

**15** LIFE  
ON LAND



Protect, restore & promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification & halt & reverse land degradation and halt biodiversity loss



# LIFE ON LAND

PROGRESS REPORT 2022-23



**Manav Rachna International Institute of Research and Studies**

(Deemed to be University under section 3 of the UGC Act, 1956)

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## 1. Preamble:

Manav Rachna International Institute of Research and Studies (MRIIRS) is committed to advancing Sustainable Development Goal 15 -Life on Land. Recognizing the importance of preserving terrestrial ecosystems, MRIIRS actively engages in education, research, and community outreach initiatives to address the challenges posed by land degradation, deforestation, and biodiversity loss. Through academic programs, awareness campaigns, and sustainable land management practices, MRIIRS strives to promote responsible land use, reforestation, and the conservation of biodiversity, thereby contributing to a healthier and more sustainable planet for current and future generations.

## 2. Teaching and Learning

MRIIRS is committed to promote sustainable development goal (SDG) 15, which focuses on Life on Land. The goal encourages students to explore the intricate relationships between terrestrial ecosystems and human society, emphasizing the need for responsible land use, biodiversity conservation, and reforestation efforts. By integrating SDG 15 into the curriculum in the form Core and elective Courses such as Environmental studies, Green energy sources etc, MRIIRS can equip its students with the knowledge and skills to address pressing environmental challenges, instilling a sense of responsibility and ethical stewardship for the planet. Engaging in practical projects, field studies, and awareness campaigns can empower students to take active roles in preserving the Earth's terrestrial life, thereby contributing to a more sustainable and ecologically balanced future.

## 3. Research Ecosystem

Manav Rachna International Institute of Research and Studies (MRIIRS) encompasses a holistic approach to terrestrial ecosystem conservation. Through dedicated research centers, interdisciplinary collaboration, funding acquisition, and data monitoring, MRIIRS seeks to advance knowledge and practices related to biodiversity protection, reforestation, and sustainable land management. Faculty members and students are leading cutting-edge research projects on topics such as conservation, biodiversity monitoring, and sustainable land management, contributing valuable insights to the global discourse on environmental sustainability. Additionally, students at MRIIRS are actively involved in these research efforts, gaining hands-on experience and learning to be responsible stewards of the environment.

### ● **Research Publications:**

Manav Rachna International Institute of Research and Studies (MRIIRS) is actively involved in research publications and book chapters related to Sustainable Development Goal 15. Faculty members and students' scholarly contributions encompass a wide range of topics, including land restoration, ecosystem preservation, wildlife conservation, and sustainable forestry practices.

## ● **PROMINENT RESEARCH PUBLICATIONS ADDRESSING SDG 15**

In the onward research journey at MRIIRS, efforts have been undertaken to not only seed the culture of research but also to achieve substantial momentum by achieving more than 2588 research publications in Scopus and Web of Science apart from several in PubMed, UGC care.

The prominent research publications addressing SDG 15 are as listed below:

### ● **Orient Romanticised: Disruption of Orient's Reality in Select Occidental Literary Discourses.**

DOI - <https://doi.org/10.1177/22308075221119241>

This article critically analyses the side effects of the Western Imperialism through their careful manufacturing of Orientalism as a discourse over centuries and promoting a stereotyped 'Oriental' flavour through its literature such as, Thomas Moore's narrative poem, Lalla Rookh (1817) that essentially obeys to confine to the identity of the Orient. Edward Said's Orientalism (1989) forms the foundation of the article and studies the role of an Orientalist in the process of Orientalising the East, as the middleman between the East and West that helped substantiate the image of the stereotyped Orient by contributing to the literature. Modern Orientalism has a recurring theme of identity crisis and displacement, which roots from the long history of exploitation faced by the people in the name of The White Man's Burden, coined in an 1899 poem by Rudyard Kipling as a symbol of his compassion towards the white supremacy. The article also identifies sensuality in language to express the exotic image of India in Thomas Moore's Lalla Rookh, an Oriental romance as an Oriental romance to substantiate the image of the stereotyped Orient

### ● **Integration of Microalgae-Based Wastewater Bioremediation–Biorefinery Process to Promote Circular Bioeconomy and Sustainability**

DOI- <https://doi.org/10.1002/cden.202100407>

Bioremediation of wastewater using microalgae is inexpensive, energy efficient, and effective in pollutant reduction as compared to conventional wastewater treatment technologies. Wastewater is a huge resource of minerals, nutrients, bioenergy, and valuable organic compounds and can be used for cultivation of microalgae. The microalgal biomass can be further used as biorefinery feedstock to produce biofuels and commercially important high-value products. The potential of microalgae toward bioremediation and biorefinery applications presents the avenues for integrating the two processes to support circular bioeconomy and sustainability. This review presents a holistic view of integration of bioremediation and biorefinery processes using microalgae for deriving multiple benefits like pollutant removal, resource recovery, biofuel production, and generation of high-value

commercial products. The current status of high-throughput microalgal screening technologies is also discussed since the selection of suitable microalgal strains is crucial for the application. The review further summarizes various processes involved in bioremediation and biorefinery systems such as cultivation, bioremediation, harvesting, and downstream processing. Recent trends in microalgal strain improvement for bioremediation and biorefinery applications through genetic engineering, bioinformatics, omics technologies, and genome editing tools are highlighted, while addressing the risks, biosafety issues, and regulatory affairs associated with genetically modified algae.

- **Effect of Cadmium and Lead Stress on Seed Germination and Seedling Growth of *Jatropha curcas* L.**

DOI- <http://dx.doi.org/10.13005/bbra/3019>

Heavy metal pollution in the biosphere has become a worldwide problem. Metal industry effluents, mining sites, municipal and agricultural waste are important sources of metal dispersion in environment. Heavy metal imposed phytotoxicity affects seed germination, seedling growth, photosynthesis and other physiological processes. Exposure of seeds to cadmium (Cd) and lead (Pb) has deleterious effects resulting into inhibition of germination, delayed germination time and retardation of seedling growth due to toxicity. The aim of this research is to investigate the toxic effects of Cd and Pb on seed germination and seedling growth of *Jatropha curcas* L. and evaluate its tolerance for heavy metal stress. The experimental treatments included exposure to five concentrations of cadmium nitrate and lead acetate (ranging from 25 to 125  $\mu\text{M/L}$ ), under which the germination and seedling growth parameters were determined periodically. The germination and growth of *J. curcas* L. was affected by cadmium and lead supplemented at different concentrations and the toxicity effects were found to be concentration dependent. Tolerance indices declined sharply with increasing concentrations of lead and cadmium treatments. Germination was inhibited upto 50% by 100  $\mu\text{mol/L}$  of Cd, 125  $\mu\text{mol/L}$  of Pb. Mean germination time and seedling vigour index also gradually decreased with increase in Cd and Pb concentration. Cadmium proved to be more toxic than lead in all considerations.

- **Insights into the human gut virome by sampling a population from the Indian subcontinent**

DOI: [10.1099/jgv.0.001774](https://doi.org/10.1099/jgv.0.001774)

Gut virome plays an important role in human physiology but remains poorly understood. This study reports an investigation of the human gut DNA-virome of a previously unexplored ethnic population through metagenomics of faecal samples collected from individuals residing in Northern India. Analysis shows that, similar to the populations investigated earlier, majority of the identified virome belongs to bacteriophages and a smaller fraction (<20 %) consists of viruses that infect animals, archaea, protists, multiple domains or plants. However, crAss-like phages, in this population, are dominated by the genera VI, VII .

and VIII. Interestingly, it also reveals the presence of a virus family, Sphaerolipoviridae, which has not been detected in the human gut earlier. Viral families, Siphoviridae, Myoviridae, Podoviridae, Microviridae, Herelleviridae and Phycodnaviridae are detected in all of the analysed individuals, which supports the existence of a core virome. Lysogeny-associated genes were found in less than 10 % of the assembled genomes and a negative correlation was observed in the richness of bacterial and free-viral species, suggesting that the dominant lifestyle of gut phage is not lysogenic. This is in contrast to some of the earlier studies. Further, several hundred high-quality viral genomes were recovered. Detailed characterization of these genomes would be useful for understanding the biology of these viruses and their significance in human physiology.

- **In silico mutational analysis to identify the role and pathogenicity of BCL-w missense variants**

DOI : [10.1186/s43141-022-00389-2](https://doi.org/10.1186/s43141-022-00389-2)

Intrinsic pathway of apoptosis is generally mediated by BCL-2 (B cell lymphoma 2) family of proteins; they either induce or inhibit the apoptosis. Overexpression of BCL-2 in cancer cell may lead to delay in apoptosis. BCL-w is the pro-survival member of the BCL-2 family. BCL2L2 gene is present on chromosome number 14 in humans, and it encodes BCL-w protein; BCL-w protein is 193 amino acids residues in length. Interactions among the BCL-2 proteins are very specific. The fate of cell is determined by the ratio of pro-apoptotic proteins to pro-survival proteins. BCL-w promotes cell survival. Studies suggested that overexpression of BCL-w protein is associated with many cancers including DLBCL, BL, colorectal cancers, gastric cancers, and many more. The cause of overexpression is translocations or gene amplification which will subsequently result in cancerous activity.

- **Microbial consortium: an eco-friendly approach against *Alternaria brassicae* in Indian mustard**

DOI: [10.1007/s42360-022-00521-9](https://doi.org/10.1007/s42360-022-00521-9)

Indian mustard is the third largest oilseed crop and important for the food security concern. Among various diseases of mustard crop, *Alternaria* leaf spot also known as *Alternaria* blight, causes yield loss of up to 70%. The use of chemicals to treat the diseases is not environmentally friendly, lead poor health of soil and damage food for the consumption. The combinations of multiple antagonistic organisms may provide improved disease control over the use of single organisms. Multiple organisms enhance the level and consistency of control by providing multiple mechanisms of action; combinations of fungi and bacteria may provide protection at different times or under different conditions and complementary niches. This investigation was performed to explore the potential of consortium of rhizospheric bacteria and fungi to use them as bio control agents for suppression of the blight of mustard and plant growth-promoting activities. The inoculated seeds were

established under greenhouse and field conditions. Based on the results, one out of four consortia has shown reduction of disease incidence by 28% and increase in seed yield by 42% as compared to control under field conditions against the pathogen. The growth parameters like length of the leaves, roots, stem, plant height, numbers of leaves, and seed development were measured after 8 weeks of planting. Microbial consortia increased the growth parameters better in comparison to single inoculant treatments. Thus, the consortia could be a reliable alternative instead of chemical fertilizers and pesticides for mustard.

- **Pharmacological Potential Of Polyherbal Formulation Kabasura Kudineer**

DOI- <http://doi.org/10.31788/RJC.2023.1618028>

Diabetes is a long-term medical condition in which the body has difficulty converting food into energy. High blood glucose levels are produced by poor glucose management, which alters the overall metabolic process of the body. The accumulation of abnormal (excess) blood glucose and the inability to metabolize plasma glucose causes lethal damage to the body's major organs or organ systems such as heart disease, nephropathy, retinal degeneration, sensory loss, and even premature death. Despite the administration of long-term medications, available diabetes mellitus therapy is unable to cure and unable to prevent patients from key organ damage. Diabetics have a significant financial burden, in addition to drug-drug interactions. A tremendous amount of data and proof has been amassed, proving medicinal plants' enormous potential. Plants are a naturally occurring source of therapeutic strategy for mankind. In accordance with the literature review, people who have metabolic syndrome are more likely to contract COVID-19. To overcome pandemics, we need efficient and effective herbal management. Kabasurakudineer is a polyherbal formulation that is gaining acceptance in the medical world. It may have a synergistic impact that is advantageous in the therapy of metabolic illnesses such as diabetes. Type 2 diabetes is expected to affect 640 million people by 2040, with 70% of those affected being hypertensive and predisposed to obesity and dyslipidemia.

- **Potential Rational Methods for Improving Thermostability of Choline Oxidase**

Choline oxidase is a very valuable enzyme for many industries. From cosmetics to cancer and from detecting clinical disorders to producing stress resistance plants. The usability of choline oxidase and its product glycine betaine is well versed across industries. Choline oxidase has a challenge with its thermostability, it loses its catalytic activity rapidly above 37°C. Over the decades' protein engineering has emerged as a very reliable, efficient, and powerful tool in developing and engineering enzymes and proteins. Protein engineering helped in improving the catalytic activity, increasing stability as well as widening the spectra of the function of the natural enzymes. Many proteins and enzymes' fates have been changed by protein engineering in the last couple of decades. *in silico* protein engineering is carried out before the experimental protein engineering approaches which can lead to efficient functional protein design.

- **Determination of endogenous concentration of Sodium potassium Cadmium Lead and Cadaverine correlating with physio-chemical parameters in *Lycopersicon esculentum* under multiple stress conditions.**

Agricultural production is under serious threat from abiotic stresses. The effects of polyamines (PA) in this context are well documented and several mechanisms have been established to increase stress factors such as resistance to agricultural salt and heavy metal stresses. A chemically similar diamine putrescine, cadaverine (Cad), appears as a growth inhibitor and acts similarly. This research, which examined the effect of salt and heavy metals on three different tomato cultivars (*Lycopersicon esculentum* (L.) em. Thell): Pusa Rohini, Pusa Ruby and Pusa Sadabahar, was conducted in relation to this. Their large size significantly hinders plant development and carbon production. Cadmium reduces the toxic effects of heavy metals and acts as a determinant of plant development, stimulating the antioxidant defense system. This study is undertaken to prove that Cad had a varying effect on the Na<sup>+</sup> / K<sup>+</sup> levels of tomato seedlings under different stress and it was more efficient in mitigating salinity stress and heavy metal stress in Pusa Rohini and Pusa Sadabahar and Cad maintained the Na<sup>+</sup> / K<sup>+</sup> homeostasis but in Pusa Ruby Cad only in combination with NH<sub>4</sub>NO<sub>3</sub> caused an increase in k<sup>+</sup> under salinity stress. Similarly, Cad supplementation did not have any effect on Pusa Ruby under heavy metal stress but significantly reduced endogenous contents of lead and cadmium in Pusa Rohini and Pusa Sadabahar which shows that the role of Cad in amelioration of multiple stresses such as salinity and heavy metal varies greatly depending on different species. In this study, Pusa Sadabahar has the highest stress tolerating capacity especially in the presence of Cad.

- **Prenatal arsenic exposure induces immunometabolic alteration and renal injury in rats**

DOI: [10.3389/fmed.2022.1045692](https://doi.org/10.3389/fmed.2022.1045692)

Arsenic (As) exposure is progressively associated with chronic kidney disease (CKD), a leading public health concern present worldwide. The adverse effect of As exposure on the kidneys of people living in As endemic areas have not been extensively studied. Furthermore, the impact of only prenatal exposure to As on the progression of CKD also has not been fully characterized. In the present study, we examined the effect of prenatal exposure to low doses of As 0.04 and 0.4 mg/kg body weight (0.04 and 0.4 ppm, respectively) on the progression of CKD in male offspring using a Wistar rat model. Interestingly, only prenatal As exposure was sufficient to elevate the expression of profibrotic (TGF-β1) and proinflammatory (IL-1α, MIP-2α, RANTES, and TNF-α) cytokines at 2-day, 12- and 38-week time points in the exposed progeny. Further, alteration in adipogenic factors (ghrelin, leptin, and glucagon) was also observed in 12- and 38-week old male offspring prenatally exposed to As. An altered level of these factors coincides with impaired glucose metabolism and homeostasis accompanied by progressive kidney damage. We observed a significant increase in the deposition of extracellular matrix components and glomerular and tubular damage in the kidneys of 38-week-old male



offspring prenatally exposed to As. Furthermore, the overexpression of TGF- $\beta$ 1 in kidneys corresponds with hypermethylation of the TGF- $\beta$ 1 gene-body, indicating a possible involvement of prenatal As exposure-driven epigenetic modulations of TGF- $\beta$ 1 expression. Our study provides evidence that prenatal As exposure to males can adversely affect the immunometabolism of offspring which can promote kidney damage later in life.

- **Nanocomposites for the removal of pharmaceuticals in drinking water sources**

DOI- <https://doi.org/10.1016/B978-0-323-99704-1.00019-9>

Water is one of the most important resources of universe. It is a basic need for human beings. About two thirds of the global population use safely managed drinking water services but millions of people use a drinking water sources contaminated with organic and inorganic pollutants and pathogens, such as surfactants, pesticides, aromatic hydrocarbons, heavy metals, fertilizers, bacteria, viruses, parasites, nitrates, phosphates, plastics, fecal waste, pharmaceuticals, and even radioactive substances. Many analytical techniques such as gas chromatography with mass spectrometry or tandem mass spectrometry and liquid chromatography with mass spectrometry or tandem mass spectrometry have resulted in detection to quantify both synthetic and natural pharmaceuticals at trace level in drinking water. Contaminated water can transmit diseases such as diarrhea, cholera, dysentery, typhoid, etc. Working group of experts of the World Health Organization added an issue to the work plan regarding the potential health impacts of residual concentrations of pharmaceuticals in drinking water.

Due to the cost-efficient removal technologies and exceptional characteristics of adsorption and reactivity, nanocomposites have been the subject of active research and development worldwide in recent years. Numerous studies have shown that nanocomposites emerged to provide beneficial alternatives to remove various pharmaceuticals effectively in drinking water with higher rates. These are efficient for adopting the recommended strategies for the on-site removal of pharmaceutical contaminants from their effluents. The recommendations provided in this article will be useful with regard to adopting novel strategies for on-site removal of the emerging contaminants in pharmaceutical effluents and related industries using adsorption and photocatalysis. Keeping in view the applicability of nanocomposites for removal of pharmaceuticals, it is expected that this technique can be applied to treatment of a variety of waters and wastewaters for drinking purposes.

- **Research Projects**

Manav Rachna Centre for Advance Water Technology and Management, MRIIRS is actively involved in projects which target sustainable resilience. Among others MRCAWTM is currently working with two National Program and with two other industrial and community driven scientific projects. The centre is pressing hard to be involved with other such projects of national repute

- Atal Bhujal Yojana** is to demonstrate community-led sustainable ground water management which can be taken to scale. The Atal Bhujal Yojana which is implemented in seven water stress states of India, including Haryana, is funded by **Govt. of India and World Bank**. 14 water stress districts of Haryana are in target under Atal Bhujal Yojana. MRIIRS, MRCAWTM has been engaged by Atal Bhujal Yojana Haryana as **District Implementation Partner (DIP)** for 7 blocks of 3 districts (Faridabad, Palwal and Rewari) Under this initiative it has been envisaged the preparation of community led Gram Panchay (GP) at level Water Security Plan (WSP) and ensuring its implementation through convergence of various government programs for 296 Gram Panchayats. The project involves strengthening of infrastructure for measurement and monitoring and capacity building of community level managers. The program is of 4- year duration started in July 2021 and expected to complete by June 2025. Total budget provision for this work allocated for MRIIRS is Rs. 7.78 crore.

Government Of India      THE WORLD BANK      ATAL BHUJAL YOJANA      विद्यया ऽ नमो भूतानां विषयः हीरकम्

**ATAL BHUJAL YOJANA HARYANA**  
 अटल भुजल योजना हरियाणा

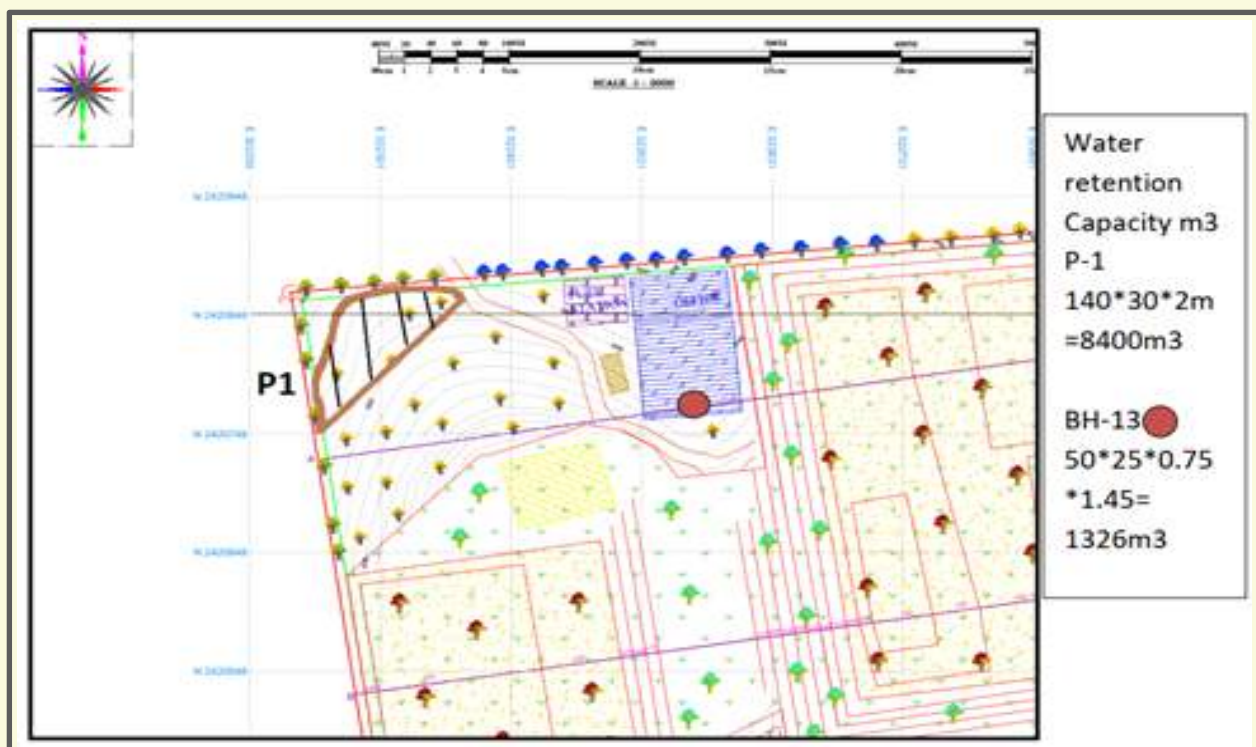
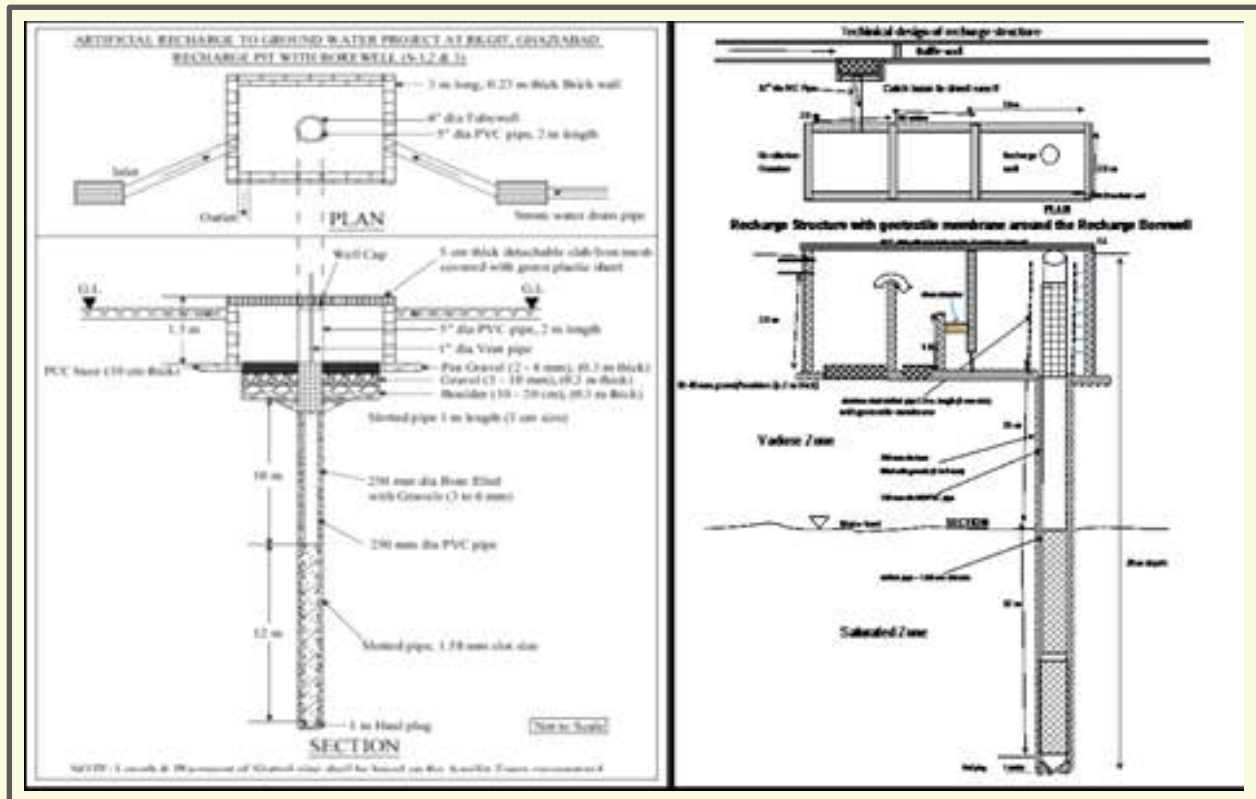
**Engagement of MRIIRS as DIP for Faridabad, Rewari and Palwal district**

**TWO PROJECTS**

Sanction No . <b>ABY/2122/26w/952- 956</b> District Implementation Partner Cluster-06(Faridabad- Rewari Districts) Duration 48 months, Budget 290.37lakh	Sanction No . <b>ABY/2122/27w/957- 961</b> District Implementation Partner Cluster-07(Palwal District) Duration 48 months, Budget 483.96lakh
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- Study for Rainwater harvesting around Iron ore mine of Dholta Pahar, and Netrabandh Pahar, Sundergarh, Odissa** to investigate water use and water balance. Hydrogeological investigation was conducted within core zone and its 10km radius of buffer zone for assessment of impact of dewatering of groundwater by the mine. A proposal was submitted for the water utilization and two structures (Roof top RWH and Ponds) for Rain Water Harvesting (RWH) in core zones were proposed.

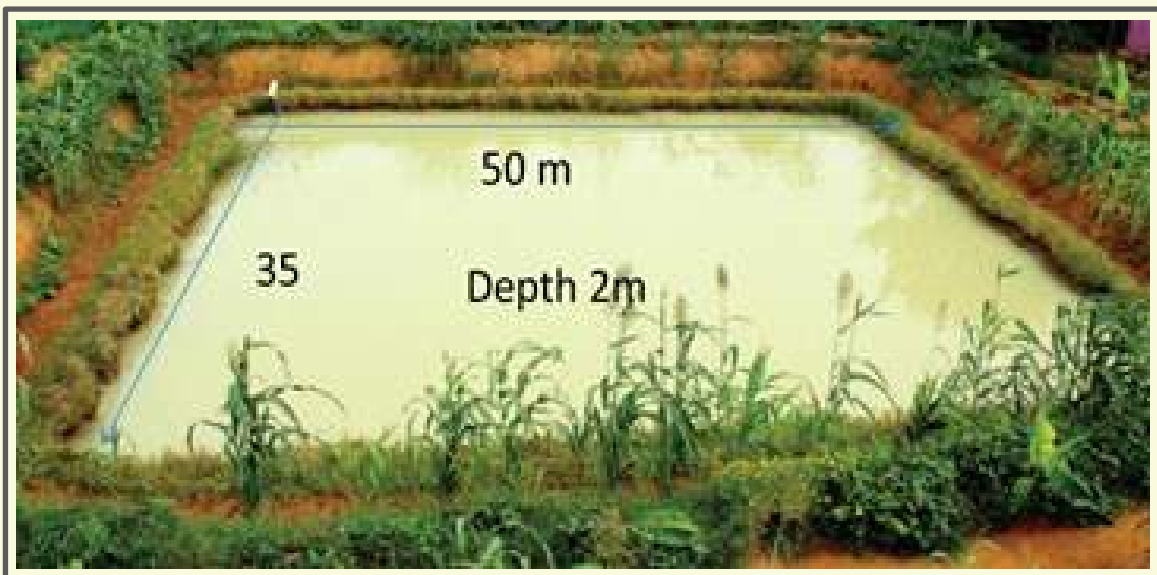




**Harvesting Structure**



**Proposed Location of Pond and RWH Structure**




**Proposed Design of Rooftop Rain Water**

- **Impact assessment of underground mining of Manganese Ore on GW in and around Miragpur, Balaghat Madhya Pradesh, India and Panderwani, Balaghat Madhya Pradesh, India**
- Geological, Remote Sensing, Hydrogeological, Geophysical, Geochemical and Socio-economical investigations completed.
- Draft reports submitted after investigation.
- Reply submitted to CGWA on query
- Report approved.
- **Jal Jeevan Mission** is an ambitious project taken by the Govt. of India to ensure achieving the Sustainable Development Goal SDG-6, where functional tap connection has to be provided to each individual household of rural India. The project has been adopted by Haryana State and MRCAWTM, MRIIRS has been engaged as State Implementation Support Agency (SISA). The main role of SISA is to assess PHED the nodal agency for Jal Jeevan Mission Haryana in achieving its objective of JJM. The appointment of SISA is initially for 1 year and extended for one more year, started in October 2021 with an annual budget of Rs. 50 lakhs. MRCAWTM is providing technical support for sustainability of water resources in both the above projects.
- **Hydrogeological surveillance** of fresh water and saline water interface at Barmer area of Rajasthan funded by CAIRN – Vedanta Oil & Gas Pvt. Ltd. CAIRN Oil and Gas use saline water for increasing oil production. For which they withdraw huge quantity of saline water from deeper aquifers of Barmer area developed within the cenozoic faulted basin. MRCAWTM through more than 1000 observation point covering nearly 5800 km<sup>2</sup> area monitor groundwater level and quality and collect various dynamic and static well and aquifer data. The 1st phase of three-year duration completed in May 2021 and the 2nd phase for further three-year duration is going on since July 2021. The budget provision for the first phase was Rs. 1.678 crore and that of 2nd phase is Rs. 2.28 crore.

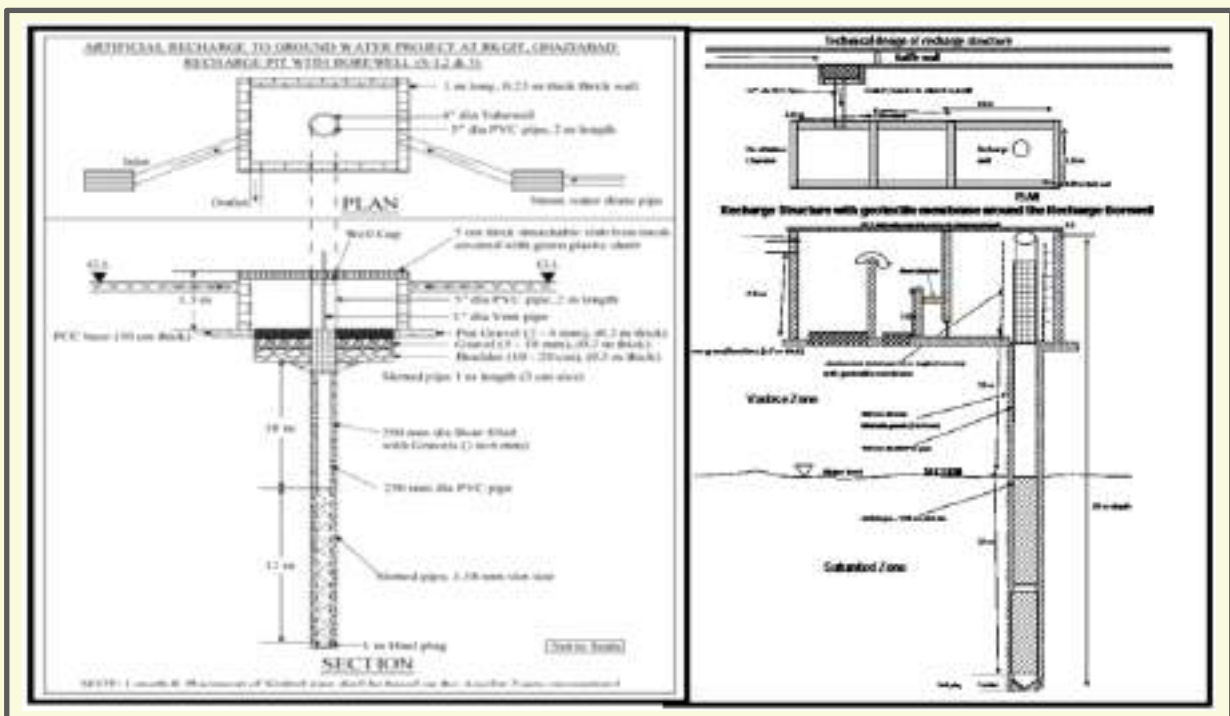
**Aquifer monitoring program of Barmer area to study possible impact on fresh water zone due to developing saline aquifer for hydrocarbon extraction by CAIRN Oil and Gas Vedanta Ltd.**

**Project duration :3.0 Yrs , Status: Ongoing**

Area of Investigation : 5860 km<sup>2</sup> of Thar Desert, Including parts of Barmer and Jaisalmer districts, Rajasthan.  
 Hydro census Frequency: Twice a year  
 Per census: 40 days activity,  
 Data collection points :1005.  
 Water sampling points: 105. Vehicle movement about 0.17lakh km By GPS tracer



# Groundwater Monitoring Study in Barmer




- Hydrogeological Investigation and Impact Assessment for Dubiyara Iron Ore Mines, Sihora Tahsil, Jabalpur District, Madhya Pradesh.** They have built a Rain Water Harvesting system and proposed to install a Rooftop rainwater harvesting system to boost the local groundwater supply. This helps lower the expenses associated with pumping groundwater, minimizes soil erosion in urban regions, and ensures a self-reliant water source. Both the existing and planned Rain Water Harvesting and groundwater recharge initiatives are crucial in meeting water needs and maintaining groundwater sustainability

**Hydrogeological Investigation and Impact Assessment Report for  
Dubiyara Iron Ore Mines, Sihora Tahsil, Jabalpur District, Madhya Pradesh**




- **Co-solving water logging and groundwater depletion issues in parts of Faridabad Smart City-Project** is for targeting the urban water management and for improving its sustainability. This **DST funded project** has been sanctioned to MRCAWTM, MRIIRS in May 2021 with 36 months duration with Rs 0.7012 crore budget. Under this investigation it is proposed to divert the urban flash flood creating water logging condition and is hampering day-to-day life during monsoon period to improve the groundwater condition within the depleted aquifer. This **aquifer storage and recovery project** of taming urban flood water is addressing two critical issues of urban hydrology to improve the sustainability.



DEPARTMENT OF SCIENCE & TECHNOLOGY  
Ministry of Science & Technology  
Government of India


Department of Science and Technology  
Technology Missions Division,  
Water Technology Initiative Programme  
WTI - (Action Research)



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### Co-solving Water logging and Groundwater depletion issue in parts of Faridabad S using Underground Taming of Flood water for Aquifer Storage and Recover

- Topographic survey and DGPS elevation mapping of the area of interest
- Micro level hydrological and hydrogeological study for designing for UTFW during pre monsoon and monsoon period
- Surface geophysical Investigations VES & Profiling
- Study for construction of connecting drain, deaeration chambers, coagulation chamber
- Experiments for selection of suitable Iron based coagulants
- Study for Optimization of flow rate and dosing of coagulant
- Auger hole drilling and slug testing- Vadose zone study
- Drilling of bore hole and litho sampling
- Subsurface geophysical logging
- Well completion and development
- Pumping test for aquifer characterization and well efficiency test
- Collection and analysis of groundwater samples for base level data acquisition
- DWLR with EC and Temp sensor and installation
- Installation of UTFW system by connection civil construction and drilled well for AS&R
- Installation of energy meter and pump
- Water sampling for analysis of regular and emerging pollutants /contaminants
- Impact assessment of UTFW



- Apart from above Projects man projects were carried out for sustainable life on Land such as Development of Water Quality Index and air quality Index by Sadiqa Abaas ,Parametric Evaluation of Fibre reinforced concrete towards sustainable approach by using Taguchi's Method by Yaman Hooda, Feasibility Study on utilization of construction and demolition waste in road works by Anjali Gupta, Durable and Strength Parameters of Sustainable Graphene Concrete by Yaman Gupta



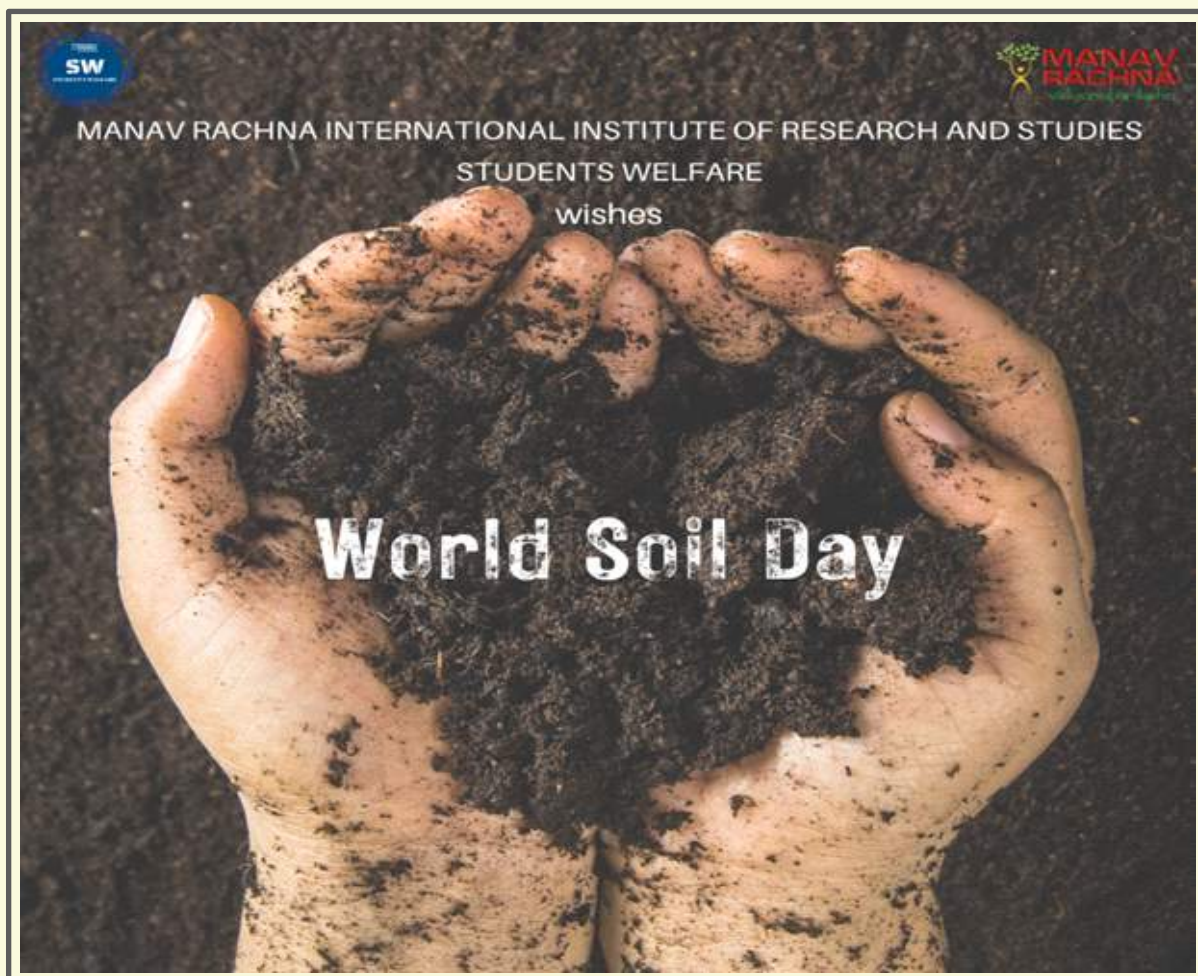
## 4. Land Ecosystem through Education

At MRIRS, we believe in the importance of sustainability and environmental conservation. Our curriculum includes subjects that integrate the principles of SDG 15. Students learn about terrestrial ecosystems, biodiversity, and sustainable land management, fostering a deep appreciation for the natural world through core and open electives such as Environmental Sciences, Green energy Resources, Disaster Management etc.

MRIRS hosts various awareness camps, seminars and workshops featuring experts in biodiversity conservation and sustainable land management. These events provide students with insights into current conservation strategies and the opportunity to engage with professionals in the field.

- **World Soil Day**

World Soil Day, celebrated on December 5th, underscores the vital role soil plays in sustaining life on Earth. It promotes soil health awareness, emphasizing its significance for agriculture, biodiversity, and climate change mitigation. This day encourages responsible land management and urges global efforts to safeguard and restore this precious natural resource for future generations.



- **World Environment Day**

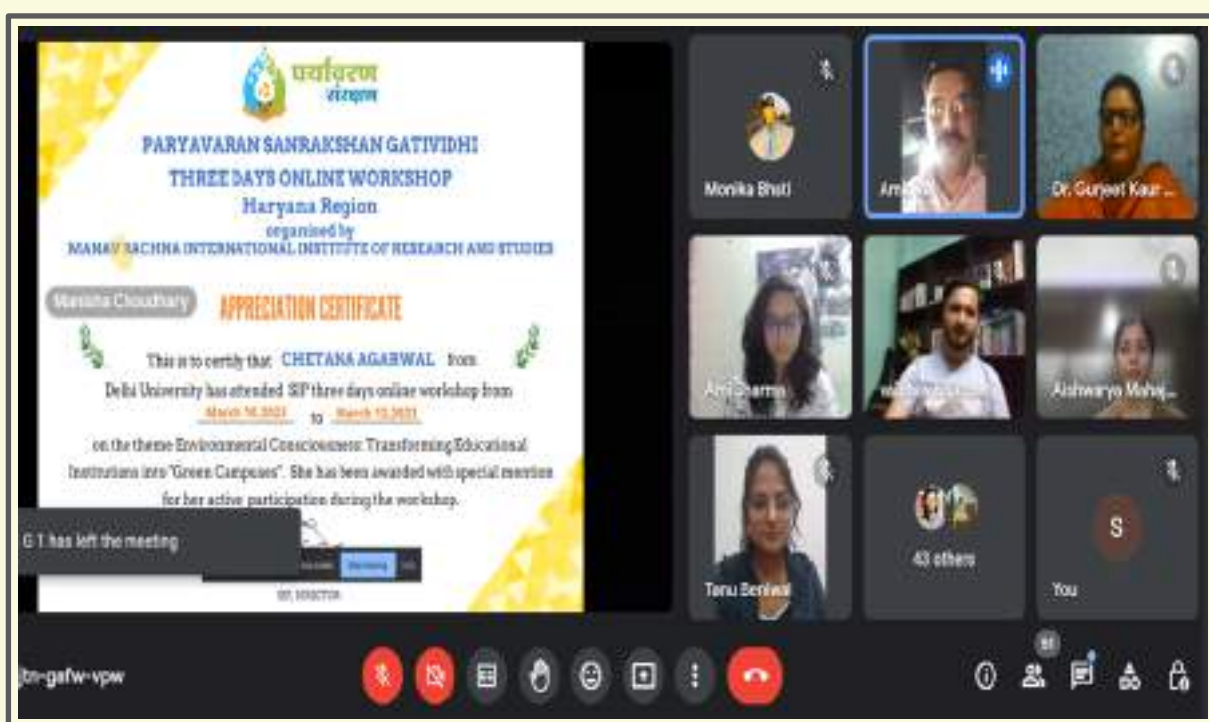
World Environment Day is an occasion to promote awareness concerning Environmental issues and promote actions for Preservation and Conservation of Environment. Working in the same direction, Students Welfare planned events on World Environment Day to engage Students and Faculty Members in meaningful conversation revolving around Mother Earth. Students Welfare took an initiative to ensure Students and Faculty Members pledge to consume only Raw Food for a day. The step was taken to disseminate information about the energy and resources that are used for manufacturing, processing and transportation of processed food. This initiative ensured a more conscious and mindful approach towards food consumption.



- **Workshop on Environmental Consciousness: Transforming Educational Institutions into "Green Campuses" from 10.03.23-12.03.23**

Manav Rachna International Institute of Research and Studies under Manav Rachna Life Skills Program organised Three Days Online Workshop-Environmental Consciousness: Transforming Educational Institutions into "Green Campuses" (Haryana Region) under the aegis of Paryavaran Sanrakshan Gavividhi from 10.03.23-12.03.23 where 92 students from all over haryana region participated.





- **ONE TREE FOR NATION -PLEDGE**

On the occasion of National Youth Day on 12.01.23, the Department of Students Welfare, under the aegis of Paryavaran Sanrakshan Gatividhi, announced the initiative "One Tree for Nation" from Sowing to Growing.

The announcement was made on the occasion of National Youth Day to encourage the younger generation to actively participate in the initiative taken by the University and to disseminate the message regarding conservation of the environment.

All the students, faculty members, and dignitaries also took pledge enthusiastically from Sowing to Growing by sowing at least 10 seeds and nurturing the plant till it grows into a tree. Dr. Sanjay Srivastava, Vice Chancellor appreciated the initiative Ek Ped Desh Ke Naam. He encouraged the students to contribute significantly for making the mother Earth cleaner and greener and being a part of this noble cause.

The Department of Students Welfare urges everyone to join hands together for EK PED DESH KE NAAM and Conserve, Preserve and Contribute towards the Environment.



- **Green Belting for a Green Earth**

Students from NSS unit, Eco-Club "Idhika" of MRIIRS under the Unnat Bharat Abhiyaan, Flagship Programme of Mainistry of Education, Government of India participated in the Plantation Drive under the aegis of Dr. O.P Bhalla Foundation. The Greenbelting was conducted outside the Off-campus Hostel, Sector 45, Faridabad.

The plantation drive was conducted with the purpose of Green Belting the area. This initiative sought to enhance the ecological balance of the region, mitigate the effects of pollution, and foster a healthier environment for both wildlife and humans alike. Through the concerted efforts of everyone the green belting project aimed to create a sustainable and visually appealing landscape, enriching the surroundings and leaving a lasting positive impact on the ecosystem.



- **Raddi -Waste Paper Collection Drive**

Raddi is a recycling initiative launched MRIIRS and Dr. O.P. Bhalla Foundation in collaboration with Rotaract Club Faridabad Aravalli. The team collects paper and cardboard from the Manav Rachna Campus and recycle them. The waste material is converted into new notebooks and stationary items that are distributed among the underprivileged children. The initiative was launched in 2022.



- **Plastic Collection Drive**

MRIIRS in association with Dr. O P Bhalla Foundation has taken an initiative to invite contribution in the Green Ghar Monthly Plastic Collection Drive. In July 2023, we collected a substantial amount of plastic. The drive ensures that students and faculty members donate plastic on the the end of every month. We aim to make benches out of recycled plastic. The target to collect 1500-2000 kgs of plastic every month.

- **Swachh Ghar Swachh Bharat**

MRIIRS with Team Foundation organized 4 workshops from 4th-7th October 2021 and Way of Life Foundation under the guidance of Municipal Corporation, Faridabad. It was an orientation and training program for Students and Teachers on the topic, "Waste Segregation." The schools were divided into 4 zones. In totality, the worksop was hosted for around 1000 attendees from various school.





- **Workshop on Eco bricks**

On August 16th, 2021, Dr. OP Bhalla Foundation organized an Eco-Brick Workshop with Department of Student's Welfare, MRIIRS under, "One Nation One Week." Delegates from various Resident Welfare Associations in Faridabad were invited for this Workshop in which they were educated about Eco-Brick, an innovative new method of recycling the one-use plastic. Dr. Gurjeet Kaur Chawla continued the workshop by explaining the concept of Eco-Bricks and giving a practical demonstration to build them.



- **Rally on Say No to Plastic**

The Department of English, SMEH organized a rally on 'Say No to Plastic' on 28 September, 2023 in Manav Rachna Campus. 23 students from B.A.(H) English 3rd semester & 5th semester carried the placards with messages on 'safe' environment and conducted a rally throughout the Campus. They were accompanied by Dr. Tripti Tyagi, Assistant Professor. The students raised slogans "Say No to Plastics" and "Refuse Reuse –Recycle Plastic" with an echo of determination and motive to reduce the use of plastic. They also pledged that they would use a minimal amount of plastic to sustain the environment



Faridabad, HR, India  
Sector 43, Faridabad, 121004, HR, India  
Lat 28.450904, Long 77.286133  
09/28/2023 01:30 PM GMT+05:30  
Note : Captured by GPS Map Camera



Faridabad, HR, India  
Sector 43, Faridabad, 121004, HR, India  
Lat 28.450243, Long 77.284028  
09/28/2023 01:44 PM GMT+05:30  
Note : Captured by GPS Map Camera

- **Green Campus**

The complete MRIIRS campus is beautifully planned in a manner to make best use of the geographical contours on the slope of an Aravalli Hill. The ambience adds to the learning needs of both students and faculty members. The lush green campus is conducive to providing a mechanism to release the pressure created by the rigors of academia, for venting out the study pressure of students through various sports, cultural, refreshment kiosks / food-junctions etc. These facilities are distributed throughout a lush green and landscaped and secured campus.

- **Extent of Greenery – 2.87 hectares**



venting out the study pressure of students through various sports, cultural, refreshment kiosks / food-junctions etc. These facilities are distributed throughout a lush green and landscaped and secured campus.



**Vegetation Coverage and Greenery in Campus**



## Medicinal Plants

### VERMICOMPOSITING



### FEATURES

- Input Waste, Get Black Gold as an output!
- Save Money by letting worms make compost for you free and fast!!
- Be Eco-conscious/Green by diverting food waste from the landfills
- Reverse the damage from years of bad soil management: Over fertilization, Chemicals, and over tilling.

- BEST PRACTISE – MEGA PLANTATION DRIVE



- BEST PRACTICE – FLOWER SHOW





MGNCRE

महात्मा गांधी राष्ट्रीय ग्रामीण शिक्षा परिषद  
Mahatma Gandhi National Council of Rural Education

Department of Higher Education, Ministry of Education, Government of India



### Certificate of Appreciation

**PROF (DR.) GURJEET KAUR CHAWLA**, PROFESSOR & DEAN, MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES, FARIDABAD, HARYANA has contributed to the World Environment Day Celebrations June 2022 as a **faculty coordinator** by **conducting and completing the Green activities on campus**. The initiatives taken up under **Swachhta Activities** were building outdoor classrooms, reinforcing greenery and showcasing the green decisions of the Institution. Mahatma Gandhi National Council of Rural Education appreciates the team work during the activities.

Date: 20.06.2022  
Certi. MG/SAR/WED/IC/129



B S C Naveen Kumar  
MGNCRE World Environment Day 2022  
Monitoring Officer

### Certificate of Appreciation for Green Activities on Campus



MGNCRE

महात्मा गांधी राष्ट्रीय ग्रामीण शिक्षा परिषद  
Mahatma Gandhi National Council of Rural Education

Department of Higher Education, Ministry of Education, Government of India



### Certificate of Appreciation

**Dr. Sanjay Srivastava**, Vice Chancellor, MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES, Faridabad, Haryana has contributed to the World Environment Day Celebrations June 2022 by **facilitating and completing the Green activities on campus**. The initiatives taken up under Swachhta Activities were building outdoor classrooms, reinforcing greenery and showcasing the green decisions of the Institution. Mahatma Gandhi National Council of Rural Education congratulates the Institution for its participation and adding impetus to the activities conducted by the faculty members and students.

Date: 20.06.2022  
Certi. MG/SAR/WED/N103



B S C Naveen Kumar  
MGNCRE World Environment Day 2022  
Monitoring Officer

### Certificate of Appreciation for Green Activities on Swachhta Activities

- **Awareness Program on Pledge on low Carbon Usage**

Awareness Programme by taking pledge with students on low Carbon Usage. Further Dr. Rajeev Kumar presented the details of low Carbon Usage. Low carbon only denotes a reduction in carbon dioxide (CO<sub>2</sub>). One of the main greenhouse gases responsible for global warming is carbon dioxide. Numerous other sorts of activities, including deforestation, burning fossil fuels, and volcanic eruptions, emit it. Therefore, by reducing our CO<sub>2</sub> emissions, we are being more considerate of the environment. Wind, solar, hydroelectricity, and nuclear energy are the four primary categories of low-carbon energy. The first three are environmentally friendly because they use renewable resources like the sun and wind to generate electricity. Renewable energy is an endless resource that never runs out. It will ultimately run out, unlike fossil fuels, which we have a finite supply of on Earth. The Pledge was taken by 51 students on low Carbon Usage.



## 5. Policies:

Manav Rachna International Institute of Research and Studies (MRIIRS) is proud to champion sustainability through a comprehensive policy that aligns with the United Nations SDG 15. Our commitment to sustainability not only recognizes the significance of protecting terrestrial ecosystems and biodiversity but actively integrates these principles into our educational and operational ethos. By adhering to this policy, MRIIRS seeks to contribute to the preservation and restoration of our planet's natural heritage. We believe that through sustainable practices and a dedicated focus on SDG 15, we can inspire positive change, empowering our community to be conscientious stewards of the environment and ensuring a greener, more sustainable future for all.

Our policy ensures the proper recycling and management of electronic and plastic materials, reducing their environmental impact. Through these initiatives, we aim to protect terrestrial ecosystems, in line with SDG 15, and promote a cleaner, more sustainable future.

**Link for Green Policy:** <https://mriirs.edu.in/wp-content/uploads/2023/02/7-1-Green-Policy-Revised-with-INDEX-BM.pdf>

**Link for Policy on Sustainable Investment :** [https://mriirs.edu.in/wp-content/uploads/2023/08/MRIIRS\\_Sustainable\\_Investment\\_Policy.pdf](https://mriirs.edu.in/wp-content/uploads/2023/08/MRIIRS_Sustainable_Investment_Policy.pdf)

**Link for Policy on Sustainable Procurement:** <https://mriirs.edu.in/wp-content/uploads/2023/08/MRIIRS%20Policy%20on%20Sustainable%20Procurement.pdf>

**Link for IT Policy:** <https://mriirs.edu.in/wp-content/uploads/2022/08/IT-Policy.pdf>





## 6. Regular Skill Set Enhancement at MRIIRS Certifications Earned By Students And Faculty Members

Skill set development and enhancement are the important component of institutional development. The university is committed to conduct, through its competent constituent bodies, programs for the faculty and students for continuous skill set enhancement relevant to the recent technologies. Further, the faculty members and students are also encouraged to participate in Seminars/ Conferences/ Workshops/ Training Programs/ Short Term courses etc. within or outside the University. Sample certifications earned by faculty members and students in the relevant areas of SDG15 are as appended below:



The image shows a sample NPTEL Online Certification certificate. It features the NPTEL logo on the left and a portrait of the recipient, Vedant Kumar Singh, on the right. The text on the certificate reads: "NPTEL Online Certification (Funded by the MoE, Govt. of India). This certificate is awarded to VEDANT KUMAR SINGH for successfully completing the course Ground Improvement with a consolidated score of 50 %". Below this, a table shows the scores for Online Assignments (19.56/25) and Proctored Exam (30/75). It also states that the total number of candidates certified in this course is 84. The certificate is dated Jul-Oct 2022 (12 week course) and is signed by Prof. Debjani Chakraborty, Coordinator, NPTEL, IIT Kharagpur. At the bottom, it includes the IIT Kharagpur logo, the Swayam logo, the roll number NPTEL22CE68554765235, a QR code for validation, and the recommended credits of 3 or 4.

Online Assignments	19.56/25	Proctored Exam	30/75
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Roll No: NPTEL22CE68554765235	To validate the certificate		No. of credits recommended: 3 or 4
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Elite

# NPTEL Online Certification

(Funded by the MoE, Govt. of India)



This certificate is awarded to

**JIMMY MEHTA**

for successfully completing the course

## Surface Engineering of Nanomaterials

with a consolidated score of **62** %

Online Assignments	21.25/25	Proctored Exam	40.5/75
--------------------	----------	----------------	---------

Total number of candidates certified in this course: 70

**Prof. Sanjeev Kantan**  
Coordinator, Continuing Education Centre  
IIT Roorkee

Jan-Mar 2023

(8 week course)

**Prof. Priti Maheshwari**  
NPTEL Coordinator  
IIT Roorkee



Indian Institute of Technology Roorkee



Roll No: NPTEL239/E-46544530410

To validate the certificate



No. of credits recommended: 2 or 3



**National Institute of Technical Teachers  
Training and Research, Chandigarh**

MINISTRY OF EDUCATION, GOVERNMENT OF INDIA

**Certificate**

*This is to certify that*

**Dr. JIMMY MEHTA**

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES,  
FARIDABAD (HARYANA)

*Participated in AICTE recognized Short Term Course*

*on*

**Water Resource Management  
through ICT**

*conducted by*

**Civil Engineering Department**

*from*

**07.03.2022 to 11.03.2022 (One Week)**

*at*

**Manav Rachna International Institute  
of Research and Studies,  
Faridabad (Haryana)**

A handwritten signature in black ink, appearing to be 'J. Mehta'.

Coordinator

A handwritten signature in black ink, appearing to be 'R. Mehta'.

Director



Certificate No: ICT-25894/23

**National Institute of  
Technical Teachers Training and Research  
Chandigarh**

MINISTRY OF EDUCATION, GOVERNMENT OF INDIA

**Certificate**

*This is to certify that*

**JIMMY MEHTA**

**MRIIRS, FARIDABAD  
HARYANA**

*Participated in the AICTE Recognized Faculty Development Programme*

**on**

**Low Cost Housing Techniques and Practices (Cluster)**

*Conducted by*

**Civil Engineering Department**


**from**

**13/03/2023 to 17/03/2023 (One Week)**

**at**

**Manav Rachna International Institute of Research and Studies, Faridabad**



  
Coordinator

  
Director



Certificate No: ICT-2194023

**National Institute of  
Technical Teachers Training and Research  
Chandigarh**

MINISTRY OF EDUCATION, GOVERNMENT OF INDIA

**Certificate**

*This is to certify that*

**VINAY**

**MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND  
STUDIES, FARIDABAD  
HARYANA**

*Participated in the AICTE Recognized Faculty Development Programme*

on

**Earthquake Risk Management**

*Conducted by*

**Civil Engineering Department**

from

**10/10/2022 to 14/10/2022 (One Week)**

at

**Manav Rachna International University, Faridabad**



Coordinator

Director



Certificate No: ICT-21952/23

**National Institute of  
Technical Teachers Training and Research  
Chandigarh**

MINISTRY OF EDUCATION, GOVERNMENT OF INDIA

**Certificate**



*This is to certify that*

**DR. RAJENDER KUMAR**

**MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND  
STUDIES, FARIDABAD  
HARYANA**

*Participated in the AICTE Recognized Faculty Development Programme*

on

**Earthquake Risk Management**

*Conducted by*

**Civil Engineering Department**

from

**10/10/2022 to 14/10/2022 (One Week)**

at

**Manav Rachna International University, Faridabad**



Coordinator

Director



Certificate No: ICT-21945/23

**National Institute of  
Technical Teachers Training and Research  
Chandigarh**

MINISTRY OF EDUCATION, GOVERNMENT OF INDIA

**Certificate**

*This is to certify that*

**PANKAJ SHAKKARWAL**

**MRIIRS, FARIDABAD  
HARYANA**

*Participated in the AICTE Recognized Faculty Development Programme*

on

**Earthquake Risk Management**

*Conducted by*

**Civil Engineering Department**

from

**10/10/2022 to 14/10/2022 (One Week)**

at

**Manav Rachna International University, Faridabad**



Coordinator

Director

# LIFE ON LAND

PROGRESS REPORT 2022-23



## **Manav Rachna International Institute of Research and Studies**

(Deemed to be University under section 3 of the UGC Act,1956)

Manav Rachna Campus Rd, Gadakhor Basti Village, Sector 43,  
Faridabad, Haryana 121004