

**REVIEW ARTICLE**

**Road towards restoring land degradation in India: A UNCCD perspective**

**Abhishek Kumar<sup>1</sup>, Sanjay Singh<sup>2</sup>, Harish Bahadur Chand<sup>3</sup>, Anil Kumar Kewat<sup>3</sup>, Kangujam Premkumar Singh<sup>1</sup>**

Forest Ecology and Climate Change Division, Forest Research Institute<sup>1</sup>

Biodiversity and Climate Change Division, Indian Council of Forestry Research and Education, Dehradun<sup>2</sup>

Forest Influence and Climate Change Division, Forest Research Institute<sup>3</sup> Uttarakhand - Dehradun

**ABSTRACT**

*Desertification is a problem of dryland ecosystems; deforestation, unsustainable farming, overgrazing, and mining can convert fertile land into deserts. Desertification, Land degradation, and Drought (DLDD) have shown a severe effect on our GDP. It is a global problem in which climatic variability plays a pivotal role. A large portion of the world's rural people live on degraded land and are exposed to problems like food insecurity, scarcity of water, drought, etc. With the rising Desertification, it is projected that food prices will rise to 30% by the next two decades. Globally, 1.5 billion people are affected due to Desertification, and this figure is continuously increasing. The climate is changing, so are the elements of the earth; this has decimating impacts on the lives of the individuals who rely upon the land. Desertification threatens the livelihood of the majority of people living in rural areas. 65% of people rely on the agricultural sector for livelihood, whereas 80 % are extremely poor, and 75 % of the moderate poor live in rural areas. People depend on the land for energy, food, shelter, fodder, and many more things, which signify land as essential for survival. Desertification hampers biological diversity, and global climate change as it releases carbon stored in the dryland vegetation and soil. An increase in global temperature by increasing CO<sub>2</sub> can cause increased water loss, limiting rainfall and promoting Desertification. Carbon storage and nutrient cycling are some of the ecosystem services provided by forests. Slowly and gradually, our forests are turning into desertified landmass. This review focuses on the UNCCD meets and desertification trends in the past and how India plans and aims to restore its degraded land in symbiosis with global policies like REDD+ till the next decade.*

**Keywords:** UNCCD, Desertification, REDD+, policies

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**INTRODUCTION**

United Nations Convention to Combat Desertification (UNCCD) is a legally binding agreement that links the environment and development with Sustainable land management [63]. UNCCD is working towards reducing land degradation and achieving a neutral land degradation status (Land Degradation Neutrality, LDN) by 2030 [3]. The UNCCD set out a meaning of Desertification in a settlement embraced by different nations and came into effect on 17<sup>th</sup> June 1994 after receiving 115 signatures. The Convention later went into power in 1996, and 197 parties have currently signed for it. It expresses that Desertification is prominent in dry, semi-dry, and dry sub-moist regions[14]. According to India's Desertification and Land Degradation Atlas, 69 % of the country's geographical area falls under the drylands category. India has desertification problems in semiarid, dry sub-humid, and arid areas.

Out of the total geographic area in India, 29.3% is affected by Desertification, according to a report published by ISRO's Space Applications Centre [7]. Food security, livelihood, and nutrition of more than 4 million people are at stake in India[44,32]. Desertification and degradation of forests coupled with water scarcity limit agriculture expansion and limits food production and the flow of other ecosystem services [58]. The significant population affected by drought and land degradation are poor or impoverished people who face the water scarcity problem leading to forced migration and more stress to already vulnerable populations[12]. The leading cause of land degradation in India is the loss of soil cover through wind erosion, rainfall, and surface runoff [52]. Unsustainable agricultural practices and deforestation lead to increased desertification [8]. With Desertification occurring at a quick pace, the importance of UNCCD is presently more noteworthy than at any other time, and its coordination with

REDD+ strategies will help in mitigation and adaptation leading towards a sustainable future. UNCCD acts as an environmental agreement and focuses on social issues like the protection of most vulnerable groups by resolving impacts of Desertification, Land Degradation, and Drought (DLDD). One of the strategic objectives of UNCCD guides stakeholders and partners in improving the living conditions of people that are continuously migrating due to Desertification and drought. The forced migration of the poor due to poverty and lack of nutrition adds a layer of additional stress to vulnerable populations. Articles 10 and 11 of the UNCCD convention encourage taking measures in this regard.

Desertification can be tackled through restoration methods by forestry tools where degraded lands are restored into green lands through forestry interventions [61]. Forests maintain ecological equilibrium and help in socio-economic development. REDD+ directives encourage forestry interventions that help in CO<sub>2</sub> sequestration from the atmosphere and storing it in biomass and soils [2]; plantations are known to facilitate the ecological restoration of degraded lands by supporting the regeneration of native species and local biodiversity [69].

FAO supports the global aim of REDD+ for climate change mitigation which goes parallel with restoring degraded and desertified land communities [15]. Integrated land development by reducing degradation and restoring desertified lands by introducing water harvesting techniques and preparing a nursery for plantation purposes can help strengthen desertification control measures [11]. REDD+ strategies are designed in such a manner that they can answer questions about deforestation and land degradation.

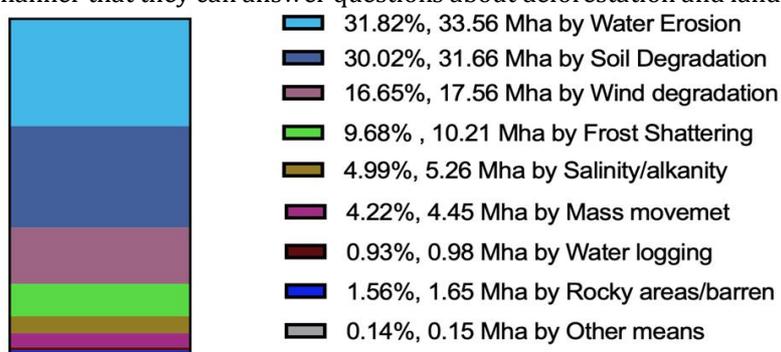


Fig 1. Land degradation causes (Area and percentage-wise distribution)

### BATTLING DESERTIFICATION AND GREEN SOLUTIONS

Various activities like Hydro-agricultural management [48], promotion of Agro-forestry and agriculture production [47], Erosion control methods [26], Pisciculture [50], Bee – culture [33], Livestock promotion [5], Hydraulic works [20], Biogas [6], Solar energy use [59] and creating awareness among people are some of the methods to deal with desertification [27]. Forests have the potential to overturn desertification trends. Scientific intervention and people's participation are needed to tackle the problem of Desertification [45]. Forest management through natural means provides ecosystem services such as carbon storage and nutrient cycling, and forest ecosystems play a significant role in establishing beneficial ecosystem services [21]. Continuous monitoring of afforestation techniques and agroforestry practices can help increase green cover in arid and semiarid zones [57,1]. To develop and sustain a productive environment, the expertise of forest ecology should be used in the areas of uncertain rainfall where surface vegetation is at risk [36]. Silvopastoral systems are encouraged to provide forage stocks utilizing trees and shrubs [43]. Forests have been called lungs of the earth, and they play a significant role in healing the drylands as they keep them working and protect people from drought conditions and Desertification [65]. National action plans focus on strategies to develop agroforestry systems, national strategies for land and drought monitoring show the country's efforts towards combating desertification/land degradation and drought (DLDD) [34].

Rio Conventions, namely CBD, UNCCD, and UNFCCC through Joint Liaison Group (JLG), were formed in 1991, linking elements like Desertification, climate change, adaptation, biodiversity conservation, and sustainable use of resources [68]. These all components act together in a framework for adaptation, mitigation, and resilience, and adaptation actions comprise all these factors for adaptation towards climate change. Thematic Programme Networks (TPNs) of institutions and agencies provide support to Regional Action Plan (RAPs), Sub-Regional Action Programs (SRAPs), and National Action Plan (NAPs) [31], which focuses on REDD+ and the countries dealing with low forest cover and tropical dryland forests [9]. Emphasis on carbon sequestration is helping in removing carbon dioxide from the atmosphere, and soil quality parameters are checked for soil holding more organic carbon than atmosphere and vegetation

combined for dealing with desertification [46]. Organically managed soil can sequester more carbon and act as a great carbon sink [37].

Adaptive and new generation technologies in agriculture and changing market trends should be implemented for poverty-stricken people residing in drylands [67], which will help them improve their livelihood, generate a new source of income, create a protected ecosystem. In return, inhabitants are benefited when agroforestry plans are implemented. Species with multipurpose usage, enhanced soil fertility, and good crop yield in desertified regions are encouraged for plantation [25]. Promising species like *Prosopis cineraria* can control wind and water erosion, and local communities which use species like *Eucalyptus*, *Neem*, *Terminalia*, *Ficus*, *Acacia* sp., etc., should be encouraged. Agroforestry species and community perception towards planting these forestry species should be given special preference.

## FINDING COMMON SYNERGIES BETWEEN REDD+ AND UNCCD

Sustainable forest management policies and practices are adopted under UNCCD, which aims to prevent soil erosion and flooding in collaboration with other parties. It aims to increase carbon sinks and conserve and sustainably use biodiversity [55]. UNCCD recognizes the potential for REDD+ as a sole legally binding instrument focusing on land and soil for achieving land degradation neutrality.

UNCCD collaborates with Partnership on Forests (CPF) for all forest types and focuses on urgent goals pledged in Rio+20 conference for sustainable growth, land degradation neutrality, and poverty eradication [60] and UNCCD, with the help of CPF open the door for UNFCCC, UNFF and other processes related to REDD+ [13]. Sustainable land and forest management aim to mitigate climate change adaptation with UNCCD by the Advocacy Policy Framework (APF) adopted in COP 10, inviting parties to consider DLDD in their national REDD+ objectives [40]. UNCCD secretariat also emphasizes the country's Parties to include REDD+ in their National Action Program (NAPs) to combat DLDD with biodiversity and climate change activities that go hand in hand. REDD+ International Symposium was organized by Seoul, Korea, in 2018 where participants from UN agencies and international organizations, national institutions and universities discussed REDD+ issues. The Forest Carbon Partnership Facility (FCPF) is a worldwide association that governments, organizations, common society, and Indigenous Peoples concentrated on decreasing outflows from deforestation and forest degradation, forest carbon stock preservation and the improvement of forest carbon stocks in developed nations and such exercises are generally alluded to as REDD+.

Many other initiatives such as Forest Investment Program (FIP) and UN-REDD are also amongst the REDD-plus initiatives. The UNCCD welcomes all Parties to adapt and scale-up management policies related to the sustainable management of forests and practices that can prevent soil degradation and flooding leading to expanding our carbon sinks, and focus on conservation and sustainable use of biodiversity. Few other conventions that relate to goals of UNCCD and REDD+ are Convention on Biological Diversity (CBD) [53], United Nations Framework Convention on Climate Change (UNFCCC) (Cheng and Berry, 2013), UN Convention to Combat Desertification (UNCCD) [54], Stockholm Convention on Persistent Organic Pollutants (POPs) [41] and Minamata Convention on Mercury [19].

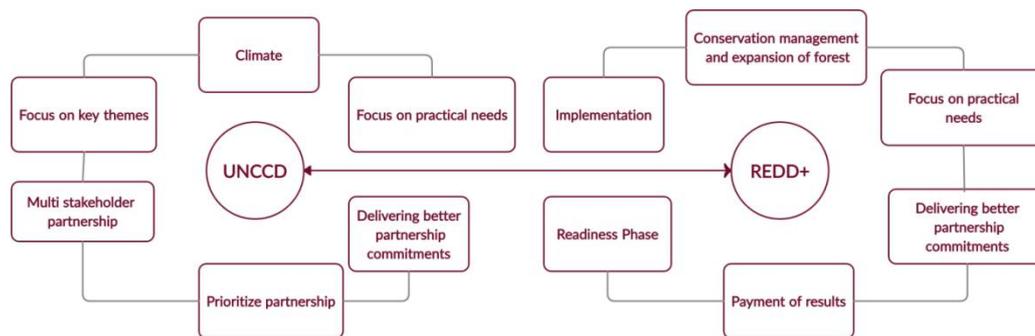
Joint Liaison Group (JLG) is formed by secretariats of UNFCCC, CBD and UNCCD in August 2001 to enhance the coordination between all the programs. UNCCD is one of the establishing foundations of the Collaborative Partnership on Forests (CPF), a policy forum and association on all types of forests. As a team with different associations of the CPF, the UNCCD encourages the UNFCCC, UNFF, and other processes that link with REDD+. UNCCD aims to accomplish LDN by 2030 discussed in UNCCD COP 13 to improve livelihoods of more than 1.3 billion people.

| REDD+  | UNCCD  |
|--|--|
| 1. Reducing emissions from forest degradation and deforestation.                                     | 1. Reinforcing sustainable forest management to prevent soil erosion and flooding.   |
| 2. Sustainable management of natural forest and their ecosystem services.                            | 2. Strengthen Low Forest Cover Countries to deal with Desertification, deforestation and land degradation.                   |
| 3. Enhancement and conservation of forest carbon stocks involving the participation of stakeholders. | 3. Increase the size of atmospheric carbon sinks; maintain ecosystem services in areas that are affected by Desertification. |
| 4. Environmental integrity by taking in account numerous areas of forests and another ecosystem.     | 4. Sustainable land management by involving local people (UNCCD).  |

**Table 1.** Goals of REDD+ and UNCCD

The objective of REDD+ is to motivate developing countries to contribute to climate change mitigation efforts by Reducing greenhouse gas emissions (GHG) by decelerating, pausing and overturning forest loss and degradation [49], FAO and increasing removal of GHGs from the earth's atmosphere through the conservation, management and expansion of forests [18]. The readiness phase of REDD+ implicates development of national strategies, REDD+ mitigation actions, and capacity building programmes. Implementation of national schemes and results-based demonstration actions also focus on Capacity-building, technology transfer, and result-based demonstration activities.

UNCCD Goals focuses on themes like adaptation to climate change, security and migration, reporting and increasing land and soil productivity for food security. It emphasizes on capacity building for stakeholders, knowledge management, science, policy, and planning. UNCCD encourages partnership prioritization with organizations that influence transformative influence and change like technical organizations, research organizations, and the private sector. It steps forward in building partnerships with multi-stakeholders which can be enhanced and more partners can possibly work together.

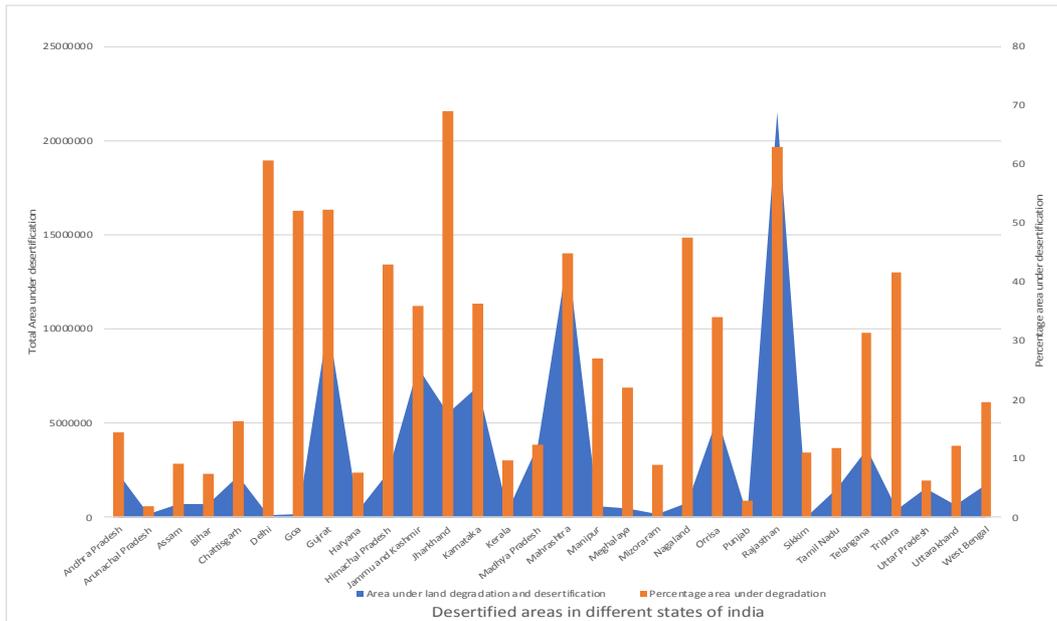


**Fig 2.** UNCCD and REDD+ interplay

**INDIA AGAINST DESERTIFICATION IN PRESENT CONTEXT**

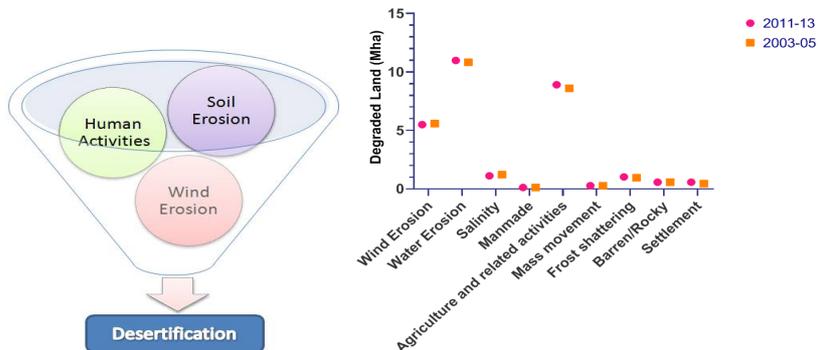
India's terrain involves four expansive topographical territories: Northern Mountains known as the great Himalayas, Indo-Gangetic plains, Southern Peninsula surrounded by the Western and Eastern Ghats and the coastal plains and islands. One-third area of India's land (29.32%) degraded in 2011-13 is under constant degradation with rising climate change and is expected to increase [30 with timekeeping in view other extraneous environmental factors involved as well as negligence of strict government rules for keeping a check on India's environmental problems. If the events of extreme weather changes and rapid urbanization continue at the same pace, it would be a difficult task to achieve India's land degradation neutrality by 2030 [35. According to the UNCCD, land degradation neutrality is defined as "state whereby the amount and quality of land resources is necessary to support ecosystem functions and services as well as enhance food security which remains steady or upsurges within stipulated temporal and spatial scales and ecosystems." India hosted Conference of Parties (COP 14), this year (August 29 - September 14, 2019) in which the desertification issue was addressed urgently.

Wetland revival projects have been given importance for a long time and some progress has been observed [10 in the past. A dedicated methodology needs to be formulated on the areas that have been overlooked to some extent for the last 30-40 years. India is Combating desertification and land degradation as it is a thrust area identified by the Ministry of Environment, Forest & Climate Change (MoEF&CC), Government of India, New Delhi. Space Applications Centre (SAC), ISRO, Ahmadabad, and 19 concerned partner institutes have carried out an inventory and monitoring of Desertification of the entire country using Indian Remote Sensing Satellites data in Geographical Information System environment. Arid Zone Forest Research Institute and MOEF & CC released land degradation maps and findings in Atlas on World day to Combat Desertification on June 17, 2016.



**Fig 3.** Desertified land of Indian states (Area and percentage-wise, in hectares), Source-Space Application Centre, 2016

A report by the Indian Space Research Organization, ISRO, published in 2016 mentioned that 96.40 million hectares of India faced desertification issues. States such as Rajasthan, Maharashtra, Gujarat, Jammu and Kashmir, Karnataka, Jharkhand, Odisha, Madhya Pradesh and Telangana (in descending order) faced land degradation/desertification issues [30]. States like Jharkhand, Rajasthan, Delhi, Gujrat, and Goa showed more than 50 % of land area under desertification [51].



**Fig 4.** Significant factors leading to Desertification & **Fig.5.** Status of Land degradation in India (2003-05) and (2011-13)

Total Area affected by Desertification was 82.64 Mha in 2011-13, which observed 1.16 Mha increase from 2003-05. India took the largest goal in Asian countries to plant 13 million trees by 2020 and 8 million hectares by 2030. India has actively participated in preparing first progress reports including datasets from private sectors, NGOs, and Government organizations [62].

All these objectives are met considering the Forest Landscape Restoration (FLR) measures whose prime objectives are to focus the ongoing process of FLR for regaining ecological functionality and enhancing the livelihood of humans across degraded and deforested landscapes. UNCCD carries out a multi visionary approach to assist the ecological process. Some major points are kept in mind while FLR is operated i.e., the restoration measures are in alliance to the existing land uses. Agricultural as well as pastoral landscapes should not affect by restoration measures. Agroforestry systems, agriculture, and ecological corridors work in harmony to build a mosaic by different land usage.

## UNCCD COP Meetings briefs

|  |   |
|--|---|
| <b><u>COP 14, New Delhi, India, 2019</u></b> | <ul style="list-style-type: none"> <li>• Report of COP in its 14th session and Action taken by COP in its 14th session.</li> <li>• Integration of Sustainable Developmental Goals (SDGs), 15 and 15.3 of UNCCD and LDN.</li> <li>• Modalities, criteria and terms of reference for a 2018-2030 midterm evaluation and development of a strategic framework.</li> <li>• Budget allocation for biennium 2020-2021 and comprehensive multiyear workplan for 2020-2023.</li> <li>• Participation of private and government sector organizations to combat Desertification and follow up on policy framework and thematic issues.</li> <li>• Additional arrangement for drought under UNCCD and discussing new and emerging issues.</li> <li>• Starting Peace Forest Initiative</li> </ul>   |
| COP 13, Ordos, China, 2017                   | <ul style="list-style-type: none"> <li>• Integration of the sustainable development goal 15 and 15.3 that targets to combat Desertification, drought and floods and achieve Land degradation Neutrality (LDN).</li> <li>• Report on effective communication strategy and future strategic framework for the convention and promoting relationships with other conventions and organizations</li> <li>• Comprehensive Multiyear Workplan (2018-2021) and two years costed work plan (2018-2019)</li> <li>• Financial Performance for the trust funds and audited financial statements for the Global Mechanism.</li> <li>• Report of the Evaluation office and participation of civil society organizations in meeting and process of UNCCD.</li> <li>• MOU between UNCCD and Global Environment Facility.</li> <li>• Draft advocacy policy framework and credentials of delegations.</li> </ul>   |
| <b><u>COP 12, Ankara, 2015</u></b>           | <ul style="list-style-type: none"> <li>• Report of the COP on its 12th session – Proceedings and Action taken.</li> <li>• Implementation of the comprehensive communication strategy to fight against Desertification (2010-2020).</li> <li>• Integrating Sustainable Development Goals into the implementation of UNCCD and comprehensive multiyear Workplan for the Convention and financial performance for the convention trust funds.</li> <li>• Effective implementation of the convention at national, sub regional and regional level as well as leveraging interactions among Rio conventions.</li> <li>• Securing of additional investments and credentials of delegations.</li> <li>• Discussion on the global land outlook and status of ratification of the United Nations Convention to Combat Desertification.</li> </ul>  |
| <b><u>COP 11, Windhoek, 2013</u></b>         | <ul style="list-style-type: none"> <li>• Report of the COP on its eleventh session and progress report on implementing a comprehensive communication strategy.</li> <li>• Revised procedure for accreditation of civil society organizations and representatives from private sector to participate in COP.</li> <li>• Programme and budget for biennium 2014-2015.</li> <li>• Final performance for the convention trust funds and unaudited financial statements for biennium 2012-2013</li> <li>• Annexes hold arbitration and conciliation procedures and midterm evaluation of the 10-year strategic plan and framework to enhance the implementation (2008-2018).</li> <li>• Compilation of the United Nations Decade for Desertification as submitted by everyone and outcome of the consultative meeting of experts on land degradation neutrality.</li> </ul>  |
| <b><u>COP 10, Changwon, 2011</u></b>         | <ul style="list-style-type: none"> <li>• Implementation of decision 6/COP9 and report of the evaluation of global mechanism report by the parties 9th session.</li> <li>• Revised rules for participation of organizations and civil society to combat Desertification</li> <li>• Follow up on the WSSD and outcome of the 18th and 19th sessions of the Committee on Sustainable Development.</li> <li>• The budget for the biennium 2012-2013 and final performance for the convention trust funds.</li> <li>• Review the implementation of the costed 2-year work of the Committee on Science and Technology (2010-2011).</li> <li>• Audited financial statements for the convention's trust funds including audit report of Pricewaterhouse-Coopers at 31st Dec, 2010.</li> <li>• Credentials of delegations and information for participants and putting up the Global Mechanism case before International Court of justice.</li> <li>• The Changwon initiative and overview of expertise per discipline by country on the roster of experts.</li> </ul> |
| <b><u>COP 9, Buenos Aires, 2009</u></b>      | <ul style="list-style-type: none"> <li>• Report of COP in its ninth session</li> </ul>  |

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|                                   | <ul style="list-style-type: none"> <li>Note by secretariat and improving regional coordination and arrangements.</li> <li>Civil society organization revised procedures for participation UNCCD meetings</li> <li>Programme and budget for biennium 2010-2011</li> <li>Consideration of draft two-year work programme for committee on Science and Technology.</li> <li>Assessment of global fund by Joint Inspection Unit and legal opinion on scenario proposed to COP</li> <li>Follow up to the outcome of world summit and Rule 47 of the rules of procedure.</li> </ul> |
| <b><u>COP 8, Madrid 2007</u></b>  | <ul style="list-style-type: none"> <li>Report on the COP 7th session held in Nairobi and program and budget for biennium 2006-2007</li> <li>A comprehensive review of secretariat activities, the rationale for modalities, and consideration of the follow up of the world summit</li> <li>Audited financial statements for conventions trust funds 2002-2003</li> <li>Drafting of the ten-year plan (2008-2018)</li> <li>Round table discussion on climate change and desertification, situational analysis, and delegations' credentials.</li> </ul>                      |
| <b><u>COP 7, Nairobi 2005</u></b> | <ul style="list-style-type: none"> <li>Budget for the biennium 2008-2009 for global mechanism Corrigendum.</li> <li>The outcome of the World Summit on Sustainable Development significant to the United Nations Convention to Combat Desertification</li> <li>Follow up on Joint Inspection Unit Report and maintenance of the roster of independent experts and formation of ad-hoc panel of experts.</li> </ul>   |
| <b><u>COP 6, Havana 2003</u></b>  | <ul style="list-style-type: none"> <li>Report of the COP on its sixth session and decision on program and budget</li> <li>Committee on science and technology and accreditations of intergovernmental and non-governmental organizations.</li> </ul>   |
| <b><u>COP 5, Geneva 2001</u></b>  | <ul style="list-style-type: none"> <li>Adoption of the plan and organization of work</li> <li>Report on COP 5th session</li> <li>Programme and budget discussion for biennium 2003 and report on conventions trust funds for 2000-2001.</li> </ul>   |
| <b><u>COP 4, Bonn 2000</u></b>    | <ul style="list-style-type: none"> <li>Report on COP in its fourth session</li> <li>Program and budget and implementation of the convention</li> </ul>   |
| <b><u>COP 3, Recife 1999</u></b>  | <ul style="list-style-type: none"> <li>Report on budget in COP 3rd meeting</li> <li>Arrangement for the functioning of secretariat and maintenance of the roster of experts.</li> <li>Strengthening relationships with organizations and agencies.</li> </ul>  |
| <b><u>COP 2, Dakar, 1998</u></b>  | <ul style="list-style-type: none"> <li>Adoption of the agenda and organization as well as corrigendum</li> <li>Report on the second session of COP held at Dakar</li> <li>Review of the implementation of the convention and promoting relationships with other conventions.</li> <li>Designation of a permanent secretariat and maintenance of the roster of experts.</li> </ul>  |
| <b><u>COP 1, Rome, 1997</u></b>   | <ul style="list-style-type: none"> <li>Adoption of the agenda and organization of the work</li> <li>Report on COP in its first session and actions taken</li> <li>Draft decisions to be taken by COP</li> <li>Proposed programme budget for 1999 and review of extrabudgetary funds.</li> <li>Compilation of revised offers of IFAD and UNDP</li> </ul>  |

### UNFCCC Meetings Brief

| Conference of Parties            | Main Agendas   |
|----------------------------------|--|
| COP 1, 1995, Berlin, Germany     | <ul style="list-style-type: none"> <li>Agreed to work and budget for the secretariat, and adopted decisions on guidance to the Global Environment Facility (GEF).</li> <li>Guidance for trade in mercury, stocks and supply of mercury, exemptions, artisanal and small-scale gold mining and emissions and formed a committee on Minamata convention formercury.</li> </ul> |
| COP 2, 1996, Geneva, Switzerland | <ul style="list-style-type: none"> <li>Accepted the scientific findings on climate change preferred by IPCC in its second assessment (1995).</li> <li>Rejected uniform "harmonized policies" in favor of flexibility and called for "legally binding mid-term targets</li> </ul>   |
| COP 3, 1997, Kyoto, Japan        | <ul style="list-style-type: none"> <li>Acceptance of the Kyoto Protocol to the United Nations Framework Convention on Climate Change.</li> <li>Development of observational networks of the climate system.</li> <li>Development and transfer of technologies.</li> </ul>  |

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| COP 4, 1998, Buenos Aires, Argentina  | <ul style="list-style-type: none"> <li>• The Buenos Aires Plan of Action.</li> <li>• Implementation of Article 4.8 and 4.9 of the Convention (decision 3/CP.3 &amp; Articles 2.3 as well as 3.14 of the Kyoto Protocol.</li> <li>• Land-use, land-use change and forestry.</li> </ul>   |
| COP 5, 1999, Bonn, Germany            | <ul style="list-style-type: none"> <li>• Implementation of the Buenos Aires Plan of Action.</li> <li>• Capacity-building in developing countries and with economies in transition.</li> <li>• Relationship between efforts to protect the stratospheric ozone layer and efforts to safeguard the global climate system.</li> <li>• Emissions based upon fuel sold to ships and aircraft engaged in international transport and cooperation with the IPCC.</li> </ul>  |
| COP 6, 2000, The Hague, Netherlands   | <ul style="list-style-type: none"> <li>• Intergovernmental Committee for the Cartagena Protocol on Biosafety.</li> <li>• Biodiversity of Marine, Coastal and Inland waters.</li> <li>• Signing International Treaty on Plant Genetic Resources (PGR) for Food and Agriculture.</li> <li>• Global Strategy for Plant Conservation and ecosystem approach for sustainable development.</li> <li>• <b>Strategic Plan for the Convention on Biological Diversity.</b></li> </ul>  |
| COP 6, 2001, Bonn, Germany            | <ul style="list-style-type: none"> <li>• The Bonn Agreements on the implementation of the Buenos Aires Plan of Action.</li> <li>• Institutional linkage of the Convention secretariat to the United Nations.</li> </ul>   |
| COP 7, Marrakech, 2002, Morocco       | <ul style="list-style-type: none"> <li>• The Marrakesh Ministerial Declaration and funding under Kyoto protocol.</li> <li>• International emission trading among parties and for the CDM and joint implementation and accounting procedures for flexibility Mechanism.</li> <li>• The decision for developing countries in COP 8 to review the adequacy of commitments and accounting flexibility to commitments.</li> </ul>  |
| COP 8, 2002, New Delhi, India         | <ul style="list-style-type: none"> <li>• Developed countries to transfer technologies to developing countries and minimize the impact of climate change.</li> <li>• Issues related to tackle hydrofluorocarbons and perfluorocarbon and safeguarding global climate.</li> <li>• Review of financial mechanism and cooperation with other conventions.</li> </ul>  |
| COP 9, 2003, Milan, Italy             | <ul style="list-style-type: none"> <li>• In depth review of agricultural biodiversity programme and global strategy for plant conservation.</li> <li>• Forest Diversity and process for the revision of strategic plan.</li> <li>• Capacity building through fund transfer and parties also agreed to review the first national reports submitted by 110 non-Annex I countries.</li> </ul>  |
| COP 10, 2004, Buenos Aires, Argentina | <ul style="list-style-type: none"> <li>• Focused on plans progress that was made 10 years ago and their implementation.</li> <li>• Special emphasis was given to Climate change, mitigation and adaptation.</li> <li>• Buenos Aires Plan was adapted that promoted developing countries to adapt climate change.</li> </ul>   |
| COP 11/CMP 1, 2005, Montreal, Canada  | <ul style="list-style-type: none"> <li>• First Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol (CMP 1) since its initial meeting in 1997.</li> <li>• Guidance relating to the clean development mechanism under first commitment period of Kyoto Protocol and standard electronic format for reporting Kyoto Protocol Units.</li> <li>• Capacity building and Five-year programme of work of the Subsidiary body for Scientific and Technological Advice on issues such as impacts, vulnerability and adaptation to climate change</li> </ul> |
| COP 12/CMP 2, 2006, Nairobi, Kenya    | <ul style="list-style-type: none"> <li>• Further guidance on Clean Development Mechanism and implementation of Article 6 of Kyoto Protocol.</li> <li>• Setting up Adaptation Committee, compliance fund and capacity building under Kyoto protocol.</li> <li>• Some additional guidance to Global Environment Facility.</li> </ul>  |
| COP 13/CMP 3, 2007, Bali, Indonesia   | <ul style="list-style-type: none"> <li>• Adaptation Fund and further advancement of clean development mechanism.</li> <li>• Development and transfer of technologies under the Subsidiary body for Implementation and Scientific and Technological Advice.</li> <li>• Fourth intergovernmental panel assessment report on IPCC.</li> <li>• Additional guidance to the Global Environment Facility and Reporting on global observing systems for climate.</li> </ul>   |
| COP 14/CMP 4, 2008, Poznań, Poland    | <ul style="list-style-type: none"> <li>• Adaptation Fund and setting up of compliance committee.</li> <li>• Advancement of Bali Action Plan and capacity building for countries under Kyoto Protocol.</li> </ul>  |

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|---|--|
| COP 15/CMP 5, 2009, Copenhagen, Denmark       | <ul style="list-style-type: none"> <li>• Fallout of the work done by Ad Hoc Working Group on Long-term Cooperative Action.</li> <li>• Systemic climate observation, capacity building and additional guidance to global environmental facility.</li> </ul>   |
| COP 16/CMP 6, 2010, Cancún, Mexico            | <ul style="list-style-type: none"> <li>• Carbon dioxide trapping and storage in geological formations as clean development mechanism (CDM) project.</li> <li>• Guidance on implementation of Article 6 of Kyoto Protocol.</li> <li>• The Cancun agreement for land use, forestry and Proposal from Kazakhstan to make modifications in Annex B of Kyoto Protocol.</li> </ul>   |
| COP 17/CMP 7, 2011, Durban, South Africa      | <ul style="list-style-type: none"> <li>• Modalities and procedures for carbon dioxide capture and storage in geological formations as clean development mechanism.</li> <li>• Launch of green climate fund and Nairobi work programme on impacts, vulnerability and adaptation to climate change.</li> </ul>   |
| COP 18/CMP 8, 2012, Doha, Qatar               | <ul style="list-style-type: none"> <li>• Address loss and damage associated with climate change impacts in developing countries and advancing the Durban platform.</li> <li>• Reviewing Doha work programme on Article 6 of the Convention.</li> <li>• Promoting gender balance and improving the participation of women in UNFCCC negotiations and in the representation of Parties and economic diversification initiative.</li> </ul>   |
| COP 19/CMP 9, 2013, Warsaw, Poland            | <ul style="list-style-type: none"> <li>• International mechanism for loss and damage associated with climate and fifth review of financial mechanism.</li> <li>• Guidelines for domestic measurement, reporting and verification of domestically supported nationally appropriate mitigation actions by different developing country Parties.</li> <li>• Nairobi work programme on impacts, vulnerability and adaptation to climate change and national adaptation plans.</li> </ul> |
| COP 20/CMP 10, 2014, Lima, Peru               | <ul style="list-style-type: none"> <li>• Lima Ministerial Declaration for the purpose of Education and Awareness-raising.</li> <li>• Training programme for review experts for the technical review of greenhouse gas.</li> <li>• Revisions to the financial procedures for the Conference of the Parties, its subsidiary bodies and the secretariat.</li> </ul>   |
| COP 21/CMP 11, 2015, Paris, France            | <ul style="list-style-type: none"> <li>• Reviewing the Warsaw International Mechanism for Loss and Damage linked with Climate Change Impacts.</li> <li>• Long term climate finance and National Adaptation Plans.</li> <li>• To focus upon linkage between Technology Mechanism and Financial Mechanism of Convention.</li> </ul>  |
| COP 22/CMP 12/CMA 1, 2016, Marrakech, Morocco | <ul style="list-style-type: none"> <li>• Paris committee on capacity building and review report on capacity building.</li> <li>• Intensifying climate technology development and transfer through the Technology Mechanism.</li> <li>• Implementation of the global observing system for climate.</li> </ul>   |
| COP 23/CMP 13/CMA 1-2, 2017, Bonn, Germany    | <ul style="list-style-type: none"> <li>• Report to Global Environment Facility to COP and guidance to GEF.</li> <li>• Assessment of the technical examination process on mitigation and adaptation.</li> <li>• Enhancing climate technology development and transfer through technology mechanism.</li> </ul>  |
| COP 24/CMP 14/CMA 1-3, 2018, Katowice, Poland | <ul style="list-style-type: none"> <li>• Review of climate technology center and network.</li> <li>• Preparation of the implementation of the Paris agreement and the first session of COP serving as the meeting of the parties to Paris agreement.</li> <li>• Linkages between financial mechanism and technology mechanism.</li> </ul>  |

## DISCUSSION AND WAY FORWARD

UNCCD COP 14 was hosted by India on 2<sup>nd</sup>-13<sup>th</sup> September 2019 at New Delhi where nearly 9000 participants from all over the globe took part. This meeting comprised 11 high-level, 30 committees and more than 170 stakeholder meetings with 44 exhibitions and 126 side events in 10 days. In this conference, Delhi Declaration was adopted, a commitment under which issues like gender health, ecosystem restoration, climate change mitigation strategies and private sector involvement will be foreseen. Peace Forest Initiative was also a part of commitments and recovery of 5 million hectares of degraded land in India will be given utmost importance. A total of 36 decisions were taken to elaborate further action on Convention's goals for 2018-2030. Land restoration measures were given a business perspective and are the cheapest solution for climate change and biodiversity loss. In the face of climate

change, it is important to engage every country whether big or small to ensure gender balance, engage young people and secure land rights.

Earlier report of IPCC has mentioned that 25 to 40 billion tons of topsoil is degraded consistently, diminishing harvest yields and the capacity of the soil to store and cycle carbon, supplements, and water [39]. According to Global Climate Risk Index 2019 held at Katowice summit, India was placed as the fourteenth most vulnerable country on the planet due to climate change [22]. India supports its huge population by the means of agriculture and a land life-supporting system is said to be hampered where agricultural produce activity is declining over time posing desertification threat [66]. As India poses a highly vulnerable climate, land degradation is a major issue that cannot be overlooked as India has only 2.4 % of the total geographical area supporting 18 % of the world's population [48] and if land degradation is not sabotaged then our land degradation neutrality goals will not be addressed effectively. Approximately, 30 % of the land is degraded in India and eight states (Rajasthan, Delhi, Goa, Maharashtra, Jharkhand, Nagaland, Tripura and Himachal Pradesh) show tremendous desertification trends where 40-70 % of the land area is degraded [57]. Up to 60% of land in India is under development contributing 14% to its GDP [7]. It is one of the most vulnerable parts in the nation to be influenced by expanding outrageous climate occasions brought about by a worldwide temperature alteration. Most influenced are the marginal farmers owning under two hectares of land, who make-up about 80% of the complete farmers in India. If the scenario worsens, 700 million people are estimated to migrate by 2050 [4]. Desertification is at the base of political and financial issues and represents a danger to the ecological harmony in influenced locales. The UNCCD and REDD+ have accomplished different advancement since it went into power. UNCCD 2018-2030 Strategic Framework is the most far-reaching worldwide pledge to accomplish Land Degradation Neutrality (LDN) [23] to re-establish the efficiency of huge swathes of corrupted land, improve the employment of more than 1.3 billion individuals and diminish the effects of a dry spell on helpless populaces. These all goals go hand in hand with the directives under REDD+ potentially contribute in removing emissions from deforestation and degradation. High human and domesticated animal pressure on our land deprived of characteristic vegetation spread is bringing about genuine soil disintegration and residue emanations. Desertification trends can decline if policymakers, stakeholders, local people, and scientific community work in harmony by implementing agricultural practices that have been designed to deal with desertification [65]. On the contrary, if we gear up our endeavors to build the enduring vegetation spread a few folds and connect it with elective business advancement for monetary prosperity, start preserving water and put forward attempts to revive our exhausted groundwater springs, there is an opportunity that we reclaim our degraded lands within a time frame. The cooperation from developed and non-developed nations and its aware population can make these programs a real success in the coming future. These mitigating tools can prove to solve the climate crisis to an extent.

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