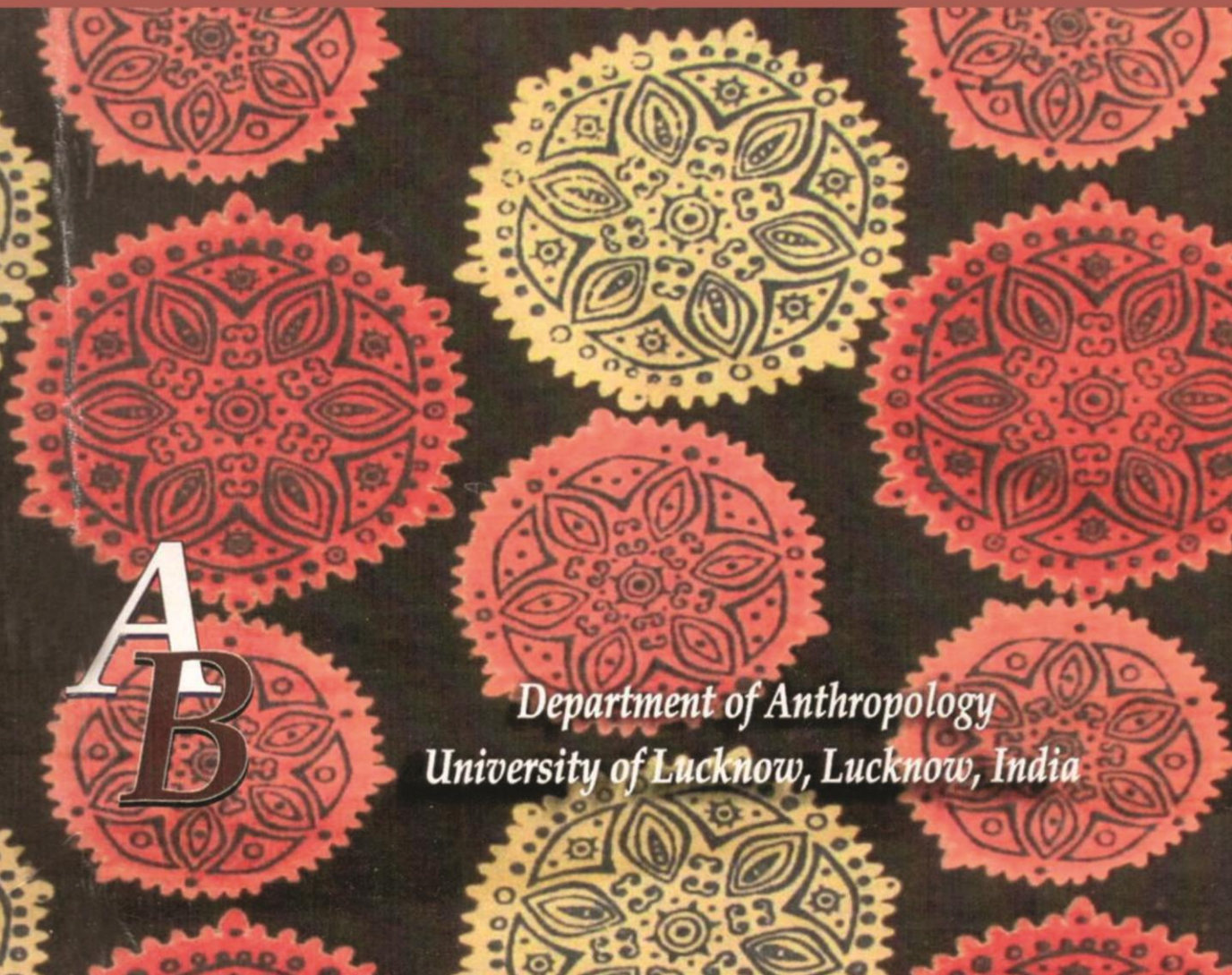


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Saliency of behavior change interventions to mitigate climate breakdown

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ABSTRACT

Unbridled human interactions with environment have resulted into alteration of geographies across the globe. If left unattended, these changes could bring about unprecedented cataclysms, long-term changes in temperature and weather patterns tantamounting to global climate change. Such changes are either caused by natural processes like oscillations in the solar cycle and delayed monsoon or through uncontrolled human activities causing geographical interference. Majority of geologists, geographers, climate scientists and behaviour scientists have agreed that the climate of Earth is changing due to human activities which tend to harm the environment (Intergovernmental Panel of Climate Change (IPCC), 2007). This paper investigates how human interference is contributing to global climate change and also reflects on how climate change is affecting mental health of individuals. Emphasizing upon individual psychological well-being must not hinder the collective response that is imperative for slowing down global climate change. The paper reflects upon psychological interventions to minimize the escalation of global climate change, also suggests measures to deal with stress induced by changes in environment.

Keywords: Behaviour Change Interventions, Climate Change, Global Warming, Climate Stress

Prologue

Human interference has long remained the major source of climate change; human activities such as deforestation, sewage management, industrial pollution and waste management have contributed heavily to the escalation of climate change. Oil and natural gas reserves which were anticipated to last for half a century are at the brink of extinction. Mineral reserves are being reduced due to uneven extraction. Wildlife and marine life are also being affected due to ill effects of human interference and uncontrolled environmental degradation. The effects of climate change began to emerge gradually as delays in monsoon, prolonged drought and temperature variations. Combustion of fossil fuels like coal, oil, and gas has been the primary cause of climate change. As fossil fuel combustion produces greenhouse gas emissions that serve as a blanket around the planet, trapping heat from the sun and increasing temperatures. Carbon dioxide and methane are two examples of

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greenhouse gas emissions that are contributing to climate change. These are produced while burning coal or gasoline to heat larger structures such as furnaces and kilns. Carbon dioxide can also be released during forest & land clearing, wildfires and other environmental hazards. Energy, industry, transport, buildings, agriculture and land use are among the main emitters that mainly contribute to climate change. It has been largely a one way lane all this time but in recent years the world has witnessed frequent natural disasters in terms of cyclones, floods, droughts, wildfires and landslides. People who have been impacted by such fateful events are still dealing with anxiety, stress and trauma. Such individuals require psychological assistance to be able to become more resilient and susceptible towards events of similar nature. The role of psychology has become inevitably significant as most of the researchers have agreed that behaviour change interventions could significantly make climate change measured.

Introduction

Global warming and climate change are inextricably linked subjects but both of these are very different phenomena as former is comparatively easier to deal with than the latter. Despite the fact that these phrases are frequently used interchangeably, climate change has several different components. The term global warming refers to the rise in global temperatures primarily brought on by an increase in the atmospheric concentration of greenhouse gases. While climate change is described as the long-term, escalating changes in variables related to the climate, such as precipitation, temperature, rainfall, wind patterns and water cycle. The Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) was released in 2007, that contained a chapter on the health effects of climate change with emphasis on mental health (Confalonieri et al. 2007). The report clearly documents the evidence for a variety of negative health outcomes as a result of climate change and makes a hint that many significant outcomes will be psychological.

Inarguably, climate change has the potential to have significant negative effects on global mental health. These effects will be felt most by those with pre-existing serious mental illness, but there is also likely to be an increase in the overall burden of mental disorder worldwide (Page & Howard, 2010). Humans have undeniably caused immense damage to the environment through their careless activities and continued contributions to global warming. From the burning of fossil fuels that emit greenhouse gases into the atmosphere, to agricultural practices like deforestation and unsustainable farming techniques, humanity has acted as a driving force behind this rapidly escalating crisis. Although many people try to downplay their individual impacts, the fact remains that even small decisions can add up to great effects on our planet's climate. Thankfully, there are solutions at hand - from more energy-efficient technology to improved renewable resources - but we must remain vigilant in order to ensure our collective preservation of the earth's invaluable natural resources. To truly make an impactful difference, it is imperative that each person take responsibility for their own actions, as well as fostering accountability among others. The future of the human race depends on our ability to come together and work collaboratively to tackle this daunting issue head-on.

Additionally, economic changes brought about by extreme weather events can wreak havoc on local populations, leading to widespread insecurity and depression. On a broader level, it has been observed that individuals who believe strongly in environmentalism report higher levels of self-esteem than those who don't. This could point to a societal need for collective action in order to preserve our planet's well-being. Ultimately, tackling the effects of climate change requires a holistic approach; psychological awareness must be part of any successful effort. When it comes to psychology and climate change, one cannot deny the reality of its impact.

These changes affect us on a psychological level as well, manifesting in depression, anxiety, fear and anger amongst people who are trying desperately to grapple with the sheer enormity of the issue at hand. The interconnectedness of these problems is something many struggle to comprehend and unfortunately remain complacent about. To address this cognitive dissonance, greater attention needs to be given towards creating a more empathetic understanding of the gravity of the situation by educating people at large. If done right, then perhaps humanity can still find solace amidst the pernicious vagaries of nature.

The Continuum of Climate Change

The detrimental effects of climate change on psychology are well documented, with many reports detailing the mental health consequences of droughts, floods, and other extreme weather events. Yet, despite this knowledge, many people remain unconvinced or apathetic about environmental issues. It's essential to realize that psychological distress can be a direct result of our inaction; prolonged neglect leads to heightened anxiety, depression, stress and even despair as we become acutely aware of the extent of human-caused destruction. While it may seem daunting to confront these realities, there is hope - through collective action and policy reform, we have the power to restore balance and reduce damage to our planet. By mobilizing individuals, communities and institutions to take concrete steps in their day-to-day lives, we can ensure a more sustainable future for generations to come.

Research literature greatly suggests that human beings are on the precipice of a great cataclysmic event; an apocalypse that might change the life on earth forever and the future generations would deal with unprecedented weather conditions. Evident through scientific trials and researches, it has been well established that carbon emissions have spiked exponentially over the last few decades due to our negligent actions and reluctance, leading to irreversible damage to the environment and further hastening the imminent demise of human civilization. The glacial melts, rising sea levels, extreme weather events, biodiversity loss, droughts and floods have all culminated into a drastically altered global landscape.

However, much less attention has been paid to the psychological impacts of environmental hazards and their chronic effects. It has been noticed that the likely psychological impacts of climate change, include anxiety, stress, and depression; increases in violence and aggression; and loss of community identity (Trombley, Chalupka & Anderko, 2017). Recent researches in environmental psychology have indicated that the mental repercussions of an increasingly volatile environment can be devastating for individuals in general and psychologically vulnerable individuals in particular. Rising temperatures, heat waves, floods, tornadoes, hurricanes, droughts, fires, loss of forest, and glaciers, along with disappearance of rivers and desertification, can directly and indirectly cause human pathologies that are physical and mental. People with pre-existing conditions may find themselves unable to cope, or might see their symptoms exacerbated by climatic shifts.

Faruquie & Niblock (2018) have found that, Noise pollution is an underestimated threat in India and most of us are unaware of the dangers it could pose before us as it can cause various short and long-term health problems for instance, tinnitus and hearing loss, cardiovascular issues and may even lead to chronic psychophysiological disorders. The year 2014 was declared as the hottest year globally by the Meteorological department of United States of America. Climate change looms as a global challenge which is all set to affect mankind in more than one ways. Not only it would impact the physical health of individuals but would substantially influence mental health too. Increasing ambient temperatures would accelerate rates of aggression and violent suicides, on the other hand prolonged droughts due to climate change may cause an increase in farmer suicides. Droughts would eventually lead to impaired mental health resulting in stress, frequent natural disasters due to climate change may also lead to posttraumatic stress disorder, adjustment disorder, and depression.

Consequentially, the populations would embark on migratory settlements, inland and intercontinental; furthering into acculturation stress. Such individuals might become prone to physical illnesses that could cause chronic distress. The world would require mitigation measures to deal with mental health issues resulting from climate change (Padhy, Sarkar, Panigrahi, & Paul, 2015). Mental health issues are feared to engulf a large amount of world population into the span of impact, which means that there could be a huge outbreak of mental health disorders which may have their origins in environmental degradation and the stress caused by it. The only remedial measure to avoid and resist such mental health challenges in future is persuasion and attitude change.

The Cirque of Environmental Attitudes

Attitudes are positive or negative feelings about a feature of the physical environment or toward a connected issue (Ajzen & Fishbein, 1980). Among social and behavioural sciences, one of the most productive fields of psychological theory and research is the study of attitudes. The interests in studying attitudes stems from the idea that people form opinions on a variety of targets and rely on these opinions, or attitudes, when choosing between several potential future actions (Crawley & Koballa, 1994). Heberlein (1981) emphasised the critical need for research to better understand how people organise their thoughts and sentiments towards environmental concerns in their minds. Multiple behavioural models have been developed as a result of the subsequent expansion of environmental attitude-behavior research (Ajzen, 1991; Grob, 1995; Homburg and Stolberg, 2006; Ohtomo and Hirose, 2007).

Environmental attitudes have started to become relevant among the many studies on attitudes in recent years, signifying the increased interest of academics and researchers in environmental preservation. According to Zelezny and Schultz (2000), research into attitudes had previously primarily been conducted in areas like tobacco control, health difficulties, sexual harassment, and racism, but of all the social issues we face in this millennium, environmental issues are the most difficult. There is a plethora of behaviours that are causing incorrigible harms to the environment and an honest submission at this crucial juncture is that attitude change can contribute to behaviour change. Behaviour change is what the world requires to make itself more resilient and less vulnerable against the devastating effects of climate change.

Studies on environmental attitudes have implied a variety of conceptualization techniques. According to social psychologists, a variety of attitudes about certain environmental challenges are influenced by primordial beliefs (Gray, 1985). Environmental attitudes are primarily focused on views about the effects that environmental degradation may have on oneself, other people, or the biosphere from a psychological perspective (Schultz, 2001; Stern & D'ez, 1994). According to Schultz, a person's self-concept and how much they feel like they are a part of the environment play a role in how concerned they are about the environment.

The purpose of education has always remained the advancement of wisdom and its application towards the welfare of people. At all educational levels, especially higher education, students are becoming more and more concerned with environmental issues. The major goal of university education was to assist the community by acting as a hub for communication and intellectual exchange (Newman, 1959). With a wider focus on educating and preparing students for an active life and social duty in the world, the modern university has moved beyond this conception of the institution (Sharon & Wright, 2006).

It is imperative to investigate the level of knowledge among university students towards environmental issues, given the growing interest of universities in contributing to the rise in environmental values. Additionally, it is important to find out if the tenure of students at the

university genuinely changes the environmental opinions they have had before the start of their higher education. It is intriguing to learn that females exhibited different environmental attitudes as compared to males (Schultz, 2002; Zelezny, 2000).

In the coming years, all environmentally destructive acts must be stopped in order to reduce the harm brought on by these changes and to achieve sustainable development. Youth knowledge, attitudes, and behaviours regarding the environment are very crucial for future environmental protection (Wray-Lake et al., 2010). Young people can contribute to a brighter future if they have the knowledge and tools required for active community involvement, according to the Positive Youth Development (PYD) framework (Lerner et al., 2015).

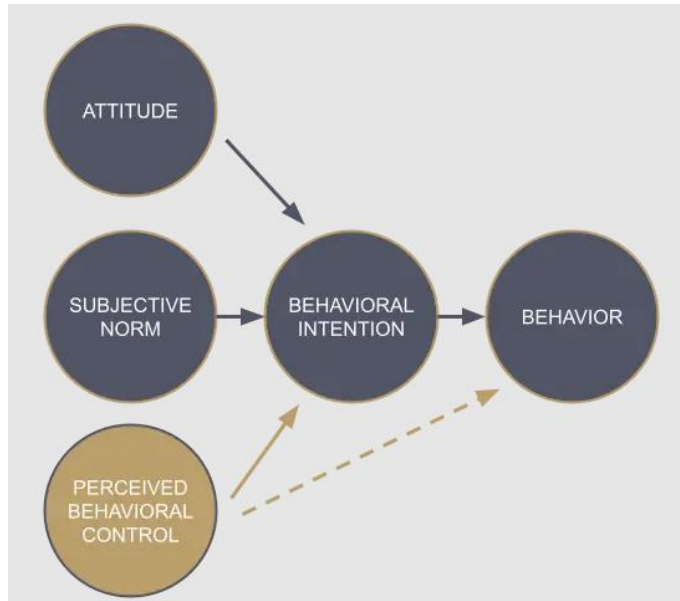


Figure 1: The theories of planned behavior/reasoned action adapted from Madden et al. (1992)

Behaviour Change: Road to Reverse Climate Change

Most of the strategies to reduce carbon emissions usually make assumptions, one of the popular assumptions is that people will eventually modify their behaviour, which could be indirectly influenced by interventions or specially designed information but ultimately depends on the perceptions of people. Participation in climate change adaptation and mitigation initiatives is hampered, in particular, by the belief that the risk posed by climate change is low. Therefore, a key component of cutting emissions is to comprehend how the general public perceives the risks of climate change. People must be sensitized through various means so that their vulnerabilities are communicated to them in an effective manner. The attitude of people requires immediate change because reluctance to take action might prove fatal and then resurrection of our environment would become a lost possibility. The advances of space technology would seem worthless when the life on earth has been made difficult.

Behaviour change interventions can play a vital role in slowing down climate change, cutting on air travel, choosing sustainable energy, and modifying eating behaviour can contribute effectively towards becoming a low-carbon economy. The facts and figures have been around since long, yet people are still not taking firm actions to change their behaviour. Understanding how people process, react to, and share knowledge would allow

identification of the motivators that make people move from awareness to action and from action to persistent behaviour change.

Academic orientations can be an influential intervention; it would inhibit the awareness towards environment from school to society among the students. Introduction of new and dedicated courses based on environmental awareness can be done at secondary, senior secondary and university levels. Behaviour science can significantly change the scenario of global climate change through systematic sensitization. Basic level transitions in everyday choices can bring about desired modifications in behaviour of individuals. Some of the suggestive measures for incorporating behaviour modification are:

- Controlling carbon footprints by opting for going paperless in everyday life.
- Discouraging single use plastic use for shopping and carrying goods.
- Effective waste management through zero waste lifestyle and home composting.
- Checking on e-waste and finding ways to recycle such wastage.
- Opting for electric vehicles instead of fuel based automobiles.

Presentation of choices favouring sustainable behaviour, pricing of goods and services can be strategically tilted mid-priced sustainable options than expensive options as the expensive items sell more when the price for mid-priced items is increased. Despite the need to promote behavioural change in industries like aviation and meat consumption (Girod et al. 2013; Hedenus et al. 2014), behavioural change is frequently ignored in evaluations of climate change mitigation for attaining international targets (Creutzig et al. 2016). National long-term climate strategies offer a crucial chance to investigate fresh ideas, possibly using a variety of scenarios or backcasting methods, to inspire imaginative visions of what a future in line with the Paris goals might entail. The majority of long-term programmes do not currently take use of this potential, despite the fact that ongoing research in many nations might inform long-term, significant emissions reduction initiatives that incorporate behaviour change.

Another very important perspective regarding carbon emission is aviation industry that is silently pushing back the adaptability of humans to an environment which is being changed at a never before pace and there is least that is being done to attend it. Wynes et. al. (2018) have suggested behaviour change intervention in order to bring forth some censorship of sorts on aviation activities. Psychological measures which might prove effective in reducing the carbon emission in aviation are discussed in the table below:

Table 1: Types of behavioral change interventions to reduce personal greenhouse gas emissions, with suggested applications to reduce emissions from aviation

Behaviour Change Intervention	Paradigm	Applications to reduce emissions from aviation
Nudges	Customers “nudged” by being given preportioned meal sizes (Friis et al. 2017).	Change defaults in government booking systems to better support booking train travel.
Prompts	Participant received text-message reminders to reduce red meat intake	Display a note on a travel booking website asking customer to consider linked low-carbon options.

	(Carfora et al. 2017).	
Justification	Carbon footprint information of meal choices displayed (Brunner et al. 2018).	Make carbon footprint of flights versus other choices more explicit in transport mapping and travel booking systems to inform travel decision.
Instructions	Energy saving tips provided to households (Allcott 2011).	Design government and institutional travel policies that prioritize travel-free meetings, then ground-based travel (von Arnold 2018) Provide instructions and technical support for institutional videoconferencing hardware and software to lower barriers for digital alternatives to air travel (Wynes and Donner 2018).
Feedback	Monthly energy statement mailed to households (Carroll et al. 2014).	Give institution members individual reports about personal air travel, including a comparison to the average member of the department or with a sustainable global citizen's annual carbon budget. Make public the emissions of public sector employees who generate above a certain threshold in air travel emissions. Similar social pressure interventions have been effective in encouraging behaviors like voting (Davenport et al. 2010) and reduced household energy consumption (Delmas and Lessem 2014).
Social modeling	Neighborhood leaders model a proenvironmental behavior.	Highlight and promote local destinations, emphasizing the economic benefits for local economies. Promote positive stories of slow travel and its health, quality time, adventure, and other benefits. Attitudes and behavior have been changed by knowing someone who flies less or doesn't fly (Westlake 2017). Increase institutional or leadership commitment to reduced flying.
Cognitive dissonance	Stressed the gap between an individual's actions	Require that air travel advertisements contain messages stating the

	(driving) and values (environmental concern) (Tertoolen et al. 1998).	environmental harms of flying, similar to the practice with cigarette packages and pharmaceutical drug commercials.
Commitment	Subjects committed to reduce car use (Tertoolen et al. 1998).	Sign personally formulated pledges at the individual, business, city, and regional levels.
Rewards	Employees offered option to cash out parking spots (Shoup 1997).	Employers give more days off to support employees who travel slower. Replace frequent flyer programs with a financial incentive program that rewards lower-carbon options.
Competition	Group competition reduced energy use at university residence (Sintov 2016).	Stimulate interdepartmental competition to reduce air travel emissions at large public institutions.
Goal	Group goal of 5% energy reduction given to households (Abrahamse et al. 2007).	Align aviation with Paris temperature targets. Campaign for 50% reduction by 2023 of greenhouse gas emissions from Swedish universities by university researchers (Alvesson et al. 2018)

Eliminating all the unsustainable choices completely could help the world achieve some significant control over climate change. By enacting outright restrictions that can alter behaviour over night, policymakers can skip a decade of slowly adjusting habitual behaviours, as Kenya's plastic bag ban has demonstrated. The ingrained behaviour that encourages the use of plastic bags must change in favour of the sustainable option. Within days, not decades, the reusable bag had become the new standard. Eliminating all the hindrances and making things hassle free could also contribute significantly to slow down the pace of climate change in several ways. Making it easier to act morally and not harder, so that individuals could harness in them a deep sense of liability in them and realize the significance of personal contribution to the cause. More and more governments have begun applying behavioural science into many parts of their policymaking, from encouraging recycling to cutting plastic waste, from timely filing of tax returns to reducing traffic accidents.

Making things personalized and compact, implying data analytics to identify which are the most effective messages that influence specific audiences. Campaigns like these could act as a pedestal approach with respect to climate change. Such initiatives could invoke public awareness and facilitate opinion formation, as they use in political campaigns. Climate

change and carbon neutrality are generally supported by the public, but many people's daily lives are far from these ideas. Niklas Hagelberg of UN Environment has pointed out that, "Therefore, behavioural science and behaviour modification methodologies are crucial to assist behavioural transformations." *Consuming Differently, Consuming Sustainably*, a UN Environment publication funded by the European Commission and written by the New York-based consulting firm 'ideas42', has efficiently discusses how behavioural science might help in improving the efficacy of sustainable consumption strategies.

Epilogue

The demands have humans have outgrown earth's natural resources, consumption has outpaced production. Humans consume and finish in less than nine months, what earth produces in one year. Consumption patterns of human beings are being linked to the expansion of economies across the world. Everyday more and more households become consumers in developing economies, the experts have estimated that two to three billion additional middle-class consumers will be added by the year 2050. Collective efforts will be required to achieve effective sustainability and the world has to employ every tool available in order to make it possible. By making people understand the value and worth of mindful decision making, better policies can be designed in order to shift consumption and achieve sustainable development goals.

The UN Environment report has also made some important recommendations which include incorporation of behavioural science into policy making and tool designing; building internal behavioural policy capacity within policymaking entities; and expansion of behavioural science research initiatives and dissemination. The recommendation must be enacted so as to attain better outcomes in sustainable consumption policy, thus realizing the greater notion that behavioural change can actually slow down climate change. Human interferences, particularly the combustion of fossil fuels, are altering earth's climate. Human driven changes with respect to land use and land cover have been altering the climate; such changes include deforestation, urbanization, and shifts in vegetation patterns. Most of the human activities directly contribute to the reflectivity of the Earth surface. Carbon emissions from burning forests, bushfires, wildfires, urban heat, island effects and changes in the natural water cycle contribute largely to climate change. Since humans are responsible for recent global climate change, the solutions also lie within the human domain. As humans, we understand the exact causes of climate change, it would certainly pave the way for effective solutions to be developed and deployed.

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