

# Policy WATCH

Volume VIII, Issue 10  
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RAJIV GANDHI INSTITUTE FOR CONTEMPORARY STUDIES

## ENVIRONMENT, NATURAL RESOURCES & SUSTAINABILITY

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in India-  
Commitments and  
Efforts**

**Rural Water Crisis  
in Madhya Pradesh  
and Way Forward**

**International  
Conference on  
Climate Change and  
Disasters:  
Challenges,  
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Responses**



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# Editorial

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Dear Reader,

This edition of Policy Watch is on the RGICS theme of Environment, Natural Resources and Sustainability. The issue brings to you varied discussion on policy history of land regeneration in India, problems and prospect for addressing rural water crisis at district level and climate change led disasters.

The first article on India's commitments and efforts on land regeneration highlights status of degraded land resources in India and challenges faced by people. It goes into the history of policy and planning of India to reclaim degraded land through various ways. In the end, the article attempts to highlight reasons of shortfall in reclamation of degraded land despite several efforts.

The second article is based on fieldwork under a research project commissioned by RGICS on water crisis in India. This article gives first hand insight of ground realities and identifies major policy gaps at the village level. The article suggest comprehensive framework to make policies effective on the ground.

The third article is a report of an international conference on 'Climate Change and Disasters: Challenges, Opportunities and Responses' jointly organized by Indian Society for Ecological Economics (INSEE) and Centre for Economic and Social Studies (CESS) in Hyderabad. This is a report from the perspective of a participant in the seminar.

We hope you enjoy the varied articles we bring to you on the RGICS theme of Environment, Natural Resources and Sustainability.

# Land Regeneration in India- Commitments and Efforts

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Jeet Singh<sup>^</sup> and Sahibpreet Kaur<sup>^^</sup>

## Introduction

Nearly 30% of India's landscape is under degradation and 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 threat to environment, biodiversity, local economy and food security. Globally and nationally, India has been very vocal in addressing this issue. Internationally, it has committed to regenerate its sizable landscape through international commitments such as Nationally Determined Contribution (NDC) under UNFCCC, 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 Soil and Water conservation programs like DPAP, Wasteland Development



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Program, Watershed Development Program, Joint forest Management, Environment Policy, National Action Plan for Climate Change (NAPCC), Green India Mission, MGNREGA, CAMPA and many others. Despite all these policy decisions, the continuous rise in degradation of land and forest is a serious environmental, economic, social and cultural issue in India. This article looks at the status of India's commitment, implementation of policies and reasons for shortfall.

## Land Degradation in India

According to a latest publication of ISRO, about 29.32% of total 328.72 million hectare (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 94.53mh 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% of desertification/land degradation with respect to total geographical area is contributed by nine states namely Rajasthan, Maharashtra, Gujarat, Jammu & Kashmir, Karnataka, Jharkhand, Odisha, Madhya Pradesh and Telangana. State specific analysis shows that more than 50% 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 compare to their total geographical area under desertification/land degradation in the Atlas<sup>1</sup>. 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
<b>Vegetation Degradation</b>	2.86	13.48	6.65	22.99	2.81	13.39	6.34	22.55
<b>Water Erosion</b>	3.03	17.51	8.97	29.51	3.12	17.07	8.91	29.11
<b>Wind Erosion</b>	17.63	0.56	0.00	18.19	17.72	0.57	0.00	18.30
<b>Salinity/Alkalinity</b>	2.52	0.86	0.09	3.48	2.52	1.07	0.21	3.80
<b>Water Logging</b>	0.02	0.08	0.31	0.42	0.02	0.08	0.25	0.36
<b>Mass Movement</b>	0.84	0.11	-	0.96	0.76	0.11	-	0.87
<b>Frost Shattering</b>	2.94	0.46	0.01	3.41	2.74	0.43	0.01	3.18
<b>Man Made</b>	0.04	0.14	0.16	0.35	0.04	0.14	0.14	0.32
<b>Barren</b>	0.25	0.28	0.05	0.58	0.25	0.28	0.05	0.58
<b>Rocky</b>	0.30	0.97	0.02	1.29	0.29	0.97	0.02	1.28
<b>Settlement</b>	0.11	0.93	0.44	1.47	0.07	0.75	0.33	1.15
<b>Grand Total</b>	30.54	35.40	16.70	82.64	30.35	34.85	16.28	81.48

Source: Space Application Centre, Ahmedabad

The Atlas on land degradation and desertification of India, published by the Space Application Centre, Ahmadabad has identified vegetation degradation, water erosion,

<sup>1</sup> [http://www.indiaenvironmentportal.org.in/files/file/Desertification\\_Atlas\\_2016.pdf](http://www.indiaenvironmentportal.org.in/files/file/Desertification_Atlas_2016.pdf)

wind erosion, water logging, salinity/alkalinity, mass movement of soil and rocks, frost heaving, frost shattering and manmade land degradation processes such as mining/quarrying, brick kilns, industrial effluents, urban agglomeration and waste as major reasons of land degradation and desertification in India.

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<sup>2</sup>. 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% of the country's GDP in 2014-15. The study of TERI in 2018 has also estimated 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.

## India's International Commitments

India has ratified to the UN Framework Convention on Climate Change (UNFCCC), the UN convention to combat desertification (UNCCD) and Convention on Biological Diversity (CBD). The objectives of each of these have been highlighted in following matrix.

The regeneration of natural resources is a crucial strategy of India as reflected in NDCs submitted to UNFCCC. 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 tonnes of carbon dioxide (CO<sub>2</sub>) by 2030 through additional forest and tree cover. To meet this target India requires not only regenerating degraded forest but also creating huge forest cover by 2030. According to an estimate, it needs to create around 30million ha new forest. It has also committed to enhance investment for climate vulnerable sectors such as agriculture, Himalayan region and coastal areas.

The government of India is convinced that the Green India Mission could achieve half of this target<sup>3</sup>. 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<sup>4</sup>.

Similarly, in the recently concluded Conference of Parties under UNFCCC, India has committed to regenerate 26 million ha land as part of its commitment under Delhi Declaration. The IUCN reported<sup>4</sup> that India's forest cover increased by 9.8 million ha

<sup>2</sup> <https://pib.gov.in/newsite/erecontent.aspx?relid=57618>

<sup>3</sup> <https://www.newsclick.in/green-india-mission-grossly-underfunded-says-report>

<sup>4</sup> <https://portals.iucn.org/library/sites/library/files/documents/2018-026-En.pdf>

### Nationally Determined Contributions for UNFCCC

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.
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 tonnes of CO<sub>2</sub> equivalent through additional forest and tree cover by 2030.
6. To better adapt to climate change by enhancing investments in development programmes in sectors vulnerable to climate change, particularly agriculture, water resources, Himalayan region, coastal regions, health and disaster management.
7. To mobilize domestic and new & 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

### Strategic Objectives of UNCCD

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

### National Biodiversity Targets for CBD

1. Knowledge awareness and conservation
2. Integration of values in planning processing and poverty alleviation strategies.
3. Reduce the rate of degradation and loss of natural habitats to reach sustainable action by 2020.
4. Controlling invasive alien species.
5. Sustainable management of agriculture, forestry and fisheries.
6. Conservation of Areas Important for Species, ecosystem services with effectiveness,- wider landscapes & seascapes-cover 20% of the area
7. Conservation of Genetic Diversity.
8. Safeguard & enumerate ecosystem services & safeguard ecosystems.
9. Ensure access & benefit sharing.
10. Ensure Participation.
11. Protection of traditional knowledge.
12. Assessment of financial and technical resources.

from 2011-2018 with increased effort due to the Bonn Challenge. This roughly translates to 1.4 mha per year, and if forest cover increases at the current rate, an additional 16.8 mha can be forested by 2030, reaching the target of 26 mha as announced. However, an action plan for achieving the same is still awaited.

Under the Convention on Biological Diversity (CBD), India is one of the first six countries<sup>5</sup> to have submitted the 6<sup>th</sup> 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 4<sup>th</sup> target on controlling alien species and measures NBT 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.

## Land Regeneration Initiatives in India

Regeneration of land and forest has been one of the core program of rural development initiative in India. The focused intervention in this sector goes back in 1970s when the government of India stated programs like Drought Prone Area Development (DPAP) and Desert Development Plan (DDP) to address problems of specific areas. Such various other initiatives by government of India are highlighted below:

### Soil and Water Conservation under DPAD and DDP

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.



<sup>5</sup> <https://pib.gov.in/newsite/PrintRelease.aspx?relid=186916> accessed on 15th October 2019



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. 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.

### 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<sup>6</sup> land degradation, restoration of ecology and meet the increasing demand of fuel wood 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, the Board was placed under the Ministry of Rural Development, as the department of wasteland development.

### National Watershed Development Program since 1990s

The National Watershed Development Programme 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.

### Joint Forest Management Programs since 1990s

The Joint Forest Management (JFM) programme came into implementation in 1990<sup>7</sup>. 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.

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<sup>8</sup>. 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%)<sup>9</sup>.

### 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

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<sup>6</sup> <https://dolr.gov.in/integrated-wasteland-development-programme>

<sup>7</sup> [http://frienvic.nic.in/database/joint\\_forest\\_management\\_1949.aspx](http://frienvic.nic.in/database/joint_forest_management_1949.aspx)

<sup>8</sup> [http://frienvic.nic.in/Database/Benefits\\_from\\_JFM\\_2244.aspx](http://frienvic.nic.in/Database/Benefits_from_JFM_2244.aspx)

<sup>9</sup> <http://moef.gov.in/division/forest-divisions-2/green-india-mission-gim/about-the-mission/>



combination of adaptation and mitigation measures<sup>9</sup>. The mission has aims to increase forest cover by 5mha and improve quality of forest/tree cover of 5mha by 2030.

### 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.

### 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.

## Reasons for Shortfall

Despite several regulations and laws enacted during pre and post independence, land remains one of the most contentious issues. 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. The shortfall in achieving desired goal can broadly be categorized in following three categories.

### Political Economy of Land Resources

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 exist contradictions 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 noble 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 54<sup>th</sup> 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<sup>66</sup>. The launch of the Wasteland Development Program in 1980s shows that the government of India has been concerned 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.

## Inadequate Financial Resources

The financial resources required for 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 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 12<sup>th</sup> five 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 low as Rs. 143.96 crore. The MOEFCC admitted that the budget allocation to the mission is very less and it is grossly insufficient.

## Inadequate Institutional Capacity

Other than 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 an objective to restore 5 mha 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.

## 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. Despite a strong policy framework at national and international level evolved in the last more than four decade to regenerate land and forest, the result remains very poor on the ground.

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.





# Rural Water Crisis in Madhya Pradesh and Way Forward

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Achintya Ghosh<sup>^</sup>, Manas Satpathy<sup>^^</sup> and Pratyaya Jagannath<sup>^^^</sup>



## Introduction

This article is based on fieldwork under the research project 'Addressing Water Crisis: Lessons from Successful Experience in China and India'. As a part of the study to deduce lessons for addressing the imminent water crisis in India, the study team visited Madhya Pradesh in July 2019. Apart from interacting with the officials at the state level, the team visited Betul and Sahadol districts to understand the situation on the ground and explore the possibilities to address the concerns of the residents, particularly in the rural area. They interacted with the district and block level officials, visited the interventions to improve access to water, and discussed with the villagers to meet the purpose. This report describes the observations, issues, and some ideas to deal with them. This article highlights water crisis in rural Madhya Pradesh and critically analyzes implementation status of various schemes to regenerate water resources.

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## Water Crisis in Madhya Pradesh

The total geographical area of the state is 308,252 km<sup>2</sup>, and the total population as per 2011 census is 7.26 crore. About 69% population of the state is dependent on agriculture. The climate of the state is tropical. The annual average rainfall in the state varies from 60 cm in North-Eastern part to 100-120 cm in South-Eastern region. Around 80% of the rainfall is received during the four monsoon months (July-September). This requires rainwater to be conserved in all parts of the state through every possible way to ensure availability of water throughout the year. Government of Madhya Pradesh develops water resources in the state through various departments, like Water Resources Department (WRD), Narmada Valley Development Authority (NVDA), Rural Development Department, Agriculture Department, and Forest Department among others.

Many major rivers, namely Narmada, Chambal, Betwa, Ken, Sone, Tapti, Pench, Wainganga, and Mahi originate from the state. The average surface water availability in the state at 75% dependability is estimated to be 81,500 MCM. Out of this, 56,800 MCM is allocated to the state, and the remaining is allocated to neighboring states under various interstate agreements. The estimated quantity of groundwater in the state is 34,159 MCM. The total culturable land in the state of M.P. is around 155.25 lakh hectares, out of which 64.18 lakh hectares are irrigated by all sources. The reservoirs, weirs and other structures, constructed by the water resource development department irrigate more than 50% of it.

The state has 128,231 villages, and around 24% of the households have access to the piped water supply. The schemes are largely implemented by the Public Health Engineering Department (PHED) and maintained by the Gram Panchayats. Madhya Pradesh Jal Nigam Maryadit, incorporated as a wholly-owned State Government Company in the year 2012, has implemented 42 multi-village piped water supply schemes, 26 of which are under construction. The PHED plans to ensure piped water supply in 50% of the villages by 2022 and 100% by 2030. Presently around Rs 4,000 crore is allocated to the department in a year, and the budget required to cover all the villages in the state is Rs 70,000 crore.

Most parts of the state have experienced 20% to 50% deficient rainfall for the past two years. This has worsened the situation in many parts of the state. Even before the onset of summer in 2019, villages in 36 out of 52 districts of Madhya Pradesh were staring at an acute drought. A report by the Panchayat and Rural Development Department said that 40 rivers that provide water to these villages went dry, and the micro-watershed management was in complete disarray. Similarly, a report of the urban administration and development (UAD) department stated that water was being supplied on alternate days during summer 2019 in 88 out of 378 municipal bodies in the state, and in another 12 the interval was even more<sup>1</sup>.

Madhya Pradesh Pollution Control Board has been vested with considerable authority and responsibility under various environment legislation to prevent pollution. The main objective of the Board is to maintain water, air, and soil is healthy and usable

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<sup>1</sup> ([http://timesofindia.indiatimes.com/articleshow/68712192.cms?utm\\_source=contentofinterest&utm\\_medium=text&utm\\_campaign=cppst](http://timesofindia.indiatimes.com/articleshow/68712192.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst))

condition for multiple purposes. India Today ranked Madhya Pradesh state in December 2018 to be the most improved state under environment category. They claim to have reduced the contamination of watercourses by the effluents from the industries to a great extent. However, contamination by sewage from the cities and towns and excess fertilizers, herbicides, and insecticides from agricultural lands are on the rise.

## Water Crisis in Rural Betul District

The district covers an area of 10,059.48 km<sup>2</sup>. and is divided into ten blocks. There are 1343 villages in the district that is predominantly rural. The total population of the district, as per the 2011 census, is 15,75,247, and the net sown area is 4046 km<sup>2</sup>. As per the government records, 29% of the net sown area is irrigated by dug-wells, canals, and tube-wells. The normal annual rainfall of Betul district is 112.96 cm, 87% of which is received during monsoon season. Betul district is underlain by various geological formations, forming different types of aquifers. In 2013, the net groundwater availability in Betul district was 1149.26 MCM, and the groundwater draft for all uses is 664.72 MCM 95% of which was for agriculture.

District officials say that five out of ten blocks of the district have faced severe groundwater depletion during the last decade. WRD officials say that 27% of the river flow is stored now in their existing 33 structures. They have planned to increase it to 90% in the coming years and are accordingly identifying the sites. They construct tanks of at least 0.5 MCM capacity. Out of the available 272 MCM of freshwater, 73 MCM is stored, of which 64 MCM is usable to irrigate 12,172 ha. The collection of irrigation charges is inferior (around 10%) as the farmers are not able to rely on these systems for irrigation. Depending on the water availability in the reservoirs after the monsoon, the number of irrigations to be given in that particular year is decided. So farmers without a backup do not dare to go for Rabi crops by relying on the canal water. On October 18, 22% of the capacity meaning 16 MCM was only filled up, and the reservoirs





failed to irrigate most of their command area. The department is not able to construct more reservoirs as most involve submergence of forest area in the district. The rules say that if a forest area has to be submerged, then double the area of degraded forest land has to be used for compensatory afforestation and Rs 15 lakh/ha is to be given to developing the allotted land. The district does not have so much land to be given to the forest department that limits the creation of large water bodies.

According to PHED officials, out of the 633 hand-pumps in the Multai block, 301 have become defunct due to depletion of water table. Hand-pumps cannot withdraw water beyond 200 feet. When the water table goes beyond this level, the hand-pump becomes defunct. So they are going for bore wells now in most of the villages to supply water to the households. The piped water supply scheme covers 120 (16 by NGOs) out of 131 villages in the block. The coverage is quite high (92%) in this block, as it was prioritized in the state because of severe water table depletion that failed most of the hand-pumps. The bore-wells have gone up to 900 feet deep to draw water. Finding a suitable location for a bore-well is also very difficult. They face failure in 50% of the cases. After execution of the water supply schemes, they are operated and managed by the Gram Panchayat (GP). Each household is provided with a single outlet in front of her house and water is supplied for 30-45minutes in the morning and again in the evening. Water charges are Rs 60/household/month, but the recovery is weak (25-30%). The Sarpanch pays the electricity charges and the operator from other funds available with her. Overhead tanks (costing Rs 20/litre) are not made in most cases. Recharge shafts (costing Rs 11,000) are now constructed everywhere to recharge the bore wells. The water supply systems are designed to supply 70 lpcd to a projected population 30 years hence.

A piped water supply scheme, implemented in 2004 in a village in Multai, was visited. It is running for the last 15 years. Initially water was pumped from a well in the lowland. Now the well dried up and PHED has constructed a bore-well this year to support the water-supply system. There is an operator to operate the pumps who gets a salary of Rs 5000 per month. Rs 60 is charged to every household every month, but the collection is around 30%. The system requires regular maintenance as the pipeline was not properly buried and it breaks frequently. The maintenance, payment to operator and payment of electricity charges are done with the funds received by the GP under 14th Finance Commission. Bleaching powder and chlorine water are added to the source at regular intervals to ensure safety.

Madhya Pradesh is among the first few states to have a separate feeder for the supply of electricity to agricultural consumers. The purpose is to provide regulated supply to agricultural consumers and continuous supply to non-agricultural consumers in rural areas. It has about 27 lakh permanent agriculture connections and about 200,000 seasonal connections. Increased power supply through this mechanism has helped the state to improve agriculture output. At least 10-hour supply for agriculture is assured in the state and the farmers are quite happy with it. However, free or subsidized electricity is a non-incentive to use water judiciously. Electricity for agriculture was earlier free, but a flat rate was introduced in 2014. Now this year the flat rate is halved encouraging farmers to be casual in using water.

## Case Study-Chikhlar Village

In village Chikhlar of Betul block, PRADAN has helped the Self Help Group (SHG) members to plan and develop water bodies under Mahatma Gandhi National Rural Employment Guarantee Scheme, MGNREGS. There are 150 households here, most of whom are Gond.; apart from 5 Kotwar families and 1 Korku family. Most families get water from the hand-pumps for their domestic use. There are ten hand-pumps in the village, out of which two dry up in summer. One has to maximum travel 200 meters to access a hand-pump. They use an average 50 liter per capita per day (lpcd). In 2017, almost everyone got their toilets constructed with assistance from the Government under the Swachh Bharat Abhiyan or Swachh Bharat Mission, and all the family members are using them. Water use has increased after toilet construction. The quality of the water is judged by visual interpretation. Water is not consumed if it looks reddish. During morning and in the evening, one has to wait for around 30 minutes to fetch water. Waiting time increases in summer as the discharge reduces. They have 30 dug-wells and ten bore-wells to irrigate the lands of about 50 families during Rabi season. In last few years, they are drying up in summer due to depletion of the water table.

A water budget in the village showed that an amount of 13,687 m<sup>3</sup> of water was used every year through the hand-pumps, which is 4% of the total groundwater withdrawal. An amount of 222,181 m<sup>3</sup> is withdrawn through the 30 wells, and another 119,013 m<sup>3</sup> is withdrawn from the ten tube-wells in the village primarily to support agriculture. So the total groundwater withdrawal in a year comes to 354,881 m<sup>3</sup>. Whereas, there was only one pond so far of 3,000 m<sup>3</sup> capacity. Last year they constructed 30 ponds under MGNREGS with a cumulative capacity of around 90,000 m<sup>3</sup>. The collective storage capacity thus is 93000 m<sup>3</sup>. Now to replenish the existing groundwater withdrawal as well as support more withdrawal in future, they at least need 70 more such ponds to create additional storage of 210,000 m<sup>3</sup>. As the village area generates a runoff of around 1,000,000 m<sup>3</sup> during the monsoon every year, the required storage can easily be created. However, it requires an amount of Rs 1.4 crore, but the village can mobilize Rs 30 lakh as maximum in a year under MGNREGS that is the primary source available now for creation of such water bodies in the rural area.

## Water Conservation Programs in the State

### Rural Engineering Services

Rural Engineering Service was established in 1976 under the Panchayat and Rural Development Department to execute the comparatively low-cost structures in the rural area and provide technical advice and control for all the structures implemented by the three-tier Panchayat Raj Institutions (PRIs). In Betul, we found them doing river deepening behind the stop dams constructed with MGNREGS funds to store adequate water beyond monsoon. The purpose was to recharge groundwater so that the wells and bore wells do not go dry during summer. The cost of each such scheme is Rs 25 lakh, and people are expected to contribute 50%. People rarely contribute except the big farmers having large chunk of land beside the river. They mobilize funds from MLAs/MPs instead. Collector sometimes assists with funds from other sources. The scheme was found to be useful, but the norm to mobilize people's contribution to the

tune of 50% has slowed down the execution, and only a few such schemes are executed. The big farmers were found to have gone for river deepening in one village with their resources to recharge their wells and bore-wells. Actually, after visiting the Shirpur model in Dhule district of Maharashtra where 282 such structures are made to rejuvenate the river, people started demanding for such activities. The idea is to convert streams into a series of water storage systems by building stop dams in series, excavating the river bed, and constructing gully plugs in the upper catchments to reduce siltation of the rivers. Roughly, an investment of Rs 1 crore benefits around 400 ha of land.

### Mahatma Gandhi National Rural Employment Guarantee Scheme

Construction of pond is encouraged under MGNREGS; however, the government staff opines that small farmers are not giving their lands for pond construction, and big farmers cannot have ponds in their lands under MGNREGS. As a result, large number of ponds are not constructed under MGNREGS, which is an essential need of the area. They are more impactful when been built-in series. As this year it had not rained much till July; most of the water bodies were dry.

### Madhya Pradesh State Rural Livelihood Mission

Madhya Pradesh State Rural Livelihood Mission (MPSRLM) is promoting rural women's self-help groups (SHGs) in the whole state. Better performing SHGs have been extended repeated loans by them to enhance their livelihoods. To create more opportunities to absorb the loans, SRLM staff have started helping the SHG members this year to plan for livelihood asset creation under MGNREGS. Nine SHGs of Raunda village were found to have prepared such plans with support from SRLM staff. People earlier did not opt to work under MGNREGS due to delayed payments, but now are hopeful of creating their assets with the involvement of MPSRLM. There are 100 wells and 35 bore wells, but only five waterbodies with average storage capacity of 3000 m<sup>3</sup>. The water level both in the wells and bore wells is depleting. The water level in the bore-well ten years back was in the range of 100-150 feet but is around 300 feet now.

### Pradhan Mantri Krishi Sichayee Yojana

Pradhan Mantri Krishi Sichayee Yojana (PMKSY) has been conceived amalgamating ongoing schemes like Accelerated Irrigation Benefit Program (AIBP) of the Ministry of Water Resources, River Development & Ganga Rejuvenation (MoWR, RD&GR), Integrated Watershed Management Program (IWMP) of Department of Land Resources (DoLR) and the On-Farm Water Management (OFWM) of Department of Agriculture and Cooperation (DAC). Ministries of Agriculture, Water Resources and Rural Development are assigned to implement different components of the program. Under this program, the Ministry of Rural Development is expected to undertake rainwater conservation, farm ponds, water harvesting structures, small check dams, contour bunding, etc. Several masonry check-dams are constructed under this program in Betul district. A sum of Rs 5-9 lakhs is spent on each such structure, but they neither store any water beyond the monsoon nor irrigate any land.

Similarly, an amount of Rs 50 lakh was spent in a village in Ghoda Dongri that does not look to be creating any significant storage. The allocation of resources alone does not seem to be adequate. It requires the staff to have the capacity to plan the interventions with the village community and execute them to their satisfaction.



## Policy Recommendations to Address Rural Water Crisis

Though piped water supply to each household looks feasible with the availability of funds, providing irrigation to every landholder is a challenge. It requires a large number of structures of different types and sizes to arrest runoff and recharge groundwater. Mostly supply-side interventions are focused now. Unless the demand is regulated and water use efficiency is increased, efficient, equitable and sustainable use of water will never be a reality. Reduction, recycling and reuse of water have to be incentivized by proper policies, pricing, and institutional systems. Instead of keeping the community at the receiving end of government interventions, they have to be in charge of visualizing, planning and bringing about the desired change. Women's SHGs promoted under NRLM can be built as agents of change. The above are the views of the Collector of Betul, Mr T S Naik. The following are the details of the ideas emerged during the discussions to ensure water for all in a sustainable manner:



**1- People's Involvement:** The villagers mostly know the solutions to their problems that vary from village to village depending upon the topography, rainfall, forest cover, subsurface profile and so on. So the top-down approach of solving the issue may not work. Each GP/village needs to prepare a water budget and plan interventions to ensure water supply to all both for consumption and production purposes with the water available. The permission/licensing system needs to be in place for any intervention by an individual or collective to consume water for production purposes. The interventions needing government support have to be grouped separately. The following are some of the interventions suggested by the villagers and officials to improve the situation in Betul district:

- I. Gabions/lose boulder check-dams in upper catchment area,
- II. weirs in series in perennial rivers,
- III. check-dams in series in ephemeral streams and river deepening,
- IV. plantation in barren lands, recharge shafts to artificially recharge groundwater,
- V. piped water supply to all rural households and all kinds of water storage structures to reduce surface runoff.

**2- Minimizing Duplication and Improving Professional output:** Now the government departments, being coordinated by the Collector at the district level and BDO at the block level, need to support the GP/village in executing their plans. All the above essential interventions have to be divided among the government departments so that no two departments implement the same scheme, like check-dams and river deepening by RES, weirs by WRD, plantation by forest department, and so on. This will make villagers clear about the department to approach for help in implementing a particular intervention as well as support the department to build expertise in the implementation of specific schemes. Proper cost norms for creation of unit storage (Rs 65-75 per m<sup>3</sup>) have to be established and shared with all including the community. All works have to be executed to the satisfaction of the villagers, and they need to certify that for closure of the schemes.

**3- Rationalizing Water Structures:** Small water bodies are found to have served the community better than the large reservoirs and canal systems. Water use efficiency is minimum in canal irrigation system. Moreover, land availability for large reservoirs is a constraint. So small water bodies up to a capacity of 0.5MCM may be promoted in large numbers, as planned by the village community, to provide irrigation through pipes rather than canals. They may also be used only for lift irrigation to save water. Farmers, whose lands are submerged, maybe prioritized to use the tanks. The present reservoirs and canals may be repaired and used for groundwater recharge only. Due to poor collection of water charges, they are not maintained properly now, and a lot of water is getting wasted. As most farmers in their command area have come up with wells to increase reliability, they will benefit by retention of water in the reservoirs and canals for a longer time.

**4- Professionalism, continuity and Quality:** For the execution of large number of structures in a relatively short period, government generally engages engineers on contract to do the measurements and adequately close the schemes. Such staff lack skills and motivation to ensure quality. Moreover, they are always under pressure of being terminated. In Maharashtra, a different model is adopted under MGNREGS for this purpose. They promote engineers as entrepreneurs to measure the government works and receive a percentage of the total budget of the schemes they close properly towards their charges. This ensures professionalism, continuity, and quality. Some of the engineers in the district having an exposure to the Maharashtra system proposed it.

**5- Strengthening MGNREGA:** MGNREGS seems to be a significant source now for creation of water bodies in addition to WRD and RES funds. The agriculture department has stopped executing Balram ponds, and PMKSY and IWMP have

also come to an end. It may be imperative now to use around 70% of MGNREGS funds for water conservation related interventions planned by the villagers. At the same time, agencies have to be identified to build the capacity of GP/village in preparing water budget and planning interventions accordingly. The personnel in charge of implementation of MGNREGS now do not have the skills and motivation to do this. NRLM teams in the districts and credible NGOs may be engaged to play the role. The pilots may immediately be started in a few most water stressed districts and it may be replicated subsequently once the systems are set for a coordinated effort by all stakeholders to work towards the goal. The present constraints in MGNREGS have to be addressed to make it more useful for water conservation. Delayed payment, no use of machines, and farm ponds only in the lands of BPL families were the major constraints identified during the visit. It is widespread in the area that lands are not divided among the brothers even though they cultivate them separately. Therefore, even though the brothers individually are small/marginal farmers, they are shown to be big farmers on the record and are not able to construct ponds and other assets under MGNREGS. Public Financial Management System (PFMS) is suitable for direct payment to workers, but the inadequately trained staff at the block level some time have made wrong entries that delayed or reduced payment to the workers. Changing entries in the system is a cumbersome task. Jan Dhan account can maximum have Rs 50,000/-; thus wages do not get deposited if the recipient already has got this amount in her account. This norm needs to be changed, as many rural households do not need employment for 100 days under MGNREGS, very low-income families may be allowed to get more than 100 days' employment. This will stop them from migrating and create more infrastructures in the area. The time for waterbody construction is January to June when districts lack funds as it is either the end or beginning of a financial year. The availability of adequate funds has to be ensured during the construction season. People have lost trust in MGNREGS due to last year's fund flow problem and extreme delay in payment.

**6- Phasing out Water Guzzling Crops:** Sugarcane cultivation needs to be phased out gradually from the district. There are three sugar meals that are promoting its farming, one started recently. Farmers opting for sugarcane and other water-intensive crops have to use drip irrigation systems. Adoption of low water consuming coarse cereals, millets, and cash crops has to be incentivized. Research says that replacing rice with maize, millets, or sorghum could reduce irrigation water demand by 33 percent while improving production of iron by 27 percent and zinc by 13 percent. Villages have to make proper allocation of the available water among all and ensure that no one uses more water than her allocation. Every household has to plan its production system as per the allocated volume of water.

There has to be a proper monitoring system along with key performance indicators to assess the progress and the results by a committee external to the district. The experience suggests that the programs that are monitored by external teams are implemented well. It is possible to transform Betul with extreme water scarcity to a district with a sustainable water supply with a coordinated effort of Government, Civil Society Organizations (CSOs), Panchayat, and Community Based Organizations (CBOs).

# International Conference on Climate Change and Disasters: Challenges, Opportunities and Responses

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Jeet Singh\*

The Indian Society for Ecological Economics (INSEE) and Centre for Economic and Social Studies (CESS) organized a three-day conference on 'Climate Change and Disaster: Challenges, Opportunities and Responses' from 6-8 November 2019 in Hyderabad. Through plenary sessions and number of parallel sessions and technical session the conference deliberated on issues related to climate change phenomena, impact, mitigation and adaptation, extreme weather events and disasters, climate justice and equity and building climate resilience. The RGICS provided me an opportunity to participate in this seminar to build my capacity as an environment and natural resource public policy researcher. I attended three plenary sessions and few technical and Panel Sessions in the three days of the seminar. This report is a brief description, observations and learning of my participation.

## Climate change and Science

- There was couple of plenary and technical sessions on scientific research on climate change. A panel of IPCC scientists presented the way IPCC work and explained how various reports of IPCC (Intergovernmental Panel on Climate Change) have influenced global policies related to climate change.
- Scientists from IPCC claimed that their report writing is scientifically robust and procedurally democratic. The entire report writing cycle provides expert and independent reviewer to feed in the information and strengthen the report.
- The IPCC have scientists from all over the world but compared to India's strength there are very few people in the IPCC from the country. The panel urged INSEE and other policy influencing institutions in India to push the government of India to recommend more scientists from India for the IPCC panel.
- The latest special report of IPCC on 1.50C is based on various research paper published all over the world. It used modeling to recommend policy intervention to restrict increase of global temperature. However, the report also suggests that INDCs adopted by nation states are inadequate to restrict global temperature below 20C.

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- The climate change modeling for various sectors such as whether forecast have reliably improved in the last few years, however, modeling related to number of other issues are yet to be developed to predict the impact of climate change in the future.
- As of today, various climate change modeling are knowingly underestimating impact of climate change.

## Climate Change Mitigation and Adaptation Strategies

- Globally the Sustainable Development Goals (SDGs) adopted by nation states provides broad framework to act locally to adapt and mitigate.
- However, there seems to be contradictions and disconnect between different SDGs.
- Global climate negotiations are also not very effective as each nation thinks differently about carbon reduction.
- Many countries are proactive in reducing their carbon emissions, and probably such initiative can motivate others to act responsibly.

## National Strategy to Mitigate and Adapt to Climate Change

- Regeneration of natural resources has been in the core of India's effort to mitigate and adapt to climate change.
- The MGNREGA has emerged as flagship program to invest in regeneration of natural resources to address issues of climate change.
- More than two-thirds of MGNREGA fund is invested in regeneration of water, soil and forest.
- State governments have also announced many schemes for regeneration of natural resources, however, in all such schemes MGNREGA is major investment mechanism.



## Policy Recommendations for Strengthening MGNREGA

- Since MGNREGA is the flagship program to address issues of climate change in India at local level, it needs to be strengthened to be more effective. The government has effectively tried convergence of human, physical and financial resources to strengthen this scheme. However, there has been no attempt to explore the convergence of skills, technology and science to improve this program.
- The MGNREGA activities require scientific knowledge and data to make its intervention effective to mitigate the impact of climate change or prepare communities for adaptation. The nodal agency – Rural Development/Panchayat does not have these skills and knowledge. Therefore, relevant agencies need to be approached for the convergence of technology, knowledge, information and skills.
- MGNREGA should also go for geo-tagging of its intervention and focus on building capacities of Panchayat Raj Institutions (PRIs) to improve its outcome.
- It also requires GIS based planning to effectively plan and implement activities related to regeneration of natural resources in a village or in a cluster of villages.

## Policy Recommendations for Integrated Water Resource Management (IWRM)

- The IWRM should be based on the use of technology, convergent planning and implementation and building capacities at local level.
- Improving strategies related to water management by improving planning process and financial mechanism.
- Integrating climate adaptation approach with IWRM at local level.
- Strengthening co-operation with the private sector to address issues of integrated water resource management

## Policy Recommendations for Climate Change Science

- Climate change modelings have progressed a lot in the last few years. However, they remain accessible only to the scientific community due to their complexities and technicalities. Further, these modeling are limited to analyze and predict climate change impact at global or national level. Scientists have two major challenges; one, they have to develop climate change modeling for local level and second they have to make them easy so that ordinary person can use them.

## Our New Initiatives

The Environment, Natural Resources and Sustainability theme of the RGICS has started following two major new initiatives to feed into state level policy research, discussion and advocacy.

### Madhya Pradesh Policy Lab

Building on its policy research work on Aviral and Nirmal Ganga through Ganga Sadbhavana Yatra in 2018, the RGICS has taken responsibility of carrying policy research and advocacy for revival of rivers in Madhya Pradesh. This initiative is part of our Policy Lab in Madhya Pradesh. This new task aims to provide policy advices to the state government and all other stakeholders involved in river revitalization program of the state government. In collaboration with various civil society organizations such as Manjari Foundation, Development Alternative, Club of Rome, Kabil Foundation, SARTHAK, and Margshree Charitable Trust, the RGICS has taken UR river basin in the Tikamgarh district as its field base for the research. The district administration of Tikamgarh is the point of contact and main recipient in this project. Also, the Water and Land Management Institute (WALMI) will collaborate with us to provide technical knowledge and advocacy support.





## Uttarakhand Sustainable Development Report- 2020

The RGICS is also set to launch its Policy Observatory in Uttarakhand by bringing out 'Uttarakhand Sustainable Development Report- 2020' report for Uttarakhand. RGICS is collaborating with People's Science Institute in Dehradun to work on this first of its kind report for Uttarakhand. Uttarakhand has completed 20 years after its formation. The discussion around its vision as a hill state, however, has still to be crystallized. The state has not really come up with a development plan to fulfill aspiration of local people. People in this region survived for generations by using local natural resources such as forest, land and water. Those sustainable practices and institutions need to be understood and recognized in planning future of this state. Given the rich biodiversity, flora and fauna in the state, it is a great challenge for state planners to use the natural resources in efficient, equitable and sustainable manner. This report aims to meaningfully contribute in envisioning a sustainable development policy for the state, offering a guide for program planning and implementation, by engaging policy makers, opinion builders, elected representatives, academic institutions, policy think tanks, civil society organizations, activists and the people.









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