in me have been the strongest pillars of my journey.

In every step I have taken, you have been my strength when I felt weak, my courage when I felt afraid, and my hope when I felt lost. Even in the moments when I doubted myself, you never did. Your silent sacrifices, your sleepless nights, and your constant prayers have made this achievement possible.

You have not only given me life, but you have also given me the confidence to dream, the courage to pursue those dreams, and the resilience to overcome every challenge. Everything I am today is because of you.

This work is not just mine-it is yours. It carries your struggles, your love, and your dreams within it. I dedicate it to you with all my heart, deepest respect, and endless love.

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ABSTRACT

The present study titled, "A Study on Climate Change Awareness Among Undergraduate Students of Western Odisha." This study investigates the level of climate change awareness among undergraduate students of Western Odisha and examines the significant relationship between the mean awareness scores with respect to gender and locality. Climate change has emerged as one of the most pressing environmental challenges to human life, ecosystems and sustainable development globally. Climatic disturbances like rising temperatures, irregular rains, droughts, floods etc., are increasingly affecting natural and human systems. In this context, awareness among young people, particularly undergraduate students, is highly important because they represent the future generation responsible for environmental protection and sustainable decision-making. The study employed descriptive survey design. The study population was the under graduate students studying in different colleges and universities of Western Odisha. Stratified random sampling techniques were used to select a sample of 110 undergraduate students from different educational institutions of the region. The data were collected through a self-developed Climate Change Awareness Questionnaire. The collected data were analyzed using descriptive and inferential statistical techniques such as mean, standard deviation, percentage, and t-test. The findings of the study revealed that undergraduate students of Western Odisha possessed a moderate to high level of awareness regarding climate change and its environmental impacts. The study further highlighted that there is no significant difference found in mean scores between the genders as well as locality. The study emphasizes the importance of strengthening environmental education and climate literacy programs at the higher education level. It suggests that climate change education should be made more practical, contextual, and connected to the local environmental realities of Western Odisha. The findings of the study may be useful for educators, curriculum planners, policymakers, and environmental organizations in developing effective awareness programs and promoting sustainable environmental practices among youth.

Keywords: *Climate Change Awareness, Undergraduate Students, Environmental, Western Odisha,*

CHAPTER-I
INTRODUCTION

1.0 BACKGROUND OF THE STUDY

Engagement Climate change is no longer a distant scientific concern it is a lived reality that's actively reshaping communities, ecosystems, and how future generations will experience the world. As extreme weather events become increasingly common and voices rise louder to address issues of sustainability, young people in undergraduate students are squarely at the heart of this global conversation. Their awareness, beliefs, and everyday choices matter as they

are not just students; they are the next scientists, teachers, policymakers, and citizens who will inherit the responsibility of addressing this crisis.

It is in the universities and colleges that a remarkable combination of knowledge, innovation, and social responsibility converges. For this reason, undergraduate students will be one of the most interesting groups to study in examining the public understanding of climate change. Many have regular exposure to scientific information within the classroom, others through social media, campus initiatives, or personal experiences with environmental impacts. However, their level and depth of awareness may vary widely depending on their academic background, the information they are exposed to, and the support mechanisms available to them.

It is very important to realize the knowledge of students about climate change and their feelings towards the issue, as attitudes will inform everything from how they individually behave all the way to the future direction of environmental action in society. By means of testing their awareness, we gain insight into how well educational institutions are preparing young adults for one of the biggest challenges of our time and where more support, teaching, worth be needed.

In the present situation, it tries to know how college and university students actually think about climate change. It looks beyond textbook knowledge and tries to see what students truly know, how they feel about the issue, and whether they are willing to change their behaviour for the

environment. By studying their awareness, attitudes, and everyday actions, this research hopes to offer useful guidance for universities, teachers, and policymakers who want to make environmental education more meaningful and practical. In the end, building climate awareness among young people is not only a part of education it is a step towards securing a safer and healthier future for the planet.

But the properties of climate change are not regularly spread around all the regions; hence, it becomes crucial to carry out research in such regions. These regions usually face environmental issues like temperature increases, irregular rainfall, drought conditions, lack of water, and many other related issues that affect agriculture directly. However, even though such environmental issues affect these regions, very little research has been carried out to know about the level of awareness among the students took admission in colleges and universities.

Besides, even though there has been an increase in awareness concerning the possessions of climate change, the problem arises in the aspect that even though the students are alert of the impact of climate change, they may not act because of their attitude towards the problems caused by such environmental change.

The educational system also has an important part to play in this respect. The university or college is a center of knowledge, but also the place where values are instilled through learning how to think critically. Students who are educated in this regard can be prepared as agents of environmental protection and conservation.

Furthermore, the advent of the Internet has provided the younger generations with many tools for receiving information regarding climate change through social networks and other online media. In some cases, this type of information may actually surpass that received in schools and universities regarding its importance, which makes it necessary to analyze the way in which this information is received by students.

Hence, this research not only assesses the climate change awareness levels among the undergraduate students of western Odisha, but also aims at finding their environmental responsibility and actions towards environmental.as well. This will also help to develop appropriate educational approaches and policies for the students so that they can increase their climate awareness levels and exhibit sustainable behavior.

1.1 CLIMATE CANGE

The term "climate change" states to a long-term shift in temperature, climate, and weather patterns that is mostly instigated by human activity that raises atmospheric concentrations of greenhouse gases. According to Sarun (2025), “climate change” is a long-term shift in the statistical distribution of variables such as temperature, precipitation, wind patterns, and extreme weather occurrences.

1.2 HISTORICAL CONTEXT OF CLIMATE CHANGE

Public awareness of “climate change” evolved over the course of several decades, shaped by scientific discoveries, political movements, and shifting social values (IPCC, 2021; UNESCO, 2017). Although discussions about human influence on the environment began as far back as the 19th century (McNeill, 2000), it was not until the late 20th century that climate change became a global concern. In the 1950s and 1960s, scientists first started documenting rising carbon dioxide levels in the atmosphere (Keeling, 1960; Intergovernmental Panel on Climate Change 2021), calling attention to the notion that human activities specifically, the burning of fossil fuels might be changing the earth's climate (IPCC, 2021). These early warnings were low and steady, but they provided a necessary foundation for the environmental conversations to come.

By the 1980s, the issue could no longer be ignored. Advances in climate modeling, combined with such visible environmental changes as unusual temperature patterns and melting glaciers, brought climate change into public debate (IPCC, 2007; IPCC,2021). In 1988, with the creation of the Intergovernmental Panel on Climate Change, or IPCC, a milestone was reached (IPCC 2021). For the first time, governments and scientists were working together in a formal process to assess the evidence and convey the risks of a warming planet. Every report from the IPCC bolstered the scientific consensus, and nudged the terms of the debate further and further from whether anything was happening to what must be done about it.

As climate science took center stage, environmental topics began being integrated into education systems worldwide (UNESCO,2017; United Nations,2015). The early 2000s particularly saw universities emerge as an important site for environmental discourse. Higher education institutions identified that the contribution of young adults to future policy, innovation, and community engagement would play a key determinant. Courses, research

programs, and campus sustainability initiatives proliferated, enabling students to engage with climate change not only as a scientific issue but as an economic, political, and ethical challenge.

With time, student awareness about climate change grew with events around the world: international agreements such as the Kyoto Protocol and the Paris Agreement, the rise of climate advocacy movements, and increased visibility of extreme weather events (UNFCCC, 1997; UNFCCC, 2015). Today, students are not just receivers in the climate information landscape but active contributors to it: they organize campaigns, take part in research, and use digital platforms to amplify their voices. From early scientific observations through widespread educational and social engagement, this historical progression frames current interest in understanding how undergraduate students perceive and respond to climate change. Their awareness is informed by decades of scientific work, policy developments, and cultural shifts; it is thus essential to explore the ways in which these influences do and perhaps do not-translate into knowledge, attitudes, and action within the university setting.

1.3 GLOBAL CONTEXT

“Climate change” is no longer regarded, a single, isolated from environmental issues, but rather as a global one-a matter for each region, community, and every sphere of human activity. In the past decades, the world has continually come to recognize that climate impacts in human society and environmental conditions, such as increasing temperature, extreme weather events, shifting ecosystems, and threats to food and water security, are shared challenges across national borders (IPCC, 2021). Hence, at the center of international discussions stands climate change, whereby policies, economies, and social priorities on continents are shaped accordingly. There is about a 50% chance that the average global temperature will be more than +1.5°C above the average over the next five years (2024-2028) (World Meteorological Organization, 2024). The 20-year average temperature is expected to rise by more than 1.5 °C by 2030, according to the Intergovernmental Panel on Climate Change (IPCC, 2021).The first decades of the twenty-first century experienced severe climate change. For instance, 2024 was the hottest year ever recorded since systematic monitoring began in 1850, with a 1.60 °C increase in temperature (Global Climate Highlights, 2024).

International cooperation has guided efforts at understanding and mitigating climate change on the global level. Organizations such as the United Nations have played an important part in bringing together scientists, policymakers, and world leaders to negotiate a response from all.

The adoption of the Kyoto Protocol in 1997 and the Paris Agreement in 2015 had therefore been major milestones, signaling a common endeavor towards the reduction of greenhouse gas emissions while strengthening resilience against climate related risks. While progress has been unequal, these agreements represent an ongoing attempt to establish a shared responsibility for protecting the planet.

Growing inequality between nations also frames the global conversation about climate change. The countries of the Global South, as they are known, are generally those suffering the most from climate change despite their minimal contribution to creating the problem. The low-lying island nations face the threat of rising sea levels; parts of Africa and Asia face disrupted agricultural cycles due to protracted droughts and floods; and the increasingly unpredictable weather places added stress on communities with limited resources. This imbalance has heightened focus on climate justice, with calls for wealthy nations to support the most vulnerable populations through financial aid, technology transfer, and capacity building.

Global public awareness has been informed and shaped by scientific communication, media coverage, and grassroots activism. Reports from the Intergovernmental Panel on Climate Change present evidence of accelerated warming and its long-term consequences, continuing to shape global understanding. Meanwhile, climate advocacy movements led by youth groups, indigenous communities, and civil society organizations brought moral urgency to the issue.

Their voices have helped transform climate change from a technical scientific matter into a deeply human one, highlighting the real lives and communities affected.

This calls for education to play a central role within the global context. Universities and colleges worldwide are increasingly incorporating climate issues into their curricula, research agendas, and campus operations. Students of today are increasingly members of a global community that is becoming better informed and more outspoken about their involvement in and concerns regarding climate change. As students engage in international debates, have access to global information, and take part in cross-cultural initiatives, their awareness is informed not only by local experiences but also by global trends, responsibilities, and expectations. Understanding the global landscape of climate change provides an interpretive lens for how undergraduate students perceive the issue. Their knowledge results from worldwide scientific findings, global policies, international media stories, and the lived

experience of communities around the world; thus, climate literacy is both an interconnected and shared endeavor globally.

Apart from policy and scientific perspectives, climate change has also been considered an integral part of sustainable development in the global context. In particular, Sustainable Development Goal 13 (Climate Action) of the United Nations highlights the pressing necessity of improving education, awareness, and capabilities to tackle climate change and its consequences. Currently, education is viewed not only as a mechanism of disseminating information but also as a means of shaping responsible behavior towards the environment on an individual and community level (UNESCO, 2020).

However, research carried out amongst students from different countries has indicated that a value-action gap can be observed. This is because although the students know about the climate change and its consequences, they are not able to adopt sustainable behavior towards the environment on a regular basis (Kollmuss & Agyeman, 2002). It is clear that a value-action gap is one of the major barriers in the learning of climate change.

On top of that, the advent of digital media technology has been a significant part of raising awareness about climate change all over the world. Digital media platforms can effectively facilitate the rapid dissemination of information related to climate change through digital activism and social media campaigns. However, there may be misinformation as well as a lack of depth in engaging with such media, as digital awareness does not mean deep awareness (O'Neill & Nicholson-Cole, 2009).

The recent global studies have been continuously stressing the need for taking action in the case of climate change. As per the IPCC, staying below the limit of 1.5 degrees Celsius increase in temperature will mean drastic cuts in greenhouse gas emissions across all sectors. It is vital to ensure that the students are equipped with both the skills and knowledge to help solve the problem.

1.4 LOCAL CONTEXT

That western part of Odisha has its own environmental and socio-cultural topography, adding meaning to the study of awareness on climate change there. Unlike the coastal districts affected by cyclones, Western Odisha faces a different kind of climate stresses. Districts like Sambalpur,

Sundargarh, Jharsuguda, Balangir, Bargarh, Kalahandi, Nuapada, and Deogarh frequently face rising temperatures and have prolonged dry spells with delayed monsoons and frequent drought like situations (IMD, 2020; IPCC, 2021). All this affects regular lives very dearly, from agriculture and availability of water to health and even migrations.

Agriculture remains one of the main sources of livelihood for many families in Western Odisha. Whenever rainfall becomes unseasonal or excessive heat damages crops, economic stress is felt at the household level (World Bank, 2013; Food and Agriculture Organization, 2017). Along with these changes, other natural resource dependent or forest dependent communities, such as rural and tribal ones, are also feeling the pain most (MoEFCC, 2018; FAQ, 2014). Students here grow up seeing these kinds of climate related challenges throughout their villages and towns; thus, it shapes their understanding of environmental issues in very real and personal ways.

This places Western Odisha's institutions of higher learning-in Sambalpur, Rourkela, Balangir, and elsewhere in a very special position vis-à-vis responding to these challenges. Yet, on any campus, knowledge or awareness of climate issues can vary wildly depending on background, information access, and environmental learning opportunities. Some students understand at a basic level but may fail to associate it with lived experiences of their home region. Others are deeply aware of the stresses caused by environmental degradation but do not have scientific clarity into the causes of such stress. The backward districts of Western Odisha are located in two districts of the KBK (Kalahandi-Balangir-Koraput) area. These districts have become more vulnerable to repeated droughts and famine-like circumstances, which have forced the poor to flee in despair during the non-agricultural season. The KBK districts of Odisha are one of the poorest districts of the state with majority of the residents living below the poverty threshold (BPL) (Panda et al., 2019). Besides, these districts are facing high exodus, diseases and starvation owing to the frequent deficiency and floods. Agricultural productivity, thus, is becoming increasingly uncertain due to factors such as unpredictable rainfall forms, inadequate irrigation, and an increase in the rate and intensity of normal disasters (Kumar & Saxena, 2024).

District like Balangir and Bargarh fall under “West Central Table Land Zone” which experience a warm and moderately moist climate (Government of Odisha, 2020; ICAR, 2013). Also district like Kalahandi and Nuapada belong to the “Western Undulating Zone” and characterised hot moist and sub-humid climate. Odisha is especially impacted by climate change because of its location and geophysical conditions (Meher, 2024). Traditional growth

models and agricultural systems are increasingly being disrupted by climate change, as rising temperatures, changing rainfall patterns, and extreme weather events negatively affects productivity and long-term economic growth (Ortiz-Bobea et al., 2021; Thornton et al., 2018)

This local context makes studying climate change awareness among undergraduate students in Western Odisha particularly important. Knowing the perceptions, interpretations, and responses among students relative to climate issues can help in the formulation of more relevant educational programs that may be carried out, besides strengthening community-based climate initiatives in the process of supporting the region in building resilience. In a place where livelihoods and daily life are directly influenced by environmental challenges, informed and aware young people may well show the way towards a more sustainable future for Western Odisha.

1.5 THEORETICAL CONTEXT

It is important to embed the study in well-established psychological, environmental, and educational theories for a proper understanding of climate change awareness and behavioral intention among undergraduate students. From these theoretical standpoints, explanation can be drawn regarding how students acquire climate-related knowledge, develop attitudes toward environmental protection, and translate their developed attitudes into real-life behavioral intentions (Kollmuss & Agyeman, 2002; Icek Ajzen, 1991)

The most relevant framework to the present study is the Theory of Planned Behavior (**TPB) by Ajzen (1991)**. According to TPB, behavior is determined by attitudes, subjective norms, and perceived behavioral control, combined in a single measure reflecting an individual's behavioral intention (Ajen, 1991; Ajzen 2002). This concept applies to climate change in that it explains why students would or would not choose environmentally responsible adaptations. In such cases, positive attitudes toward environmental protection, social pressures from their cohort, and a sense of personal ability to take sustainable action are strong motivators for participating in climate-friendly behaviors.

The **Value Belief Norms** (VBN) theory, which is a part of the contributions of Stern (2000), gives yet another perspective on the understanding of eco-friendly behaviors. The VBN theory argues that individual values determine individual beliefs about environmental damage, and this determines personal norms, which finally determines behavior. As such, the value belief

norm model explains the global warming issue by stating that students who hold positive ecological values, and believe that environmental damage is negative will act according to their moral obligations to the environment (Stern, 2000).

The **Knowledge Attitude Behavior** (KAB) Model (Hungerford et al., 1990) also informs the study, which assumes that people first obtain knowledge about the problem at hand, followed by attitude formation, and finally, behavior change. In other words, increased level of knowledge of "climate change" among students will also increase the level of positive environmental attitude and intention to act in a more sustainable manner. Based on this model, variables such as knowledge, awareness, and behavioral intention are warranted.

Environmental literacy can serve as one of those approaches. This concept is focused on knowledge, skills, attitudes, and involvement in decision-making regarding the issue at hand. Environmental literacy consists of three components: cognitive, affective, and behavioral. In the latter two cases, it means that just knowing is not enough. Instead, it requires being able to critically think about issues pertaining to the environment and act accordingly (Roth, 1992). It becomes clear that environmental literacy can be used to assess the readiness of students to cope with climate change.

The **Social Learning Theory by Bandura (1977)** has also been useful in realizing how observation, peer influence, and institutional practices shape the environmental behaviors of students. Because institutions of higher learning act as social environments where students interact, observe, and adopt ways of behavior, this theory shows how campus culture, environmental initiatives, and peer groups shape climate-related intentions. These collectively form a solid foundation for analyzing the understanding of climate change among the undergraduate students of Western Odisha and how this awareness turns into behavioral intentions. The theoretical context relates knowledge, attitudes, social influence, and perceived control in such a way that it embeds the rationale for investigating students' climate literacy within the broader educational and socio-environmental landscape of the region.

Experiential Learning Theory, proposed by Kolb (1984), also provides valuable insights into how students develop environmental awareness. According to this theory, learning occurs through experience, reflection, conceptualization, and application. In the context of climate change, students who engage in fieldwork, sustainability projects, or community-based activities are more likely to develop deeper understanding and stronger pro-environmental

attitudes compared to those relying solely on theoretical instruction (Kolb, 1984). This highlights the importance of practical exposure in shaping climate-related awareness and behavior.

1.6 SIGNIFICANCE OF THE STUDY

One of India's eastern states, Odisha, has a predominantly agrarian economy (Government of Odisha, 2020). According to the Government of India (2011), more than 80% of Odisha's population resides in rural settings, where the rate of poverty are more than in the towns and cities. Among all the Indian states, Odisha holds the largest percentage of people from ST and SC (39.9% compared to 24% nationwide) (Government of India 2011). This, higher poverty rates results into lower levels in the education sector, and poor health is experienced by these marginalized groups (Mohanty, 2011; UNDP, 2020). The districts of Bolangir and Bargarh have a hot, humid climate and are located in the "West Central Table Land Zone." Similar to this, the districts of Kalahandi and Nuapada have hot, humid, and subhumid climates and are included in the "Western Undulating Zone" (Planning Commission, 1989). Odisha is particularly impacted by climate change due to its location and geophysical conditions (Meher, 2024). Residents of these areas should be aware of this as They are expected to face worsening weather conditions (such as drought, floods, and rising temperatures), higher risks of illness and pests, and related consequences for human and animal health. (Indian Meteoroloical Department IMD, 2023).

Over half of the people living in western Odisha are from ST and SC communities (Government of India,2011). These people in western Odisha are particularly vulnerable to climate change, in part because their poverty makes it difficult for them to cope with shocks and stress, and in part because they depend on climate-sensitive livelihoods and live in a highrisk location. According to the vulnerability profile, this area of India has one of the greatest risk levels in the nation, and its mean temperatures are rising (WORLP 1999).

Kalahandi and Balangir, which are the backward districts of Western Odisha and are a part of Kalahandi-Balangir-Koraput place. The increased vulnerability of the poor to frequent droughts and famine like conditions has compelled them During the non-agricultural season, people move in despair. KBK districts of Odisha are among the poorest in the state, with a majority BPL population (Panda et al., 2019). Due to the recent drought and floods, these districts are also seeing an increase in migration, illnesses, and famine. However, a variety of

factors, including as erratic rainfall patterns, insufficient irrigation, and an increase in the frequency and severity of natural catastrophes, are making agricultural production increasingly uncertain. (Kumar & Saxena, 2024).

The importance of the study becomes clearer when we look at the unique environmental and social realities of Western Odisha. Districts like Sambalpur, Jharsuguda, Sundargarh, Balangir, Bargarh, Kalahandi, Nuapada, and Deogarh represent a different set of climate related challenges compared to the coastal belt. Recurring heatwaves, rising temperatures, erratic rainfall, drought-like situations, drying water bodies, and shifts in agricultural patterns have become common experiences that people face in this region. These conditions directly affect livelihoods, especially for families dependent on agriculture, day labour, and forest based resources.

These are changes most undergraduate students in Western Odisha grow up witnessing firsthand. They see how drought situations affect the crop productivity, extreme summer temperatures affect health, and scarcity of water dictates the daily lifestyle. Because of these lived experiences, studying their awareness about climate change is not only relevant but also necessary. Their perceptions can shed valuable light on how young people in semi-urban and rural settings make sense of the environmental changes occurring around them.

This is important because it gives insight into whether these students possess clear scientific knowledge regarding climate change or if their understanding is shaped mainly by local experiences and informal discussions. Such understanding will also examine whether they feel responsible or motivated to adopt climate-friendly behaviours. In addition, this can help in the design of educational interventions that would be better suited to the socio-economic realities of Western Odisha.

The study may also serve for policymakers, teachers, and universities in the region by guiding them on how to develop more contextualized environmental education programs that will not stay confined to mere theory but shall link up with the practical issues at ground level like water scarcity, sustainable agriculture, conservation of forests, and preparedness for heatwaves. This study, therefore, empowers the youth of Western Odisha with the knowledge, skills, and attitudes necessary to support climate resilience in their communities and enhances sustainable development efforts across the region.

In addition to its significance in the regional perspective, the research has an additional contribution to offer to the available body of knowledge on climate change awareness by restricting its scope to the phenomenon concerning students of universities living in a semiurban/rural environment, which is seldom addressed in any existing literature. Although various types of research studies have been conducted on the subject of climate change awareness in urban citizens, only scant empirical information has been produced about the problem in Western Odisha.

Moreover, the study is applicable from a practical perspective since students serve as important agents of change not only within their own families but also within their communities, especially those located in rural and semi-urban settings. Their increased knowledge and climate awareness could contribute to building resilience against various environmental risks such as droughts, water shortages, and heatwaves (IPCC, 2021).

Finally, the study is instrumental in forming the foundation for future research since there are several significant variables associated with the issue of climate change. One example would be studying potential interventions or conducting comparative analysis on regional variations in the evolving patterns of climate awareness among youth.

1.7 STATEMENT OF THE PROBLEM

The problem to be addressed through this study is, **"A study on Climate Change Awareness among Undergraduate Students of Western Odisha."**

1.8 VARIABLES

The variables for the present study are mentioned below

Dependent variables:

1. Climate change awareness

Independent variables:

1. Gender
2. Locality: Urban and Rural
3. Academic discipline: Science and Non-Science

1.9 OPERATIONAL DEFINITION

- **Climate change awareness:** In this study, "climate change awareness" is the total score of respondents obtained by using climate change awareness scale.
- **Undergraduate students:-** Undergraduate students are those students, completed their higher secondary level and currently enrolled in colleges, universities, and other postsecondary institutions in Western Odisha.

1.10 RESEARCH QUESTIONS

1. What is the awareness level of climate change among undergraduate students of Western Odisha?
2. Does the climate change awareness level of undergraduate students differ with respect to gender, academic discipline, and locality of Western Odisha students?

1.11 OBJECTIVES

On the basis of research questions, the following objectives are framed.

1. To assess the awareness level of climate change among undergraduate students of Western Odisha.
2. To find out the significant difference in climate change awareness level with reference to gender, academic discipline and locality of Western Odisha undergraduate students.

1.12 HYPOTHESIS

Based on the nature of objectives, 3 null hypotheses are framed.

Ho1: There is no significant difference between the mean scores of climate change Awareness among Western Odisha UG students with respect to their gender.

Ho2: There is no significant difference between the mean scores of climate change Awareness among Western Odisha UG students with respect to their academic discipline

Ho3: There is no significant difference between the mean scores of climate change Awareness among Western Odisha UG students with respect to their locality

1.13 SCOPE OF THE STUDY

The study leads to understand the awareness level of climate change among undergraduate students of Western Odisha. The present research primarily focuses on undergraduate students from various academic streams comprising science, arts, and commerce, which would enable an overall understanding of awareness levels in different streams. Besides this, other demographic variables like gender, age, and urban/rural origin have also been considered to explore the possibility of a variation in awareness.

As described in the research design, this study is confined to universities and degree colleges and excludes school students, working professionals, and other groups within the community. It gives insight into the students' awareness, attitudes, and intended behaviors but does not measure actual long-term behavior change or the effectiveness of prevailing environmental policies in the region.

The findings are expected to be useful for educators, curriculum planners, policymakers, and environmental organizations in designing context-specific strategies to enhance climate literacy and promote sustainable practices among the youth of Western Odisha.

Despite the large number of resources available to people all over the world focusing on the issue of climate change, it still appears that no sufficient data are available regarding the measuring the level of awareness of these issues among undergraduate students of Western Odisha. The significance of students can never be underestimated when discussing the resolution of environmental problems since the individuals are expected to assume positions of significant responsibility in the future. Nevertheless, the current body of literature does not contain information related to the discrepancy of awareness among various academic streams and socio-demographic groups.

1.14 DELIMITATION

Although the present study aims to explore awareness on climate change among undergraduate students in Western Odisha, it has some boundaries set so as to keep the focus and feasibility.

Geographical Delimitation: The research will be restricted to the selected districts of Western Odisha: Sambalpur, Sundargarh, Jharsuguda, Balangir, Bargarh, Kalahandi, Nuapada, and

Deogarh. The findings might not be generalized directly to students from coastal Odisha or other states, as climate challenges are faced differently there.

Population Delimitation: The research confines itself to students in colleges and universities, which will include undergraduate levels. School students, vocational trainees, and working youth are excluded.

Conceptual Delimitation: The present study is conceptually delimited to investigating the awareness of climate change through selected demographic variables only. More specifically, the research considers gender, rural urban background, and academic discipline as the main variables that could affect students' knowledge, and behavioral intentions with regard to climate change. Focusing on the chosen variables, the research has kept a clear and workable scope by analyzing how basic demographic differences shape students' awareness levels in Western Odisha.

These considerations ensure that the study is focused, manageable, and contextually relevant to understanding climate change awareness among the students of undergraduate level in Western Odisha

CHAPTER-II

REVIEW OF LITERARUTE

2.0 INTRODUCTION

Climate change now appears to be one of the crucial challenges in the 21st century, exerting influence not just on the natural environment but also economic stability, cultural practices, public health, and global patterns of development. While societies the world over grapple with rising temperatures, unpredictable rainfall patterns, drastic weather events, and shifting ecological processes, increasing attention by researchers has flowed toward understanding how people perceive and respond to this crisis. Within this, there has been a growing interest in undergraduate students as an important population group. This is in large part because they represent the future generations of professionals, policymakers, educators, and informed citizens who will shape prospective environmental decision-making.

The literature review in this chapter attempts to present a comprehensive understanding of what previous scholars have documented on climate change awareness, particularly among young adults in educational institutions. In the last two decades, studies from both developed and developing countries investigated various dimensions of climate awareness, which range from students' factual knowledge and conceptual clarity to their attitudes, perceptions, fears, and readiness for modifying their behavior. All these studies collectively underline that awareness is not a single construct but involves cognitive understanding, emotional engagement, moral responsibility, and behavioral intention.

A critical review of related literature indicates that climate change education has been addressed through various academic lenses. Environmental scientists have researched knowledge gaps and misconceptions about climate science. Psychologists have investigated how awareness influences attitudes and pro-environmental behavior. Educators have researched the role of curriculum, teaching strategies, and institutional culture in influencing environmental literacy. Sociologists have identified how geographic location, socio-economic background, and

community experiences drive environmental awareness. It is within this rich context that the present study is situated.

Another important insight that emerges from the literature is that there is regional, cultural, and educational institutional variability in climate change awareness. While numerous studies indicate a high degree of concern among students, others note limited understanding of root causes, consequences, and possible mitigation strategies. Several researchers note that whereas students may express concern about climate change, this concern does not always translate into consistent environmentally responsible behavior. This gap between knowledge and action is a recurring theme in many global and national studies.

Moreover, the literature also points to the increasing need for research pertaining to specific contexts. There are great variations in climatic experiences from region to region, as there are also in local ecological challenges. It therefore becomes important to understand climate change awareness in its specific geographical and socio-cultural contexts. Odisha is a state which suffers from cyclones, heatwaves, drought-like situations, and a host of other climaterelated stressors fairly regularly. Within Odisha, Western Odisha presents a distinctive set of environmental vulnerabilities: rising temperatures, decreasing duration of winters, changing rainfall patterns, and dependence on agriculture and forest-based livelihoods. Surprisingly, very few studies have deeply explored how these lived environmental realities shape climate awareness among students in universities, degree colleges in Western Odisha. This chapter provides a sound conceptual framework for the present study through a review of existing scholarly works. It identifies what is known, not known, and where the gaps are that indicate significant research. It will also define the theoretical lens from which this study is founded in reference to the empirical trends of undergraduate students regarding climate change awareness. Lastly, this literature review does not simply summarize earlier findings; it provides the intellectual map that anchors the study, justifies its relevance, and strengthens its academic contribution.

2.1 REVIEW OF RELATED LITERATURE

Aksit (2025) sought to determine how well high school pupils in Saudi Arabia understood scientific ideas about climate change and how they perceived danger before and after taking an environmental science course. In order to accomplish this goal, the researchers used a pre-post research design with 51 students in the eleventh and twelfth grades. They measured risk

perception using Likert-scale items and a previously validated climate change knowledge assessment. Data were gathered both before and after the course to look at how students' views and knowledge had changed. The results showed that students' initial comprehension of important climate change concepts, especially the greenhouse effect, was restricted; but, after finishing the course, their knowledge much improved, demonstrating the value of formal training. Additionally, after the course, students' initial mild judgments of the risks associated with climate change significantly rose, particularly with regard to long-term effects. The study emphasizes the significance of incorporating environmental science education at the secondary level to improve climate literacy and assist informed decision-making, even though the association between knowledge and risk perception was not statistically significant.

Gara et al. (2025) aimed to examine the effectiveness of Project-Based Learning (PBL) in enhancing students' knowledge and comprehension of sustainability and climate change in scientific classes. To achieve this objective, the researchers adopted a mixed-methods approach, merging quantitative surveys and qualitative focus group discussions were employed for the study, involving Grade 10 students in Imus City's General Emilio Aguinaldo National High School. Over the course of three months, the PBL intervention engaged students in practical, real-world projects pertaining to sustainability and climate challenges. The results exposed that students exhibited a modest to high degree of awareness and knowledge regarding climate change, mainly in terms of its reasons, effects, and extenuation efforts. The study further found that PBL significantly improved students' conceptual understanding, engagement, and confidence, enabling them to relate classroom learning to real-life situations. Additionally, students developed a broader perspective on environmental issues, including biodiversity conservation and individual responsibility, although obstacles include the demanding nature of academic work and the requirement for distinct assignments were noted. Overall, the study highlights the effectiveness of PBL as a pedagogical approach in promoting environmental literacy, critical thinking, and active participation in climate action.

Manchanda et al. (2025) intended to explore the climate change awareness level knowledge among university students in Delhi, with a focus on understanding their sensitivity and engagement with climate-related issues. To accomplish this objective, the researchers approved

a qualitative research methodology based on a subjectivist ontology approach, emphasizing students' subjective experiences in their day-to-day lives. Data were collected through interviews with 153 university students across Delhi and NCR. The findings revealed that while students had some knowledge of climate change and its consequences, but more empowerment and involvement are still required to turn knowledge into significant action. The study further highlights the he significance of incorporating climate change education and active engagement initiatives, suggesting that policymakers should strengthen such efforts to foster informed participation and promote sustainable practices among university students.

Yildiz (2025) sought to find out how much university students involved in youth office activities knew about climate change, how anxious they were, and how hopeful they were, as well as how these factors related to one another. To achieve this objective, the investigators adopted a quantitative research design, data collected from 881 volunteer students across four public universities in the Eastern Anatolia Region of Türkiye. The researcher used t-test, oneway ANOVA, and Pearson's correlation coefficient were used as a Statistical- methods to examine the data. The findings showed that students had modest levels of awareness, anxiety, and hope regarding climate change, with a positive association showing that greater awareness was linked to higher levels of anxiety and hope. Differences were observed based on demographic factors, with male students, graduate students, and those from rural areas showing higher levels of awareness and anxiety, while students with better economic conditions reported lower anxiety and hope levels. The study highlights the need for universities to strengthen educational programs to enhance the level of awareness towards climate change and promote informed engagement among students.

Jindal et al. (2024) A study meant assess the climate change awareness level among teenagers and its relationship with their consumer behavior. To achieve this objective, the researchers employed a survey method involving 85 school-going teenagers from Chandigarh, India. A self-designed questionnaire that evaluated pro-environmental consumer behavior and climate change awareness was used to gather data. Descriptive statistics and correlation analysis were used to examine the replies and interpret the results. The results revealed that most participants recognized climate change as a real and ongoing issue and identified human activities as its primary cause. Furthermore, Pro-environmental consumer behavior and awareness of climate

change were found to be significantly positively correlated indicating that teenagers with higher awareness were more likely to engage in sustainable practices such as purchasing ecofriendly products and reducing their carbon footprint. Based on these findings, the study emphasizes the importance of promoting climate education among teenagers to encourage responsible and sustainable consumer behavior.

Sanchez et al. (2024) sought to assess undergraduate students' awareness of climate change and level of eco-anxiety and to examine the relationship between these two variables. To achieve this objective, the researcher used established instruments like Hogg's Eco-Anxiety Scale and the Awareness Scale for Climate Change, the researchers used a quantitative research methodology to gather data from 392 undergraduate students at a higher education institution in Davao City, Philippines. To evaluate awareness and eco-anxiety levels and find any meaningful connections between them, the gathered data was examined. The study concluded that students had a modest amount of eco-anxiety but a very high level of awareness for climate change. Additionally, a strong but weak positive correlation was discovered between ecoanxiety and climate change awareness, suggesting that greater understanding may be linked to higher levels of worry or anxiety. In order to promote both educated understanding and psychological well-being, the study emphasizes the necessity of enhancing climate change awareness programs and implementing interventions to alleviate students' eco-anxiety.

Desabayla and Gueta (2023) aimed to ascertain the level of climate change knowledge among senior high school students in the Sorsogon Province Division during the 2022–2023 academic year. In order to achieve the goal, 412 senior students who were formally enrolled in the Academic and Technical-Vocational-Livelihood programs at Juban National High School and

J.P. Laurel High School in Grades 11 and 12 participated in a descriptive survey. They used questionnaires to gather data, and weighted mean and ranking were used to analyse the replies. The results were interpreted with assistance from relevant literature. According to the findings, pupils agreed about the properties of climate change but were largely indifferent to mitigating its effects. Additionally, the internet, television, school, and radio were found to be their main information sources. Based on these results, the researchers advised students to keep using a variety of information sources to deepen their comprehension of climate change, which can

promote more knowledgeable viewpoints and motivate active involvement in mitigation initiatives.

Esakkimuthu and Banupriya (2023) sought to gauge students' understanding of climate change and investigate its consequences for creating a sustainable future. In order to accomplish this goal, the researchers used a mixed-methods strategy, gathering data from a wide sample of students from different educational institutions using both quantitative surveys and qualitative interviews. While the qualitative phase included in-depth interviews to investigate students' comprehension, information sources, and factors influencing their attitudes and behaviors, the quantitative phase used structured questionnaires to assess students' knowledge of climate change, its causes, consequences, mitigation strategies, and attitudes toward sustainable practices. The results showed that pupils' awareness varied, with some exhibiting thorough knowledge and others misunderstandings or a lack of comprehension. Formal education, social media, and environmental advocacy groups were found to be important knowledge sources, and students' attitudes were shown to be influenced by personal experiences, cultural backgrounds, and socioeconomic considerations. In order to improve students' comprehension and promote pro-environmental behavior for a sustainable future, the study emphasizes the necessity of including comprehensive climate change education into curriculum and supporting focused awareness activities.

Ghazy, Fathy (2023) examined how university students' knowledge, attitudes, and behaviors are affected by climate change awareness programs. 1. Evaluating students' climate change knowledge, attitudes, and behaviors. 2. Evaluating students' knowledge of climate change before and after the program.3. Creating and executing a climate change awareness program (based on the university students' specified pre-assessment data).4. Assessing how the awareness program has affected the pupils' everyday routines, attitudes, and knowledge. University students' attitudes and behaviors. Three community health nursing specialists verified the study tool. With the assistance of additional specialists, content and construct validity were acquired. The final version of the instrument was prepared taking into account all of the professional modifications and constructive feedback. In order to evaluate the consistency of measurement, the researchers used reliability to verify the instruments' internal

consistency. It was acquired by figuring out each scale's correlation coefficient .According to the study, the awareness program significantly improves university students' overall knowledge and attitudes, and also reported about daily practices connected to climate change. Additionally, the study concluded that “The overall knowledge score level of university students before and after the program was positively correlated with their attitudes and total daily life” .

Hayek et al. (2023) designed to assess government university geography students' understanding of climate change and look for variations depending on demographic factors. The researchers collected data from 307 randomly chosen geography students at various public universities, including Jordan University, Mut'ah University, Al Hussein University, Al-Albait University, and Yarmouk University, using a descriptive analytical approach in conjunction with a quantitative method to accomplish this goal. The researcher used the questionnaire tool to gather the data, which were then evaluated to determine the awareness levels of the students and group differences. The results indicated a medium level of understanding of climate change in terms of its ideas, causes, and mitigation techniques, as well as its affecting variables. Additionally, there were notable variations in awareness according to age, gender, and university affiliation. In order to improve students' comprehension, foster critical thinking abilities, and promote workable solutions to environmental problems, the study emphasizes the necessity of creating specialized climate change study programs.

Nguyen (2023) analysed students’ perceptions of climate change in Vietnam, particularly in relation to various communication channels. To achieve this objective, the researchers employed a quantitative research design, collecting data from 460 university students through a structured survey. The data were examined using by frequency analysis, and Exploratory Factor Analysis (EFA) to ensure reliability and identify underlying factors. The findings revealed significant differences in students’ perceptions, with contrasting views on whether climate change can be overcome in the future. It was observed that students largely form their opinions based on their own understanding and exposure to information sources. Additionally, the study highlighted a general lack of awareness regarding environmental protection among students and the wider population, emphasizing the need to strengthen educational programs and promote environmental awareness campaigns. The study underscores the crucial role of youth as future contributors to environmental sustainability and calls for enhanced efforts to improve climate change education and engagement.

Ofori et al. (2023) aimed to evaluate Ghanaian undergraduate students' knowledge, attitudes, and perceptions of climate change as well as the variables affecting these elements. In order to accomplish this goal, the researchers used a semi-structured questionnaire to gather data from full-time undergraduate students at the University of Ghana, Legon in a cross-sectional study design. Descriptive statistics, logistic regression, t-tests, and One-Way ANOVA were used to evaluate the gathered data in order to look at correlations between variables. The results showed that a sizable majority of students expressed worry on the consequences of climate change and thought it was genuine and mostly driven by human activity. Despite this awareness, students' knowledge of the reasons and effects of climate change was only mediocre, and they had a number of false beliefs. Students' knowledge, attitudes, and views were also shown to be greatly influenced by variables including mother's employment, ethnicity, religion, education level, and study program. In order to improve comprehension and encourage informed participation, the study identifies current knowledge gaps and stresses the necessity of including thorough climate change education into curriculum at all levels.

Deshiana et al. (2022) examined high school students' climate change aawreness and how they response to its adaptation and mitigation. Using a qualitative research approach, the study involved 611 students from South Sumatra to explore their understanding and perspectives. showed that 98.4% of the students were aware of climate change, and over 80% were aware of its effects, including the rise of vector-borne illnesses like malaria and dengue fever, droughts, floods, and deteriorating water quality. Furthermore, 95.7% of the students showed a favorable attitude toward initiatives to lessen climate change, demonstrating a high degree of concern and a readiness to handle the problem among the younger generation

Mohapatra et al. (2022) aimed to examine the attitudes of pre-service and in-service elementary school teachers towards climate change and to explore differences based on variables such as teaching status, subject, gender, residence, and age, along with the relationship between knowledge and attitude. To achieve this objective, the researchers employed a quantitative approach using a Likert-type five-point attitude scale comprising 30 items across six dimensions, including scienceclimate change's causes, effects, mitigation, national efforts and strategies, and politics. The sample consisted of 462 teachers . The findings revealed that both groups exhibited generally favourable attitudes towards climate change issues, with pre-service teachers showing higher levels of concern compared to in-service

teachers. Dimension-wise, teachers had favourable attitudes towards scientific aspects, causes, impacts, and mitigation, but showed less favourable attitudes towards national initiatives, policies, and political aspects. Differences were observed based on residence, subject, and teaching status, with variations between urban and rural teachers. Additionally, a positive correlation between knowledge and attitude was identified, indicating that increased knowledge leads to greater concern, and age was also found to positively influence concern towards climate change.

Chwialkowska et al, (2020) designed a study on the influence of cultural values on proenvironmental behaviour. The main objective of the research was to develop a theoretical model that explains how specific cultural dimensions moderate the key relationships proposed by the TPB namely, between environmental values, concern, attitudes, intentions, and actual pro-environmental actions.explores the complex relationship between cultural values and proenvironmental behavior, providing a conceptual framework that integrates cultural dimensions into the TPB. The authors therefore identified a research gap in the cross-cultural environmental behavior literature: although global surveys and regional comparisons had revealed differences in environmental attitudes, there was limited understanding of how and why cultural values alter the cognitive and normative processes underpinning sustainable actions. According to TPB, "behavioral intentions are influenced by attitudes toward the behavior, subjective norms, and perceived behavioral control." Using a conceptual modeling approach, the authors identified four key cultural dimensions as significant moderators: collectivism, femininity, uncertainty avoidance, and future orientation. These studies collectively highlight the importance of cultural context in understanding why some societies exhibit stronger environmental actions than others despite similar levels of awareness or education.

Lange and Dewitte (2019) conducted a study on measuring pro environmental behavior: Review and recommendations. The study aims to identifying individual variations in proenvironmental behavior, comprehending the mechanisms behind pro-environmental behavior, and assessing the efficacy of pro-environmental behavior-promoting interventions. The variables are household water, gas, and power use. Numerous tools have been produced as

a result of the interdisciplinary interest in pro-environmental behavior, including domain-general and domain-specific specific self-report measures, outdoor observations made with the assistance of professional observers, informants, or technical tools, to behavioral activities for use in the lab. The wide range of current methods for measuring pro-environmental behavior are covered in this overview, along with their advantages and disadvantages and opportunities for improvement. We draw a number of conclusions from this analysis about the creation, choice, and use of measures in pro-environmental behavior studies. The significance of established and verified measurements for a cumulative science of pro-environmental behavior was emphasized in the study's conclusion.

Magulod (2018) directed a study on "climate change awareness and environmental attitude of College students in one campus of a state University in the Philippines." The overall goal of this study is to evaluate college students' environmental attitudes and awareness of climate change. In particular, (1) ascertain the students' level of climate change awareness; (2) ascertain the students' level of environmental attitude; and (3) ascertain the significant differences in When categorized based on the profile factors of the respondents, climate change awareness, ecological behavior, and environmental attitude. A descriptive correlational research approach was employed. The information utilized in this study came from a survey of 180 undergraduate students at Cagayan State University in Lasam. The validity of the data in this study is confirmed using inferential statistics such as the independent sample t-test and one-way ANOVA. The independent variables in this study were year level, college departments, kind of high school graduation, family monthly income, parents' job, and knowledge of climate change. According to the survey, undergraduate students have a strong environmental attitude and a high level of awareness of climate change. This indicates that the pupils are prepared to take steps to lessen the consequences of climate change. The survey also revealed that pupils' understanding of climate change varied considerably by gender, age, birth order, and parents' level of education. In the meanwhile, respondents' attitudes toward the environment varied according to their age and academic departments. Additionally, there is a strong correlation between respondents' environmental attitudes and their awareness of climate change.

Barreda (2018) carried out a research to determine Partido State University students' understanding of sustainable development and climate change in Camarines Sur, Philippines. The purpose of the study was to ascertain the elements influencing the awareness of young people attending a Philippine public institution. Students from Partido State University (PSU), Camares Sur, Philippines, participated in the study, which used a descriptive survey approach with a 5-Lickert scale instrument. The undergraduate student population provided the data for this study, which was stratified by year level. The calculated weighted mean for all variables under investigation differs between year levels, despite the fact that there was no qualitative variation seen among the respondents. Senior students often have a greater level of awareness than first-year students, according to the calculated weighted mean. For every variable, similar findings were made, i.e., calculated weighted means rise with year level. Furthermore, the things that respondents believe have a substantial impact on their level of awareness have varied depending on the year level. Students in their first year perceived their own experiences. Students in their second, third, and fourth years, on the other hand, believed that government acts and education were significant variables that may affect their consciousness. Based on the calculated weighted averages, the routes of climate change information likewise vary by year level. First and second-year students considered mass media, family, trainings, and seminars to be important information channels; third-year students thought of the internet and social media; and fourth-year students thought of education, mass media, family, trainings, and seminars.

Ogunsola, Araromi, and Adeshina, (2018) investigated Nigerian students' understanding of climate change education utilizing University of Ibadan students as a case study. The study's primary goals are I. Identifying each participant's profile in the climate change awareness campaign. II. Examining pupils' knowledge of climate change. III. Determining if one is sufficiently informed of the potential consequences of climate change. IV. Finding out what the students think about ways to address climate change issues. A descriptive survey was used to assess students' understanding of climate change education for sustainable development in several faculties at the University of Ibadan. In order to collect data, a questionnaire was used. A sample size of 300 University of Ibadan students was selected using a straightforward random selection procedure. The majority of University of Ibadan students are aware of the reasons and penalties of climate change, according to this survey. Yet, this study provided sufficient exposure to climate change awareness among Nigerian university students, even

though it is restricted to University of Ibadan students and cannot be applied to other Nigerian institutions. However, in order to raise awareness, climate change courses must be incorporated into Nigeria's tertiary education curriculum.

Olufemi et al. (2014) sought to determine how climate change education may be included into secondary school students' education in order to increase their understanding and inspire them to take care of the environment. The methodology involved selecting three classes from Kasthurba Gandhi Balika Vidyalaya (KGBV) School, which were randomly assigned for the study, and examining students' awareness across seven grouped areas. The findings revealed that 95% of students identified newspapers as their main source of information, while 97% believed that the climate is changing year by year. About 88% expressed that environmental usage and pollution from heavy industries affect climate change, and 91% recognized human activities as a major cause. However, a significant portion of respondents reported not participating in discussions about climate change at school or at home. Additionally, 76% stated that humans cannot live without animals, 82% identified causes such as deforestation and volcanic eruptions, and 76% pointed to burning fossil fuels as a contributor. The study also highlighted students' understanding of the need for strategies to mitigate climate change.

Wachholz et al. (2014) aims to contribute to a complete knowing of college students' knowledge, attitudes, and participation with climate change, bridging a gap in the existing research that mostly focused on school-age students. To achieve this objective, the researchers employed a survey methodology involving college students from lower- and upper-division courses across different academic disciplines.

The survey focused on three areas: students' attitudes and understanding regarding climate change, their goals to cut their own greenhouse gas emissions, how satisfied they are with the way climate change is now taught, and suggestions for improvement. The findings show that most students believe that human activity is the primary driver of climate change, and many of them are worried about its consequences. Despite this widespread knowledge, a number of false beliefs about the origins and effects of climate change were found. In order to close these gaps and better prepare students to actively participate in mitigation efforts, the study

emphasizes the necessity for higher education institutions to enhance and broaden climate change education.

2.2 CONCLUSION

The review of related literature reveals that climate change awareness has emerged as an important area of research across different countries and educational settings. According to the evaluated research, students' knowledge of climate change, its origins, effects, and potential mitigation strategies is typically modest to high. Researchers such as Aksit (2025), Gara et al. (2025), Yildiz (2025), Sanchez et al. (2024), and Magulod (2018) found that educational interventions, environmental science courses, and project-based learning approaches significantly improve students' understanding and awareness of climate-related issues. Similarly, several studies highlighted that students recognize climate change as a real and serious environmental problem largely caused by human activities.

The literature further demonstrates that climate change awareness is closely associated with attitudes, perceptions, emotional responses, and pro-environmental behavior. Studies conducted by Jindal et al. (2024), Mohapatra et al. (2022), and Chwialkowska et al. (2020) revealed that increased awareness often contributes to greater environmental concern, positive attitudes, and sustainable behavioral intentions. However, many researchers also observed a gap between awareness and actual environmental action, suggesting that knowledge alone may not always lead to consistent environmentally responsible practices. In addition, studies such as Sanchez et al. (2024) and Yildiz (2025) showed that higher awareness levels may also be associated with eco-anxiety and emotional concern about future environmental conditions.

Another major finding from the reviewed literature is that climate change awareness varies according to demographic, educational, social, and cultural factors. Variables such as gender, educational level, place of residence, socio-economic background, academic discipline, and access to information sources were found to influence awareness levels among students.

Several studies emphasized the role of schools, universities, media, internet, and environmental education programs as important sources of climate-related knowledge. Moreover, regional and contextual differences significantly shape students' perceptions and experiences regarding climate change.

Although a considerable number of studies have been conducted globally and nationally, the review indicates limited research focusing specifically on undergraduate students in Western Odisha. Most existing studies concentrate on school students, teachers, or university students in other geographical contexts. Very few studies have examined how the unique climatic experiences and environmental vulnerabilities of Western Odisha influence climate change awareness among undergraduate students. Thus, by examining the degree of climate change knowledge among Western Odisha undergraduate students, the current study aims to fill this research gap. The review of literature thus provides a strong conceptual and empirical foundation for the present study and justifies its relevance and significance in the current environmental context.

2.3 RESEARCH GAP

The review of related literature reveals that climate change awareness has been widely studied in different countries and among various groups such as school students, university students, teachers, and community members. Several studies have focused on students' knowledge, attitudes, perceptions, eco-anxiety, and pro-environmental behavior related to climate change. Researchers have also examined the role of educational programs, project-based learning, media exposure, and socio-demographic factors in shaping climate change awareness. Although these studies provide valuable insights into environmental awareness and education, certain important gaps still remain.

Firstly, most of the existing studies have been conducted in foreign countries or in urban educational settings, while comparatively fewer studies have focused on the Indian context, particularly in eastern India. Despite being extremely vulnerable to climate-related calamities such cyclones, floods, droughts, and heatwaves, very little study has been done in Odisha. Secondly, the majority of previous studies concentrated either on school students or on general university populations without specifically focusing on undergraduate students belonging to different academic streams.

Another significant gap identified in the literature is the lack of region-specific studies. Western Odisha possesses distinct environmental, geographical, and socio-economic characteristics, including agricultural dependence, rising temperatures, irregular rainfall, water scarcity, and rural livelihood vulnerabilities. However, very few studies have attempted to understand how

these local climatic realities influence climate change awareness among undergraduate students of this region.

Further, several studies mainly examined knowledge and attitudes separately, whereas limited attention has been given to understanding awareness in a comprehensive manner that includes students' understanding of causes, effects, mitigation measures, and information sources together. Further research into awareness levels and educational consequences is necessary, as several studies have shown that even when students are aware of climate change, this understanding does not necessarily convert into ecologically responsible conduct.

Moreover, differences in awareness based on variables such as gender, locality, academic discipline, and socio-economic background have produced inconsistent findings across studies. This indicates the necessity for additional empirical research in diverse socio-cultural settings to obtain clearer understanding of these variations.

In order to overcome these research gaps, the current study looks at Western Odisha undergraduate students' knowledge of climate change. The study aims to provide regionspecific empirical evidence that may contribute to the understanding of students' awareness levels and support the development of effective environmental education strategies and policy interventions in higher education institutions.

CHAPTER- III

RESEARCH DESIGN AND METHODOLOGY

3.0 INTRODUCTION

The research is a process in itself which starts from the research proposal and ends with the research report. Meanwhile various steps are involved to get the answer of the question raised in the mind of researcher. These systematic steps formulate the research design. Research methodology is a collection of procedures and techniques that a researcher employs to collect, assess, and interpret data in order to address research questions and accomplish the objectives of the study. It gives the whole research process a defined structure and makes sure that the results are valid, dependable, and scientifically sound. A well thought out research design helps the researcher set up the study in a way that makes sense and get results that are correct and useful.

The purpose of this chapter is to provide a detailed description of the methodology that was followed for the study. This chapter would also provide an idea about the methodology that was adopted to collect data from undergraduate students about their awareness of climate change. This methodology would help other researchers understand this study and even replicate the same study if required.

For this study the research design can be presented as the following consecutive steps:

1. Statement of problems
2. Objectives

3. Hypothesis
4. Construction and standardization of tools
5. Selection of Sample
6. Collection of Data
7. Analysis and interpretation of data
8. Findings conclusion and suggestions

Research methodology is a scientific approach to solve the research problem. It entails all the methods, techniques, and procedures used in the gathering, analysis, and interpretation of data by the researcher. As the methodology gives a clear direction for conducting the research, it forms an integral part of the research work carried out by the researcher. The methodology helps in conducting the research in a scientific, valid, and reliable manner. For the systematic and appropriate investigation, the methodology followed by the researcher can be given under the following headings:

- Methods
- Population
- Sample
- Sampling Techniques
- Description of research tool
- Development and standardization of Questionnaire

3.1 METHOD OF THE STUDY

The method study is the structured way or procedure that the researcher used to do the research in a scientific and organized way. Methodology is concerned with the selection of appropriate techniques to collect, analyse, and interpret data appropriately to achieve the objectives of the research.

3.2 DESCRIPTIVE RESEARCH DESIGN

According to **C.R. Kothari**, "descriptive research design is a research design connected with describing the characteristics of a particular individual or of a group." The current study concentrates on measuring awareness level of climate change among the undergraduate students of Western Odisha and also to find out the significant differences in their climate change awareness with reference to their gender, academic discipline and locality. So, the **descriptive research design** is considered as appropriate.

This study employs the quantitative research methodology in its analysis. The application of such a research methodology will enable the measurement of awareness through the use of quantitative figures. This research methodology will also help in providing an in-depth knowledge of how students perceive climate change.

3.3 POPULATION OF THE STUDY

According to **C.R. Kothari,** population is the aggregate of all units pertaining to a study. It refers to the entire group of individuals, objects, or observations that process common characteristics relevant to the research problem. Population of the study comprises **all the undergraduate students studying in different govt. colleges and Universities of Western Odisha** who have taken admission in different academic sessions like, 2023-26, 2024-27, 2025-28. As the researcher have taken data from different levels of graduation (1^{st} year, 2^{nd} year & 3^{rd} year), due to that reason their academic batches are different. Although exact statistical data is not available, the population of the present study is considered finite and consist all the graduations students enrolled in colleges or Universities in Western Odisha.

3.4 SAMPLE

According to **Garrett** (year) a sample is a smaller group selected from the total population and considered as representative of the whole population. In this present study, data were collected from 10 institutions with different male and female students of different streams

In this study, total **110 samples** taken from various academic discipline such as science and non-science. The sample distribution with demographical variables of the present study, are shown in below table.

Table No. 3.1: Distribution of samples

Sl no.	Name of the institution	Female	Male	Total
1	Gangadhar Meher University, Sambalpur	4	9	13
2	Panchayat College, Bargarh	6	2	8
3	Sambalpur University	9	4	13
4	Barpali College, Barpali	3	6	9
5	Bijepur College, Bijepur	3	9	12
6	Dadhibaman Degree College, Bhatli	5	6	11
7	S.B. Women's Degree College, Kamgaon	10	-	10
8	Larambha College, Larambha	7	3	10
9	Kuchinda College, Kuchinda	4	3	7
10	Dadhibaman College, Bhatli	8	9	17
Total		**60**	**50**	**110**

3.5 SAMPLING TECHNIQUES DISTRIBUTION

Sampling is the selection of some part of a population, on the basis of which a judgement or inference can be drawn for the population. A **sampling technique** therefore refers to the specific method or procedure adopted by the researcher for selecting a representative sample from the population.

Choosing the right sampling method is vital to make sure that the sample accurately represents the population. It is very important for the researcher to employ the correct sampling methodology to ensure that he/she gets the best results from his/her research as well as to ensure that the entire population is represented correctly.

The researcher select the sample through **stratified random sampling technique**. In this sampling the entire population is divided into various strata based on various characteristics such as academic discipline, gender, and locality. From each stratum samples are selected randomly to ensure proper representation.

Table 3.2 Gender wise sample distribution

Gender	total	Percentage
Male	50	54.50%
Female	60	54.50%
Total	**110**	**100%**

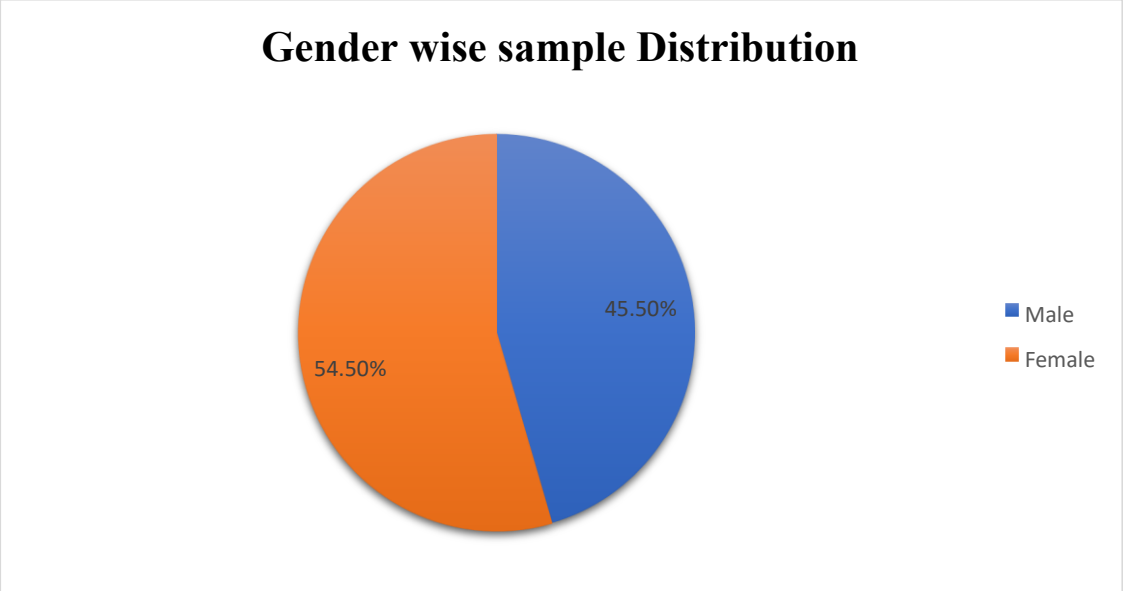

Figure No 3.1: Gender wise sample distribution

The above table No. 3.2 and figure No. 3.1 demonstrates gender wise distribution of the sample selected for the study. Out of the total 110 undergraduate students, 50 respondent (45.55%) are male and 60 (54.5%) are female.

Table No. 3.3 Distribution of Sample based on Academic Discipline

Stream	Total	Percentage
Science	45	40.90%
Non-Science	65	59.10
Total	**110**	**100%**

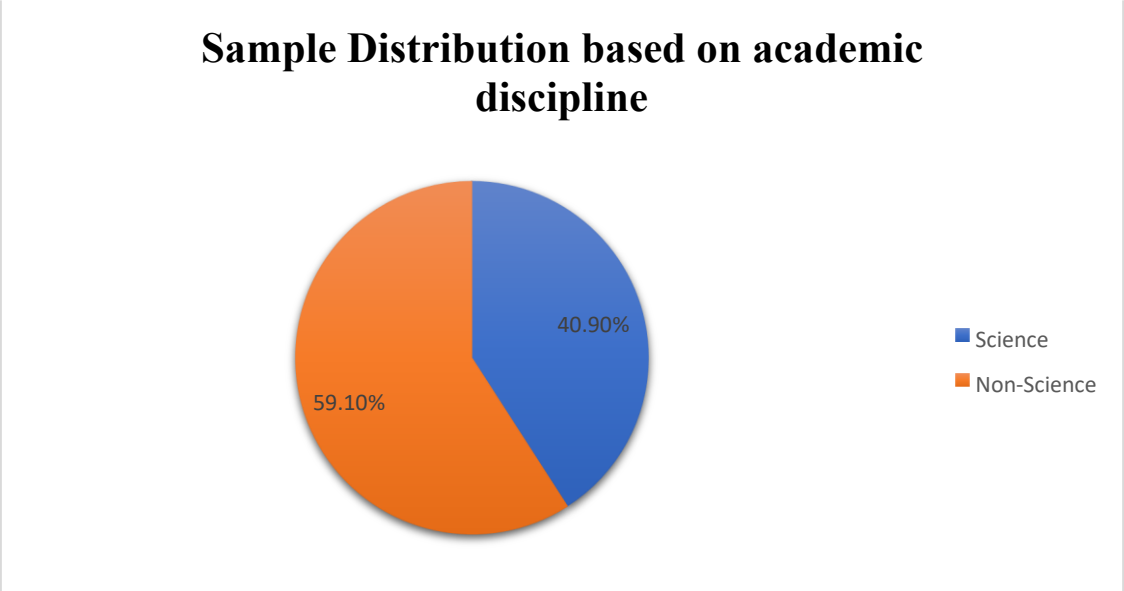

Figure No 3.2: percentage of science and non-science respondents

The above table No. 3.3 and figure No. 3.2 represent the distribution of the participant based on discipline. This indicates that total 110 are the participant out of which 45 students (40.9%) belong to science stream and 65 students (59.1%) belongs to the non-science discipline.

Further this table and figure show that among the Science students, 24 are male and 21 are female. In the non-science stream, 26 respondents are male and 39 are female

Table No. 3.4 Distribution of Sample based on Locality

Locality	Total	Percentage
Rural	44	40.00%
Urban	66	60.00%
Total	110	100%

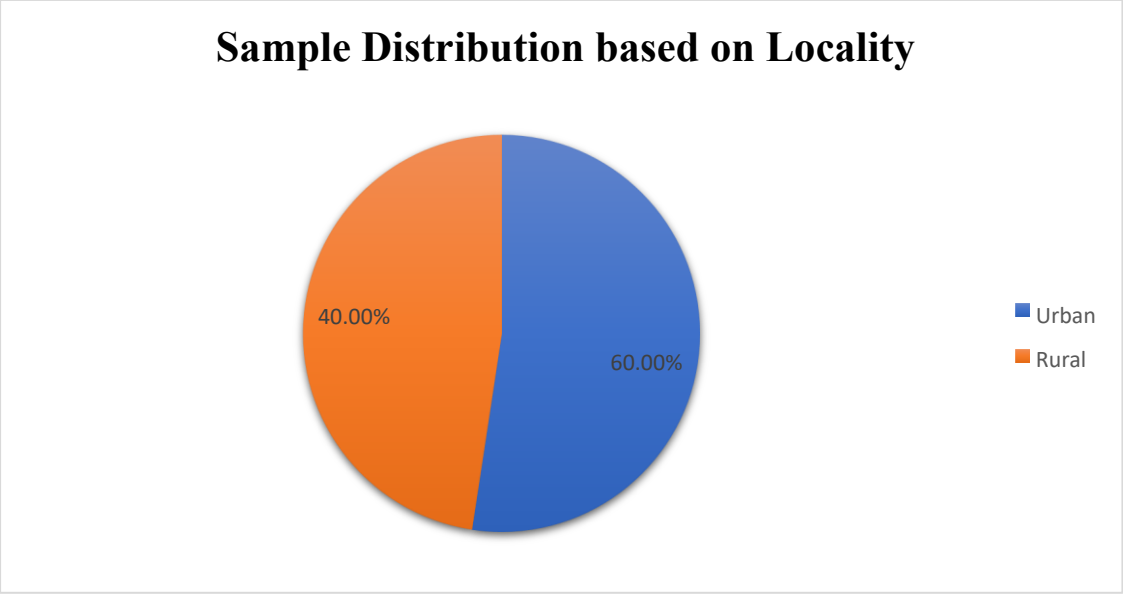

Figure No 3.3: Sample distribution based on locality

Table No. 3.4 and Figure No. 3.3 represents the participant based on the locality. Total 110 numbers of undergraduate students were participated. Out of the total 66 participant (60%) belongs to urban areas, while 44 participant (40%) belongs to rural areas.

The distribution also reveals that among the rural participant, 15 are male and 29 are female. In contrast, among urban participant, 36 are male and 30 are female.

3.6 RESEARCH TOOL

One important factor in the successfully completing any kind of research is suitability of the research tools used to collect data. The researcher used a self-developed structured questionnaire based on the objectives of the research. The questionnaire was meant to measure the awareness level "climate change" of undergraduate students of Western Odisha.

3.6.1 DEVELOPMENT OF TOOL

The researcher used a self-developed tool for this study i.e., climate change awareness questionnaire. The Likert-type scale has five points, ranging from Strongly Agree to Strongly Disagree.

The development the tool was carried out systematically through the following steps:

Review of related literature: Relevant books, research studies, journals, reports, and online resources related climate change awareness were thoroughly reviewed to understand the concept and identity important dimensions.

Identification of Dimension: On the basis of literature review and objectives of the study, major dimensions of climate change awareness were identified, namely general view, changing weather, causes, effects, methods of prevention, and media/ information sources. Each dimension is holding different no. of items. The details of items of each are explained in below table 3.5

Table 3.5: distribution of items for each item

Dimensions	Item	No of items
General View	1,6,12,17,22	5
Changing weather	7,13,23,28,32	5
causes	2,8,14,18,24,29,33	7
effect	3,9,15,19,25,30,34	7
methods	4,10,16,20,26,31,35	7
Media and information sources	5,11,21,27	4
Total items		**35**

In each item positive and negative both type of questions was included. In this questionnaire, item no. 1,11,22, 24, 28, 31, 34 are given as a negative statement.

3.6.2 SCORING PROCEDURE

In the present study, the responses of the participants were measured using a **five-point Likerttype scale** to assess the level of climate change awareness among undergraduate students of western Odisha. Each item in the questionnaire required respondents to indicate their level of agreement with the given statements.

The scoring was done as follows:

- **Strongly Disagree – 1**
- **Disagree – 2**
- **Neutral – 3**
- **Agree – 4**
- **Strongly Agree – 5**

A total of **35 items** were included in the questionnaire. Each response was assigned a score ranging from 1 to 5, depending on the level of agreement. The scores obtained for all items were summed to calculate the overall awareness score of each respondent.

- **Maximum Score:** 175 (35 × 5)
- **Minimum Score:** 35 (35 × 1)

A **higher score** indicates a higher level of climate change awareness, while a **lower score** reflects a lower level of awareness. This scoring procedure helps in quantifying students' familiarity, attitudes, and behaviour associated to climate change in a systematic and measurable way.

Thus, the Likert scale provides a reliable method to examine the extent of climate change awareness UG students and allows for meaningful comparison and statistical analysis.

3.6.3 VALIDITY OF THE TOOL

The degree to which a test measures what it claims to measure is referred to as validity, according to Garrett (2008). It shows how well an instrument measures the desired characteristic or trait and how accurate, suitable, and helpful it is.

The current tool's essential validities were established. The investigator used factor analysis for construct validity and experts for content validity to confirm the tool's validity. Whether a theoretical construct measures the things it is supposed to measure is known as construct validity.

Experts in environmental studies and education evaluated the questionnaire to determine its validity. They evaluated the items' clarity, applicability, and sufficiency in addressing many aspects, including general awareness, shifting weather patterns, causes, effects, preventative strategies, and bases of information about climate change.

The essential changes were made to enhance the instrument's quality and accuracy based on the experts' recommendations and comments. As a result, the instrument was determined to be reliable and appropriate for gauging undergraduate students' awareness of climate change.

Revision of Items: Necessary modifications were made by deleting, adding items according to the suggestions received from experts.

3.6.4 RELIABILITY OF THE TOOL

Garrett (2008) defines reliability as a test's capacity to consistently produce the same results after multiple administrations. It shows how reliable, accurate, and stable a measuring device is.

A pilot test of the questionnaire's reliability was carried out in the current study using a small sample of 32 undergraduate students who were excluded from the final sample. The **Cronbach's alpha** value was calculated to determine the internal consistency of the tool.

The Cronbach's alpha value of the questionnaire was found to be 0.9. This value indicates that the tool is reliable and suitable for the collection of data for the present study

Finalization of the Tool: Based on pilot study results and items analysis, the final form of the climate change awareness scale was prepared for data collection.

3.6.5 DATA COLLECTION PROCEDURE

The data were collected through Google Forms. The questionnaire was converted into an online form and the link was shared with the selected UG students of different universities and degree colleges of Western Odisha through appropriate digital platforms. The purpose of the study and instructions for filling the form were clearly mentioned at the beginning of the questionnaire. The respondents were requested to provide honest and independent responses. Adequate time was given for submitting the form. After receiving the responses, the collected data were downloaded, checked for completeness and organized systematically for scoring, tabulation, and further statistical analysis.

The inclusion of these sections ensured a comprehensive assessment of both the knowledge and perception of students regarding climate change.

3.7 STATISTICAL TECHNIQUE

According to **Garrett, H.E. (2008)** "statistical techniques are the methods or procedures used for collecting, classifying, presenting, analyzing, and interpreting numerical data in order to draw meaningful conclusions". These techniques help the researcher to organize data systematically and make accurate decisions based on the result.

After the collection of data, the responses were scored and tabulated systematically. Appropriate statistical techniques were used for analyzing the data in accordance with the objectives and hypotheses of the study. The degree of climate change knowledge among Western Odisha's UG students was assessed using descriptive statistics including mean, median, standard deviation, and percentage. The significance of differences in climate change awareness with regard to characteristics including gender, academic discipline, and area was determined using inferential statistics, specifically the t-test. The obtained result were interpreted at the appropriate level of significance.

3.7.1 DESCRIPTIVE STATISTICS

Descriptive statistics were used in the present study to summarize and describe the data related to the climate change awareness of UG students. Techniques such as **Mean and Standardized Deviation** was used to classify students according to different levels of CCA such as low,

moderate, and high. These statistical measures helped in presenting a clear picture of the overall CCA of UG students and in interpreting the collected data meaningfully.

3.7.2 MEAN

Garrett states that the arithmetic mean is calculated by dividing the total number of scores by the sum of the scores. It represents the average value of a distribution and is one of the most widely used measures of central tendency. The average CCA score among UG students in the current study was calculated using the mean. Higher awareness was indicated by a higher mean score, whereas lesser awareness was indicated by a lower mean score.

3.7.3 STANDARD DEVIATION

According to Garrett (2008), standard deviation is a measure of variability which indicates how much the individual scores of a distribution differ from the mean. It is one of the most widely used measures of dispersions.

In the present study, standard deviation was used to determine the extent of variation in climate change awareness scores of UG studentsThe scores were closely concentrated around the mean when the standard deviation was low, but a high standard indicated greater variation in the awareness scores. Thus, it helped in understanding the consistency and spread of students' climate change awareness levels.

3.7.4 INFERENTIAL STATISTICS

According to Garrett (2008), inferential statistics are statistical techniques used to derive conclusions, forecasts, or test hypotheses for a population based on sample data. It helps the researcher ascertain if the observed relationships or differences are statistically significant or the result of chance.

t-test: According to **C.R. Kothari,** the **t-test** is a statistical technique which is used to determine the significant difference between the means of two groups. It is commonly applied when the sample size is small or when population parameters are unknown.

The t-test was used in the present study because the investigator intended to compare the mean climate change awareness scores of two independent groups, such as male and female students, urban and rural students, and science and non-science students. It helped to identify whether The groups' mean score differences were either statistically significant or the result of pure

chance. Consequently, it was determined that the t-test was suitable for evaluating the study's null hypotheses.

Chapter - IV
Analysis and Interpretation

4.0 INTRODUCTION

The previous chapter provided a detailed explanation of the methodology employed for this investigation. To find the answers to the study questions, analysis entails classifying, organizing, modifying, and summarizing the data. In order to interpret the outcome, this method involves dissecting the current complicated elements into simpler components and rearranging the components.

The objective of analysis is to make the data understandable and interpretable so that the linkages between the research topics may be examined and tested. However, the solution to the research question cannot be found alone through the analysis of research data. Interpretation draws judgments about the research relationships examined and draws inferences relevant to the analysis's findings. The researcher examines the research findings to determine their significance and implications. The data tabulation, analysis, and interpretations are covered in this chapter.

Methodology used for this study has been given detail in the previous chapter. Statistical techniques for analysis were also mentioned there. Result obtained from data analysis and then interpretation has given in this chapter.

In the present chapter, the collected data have been analyzed systematically in accordance with the objectives and hypotheses of the study. Appropriate statistical techniques such as Mean, Standard Deviation, Percentage, t-test have been employed to present the findings in a clear and scientific manner. The data have been organized into tables for easy understanding and meaningful interpretation. Each table is followed by a detailed explanation to highlight the major findings emerging from the analysis.

The interpretation of data is an important step in research because it helps the investigator to understand the significance of the obtained to the problem under investigation. It enables the researcher to compare the results with previous studies, identify patterns and trends and draw valid inferences.

The present chapter mainly focuses on analyzing the level of climate change awareness among undergraduate students and examining whether significant differences exist with respect to selected variables such gender, locality, caste, stream, and type of school. The findings obtained through statistical analysis are presented objective-wise and hypothesis-wise. Thus this chapter provides a clear picture of the research findings and serves as the basis for discussion, conclusions, and educational implications presented in the subsequent chapter.

4.1 DESCRIPTION OF THE DATA

The description of the data is shown in the table below

Table: 4.1: Description of data

Descriptives

	Total score of awareness
N	110
Missing	0
Mean	139
Median	136
Mode	126
Standard deviation	17.2
Minimum	104
Maximum	171
Skewness	0.180
Std. error skewness	0.230

The descriptive statistics of Table 4.1 the total climate change scores obtained from the undergraduate students of Western Odisha. A total 110 respondents were included in the

analysis, and no data were found missing, which indicates that all questionnaires were properly completed and considered suitable for statistical analysis. The absence of missing values enhances the reliability and completeness of the dataset.

The **mean score** of the respondents was found to be **139**, which represents the average degree of student awareness of climate change. This suggests that respondents' awareness of climate change problems is generally adequate. 136 was the median score which means that half of the respondent scored below 136 and other half scored above this value. The closeness between the mean (139) and median (136) suggest that the distribution of scores is fairly balanced without any major distortion.

The **mode score** was **126**, indicating that this was the most frequently occurring score among the respondents. Since the mode is slightly lower than the mean, it may be inferred that a considerable number of students scored around the moderate awareness range, while many others scored higher, thereby increasing the average score.

The **standard deviation** of the scores was **17.2**, which reflects the spread or variability of the respondents' awareness scores around the mean. This moderate value indicates that while students differ in their levels of awareness, the variation is not excessively high. In other words, most students' scores are reasonably clustered around the average score.

The **minimum score** obtained was **104**, whereas the **maximum score** was **171**. Thus, the total range of scores was **67**, showing the difference between the highest and lowest obtained scores. This suggests that although awareness levels vary among students, the scores remain within a manageable spread.

The **skewness value** of **0.108** indicates a slight positive skewness in the distribution. Since the value is close to zero, it can be concluded that the distribution is approximately normal. The standard error of skewness was **0.230**, which further supports the view that the scores do not deviate substantially from normality.

4.2 ANALYSIS OF OBJECTIVE 1

Objective 1 is **to assess the awareness level of climate change among undergraduate students of Western Odisha.**

For analysis this objective, percentage analysis is done for the frequencies of levels of awareness of the students. The collected data were categorized by using the formula M ± SD. The analysis is shown in the table below.

Table: 4.2 Climate change awareness levels of UG students

	LEVEL	N	Missing	Mean	Median	SD	Minimum	Maximum
Mean Score	Moderate	39	0	3.47	3.51	0.191	2.97	3.66
	High	71	0	4.25	4.26	0.373	3.69	4.89

The objective 1 of the study, is to assess the climate change awareness level among the UG students of Western Odisha, indicate the presence of two distinct groups: moderate and high awareness. Out of the total sample, **39** students fall under the **moderate awareness category**, while a larger proportion, **71** students, belong to the **high awareness group**, suggesting that most respondents demonstrate a higher level of awareness regarding climate change.

In the **moderate awareness group**, the average score is **3.47,** and the median is **3.51**, which are quite close to each other. The low standard deviation **0.191** shows that most students' responses are very similar and grouped closely around the average, indicating a good level of consistency within this group. Additionally, the scores range from **2.97 to 3.66**, which reflects only a small variation, meaning that students in this category have relatively similar levels of awareness.

In the **high awareness group**, the average score is **4.25** and the median is **4.26**, which are very close to each other. This shows that scores are fairly balanced and evenly distributed. The

standard deviation **(0.373)** is a bit higher than that of the moderate group, suggesting that there is slightly more variation in how students scored. The scores range from **3.69 to 4.89**, indicating that although most students have a **high level of awareness**, their understanding still differs to some extent within the group.

To obtain a clear interpretation of the results, the researcher classified the respondents' climate change awareness scores into different levels by using the formula **Mean ± Standard Deviation**. The obtained **Mean score** was **139**, and the **Standard Deviation** was **17.2**. Based on this criterion, scores **above 156.2** (139 + 17.2) were considered as **high level**, scores ranging between **121.8 and 156.2** were considered as **moderate level**, and scores **below 121.8** (139 – 17.2) were categorized as **low level**. Analysis of the data indicated that none of the respondents fell under the low level category. The respondents were found only in the **moderate** and **high** levels of climate change awareness, indicating a satisfactory level of awareness among senior secondary school students.

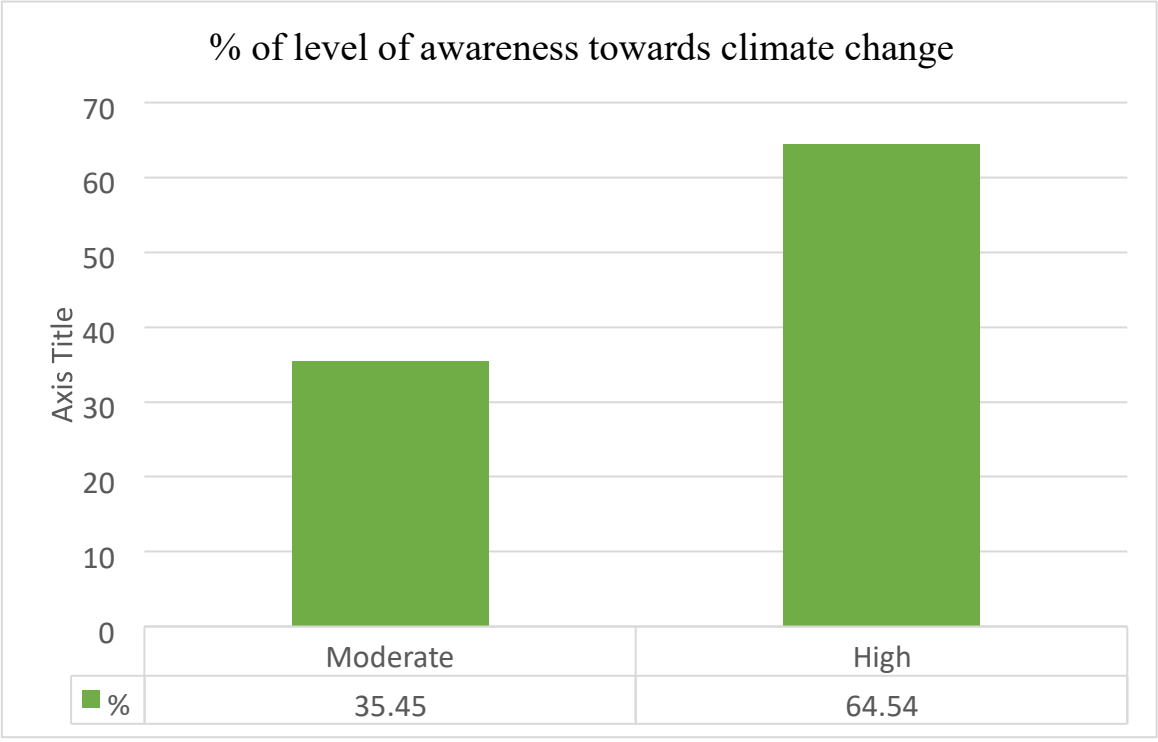

Figure 4.1: percentage of awareness level of respondents

Figure 4.1 presents the percentage dispersal of undergraduate students according to their level of awareness towards climate change. The figure clearly indicates that the respondents are distributed into two categories only, namely **moderate awareness** and **high awareness**, while no students was found in the low awareness category. This itself is a positive indication that all

respondents possess at least a basic level of understanding regarding climate change and its related issues.

It is evident from the figure that the majority of the students, according for **64.54%,** fall under the **high awareness** category. This means that nearly two-thirds of the respondents demonstrate a strong level of familiarity and understanding regarding climate change, including its reasons, effects, and possible preventive measures. Such a high proportion may be attributed to increasing public concern about environmental problems, educational exposure, access to digital media and regular discussion on climate-related issues in society. It also reflects that many students are becoming more conscious of environmental sustainability and global ecological challenges.

On the other hand, **35.45%** of the students belong to the **moderate awareness** category. This shows that more than one-third of the participants have a fair awareness level about climate change. These students may possess general information regarding the issue, but their understanding may not be as deep or comprehensive as those in the high awareness category.

The difference between the two categories also indicates indicates there are much more kids with high awareness than those with moderate awareness. This suggests a favourable trend among undergraduate students, as a larger segment of the student's population is well informed about one of the most pressing global issues of the present time. Since no respondents fall in low awareness category, it can be inferred that climate change awareness has reached a satisfactory level among the students of Western Odisha.

Overall, the figure reveals that undergraduate students possess a generally positive and encouraging awareness level towards climate change. The dominance of the high awareness group reflects the success of educational institutions, media sources and public discourse in spreading knowledge regarding environmental concerns. However, the presence of a moderate awareness group also highlights the need for continuous efforts to transform moderate awareness into high awareness through systematic educational interventions.

4.3 ANALYSIS OF OBJECTIVE 2

To determine if Western Odisha undergraduate students' knowledge of climate change differs significantly according on their gender, academic field, and place of residence.

For achieving this objective three different null hypotheses are framed and analysed separately.

4.3.1 ANALYSIS OF HYPOTHESIS 1

Ho1: There is no significant difference between the mean scores of climate change Awareness among Western Odisha UG students with respect to their gender.

Table No. 4.3: Gender- wise comparison in climate change awareness

Variables	Category	number	Mean	SD	df	T avlue	p-value	Result
Gender	Male	50	137	17.6	108	0.849	0.398	NS
	Female	60	140	16.9				

H_a $\mu_1 \neq \mu_2$, critical value foe df = 108 at 0.05 level of significance = 1.96

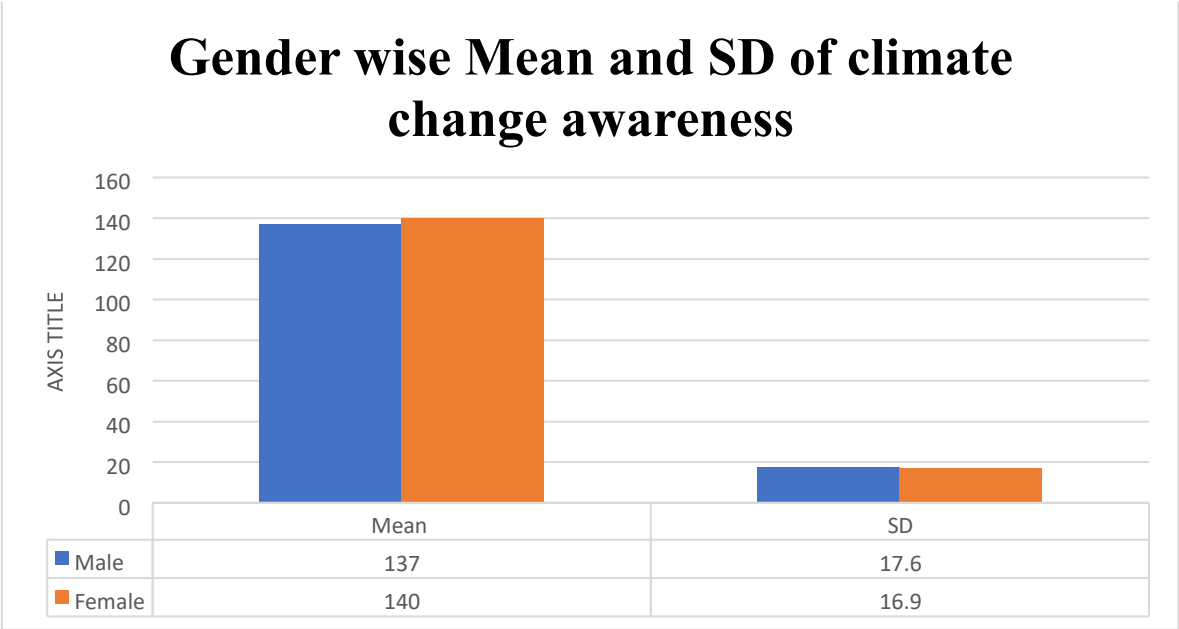

Figure 4.2: Gender wise Mean and SD of climate change awareness

Table 4.3 and Figure 4.2 present the comparison of climate change awareness scores of male and female undergraduate students of Western Odisha. The purpose of this analysis was to examine whether any significant difference exists between male and female students with respects to their level of climate change awareness. For this purpose, the independent samples **t-test** was employed.

It is evident from the table that the mean score of male students is 137, whereas the mean score of female students is 140. This indicates that female students scored slightly higher than male students in climate change awareness. However, the difference in mean scores is very small and does not indicate any substantial variation between the two groups. Both the male and female students appear to possess nearly similar levels of awareness regarding climate change.

The standard deviation of male students **17.6**, while that of female students is **16.9**. This shows that the awareness scores of both groups are moderately dispersed around their respective means. The slightly lower standard deviation among female students suggests that their scores are somewhat more consistent when compared to male students. Nevertheless, the variation within the both groups remains fairly similar.

Further,At the 0.05 level of significance for 108 degrees of freedom, the computed t-value of 0.849 is less than the critical/tabulated value of 1.96. The difference between the mean scores of male and female students is not statistically significant since the computed t-value does not surpass the critical threshold. As a result, the null hypothesis—which claims that there is no discernible difference between male and female undergraduate students' understanding of climate change—is accepted. Furthermore, the computed p-value of 0.398 above the significance level of 0.05. This further demonstrates that the observed difference between male and female pupils is not statistically significant and was only the result of chance

. **Thus, gender does not appear to have a significant on climate change awareness among the respondents**.

Figure 4.2 also supports the statistical findings by visually presenting the mean and standard deviation scores of male and female students. The bars representing the mean scores of both groups are very close to each other, with **female students showing only a marginally higher score.** Similarly, the bars representing standard deviation indicate nearly equal variability in both groups. The graphical representation therefore reinforces the conclusion drawn from **ttest analysis.**

The findings imply that awareness regarding climate change has become common among both male and female students. This may be due to equal access to educational opportunities, social media, internet resources, environmental campaigns, and academic discussions related to climate issues. In the present era, climate change is a widely discussed global concern, and information regarding it is accessible to all students irrespective of gender.

4.3.2 ANALYSIS OF HYPOTHESIS 2

Ho2: There is no significant difference between the mean scores of climate change Awareness among Western Odisha UG students with respect to their academic discipline.

Table 4.4: Academic-discipline wise comparison in climate change awareness

Variables	Category	number	Mean	SD	SE	df	Tvalue	pvalue	Result
Academic Discipline	Science	45	138	19.5	2.90	108	0.487	0.627	NS
	Non-Science	65	140	15.6	1.93				

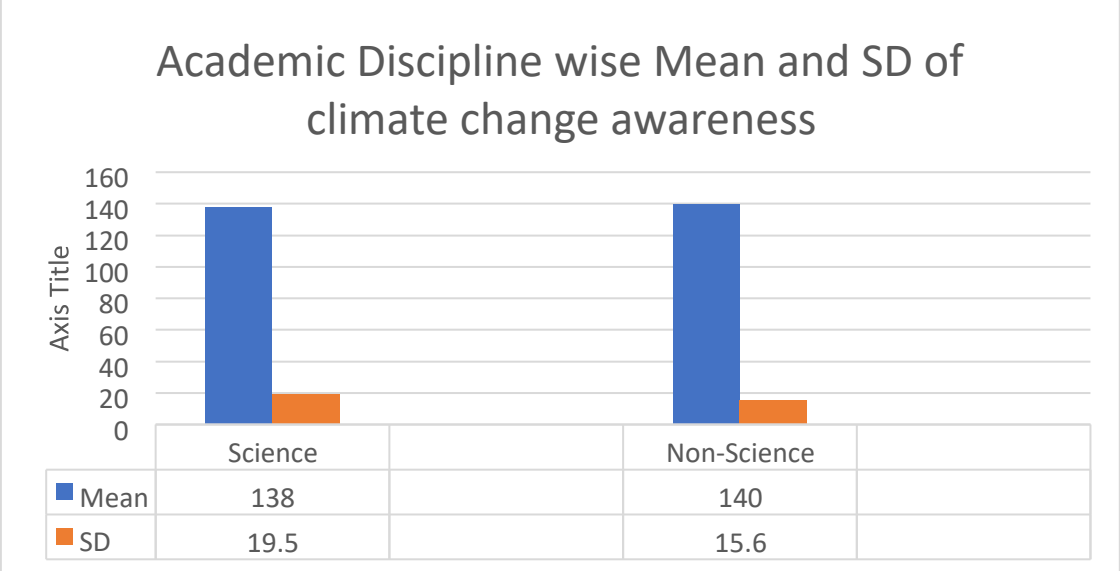

Figure No. 4.3: Academic Discipline wise Mean and SD of climate change awareness

Table 4.4 and Figure 4.3 present the comparison of climate change awareness scores of undergraduate students of Western Odisha with respect to their **academic discipline**, namely Science and Non-Science streams. The purpose of this analysis was to determine whether

students belonging to different academic backgrounds differ significantly in their level of climate change awareness. For this purpose, the independent samples **t-test** was employed.

The chart makes it clear that, of the 110 pupils in the sample, 45 are in the science stream and 65 are in the non-science stream. The average score for scientific students was 138, whereas the average score for non-science students was 140**.** However, the difference between the two mean scores is very small and does not indicate any substantial variation in awareness levels. Both the groups appear to possess almost similar levels of understanding regarding climate change.

The **standard deviation** of science was **19.5**, while the standard deviation of non-science students was **15.6.** This shows that the awareness scores of science students are more widely spread around the mean as compared to non-science students. In other words, there is comparatively greater variation in the awareness levels of science students, whereas the scores of non-sciences are relatively more consistent and clustered around the mean.

The **standard error** for science students was **2.90**, whereas for non-science it was **1.93**. This indicates that the sample mean of non-science students is estimated with slightly greater precision than that of science students, which may be due to the larger sample size of the nonscience group.

Additionally, at the 0.05 level of significance for 108 degrees of freedom, the resultant t-value of 0.487 is less than the critical/tabulated value of 1.96. The difference between the mean scores of science and non-science students is not statistically significant since the computed t-value is less than the necessary critical value. Therefore, the null hypothesis, which claims that undergraduate students' knowledge of climate change is not significantly different depending on their academic subject, is not rejected.

Moreover, the **p-value** obtained was **0.627**, which is greater than the **significance level of 0.05**. This further confirms that the observed difference in mean scored is not statistically meaningful and have occurred due to chance factors rather than any real difference between the two groups. Hence, academic discipline does not appear to have a significant influence on climate change awareness among the respondents.

Figure 4.3 also supports these finding by visually presenting the mean and standard deviation scores of both groups. The bars representing the mean scores of Sciences and Non-Science are very close to each other, showing only a marginal difference. Likewise, the bars for standard

deviation indicate somewhat greater variability among science students than among nonscience students. However, these differences are not large enough to establish statistical significance.

4.3.3 ANALYSIS OF HYPOTHESIS 3

Ho3: There is no significant difference between the mean scores of climate change Awareness among Western Odisha UG students with respect to their locality.

Table 4.5: ***Locality wise comparison in climate change awareness***

Variables	Category	number	Mean	SD	SE	df	t-value	pvalue	Result
Locality	Urban	66	140	18.0	2.21	108	1.01	0.314	NS
	Rural	44	137	16.0	2.41				

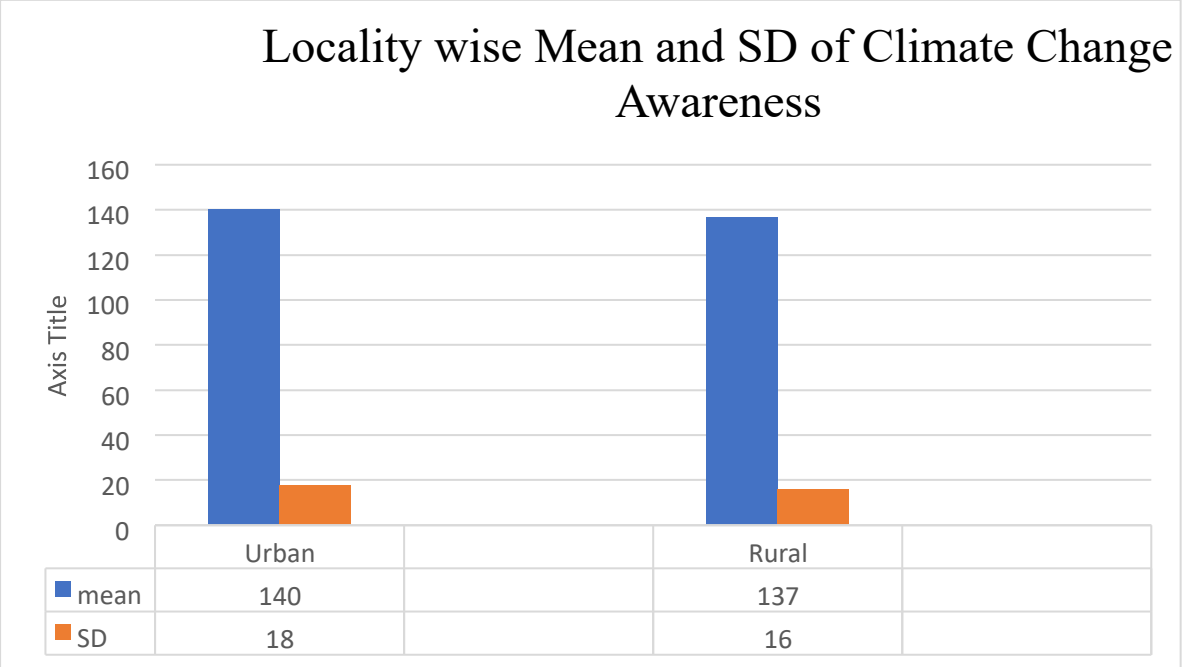

Figure No. 4.4: Locality wise Mean and SD of Climate Change Awareness

Table 4.5 and Figure 4.4 present the comparison of climate change awareness scores of undergraduate students of Western Odisha with respect to their locality, namely Urban and Rural areas. The purpose of this analysis was to examine whether students belonging to

different residential backgrounds differ significantly in their level of climate change awareness. It is evident from the table that out of the total sample of 110 students, **66** students belonged to Urban areas and **44** students belonged to Rural areas. The mean score of urban students was found to be 140, whereas the mean score of rural students was 137. Both the groups appear to possess almost similar levels of understanding regarding climate change.

The **standard deviation** of urban students was **18.0,** while that of rural students was **16.0.** This shows that the awareness scores of Urban students are somewhat more dispersed around the mean compared to rural students. In other words, there is slightly greater variability among urban students, whereas the scores of rural students are relatively more consistent and clustered around their mean score. However, the difference in variability is not large.

The **standard error** for urban students was **2.21**, while for rural students it was **2.41**. This indicates that the sample means of both groups are estimated with nearly equal precision. The small difference in standard error may be due to variation in sample size and score dispersion between the two groups.

Further, At the 0.05 threshold of significance for 108 degrees of freedom, the computed t-value of 1.01 was lower than the tabulated value of "t" (1.96). The difference between the mean scores of urban and rural pupils is not statistically significant since the computed t-value is less than the necessary critical value. As a result, the null hypothesis, which claims that undergraduate students' knowledge of climate change is not significantly different depending on their location, is not rejected.

Figure 4.4 provides a graphical representation of these findings. The bars representing the mean scores of urban and rural students are very close to each other, indicating only a marginal difference in awareness levels. Similarly, the bars representing standard deviation show only a slight difference in variability between the two groups. The figure therefore supports the statistical results obtained through the t-test.

Hence, it can be concluded that **locality does not significantly influence the climate change awareness levels of undergraduate students in Western Odisha.**

4.4 Discussion:

The findings of the present study indicate that undergraduate students of Western Odis-ha possess a generally high level of climate change awareness, with the majority falling in the high

awareness category. This suggests that students are reasonably informed about climaterelated issues, which may be attributed to increased exposure through education, media, and public discourse. However, the presence of a moderate awareness group indicates that there is still scope for further strengthening understanding among certain students.

The study also revealed that variables such as academic discipline (Science and Non-Science) and locality (Urban and Rural) do not significantly influence the level of climate awareness. Although minor differences in mean scores were observed, these differences were not statistically significant. This implies that awareness of climate change has become widespread and is not limited to specific academic backgrounds or geographical locations. Such a findings the growing universality of environmental concerns across different sections of students.

CHAPTER – V

SUMMARY, CONCLUSIONS AND SUGGESTIONS

5.0 INTRODUCTION

This chapter marks the conclusion of this study and is vital for bringing together all aspects of the research study into an organized whole. Whereas the earlier chapters focused on building up a theoretical foundation, literature review, research methodology, and data analysis, this chapter will take it a step further by interpreting the findings of the entire study. Climate change today is perceived as one of the most serious challenges to humanity. Not only does climate change threaten the environment, but it also endangers the economy, health, and sustainable development. In this context, youth climate change awareness turns into a topic of special importance. The reason is that the youth will take positions of decision-makers and educators in the future. Therefore, it would be interesting to see how climate change awareness differs from person to person, especially regarding college students. This study was conducted in order to determine the degree of climate change awareness among undergraduate students of Western Odisha and whether any significant differences are evident in relation to the following independent variables: gender, major, and location. The results of this study will help us get a better understanding of the current situation regarding climate change awareness. It is for this reason that this chapter will endeavor to offer a detailed summary of the whole study followed by a brief explanation of the major results. Conclusions will then be drawn from the findings as well as an analysis of their significance in the education field. Moreover, this chapter will recommend measures that can help raise the level of awareness about climate change. In addition to that, the chapter highlights the limitations faced in the course of conducting the

study, and this is important since it contributes towards understanding how the results need to be considered in context. Additionally, there are new areas that have been opened up for further research as well.

In general, this chapter serves as a connecting factor between the results generated by research and their implementation in practice. Not only will this chapter serve to point out the results which have been derived through research, but it will also emphasize the importance of these results in the context of larger problems like environmental education and sustainable development, thus enabling the identification of the necessity of taking action regarding the problem of climate change.

5.1 BACKGROUND OF THE PROBLEM

One of the most important issues facing the globe today is climate change, which has an impact on social, economic, and environmental systems all across the world. Rising temperatures, erratic rainfall patterns, droughts, and extreme weather events have all had a major influence on human lives in recent decades, especially in susceptible areas like Western Odisha. Climate fluctuation causes severe environmental stress in this area, which is known for its agrarian reliance and socioeconomic vulnerability. Undergraduate students' understanding becomes crucial in this situation because they will be the future instructors, decision-makers, and responsible citizens. Developing successful instructional initiatives and encouraging sustainable practices requires an understanding of their awareness, attitudes, and beliefs regarding climate change.

5.2 STATEMENT OF THE PROBLEM

The present study is entitled: **"A study on climate change awareness among Undergraduate students of Western Odisha."**

5.3 OBJECTIVE OF THE STUDY

1. To assess the awareness level of climate change among undergraduate students of Western Odisha.

2. To find out the significant difference in climate change awareness level with reference to gender, academic discipline and locality of Western Odisha undergraduate students.

5.4 HYPOTHESIS

Ho1: There is no significant difference between the mean scores of climate change Awareness among Western Odisha UG students with respect to their gender.

Ho2: There is no significant difference between the mean scores of climate change Awareness among Western Odisha UG students with respect to their academic discipline

Ho3: There is no significant difference between the mean scores of climate change Awareness among Western Odisha UG students with respect to their locality

5.5 METHODS OF THE STUDY

The present study adopted a **descriptive research design.** This method was considered appropriate a it helps in describing and analyzing the existing level of climate change awareness among undergraduate students.

A quantitative was also used to gather both quantitative and qualitative data, providing a comprehensive understanding of students' awareness and perceptions.

5.6 POPULATION OF THE STUDY

The population of the study considered of all undergraduate students studying in government colleges and universities of Western Odisha across different academic sessions.

5.7 SAMPLE/ PARTICIPANT

A total of 110 undergraduate students were selected as the sample for the present study. The samples were selected from 10 higher education institutions in Western Odisha.

5.8 SAMPLING TECHNIQUE

The study primarily used **stratified random sampling** to ensure representation across different groups such as gender, discipline, and locality.

5.9 DELIMITATIONS OF THE STUDY

The study was delimited in the following ways:

- Geographically limited to selected districts of Western Odisha.
- Focused only on undergraduate students
- Considered only selected variables (gender, discipline, locality)

5.10 DESCRIPTION OF THE RESEARCH INSTRUMENTS / TOOLS

A self-developed Climate Change Awareness Questionnaire was used as the primary tool for data collection. It consisted of closed-ended questions based on a 5-point Likert scale covered dimension such as: General awareness, Changing weather patterns, Causes and effects, Preventive measures, Information Sources.

Validity: Validity was established through expert review
Reliability: Cronbach's Alpha = 0.9, indicating high reliability

5.11 PROCEDURE FOR DATA COLLECTION

Data were collected using an online google form. The questionnaire link was shared with selected undergraduate students from various colleges and universities. Participants were informed about; purpose of the study, instruction for response, confidentiality of data. The responses were collected, organized, and prepared for analysis.

5.12 STATISTICAL TECHNIQUE USED FOR ANALYSIS

Both descriptive and inferential statistical methods were applied to the data analysis in this study. Students' awareness of climate change was summarized and described using descriptive statistics including mean, median, standard deviation, and percentage. Significant variations in awareness between groups according to gender, academic discipline, and location were examined using inferential statistics, particularly the t-test.

5.13 MAJOR FINDINGS

Based on the analysis and interpretation of data, the following key findings were obtained.

Overall level of climate change awareness: One of the most important findings of the study is that undergraduate students of Western Odisha generally possess a medium to high level of awareness regarding climate change. The data clearly indicate that; a majority of the respondents (64.54%) fall under the high awareness category. The remaining (35.45%) fall under the moderate awareness category. Especially, no students were found in the low awareness category. This finding reflects a positive and encouraging trend, suggesting that climate change has become a widely recognized issue among students. The absence of respondents in the low awareness category indicates that at least a basic level of understanding in present among all participants.

Findings related to gender: male and female UG students are having similar awareness level of **climate change. This may be because all the students are studying Environmental studies in their curriculum and all the students are getting aware about the climate change. Kumar, Tiwari and Bhardwaj, (2023)** carried a study on to find out the significance difference between male and female among senior secondary school students of district Hamirpur Himachal Pradesh of climate change awareness by employing t-Test. The researchers also found the similar result. It is also found that **female students showing marginally higher awareness level. This may be due to their more consciousness towards climate change.**

Findings related to academic discipline: Another important objectives of the study was to determine whether students from different academic backgrounds (Science and Non-Science) differ in their level of climate change awareness. Here, it clearly indicates that academic discipline does not significantly influence climate change awareness. As environmental studies is a compulsory paper for all disciplines, so all are equally are about climate change.

Findings related to locality: the study conclude that although the students are coming from different types of locality but it do not now show any difference in their awareness level. It may be due to the incorporation of EVS subject in the educational curriculum. The results also indicates that; urban students had a slightly higher mean score (140) compared to rural students (137). This may be they got more exposure regarding climate change. Another reason may be they got better education regarding protecting environment.

When all findings are considered together, a clear pattern emerges: Climate change awareness among undergraduate students is generally high. Difference based on gender, academic discipline and locality are minimal. Awareness appears to be widely distributed and not restricted to any specific group.

5.14 EDUCATIONAL IMPLICATIONS

The study's conclusions have several significant educational implications.

Experiential learning: Institutions should promote field-based learning, projects, and sustainability initiatives.

Awareness program: Workshops, seminars, and awareness campaigns should be organized regularly. Specially in rural areas.

Bridging knowledge action gap: Efforts should be made to convert awareness into actual environmentally responsible behaviour.

Use of digital media: Reliable and scientific information should be promoted through digital platforms so that more awareness can be spreaded.

Teacher training: Educators should be trained to effectively teach climate-related topics.

5.15 SUGGESTIONS FOR FUTURE RESEARCH:

Similar studies can be conducted in other regions to enable comparative analysis and gain a broader understanding of climate change awareness among students. Future research may also consider using larger sample sizes to enhance the generalizability of the findings. In addition, upcoming studies can focus more on behavioral changes rather than limiting themselves only to awareness levels. Longitudinal research designs may be adopted to examine changes in awareness and attitudes over time. Further, researchers can include additional variables such as socio-economic status, educational background, and access to media to provide a more comprehensive analysis. Experimental studies may also be conducted to evaluate the effectiveness of climate change education programs in improving students' awareness and promoting sustainable behavior.

5.16 CONCLUSION

The current study purpose to examine the degree of awareness about climate change among students pursuing their under graduation at Western Odisha. It also tries to analyze whether there is any significant difference in terms of gender, discipline, and region concerning awareness about climate change. Several important conclusions can be drawn from the analyzed and interpreted data. Apart from many important findings that resulted from the research performed, one should highlight the very high level of awareness related to climate change among undergraduate students from Western Odisha. It should be pointed out that this issue is evident since students are among those people who have a high level of awareness concerning the problem mentioned above. Moreover, not a single respondent turned out to be less aware of the issue under investigation. One other notable finding that stems from the study is the idea that awareness of climate change does not discriminate between various categories of students. It was observed that factors such as sex, field of study, and place of residence make no difference in terms of statistical significance for awareness levels. This may indicate an increase in the accessibility of information regarding climate change among all sectors. Regardless of whether the student comes from a scientific or non-scientific background, is living in an urban or rural setting, or is of male or female gender, the level of awareness remains relatively equal. Also, from the results presented, it is clear that formal education alone cannot be considered as the only aspect that makes people become aware of climatic change. There is certainly a crucial role played by formal educational institutions in this regard; but it must be known that students' awareness is achieved from several different sources, including social media, news, discussion with peers, among others. If students are residing in a place that experiences environmental problems like drought, heat, water shortages, and many more, then they gain awareness about climatic changes even through life experience. Nevertheless, one of the significant conclusions drawn from the research is that the possession of knowledge is not enough to ensure action. Even though students show a decent level of awareness and comprehension, this cannot be said for sure when it comes to adopting sustainable practices. The existence of a potential discrepancy between being aware of the issue and putting this awareness into practice should be noted here. In particular, students may be aware of what leads to climate change and its impact but do not act upon this knowledge. Also, classifying some students as moderately aware indicates that although there might be some level of awareness, there is variance on the level of awareness. This indicates that although some

number of students might have been made aware of climate change, they may not necessarily be highly knowledgeable concerning the science behind climate change. One more important issue mentioned here refers to the emergence of the culture of environmental consciousness as manifested through a high degree of climate change awareness on behalf of students. Environmental questions are currently addressed much more often, and today's students have much broader knowledge of the matter than their predecessors did. Such environmental consciousness forms a strong foundation for raising environmentally conscious individuals who will be able to contribute significantly to sustainable development.

One has to take into consideration the importance of the transition from climate change awareness to behavior changes and actions related to the issue. In other words, it is not enough for schools to provide information to the youth; they need to encourage them to engage in environmental actions.

In conclusion, the study highlights that while undergraduate students of Western Odisha are generally aware of climate change and its implications, there is a need to deepen this awareness and channel it into meaningful action. The findings highlight the crucial of integrating knowledge with practice, so that students do not remain passive observers but become active contributors to environmental sustainability. By strengthening climate education and promoting responsible behavior, it is possible to empower young individuals to play a dominant role in addressing one of the most critical challenges of our time

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AWARENESS OF CLIMATE CHANGE

I am Sasmita Beriha, a postgraduate student of the Department of Education and Educational Technology, School of Social Science, University of Hyderabad. This questionnaire is designed to collect data for my M.Ed dissertation research entitled "A Study on Climate Change Awareness among Higher Education Students." You have been invited to participate in this study, and your honest and thoughtful responses will contribute significantly to academic understanding in this area. Your responses will be kept strictly confidential and used only for research purposes. It will take only 10 to 12 Minutes. It's not for your academic performance.

There are no right or wrong answers. Please indicate your level of agreement with the following statements.

Personal information

1. Name …….
2. Gender …….
3. Locality……
4. Stream …….

	STATEMENT	SA	A	N	DA	SDA	TOTAL
1	1 Protecting the environment for the future is regarded as less important than securing jobs today.						
2	I think climate change is primarily caused by human actions.						

3	Climate change leads to a rise in global sea levels, threatening coastal communities.						
4	I believe that transitioning to renewable energy sources is essential to combat climate change.						
5	In the past few months, I have often come across information about climate change in television programmes, news reports, or print media.						
6	If my job harmed the environment, I would prefer to leave it rather than continue causing damage.						
7	The frequency of extreme weather events has increased globally compared to last few decades.						
8	I have knowledge that the release of greenhouse gases (e.g., carbon dioxide, methane) traps heat in the atmosphere.						
9	I believe that climate change is a leading cause of biodiversity loss and the extinction of various species.						

10	Planting more trees helps in reducing the level of carbon dioxide in the atmosphere.						

11	I rarely pay attention to information about climate change when it appears on the news, social media, or other media sources.						
12	Climate change is a serious problem that needs immediate attention.						
13	I can clearly distinguish between shortterm weather changes and long-term climate trends.						
14	I understand that large-scale deforestation contributes significantly to the warming of the planet.						
15	Climate change can lead to more frequent and severe food and water shortages globally.						
16	I have an understanding that my actions, such as recycling waste acting as an effective-ways to help the environment.						
17	I feel that people in my community are not doing enough to address climate change.						

18	I believe that industrial processes and factory emissions are major drivers of the current climate crisis.						

19	I think that rising temperatures pose a direct threat to human health through heat-related illnesses.						
20	Improving energy efficiency in homes and appliances helps to reduce climate change						
21	I learn about climate change through posters, campaigns, or public-awareness messages in my community or locality.						
22	I am reluctant to give up personal comforts for the sake of the environment.						
23	Earth's polar ice sheets and glaciers are melting at an accelerated rate.						
24	Human activities, such as driving cars and running factories, have nothing to do with the Earth's changing weather and climate.						
25	Climate change negatively impacts the economy by damaging infrastructure and agricultural yields.						

26	I believe that supporting government policies and international climate agreements is crucial for environmental progress.						
27	I sometimes discuss the news or reports related to climate change with my						

	family, friends, or colleagues for my deeper my understanding.						
28	The current changes in global temperatures are entirely caused by natural Earth cycles and have nothing to do with human activity						
29	I understand that the widespread use of chemical fertilizers in farming can release harmful gases into the air.						
30	In my opinion, climate change increases the intensity of natural disasters like hurricanes, droughts, and floods.						
31	I have lack of knowledge for adapting strategies in flood resistant in vulnerable areas.						
32	I believe that recent changes in local rainfall patterns are part of a larger global climate change trend.						

33	I believe that the increasing number of motor vehicles is a major contributor to global carbon emissions.						
34	Changing weather and environmental conditions have no influence on people's decisions to move or migrate from their homes.						
35	I think that increasing public education on environmental issues is a vital step toward long-term climate adaptation.						

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A Study on Climate Change Awareness among Undergraduate Students of Western Odisha

Book Summary

The study examines climate change awareness among 110 undergraduate students in Western Odisha. Using a descriptive survey design and stratified random sampling, data were collected through a self-developed Climate Change Awareness Questionnaire. Descriptive statistics and t-tests were used to examine awareness levels and differences by gender, academic discipline, and locality. Findings indicated moderate-to-high awareness, with no significant gender or locality differences.

Sasmita Beriha and Dr. Ujjala Singh

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