Regeneration of Degraded Land in India: Challenges and Possibilities

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*We acknowledge support of Landesa for allowing Ms. Shipra and her team members to contribute in this discussion paper.

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1 Introduction

Nearly 30 per cent of India's landscape is degraded or under desertification. Successive surveys related to land degradation in India, reveal that despite several announcements and policy changes, the desertification and degradation of land and forest continues to rise. It has posed serious threats to environment, biodiversity, local economy and food security. Globally and nationally, India has been very vocal to address this issue. Internationally, it has committed to regenerate its sizable landscape through international commitments such as Nationally Determined Contribution (NDC) under UNFCC, Convention on Biodiversity Target (CBT), Land Degradation Neutrality (LDN) target under UNCCD and Bonn Challenge anchored by IUCN.

At the national level it has initiated various programs to meet these goals, which includes Environment Policy, National Action Plan for Climate Change (NAPCC), Green India Mission, MGNREGA, CAMPA and many others. While all these commitments and policy decisions are related to each other, there exist variations and difference in targets. Moreover, the poor implementation of policies to achieve these targets has also been a serious issue. This discussion paper attempts to put together all commitments/target of India related to regeneration of land and forest to have further discussion on their status, implementation strategies and expected results in future.

Various studies including one done by Space Application Centre, Ahmadabad in 2016 reveals that a large part of India's land mass is under land degradation and desertification. Successive studies also indicated that the process of land degradation is increasing. It has huge direct social, cultural, environmental and economic repercussions, as the majority of Indian population is directly dependent on natural resources.

Realizing these threats, the successive Indian governments were in the forefront to announce policies and set target to regenerate degraded land resources. The pro-activeness of the government is evident from its active participation in international conventions related to environment and climate change such as National Determined Contributions (NDCs), UNCCD and UN Convention on Biological Diversity. However, the action on ground has been very poor.

We have committed to increase forest cover by 2030 in order to sink 2.5 to 3 million tons of carbon dioxide under NDC in UNFCC. Expert argues that for this target India need to add 30 million hectares (mha) forest in its current forest land. For this specific and measurable target, unfortunately, the nation has no specific program/scheme.

In this paper, we look at the various commitments made by India under international agreements and the status thereof as in 2019. We also look at the various missions/programs to address land degradation and their status. The reasons for shortfall are discussed under three headings (i) political economy of land resources (ii) inadequacy of financial resources and (iii) inadequate institutional capacity – from legal framework to implementation organizations.

2 Land Degradation in India

According to a latest publication of ISRO, about 29.32 per cent of total 328.72 mha geographical area of India is affected by land degradation. It accounts for 96.4 mha of forest, non-forest and agriculture land spread across the country. Disturbingly, the total degraded land has increased to this level in 2011-13 from 94.53mha in 2003-05. In these eight years, 1.87 mha more land degraded or deserted due to various reasons.

The 'Desertification and Land Degradation Atlas of India' published by the Space Application Centre (ISRO) published in 2016 reveals that about 24 per cent of desertification/land degradation with respect to total geographical area is contributed by nine states namely Rajasthan, Maharashtra, Gujarat, Jammu and Kashmir, Karnataka, Jharkhand, Odisha, Madhya Pradesh and Telangana. State specific analysis shows that more than 50 per cent land of states like Jharkhand, Rajasthan, Delhi, Gujarat and Goa is under desertification/land degradation. Kerala, Assam, Mizoram, Haryana, Bihar, Uttar Pradesh, Punjab and Arunachal Pradesh have shown less land as compared to their total geographical area under desertification/land degradation in the Atlas[1]. Total land degradation in India is given in the following table.

Process of Degradation	Area under Desertification (mha)							
	2011-13				2003-05			
	Arid	Semi-Arid	Sub-Humid	Total	Arid	Semi-Arid	Sub-Humid	Total
Vegetation Degradation	2.86	13.48	6.65	22.99	2.81	13.39	6.34	22.54
Water Erosion	3.03	17.51	8.97	29.51	3.12	17.07	8.91	29.1
Wind Erosion	17.63	0.56	0	18.19	17.72	0.57	0	18.29
Salinity/Alkalinity	2.52	0.86	0.09	3.47	2.52	1.07	0.21	3.8
Water Logging	0.02	0.08	0.31	0.41	0.02	0.08	0.25	0.35
Mass Movement	0.84	0.11	0	0.95	0.76	0.11	0	0.87
Forest Shattering	2.94	0.46	0.01	3.41	2.74	0.43	0.01	3.18
Man Made	0.04	0.14	0.16	0.34	0.04	0.14	0.14	0.32
Barren	0.25	0.28	0.05	0.58	0.25	0.28	0.05	0.58
Rocky	0.3	0.97	0.02	1.29	0.29	0.97	0.02	1.28
Settlement	0.11	0.93	0.44	1.48	0.07	0.75	0.33	1.15
Grand Total	**30.54**	**35.38**	**16.7**	**82.62**	**30.34**	**34.86**	**16.26**	**81.46**

Source: Space Application Centre, Ahmadabad

[1] http://www.indiaenvironmentportal.org.in/files/file/Desertification_Atlas_2016.pdf

2.1 Land Degradation/Desertification Processes in India

The Atlas on land degradation and desertification of India, published by the Space Application Centre, Ahmadabad has identified following major processes of land degradation and desertification in India.

Vegetation degradation: Vegetation degradation is observed mainly as deforestation / forest-blanks / shifting cultivation and degradation in grazing / grassland as well as in scrubland. In India this process has degraded about 23mha land.

Water erosion: Water Erosion is loss of soil cover mainly due to rainfall and surface runoff water. Water erosion is observed in both hot and cold desert areas, across various land covers and with varying severity levels. Water erosion is the biggest factor in land degradation in India which as degraded more than 29mha land.

Wind erosion: Wind erosion pertains to the Aeolian activities. It denotes the spread of sand by various processes, even up to lofty altitudes of Himalayas. Wind can erode soil very selectively and intensively in three transporting method, namely Suspension, Siltation and Soil creep. Wind erosion is third largest factor after water erosion and vegetation loss. In India, it has degraded about 18mha land.

Water logging: The undrained land parcels tend to accumulate standing water for longer durations of time on the surface, this condition is called water logging. The severity of water logging is determined based on the period of time the water remains stagnant. It has degraded 0.42 mha land in the country.

Salinity / Alkalinity: Salinity or Alkalinity is fundamentally the chemical property of the soils. It occurs mostly in cultivated lands, especially in the irrigated areas. It is fourth largest factor behind land degradation in India and has degraded 3.48mha land.

Mass Movement: The spontaneous downward movement of soil and rock under the influence of gravity (but without the dynamic action of moving fluids) is included under the general term Mass Movement. The mass movement processes include all forms of down slope movement of soils, overburden, or bedrock under the direct influence of gravity. This process has degraded nearly one mha land in the country.

Frost Heaving: Frost heaving is the process of ice lens formation beneath the soil surface during freezing conditions in the atmosphere. The ice grows in the direction of heat loss (vertically toward the surface), starting at the freezing front or boundary in the soil.

Frost shattering: Frost shattering is the essentially a process of mechanical weathering or breakdown of rocks due to regular fluctuation in temperature, around 0oC, in joints or cracks in rocks. At the time of precipitation water enters into the cracks of rock. In winter, it freezes to ice and increases in volume.

Man Made: All those land degradation processes which are induced directly or indirectly by human intervention and are not natural, are categorised as Man Made

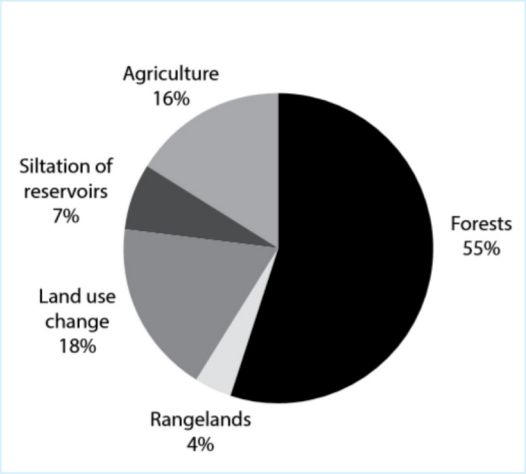
desertification processes. It includes Mining/Quarrying, Brick Kiln, Industrial Effluents, City Waste, Urban Agglomeration etc. Manmade processes have degraded 0.35 mha land.

Barren / Rocky area: Barren / rocky areas are kind of wastelands, which do not have productive capacity. These areas are mostly without or negligible soil cover either due to weathering and erosion of exogenetic processes or due to specific regolith made of hard rock. These two processes have together degraded nearly 2mha of land in this country.

2.2 Impact of Land Degradation

Land degradation has direct correlation with the loss of livelihood in India, as a large part of the population is still dependent on natural resources for their livelihood. Adverse impacts of land degradation pose challenges such as low agro-productivity, environment loss, food security and overall quality of life of people. It also poses challenges like loss of biodiversity and climate change[2]. Moreover, this can have far reaching impacts on the growth trajectory of the country.

The Energy and Resource Institute (TERI) in its recent study on economics of desertification and land degradation found that the cost of land degradation through various processes in India cost around 2.5 per cent of the country's GDP in 2014-15. It also found that almost 82 per cent of the estimated cost is on account of land degradation[3], which indicates that it has severe adverse impact on food security and livelihood security of millions of people.



Distribution of the total costs of land degradation in India

Source: TERI, 2018

The study of TERI in 2018 estimated total investment required for reclamation of land degraded by five major processes namely water erosion, wind erosion, forest degradation, water logging and salinity. The study found that India requires Rs. 2948 billion (2014-15 price) to reclaim 94.53 mha degraded land as per newest survey of by SAC, Ahmadabad. This estimate analyses land degradation pattern between two surveys conducted in 2003 and 2011. In another estimate, the study analyzed land

[2] https://pib.gov.in/newsite/erelcontent.aspx?relid=57618

[3] https://www.teriin.org/sites/default/files/2018-04/Vol per cent20I per cent20- per cent20Macroeconomic per cent20assessment per cent20of per cent-20the per cent20costs per cent20of per cent20land per cent20degradation per cent20in per cent20India_0.pdf

degradation pattern based on three surveys conducted in 1995, 2003 and 2011 and calculated that India will require Rs. 3175 billion to reclaim 106.15mha degraded land by 2030[3].

2.3 Linkages between land tenure and land degradation

While there is a diverse set of variables that drives land degradation, land tenure – the relationship of people to land –often has a causal linkage with land degradation. The rules of the land tenure define how people are granted access or rights to use, control, and transfer land, as well as associated responsibilities and restraints. Secure and clear land tenure often motivates and enables a person to make conscious and long-term investments towards retaining the soil health and land quality, thereby contributing to land conservation. This can include plantation of environmentally beneficial trees, judicious of agrochemicals; leaving the land fallow or following environmentally effective crop rotation. On the contrary if the land tenure is not safe clear, the person often fears losing the land any time and makes short term decisions aimed towards maximizing profits. This leads to over use of land resources through exploitative techniques.

[3] https://www.teriin.org/sites/default/files/2018-04/Vol per cent20I per cent20- per cent20Macroeconomic per cent20assessment per cent20of per cent-20the per cent20costs per cent20of per cent20land per cent20degradation per cent20in per cent20India_0.pdf

3 India's International Commitments which Impinge on Land Restoration

3.1 United Nations Convention to Combat Desertification (UNCCD)

The United Nations Convention to Combat Desertification (UNCCD) was established in 1994. It is an international agreement legally binding on its parties and the only one in the world that brings sustainable land management into the discussion along with environment and development. The arid, semi-arid and dry-sub humid areas of the world, known as dry lands are the focus of this convention. The dry lands, that covers 41.3 per cent of the land mass of the earth are some of the vulnerable ecosystems and home to numerous indigenous communities. Land degradation neutrality is one the key objectives of the convention. It is defined by the UNCCD as

"A state whereby the amount and quality of land resources, necessary to support ecosystem functions and services and enhance food security, remains stable or increases within specified temporal and spatial scales and ecosystems[4]"

The *'UNCCD 2018-2030 Strategic Framework'* strives to achieve Land Degradation Neutrality in a comprehensive and holistic manner. It aims at restoring degraded lands and making them productive again in order to make vulnerable populations of around 2.1 billion people, who dwell in these areas more resilient to the impact of droughts[5]. The 197 countries that have ratified the convention work collectively towards following three objectives-

1. Better living conditions for the people in dry lands,
2. Maintaining and restoring land and soil productivity
3. Mitigating the effects of drought.

The UNCCD adopted the strategic framework to combat desertification at the COP13 to guide the actions of the stakeholders and partners. The framework includes five objectives and indicators under each objective that Parties must strive to improve within the period of 2018-2030. The five strategic objectives are as follows[6]:

1. Improving the condition of affected ecosystems, combating desertification/land degradation, promoting sustainable land management and contributing towards land degradation neutrality.

[4] https://www.unccd.int/actions/achieving-land-degradation-neutrality accessed on 22nd October
[5] ibid
[6] https://www.unccd.int/sites/default/files/inline-files/ICCD_COP per cent2813 per cent29_L.18-1716078E_1.pdf accessed on 19th October 2019

2. Improving the living conditions of the affected populations;
3. Mitigation, adaptation and management of the effects of drought;
4. Generating global environmental benefits through effective implementation of the UNCCD;
5. Mobilizing substantial and additional financial and non-financial resources to support the implementation of the Convention by building effective partnerships at global and national level.

The agenda was adopted in 2015 by 120 countries and progress has been made. According to the UNCCD, the LDN will be an exemplar for policies and practices of land management. Recovery of degraded areas is expected to counterbalance the expected loss of productive land by incorporating conservation, sustainable management and restoration practices in land use planning.

The latest conference of party, the COP 14 was held in New Delhi, India from the 3rd-13th September 2019 and the 'Delhi Declaration' was adopted by parties[7]. The Delhi Declaration has renewed commitment to objectives already set at the COP13. It further commits to achieve objectives with programs that include the participation of local communities and are gender inclusive, include drought preparedness and risk mitigation in case of droughts and dust storms, invite more investments from different stakeholders including the private sector and encourage the creation green jobs, encourage the peace forest initiative amongst others within the time period from 2018-2030.

India ratified to the UNCCD on 17 December 1996 and released its first and only program up till now in 2001. India's National Action Program included comprehensive measures to achieve the UNCCD objectives.

Institutional Structure at the Local Level includes several programs and schemes for combating desertification as well as social sector schemes for community development for women and child development, health, literacy as well provision of basic needs such as drinking water and sanitation. Several income generating schemes, micro credit and credit assistance activities for eradicating poverty are also part of the plan. Capacity building and strengthening the roles of various stakeholders in the degraded regions of the country is also part of the plan. The NAP strived to operate through active participation of NGO's and local communities in dry lands.

National land use boards such as the National Land Use and Conservation Board (NLCB), National Wastelands Development Board, National Afforestation and Eco-Development Board were set up. The 2018 report submitted to the UNCCD states that in 2014-15, after the COP13, the objectives of the strategic framework were aligned within the existing objectives of the NAP 2011.

[7] https://www.unccd.int/news-events/new-delhi-declaration-investing-land-and-unlocking-opportunities accessed on 17th October 2019

3.1.1 Secure Land Tenure as in UNCCD

COP 13 of the UNCCD acknowledged the importance of land tenure towards achieving Land Degradation Neutrality and endorsed the inclusion of Land Tenure as a new and emerging issues in COP 14[8].The Science Policy Interface, which provides a scientific basis for understanding the key dimensions of an enabling environment for LDN planning concludes that land tenure security and land-use planning conditions are key for creating an enabling policy and regulatory environment, and there is a clear need to build national capacity for securing land tenure arrangements[9].It also notes that land tenure security is not necessarily achieved through land titling; interventions that address the sources of tenure insecurity are more effective than a single focus on titling (Para 52, conclusion 3)

COP 14, notes that responsible land governance is a fundamental component of sustainable land management and is important to addressing desertification/land degradation and drought[10]. In its call to action it encourages member nations to -

1. follow the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests[11] in the Context of National Food Security principles, in the implementation of activities to combat desertification/ land degradation and drought and achieve land degradation neutrality;
2. review and, where appropriate, adopt national land governance legislation and procedures in order to support sustainable land use and land restoration;
3. to recognize legitimate tenure rights, including customary rights, consistent with the national legal framework;
4. legally recognize equal use and ownership rights of land for women and the enhancement of women's equal access to land and land tenure security as well as the promotion of gender-sensitive measures to combat desertification/land degradation and drought and achieve land degradation neutrality, taking into account the national context;
5. provide effective, timely and affordable access to justice and transparent dispute resolution mechanisms;
6. recognize and promote fair and inclusive community-based conflict resolution mechanisms;
7. ensure that measures to combat desertification/land degradation and drought are carried out in a non-discriminatory and participatory way so that they promote equal tenure rights and access to land for all, in particular vulnerable and marginal groups, within the national context;

[8] https://www.unccd.int/sites/default/files/sessions/documents/2019-08/ICCD_COP%2814%29_20-1913881E.pdf
[9] https://www.unccd.int/sites/default/files/sessions/documents/2019-08/ICCD_COP%2814%29_CST_2-1911899E.pdf
[10] https://www.unccd.int/sites/default/files/sessions/documents/2019-11/26-cop14.pdf
[11] The Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security (VGGTs) provides states, private sector actors, and other stakeholders with specific guidance on gender-equitable land governance, in order to contribute to global efforts to eradicate poverty and hunger and realize the right to food.While supporting efforts towards the eradication of hunger and poverty, the guidelines are also intended to be supportingsustainable development and enhancing the environment.

8. promote responsible and sustainable private and public investments in combating desertification/land degradation and drought, including restoration programmes that adhere to environmental and social safeguards in line with the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security, and national legislation;

9. explore options for the integration of existing globally agreed Sustainable Development Goal indicators relevant to land governance into the United Nations Convention to Combat Desertification reporting process, with a view to avoiding duplication of reporting efforts and ensuring the widest reach among different national contexts;

3.1.2 Gender considerations in UNCCD

The Scientific Conceptual Framework for Land Degradation Neutrality states that the drivers of land degradation are not gender neutral. It stresses that poverty is both a root cause and a consequence of land degradation, with gender inequality playing a significant role in the process, worsening the impacts on women. The UNCCD Science Policy Interface (SPI) argues that excluding gender from the analysis of preliminary assessment data for LDN activities will lead to incomplete or misleading findings.[12]

In 2017, UNCCD adopted a Gender Action Plan to make the implementation of UNCCD gender responsive and transformative and thus more effective, efficient and successful. It prioritizes four thematic areas to close the gender gap:(i) Participation in decisions taken during the design, planning, implementation and evaluation of initiatives to implement the UNCCD (ii) Integrating women's economic empowerment in UNCCD implementation activities in order to eradicate their extreme poverty (iii) Strengthening women's land rights and access to resources (iv) Enhancing women's access to improved knowledge and technologies that relate to effective UNCCD implementation.

To promote gender equality and/or women's empowerment in their interventions, it encourages Parties to work with and through women's organizations; develop strategic partnerships; and mobilize and allocate resources to support gender related initiatives.

3.1.3 Status of Commitments under the UNCCD as in 2019

The MOEFCC reports that by 2012 India submitted four progress reports to the UNCCD in the years 2000, 2002, 2006 and 2010. India submitted its latest report[13] to the UNCCD in August 2018 to review progress on the objectives of the strategic framework.

[12] Orr, B.J, et al. Scientific Conceptual Framework for Land Degradation Neutrality (2017). https://www.unccd.int/sites/default/files/documents/2019-06/LDN_CF_report_web-english.pdf

[13] https://prais.unccd.int/sites/default/files/pdf_reports/unccd_India_2018_2.pdf accessed on 17th October 2019

The report submitted to UNCCD states the progress towards each strategic objective (SO) through different indicators. Trends in land cover show an increase in tree cover area by 3,324.59 km2, decrease in grassland area by 56,520.21 km2 and increase in cropland area by 2.09 lakh km2 in the period from 2005 to 2015. While 19,746.09 km2 land has been converted from tree cover to cropland, 47,483.08km2 land has been converted from grassland to cropland, 1.24 lakh km2 land has been diverted from cropland to other land in the decade from 2005 to 2015.

With regard to carbon stocks in the country, which are an indicator for measuring performance for SO1 and SO4, stocks have decreased in some areas due to land use change from tree-covered areas to crop land and other land uses, while it has also increased in some cases when land use change has converted cropland into tree covered area and other lands into cropland. The red list of select species survival has seen a downward trend due to deforestation, industrial activities, urbanization and land tenure. While the report states there has been an increase in the domestic budget allocation, private sources have not contributed towards any developments. The report furthers mentions the number of projects that have been undertaken and completed with regard to the objectives of UNCCD. A grant of USD 516 million was given to 84 projects that cover 21 states. Out of these 37 have been completed and 33 are under implementation.

In 2017, ahead of the World Day to Combat Desertification, the MOEFCC released a PIB[14] that updated the progress of India towards combating drought, land degradation and desertification (DLDD). The then Environment Minister Dr. Harsh Vardhan announced that India was working on a new NAP to achieve LDN by 2030. Some of the main programs and schemes mentioned by him include the Soil Health Card Scheme, which was launched to help increase productivity of farmers and encourage judicious use on inputs.

The Scheme was allotted Rs. 840.52 Crore over a period of three years, which the PIB sates is 30 times more than any funding allotted to soil research and analysis in previous years. Some other major schemes mentioned included the 'Rashtriya Krishi Vikas Yojana' which has been allotted Rs. 4750 crore in 2016-17 as compared to the Rs. 3707 crore in the preceding year. The 'Pradhan Mantri Krishi Sinchayee Yojana' was also allotted 22 per cent more funds than the preceding year. Allocation under the NRLM also increased by 33 per cent.

However, on Land Degradation Neutrality, no action plan or program has been submitted to the UNCCD although the Indian Prime Minister Narendra Modi announced its LDN target at COP14 of restoring 26 mha of degraded land. This number has been quite controversial[15] as earlier the MOEFCC

[14] https://pib.gov.in/newsite/PrintRelease.aspx?relid=165692 accessed on 18th October 2019

[15] https://www.downtoearth.org.in/news/environment/unccd-cop-india-still-unclear-about-its-degradation-target-66422 accessed on 18th October 2019

announced a target of achieving LDN on 30 mha of land at the conclusion of the LDN target setting program on June 17. While on 28 August, Prakash Javadekar, the Union Minster for Environment, Forest and Climate Change, announced a target of 5 mha at a curtain raiser at the National Media Centre. Finally, Mr Modi's announcement of achieving LDN on 26 mha of land has been set as the target. The action plan for achieving the same is still awaited.

The *Desertification and Land Degradation of Selected Districts of India*, an atlas published by the ISRO's Space Application Centre, Ahmadabad in 2018, around 30 per cent of the country's area or 96.40 million ha, is undergoing degradation. Reports from different states of the country only show a downward shift regarding the same[16]. For example, timber extraction in Maharashtra has led to rampant soil erosion and these extractions in fact happened with the permissions from the state's forest department leading to 0.26 million trees being cut.

Soil erosion triggered by mining has led to aggravated water scarcity in Jharkhand with alarming reduction in ground water levels. Desertification is creeping into Nagaland due to shifting cultivation, deforestation and rising populations. Low rainfall and increase dependence on bore wells has led to soil aridity in many places in Andhra Pradesh.

Going by the above reports, there needs to be immediate action taken with regard to water conservation, mining and cutting down of trees for development.

Water scarcity in India is becoming commonplace every year and spreading to more and more urban and rural areas. 2019 monsoons witnessed drought in more than 50 per cent of the country[17]. The Niti Aayog's composite water management index report 2018, stated that 12 major cities including Delhi, Bangalore, Chennai, Hyderabad and others are edging towards zero groundwater levels by 2020, and will affect around 100 million people. Availability of water is a crucial aspect towards reaching LDN. Making lands productive again is a target impossible to reach without water, and over pumping of water in cities, and movement of water from rural to urban areas affects availability throughout.

Water scarcity in cities has often been supplemented by water sourced from nearby peri-urban and rural areas, which affects livelihoods in those regions. If the country has to reach its ambitious target of restoring 26 million ha of land by 2030, then water harvesting and management should be on top of the list. There is a need of shifting the focus from more and more supply towards careful use and harvesting.

[16] https://www.downtoearth.org.in/news/environment/desertification-setting-in-across-a-quarter-of-india-66407 accessed on 21st October 2019
[17] https://www.downtoearth.org.in/blog/water/india-s-water-crisis-the-clock-is-ticking-65217 accessed on 21st October 2019

3.1.4 Tenure security and Land ownership by women

Responsible land governance including land tenure security has emerged as one of the critical factors in combating desertification. Since independence several progressive measures have been taken by the various states as well as well as center to usher in land reforms. But an inherently complex land tenure system and inequity in land access & distribution continue to pose challenges including an increasing number of land conflicts.

Land ownership in India is highly skewed in favour of men. It is important to note that the data available in India on ownership of land by women are severely inadequate and lack coherence, primarily because for years land records have not kept sex-disaggregated data of land ownership. The closest data (of all the existing sources) comes from the Agriculture Census and gives information on management rights. Per the agriculture census in 2015-16, 13.96% of agricultural land holders are women while they constitute 65% of all agricultural workers. This gap is attributed to the inherent biases in the legal scope that explicitly discriminates against women's land ownership coupled with the social biases that blight the implementation of even the existing progressive provisions at several levels. There is an urgent need for at least two things– one, review of all land laws so that they become gender just and two, effective measures to establish social legitimacy of women's rights.

3.2 India's Nationally Determined Contribution to Climate Change Mitigation and Adaptation

The Conference of Parties (COP 21) in Paris in December 2015 organized by the UN Framework Convention on Climate Change (UNFCCC) resulted into adoption of non-binding and voluntary target to address issues related to climate change. "Countries publicly outlined what post-2020 climate actions they intended to take under the new international agreement, known as their Intended Nationally Determined Contributions (INDCs)." The overall purpose of INDCs is to hold the increase of global average temperature to well below 20C or even limit the increase to 1.50C. Also, aim for zero emission in the second half of the century[18].

India being a responsible signatory and member of COP 21 ratified the convention and converted INDCs into Nationally Determined Contributions (NDCs). India's NDCs communicated to UNFCC are as follows:

3.2.1 India's Nationally Determined Contributions[19]

1. To put forward and further propagate a healthy and sustainable way of living based on traditions and values of conservation and moderation.

2. To adopt a climate friendly and a cleaner path than the one followed hitherto by others at corresponding level of economic development.

[18] https://www.wri.org/indc-definition

[19] https://www4.unfccc.int/sites/submissions/INDC/Published per cent20Documents/India/1/INDIA per cent20INDC per cent20TO per cent20UNFCCC.pdf

3. To reduce the emissions intensity of its GDP by 33 to 35 percent by 2030 from 2005 level.

4. To achieve about 40 percent cumulative electric power installed capacity from non-fossil fuel based energy resources by 2030 with the help of transfer of technology and low cost international finance including from Green Climate Fund (GCF).

5. To create an additional carbon sink of 2.5 to 3 billion tons of CO2 equivalent through additional forest and tree cover by 2030.

6. To better adapt to climate change by enhancing investments in development programs in sectors vulnerable to climate change, particularly agriculture, water resources, Himalayan region, coastal regions, health and disaster management.

7. To mobilize domestic and new and additional funds from developed countries to implement the above mitigation and adaptation actions in view of the resource required and the resource gap.

8. To build capacities, create domestic framework and international architecture for quick diffusion of cutting edge climate technology in India and for joint collaborative R&D for such future technologies

India has submitted to UNFCC that to achieve its goal in limiting increase of average global temperature, it will launch new initiatives along with continuation of its on-going interventions. New interventions committed by the country range from promoting clean technology in thermal power generation, promoting renewable energy, reducing emission from transportation, promotion of energy efficiency, reducing emission from waste and developing climate resilient infrastructure.

The regeneration of natural resources is a crucial strategy of India as reflected in NDCs submitted to UNFCC. NDC no. 5 and 6 provides for regeneration of land, forest and biodiversity in the country. It has ambitious plan to absorb 2.5 to 3 billion tons of carbon dioxide (CO2) by 2030 through additional forest and tree cover. It has also committed to enhance investment for climate vulnerable sectors such as agriculture, Himalayan region and coastal areas. Environment magazine Down to Earth in one of its article praised India's NDCs by comparing it with INCs committed by China and USA[20].

3.2.2 Status of Commitments under NDCs as in 2019

The Climate Action Tracker found that India's NDCs is within the range of what is considered to be a fair share of global effort to limit average global temperature to 20C. However, it calls for other countries to go for deeper emission cut to ensure limiting increase of temperature[21] and avoid stream

[20] https://www.downtoearth.org.in/coverage/climate-change/climate-change-package-51338
[21] https://climateactiontracker.org/countries/india/pledges-and-targets/

events of climate change in the future. It can be assumed that the India's NDC to create an additional carbon sink through additional forest and tree cover by 2030 is cumulative. The average annual carbon sink will be 167 to 200Mt CO2 over the period 2016 to 2030. The Government of India is convinced that the Green India Mission could achieve half of this target3. However, the Parliamentary Standing Committee for the Environment, Forest and Climate Change found that the Green India Mission is grossly underfunded. The budget allocation for the mission has sharply declined from Rs. 89.53 core in 2015-16 to just Rs. 47.8 crore in 2017-18[22].

3.3 UN Convention on Biological Diversity (CBD)

The United Nations Convention on Biological Diversity (CBD) is an international treaty, which was set up in 1993 to adhere to the comprehensive sustainability plan laid out by the Agenda 21 at the Rio Earth Summit 1992. The convention has been ratified by 193 countries and the European Union that are lawfully bound to follow its objectives.

The Secretariat of the CBD is based in Montreal, Canada and it supports[23] the Convention by assisting the member governments in implementing various action plans as well as organizing meetings, preparing reports and coordinating with other international organizations and collection and disseminating information. The governing body of the Convention is the Conference of Parties (COP) made of the ratified countries who meet every two years to review progress and plan ahead.

The Secretariat also manages the internet based network Clearing-House Mechanism (CHM). CHM is a platform for exchange of information and technical and scientific cooperation amongst members. The Financial Resources Mechanism of the Convention provides financial support for implementing CBD in developing countries. Handled by the Global Environment Facility (GEF), funding is sourced from member governments.

Purpose: The article 1 of the convention lays down the objectives[24] as

"The objectives of this Convention, to be pursued in accordance with its relevant provisions, are the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding."

Biodiversity at all levels- ecosystem, species and genetic resources is covered by the convention. The Nagoya Protocol, which came into effect in October 2014, covers the second objective that is fair and equitable sharing of the benefits arising out of the utilization of genetic resources. The third objective is covered under the Cartagena Protocol, which was enforced in September 2003 and is aimed at the safe handling, use and transport of living modified organisms (LMOs) which are a product of modern biotechnology and may have harmful impact on biodiversity and risks to human health.

[22] https://www.newsclick.in/green-india-mission-grossly-underfunded-says-report
[23] https://www.cbd.int/secretariat/role/ accessed on 15th October 2019
[24] https://www.cbd.int/convention/articles/default.shtml?a=cbd-01 accessed on 15th October 2019

The Convention has been successful in bringing the issues of biodiversity to the fore in many developed and developing countries and be considered as an important part of environment and development issues. The flexible approach of CBD in setting general goals and policies rather than compulsory targets, has allowed countries to come up with their own plans to implement the CBD and made it one of the most widely ratified international conventions.

3.3.1 India's Commitments under CBD

The COP adopted the 'Strategic Plan for Biodiversity 2011-20' in 2010[25]. It is a ten-year framework to safeguard biodiversity and the benefits it provides to humans, which was adopted by all countries and stakeholders. The Strategic Plan put down 20 'ambitious but realistic' targets known as the Aichi Biodiversity Targets were to be incorporated into the National Biodiversity Strategies and Action Plans (NBSAPs) of the member governments. India provided its 6th national report to the CBD in 2018 to provide an update on its progress towards the national biodiversity targets (NBT). The 20 Aichi targets have been enshrined within the 12 NBT's in India. The table below lists the NBTs, the action taken and progress as per the 6th national report.

The Constitution of India embeds the fundamental support in the form of laws and policies for the realization of these targets. The State and the people of India are bound to comply with these and conserve the rich biodiversity of the country at the national, state and local level. While various policies and laws existed, many news ones have evolved to address the various aspects of the NBAP serves. Following policy and legislative framework in India aims to achieve its biodiversity target:

1. The policy framework includes the National Forest Policy 1998
2. National Environment Policy 2006
3. National Agroforestry Policy 2014
4. The National Policy on Marine Fisheries 2017
5. The Biodiversity Act 2002
6. Indian Forest Act 1927 (Last amended 2017)
7. Wildlife Protection Act 1972 (Last amended 2002)
8. Forest Conservation Act 1980
9. Environment Protection Act 1986
10. Wetland (Conservation and Management)Rules 2017
11. The Plant Quarantine(Regulation of Import into India) Order, 2003 (PQO, 2003)

[25] https://www.cbd.int/sp/ accessed on 15th October 2019

12. The Protection of Plant Varieties and Farmers' Rights Act, 2001 (PPVFR Act, 2001)
13. The National Green Tribunal Act, 2010 (NGT Act, 2010)
14. The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (Forest Rights Act, 2006)

The following table[26] states the NBTs, measures taken by the Indian government and their progress as per its 6th national report.

	National Biodiversity Target (By 2020)	Measures	Progress
1	A significant proportion of the population especially the youth, is aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.	Inclusion of EE in school syllabus at all levels; capacity building programs and awareness amongst youth; BMCs	Effective
2	Values of biodiversity are integrated in national and state planning processes, development programs and poverty alleviation	Valuation of biodiversity integral before pre-appraisal of projects, TEEB India Initiative, made part of state planning, development and poverty alleviation projects	Effective
3	Strategies for reducing rate of degradation, fragmentation and loss of all natural habitats are finalized and actions put in place by 2020 for environmental amelioration and human well-being.	Afforestation, reforestation, PMUY, restoration, NRCP, Sustainable Tourism	Effective
4	Invasive alien species and pathways are identified and strategies to manage them developed so that populations of prioritized invasive alien species are managed.	Sustainable management of forests and biodiversity	Partially Effective
5	Measures are adopted for Sustainable Management of Agriculture, Forestry and Fisheries.	National farmers policy, 2007; Plant quarantine order 2003; Protection of plant varieties and farmers' rights act 2001; Fertilizer control Act; Seed act, 1966; Insecticides act 1968, destructive insects and pests act, 1914; 4 National missions (2014) on sustainable agriculture, oilseeds and oil palms, agricultural extension and technology and integrated development of horticulture respectively.	Effective
6	Ecologically representative areas on land and in inland waters, as well as coastal and marine zones, especially those of particular importance for species, biodiversity and ecosystem services, are conserved effectively and equitably, on the basis of protected area designation and management and other area-based conservation measures and are integrated into the wider landscapes and seascapes, covering over 20 per cent of the geographic area of the country, by 2020.	Wetland rules, 2017; Air (prevention and control of pollution) act, 1981; National afforestation plan, Green India mission; notifying eco-sensitive zones; NPOA- Sharks; Recourse to judicial means such as NGT	Effective

[26] Information sourced from the 6th National Report submitted to the CBD https://chm.cbd.int/database/record?documentID=241351 accessed on 15th October 2019

7	Genetic diversity of cultivated plants, farm livestock, and their wild relatives including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.	National level bureaus and organizations set up; NICRA; NHCP; AICRNCP; My village my pride initiative, Rashtriya Gokul Mission; awards for conservation, plant genome saviour, biodiversity; National medicinal plants board	Effective
8	Ecosystem services especially those relating to water, human health, livelihoods and well-being, are enumerated and measures to safeguard them are identified taking into account the needs of women and local communities particularly the poor and vulnerable section.	MGNREGA; DDU-NRLM; AMRUT, Smart Cities; Nagar Van Udayan Yojana; National Solar Mission; PMGSY; The Right to Free and Compulsory Education Act, 2009; NHM; National Rural Drinking Water Program	Effective
9	By 2015, Access to Genetic Resources (GRs) and the Fair and Equitable Sharing of Benefits Arising from their Utilization as per the Nagoya Protocol are operational, consistent with national legislation.	Guidelines on Access to Biological Resources and Associated Knowledge and Benefit Sharing Regulations, (Guidelines 2014); Institutional Mechanisms like NBA, SBB and BMCs at national, state and local body levels respectively	Effective
10	An effective participatory and updated national biodiversity plan is made operational at different levels of governance.	Green Highways policy 2015; National biotechnology development strategy, 2015-20; National Conservation Strategy and Policy Statement for Environment and Sustainable Development, 1992;measures that incentivize sustainable use and biodiversity conservation	Effective
11	National initiatives using communities' traditional knowledge relating to biodiversity are strengthened, with the view to protecting this knowledge in accordance with national legislations and international obligations.	National Intellectual Property Rights Policy (2016); Geographical Indication of goods, 1999; Agencies and institutional measures like NBA's, SBBs, Traditional knowledge digital library; National Innovation Foundation India (2010); SRISTI	Effective
12	Opportunities to increase the availability of financial human and technical resources to facilitate effective implementation of the Strategic Plan for Biodiversity 2011-2020 and the national targets are identified and the Strategy for Resource Mobilization is adopted.	Policy and program reviews to assess funding and budget allocations; Implementation of Biodiversity Finance Initiative (BIOFIN)	Partially Effective

India has created a comprehensive plan to achieve the Aichi targets through the NBSAP. The legal and policy framework embedded in the constitution make the task of realization of these targets abiding by the States and citizens of the country. The main measures taken to achieve targets has been listed in table above. India is one of the first six countries[27] to have submitted the 6th report on NBSAPs to the CBD. The report shows that out of 12, measures for 10 targets have been effective and significant progress made. For the 4th target on controlling alien species and measures NBT

[27] https://pib.gov.in/newsite/PrintRelease.aspx?relid=186916 accessed on 15th October 2019

12 on assessment of financial and technical resources have been partially effective. Whereas with respect to NBT 6 and 9 on Conservation of areas important for species and ecosystem services with effectiveness and Ensuring access and benefit sharing measures have exceeded expectations and significant improvements have been noted.

3.3.2 Status of Commitments under CBD as in 2019

The MOEFCC in 2019 published a report[28] on Implementation of India's National Biodiversity Action Plan and noted that climate change, pollution and invasive alien species have posed major challenges and need to be incorporated into the existing frameworks as well be seen as important themes around which newer action plans be designed. Realignment of existing resources and identification of new resources is requirement for better implementation of targets where achievements have been less than satisfactory especially with regards to human and technical resources, as also found in a BIOFIN review study. The report emphasizes on the need for more studies and communication material for better implementation especially for NBT 6. Best practices from across the globe should be incorporated for realization of targets.

A voluntary peer review[29] was conducted for India progress with the NBSAP. The recommendations included a separate body to monitor the implementation of the NBTs. The review consisting of experts from various countries also suggested mapping of ongoing projects to record progress. The team also noted the over emphasis of the India's national reports on description and lists of initiatives and suggested that more be written on their performance, analysis and synthesis. They also called for more involvement of NGOs and civil society in general for better implementation of the NBTs. India currently does not have a Strategic Environment Impact Assessments (SEAs) which the team recommended, should be looked into to ensure 'development without destruction'.

While on one hand, India seems to have an impressive action plan for the conservation of biodiversity, on the other hand, the Indian government is systematically bent on destroying the rich biodiversity of the country in the name of development as per many recent cases. Perhaps the most controversial news as of now has been the conflict between the civil society and the government concerning the cutting of 2000 trees in the Aarey forest in Mumbai to make way for a metro car shed. Despite many protests and a PIL by the civil society, over 2000 trees were cut overnight. The Supreme Court was just a little late in putting a stay on the axing of trees.[30]

A similar case was reported as over 12,000 trees were chopped in a forest area near the Dandeli Wildlife Sanctuary in Karnataka for improvement works

[28] https://www.cbd.int/doc/world/in/in-nbsap-other-en.pdf accessed on 16th October 2019
[29] https://www.cbd.int/doc/nbsap/in-vpr-en.pdf accessed on 17th October 2019
[30] https://www.timesnownews.com/mirror-now/civic-issues/article/after-aarey-row-over-12000-trees-axed-in-karnataka-to-widen-nh-4a-hc-takes-cognisance/505077 accessed on 17th October 2019

undertaken by the National Highway Authority for connected Khanapura with Londa. Many other cases have been reported with regard to mining, development activities, and even conservation itself[31]. It was reported in a 2013 report by the Shah Commission that over 11000 ha of trees were cut down for illegal iron ore mining. The Aravalli forest is under great threat from encroachment and mining, lost 20,500 trees to make way for two police training-centre of the Haryana Police department.

It is not just forest who are losing trees, the future of around 1.9 million forest dwellers is uncertain as their claims to forest rights have been rejected under the FRA 2006. The Supreme Court ordered their eviction in August 2019, which would have been a blatant blow to human rights, but later on put a stay on the order. The finest grasslands of India, the Banni grasslands in Kutch Gujarat, 60 per cent of which have been lost due to the highly invasive species *ProsopisJuliflora*. Millions of seeds of this species were dropped on to the grasslands to protect from salinity ingress.[32] The spread of this species has meant the loss of pasture for the Maldharis, a pastoral community who have been dwelling in this region historically. The same species is also spreading rapidly in the ridge forests of Delhi. It seems in the larger debate on environment and development, the Indian state time and again chooses development.

India has substantially reduced its target of land regeneration as part of UNCCD framework from 30 mha to just 23 mha. Interestingly, the Government of India had announced in 2018 that under Bonn Challenge, it has restored 9.8 mha land. Expert found this claim baseless as the government did not provide any data in this regard. These examples show that while we are enthusiastic about regeneration of natural resources, we have failed in fulfilling our own target of natural resource regeneration.

3.4 Sustainable Development Goals

The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. The 17 Sustainable Development Goals (SDGs), are an urgent call for action by all countries - developed and developing - in a global partnership. They recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests[33].

Goal 15 of the SDGs aims to protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss. Two of the targets of goal 15, as mentioned below, commit to check land degradation, and Ministry of Environment,

[32] https://www.cseindia.org/how-india-lost-its-finest-banni-grasslands-to-an-exotic-species-called-prosopis-juliflora-9688 accessed on 21st October 2019
[33] https://sustainabledevelopment.un.org/sdgs

Forest and Climate Change in India is the nodal body to report and track progress on these targets.

Target 15.2: By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally

Target 15.3: By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world

The SDGs also recognize land rights as foundational, including targets and indicators related to access to land in goals related to poverty, hunger, and gender equality. But the need to secure gender-equitable rights to land and the need for sustainable land management pervade countries' commitments under the SDGs.[34] Climate change, land degradation neutrality, sustainable cities, equity in the workforce, good governance, and infrastructure for clean energy all require keen attention to land use, land planning, and robust participation of local and indigenous communities in all these policy processes.[35] Women's rights to land in particular lead to other key outcomes for sustainable development.

[34] Land Portal, Full implementation of the SDGs Land Rights Indicators Needed to Ensure a Successful Agenda 2030,(2017).; Land Portal, Land and the Sustainable Development Goals. See also, U.N. Convention to Combat Desertification, Land and Sustainable Development Goals.

[35] Land Portal (2017). Full implementation of the SDGs land rights indicators needed to ensure a successful Agenda 2030, available at: https://landportal.org/news/2017/11/full-implementation-sdgs-land-rights-indicators-needed-ensure-successful-agenda-2030; Land Portal, Land and the Sustainable Development Goals, available at: https://landportal.org/book/sdgs. See also, United Nations Convention to Combat Desertification, Land and Sustainable Development Goals, available at: https://www.unccd.int/issues/land-and-sustainable-development-goals

4 Land Regeneration Initiatives in India

4.1 Early Efforts

4.1.1 Soil and Water Conservation under DPAP and DDP since the 1970s

The Drought Prone Area Development (DPAP) was one of the first development programmes launched to address the problems of a specific area such as drylands. Launched in 1973-74, the programme was set up to reduce the effects of drought on fragile ecosystems and vulnerable populations.

The Desert Development Plan (DDP) was set up to combat desertification and restore ecological balance in the desert areas of the country like Rajasthan, Gujarat and Himachal Pradesh.

Objectives

The main objective[36] of the DPAP was to curtail the impacts of drought on cultivation, livestock, water, land and human resources. The drought proofing programme also sought to enhance the socio-economic conditions of the vulnerable people who lived amongst precarious conditions.

The DDP sought[37] to restore ecological balance in areas where desertification had set in and droughts were severe. This was to be done by rejuvenation of natural resources and making the local poor populations more resilient and capable by improving their socio-economic status.

After two decades of being operationalised, the Hanumantha Rao Committee reviewed[38] these two programmes in 1995 and changes according to the review were implemented. The problems identified were that the programmes were implemented in an isolated and segmented manner, exclusive of other development schemes that led to the duplication of efforts and wasted scarce resources. Area treated under both the projects was a very small proportion of the total area selected. The committee suggested that successful implementation would require active participation of farmers, use of indigenous technologies and focus on more income generating activities that could reduce pressure on land. A watershed approach was suggested and area limit off 500 ha was set.

[36] https://dolr.gov.in/drought-prone-areas-programme-dpap
[37] https://dolr.gov.in/desert-development-programme-ddp
[38] https://dolr.gov.in/documents/hanumantha-rao-committee-report-new

Area Covered

The department of land resources (DOLR), Ministry of Rural Development (MORD) reports that DPAP had since its inception till 1995 treated an area of 57.14 lakh ha, and from 1995-96 till 2005-06, had treated an area of 65.74 lakh ha with the watershed approach. Since 1995-76, 947 blocks in 164 districts in 13 states have been covered, panning the dry sub-humid region of the country have been covered.

Under DDP, 235 blocks 40 districts in 7 states have been covered. While 5.15 lakh ha area was covered from its inception in 1977-78 till 1995-96, since then, 35.31 lakh ha was covered till 2005-06.

Financing

Each project under DPAP was limited to 500 ha and allotted Rs. 30 lakh which was borne by the Central and State Governments in a 75:25 ratio. The funding and financial performance as per the DOLR reports that out of total, 80% of the cost would be allocated towards watershed activities and the rest on training, community organisation and administration[39].

An amount of Rs. 2095.33 crore was released from 1995-96 to 2005-06 for 24,363 projects that were sanctioned in this period.

The DDP programme since 2000 has also be funded jointly by the central and state government in the proportion 75:25. The cost of project since then has been Rs. 30 lakhs each. And the period of ten years from 1995-96- 2005-05, 13,476 projects were sanctioned. Total amount of Rs. 3817.68 crores was committed while an amount of Rs. 1568.79 crores was released[40].

Impact

As per a study[41] on watershed development by the Planning Commission, several positive impacts of watershed projects were noted. In sampled projects in Karnataka, a significant portion- 76% of the project area had been brought under well irrigation, while the same has been done for 80% of the area in Andhra Pradesh. Dried up wells in these regions were also rejuvenated. Migration to other regions for work opportunities had reduced amongst the local communities were the projects were implemented due to the opportunities created by the construction of watershed structures. More commercial crops were being grown in areas in Karnataka due to improvement in irrigation due to watershed. The income of landowning community in the sampled watershed areas had increased by nearly one third as compared to pre-project phase. A National Development Council report[42] on watershed development reviews different studies conducted on the same. A study by TERI, reviewed in the report, in 2004 on select watershed under DPAP, DPP and IWDP reported overall improvement in land use and increase in area under cultivation. Irrigation options increased.

[39] https://dolr.gov.in/drought-prone-areas-programme-dpap
[40] https://dolr.gov.in/desert-development-programme-ddp
[41] http://planningcommission.nic.in/reports/sereport/ser/stdy_watrshd.pdf
[42] http://agricoop.nic.in/sites/default/files/NDCRPT.pdf

In terms of livestock, a qualitative change on breeds preferred was noted as well as emergence fisheries.

However, several issues were also faced in the project implementation. The issue of gender and equality was apparent in sampled projects as employment opportunities catered more to males rather than females. The institutions involved in operationalising these watershed projects were dominated by big landowning communities. Elite capture kept the voice of the marginalized at the margins.

Other issues included poor design of watershed, poor maintenance after initial years of development, distributional problems because of inherent inequalities in the communities, elite capture and encroachment. Problems arose as watershed programmes were implemented by too many central and state government authorities making the coordination of tasks a difficult endeavour which often led to poor planning and implementation.

Present Status

In 2010, the MORD announced[43] that DDAP, DDP and Integrated Wasteland Development Programme would be merged under the Integrated Watershed Management Programme (IWMP). At present, the IWMP is now the Watershed Development Component of the Pradhan Mantri Krishi Sinchayi Yojana (WDC-PMKSY).

4.1.2 The National Wasteland Development Board, 1985

The National Wastelands Development Board (NWDB) was set up under the Ministry of Forests and Environment in 1985 in order to address[44] land degradation, restoration of ecology and meet the increasing demand of fuelwood and fodder at the national level. The board's activities were focused more on tree plantations during the seventh five year plan (1985-1990) but in 1992, as the Board was placed under the Ministry of Rural Development, as the department of wasteland development, the responsibilities focused on developing wastelands in non-forested areas with the active involvement of local people at every step. The people were to be made the real functionaries with government just facilitating them. In 1999, the department of wastelands development was renamed[45] as the Department of Land Resources and all matters related to land resource management came to be handled under it.

Purpose

As per the NWDB, wastelands were divided into 2 categories-culturable and unculturable. The board was implemented for bringing to health degraded forests and non-forest (culturable) wastelands specifically. The mission was to restore 5mha of wastelands annually by planting trees. [46]The dream was that by 2000AD one third of India's land mass will have green cover with rich biodiversity. However, the board could not translate its vision into action.

[43] https://pib.gov.in/newsite/PrintRelease.aspx?relid=67440
[44] https://dolr.gov.in/integrated-wasteland-development-programme
[45] https://rural.nic.in/sites/default/files/anualreport0809_eng_0.pdf, pg 132
[46] https://www.indiatoday.in/magazine/environment/story/19890815-defunct-national-wastelands-development-board-resurfaces-as-technology-mission-816386-1989-08-15

The reasons[47] for this was mostly the conflict between the forest Ministry and NWDB on land. While NWDB wanted to use 28 mha of degraded forest land, the ministry opposed it, as it was a large piece of land under its control and kept for afforestation for conservation and not social forestry. The other kind of land left was revenue or private lands which were difficult to work with with people's apprehensions as well as illegal occupations of revenue lands. Wherever the project was implemented, people's participation was underwhelming as they could not claim the trees that they had planted due to legal restrictions. The NWDB was unable to work around this. A lack of political will was also cited as an obstacle to better implementation.

Wasteland development then came[48] in the form of Integrated Wasteland Development Program (IWDP) in 1989-90 under the NWDB. The IWDP develops common property resources (CPRs) land and government wastelands through village-level micro watershed projects. The IWDP was later incorporated into the Integrated Watershed Management Program and presently comes under the Watershed Development Component of Pradhan Mantri Krishi Sinchayee Yojana (PMKSY).

In 1992, the National Afforestation and Eco-Development Board (NAEB) came to replace the NWDB under the then Ministry of Environment and Forests. The National Afforestation Program and Green India Mission are currently underway to address degrading forest cover. Whereas the IWDP came under the department of land resources and became a watershed development program.

As per the Ministry of Rural Development's response[49] in Lok Sabha on 20. 07. 2017, under the PMKSY, the department of land resources sanctioned 8214 watershed projects in 28 states during the period of 2009-10 to 2014-15 covering an area of 39.07 mha under the WDC. Additionally, schemes and programs have been implemented like Per Drop More Crop component which included water conservation, drought proofing and water harvesting. National Mission for Sustainable Agriculture (NMSA) to prevent soil erosion and land degradation is underway. Reclamation of Problem Soil (RPS) was also launched as a sub-scheme of Rashtriya Krishi Vikas Yojana to address reclamation of problem soils on pilot basis, to manage the alkalinity, salinity and acidity of problem soil.

[47] ibid.
[48] http://planningcommission.nic.in/plans/planrel/fiveyr/10th/volume2/v2_ch5_3.pdf
[49] http://www.indiaenvironmentportal.org.in/files/file/Development%20of%20Wasteland.pdf

The trajectory of Wasteland Development

Organ	Objective	Area Covered	Ministry	Expenditure	Main Programmes	Timeline
NWDB	Regenerating 5mha of degraded land every year since its inception in 1985, mapping wastelands	NA	Ministry of Environment and Forests, later the Ministry of Rural Development	NA	Integrated Wastelands Development Programme	1985-1999
IWDP	Creating micro watersheds on common lands	10.7 mha (1995-96 to 2007-08)	Ministry of Rural Development	2797.56 crores (1995-96 to 2007-08)	-	1990-ongoing under PMKSY
NAEB	Afforestation, reforestation and eco-development activities on degraded lands especially areas adjoining forests	24.6 mha by 2010	Ministry of Environment and Forests and Climate Change (earlier MOEF)	46000 crores for GIM for next 10 years, NAP 80 crores (2011)	National Afforestation Programme (yr), Eco-Development Forces, Green India Mission (yr)	1992-ongoing

The table shows the various ways wasteland development has occurred in India, first, formally under the NWDB with the objective regenerating wastelands for social forestry, then developing micro-watersheds under the IWDP and finally in the form of afforestation and restoration under the NAEB and its various programs.

4.1.3 National Watershed Development Program since 1990s

The National Watershed Development Program for Rainfed Areas was launched in 1990-91 under the Ministry of Agriculture. The twin formula of integrated watershed management and sustainable farming systems formed the basis for it. In 2000-01, the scheme was subsumed under the Macro Management of Agriculture (MMA) as implemented under it in 28 states and 2 Union Territories.

The approved annual plan work formed the basis of fund release by the central government. On 1st April 2013, MMA was closed and the scheme discontinued.

Objectives-

The scheme was set up to address[50] conservation, development and sustainable management of natural resources. Increasing agriculture production in a sustainable manner was also part of the scheme as well as greening and restoring the ecological balance in degraded rainfed eco-systems. Generating employment opportunities for rural community was also a tenet of the scheme.

[50] http://agricoop.nic.in/sites/default/files/NMSA5913.pdf

Evolution and Impact-

In November 2000, Common Approach for Watershed Development and New Operational Guidelines for NWDPRA were operationalised. As per a report[51] of the planning commission, this allowed NWDPRA more flexibility in choice of technology, active participation of watershed community in planning and execution and greater degree of decentralised procedures.

The following table shows the impact of NWDPRA since its inception-

The Achievements made under NWDPRA are:

Area in lakh ha. / Expenditure in Rs. crore

Sr. No.	Plan period	No. of Micro Watersheds	Area developed	Expenditure
1.	VIII	2554	42.232	966.93
2.	IX	3007	27.663	910.81
3.	X	6315	24.133	1156.92
	Total up to X Plan	**11876**	**94.028**	**3034.66**
4.	XI			
	2007-08		3.736	219.09
	2008-09		2.624	264.67
	2009-10	3744	2.768	283.38
	2010-11		2.930	297.75
	2011-12		2.315	221.48
	Total XI Plan		14.370	1286.37
5	2012-13*		1.909	178.82
	Total		14.574	1297.30
	Grand Total	**15620**	**110.310**	**4499.85**

* The balance works of the approved watersheds of the XII Plan Period were taken up during the year 2012-13.

Impact studies (Deshpande & Narayanamoorthy, 1999;Kshirsagar, K.G., M.P. Madhusoodhanan, S. Chavan and R. Rathod, 2003) were reviewed by LBSNAA[52] that were conducted on different watershed projects have acknowledged these programs carry the prospect of adding to the incomes of and reducing poverty amongst watershed communities. Positive change has been observed by these studies on crop yield and productivity, cropping intensity and better usage of inputs. Impact of NWDPRA in four states- Gujarat, Rajasthan, Madhya Pradesh and Maharashtra was studied by Deshpande &Narayanamoorthy (1999). The results across states were varied, however some common constraints were observed like ineffective implementation of guidelines, slackening of projects due to lack of external monitoring and evaluation, and functionaries being ineffectual beyond a point due to lack of feedback. Lack of people's participation in meetings, training programs and planning was found to be one of the major shortcomings of the NWDPRA projects studied in the states of Andhra Pradesh, Tamil Nadu and Karnataka.

At present, the Integrated Watershed Management Program operates under the Pradhan Mantri Krishi Sinchayee Yojana. From 2009-10 to 2014-15, 8,215 projects were sanctioned in 28 states and Rs. 18,60,584 lakhs have been spent.

[51] http://planningcommission.gov.in/aboutus/committee/wrkgrp/wgwtrshd.pdf
[52] https://www.cse.iitb.ac.in/~karjat/waterdocs/Impact%20and%20Effectiveness%20of%20WDP%20by%20LBSNAA.pdf

4.1.4 Social Forestry and Joint Forest Management Programs since 1990s

While the idea of social forestry had been around since pre-independence time in India, it originated[53] formally in 1976 with a report by the National Commission of Agriculture. The report recommended that private and communal land of the village people be used to grow species for fuel wood, grazing and other forest products in order to reduce pressure on reserved forests and public lands, while commercial forestry would take place on forest land. The National Wastelands Development Board was set up to check the progress of social forestry. However, under-implementation and lack of will lead to the failure of the program.

The forest policy saw a radical change with the new forest policy in 1988, when joint forest management and integrated forestry came into the purview. The new policy was drastically different from its predecessors as it viewed forests as not as a source of revenue, but recognised the intrinsic value of forests and gave high priority to environmental stability. In June 1990, the government released its guidelines and the policy was implemented, enabling the involvement of local people in managing forests.

Joint Forest Management

The Joint Forest Management (JFM) program came into implementation in 1990[54]. State forest departments and local communities were to take part in management of degraded or deforested forests together. While all income for non-wooded forest produce was to go to the locals, their share in the sale of timber was 25%, while the rest would go to the forest department. Village level committees were to be formed for this joint management. Further, each state had its own guidelines according to which JFM was to be implemented.

Coverage

The area covered by JFM in 2010 was approximately 24.6 million ha, which is about 30% of the forest cover of the country with around 99 lakh beneficiaries participating[55]. In several states, almost 3/4th of the forest cover was under JFM such as Jharkhand (72.94%), Bihar (71.42%) and Madhya Pradesh (70.62%)[56].

Percentage of forest area covered by JFM (2011)			
States	Recorded forest area (ha)	Area under JFM (ha)	Forests covered by JFM (%)
A & N Islands	7,17,100	262	0.04
Andhra Pradesh	63,81,400	15,19,000	23.8
Arunachal Pradesh	51,54,000	1,00,377	1.95
Assam	26,83,200	52,499	1.96

[53] https://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/984.pdf
[54] http://frienvis.nic.in/database/joint_forest_management_1949.aspx
[55] http://frienvis.nic.in/Database/Benefits_from_JFM_2244.aspx
[56] http://frienvis.nic.in/Database/Forest-Area-Covered-by-JFM_2245.aspx

Bihar	6,47,300	4,62,333	71.42
Chhattisgarh	59,77,200	33,19,000	55.53
Goa	1,22,400	10,000	8.17
Gujarat	18,92,700	4,14,151	21.88
Haryana	1,55,900	41,188	26.42
Himachal Pradesh	37,03,300	2,05,056	5.54
Jammu & Kashmir	20,23,000	38,736	1.91
Jharkhand	23,60,500	17,21,700	72.94
Karnataka	38,28,400	8,08,020	21.11
Kerala	11,26,500	2,07,404	18.41
Madhya Pradesh	94,68,900	66,87,390	70.62
Maharashtra	61,93,900	24,03,344	38.8
Manipur	17,41,800	1,66,767	9.57
Meghalaya	9,49,600	17,245	1.82
Mizoram	16,71,700	55,990	3.35
Nagaland	9,22,200	42,929	4.66
Orissa	58,13,600	11,48,676	19.76
Punjab	3,05,800	1,78,333	58.32
Rajasthan	32,63,900	8,58,614	26.31
Sikkim	5,84,100	88,518	15.15
Tamil Nadu	22,87,700	7,56,446	33.07
Tripura	6,29,400	2,41,138	38.31
Uttar Pradesh	16,58,300	1,83,393	11.06
Uttarakhand	34,65,100	5,64,221	16.28
West Bengal	11,87,900	6,46,084	54.39

Source: National Workshop on JFM, Dehradun, 27-28 June 2011. Proceedings. Dehradun, Forest Research Institute.

Funding

The JFM received a lot of funds from international donor agencies which shaped the outcomes of the program[57]. HBIC, World Bank, DFID-UK, SIDA-Sweden, UNDP, OECF- Japan and Germany majorly funded the program. States with JFM projects funded by international donor agencies performed better. Some of these states were Andhra Pradesh, Madhya Pradesh, Karnataka, Rajasthan, Himachal Pradesh and West Bengal, wherein around 48% of forest area is under JFM. On the other hand, states that were not funded by international donors did not perform as well, with only 16% of forests under JFM.

Various schemes also contributed to JFM such as the Hariyali scheme with the watershed program under it, the MGNREGA and several tribal development schemes. The Forest Development Agencies (FDAs) were put in place in 2000-01 as implementing agencies and were responsible for fund management.

[57] https://www.downtoearth.org.in/coverage/is-jfm-relevant-33949

Year Wise Expenditure on JFM

State/Union Territory	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
Andhra Pradesh	2397500	2635100	NA	2772793	3311455	3562309
Arunachal Pradesh	428210	496390	727010	NA	NA	NA
Assam	1588000	1702500	2312300	2667794	NA	NA
Bihar	736250	785250	931280	NA	NA	NA
Chhattisgarh	3110900	4308000	4107500	NA	NA	NA
Goa	134950	163990	363250	199789	NA	NA
Gujarat	3630900	NA	NA	6289610	7225259	7805523
Haryana	1581300	855120	1864300	NA	NA	NA
Himachal Pradesh	2516500	3147300	3466700	3674200	3770700	NA
Jammu and Kashmir	1330100	1399100	1692800	2062465	NA	NA
Jharkhand	1717455	NA	NA	NA	NA	NA
Karnataka	3771400	4511200	5007600	5550980	6654000	8521200
Kerala	1658400	2055200	2083100	2144800	2985300	3732400
Madhya Pradesh	7792500	8530800	5404300	NA	NA	NA
Maharashtra	4584900	6127900	7202600	9168000	11201700	13319700
Manipur	269730	257030	402080	785401	NA	NA
Meghalaya	533780	581090	787020	NA	NA	NA
Mizoram	290650	NA	NA	1036703	632282	821781
Nagaland	359910	450470	542900	624698	806620	869035
Orissa	1917400	2695700	1743700	3272365	NA	NA
Punjab	507470	NA	NA	NA	NA	NA
Rajasthan	2893300	3803900	NA	NA	NA	NA
Sikkim	320530	336570	535440	1581391	NA	NA
Tamil Nadu	27910	3290300	3105800	NA	NA	5616052
Tripura	545920	424070	505550	606786	NA	NA
Uttar Pradesh	4113000	5125900	5719000	4672682	4896465	5914033
Uttarakhand	2619100	3201800	2917500	3072797	3204206	3915503
West Bengal	2679000	2191300	3052800	3305723	NA	3384590
A.and N. Islands	626880	937090	NA	NA	NA	NA
Chandigarh	NA	NA	NA	NA	NA	NA
D.and N. Haveli	85186	NA	NA	NA	NA	NA
Daman and Diu	NA	NA	NA	NA	NA	NA
Delhi	109490	85076	164340	NA	NA	NA
Lakshadweep	NA	NA	NA	NA	NA	NA
Puducherry	NA	NA	NA	NA	NA	NA

Source: data.gov.in

Impact

A review of the ecological impact of JFM done by Murail, Murthy and Ravindranath[58] (2002) showed that very few studies have been conducted

[58] http://www.indiaenvironmentportal.org.in/files/file/joint%20forest%20management%20India.pdf

to study the ecological aspects of the program. The species chosen for JFM, the authors noted, yielded low timber and non-timber produce and these were mostly exotic firewood species. Biomass growth rate had seen a positive impact as its growth rate was relatively higher in JFM forests as compared to the national average. A study conducted on JFM's effect on stress migration by Sahu and Rath (2011) showed that JFM activities had led to a reduction in stress migration[59]. The study also indicated that proper utilization of CPRs under JFM had improved the health of local labourers. Positive impacts of JFM on livelihoods have been reiterated in various studies[60] conducted in different parts of the country- Uttarakhand, Kerala, Andhra Pradesh, Kerala and Kashmir.

However, there have also been many short-comings the implementation of JFM[61]. The majority of decision-making lies with the forest departments who have since long had an antagonistic relation with the local communities. Local communities could not avail the benefits often because of this reason. Poverty reduction remained unaddressed[62]. The top-down approach of the JFM more or less failed to empower local communities.

Benefits from JFM (2011)

States	JFM committees (no.)	Total no. of families	Benefit in Rs. Lakhs				
			Fuelwood	Fodder	NTFP	Others	Total
Andhra Pradesh	7,718	14,38,000	1,022.61	217.90	700.53	897.37	2,838.41
Arunachal Pradesh	1,013	33,048	1,883.56	9,198.00	117.90	44.25	11,243.71
Chhattisgarh	7,887	11,17,000	14,400.00	24,000.00	93,050.00	800.00	1,32,250.00
Haryana	2,487	66,036	94.60	78.48	20.98	0.27	194.33
Jharkhand	9,926	4,29,796	8,580.00	-	3,124.00	-	11,704.00
Karnataka	3,848	2,72,805	1,628.58	-	-	1,515.42	3,144.00
Madhya Pradesh	15,228	17,00,000	-	-	-	2,841.91	2,841.91
Maharashtra	12,665	27,09,000	919.63	117.63	25.48	2.92	1,065.66
Meghalaya	285	39,210	68.75	24.62	7.82	6.00	107.19
Nagaland	951	1,59,587	675.00	0.00	20.00	0.00	695.00
Punjab	1,224	91,850	25.00	20.00	40.00	5.00	90.00
Rajasthan	5,316	5,71,051	-	488.46	75.26	129.75	693.47
Tripura	920	79,445	4,472.00	762.00	483.00	170.00	5,887.00
Uttar Pradesh	3,426	7,06,050	1,152.02	791.18	50.33	53.22	2,046.75
West Bengal	4,368	5,05,149	10,000.00	3,000.00	5,000.00	0.00	18,000.00
Total	**77,262**	**99,18,027**	**44,921.75**	**38,698.27**	**1,02,715.30**	**6,466.11**	**1,92,801.43**

Source: National Workshop on JFM, Dehradun, 27-28 June 2011. Proceedings. Dehradun, Forest Research Institute.

[59] https://journals.sagepub.com/doi/10.1177/097300521100600103
[60] http://www.ijpab.com/form/2017%20Volume%205,%20issue%202/IJPAB-2017-5-2-813-825.pdf
[61] http://planningcommission.nic.in/reports/articles/ncsxna/art_pcb.pdf
[62] https://www.downtoearth.org.in/news/not-a-bankable-strategy-40322

4.2 Green India Mission, 2014

The Green India Mission (GIM) is one the eight missions outlined under the National Action Plan on Climate Change (NAPCC). It the newest mission included in the Action Plan in 2014. This scheme was proposed for 10 years. It aims at protecting; restoring and enhancing India's diminishing forest cover and responding to climate change by a combination of adaptation and mitigation measures[63]. The mission has following goals to regenerate forest and land.

Mission Objective	Target
Increase forest/tree cover - Eco-restoration and afforestation of scrub, cold deserts, mangroves: 1.8 mha - Bringing urban/peri-urban land under forest and tree cover: 0.20 mha - Agro- forestry/social forestry: 3.00 mha	5 mha
Improve Quality of Forest/tree cover Improvement of forest cover and ecosystem in - moderately dense forest: ..... :- 1.5 mha - open degraded forest:..... :- 3.0 mha - degraded grassland: ..... :- 0.4 mha - Wetlands: ..... :- 0.1 mha	5 mha
Increaseforest based livelihood income	Of about 3 million household

http://www.indiaenvironmentportal.org.in/files/file/coping-climate-change-NAPCC.pdf

The Green India mission seeks to converge with other sub missions of NAPCC and related national schemes, programs and missions. The government of India has recently issued guidelines for converging this mission with the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) and the Compensatory Afforestation Fund Management and Planning Authority (CAMPA).

As against ambitious target of regenerating 10 mha forest land, the progress of GIM has been very disappointing as of now. The financial disbursement for the mission started in 2015-16 and as 2017-18 only Rs. 144 crore was spent. As against target of improving quality of forest of 5 mha, the mission could started intervention only in 0.043 thousands hectare[64].

4.3 Compensatory Afforestation Fund Management and Planning Authority (CAMPA)

The CAMPA authority created in 2001 by the Supreme Court to manage fund collected towards compensatory afforestation. For last two decades, the collected CAMPA fund remains largely un-utilized and in some case it was diverted for other purposes. In August 2019, the government of India released Rs. 47,436 crore of CAMPA fund to 27 different States and UTs. While releasing this fund the Union minister of Environment and Forest, Mr. Prakash Javadekar said that this fund will be used by state governments

[63] http://moef.gov.in/division/forest-divisions-2/green-india-mission-gim/about-the-mission/
[64] http://164.100.47.193/lsscommittee/Estimates/16_Estimates_30.pdf

towards forestry work to achieve objectives of Nationally Determined Contribution (NDCs) committed by India[65].

The NDC committed by the country aspire to create more forest in order to sink 2.5 to 3 billion tons of carbon dioxide by the year 2030. According to some expert, to achieve this target, India needs to create nearly 30 mha forest over and above the existing forest land mass of 75 mha[66]. However, the green India mission targets to generate only 5 mha new forest.

The national forest policy, 1952 provides for maintaining minimum 33 per cent of total geographical area under the forest cover. However, the current forest cover is much less than the set standard. Moreover, in last few decades, as much as 14,000 square kilometer forest were cleared for industrial and development projects[67]. According to an estimate by TERI in 2018, the total cost of land degradation due to degradation of forest in India is Rs. 1758.6 billion at 2014-15 prices[68].

As against this huge cost, the fund available in CAMPA fund and recent release for afforestation is negligible. Moreover, an estimate and future prediction based on the assessment of State of Forest Reports from 2007 to 2017 found that rate of growth of forest cover in India is very slow[69]. According to this estimate, if forest expansion grows with same speed, it will take 180 years to achieve goal of 33 per cent of forest cover in the country. While the CAMPA is a crucial environment policy, but a lot more is required to rapidly increase the forest cover.

4.4 Mahatma Gandhi National Employment Guarantee Scheme (MG-NREGA)

The Mahatma Gandhi National Rural Employment Guarantee Scheme has evolved as a major program for regeneration of natural resources in the rural part of India. While this program guarantees 100 days of unskilled job per year for every rural household, it also has played crucial role in creating individual and community level rural assets. These assets are largely constructed to re-generate local natural resources.

The works included in Para 1B Schedule- 1 of the MGNREG Act includes following:

i. Water conservation and water harvesting

ii. Watershed management

iii. Drought proofing including afforestation and tree plantation

iv. Irrigation canals, including micro and macro irrigation works

v. Provision of irrigation facility, dug out farm pond, Horticulture, Plantation, farm bund and land development on land owned by households specified in paragraph 1C of Schedule 1 of the Act.

vi. Renovation of traditional water bodies including de-silting of tanks

[65] https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1583452
[66] http://164.100.47.193/lsscommittee/Estimates/16_Estimates_30.pdf
[67] https://www.downtoearth.org.in/blog/forests/campa-funds-should-be-used-to-conserve-nature-65717
[68] https://www.teriin.org/sites/default/files/2018-04/Vol per cent20I per cent20- per cent20Macroeconomic per cent20assessment per cent20of per cent-20the per cent20costs per cent20of per cent20land per cent20degradation per cent20in per cent20India_0.pdf
[69] https://www.downtoearth.org.in/blog/forests/campa-funds-should-be-used-to-conserve-nature-65717

vii. Land development

viii. Flood control and protection work including drainage in water logged areas i

ix. Deepening and repairing of flood channels, construction of storm water

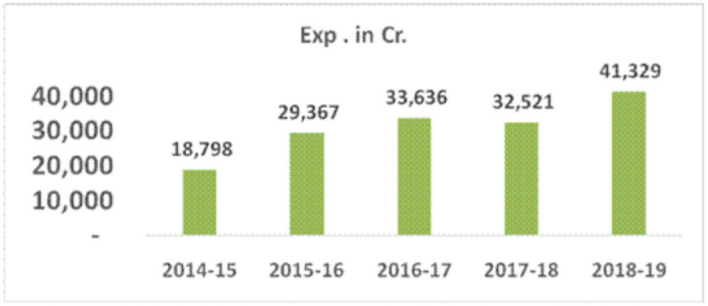
x. Drains for coastal protection; fisheries related works, such as fisheries in seasonal water bodies on public land; works in coastal areas, such as fish drying yards, belt vegetation.

xi. Rural sanitation related works

xii. Solid and liquid waste management

The expenditure of work related to Natural Resource Management (NRM) under GNNREGA has gradually increased over the period. Central and State governments have also focused on state specific requirements of NRM through MGNREGA.

MGNREGA Expenditure on NRM 2014 to 2019



https://pib.gov.in/PressReleasePage.aspx?PRID=1576612

The amendment to MGNREGA Schedule-1 in 2014 mandates that at least 60 per cent expenditure will be for agriculture and allied activities. With this amendment, nearly 75 per cent of permissible work under the program aims to regenerate natural resources including land, water and forest[70]. Major activities under NRM within MGNREGA includes check dam, ponds, renovation of traditional water bodies, land development, embankment, filed bunds, field channels, plantation, contour trenches etc. The Union Ministry of Rural Development in July 2019 claimed that in last five years (2014 to 2019) 143 lakh hectare of land benefited through these interventions under MGNREGA[71].

An assessment of MGNREGA in 30 selected districts by Institute of Economic Growth (IEG) in 2016 found that the NRM component of the scheme has noticeable impact on agriculture productivity, rural income, stopping distress migration, improving ground water level and soil conservation[72]. The noticeable results of MGREGA is indicates that the focus and intention of the scheme is good and need of hour. However, shortage of funds, delay in wage payment, and lack of integrated planning, lack of skilled human resources, highly bureaucratic system, and lack of people's participation are major hindrances in realizing full potential of this scheme.

[70] https://pib.gov.in/PressReleasePage.aspx?PRID=1576612
[71] https://pib.gov.in/PressReleasePage.aspx?PRID=1576612
[72] https://nrega.nic.in/netnrega/Data/JSA_sucessstory/IEG-Study-on-NRM-Works-under-MGNREGS.pdf

4.5 Digital India Land Record Modernization Program and State Land Reforms

The Digital India Land Records Modernization Program (DILRMP) was initiated in 2006-2007 with the aim of introducing "conclusive titling" in India and is under implementation since 2008 following the merger of two earlier schemes, namely, 'Computerization of Land Records (CLR)' and 'Strengthening of Revenue Administration and Updating of Land Records (SRA & ULR).'[73]

The main aims of DILRMP are to usher in a modern and updated system of land records which leads to a minimum scope of land/property disputes, enhance transparency in the land records maintenance system, and facilitate moving eventually towards guaranteed conclusive titles to immovable properties in the country. The district has been taken as the unit of implementation, where all program activities are to converge.

It relies on four basic principle (i) a single window to handle land records (including the maintenance and updating of textual records, maps, survey and settlement operations and registration of immovable property), (ii) the mirror principle, which refers to the fact that cadastral records mirror the ground reality, (iii) the curtain principle which indicates that the record of title is a true depiction of the ownership status, mutation is automated and automatic following registration and the reference to past records is not necessary, and (iv) title insurance, which guarantees the title for its correctness and indemnifies the title holder against loss arising on account of any defect therein[74].

Over the years, different states have made significant progress in making their land records digitally available to citizens. Recently National Council of Applied and Economic Research (NCAER) developed an index to understand the extent of progress and existing gaps in land records in each state.[75] The index called Land Records and Service Index (LRSI) indicate a mixed response of the impact of the digitization of land records and the registration process across States/UTs. There is a long way to go if the intended objectives of the program are to be accomplished.

4.6 Land Leasing Reforms

During the land reforms at the time of independence, agriculture land leasing had either been restricted or banned, primarily to protect from the rich and the powerful landlords, the interest of the tenants who existed at the time of the law's adoption, as well as any possible future tenants. Several researches since then have revealed that these prohibitions or heavy regulations have had overwhelmingly negative effects on agricultural growth and equity and have contributed to land degradation, since concealed tenancies continues unabated.

Because their lease agreement is informal and not legally binding, tenant farmers reasonably fear that they could be evicted if the land owner has a change of heart. And since their status is unprotected, they lack the incentive to care for the land in ways that can boost productivity and conserve resources.

[73] https://dolr.gov.in/programme-schemes/dilrmp/digital-india-land-record-modernization-programme
[74] https://dolr.gov.in/sites/default/files/Guidelines%20%20NLRMP%2017.4.2009%20-%20Final.pdf
[75] https://www.omidyarnetwork.in/insights/ncaer-releases-indias-first-land-records-and-services-index-to-energise-land-governance-in-india

Resistance to land leasing has begun to soften in India in recent years. In 2016, the national policy-making body, NITI Aayog, prepared a Model Land Leasing Act[76], and encouraged states to adopt it. A few States including Madhya Pradesh, Telangana, Andhra Pradesh and Uttar Pradesh, have since amended the leasing laws, but several others need to revisit their policies and provide the much need security of tenure to land owners as well as tenant farmers.

4.7 Gender Equitable Land Ownership

Despite the principles of equality enshrined in our constitution, statutory laws as well as traditional practices related to inheritance and women's land ownership display a huge gap between the ideals and the lived realities by women. A complex web of laws governs women's land ownership and access including through inheritance. Most of these laws work to women's disadvantage. Even when there are progressive provisions they are undercut by legal loopholes, lax enforcement and patriarchal social norms and customary practices.

At the national level, The 6th Five Year Plan (1985-1990) in India was the first to talk about women's rights to economic resources and a policy for joint titles to husband and wife in transfer of assets. Since then subsequent plans have been giving importance to land title in name of women. The 12th plan emphasized increasing women's access to land from three sources: direct government transfers, purchase or lease from the market and inheritance. The draft National Land Reforms Policy (2013) as well as the 2016 Draft National Policy for Women explicitly state that efforts should be made to prioritize women in all government land redistribution, land purchase and land lease schemes. Recently, NITI Aayog (2018) also emphasized the need for improved asset ownership and economic security of women and suggested encouraging joint registration with spouses or sole registration of land in the name of the woman through registration fee and stamp duty concessions.

In the three-fold distribution of legislative powers in India, land is a State subject, and responses to the policy commitments for land rights of women in India varies across States. Several States have also adopted policy measure to improve women's ability to own land. For example, the Vasundhara Scheme in Orissa and the Nijo Griha Nijo Bhumi in West Bengal mandate that homestead plots allocated to landless households shall be distributed in the name of women, either individually or jointly. Several States, such as Himachal Pradesh, Punjab, Uttar Pradesh, Madhya Pradesh, Haryana and Delhi, have provided some stamp duty exemption for land registration in the names of women. More recent changes include West Bengal's abolition of the mutation fee for all inherited property. Further, States of West Bengal and Odisha have included land rights curriculum as part of the training courses for women Self Help group members who are part of West Bengal State Rural Livelihood Mission and Orissa Livelihood Mission respectively.

[76] Report of the Expert Committee on Land Leasing, NITI Aayog, Government of India, New Delhi, March 31, 2016.

In 2005, the Government of India amended the Hindu Succession Act, 1956 to make daughters coparceners in the joint family land and property. It was a welcome progressive step though its implementation is still limited, and there are other religious and State laws that govern inheritance of women belonging to different religions and States.

To build a fairer and more equitable land governance ecosystem in India, efforts need to be taken with multiple stakeholders and at multiple levels.

5 Reasons for Shortfall

5.1 Political Economy of Land Resources

Land has been at the core of our economy and a large section of population is still dependent on land (both forest and non-forest). The struggle for ownership over land started during British rule, when the then government started controlling forest for commercial purposes. The nineteen and twentieth century observed large number of people's struggle/protest in various parts of India to assert their traditional rights over land and forest. This led to regulation of land and forest resources in India. Despite, several regulations and laws enacted during pre and post independence, land remain one of the most contentious issues. Various stakeholders including old Zamidars, rural elites, revenue department, forest department, land less people, agriculture labourers and forest dwellers with diverse and conflicting interest makes the land resource more complicated.

The forest department is the biggest landowner in this country with nearly 22% of total landmass in its control. Within the forest area, nearly 11% forest land is highly degraded with canopy density less than 10 percent. Various projects were carried out in last four decades to re-generate this part of forest. However, nothing much could be achieved. One of the main reasons of this failure cited by various experts is lack of coordination and collaboration between government and local communities. Apart from this there exists contradiction in many government policies affecting natural resources. For example, while the government is keen in Madhya Pradesh to protect tigers and their habitat, simultaneously, it is also adamant for linking Ken and Betwa rivers by fragmenting a crucial tiger corridor in Panna tiger reserve.

Encroachment of common land and other natural resources is another big hurdle in the Nobel goal of regenerating land. In many places, these commons have been termed as wasteland, which allows influential rural and urban elite to capture for their personal interest. According to an estimate, land occupied by commons in this country is around 60 million hectare. The 54th round of National Sample Survey (NSSO) in 1999 collected information on common property resources. But no follow-up research or survey was carried out after that[77]. The launch of the Wasteland Development Program in 1980s shows that the government of India has been concern about regeneration of natural resources. However, it could not resolve political economy around it. Therefore, various public efforts in the past did not yield desired result.

5.2 Inadequate Financial Resources

The financial resources required for the regeneration of degraded land is huge. Various studies have found that the government funding alone is not sufficient for the task. Moreover, currently the Mahatma Gandhi National Rural Employment Guarantee

[77] Nagendra Harini and RuchaGhate, 2019, 'Building an Alliance on Commons', Ecology, Economy and Society – the INSEE journal' 2(2), Indian Society for Ecological Economics, New Delhi.

program (MGNREGA) is the main financing instrument for the regeneration of natural resources. The last union budget allocated Rs. 60,000 crore for this program. This amount is negligible as compared to the required Rs. 2948 billion to regenerate resources as studied by the TERI.

The inadequate allocation of financial resources has always been major hurdle in implementing programs like DPAP, DDP, Wasteland development board, Joint Forest Management and Green India Mission. The 12thfive year plan approved budget outlay of Rs. 2,000 crore for regeneration of forest land, however the project to achieve this target namely- the Green India Mission' has been allotted very little fund in last few years. Up to financial year 2017-18, the mission was allotted only Rs. 161.81 crore. Out of this the actual amount spent by various agencies is as law as Rs. 143.96 crore. The Ministry of Environment, Forest and Climate Change (MoEFCC) admitted that the budget allocation to the mission is very less and it is grossly insufficient[78].

5.3 Inadequate Institutional Capacity

Other then the adequate allocation of financial resources, the institutional mechanism plays crucial role in the success of any mission. The governments in India realized the need of investing in natural resources for better future as early in 1970s with the introduction of schemes like DPAP and DDP. However, institutions could not be formed to deliver on these objectives. The case of Wasteland Development Board in 1980s is the classic case of this sort. Initially, it was an institution under the ministry of environment & forest. However, later it was moved to the ministry of rural development. More importantly, the board was not given forest land for its regeneration. The confusion over rights and mandate of the board grossly affected its output. It had objective to restore 5mha land every year, but it could regenerate only 2mha land in total.

Many institutions created for regeneration of land resources in last 4-5 decade were also seriously criticized for non-involvement of community. We know that the political economy is one the major hurdle in this process. Despite this, no institutions seriously attempted pro-active collaboration and cooperation with local community. The Joint Forest Management attempted to involve local communities to some extent but communities were given less power and autonomy compared to the forest department.

In many cases, the Panchayati Raj Institutions (PRIs) is the field agency responsible for implementation of various programs. However, in many parts of the country these institutions do not have adequate skill and capacity to handle specialized projects. Moreover, the inadequate devolution of fund, functionary and function to the PRIs also restrict them from performing well. The lesser power and autonomy of PRIs further pushes for top-down planning, where things are planned at higher level, and PRI remains at the receiving end. The lack of skilled human resources is another big challenge faced by the institutions involved in the process of land regeneration. We have been talking about Integrated Water Resource Management (IWRM) and River Basin Management (RBM), however, we don't have enough qualified human resources to work with these methods.

[78] http://164.100.47.193/lsscommittee/Estimates/16_Estimates_30.pdf

6 Some Recommendations for the Way Forward

- There is huge mismatch between policy announcement and allocation of resources (financial, human and institutional). This persistent mismatch needs to be addressed immediately by allocating adequate funds, mobilizing funds from alternate sources, building professional institutions and nurturing human resource.
- India has promised on number of goals related to regeneration/reclamation of land resources both nationally and internationally. Often these goals/targets do not match with each-others. For example, the government of India aims to regenerate forest to sink additional 2.5 to 3 billion tones of CO2 by 2030. Expert says that to achieve this target India needs to generate additional 30 million hectare forest. However, the country has no plan to create such a huge forest. India has to rationalize its target to be honest to work on them.
- The government can not regenerate the degraded land and forest by its own. It requires active involvement of other stakeholders such as community, financial institutions and corporate. It is high time to work together to regenerate natural resources.
- Convergence of technology such as GIS in programs related to watershed management and regeneration of natural resources such as MGNREGA is need of the hour. Technical institutions should work with MGNREGA to improve its efficiency, output and outcome.
- Degradation of natural resources is a big challenge; it will directly and indirectly affect each one of us. Unfortunately, we don't have professionally trained human resources to address this challenge. The government along with other stakeholder is required to work towards nurturing cadre of trained human resources for regeneration of natural resources.
- Since the tenure security, including that of women is closely linked to usage of land, conscious efforts need to be taken to amending laws to remove overt and covert discrimination against women. There is a need to review all land laws with a gender lens and identify areas where there is either overt or covert discrimination. There also is a need to strengthen collection of sex-disaggregated data related to landholding, fortify monitoring systems and fix accountability for the implementation of existing laws.

7 Conclusion

Various studies including one done by Space Application Centre, Ahmadabad in 2016 reveals that a large part of India's land mass is under land degradation and desertification. Successive studies also indicated that the process of land degradation is increasing. It has huge direct social, cultural, environmental and economic repercussions, as the majority of Indian population is directly dependent on natural resources. Realizing these threats, the successive Indian governments were in the forefront to announce policies and set target to regenerate degraded land resources. The pro-activeness of the government is evident from its active participation in international conventions related to environment and climate change such as National Determined Contributions (NDCs), UNCCD and UN convention on Biological Diversity. Nationally India launched the DPAP, DDP program in 1970 followed by National Wasteland Development Program in 1980s, Joint forest management in 1990s, Watershed Management Program and MGNREGA in the beginning of 21st century. However, the action on ground has been very poor.

We have committed to increase forest cover by 2030 in order to sink 2.5 to 3 million tones of carbon dioxide under NDC in UNFCC. Expert argues that for this target India need to add 30 million hectare forest in its current forest land. For this specific and measurable target, unfortunately, the nation has no specific program/scheme. Similarly, India has substantially reduced its target of land regeneration as part of UNCCD framework from 30 million hectare to just 23 million hectare. Interestingly, the government of India had announced in 2018 that under Bonn Challenge, it has restored 9.8 million hectare land. Expert found this claim baseless as the government did not provide any data in this regard. These examples show that while we are enthusiastic about regeneration of natural resources, we have failed in fulfilling our own target of natural resource regeneration.

At home, we have been pro-active in launching relevant policies and scheme, but due to lack of financial resources, inadequate institutional mechanism and unresolved political economy, our progress remained very slow. We as a nation need to learn from our experiences to overcome such barrier.

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