

KNOWLEDGE ACTION GAP BETWEEN MOUNTAIN ECOSYSTEM & CLIMATE CHANGE POLICIES FOR LEGAL RAMIFICATION OF ENVIRONMENTAL LAWS IN UTTARAKHAND



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Abstract

Mountains are the repository of fresh air, water, forest and biodiversity. Countries across the world have large areas of land covered by mountains, and their resources are becoming more and more important for sustainable development. Nonetheless, national strategies rarely take into account the unique difficulties associated with growth in the mountains. The biggest perpetrator to the Mountains ecosystem is Climate Change. It is anthropogenic phenomena resorting to deplete the Mountain ecosystem. This problem has become peculiar, and the solutions are harder to adhere. The inadequacies of the appropriate framework, and the actual application differ, regrettably the rate at which global authorities are disclosing information. Different states have different perspectives, there are drastic differences between the shortcomings of a robust foundation and real implementation. Uttarakhand a newly formed 'Mountain State' is limited in financial resources, but abundant in Natural resources. Governance is an important aspect in a problem-solving situation of the contemporary political & environmental world. The present paper will review the statute of Mountain Ecosystem and Climate Change in terms of International, National & Local Governance. It will study the foundation laid down by "United Nation Framework Convention on Climate Change" (UNFCCC) and will proceed towards "Conference of Parties"

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(COP) 28 agendas for Climate change and its trans-border effects. International instruments like Alpine Convention, “Carpathian Convention”, Ch13 Agenda 2 of Earth summit, and few other such instruments can be a study base for empowering the Governance in Uttarakhand for mitigating Climate Change and framing the mountain laws for protection of the environment in Uttarakhand. The Forest research Institute and Uttarakhand State disaster management authority, are some hidden gems working as a silent warrior. These warriors need to be consolidated with certain inclusions and resonance with foreign conventions. Local laws like “Uttaranchal Contingency fund Act” 2001, and “Uttarakhand Anti Littering and Anti Spitting Act” 2016, are helpful legislations but they require careful revisions. The present study will showcase a Knowledge Action Gap between Mountain Ecosystem and Climate Change policies by harmonizing state and federal legislation through trans-border information exchange in the legal, scientific, economic and technical domains. This paper will also focus on bringing public consciousness by creating an ecological world with sustainable development for present & future generations.

Keywords: *Mountain Ecosystem, Climate Change, Sustainable Development.*

INTRODUCTION

Uttarakhand, the 27th State of Indian Union was formed on the 9th of November, 2000. Uttarakhand is also termed as “terai” region which signifies lowland regions. The combination of low-lying mountains and high snow-peaked mountains adds to its complexity and beauty.¹ Uttarakhand is also known as Land of Gods (Dev Bhoomi). Had its own blessings and disguises. In recent years, the state of Uttarakhand has experienced a number of devastating occurrences, including floods, landslides, and cloud bursts. One major factor contributing to the deterioration of mountains is climate change. Every year that goes by, brings more disasters to the young Himalaya due to Climate Change. It leads to flash floods, unavoidable and exceptional rainfall, and, tragically, glacial lake eruptions that worsen them. It destabilizes delicate ecosystems on a massive scale and deprives individuals who are extremely susceptible to a variety of social and economic issues. Reviving its legal structures and policies is currently imperative and a necessity. As conditions

¹Kavita Tariyal, “Climatic fluctuations in Uttarakhand Himalayan region and resulting impacts” A review. Archives of Agriculture and Environmental Science, 124-128 (2017)



change and the relative importance of legal, social, and economic requirements shifts, so does the common law. New ideas are introduced, and new laws have an impact on non-statutory law. The common law's strength lies in its capacity to grow and formulate laws for the pressing need.² The paper focuses Legal strata of Mountain Ecosystem and Climate Change. It will highlight the detailed International, National and local policies of each respectively. The study will further enlighten the Knowledge action gap between the two. Henceforth the paper details the suggestive ramification of environmental laws for Uttarakhand State.

(A) THE MOUNTAIN ECOSYSTEM

The National Biodiversity Action Plan of India outlines the three components of the mountain ecosystem. (1) Himalayas, they are vividly expanded mountain ranges of India (2) Western Ghats, they are distinct ecological ranges, this region is considered with locations that are the hottest of biological diversity in the world, it is due to its exceptionally high levels of endemism and biological diversity. (3) Aravalli are the oldest mountain system in India and form the southern boundary of the central highlands.³ The Himalayan range where Uttarakhand subsides is the primary focus of this research. The Mountain ecosystem needs a multifarious attention, compiling deep-seated efforts with Governmental arrangements. All concerned nations, civil society organizations, indigenous peoples, and farmer's organizations must participate in the international community's thorough discussion of the crucial governance issue in a manner that is blatantly democratic, multilateral, open, and accountable.⁴ Mountain specific international, national and local instruments are studied hereunder.

(I) INTERNATIONAL GOVERNANCE,

The European nations have been active contributors in formulating the conventions. "On issues including a European component, however, the Treaty is like a wave that is coming in. It rises the rivers and enters the estuaries. There is no stopping it.

²A.T.M.Smith, Glanville Williams: Learning the Law, 124 (Thomson Reuters, London, 16thed.,2016)

³<https://www.cbd.int/doc/world/in/in-nbsap-v3-en.pdf> (last visited on October 26, 2024)

⁴Mike Hulme, Can Science fix climate change? A case against Climate Engineering, 85 (Polity Press, Cambridge, 1st ed.,2014)

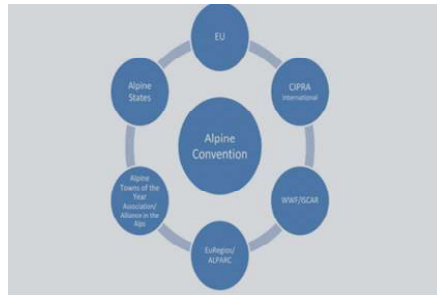


Fig 1. Institutional Arrangements in Alpine Convention⁷

The Treaty will now be a part of our legislation, according to a proclamation by Parliament. It has the same legal weight as any statute.”⁵ The Alpine Convention, the initial international pact dealing with the mountain range in Europe. The snow clad peak with mesmerizing flora and fauna are the shelter of many living inhabitants of the European countries, for protecting its sanctity, the convention was signed in Salzburg (Austria) on 7th November 1991.⁶ The Convention ensures Cooperation in statute, technology, research & finances for the development of participant countries.

The diagram shown above exclaims that the convention fits perfectly for the task predetermined to be solved by Governance Arrangements. “International Commission for the Protection of the Alps (CIPRA)” is an independent organization working for no profits, formed since 1952 for the Alps’ conservation and equitable development”.⁸ The convention has a research committee termed as “International Scientific Committee on Research in the Alps (ICSAR)”.⁹ “Permanent Committee” is the governing entity of the Alpine Conference. The Permanent Secretariat gives administrative assistance to its member countries for channelizing the convention and its protocols. Alpine Town of the year is an event to encourage local inhabitants and promote development. The Alpine State is a symbol of harmony between the populace and the government. The Alpine Convention was also a forerunner in the

⁵H.P. Bulmar Ltd Vs Bollinger SA& ORS (1974) EWCA Civ 14

⁶<https://www.fao.org/4/y3549e/y3549e14.htm#TopOfPage> (last visited on September 19, 2024)

⁷Johannes Buhl, “The Alpine Convention and New Modes of Governance: The Alpine Convention as evidential support for New Governance Arrangements” Marie Curie Chair in Public Policies, Charles University Prague 4 (2011)

⁸<https://www.cipra.org/en/topics/alpine-politics/alpine-convention> (last visited on September 19, 2024)

⁹<https://iscar-alpineresearch.org> (last visited on September 21, 2024)



implementation of the Agenda 2030. It is the first example of a global application of the Sustainable Development Goals (SDGs), having existed long before the United Nations established them in 2015.¹⁰ “Framework Convention on the Protection and Sustainable Development of the Carpathians”, joins seven “Carpathian” countries in an unprecedented partnership for collaboration and multisectoral policy for their mountain development . It is a platform for creating and carrying out international policies, programs, and projects for safeguarding and sustainably developing the area. It is also an open forum for public and stakeholder participation.¹¹ In Rio Declaration Mountain agenda was elaborated in Chapter 13, detailing that the global ecosystem depends on mountain settings, a significant ecosystem that reflects the intricate and interconnected ecology of our world.¹² “Regional Act No.15” on interventions concerning the protection, the development and improvement of mountain territories (Act No. 12 of 2002). Protecting the environment, preserving soil, and boosting economic activity in mountainous regions are some of the goals of this mountain policy.¹³ Within the act the Regional Council will specify the overarching objectives in the Development Plan of Mountain Areas under art.3. Additional provisions address the allocation of local entities’ competencies in this area. Specifically, Mountain Communities are responsible for carrying out administrative duties related to agriculture under art.5. It calls for the creation of the Regional Fund for Mountains under art.7. and also creates the Standing Council for Mountains under art.6. It also has a unique information system pertaining to mountain regions under art.8. Additional clauses address the supply of subsidies in certain production areas, including forestry, agriculture, and zoo-technics. An act might help other mountain nations. Nonetheless, the environment in the mountains is changing quickly. They are vulnerable to landslides, increased soil erosion, and the quick loss of genetic variety and habitat. On the human side, there is a loss of traditional knowledge and pervasive poverty among people living in the mountains. As a result, environmental degradation is occurring in the majority of mountain regions

¹⁰<https://www.alpconv.org/en/home/convention/framework-convention/> (last visited on September 27, 2024)

¹¹<http://www.carpathianconvention.org/convention/framework-convention/> (last visited on September 20, 2024)

¹²https://www.iau-hesd.net/sites/default/files/documents/rio_e.pdf (last visited on September 21, 2024)

¹³<https://leap.unep.org/en/countries/it/national-legislation/regional-act-no-15-interventions-concerning-protection> (last visited on August 12, 2024)



worldwide. Therefore, prompt action is required to ensure the sustainable oversight of mountain development and the socioeconomic advancement of the populace.

(II) NATIONAL INTROSPECTION

National laws create the framework for the laws that govern a nation, establishing standards and regulations for social interactions and governance. In terms of the Indian Constitution the following Articles have enunciated the term Environmental Constitutionalism. “The State endeavor to safeguard the environment, protecting the forests and wild life of the country.”¹⁴ “Firstly, by relying upon the Directive Principles of State Policies imbibed under art.48A and art.51A(g) the Constitution has to maintain, preserve and promote the environment, to have empathy for all living things and to preserve and enhance the natural environment, which includes the forest, lakes, rivers, and wildlife.”¹⁵ “Dr Ambedkar responded to art.32 in the Constituent Assembly by saying, “ If I had to choose just one article of the Constitution as the most crucial—one that would render the entire document meaningless without it—I would only mention this one.” This statement resonates with the foundation of everything that the constitution has laid down. It is the essential and fundamental part of the Constitution. In addition to enforcing fundamental rights, a High Court may issue these writs to remedy any further injury or illegality brought about by infringing the law.”¹⁶ “The interpretation of art. 48A. and art.51A(g) must be based on art.21. which states that “No one may be dispossessed of their life or freedom unless a statutory procedure is followed. Any disruption of the fundamental components of the environment—soil, water, and air—that are essential to life as defined by art.21. of the Constitution would be dangerous to life.”¹⁷ Indian legal strata are at deficiency to give legal protections to the mountains hence they acknowledge Mountains under Forest acts. “The Indian (Forest) Act of 1927” includes the laws concerning taxes applied on timber and supply chain of forests goods. “Forest Conservation Act 1980”, was passed with the intention of preventing additional deforestation. ”Forest Right Act (FRA) 2006” discusses how the nation’s

¹⁴The Constitution of India, art 48(A).

¹⁵M/S Khandelwal Paper Industries vs. Rajasthan State Pollution Control Board and ORS, (S.B.Civil Writ Petition No. 11299/2022)

¹⁶Durga Das Basu, Introduction to The Constitution of India, 152-153(Lexis Nexis, Gurgaon, Haryana, 26th ed.,2022)

¹⁷M.C. Mehta v. Kamal Nath (1997) 1 SCC 388



persistent colonial-era forest laws have weakened the rights of populations that live in forests (such Scheduled Tribes) over land and other resources throughout time. “The Compensatory Afforestation Fund Act, 2016”. In the Supreme Court ordered that a compensation afforestation fund to be established. The fund’s primary uses would be plantations, forest protection, wildlife conservation, and other similar initiatives.”¹⁸ “The National Mission for Sustaining the Himalayan Ecosystem” seeks to improve knowledge of the climate and the Himalayan ecosystem. It also contributes to sustainable development in the region and works to preserve a delicate ecosystem.¹⁹ One of the mission’s approaches involves sharing knowledge with South Asian states and others who belong to the Himalayan ecosystem. Such missions must be valued and carried out with discipline.

(III) LOCAL INTROSPECTION

Local laws function as a way to codify cultural norms and ethics by reflecting the values, beliefs, and priorities of a society. Uttarakhand “The Uttaranchal Contingency Fund Act, 2001” has been formulated under Clause (2) of “(art.267) of the Constitution to cover unforeseen expenses. The Fund is at the discretion of the Governor of Uttarakhand. The Local Government can withdraw Five hundred crores from the Consolidated fund and can use it further under the said act.²⁰ Agriculture Produce Marketing Act, 2011(Uttarakhand) s.61A(1) states that the “Revolving Fund” established to use money for the promotion, acquisition, and processing of organic and traditional agricultural products grown in the state’s mountainous regions. Under s.62(2). Kendriya Mandi Fund to be utilized for the following purposes, namely- (b) development works in the hilly areas.²¹ “Uttarakhand Anti littering and Anti Spitting Act, 2016”. s.3(i) refers to the term “public place” which means any public highway, street, road, hillside, drain, etc. “Offences” define under s.4 Any person who dries or desecrates any article of food or any article or thing in any public place is an offence under s.4. The Authorities like the urban local body or authorized officer are define under s.5, they may

¹⁸T.N. Godavarman Thirumulpad Vs Union of India [Writ Petition (Civil) No.202 of 1995]

¹⁹https://dst.gov.in/sites/default/files/NMSHE_Mission_document.pdf (last visited on September 12, 2024)

²⁰https://highcourtofuttarakhand.gov.in/files/Contingency_Fund_Act,_2001.pdf (last visited on September 12, 2024)

²¹https://www.indiacode.nic.in/handle/123456789/5033?view_type=browse (last visited on September 13, 2024)



order to remove the litter under s.5. “Any person who contravenes the provisions of this act shall be punished under s.9 with such fine, as per the local Government”.²² Pollution on Mountain is a matter of concern and pathos. The said legislation is not strong enough to punish the offender as the act symbolizes with penalty as determined by the state government. Forest Department in Uttarakhand is responsible for managing some of the diversified forests and divergent nature in India. “The Van Panchayat -Due to the indiscriminate deforestation of civil forests, the Van Panchayat Act of 1931 gave the villagers the authority to control forest use within their borders by following certain guidelines and being supervised by the Revenue Department”.²³

(B) CLIMATE CHANGE

According to “United Nations framework convention on climate change” UNFCCC, art.1(2). “Climate change” is alteration in the atmosphere due to human initiatives, whether immediate or incidental that influences the global atmosphere and harnesses the natural climate shifts over regular time spans.²⁴ City dwellers endure & damages the environment more by greenhouse gas emissions, and are causing greater global warming than their rural counterparts. “The power plant that emits poisons into the air depends on the people who use the energy it produces. Therefore, how much a plant belches depends on how much energy we use in cities. Cities need to lead the way in combating climate change because they are its main contributors as well as the victims of climate change.”²⁵ Climate change, acidification, the use of fossil fuels for energy, resource depletion, smog, ozone layer depletion, and other forms of toxicity are all indicators of environmental deterioration.²⁶ “Intergovernmental panel on Climate Change” 1988, is a joint effort of “World Meteorological Organization”, & “United Nation Environment Programme”. In year 1990, three Working Groups of the IPCC presented their “First Assessment Reports to the Second world climate conference”.²⁷ “The court held that

²²<https://highcourtofuttarakhand.gov.in/pages/display/296-uttarakhand-acts> (last visited on August 24, 2024)

²³Satyajit Singh, “Diverse property rights, institutions and decentralisation: Forest management by village forest councils in Uttarakhand,” 32 Policy and Society 43–59 (2013)

²⁴<https://unfccc.int/resource/docs/convkp/conveng.pdf> (last visited on 28 August, 2024)

²⁵Michael Bloomberg and Carl Pope, *Climate of Hope*, 17 (St. Martin’s Press, New York, 1st ed., 2017)

²⁶Aashif Morgan & HBA Hunter, *Sustainable Cities-Realities Vs Dreams*, 135 (Knowledge Bakers, Pune, 1st ed., 2024)

²⁷J. Jaeger and H.L. Ferguson (eds.) *Climate Change: Science, Impacts and Policy*, 56 (Cambridge University Press, Cambridge, 1991)



India is confronted with several urgent short-term issues that directly affect the right to a healthy environment, especially for indigenous and vulnerable communities. When states detect the optimal effects of climate change, they feel driven to adhere to environmental protection and sustainable development for welfare of the current and future generations”.²⁸ There are several repercussions of climate change that have exacerbated the climate and disrupted economies worldwide.

(I) INTERNATIONAL INTROSPECTION

Human being ignorant and negligent of environmental damages. This ignorance has led us to ecological imbalances caused due to uncontrolled use of mineral, fossils fuels, deforestation, pollution of air, water, soil and Mountains. This has given rise to untapped emission of greenhouse gases, it has resulted in ozone depletion and caused Global warming. “The 1972 United Nations Conference on the Human Environment in Stockholm was the first world conference to prioritize environmental issues”.²⁹ The Stockholm Declaration promoted monetary growth and the decrease of air, water, and ocean pollution, with a focus on welfare for people. In 1985, “The Vienna Convention for the protection of the Ozone” 1988, was universally ratified in 2009 by each participating nations.³⁰ The convention deemed as a *peremptory norm* with no derogation and had universal acceptance. The Convention’s creators hoped that by sharing information about how human activities affect the ozone layer, policymakers would take action against those activities that cause ozone depletion. “The Montreal Protocol on Substances that Deplete the ozone layer”1987, aims to preserve the ozone layer by gradually eliminating the compounds that cause it to thin.³¹ Ozone-depleting compounds are produced and consumed as part of this phase-out plan. The ozone layer is nearly fully recovered because of the cooperation of nations worldwide.

²⁸MK Ranjitsinh And Ors. v. Union of India And Ors [WP (C) No. 838/ 2019]

²⁹[https://www.un.org/en/conferences/environment/stockholm_1972#:~:text=The%201972%20United%20Nations%20Conference,the%20environment%20a%20major%20issue.&text=One%20of%20the%20major%20results,Nations%20Environment%20Programme%20\(UNEP\).](https://www.un.org/en/conferences/environment/stockholm_1972#:~:text=The%201972%20United%20Nations%20Conference,the%20environment%20a%20major%20issue.&text=One%20of%20the%20major%20results,Nations%20Environment%20Programme%20(UNEP).) (last visited on 25 August, 2024)

³⁰<https://ozone.unep.org/treaties/vienna-convention> (last visited on 17 Sep, 2024)

³¹<https://ozone.unep.org/treaties/montreal-protocol#nolink> (last visited on 17 Sep, 2024)



| Non-Article 5 parties | | Article 5 parties – Group 1 | | Article 5 parties – Group 2 | |
|------------------------|---------------------------------------------------|-----------------------------|--------------------------------------------------|-----------------------------|--------------------------------------------------|
| Baseline | Average HFC for 2011–2013 + 15% of HCFC baseline* | Baseline | Average HFC for 2020–2022 + 65% of HCFC baseline | Baseline | Average HFC for 2024–2026 + 65% of HCFC baseline |
| Freeze | – | Freeze | January 1, 2024 | Freeze | January 1, 2028 |
| 10* per cent reduction | January 1, 2019 | 10 per cent reduction | January 1, 2029 | 10 per cent reduction | January 1, 2032 |
| 40* per cent reduction | January 1, 2024 | 30 per cent reduction | January 1, 2035 | 20 per cent reduction | January 1, 2037 |
| 70 per cent reduction | January 1, 2029 | 50 per cent reduction | January 1, 2040 | 30 per cent reduction | January 1, 2042 |
| 80 per cent reduction | January 1, 2034 | 80 per cent reduction | January 1, 2045 | 85 per cent reduction | January 1, 2047 |
| 85 per cent reduction | January 1, 2036 | | | | |

Fig 2: The Targeted reduction of Hydrofluorocarbons (Greenhouse Gas)

The above data has been taken from UNEP Programme, stating the average reduction of Hydrofluorocarbon from 2011-2013 and demarcating its targeting reduction timeframe from 2024-2047. For Belarus, Kazakhstan, the Russian Federation, Tajikistan, and Uzbekistan, there is a baseline of 25% HCFC, along with two different initial steps: (1) a 5% reduction by 2020, and (2) a 35% reduction by 2025. India has been considered in Group 2 for the targeted reductions.³² “The United Nation Framework Convention on Climate Change” UNFCCC, was formed to achieve the stabilization of greenhouse gas concentration exclaiming that Climate Change is an anthropogenic interference. The convention work with the principle of “common but differentiated responsibilities and their specific national and regional development priorities”.³³ Impart legal education & public awareness regarding Climate Change. (Conference of Parties) A statutory body with a representative of a member country to meet and discuss the climate crisis and its mitigations. The Financial mechanism ensures the projects addressing the Climate change policies & programmes and settles disputes through negotiations and peaceful means, if fails then resort to International Court of Justice. “Recently COP 28 (Dubai, 2023) underscored world’s efforts to address climate change was too slow, countries to respond to accelerate action by 2030. Authorities are being asked to accelerate the switch to energy from sustainable sources like solar and wind replacing petroleum and coal in their

³²Ozone Secretariat, Handbook for the Montreal Protocol on Substances that Deplete the Ozone Layer “14th edition (2020) ISBN: 978-9966-076-79-3, available at: <https://ozone.unep.org/sites/default/files/Handbooks/MP-Handbook-2020-English.pdf> (last visited on August 16, 2024)

³³<https://unfccc.int/gese?q=UNFCCC%20CONVENTION%20PDF#gsc.tab=0&gsc.q=UNFCCC%20CONVENTION%20PDF&gsc.page=1> (last visited on August 22, 2024)



upcoming phase of climate commitments”.³⁴ The Kyoto Protocol 1997 explains “common but differentiated responsibility and respective capacities,” for nabbing developed nations as they are the reason for the present high levels of greenhouse gas emissions in the atmosphere. The protocol introduced three mechanisms to control emissions. 1. Global Emission Trading which means the entities that are part of the emission, permits or allowances are sold or allocated. 2. The CDM, or Clean Development Mechanism means while the developing nation would acquire the funding and clean technologies to carry out the project, the developed nation would gain credits for reaching its emission reduction goals. 3. Collaborative execution means countries working together to gradually reduce emissions.³⁵ The Paris Agreement 2015 aims to restrict the global average temperature to 1.5°C, over pre-industrial levels and to keep it below 2°C.³⁶ “Paris Agreement” employs a five-year timeline for countries to share their action plans, & “Nationally determined contributions” (NDCs). India pledged to boost forest carbon storage by raising the country’s forest cover from 21% to 33% as part of its Paris Pledge. A one-day initiative to plant fifty million trees in Uttar Pradesh, the most populous state in the nation, served as the program’s distinctive India big-bang. India’s forests will eventually store an extra 14 gigaton of carbon if it meets its target. India is not the only country with aspirational plans to restore its forests. Kenya has declared its intention to reforest 9% of its total land area.³⁷ When it comes to this pressing problem, international rules have been genuine and significant.

(II) NATIONAL INTROSPECTION

India introduced its “National action plan on climate change” 2008, outlining its national strategy for sustainable development. “National Mission on Strategic Knowledge for Climate Change” aims for sustainable development and include planned actions against greenhouse gases.³⁸ The Mission is one of the eight national missions that plan national climate action strategies. India needs more stringent regulations.

³⁴<https://unfccc.int/cop28/5-key-takeaways> (last visited on September 21, 2024)

³⁵Usha Tandon, *Climate Change Law, Policy and Governance* 18-19 (Eastern Book Company Publishing Pvt. Ltd, Lucknow, 1st ed. 2016).

³⁶<https://unfccc.int/process-and-meetings/the-paris-agreement> (last visited on August 26, 2024)

³⁷Supra note 25 at 208-209.

³⁸https://dst.gov.in/sites/default/files/NMSKCC_mission%20document%201.pdf (last visited on August 28, 2024)



(III) LOCAL GOVERNANCE

Local government has a special role in providing a variety of services to the public directly, it has the closest ties to the local environment and community. This enormous advantage of proximity guarantees that decision-makers and their choices are in line with community interests and effectively address local conditions and opportunities.³⁹ According to s.14(1). of the “Disaster Management Act” 2005, the “Uttarakhand State Disaster Management Authority” was established. The State Climate Change Centre, Uttarakhand was proposed long back but is still undergoing for an upgrade as it is in public domain.⁴⁰ “Disaster Mitigation and Management Centre (DMMC) Aims for disaster mitigation and management, protecting the environment and the community from the destruction brought on by disasters”.⁴¹ The centre operates under the Department of Disaster Management, Government of Uttarakhand, aims to instill a sense of value in the general public and government officials so they may better formulate policies and bolster their capacity to handle all facets of disaster management. It serves as a nodal agency for organizing, coordinating, and overseeing efforts pertaining to resilience, administration, prevention, and preventing catastrophes. The involvement of the Non-Government Organization and other civil society organizations in the legislative action has grown on the part of governments. Many non-profit organizations have been vocal and uprooted for the protection of mountains. Wake up Trust, Uttarakhand, Sam Earth India, Sankalp Taru Foundation, Suvidha NGO are some NGO’s working for Animal Rescue, Tribal communities, green planet through Plantation, women farmers to promote organic farming are some initiatives undertaken to prompt and protect the environment with sustainability.

KNOWLEDGE ACTION GAP

In terms of biogeography, mountain regions are among the most susceptible to environmental deterioration. Thus, a key component of mountain regulations should be their protection. However, in reality, safeguards for mountain ecosystems are typically found in related texts of forest legislation. Mountains & Climate Change to be included in the definition of Environment and to be imbued as a ‘Legal Entity’. Pollution control boards to rigorously help state legislation in formulating regional policies in mitigating Climate Change & Mountain Ecosystem policies. International Legal Solution to be inculcated

³⁹Supra note 35 at 119

⁴⁰<https://forest.uk.gov.in/climate-change> (last visited on November 5, 2024)

⁴¹<https://dmmc.uk.gov.in/pages/display/2-about-us> (last visited on November 15, 2024)



by the government. “United Nation Environment Programme” (UNEP) has been working for more than 50 years to address pressing environmental concerns. The concern includes restoring the ecological economy in collaboration with UN agencies, the commercial sector, governments and community groups. It can built such network for India to benefit Uttarakhand and other alike mountain countries. Ukraine launched intergovernmental negotiations for the Carpathian countries in 2003. The goal was to develop an agreement on the Carpathian Mountains that would be accepted by countries with the objective of “Right of Nature equivalent to Right to Life: A Protocol on Right to Nature in UNFCCC empowering the principle of “common but differentiated responsibility and respective capacities” (CBDR-RC) as an agenda in COP will be an effective component for Environmental Jurisprudence. Government should consider & advocate such principle. Granting legal protection to nature and making it illegal to violate, such rights will instantly help to alleviate the consequences of climate change on the mountain environment. The Right of Nature is a field that needs to be investigated, particularly in light of the fact that the human rights paradigm has not produced practical solutions to the issue of climate change affecting mountain ecosystem. One of the main factors in establishing and fortifying the Alpine Convention was CIPRA, a non-governmental and non-profit organization. In Uttarakhand Forest Department & Forest Research Institute along with various NGO’s like Wake up trust, Sam Earth India, Sakalp Taru foundation, Suvidha NGO can channelize their resources. Collaboration between Govt & non- Government Organizations can also help in construing a strong mountain ecosystem infrastructure gardening the Mountain ecosystem & combating the consequences of Climate Change. All these factors can help in bridging the knowledge action gap on Climate Change impacting Mountain Ecosystem and bringing International Legal Solutions.

LEAGL RAMPIFICATION OF ENVIRONMENTAL LAWS IN UTTARAKHAND

Local Legal Mechanism -Uttaranchal Contingency Fund was formed to provide a Contingency Fund for the State. The Mechanism to utilize the fund has never been relished. Uttarakhand a land of Mountains where Natural Disasters are inherent entity. The state has witnessed severe earthquakes, cloud burst, avalanches, landslides etc. The said act needs an open access system to the people for funds availability & their disbursements. This act safeguards the Mountains from natural calamities and disorders, but the



disbursement and utilization of funds through a legal mechanism is a big loophole in the said act.

State Climate Change Centre -Uttarakhand's State Climate Change Centre is still undergoing for an upgrade. It has been put in public domain since years, the centre needs to be construed soon. The right to be immune to the detrimental effects of climate change was recently acknowledged by the Supreme Court as a separate constitutional right.

Natural Disaster Insurance Scheme- A disaster is defined as an event or sequence of events that result in casualties, harm people and property causes destruction to the ecosystem, infrastructure and vital services. It exceeds the ability of the impacted community to be recovered. Natural Disaster Insurance Scheme can shield the layout of our mountain state. State government flee to Central government at the occurrence of a natural calamity. The delayed allocation of funding results in unfortunate circumstances for the victims and their relatives. Such an insurance plan will allow the state to become self-sufficient in terms of natural disasters and tragedies.

Consolidated legislation “The Mountain Laws”: **Protection of Environment in Uttarakhand-** The promotion of a single mountain legislation that addresses climate change and sustainable development will be aided by a consolidated mountain law. By creating procedures for cooperation and information sharing between national and international institutions working on fragile ecosystems will create a foundation of knowledge and understanding. This will help state government to create laws that support the sustainable use of natural resources and local communities' involvement for the overall development.

CONCLUSION

Environment is a congenial world for the entire human race. One of the primitive structures given by Environment are Mountains. They are home to a vivid range of glaciers, wildlife, diverse communities, traditions, and languages. Mountains are vulnerable to the biggest threat termed as “Climate Change”. We can protect our mountain state's layout using the Natural Disaster Insurance Scheme. In times of natural disaster, state governments seek refuge with central government. The unpleasant situations that befall the victims and their relatives are caused by the delayed allocation of funding. With the help of such insurance scheme the state will be strong & independent in confronting such tragic natural disasters. The goal of this research is to create a legal framework through a governance arrangement by combining Uttarakhand's



local law, national law, and international treaties. This study will uniform, the scattered working bodies under consolidated legislation to safeguard Uttarakhand & its habitants. With these endeavour, the distinctive Mountain ecosystems of Uttarakhand are to be preserved while still meeting the demands of economic development. The “One Mountain” all-solution theme has the potential to bring departments together and improve ease and openness for Uttarakhand’s government and people.

WOMEN IN INDIAN ENTREPRENEURSHIP AND INNOVATION; ISSUES & CHALLENGES



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Abstract

In the present scenario women are dominating the field of innovation, technology, science and entrepreneurship but even today there exists a significant gap before females can achieve parity with men. The present paper attempts to trace the historical role of women in entrepreneurship through review literature survey and the challenges to female participation in the field of innovation in STEM (Science, Technology, Engineering and Mathematics) fields in India in the emerging economic scenario. In the present study the survey revolves around a round table discussion with the recognized and distinguished women academicians, entrepreneurs and scientists as well with respect to the barriers and challenges to the participation of women in the field of Indian entrepreneurship and innovation and the ways in which it could be facilitated.

Keywords: *Entrepreneurship, Innovation, Science, Technology, Women Entrepreneurship, Gender, Commercialization.*

INTRODUCTION:

In the present scenario when it comes to the development and progress of entrepreneurship and innovation the role of gender becomes prominent. Most of the studies have applied gender based lens to study the innovative measures

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taken from the end of females for instance, filing of patents. However, most of the striking findings of the study on the topic reflects a number of initiatives taken by the women with respect to innovation and entrepreneurship but still there exists a wide gap when it comes to parity with men in the same field. Report on women innovation suggests that females will not be able to reach parity with men when it comes to filing the patent till 2092. Hence, there is a need to understand the reasons behind these disparities and the influence of these disparities on women in general and society at large. At the same the study delineates the possible solution to the problem.

The study is more important in advanced contemporary society where the majority of the dominant fields be it innovation, technology, entrepreneurship, science and many other fields are exclusively being dominated by women as a current initiative taken the Indian Government. The paper proposes to review the literature and then proceed with the panel discussion on related topic and issues in the context of Indian society.

The lower is the participation of women in innovation and technology the larger it has socio-economic implications. Studies reflect that around 90% of the women spend an additional income attained on human resources for the families only. Health, education, nutrition are in all included in and this ratio is very low as compared to men. If the proportion of women be more in entrepreneurship and as innovators it will directly impact the families, communities and society at large positively.

The second immediate and direct influence is that of the creation of job. Survey conducted by Global Entrepreneurship monitor in 2012 indicated that in totality 126 million women are either starting a new business or running the same. Whereas 98 million of them are running an established business. Out of these 112 million of women entrepreneurs employed one or two people while 12 million of them expects to hire up to six people in the next forthcoming years which clearly indicates a total of 72 million jobs. Thus, gender disparity in innovation and entrepreneurship represents lost prosperity and developmental growth. Countries facing larger proportion of gender gaps in labor force participation incurs a wide loss of income i.e. around 30% of GDP per capita. It is for this reason that reducing the gender gap and encouraging female entrepreneurship are essential for the economic growth and development of the nation thereby reducing the proportion of poverty in any country.¹ With

¹T. Tambunan, "Women entrepreneurship in Asian Developing Countries: Their Development and Main Constraints" *Journal of Development and Agricultural Economics* 27-40 (2009)



the help of these entrepreneurial activities women not only create vocations for themselves but generating employment for others as well thereby producing income for the sustenance of their families and communities. By generating employment women not only gain economic autonomy but they are serving the markets with valuable services and products as well. They simultaneously reduce the level of social exclusion and contribute in the economic prosperity.

As the discussion revolves around women in the field of innovation, it is necessary to take into consideration the barriers faced by women entrepreneurs which limits their entrepreneurial potential. Some of the prominent factors include a) Issues pertaining to gender-based cultural constraints specifically in the countries like India b) lack of access to capital c) lack of knowledge regarding the resources d) In developing economies lack of education e) No knowledge of markets e) lack of knowledge regarding business and no technical knowledge f) dearth of knowledge regarding communication and technology, be it internet or social media.

OBJECTIVES OF THE SYUDY:

1. To explore the case studies related to women innovation and entrepreneurship.
2. To understand the ways in which the entrepreneurship results in growth and success of the enterprise.
3. To throw light on the barriers faced by women in the field of innovation and entrepreneurship.

HISTORICAL PERSPECTIVE: It was the pioneering work of Danish Ester the Economist that brought to light the role of women in economic growth and development who for the first time conducted an evidence-based studies on the impact of the development projects on the women from diverse societies finding that the females in the third world are all excluded from the benefitsof these advanced technologically delicate programs. Historical data has been mined through several studies with a view to examine the economic activities and entrepreneurial activities of female in previous times across various economies of the world.

As per the description of historical data a major barrier to women entrepreneurs had been that they were not having the legal rights on their property and on their own earnings and thus they were unable to participate in trade or enter in business agreements without the prior permission of their husband. Until the adoption of married woman's Property act in 19th century in United States and United Kingdom that they don't have any right to inherit



property or control over their earnings. Simultaneously she faced external barriers too including lack of access to training, lack of access to education including negative stereotypes and cultural restrictions against the participation of women in commercial sector.

However, women in the era of 18th and 19th century in Latin America, Europe, United States, United Kingdom were active in some of the spheres like holding patents, share, operating business etc.² Some of these activities were exclusively feminine for example, 19th century Corset Industry observed women not merely as consumers but manufacturers and inventors as well. Women patented their innovations in this realm and utilized them as the foundation stone of flourishing businesses. The female patent holders of the era were somewhere motivated by the market incentives just like their present day counterparts. So far as the analysis of United States in 19th century is concerned with respect to women innovation, data highlighted that more than 500 number of females were patented with more than one discovery and many of them gained income out of these discoveries. A crucial contribution to this level of activity came from the emergence of property laws protecting the individual property rights of females. States which incorporated property laws saw a higher proportion of patents which clearly indicated that legal reform has the capacity to boost the participation of women in innovation and discoveries. Adding to the same, the family firms had been a crucial source of encouraging commercial activity in women permitting them to yield a far better influence than actually have been possible.

Research Methodology: An Inductive approach has been used in the study. Case study approach has been utilized as a research strategy. Research on women innovators and entrepreneurship is documented through case studies. Case study is method of choice in the study when the phenomenon is not much distinguishable from its very context and its very complex to de-contextualize the enterprises without seeking voluble information. It is for this reason that case study methodology has been utilized in this study The second reason is to understand the viewpoint of indigenous people and for the purpose qualitative tools including interview and group discussions are more feasible than the actual surveys. The women entrepreneurship ventures which are in the initial stage of its development should be documented for the purpose so that one could establish the relationship for the qualitative studies. The

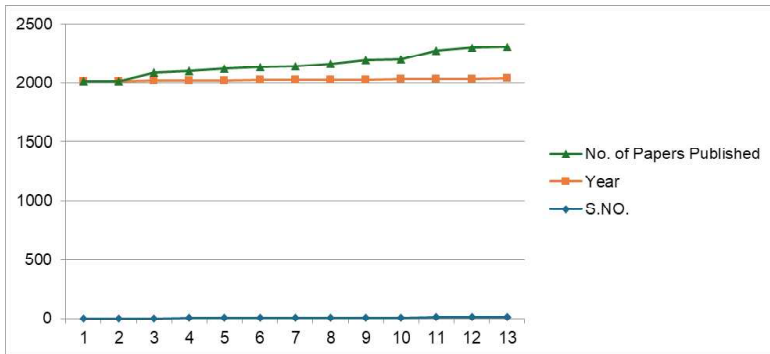
²Womenable, "Innovation and Women's Entrepreneurship: An Exploration of Current Knowledge to United Nations" *Conference on Trade and Development* (2010).



study also takes into account the number of papers published in Scopus Database, Web of Science and Reputed Journals from the Year 2014 t0 2022

Table No.01

| S.NO. | Year | No. of Papers Published |
|-------|------|-------------------------|
| 1 | 2012 | 67 |
| 2 | 2013 | 83 |
| 3 | 2014 | 100 |
| 4 | 2015 | 111 |
| 5 | 2016 | 115 |
| 6 | 2017 | 131 |
| 7 | 2018 | 165 |
| 8 | 2019 | 170 |
| 9 | 2020 | 237 |
| 10 | 2021 | 260 |
| 11 | 2022 | 266 |
| 12 | 2023 | 265 |



Source: Trends of Publication

CASE STUDIES:

1. Deepanvita Chhtopadhyay: CEO and Chairperson of IKP Knowledge park. She has been the first to develop life science and for the first time laying the foundation of developing innovative and sustainable knowledge cluster on the basis of public and private partnership model.



What are the career options for females in the field of entrepreneurship and innovation

Today a large number of women are working in multinational organizations and various other corporations who are simultaneously working on innovation programs but the number of women entrepreneurs in the field of technology is comparatively lesser. She further said that out of total number of 100 entrepreneurs funded by them, merely 07 are females, out of 400 interactions, only of 20 were women.

Are there incentives for Innovation.

On being asked it was stated that she was not sure whether there are such policies or not. But certainly she had her own observances; however there is an incubator for women in Chennai but at the same time, they focus more on low hanging fruits that is their emphasis is more on lower technology instead of focusing on high level of technological innovation and entrepreneurship. She further stated that she saw many working women who took a break from their career with a view to take training in IPR and in drafting of patents. Technology Information, Forecasting and Assessment Council (TIFAC) which has been established by Government of India aimed to set directions for technological advancement in India has become one of the most crucial organizations.

2. Case Studies: Soft Toys creation by Phoenix

A young and enthusiastic woman from Chorward, Saurashtra from the country itself had a hobby of making toys in the beginning, later on it transformed into the skill of puppet making but then she converted these skills into a business. For her business does not aim at maximization of profit rather she wants to do something for society as well through women education, art and empowerment. With her innovations she converted the idea into a business, became entrepreneur and provided job to others. The case study also assumes that with alterations in demand conditions like technology, demography, cultural as well as political institutional frameworks create certain opportunities which are not obvious to all but are exploited because only some particular individuals have the opportunity to discover these specific opportunities. There is thus a need to unleash the power of women entrepreneurship with a view to make the society and economy sustainable. But this a great irony that the traditional measures of development of economy and performance of business do not at all capture the real transformational benefits of the change inducing



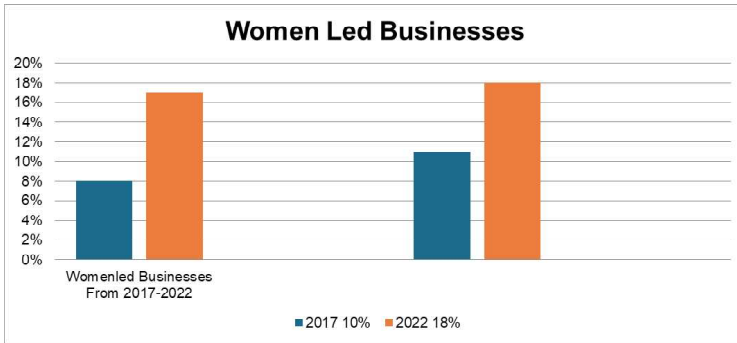
enterprises. It is to be noted that innovation is higher in growth-oriented firms where the owner's motivation and intent plays a key role in firms innovation behavior. In the present case study it was the motivation and intent which gave the success and growth to women entrepreneur.

3. Creation of Rinki from a housewife to a business woman

This is the case history of a women who not only sustained her familial but societal norms too and made her aspirations convert into reality. Rinku Lakdawala who is from a Gujrati family has five siblings is from a very modest financial background who always tried to update herself in terms of education, technology and manufacturing practices. She started her business as a dress designer from her husband's garage. In the beginning she had only hand embroidery work but later on diversified it into machinery wok as well. At present her unit consists of 7 automated machines. However, there is a cut throat competition in the field because of her continues investment in manpower and technology she is able to attain great heights. In the advanced society creativity, innovation as well as the design of product has become the key to success. Without proper market segmentation and focused orientation on profit-oriented market it is difficult to attain the success results. Thus, facing all these challenges Rinku became the most popular women entrepreneur of Surat, Gujarat. In the year 2012, she was awarded with Savani Women Entrepreneur Award. As a woman she explored new avenues of economic participation. She has proved that women are capable enough to be a successful women entrepreneur as men are.

Table No. 02: Businesses led by Women Increasing in India; Startups fueling India's Growth

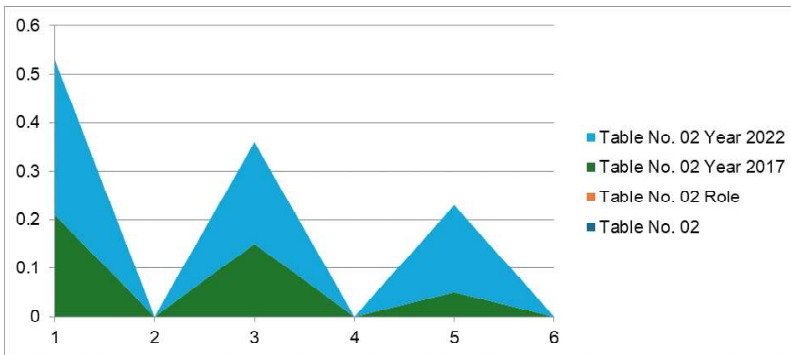
| Women led Businesses From 2017-2022 | 2017 | 2022 |
|-------------------------------------|------|------|
| | 10% | 18 % |
| | 8 % | 17 % |
| | 11 % | 18 % |



Source: *Businesses led by Women Increasing in India; Startups fueling India's Growth from 2017- 2022*

Table No. 03: Women in Senior Role in Start- ups

| Women in Senior | | Year 2017 | Year 2022 |
|---------------------|-------------------|-----------|-----------|
| Roles in Start- Ups | Role | | |
| | Women Managers | 21% | 32% |
| | Women Directors | 15% | 21% |
| | Women Founder CEO | 5% | 18% |



Source: *Women in Senior Role in Start- up*

Women Innovators at Global Level:

4. Case Study of Cristina Junqueira: Cristina Junqueira, the cofounder of Nubank is a woman entrepreneur in finetech space. However, she was from Engineering background but she herself paved the way for management consulting and acquired the job of credit card portfolio at one of the recognized banks of Brazil. With a view to bring about a revolutionary change in the economic field. She introduced an eco-friendly app which provided digital financial services to more than 53 million of people in Latin America. This bank is one of the biggest banks of the world providing digital baking platform



to the public. Her contribution in the finetech industry as a women entrepreneur has been recognized by Fortunes 40. In most of the finetechmagines she is being recognized as the strongest start- up founders in Latin America.³

5. Case Study of Diane Von Furstenburg: Dian is a fashion designer, a social worker. A philanthropist and a chairman of the company. In the year 1974, Von designed a dress which became an epitome of women empowerment and later on became a global trend. She is recognized as a leader who has empowered women and supported women leaders throughout the globe. In the year 2010, she laid the foundation of DVF awards to provide the grants to women who have been the personification of women empowerment, leadership and strength. She was the one who chaired the session of Fashion Designers of America from year 2006 to year 2019. In the year 2005, she was awarded the Lifetime achievement award in the year 2016 she was awarded the Swarovski Award for bringing about positive change. Presently she is associated with Ellis Island Foundation.

6. Case Study of Annabelle Huang: Huang has been a student at High School STEM in China to having her honors in Math's from Carnegie University. Today she is a leading figure in block chain. In the year 2018. She took a leap of faith in the world of crypto currency with a viewpoint to transform the finance with the help of block chain technology.⁴ At present she is the managing partner at Amber group which is one of the leading global digital asset platforms having 12 offices operation 24/7 in 06 continents. Huang has been a prominent speaker at Dubai block chainsummit, TOKEN2049 London, Yahoo finance and Coindesk. At a global level she is the mentor of Female Entrepreneurs Incubators who mobilizes women to be a part of crypto currency industry.

Barriers faced by Women Innovators and Entrepreneurs:

1. Barrier of Technological Advancement: Participation of women in labor-force is comparatively very low. Active participation of women in labor market and employment reflects women's contribution and level of economic activity. It indicates pool of percentage of women

³Candida G. Brush and Sarah Y. Cooper, "Female Entrepreneurship and Economic Development: An International Perspective" *Entrepreneurship and Regional Development* 1-6(2012).

⁴Anju Malhotra, Sidney Schuler, and Carol Boender, "Measuring Women's Empowerment as a Variable in International Development" *Gender and Development Group of the World Bank* 81-88 (2002).



laborers to potentially turn into an innovation.⁵ Not only in India, but across the globe the participation of women in workforce is too less. The global female labor participation rate is merely 48.5% in the year 2018, and in case of men it reached to 75%. Most of the women when work is very less likely to be in a position which could lend them to any kind of innovation. In most of the developing countries women often to entrepreneurship not out of choice but it is conditional that is to support their families as an additional source of their earning and income. It is this type of pattern which will influence the performance of females in business else in developing countries there are is more probability for them to uphill climb in making their innovative potential more successful and viable.

2. **Lack of Childhood exposure to Businesses:** The possibilities of children becoming inventors vary with particular characteristics like birth, race, gender and socio- economic class as well. It is the lack of exposure to the field of innovation which clearly explains the fact that why the talented children from lower income groups, minorities, females have a lesser chance to become inventors and innovators. All these lost contributors might have given valuable contribution had they been introduced to innovation earlier.⁶ At the same time if females be exposed to inventions and innovations, the problem of gender gap in the concerned area would have halved to till date.
3. **Representation of Women in Science, Technology, Engineering and Mathematics is too Low:** The representation of women in STEM is very low which is one of the key reasons behind gender disparity in the field of innovation as well as patenting. It is a well-known fact that as the STEM degrees increases the proportion of patenting increases as well. Women are under- represented in such fields and study which are rich in innovation. It is for this reason that a major pool of women who could turn to innovation are turned down which makes the gap wider.⁷ Today women outnumber men

⁵U. Premalatha, “An Empirical Study of the impact of Training and Development on Women Entrepreneurs in Karnataka” *The IUP Journal of Soft Skills* 44-59 (2010)

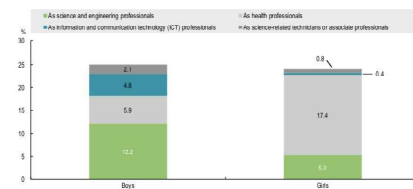
⁶N. P. Singh, P. Sehgal, M. Tinani, and Sengupta, “Successful Women Entrepreneurs – Their Identity, Expectations and Problems: An Exploratory Research Study” *Research Report Serial Two, NIESBUD/MDI Collaboration*, New Delhi (2011).

⁷A.A. Jahanshahi, & B.K. Pitamber, “Issues and Challenges for Women Entrepreneurs in Global Scene, with Special Reference to India” *Australian Journal of Basic and Applied Sciences* 4347-4356 (2018)



so far as UG Degree and PG is concerned but there are very few women for whom areas like innovation matters. Number of females in scientific fields is still at tertiary level that is just 30- 47 percent and most of them are under- represented in computer science, engineering and manufacturing. Report by OECD reflects that the career path of most of the females diverged immediately after the age group of 15. i.e. though women aspire to start career as an innovator and scientist at the age of 15 but only 20 percent of the total aspirants out of 100 graduated in ICT fields.

4. Rigid Socio- cultural norms, sexism and open discrimination a barrier in the success of women:
 - a) Women who are solo in the team are often isolated.
 - b) It is the macho culture, rigid social norms which hinders STEM based careers.
 - c) The expectations of gender resulting from gender roles of females related to reproduction and domestic jobs significantly effects the progression of women.⁸
 - d) Bias in giving promotion or hiring the employees.
 - e) Lesser contacts with industry.
 - f) Lack of access to public funding



Notes: ICT = information and communication technology. OECD PISA 2015 asked students what occupation they expected to be working in by the time they reached the age of 30. Students could enter any job title or description in an open-entry field; their answers were later classified according to the International Standard Classification of Occupations, 2008 edition (ISCO-08). These coded answers were used to create an indicator of science-related career expectations, defined as those whose realisation requires the study of science beyond compulsory education, typically in formal tertiary education. Within the large group of science-related occupations, the following major groups were distinguished: science and engineering professionals; health professionals; science technicians and associate professionals; and ICT professionals.

Source: OECD. 2018. Empowering Women in the Digital Age.

Policies Framed in India:

- Start Up India Program; The program was initiated in February 2016 and by the end of the period it became the biggest start- up program across the globe which provides academic industry partnership, incentives and funding support. In order to build a strong ecosystem

⁸K. Surti, & D. Sarupriya, “Psychological Factors Affecting Women Entrepreneurs: Some Findings” Indian Journal of Social Work I 287-295 (2005)



a corpus fund of 10,000 has already been embarked with a view to nurturing start ups and innovation. For women led start ups around 10% of the funds are reserved. These reservations act as a catalyst to create a hostile environment for start – ups and innovation to flourish.

- Economic Empowerment of Women Enterprises & Start- ups by Women in association with German Based Development Authority: The initiative is taken by Ministry of Skill Development and Entrepreneurs which provides different accelerating programs for the women entrepreneurs who aims at starting business at small scale.
- Cluster Development Program for micro level enterprises: The Ministry of MSME (Ministry of Micro, Small and Medium Enterprises) of Government of India has initiated cluster development approach is a planned strategy to enhance the productivity as well as capacity building in the country at small and micro level enterprises. It comprises of cluster of enterprises located at differential geographical regions for the purpose of producing complementary , similar products which can easily connected with a common physical infrastructure facilities which can help in addressing the common challenges. The main motive of the scheme is to support the sustainability, demand and growth of MSE's by bringing into focus the common issues related to skills, technology, market access etc.⁹ It also includes creation of self- help groups, consortia, setting up of faculty centers. In all the programs women Owned enterprises is given consideration.
- Credit Guarantee Fund Trust for Micro and Small Enterprises (CGTMSE): The main aim of this scheme is to make collateral free credit to the small enterprises. The new and existing enterprises both are covered under this scheme. The scheme provides around 200 lakh credit facilities to the borrowers provided they provide credit facilities without the guarantee of third party. For small enterprises the guarantee cover is of 80% for all the small enterprises. If there is any default the claim is settled down by the trust which is up- to 75% of the amount in the default of the credit facility extended by lending an amount of 200 lakh.

⁹R. Vishwanathan, “Opportunities and Challenges for Women in Business” *India Together* 1-9 (2001).



- Exhibition for Women under Promotional Package for Small Enterprises with a view to marketing support: In order to encourage women entrepreneurs to have active participation in International Exhibitions, there are some provisions including business and economic class fare for one female representative and a shipping cost of up to 1500 is reimbursed at the same time.

Recommendations:

1. Increase to the access of critical resources especially funding.
2. Those socio- cultural issues should be addressed which inhibits the innovative potential of women.
3. Activities like teaching, collaborations and networking should be promoted.
4. Women rights should be enforced especially in developing countries.
5. More of gender neutral policies should also be framed.
6. National policies should be framed to promote women innovators and entrepreneurs.
7. Women should be motivated to pursue their careers in STEM.

The research in totality provides useful insights for policymakers, stakeholders and practitioners helping them to take informed decisions and identify the gap areas where we are still lagging behind.