



PROMISING ROLE OF BEHAVIOURAL SCIENCES TO MITIGATE CLIMATE CHANGE

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Abstract

In contemporary times, rapid climate change has emerged as an obstructive factor to goals of sustainable development. Thus mitigating climate change seems an essential goal to achieve milestones towards sustainable development. This paper attempts to investigate the role of behavioural sciences towards mitigating climate change in contemporary times. Further it explores the role of BIG data research and media in mitigation of climate change.

Behavioural sciences have already proven their significant role in health policy. It is being evident that in the near future among other sciences behavioural sciences will play important role to mitigating climate change and to adjustment in a changing environment. Policy interventions towards mitigating climate change should hold their behavioural assumptions for better results. Identification of environmentally significant behaviours as well as identification of determinants of these behaviours is vital steps towards primary behavioural research in area of climate change. Behavioural sciences have to assist engineers and designers in developing new technologies for improving energy efficiency. Further they also have to work with environmental scientists in developing models predicting the relationships between environmental changes and adaptation. The study discusses the need of research from Big-data perspective to identify trends in

adjustment process due to climate change. For advocacy of behavioural change the role of media is essential. Conclusively limitations and areas of possible future researches are discussed.

Key words: Behavioural Sciences, Climate Change, Development, Environmentally Significant Behaviours.

Introduction

Increasing frequency and intensity of natural disasters are indicating towards the serious outcomes of the climate change. Recent natural calamities and increased frequency of cyclones/hurricanes/storms around the world are instances that our natural environment is facing some imbalance. The outcome of such natural calamities is known to us in terms of losses of lives, infrastructure, and in financial terms. The unprecedented rains devastating kerala, India (October, 2018), massive landslide and heavy rainfall in Uttarakhand India (2013), Maharastra draught (2013), typhoon Haiyan in Philippines (November 2013), hurricane Katrina (23-20 August, 2005) in USA are some recent examples. The typhoon Haiyan (2013) in Philippines has expected to leave behind devastating effects in terms of 10,000 lives and ruined infrastructures. The unprecedented amount of rain (26 July, 2005) in Mumbai was another incidence of climate degradation. It was the eighth heaviest ever recorded 24-hour rainfall (994 mm or 39.1 inches) which smashed the metropolis claiming more than 5000 lives. Not only in India but across the world such calamities and disasters have been more frequent in recent past. The prominence of the issue can be understood by the fact that the search for the word 'climate change effects' resulted in about 114,000,000 results in google and about 2,780,000 results in google scholar at the time of this writing.

Human activity and climate change

A significant number of studies shows that there is a relation between human behaviors' and climate change. The process of global climate change have been increasingly observed in recent years are caused largely by human activities' (National Research Council, Washington DC, 2010). Human behavior has become a significant reason for degradation of climate in therecent past. Burning fossil fuels, cutting and burning forests, excess use of automobiles, excess use of electricity and other environment-impacting behavior have resulted in poor to extreme climate conditions in most parts of the world. Thus human activity (systems) and climate systems affect each other through a number of factors (cognition, affect, motivation, etc.) and may result in

mitigation and adaptation. Although India is not a top contributor to climate degradation in comparison to developed nations, it too owns responsibility to mitigate climate change. If individual behavioural actions are linked with climate degradation, India as the second largest population country too has an important role to play in mitigating climate change.

Climate change and sustainable development relationship

Climate change and Global warming are two prominent words used by the public to describe degradation of the environment and often they are used interchangeably. However climate change involves much more than just changes in the temperature (Swim, *et al.* 2011).

A popular, brief and one of the frequently cited definitions of sustainable development comes from the Brundtland Commission (1987). It defines sustainable development as the “ability to make development sustainable—to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs”. There may be various definitions of sustainable development depending on what the goals are or what it specifically wants to achieve.

It is observed that climate change has not received required attention as an important issue in the economic and environmental policies of India and other developing countries (Beg, *et al.* 2002). The relationship of mitigating climate change and sustainable development is obvious and it must be acknowledged in government policies without delay. There are issues of mutual concern for both climate change and sustainable development such as Energy efficiency, renewable energy, transport and sustainable land-use policies. It is expected that government economic policies accompanying sustainable development and climate change issues will achieve more far-reaching and appropriate goals of development especially for developing countries.

Mitigating climate change now seems an important and integral part/step of attaining goals of sustainable development. As Tariq Banuri and Hans Opschoor (2007) reported that it was a mistake to see climate change and sustainable development as separate issues.

There is need to develop frameworks and models for mitigating climate change within broader context of sustainable development. A major goal is to establish long-term ecological thresholds to pressurise the

timing and level of allowable global emissions. The actions would be taken at international, national, regional or local levels.

Role of behavioural sciences towards mitigating climate change

It is essential to understand all important aspects and perspectives which are contributing to climate change for a possible successful mitigation. It seems we have been little late in identifying human aspects to this problem which is threatening life at planet earth.

Behavioural sciences can help understanding and explaining human causes of climate change to a larger extent. Psychology as a field of behavioural sciences is important in understanding of human psyche and behaviour towards climate change. Behavioural science including other close fields and methodological innovations may provide ways which will be beneficial for mitigating climate change in near future (Figure 1).

Primarily, Psychology has helped in identifying human contribution to climate change. Recently, we have learned that human actions are one of the major factors degrading climate at planet earth. Because human behaviour is not always explicit, but implicit too, it is important to keep a track of human behaviours significant to climate change. The rate and type of human consumption are directly associated with climate related issues. There is a need to control rate of consumptions of environmental resources. Again behavioural sciences may be helpful in achieving this goal. It is highly important to explore human understanding about climate change, their intentions and behaviour.

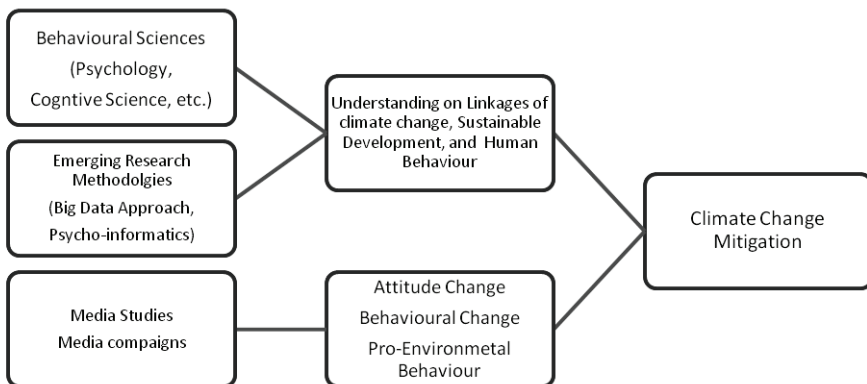


Figure 1: Role of Behavioural Sciences, Big-Data, and Media to Climate change mitigation

Stern (2000) made an important observation on behavioral researches in the area of climate change. He distinguishes between two types of researches- intent oriented research and impact oriented research. Intent oriented research examines the behaviors related to climate change in terms of actor's motive to climate change issues whereas impact-oriented research examines what actual impacts behavioral actions have on environmental issues.

The decision to exhibit pro-environmental behaviour may get affected strongly by exchange theories, and loss-benefit analysis. Thus intentions to involve in behaviour to mitigate climate change is different that the person actually exhibiting that behaviour.

Specifically, if study finds that there are differences between intentions and the actual mitigation behavior, then it will be useful finding for policy making on climate change issues. Knowledge of awareness of the people towards environment in terms of quantity and quality is fundamental to most behavioral research.

Noticeably, environmentally significant behaviors of most Indians which have an impact on environment are carried out with the intention of personal benefits and not with the pro-environmental intentions. For example, the purchase of energy efficient appliances in developing countries like India may depend totally on the cost involved, because most of its population belongs to middle class and lower class. This scenario may change in the near future with increasing literacy towards environmental issues.

The role of psychology in mitigating climate change is a growing research area in which there is a need to do many researches on various topics. People's awareness and understanding of climate change is the base for any policy which involves human behavior. The perception of climate change is the foundation for making related policies to cope with climate change (Yu, Wang, Zhang, Wang, and Wei, 2013).

There is a need to do representative Nation-wide research on the behavioral responses to climate change (Whitmarsh, 2009). Although some of the studies have been done in Europe, China and other parts of the world on this issue, fewer studies have been reported in India. In recent times, scientists from natural sciences, physical sciences and social sciences are doing important research to deal with this issue related to human survival.

Cognitive science too offers deep level understanding of human related factors and climate change. First it helps in understanding various human behaviours in context of climate change. Human cognitive processes (perception, thinking, decision making) are bounded by their limitations of functioning, hence the term bounded rationality (Tversky and Kahnemann, 1974). Humans get biased due to limitations of cognitive functions and make take wrong decisions. Events which have high representations in its class are likely to be judged to occur more frequently. Contrarily the events which have low representations of their class are judged to occur less frequently. Since climate change is unrepresentative of the class of future events (in its order or magnitude), therefore people tend to ignore or downplay it.

Psychology of risk perception and risk behaviour (Weber, 2006) helps in understanding of risk perceptions associated with climate change. This answers why we humans give little attention towards climate change issues. We are programmed to notice those events as associated with some risks that are fast, automatic, visceral reactions, in particular through recent, personal experience. However climate change is a subtle and slow process and thus it is only perceived through extreme events. Consequently it is mostly unnoticed and labelled as not associated with risk.

Cognitive science extends one more reason to the humans' casual approach to climate change. We tend to label events as *normal* (even it is unusual) which we experience frequently in our lifetime in comparison to previous or future generation's life time. Thus we keep changing the baseline as depending on our life experiences, and even extreme events are considered as expected and usual.

Further, the undesirable effects of changing climate are more evident today in various forms. Unfortunately, we have already lost some rich branches of our natural diversity in forms of disappeared natural/animal species. Moreover, the number of endanger species are increasing due to polluted climate. The unwanted effect of the climate change may be direct and profound as in case of extreme weather conditions, heat waves, melting glaciers, as well as it may be subtle, indirect and long lasting such as emerging diseases and pollution related effects.

Extensive studies of people attitudes, intention, as well as environmentally significant behaviour pattern are the need of the hour for predicting managing and controlling human actions towards climate change. Psychology may identify those behaviours which play

significant role to climate change. Specifically, exploring factors which motivates pro-environmental behaviour and to identifying barriers which inhibits these behaviours. Mitigation responses towards climate change are expected to rise with increasing awareness to environment and environmental education. Although, human adaptation to its environment is a continuous process, it is likely that humans will need to learn fast and special adjustment strategies to adapt against disastrous effects of climate change in near future.

Special policies should be made to initiate and facilitate the adjustment process, such as special housing to deal with extreme weather conditions (either extreme heat or cold seasons) in some of the developing countries. The populous cities which are developed near coastal areas need master plan and specialised policies in the coming decades due to rising sea levels. Psychology will play a front role in making people prepared for change and adjustment.

Future of climate change research and Implications

The insights for important implications come not only from psychology, behavioural sciences, rather from emerging methodological approaches and media studies. Here, we discuss some of them.

In line with success of behavioural science theories and models in public health policies and interventions, it is expected and suggested that policies and interventions based on behavioural science theories to mitigate climate change will yield better results than the policies and interventions which do not hold theories and models. The health belief model, the trans theoretical model, social cognitive theory, Goal setting theory, and the ecological model are some examples of the models and theories used in developing health policies and interventions. Hence, Policy interventions towards mitigating climate change should hold their behavioural assumptions for better results.

One consensus can be observed among the climate change researchers on their understanding that developing countries may have to suffer more due to climate change effects, and thus the developing countries should be more concerned about factors which lead to global warming and climate change and preparing for the adjustment. Importantly exploring the factors which makes them more vulnerable to climate change effects and working on those factors would be a good step.

Further, synergies between climate change and sustainable development should be identified and exploited. The identification of synergies would help in developing better policies.

Big data approach to climate change research

In line with pure sciences, researches in the area of behavioural sciences are growing very fast. The related data obtained is too large and complex to handle by traditional data processing tools. A technology to manage large data has emerged called Big Data. The term Big Data, usually, refers to large data characterized by four V's: volume, velocity, variety and veracity. Volume refers to the amount of data. Velocity is the rate at which data is generated. Variety characterizes the complexity of data, whereas the veracity measures the accuracy of data. Large data can further be classified into different types according to the various sources it is generated from: structured, unstructured and semi-structured. Semi-structure and unstructured nature of data further adds to the complexity of Big Data. Interestingly, big data is shaping a new field in psychology- psycho-informatics.

The researches in the area of human behavior and climate change have been under two major areas- the effect of human behavior on climate change and effect of climate change on human behavior-such as issue of adaptability. The researches under both areas growing by the day, and therefore there is a need of a unifying approach to capture meaning out of a vast amount of data. Big Data offers an important role to play in assessing the behavioural patterns of humans toward climate change. Climate changed is not directly observed rather is reflected through various phenomenon such as increase or decrease in temperature during summers and winters, rainfall, draught, rise of sea level, pollution level etc. Some behaviour patterns of humans' may not also be observed directly. Big Data, a quick data handling tool, is required to store, analyze and consume unstructured data identifying the hidden behavior pattern towards climate change to ensure time efficiency. It uses data models and technologies to not only store Big Data, but also to capture, search, share, transfer, analyze and visualize stored data. Hadoop is one such low-cost and reliable technology to analyze Big Data.

There is also an interest to explore Big Data in order to see the systematic pattern between the variables (characteristics) of data. Data mining, a tool of Data Analytics may be applied to Big Data for three purposes: data exploration, statistical modeling and prediction.

Essential role of Media in Behavioural Change

The ambition of changing behavioural pattern of people through media regarding climate change triggers both opportunities and challenges. Media is considered as one of the most potent and powerful tools in influencing people's behaviour in a certain direction. Researches reveal that media can effect behaviour change. Many effects theories support this line of view as Maxwell McCombs and Donald L. Shaw (1972) in their 'agenda setting theory' states that if a particular news item is presented prominently and frequently by the press, the public will be compelled to believe that it is important. Thus, the media does not necessarily tell people what to think, but what to think about. The whole process of packaging news is nothing but selection of certain news items considered as more important than others. Hence it is the media who set that agenda for the current issues like climate change or any other environmental related news which ultimately results in an attitudinal change in terms of people behaviour. There are other theories which support this line of thinking as S.J. Ball-Rokeach and Melvin Defleur (1976) proposed 'dependency theory' which states that people depend on media for information to meet certain needs and achieve certain goals but the degree of dependency varies according to situation. When social change and conflict are high, established institutions, beliefs and practices are severely hampered, curtailed or are challenged, people are forced to be over dependent on media. Hence it is the role of media to make the issue of climate change a resulting agenda and compel people to believe in a certain way. Thus educating and informing the masses through mediation (climatic science) should be taken on a priority basis. Gerbner's (1967) cultivation theory also suggests that television is responsible for shaping or cultivating viewers' conception of social reality. It is based on the assumption that mass media have subtle effects on media consumers who unknowingly, absorb the dominant symbols, images and messages of media. This theory also states that a long, persistent exposure to TV is capable of cultivating common beliefs about the world. Repeated exposure to TV leads to the development of particular beliefs about the world and if television industry tries to reinforce the environmental concerns to the people then they will be informed, enlightened and consequently act and behave the way they should. Plethora of contemporary instances is available in this regard like India's 'Swachh Bharat Abhiyaan' campaign or the 'Cleanliness Drive' where we have observed how different media vehicles loudly trumpeted in favour of this campaign and consequently officials, policy makers and others actively participated in the biggest cleanliness

drive. The other examples include how considerable amount of people have stopped smoking in public places because it is media which have developed a public opinion in favour of such restriction. Thus whether it is creating awareness among people regarding climate change or forcing lawmakers to impose restriction in preventing and saving nature or natural resources, media's role cannot be overlooked, underestimated and ignored.

Conclusion

Existing and emerging Institutions and organizations in developing countries should alien their objectives protecting the natural environment. Moreover to alleviate this global problem, attempt should be made among international bodies- such as including eastern and western. Vulnerable developing countries together should also develop major plans for adjustment to extreme weather conditions in near future.

It should not be expected that behavioural sciences including psychology should work in isolation; rather their most important role is to assist other sciences in many aspects. Behavioural scientist should work with environmental sciences, environmentalists, and NGOs. Behavioural sciences have to assist engineers and designers in developing new technologies for improving energy efficiency. Further they also have to work with environmental scientists in developing models predicting the relationships between environmental changes and adaptation.

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