

Adaptation and Mitigation in Two Cultures: Rural and Urban

Dr. Balbinder Singh* 2. Dr. Nisha Chhabra**

* Assistant Professor, Department of Psychology, Jain Deemed to be University, Bangalore, (India),

** Assistant Professor, Department of Psychology, Guru Nanak Dev University College, Verka, Amritsar (Pb.) India.

Abstract

Around the globe people are talking about climate change and its effects on the planet. Now, it is fairly evident that climate change is there and that change is due to man-made activities. So, if the change is due to man-made activities then the better possible solution is taking a U-turn of the same. From highly qualified scientists to the very simple layman who's just concerned about the increased heat or fall in crop production all are thinking of reversing this change and they are working or try to work too for that. Data from International Energy Agency (2018) demonstrates the per capita GHG emission in India (IEA, 2018). It's very logical to think that if the contribution in GHG emission is at individual level then mitigation and adaptation should begin at individual level, it may become role model for others. Similar efforts – one in rural set-up and another in urban set-up have been discussed in this paper which is quite insightful and meant to learn.

Key words: Adaptation, Mitigation, Values, Beliefs, Climate Change, etc.

Introduction

Climate change is an apparent global threat. India is one of the world's most vulnerable countries to climate change (Cruz et al., 2007; & NAPCC, 2008) because about half of India's population is dependent upon agriculture or other climate sensitive sectors (Bureau of Labour Statistics, India, 2010). According to the Global Climate Risk Index released by Germany-based think tank, Germanwatch, India is the 14th most climate change-affected country in the world (Padmanabhan, Alexander & Srivastava, n. d.). India is exposed to sea level rise and extreme weather conditions, and will face more and more threats to human health, water availability, and food guarantee (Cruz, et. al., 2007).

In one year, 2,400 Indians lost their lives to extreme weather events such as floods and cyclones, according to the environment ministry (Padmanabhan, Alexander & Srivastava, n. d.). Further, the UN Office for Disaster Risk Reduction's report has listed India among top five countries in the world with \$80 billion (56,41,80,00,00,000.00 Indian Rupee) in absolute economic loss due to disasters in the last 20 years (Times Of India, Oct 17, 2018). According to The Economic Survey (2018) climate change is affecting India's agricultural productivity and income of the farmers. It is quite possible that about 600 million Indians would be moderately or severely affected by changes in temperature and rainfall (Pandey, December 27, 2018).

Estimated by Rashtriya Barh Ayog (RBA) in 1980 total flood-prone area in the India as 40 million hectare (mha, 12%) which was revised further to 49.815 mha during the 12th Five-Year Plan (2012 – 2017), based upon the information provided by the State Governments while 51 (mha, 16%) is drought prone (Central Water Commission, 2016). Thus India is also at a big risk to possible climate change-lead shifts in rain and snow (precipitation) patterns. Further, the frequency of heat-waves along with drought has increased in proportion in over past three decades in India - especially in Maharashtra and Southern Gujarat, Karnataka, Andhra Pradesh and Central India (Current Affairs, November 27, 2017).

Carbon dioxide, the heat-trapping greenhouse gas (GHG, India is now the world's third largest GHG emitter, IEA, 2013 & 2018) that has led to the current global warming, stays in the atmosphere for hundreds of years, and the planet (especially the oceans) takes a while to respond to warming. So, even if we stopped emitting all GHG today, global warming and climate change will keep on affecting coming ages (NASA, October 15, 2018).

Quietly, climate change has unfolded the stream of catastrophes. For example, melting of glaciers, rise in sea level, change in Rainfall Patterns, cyclones, floods, draughts, extreme heat, affecting agriculture and food security, energy and water security, health (physical and mental) issues, financial issues and, migration and conflict (Pandey, December 27, 2018; Recharte, December 6, 2017; & World Bank Group, June 19, 2013).

Climate change (drought in particular) has been at least partly responsible for the rise and fall of civilizations. Earth's climate has been relatively stable for the past 12,000 years and this stability has been crucial for the development of our modern civilization and life as we know it today. Modern life is acclimatized to the stable climate we have become attuned to. As our climate changes, we will have to learn to adapt and the faster the

climate changes, the harder it could be (Sohn, 2014). According to National Aeronautics and Space Administration (NASA, October 15, 2018) responses to climate change involves two possible approaches:

- a) **Mitigation** – It means reducing and stabilizing the levels of heat-trapping greenhouse gases in the atmosphere either by reducing sources of these gases (for example, the burning of fossil fuels for electricity, heat or transport) or enhancing the “sinks” that accumulate and store these gases (such as the oceans, forests and soil) (IPCC, 2014).
- b) **Adaptation** – It means adapting/adjusting to the climate change already in the pipeline. It involves adjusting to actual or expected future climate. It also encompasses making the most of any potential beneficial opportunities associated with climate change (for example, longer growing seasons or increased yields in some regions) (IPCC, 2014).

Man, Nature and Climate Change

Basically, forests and terrestrial soils jointly accumulate more than two and half times as much carbon as the atmosphere and it can be managed to emit less carbon and store much more (Adams, 30 Aug 2018). Farmers are using cover crops (a crop grown for the protection and enrichment of the soil) and strip – tillage (a practice that involves minimal soil turnover) to store organic matter in the ground for better crop yields. This process seizes more carbon is in soil and is a good food production strategy, but at the same times a climate mitigation strategy too (Scarlett, August 14, 2018).

Increasing carbon in soils is an effective means of removing dangerous levels of carbon dioxide in the atmosphere, as well as providing benefits such as increased and more resilient food production. There is growing recognition that soil-carbon can help tackle climate change, and quality soil helps various goals for food security, sustainable development, conservation, economic growth and equity (Bossio, March 12, 2018).

Another method is to restore the poisoned river water and contaminated landscape around it. Residents of the remote mountain villages around the Rio Negro (Peru, South America) collaborated with scientists from the Mountain Institute and with academic specialists. They were trained by scientist and resultantly they used their local traditional knowledge, they planted native plant species that could absorb metals from the water [technically called as phytoremediation or bioremediation] and developed water purification system that collects the acidic river water in small ponds (Recharte, December 6, 2017).

The role of natural infrastructure in tackling global climate change, in particular by providing carbon sinks through oceans, forests and soils, is also increasingly recognized (Yang, June 11, 2018). Ana Yang (June 11, 2018) outlines three essentials to build and sustain natural infrastructure for climate and nutrition security. These are:

1. To protect what is already there
2. To restore what has been degraded and
3. To manage sustainably for production

Psychology and Climate Change

Fear is generally is not an effective tool for motivating genuine personal engagement rather positive representations (such as discussed under the title - Nature and Climate Change) for attracting people's attention to climate change works well. Non-threatening imagery and icons that link to individuals' everyday emotions and concerns in the context of this macro-environmental issue tend to be the most engaging (O'Neill, & Nicholson-Cole, 2009). Further, short-term incentives for fighting climate change also exist. The beliefs and concern about climate change are reflected in changing levels of perceived outcomes of climate change, climate change risk perception and doubt in climate change (Whitmarsh 2011; Bostrom et al. 2012; Leiserowitz et al. 2013).

The values, another important factor, play pivotal role in shaping perception of effect of climate and adaptation. Unique values, such as tradition, freedom, harmony, safety, and unity design different interpretations and meaning of impacts, and lead to unique views on how to adapt to these. Conflicting and competing values can act as barriers to adaptation (Wolf, Allice & Bell, 2013; O'Brien & Wolf 2010). Disagreements about climate change are more likely to be about values than about the underlying science (Corner et al., 2014).

Further, a study examined the role personality dimensions - neuroticism, extraversion, openness, agreeableness and conscientiousness; attitude domains as high standards, self-criticism and generalization and climate change perception as threatful or existential of people who are working for prevention of climate change and people who are not working for prevention of climate change. Results indicated that people who are working for prevention of climate change perceive climate change as a threat where as those who are not working for prevention of climate change perceive climate change as existential phenomenon. People, who are working for

prevention of climate change compared to those who are not working, have high standards, self-criticism, neuroticism, extraversion, openness, and conscientiousness whereas agreeableness is low among them (Singh & Rajawat, 2019).

Individual Level: Emissions - Adaptation and Mitigation

It is quite clear now that climate change is a man-made event. Individually and collectively – it can no longer ignorance or innocence be claimed about the state of the planet. The knowledge is too deep and too pervasive and the evidence is too strong and feasible resources are available too. Personally, politically, and at religious places the fact of emergency and the call for transformational change is evident (Global Catholic Climate Movement, n. d.). It is an individual responsibility too because there is per capita contribution of GHG. Table I shows per capita emissions in India by sector in 2016 (IEA, 2018).

Sector	Kgs CO₂/ capita
Total CO ₂ emissions from fuel combustion	1 568
Electricity and heat production	810
Other Energy individual's own use	29
Manufacturing industries and construction	403
Transport (of which road is 186)	200
Residential	64
Commercial and public services	18

The data in Table I shows individual level emissions and the reverse has to be done at individual level. Through this research article an effort has been made to model adaptation and mitigation in rural and urban areas at individual level.

In this research paper two examples of individual responsibility have been presented – one from rural area Hari and Asha, and one from Urban – Mr. Dwarkadas Suresh.

Hari and Asha

Hari is an employee of the local water authority in Kannur District of Kerala (Kerala Water Authority, Kerala, India) and Asha is part of a community that helps farmers practice natural farming. They both love nature and this is reflected in every aspect of their lives. Hari and Asha built a house which is energy efficient, deeply

connected to nature and sustainable and the uniqueness of the house is its mud walls which are alive - means they breathe – in and out. This makes the house fan-free even if the temperature outside is 40 degrees Celsius. (Sivaswamy, June 19, 2016). They named it as “Nanau” means the home of harmony.

The usage of electricity is minimal and there are very few light points in the house. As the house has been architecture in such a way that it gets ample natural light. They are not living a “primitive life”- they have all the electronic appliances they want, supported by solar energy. Their philosophy is that we should take as less as possible from the Mother Nature and should work in favour of Mother Nature. Whatever we are taking from Mother Nature we should pay back in a healthy way (Sivaswamy, June 19, 2016).

Solar Suresh (Mr. Dwarkadas Suresh)

Suresh is a graduate of IIT-Madras and IIM-Ahmedabad and has worked as a marketing executive in textile companies and then became the MD of a textile group. The idea of electricity from solar energy came to him when he visited Germany and after returning to India, he applied this idea by fashioning a self-sustaining home (Pal, February 3, 2017).

Table II compares Rural – Urban Models of Adaptation and Mitigation

The Two Cultures		
Domain	Rural (Asha and Hari)	Urban (Mr. Dwarkadas Suresh)
House	The walls of the house are made of mud; the house is tremendously capacious having bedrooms, kitchen and hall. The estimated cost of the house is less than Rs. 3 lakhs.	Modern house with all the amenities of the present day requirements. He built a House that harvests rainwater, produces solar energy, organic food, and biogas.
Kitchen Gas	Exclusively biogas - all the waste generated in the house (including latrine) is converted into biogas.	Bio gas plant - all the waste generated in the house as well as buys from outside.

<i>Electricity and Electric Appliances</i>	Solar panels. They have all the electronic appliances they want, supported by solar power.	Solar panels. He has all the electronic amenities he desire, supported by solar power.
<i>Refrigerator</i>	Instead of using a fridge, they use simple baked brick and earthen utensils. Since the earthen pot keeps things under optimum temperature, the things stored never gets spoiled.	Modern Refrigerator that works on electricity generated from solar energy.
<i>Food and Vegetables</i>	They use naturally grown fruits and vegetables, they do not till the land. Natural manure is used without over-feeding the land with nutrients.	Rooftop Kitchen Garden with 70 pots. Organically growing about 15 types of vegetables. Bio-waste is used as manure.
<i>Water Management</i>	Natural as well as rain water harvesting	Rain water harvesting and <i>Water-Gen</i> that absorbs the humidity from air and converts it into potable water.
<i>Health</i>	Due to natural and simple they rarely fall sick; they haven't taken any medicines since last 17 years. If ever they have cold and fever, with some rest, liquids and fasting they get well (Sivaswamy, June 19, 2016).	Natural living has also benefited him and his family members' health.

Conclusion

The aim of this research article is to present rural-urban models of adaptation and mitigation. It is obvious from the Table II wherever an individual is living they can contribute – if they can contribute for GHG emission – they can contribute for mitigation and adaptation as well. For example, Suresh says that “I am applying the old concepts which people have now abandoned; they just need to flash back and can live a comfortable life without being dependent on others or on methods that harm the environment” (Pal, February 3, 2017). Further, He says that “by installing solar, domestic biogas, rain water harvesting, rooftop kitchen garden, creating urban forestry, clean air and water from air I have practically demonstrated that one can be self-sufficient and not depend on anyone” (Ram, n. d.). Asha and Hari express their love for Mother Nature, simple and healthy life style. From both the perspectives it can be well understood that, love for nature that comes from beliefs and values, and incentives (for e.g., better health, financial savings, healthy and hygienic food and fruits, etc.) are very important aspects of pro-environment behaviour. So, the article briefs about the psychological perspective of pro-environment behaviour – beliefs, values, incentives and courtesy for Nature. Further, personal interests and personality do play an important role in shaping pro-environment behaviour.

References

- Adams, J. (30 Aug 2018). *There is a forgotten solution to climate change that we must invest in – nature*. Retrieved on 26/10/2018 from: <https://www.weforum.org/agenda/2018/08/investing-in-a-forgotten-solution-to-climate-change-nature/>
- Bossio, D. (March 12, 2018). *Soils and Climate: From Hidden Depths to Center Stage?* Retrieved on 26/10/2018 from: <https://www.nature.org/en-us/what-we-do/our-insights/perspectives/soils-and-climate-from-hidden-depths-to-center-stage/>
- Bostrom, A., O'Connor, R. E., Böhm, G., Hanss, D., Bodi, O., Ekström, F., ... & Rosentrater, L. (2012). Causal thinking and support for climate change policies: International survey findings. *Global Environmental Change*, 22(1), 210-222.
- Bureau, L. (2010). Report on Employment & Unemployment Survey (2009-10). *Ministry of Labour & Employment, Government of India. Bureau of Labour Statistics, Govt. of India*. Available at: http://labourbureau.nic.in/Final_Report_Emp_Unemp_2009_10.pdf
- Central Water Commission. (2016). *Flood Management Projects*. Retrieved on 06/12/2018 from: <http://cwc.gov.in/newsite/FMProjects.html>
- Corner, A., Markowitz, E., & Pidgeon, N. (2014). Public engagement with climate change: the role of human values. *Wiley Interdisciplinary Reviews: Climate Change*, 5(3), 411-422.

- Cruz, R. V., Harasawa, H., Lal, M., Wu, S., Anokhin, Y., Punsalmaa, B., ... & Huu Ninh, N. (2007). Asia. In 'Climate Change 2007: impacts, adaptation and vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change'.(Eds ML Parry, OF Canziani, JP Palutikof, PJ van der Linden, CE Hanson) pp. 469–506. *Cambridge, UK: Cambridge University Press. Accessed February, 28, 2013.*
- Current Affairs (November 27, 2017). *Drought, heatwaves increasing in frequency, area in India: IISc Study.* Retrieved on 08/12/2018 from: <https://currentaffairs.gktoday.in/drought-heatwaves-increasing-frequency-area-india-iisc-study-11201750310.html>
- Global Catholic Climate Movement. (n. d.). *The top environmental problems are selfishness, greed, and apathy and resignation. We need spiritual and cultural transformation.* Retrieved on 26/5/2020 from: <https://catholicclimatemovement.global/the-top-environmental-problems-are-selfishness-greed-and-apaty-and-resignation-we-need-spiritual-and-cultural-transformation/>
- IEA International Energy Agency (2013). *CO2 emissions from fuel combustion – highlights.* Retrieved on 06/12/2018 from: <http://www.iea.org/co2highlights/co2highlights.pdf>.
- IEA International Energy Agency (2018). *CO2 emissions from fuel combustion – highlights.* Retrieved on 06/12/2018 from: http://www.indiaenvironmentportal.org.in/files/file/CO2_Emissions_from_Fuel_Combustion_2018_Highlights.pdf
- IPCC (2014). Summary for Policymakers. In: *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
- Leiserowitz, A., Thaker, J., Feinberg, G., & Cooper, D. (2013). *Global warming's six Indias.* In: *Yale University (ed.) Yale Project on Climate Change Communication.* Yale University, New Haven .
- NASA. (October 15, 2018). *Responding to Climate Change.* Retrieved on 26/10/2018 from: <https://climate.nasa.gov/solutions/adaptation-mitigation/>
- National Action Plan on Climate Change [NAPCC] (2008). Available from: <http://pmindia.nic.in/Pg01-52.pdf> [last assessed on 2008 Oct 11]
- O'Brien, K. L., & Wolf, J. (2010). A values-based approach to vulnerability and adaptation to climate change. *Wiley Interdisciplinary Reviews: Climate Change*, 1(2), 232-242.

- O'Neill, S., & Nicholson-Cole, S. (2009). "Fear won't do it" promoting positive engagement with climate change through visual and iconic representations. *Science Communication*, 30(3), 355-379.
- Padmanabhan, V., Alexander, S. & Srivastava, P. (n. d.). *The growing threat of climate change in India*. Retrieved on 26/05/2018 from: <https://www.livemint.com/news/india/the-growing-threat-of-climate-change-in-india-1563716968468.html>
- Pal, S. (February 3, 2017). *This man built a house that harvests rainwater, produces solar energy, organic food, and biogas!* Retrieved on 27/11/2018 from: <https://www.thebetterindia.com/85088/solar-suresh-chennai-tamil-nadu-biogas-rainwater-harvesting-organic-garden/>
- Pandey, K. (December 27, 2018). *Rewind 2018: How much India changed with climate change*. Retrieved on 06/12/2018 from: <https://www.downtoearth.org.in/news/climate-change/rewind-2018-how-much-india-changed-with-climate-change62609#:~:text=The%20Economic%20Survey%202018%20said,Bank%20report%20released%20in%20June.>
- Ram, V. (n. d.). *'Solar Suresh' – Make the smartest energy choice under the Sun*. Retrieved on 12/12/2018 from: <https://www.hrdots.com/inspired-life-solar-suresh-chennai/>
- Recharte, J. (December 6, 2017). *These indigenous communities are models for how to adapt to climate change*. Retrieved on 26/10/2018 from: https://www.washingtonpost.com/news/the-worldpost/wp/2017/12/06/climate-change-glaciers/?noredirect=on&utm_term=.d51df988e34f
- Scarlett, L. (August 14, 2018). *Climate action from the ground up*. Retrieved on 26/10/2018 from: <https://www.nature.org/en-us/what-we-do/our-insights/perspectives/climate-action-from-the-ground-up/>
- Singh, B. & Rajawat, P. R. (2019). Role of personality, self-attitude and climate change perception in prevention of climate change. *Indian Journal of Psychology and Education*, 9(1), 174-179
- Sivaswamy, R. (June 19, 2016). *This couple's quest for natural living has resulted in a mini forest and an energy efficient home*. Retrieved on 27/11/2018 from: <https://www.thebetterindia.com/57389/energy-efficient-house-natural-farm-medicine-free-life-couple-live-life-closest-nature/>
- Sohn, E. (2014). *Climate change and the rise and fall of civilizations*. National Aeronautics and Space Administration.
- Times Of India. (TOI, Oct 17, 2018). *'India among 5 economies worst hit by climate change'*. Retrieved on 30/08/2018 from: <https://timesofindia.indiatimes.com/home/environment/india-among-5-economies-worst-hit-by-climate-change/articleshowprint/66253350.cms>

- Whitmarsh, L. (2011). Scepticism and uncertainty about climate change: Dimensions, determinants and change over time. *Global Environmental Change*, 21(2), 690-700.
- Wolf, J., Alice, I., & Bell, T. (2013). Values, climate change, and implications for adaptation: Evidence from two communities in Labrador, Canada. *Global Environmental Change*, 23(2), 548-562.
- World Bank Group. (June 19, 2013). India: Climate Change Impacts. Retrieved on 30/08/2018 from: <https://www.worldbank.org/en/news/feature/2013/06/19/india-climate-change-impacts>
- Yang, A. (June 11, 2018). *Interventions: Natural infrastructure*. Retrieved on 26/05/2018 from: <https://hoffmanncentre.chathamhouse.org/article/natural-infrastructure-for-livelihoods-planetary-and-human-health/>

