



A Conceptual analysis of tech green warriors and their contribution towards climate change

¹Sanjai. B. R., ² Daniel John. K J

¹ Undergraduate student, ² Research scholar

¹ School of Science,

¹ CHRIST (Deemed to be University, Bangalore, India.

Abstract: Climate change has established its agenda against humankind thus affecting the prerequisites of population health. This is an outbreak of human intervention with the nature and we have led ourselves towards the disasters of global warming and other consequences. Gender equality serves as an avenue for the crisis at the outset. As women face more difficulties during an outbreak or disaster due to climate change, they have been playing a crucial role in the fight against climate change. The current study aims at exploring the prospects of women participation in climate change interventions through technological innovations. The study is descriptive in nature with six case studies involved. The results show that their contribution to technological innovations serves as a platform to connect with climate activists, spread awareness and empower other women in their agenda to fight against climate change.

Keywords: Climate change, Technology, Green Warriors

The climate crisis has already been solved. We already have facts and solutions. All we have to do is wake up and change. – Greta Thunberg. [1]

I. INTRODUCTION

Tarcila Rivera, advisor in Peru and a Quechuan activist working with grantee partner the Centre for Indigenous Cultures of Peru (CHIRAPAQ) quoted - “We, as indigenous women and indigenous people, believe it’s vital to take into account our knowledge to prevent and adapt to climate change, because the communities are the ones who know how.” [2].

Climate change poses a significant threat to the population, the environment, and economies around the world. Resulting in a range of interdisciplinary and cross disciplinary studies which focused on the most efficient means of alleviating the worst excesses and adapting to the realities of global warming. [3]. People are affected based on their cultural, economic, environmental and social context. The integrity of social science perspective is slow in climate change and feminist research perspective is much slower. There is a need to understand “sociology of climate change” to understand root cause and to adjust to climate change. [4]

In low- and middle-income countries (LMICs), the responsibility for collecting water for household is 8 in 10 women. Women are worldwide responsible for more than 70% of water-related tasks and management. Women make up over 65% of the agricultural workforce in India alone. [5]. Hence, investing in women generates a ripple effect that provides multiple benefits, not only to individual women, but to a nation. A study found that countries with higher female parliamentary representation are more likely to ratify international treaties regarding the environment. Research suggests women use resources sustainably while having stable rights and access to land. Even women in mitigating climate change help ensure sufficient clean air, safe drinking water, sufficient food and secure shelter for future generations. [6].

The UNFCCC (2005) describes adaptation technologies as a key with a comment “the application of technology in order to reduce the vulnerability, or enhance the resilience, of a natural or human system to the impacts of climate change”. [7]. Females still lack access to technology, as well as knowledge and instruction on the use of acceptable technologies. Their voices are very rarely heard in technology transfer debates. Views of women are at risk in different parts of the world. This explains why women are strongly rejected of risky technologies such as nuclear power, genetically modified organisms, as well as large hydroelectric dams that could have a negative impact on the environment and local communities. Technology exchange should therefore be a new strategy of cooperation. Therefore, efforts to transfer technology should include a gender perspective to ensure that gender-specific data is collected to assess the technology needs of different stakeholders and to ensure that these needs are reflected and prioritized. Women must be equally involved in the process of Fair and equitable access to secure technology so developing countries can build and develop their own technological base. [8]

II. REVIEW OF LITERATURE -

This study focuses on women who belong to the age group of 18 to 25 who are using the technologies to change the world. Tech women warriors are women who fight the world crisis of climate change using technology as a tool. The role of technology has always been contested in terms of sustainability. Their technology is viewed as either part of the problem or part of the solution. It is the old technology that caused the issue of climate Change and the counter can be new technology but it is the consumer who decides to choose. [9] Hence, the need for improved capability has rendered technology transfer a high priority on both the international development agenda and the climate change negotiations. [10]

Bill Gates stated that "we need an energy miracle," to have a stand so he and some of the richest people in the world have created a fund to invest in technology-driven solutions by bring together governments and research institutions and billionaire investors. Nuclear power, electric cars, lab-grown meat, carbon engineering, building smart cities these are the 5 major projects which is going on. [11]

The U.N. Suggests that we need to narrow the emission gap by 2030. The collaboration of the private sector must increase to fill the gap. The survey of research firm Concentrix with U.S. business decision-makers involved in environmental sustainability showed 74% believe emerging technology holds enormous potential to solve the challenges of climate change and 92% believe it will help organize detect issues and solutions. [12]

III. OPERATIONAL DEFINITIONS:

Tech green warriors - Tech green warriors are individuals who are helping the world to respond to climate change using technology.

Climate change - Climate change applies to any major change in climate policies that persists longer. This includes global warming lead by human activities.

IV. RESEARCH OBJECTIVES-

1. To understand the participation of women in climate change.
2. To explore the prospects of women participation in Climate Change interventions through technological innovations.

V. CONCEPTUAL ANALYSIS OF SIX WOMEN-

A case analysis of six women activists working towards climate change with the help of technology and innovation was done. This s a Non-participant Observational study where a Review of Secondary data and literatures were performed and A reflective analysis of six tech green warriors working towards climate change with the help of technology and their innovation was done. The samples are from Azerbaijan, India, USA, and Sweden.

Case- 1

Reyhan jamalova is a Student Inventor active from 2017-2020. Jamalova, 15, created a product called ' Rainergy, ' built to harness rainwater as a source of electricity. [13] She was the youngest delegate at the 8th Global Entrepreneurship Summit organized in India in November 2017. She also received an honourable mention at the 2017 UN Model Conference in Azerbaijan and made it the final stage of the Climate Launch pad series, Europe's biggest green business idea award. Her work is focused on SDG 7: Affordable & Clean Energy. According to the Global Tracking System 2014 survey, 21 per cent of the population in India and 11 per cent in the Philippines need access to electricity. Where monsoon rains are regular, this system could be the perfect solution to minimise reliance on power lines and increase access to electricity. She is only 16 and is clamed one of world's 100 most inspiring females. [14]

Case- 2

Miranda Wang is an entrepreneur, environmental advocate and inventor. Miranda Wang and Yao serve are the co-founder and Chief Executive Officer of BioCollection Inc., an innovation company that turns non-recyclable plastic waste into valuable chemicals. [15] they are active from the year 2015- 2020. Bacterial strains that have the potential to naturally degrade phthalates have been discovered. GreenWaste Recovery and Recology is an idea which increases her operation 200x to demonstrate the effectiveness and practicality of her technology, which can process 5 metric tons of waste per day using modularized in standardized machines. [16] Their work earned a regional first place in British Columbia at the 2012 Sanofi BioGENEius Challenge Canada, as well as a special award for the most commercial potential at the finals of the competition. ROLEX Awards for Enterprise In 2018, Wang received the United Nations Environment Programme Young Champions of the earth award. Wang's business received the Perlman Grand Prize at the Wharton Business Plan Competition in 2016, earning \$30,000 for their activities. In 2019, BioCollection was the second in the Urban Resilience Challenge who provide financial support to entrepreneurs. [17]

Case- 3

Sunita Narain is the Director General of the India-based research institute the centre for science and environmental communications, Editor of fortnightly magazine, Indian environmentalist and political activist. She is active from the year 1982-2020. [18]Over the years, Narain has also established the administrative and financial support structures required for the Centre, which has over 100 staff members and a diverse programme profile. She has co-authored Global warming in an unequal world: A case of environmental colonialism, this has establishing the principle of equity in the framework convention on climate change with its subject importance. [19] She was given the Chameli Devi Jain Award for Outstanding Female Mediaperson in 2004, and the Government of India granted her the Padma Shri in 2005. The Stockholm Water Prize was presented to the Climate and Environment Centre under her guidance in 2005. Sri Raja-Lakshmi Foundation, Chennai, awarded the Raja-Lakshmi Award for

the year 2009. In 2016 Narain was given the IAMCR Climate Change Communication Analysis Award in Practice. She was on Time's 100 Most Influential People chart in 2016. She has about nine publications. [20]

Case- 4

Kate Marvel is a Climate scientist, Science writer, Associate Research scientist at NASA. She started her work from 2000 to 2020. Her active fields of research in climatology, science innovation where she has a lot of research publications of nearly 43 publications and 23 books. [21] [22] Her Current research centres on climate modelling are trying to better predict how much the Earth's temperature will rise in the future. This has led her to investigate the effects of cloud cover on modelling rising temperatures; this is proved to be an important factor in climate models. [23] She utilises satellite observations and computer models to track and describe the changes that are happening around us. Her work suggests that human activities already affect global rainfall patterns and cloud patterns. [24] She feels she would not have been able to do this work, which requires sophisticated computer models, 10 years back. She feels We're gearing up for the next generation of climate models. She expects this new batch of models will produce more than 20 million billion bytes of data. Climate is one of the world's biggest data problems according to her. [25]

Case- 5

Petra Wadström is active from year 2013. Solvatten is the brainchild of Petra Wadström, the Swedish founder. Wadström's completed her invention in 2003. Solvatten is a Swedish enterprise that takes the Solvatten Solar Safe Water Program to consumers, NGOs and retailers around the globe. [26] Water purifier Solvatten is already used in more than 20 countries by 60,000 households. The approach is being implemented in some 40 separate humanitarian programs managed by organisations such as UNICEF, Plan International and Norwegian Refugee Aid, which spread Solvatten and teach the value of water treatment, sanitation and health. Currently 120,000 units sold globally, SOLVATTEN is protecting lives daily. [27]. She has been awarded with Panellist Nobel Week Dialogue Water Matters, Sweden's 100 most influential environmentalists, Sweden's top 100 women, The Polhem Prize, The Energy Globe Award Mali, Outstanding Achievement Award 2012, SACC NY Deloitte Green Award, Änglamarks Prize, Best Green New Product Innovation, Climate Solver, Skapa Prize. [28]

Case- 6

Nivedha R. N is CEO & Founder at Trashcon Labs Private Limited is active from 2016. Ms. Nivedha is a prominent participant in numerous national and International waste management conferences where she is invited as a guest. She is also a popular TEDx speaker. At a humble age of 21 she launched TrashCon and is now hitting 30,000 lives every day. [29] Its awards include the 2018 Skoch Award, the 2018 CII Best Woman Start-up of the Year Award, the Top 30 Economic Times start-ups, the Top 100 Karnataka Government Inventions to name but a few. The technology has been widely recognized and distributed through 50+ media outlets. It is now applied successfully across Gujarat and Bengaluru and has ongoing projects in four other states. [30]

VI. MAJOR FINDINGS-

Cases	Impact
1	According to the Global Tracking System 2014 survey, 21 per cent of the population in India and 11 per cent in the Philippines need access to electricity. Where monsoon rains are regular, this system could be the perfect solution to minimise reliance on power lines and increase access to electricity. She is only 16 and is claimed one of world's 100 most inspiring females. [14]
2	GreenWaste Recovery and Recology idea to increase her operation 200x to demonstrate the effectiveness and practicality of her technology, which will be modularized in standardized machines which can process 5 metric tons of waste per day. [16]
3	Sunita Narain was on Time's 100 Most Influential People chart in 2016. She has co-authored Global warming in an unequal world: A case of environmental colonialism, this has establishing the principle of equity in the framework convention on climate change with its subject importance. [19]
4	Her Current research centres on climate modeling are trying to better predict how much the Earth's temperature will rise in the future. This has led her to investigate the effects of cloud cover on modelling rising temperatures; this is proved to be an important factor in climate models. [23]
5	Water purifier Solvatten is already used in more than 20 countries by 60,000 households. Currently 120,000 units sold globally. [27] She is Sweden's 100 most influential environmentalists. [28]
6	The technology has been widely recognized and distributed through 50+ media outlets. It is now applied successfully across Gujarat and Bengaluru and has ongoing projects in four other states. [30]

Climate change affects livestock, natural disasters and climate change induced displacement that affects women differently and more seriously because of social roles like sexism and deprivation. Hence the importance stands for the participation of women.

Here women are young and have great ideas and responsibility. Their idea has made a difference irrespective of gender. Here women have had faith in their ideas and thanks what made it a success. They are serving as examples for the coming generations to think and react.

Media has played a major role by creating awareness on the innovations to a larger scale. There are government bodies and NGOs that have recognized the importance and the right use of these innovations in the present time. They are provided with funding to serve their innovation on a large scale. The participation of women in the frontier of climate change is a light to women empowerment.

VII. RECOMMENDATIONS-

Digital education can also be a tool to empower women, as well as how to use economic measures to close the gender pay gap in markets. Women must be encouraged in schools and colleges to come up with ideas and implement it practically. Encouraging women to lead and to become leaders is a path for ideas that promote sustainability. We must find and support the activities of change makers in the world. Involving Women early can use their expertise and imaginations to come up with technological approaches to the things that concern most. Women speakers must be given opportunities to express their thoughts either during a protest or academic conference.

VIII. CONCLUSION-

This case study has dealt with the role of women in climate change where an analysis of six tech women was done. We understand the importance of equal participation of both men and women is necessary. Technology has always been a part where women exposure has been limited. Now women are not only involved in studying technology they have made innovative technological contributions for the world. In our case study there are examples of inventions of new technology by women towards climate change. The verbal statements of tech warriors in the case study show age is just a number and with an idea you can change someone's life may it be yours or the people benefited by fighting climate change their and protecting the world and themselves. Here everyone has tried to improve their finding and implement their ideas on a large scale. They have found ways to educate people on their Nobel work through media and books. This has also motivated many parts of the world to fight climate change.

IX. References-

- [1] N. Gowthaman, "Makers India," 29th Sep 2019. [Online]. Available: <https://yourstory.com/herstory/2019/09/motivational-quotes-climate-activist-greta-thunberg>. [Accessed 6 jan 2021].
- [2] T. Rivera, "global fund for women," 1987. [Online]. Available: <https://www.globalfundforwomen.org/8-quotes-women-land-defenders-earth-day/>.
- [3] M. Alston, "Women and adaptation," Advanced Review, 2013 John Wiley & Sons, Ltd, p. 351, Volume 4, September/October 2013 .
- [4] B. L. C. V. K. A. M. B. B. S. Houria Djoudi, "Beyond dichotomies: Gender and intersecting inequalities in climate change studies," Springer, p. S248–S262, 2016.
- [5] G. Ethiraj, "IndiaSpend," 2011. [Online]. Available: <https://www.indiaspend.com/women-may-be-more-vulnerable-to-climate-change-but-data-absent/>.
- [6] "Invest in Women to Tackle Climate Change and Conserve the Environment," 2007. [Online]. Available: <https://womendeliver.org/investment/invest-women-tackle-climate-change-conserve-environment/>.
- [7] T. E. C. T. f. A. i. t. A. sector, "Technologies for Adaptation in the Agriculture Sector," United Nations Framework Convention on Climate Change, Platz der Vereinten Nationen 1, 53113 Bonn, Germany , November 2014.
- [8] "Technology transfer and exchange," 2010. [Online]. Available: <https://gendercc.net/genderunfccc/topics/technology-transfer.html>.
- [9] S. Axon, "Addressing Climate Change and the Role of Technological Solutions," HUMAN GEOGRAPHIES – Journal of Studies and Research in Human Geography, pp. 4.1, 43-52, May 2010.
- [10] J. R. M. J. S. J. K. R. N. K. A. S. C. B. M. Ogunlade Davidson, "Climate Change: Technology Development and Technology Transfer," United Nations Department of Economic and Social Affairs, pp. 2-4, 7-8 November 2008 .
- [11] "world economic forum," 9 january 2017. [Online]. Available: <https://www.weforum.org/agenda/2017/01/tech-innovations-save-us-from-climate-change/>.
- [12] T. Brady, "greenbiz," 23 january 2019. [Online]. Available: <https://www.greenbiz.com/article/how-emerging-tech-can-counteract-climate-change>.
- [13] REYHAN-JAMALOVA, "Reyhan Jamalova," [Online]. Available: <https://peoplepill.com/people/reghan-jamalova/>.

- [14 u. N. Network, "Only 16 and a CEO, Reyhan Jamalova is one of world's 100 most inspiring females," 25 november 2018. [Online]. Available: <https://www.ummid.com/news/2018/November/25.11.2018/only-15-and-a-ceo-reyhan-jamalova-is-one-of-worlds-100-most-inspiring-females.html>.]
- [15 "CITEO," [Online]. Available: <https://www.circular-challenge.com/en/participants/biocollection>.]
- [16 M. Wang, "UCLA," [Online]. Available: <https://www.ioes.ucla.edu/person/miranda-wang/>. [Accessed 06 01 2021].]
- [17 "mission blue," 17 july 2017. [Online]. Available: <https://mission-blue.org/2019/07/a-solution-to-the-plastic-pollution-problem-with-miranda-wang-2019-rolex-awards-for-enterprise-laureate/>.]
- [18 "Centre for Science and environment," [Online]. Available: <https://www.cseindia.org/page/sunita-narain>.]
- [19 S. Narain, "Centre for Science and Environment," 2020. [Online]. Available: <https://www.cseindia.org/page/sunita-narain#:~:text=Narain%20began%20work%20on%20climate,framework%20convention%20on%20climate%20change..> [Accessed 06 1 2020].]
- [20 "Sunita Narain," 21 november 2019. [Online]. Available: https://en.wikipedia.org/wiki/Sunita_Narain.]
- [21 "SCIENTIFIC AMERICAN ARABIC," [Online]. Available: <https://www.scientificamerican.com/author/kate-marvel/>.]
- [22 "Kate Marvel," [Online]. Available: <https://scholar.google.co.in/citations?user=cC8JXpQAAAAJ&hl=en>.]
- [23 "wikipedia," 06 1 2021. [Online]. Available: https://en.wikipedia.org/wiki/Kate_Marvel#:~:text=Marvel's%20current%20research%20centers%20on,important%20variable%20in%20climate%20models.. [Accessed 15 December 2020].]
- [24 TED, "TED," july 2017. [Online]. Available: https://www.ted.com/speakers/kate_marvel.]
- [25 L. HICKMAN, "Carbon Brief," 24 october 2018. [Online]. Available: <https://www.carbonbrief.org/carbon-brief-interview-dr-kate-marvel>.]
- [26 P. Wadström, "Solvatten," 2016. [Online]. Available: <https://solvatten.org/about-us/>.]
- [27 n. media, "Nobel Week Dialogue," 2020. [Online]. Available: <https://www.nobelprize.org/events/nobel-week-dialogue/stockholm-2018/panellists/petra-wadstrom/>.]
- [28 "Solvatten," 23 october 2019. [Online]. Available: <https://en.wikipedia.org/wiki/Solvatten>.]
- [29 N. RM, "tecon," 2019. [Online]. Available: <https://tieconkerala.org/speaker/nivedha-rm/>.]
- [30 "trashcon," 2019. [Online]. Available: <https://trashcon.in/>.]
- [31 P. Wadstrom, "Solvatten," 26 april 2017. [Online]. Available: <https://solvatten.org/tag/petra-wadstrom/>.]
- [32 Français, "GENDER AND SCIENCE," 2017. [Online]. Available: <http://www.unesco.org/new/en/natural-sciences/priority-areas/gender-and-science/cross-cutting-issues/climate-change-and-gender-equality/>.]

[33 S. PAL, "the better india," 2018. [Online]. Available: <https://www.thebetterindia.com/149453/electricity-from-rain-rainergy-reyhan-jamalova-innovation-india-news/>.

