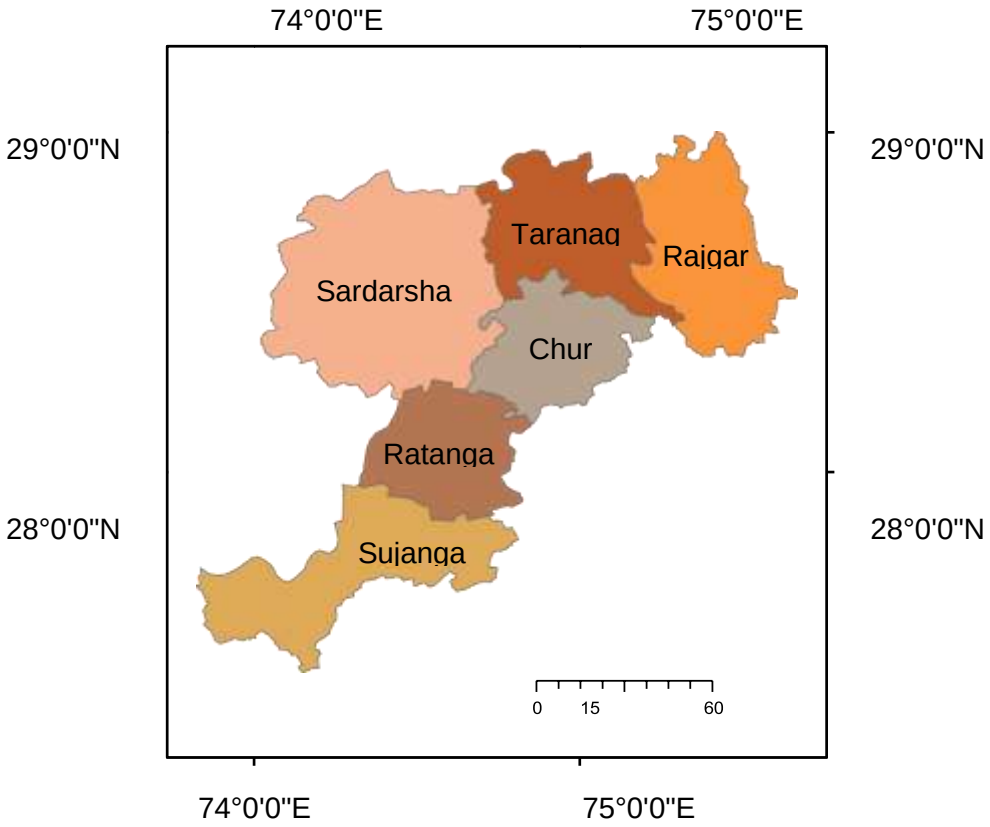
DISTRICT ENVIRONMENT PLAN FOR CHURU



Submitted By:
Shri Sanwar Mal Verma, IAS
District Collector and District Magistrate
Churu, Rajasthan, India

Prepared By
Prof. Ajit Pratap Singh
Professor & Dean, Civil Engineering Department
Birla Institute of Technology & Science, Pilani
Rajasthan, India

PREFACE

As directed by the Honorable National Green Tribunal (NGT), District Environment Plan hasbeen prepared for the Churu district by taking into consideration of the current status of various environmental concerns and potential environmental issues required to be addressed keeping in view of desirable planned developmental activities in future. The District Environmental Plan for Churu District is in line with the model District Environment Plan of CPCB, New Delhi. This District Environment Management Plan would play an important role in implementing mitigation measures to minimize adverse environmental impacts associated withdifferent activities.

We are in the 21st century. The population is expanding, the demand for resources is increasing, the climate is changing and the impact of humanity on the earth is increasing day by day. Therewould be daunting challenges for human society and the environment in coming times to facilitate safe, sufficient, and secured resources for all dimensions of life. We have to achievea better quality of life for our growing population sustainably, without compromising the requirements of future generations to achieve the same.

The District Environment Plan is ambitious, though very necessary. The challenges ahead areconsiderable. We must achieve a permanently better standard of living for our growing population without compromising the needs of generations to come. I am sure the "District Environment Plan for Churu District" presented here will be useful in planning and executing various development schemes of the district without compromising environmental quality and will prove an invaluable asset for associated departments/agencies.

I am thankful to the entire team members who have actively participated for their invaluable contribution. I am happy to appreciate the co-operation of the entire District Administration and request that all concerned district officials must act to achieve the targets for maintaining a clean, safe, and secured environment in their respective domains to make this plan a success.

I wish to thank Mrs. Savita Dahiya, DCF, Churu and Nodal Officer & Member Secretary, District Environment Committee, Churu for her active participation, necessary support and overall coordination during preparation of this district environment plan.

I wish to extend our special thanks to Prof. Ajit Pratap Singh, Professor and Dean, BITS Pilani, and his team for accepting the task of preparing the district environment plan for the Churu district. His consistent efforts throughout for preparation of this report are highly appreciated. The plan shall surely prove most fruitful to the people of Churu district.

Churu
June 18, 2021

Shri Sanwar Mal Verma, IAS
District Collector and District Magistrate
Churu, Rajasthan, India

ABOUT THE REPORT

Since the beginning of civilization, human beings have been utilizing natural resources and the environment to fulfil their requirements. Progress towards different sectors, viz., agriculture, manufacturing, mining, infrastructure, transportation, industrialization, and energy production have extremely improved standards of living. However, this has been achieved at a cost to natural resources and environmental systems. Human impacts on the environment accelerated with the advent of the Industrial Age and the subsequent rapid growth of the human population, creating significant areas of resistance between humans and the environment. The quality of the environment has been degrading day by day, forests are replaced with sprawling development; water resources, viz., groundwater aquifers, rivers, lakes, and soil have been contaminating with harmful chemicals; endangered species are becoming extinct.

As the human population increases, so the demand for natural resources increases, and natural systems experience more pressure. These effects will appear in different areas in different ways. By 2050, at least two-thirds of the population will live in cities, putting pressure on urban systems that provide clean water, food, energy, and sanitation. As a result, rapid economic andpopulation growth would threaten to dominate infrastructure and would lead to a sharp increase in pollution as was experienced by the developed world in the early 20th century. We will face new types of challenges - those driven by climate change - that are not equipped to handle existing policies, technologies, and infrastructure.

There is a need to support human and environmental needs while mitigating adverse impacts associated with human activities. Driven by public sentiment in support of protecting natural resources and human health and due to the execution of by-laws aimed at implementing some of the most powerful forms of environmental protection, we have achieved notable successes over the past few decades. However, solutions to the past will not be sufficient to overcome future problems. As humanity faces increasing and diverse challenges, a comprehensive plan needs to be developed at the district level to cover all issues related to the environment of the district.

Such an environment plan at the district level should deal with environmental conservation planning, pollution mitigation, management of wastes, conservation of natural resources including surface water and groundwater, and necessary measures for

ecological balance in a sustainable manner. This plan is also required to restore the ecological balance of all the cities/

districts through smart planning for waste minimization, control of different types of pollution,and intense drive for tree plantation so that we can build a better tomorrow with its unique strengths, inspire and implement visionary solutions, and continue to evolve in order to serve the best interests of people of the district of Churu and the planet.

As directed by the Hon'ble National Green Tribunal (NGT), District Environment Plan has been developed for the Churu district by taking into consideration of the current status of various environmental attributes and probable future environmental issues required to be addressed for future planned developmental activities.

The Environmental Management Plan plays an important role in implementing mitigation measures to minimize adverse environmental impacts on various developmental activities. Wehope that the "District Environment Plan of Churu district" will be useful in planning and executing various development schemes by keeping in view of pressing challenges of differentenvironmental problems of the 21st century and will prove an invaluable asset for different agencies working in this field for the betterment of the Churu district.

Shri Sanwar Mal Verma, IAS, District Collector Churu took special interest to help and guide us to develop district environment plan along with his team of ADMs and Mrs. Savita Dahiya, DCF, Shri Neeraj Sharma, Regional Officer, RSPCB, Sikar, Commissioner-Municipal Council, and all Executive Officers of nine Nagarpalika, Chief Executive Officer, ZillaParishad Churu, Regional Manager, RIICO, Churu, Executive and Assistant Engineers of all concerned Departments, SDMs, Tehsildars, and BDOs. All of them have provided us whole- heartedly with excellent cooperation. At Churu Executive Engineers, AENs & Chemist PHED, Executive Engineers & AENs Irrigation, Deputy Director & AENs Deputy Director & - Assistant Director Agriculture, Senior Hydrogeologist Groundwater, Engineer in Charge, Mining Department, District Statistical Officer, Public Relation Officer, and several officials, agencies personnel have also provided us needed data and extreme support.

We express our extreme gratitude to Shri Sanwar Mal Verma, IAS, District Collector Churu for his keen interest, guidance, and district-level support. Special thanks to the entire team of district administration including Additional District Magistrates, CEO, ACEO, SDMs, Commissioner-Municipal Council, and all E.O.s, Tehsildars, and BDOs,

for their continued excellent support and guidance.

Our most sincere gratitude to Mrs. Savita Dahiya DCF and Member Secretary, District Environment Committee (District Nodal Officer) and Shri Neeraj Sharma, Regional Officer, RSPCB, Sikar for their continued support and necessary help.

Thanks are due to all Irrigation Engineers, PHED - Engineers Watershed Engineers and Zila Parishad/DRDA Engineers, District Senior Hydrogeologist, Deputy Directors Watershed & Agriculture, District Statistical Officer, and Public Relation Officer who cooperated extremelywell and provided us the enormous data freely & happily all through the Study period.

We wish to extend our thanks to those who have helped to prepare this report directly or indirectly.

Last but not least we are thankful to the entire team especially Dr. Harish Pupalla, Assistant Professor, BML University, and my friend who has continuously given his consistent efforts and support throughout for preparation of this report.

The report on ‘District Environment Plan of Churu district’ has been compiled in fifteen Chapters which are described as given below:

Chapter 1 on 'Introduction' addresses background information and aims & objectives of the study. This chapter covers the background of preparation of district environment plan along with the aim, objective & scope of the district environment plan. It also discusses the information on the constitution of the District Environment Committee / District Specific Task Forces for Environment management in context to the Churu district of Rajasthan.

Chapter 2 on 'Brief Profile of the District ' reveals the position of district towns/Nagarpalika along with population statistics.

Chapter 3 on ‘Solid Waste Management’ covers the present scenario of solid waste management of Churu district in general and its status in different urban local bodies (ULBs) particularly. Datasheet duly filled by concerned officials as provided by CPCB for Model DEPs. Finally, it emphasizes the details of action plans along with the actionable points, the present status of implementation, gap to be addressed, and proposed timeline for completion with the financial cost required. The activities are suggested by keeping in view of the future generation of wastes etc. with timelines for completing the

tasks.

Chapter 4 on 'Plastic Waste Management' deals with the present scenario of plastic waste management of Churu district in general and its status in different urban local bodies (ULBs) particularly. Finally, it emphasizes the details of action plans along with the actionable points, the present status of implementation, gap to be addressed, and proposed timeline for completion with the financial cost required. The activities are suggested by keeping in view of the future generation of wastes etc. with timelines for completing the tasks.

Chapter 5 on Construction and Demolition Waste Management' covers the present scenario of construction and demolition waste management of Churu district in general and its status in different urban local bodies (ULBs) particularly. Finally, it emphasizes the details of action plans along with the actionable points, the present status of implementation, gap to be addressed. The activities are suggested by keeping in view of the future generation of wastes etc. with timelines for completing the tasks.

Chapter 6 on 'Bio-Medical Waste Management' deals with the current status of bio-medical waste management in Churu district in general and its status in different urban local bodies (ULBs) particularly. Datasheet duly filled by concerned officials has been presented as per the format prescribed by CPCB for Model DEPs. Finally, it emphasizes the details of action plans along with the actionable points, the present status of implementation, the gap to be addressed. The activities are suggested by keeping in view of the future generation of wastes etc.

Chapter 7 on ‘E-Waste Management' mainly deals with the current status of E-waste management in Churu district in general and its status in different urban local bodies (ULBs) particularly. Datasheet duly filled by concerned officials has been presented as per the format prescribed by CPCB for Model DEPs. Finally, it emphasizes the details of action plans along with the actionable points, the present status of implementation, gap to be addressed, and proposed timeline for completion with the financial cost required.

Chapter 8 on ‘Hazardous Waste Management’ has dealt with the current status of the production of hazardous waste in the district. The only notable industry is the Indian Oil corporation which runs as the LPG bottling plant and generates waste oil from DG cells in Churu. From the collated information, it is observed that no potential hazardous waste is emitted from this plant. Since no hazardous waste is being emitted, no essential resources

are required for the mitigations activities.

Chapter 9 on 'Water Quality Management Plan' deals with the current status of water management in Churu district in general and its status in different urban local bodies (ULBs) particularly. Datasheet duly filled by concerned officials has been presented as per the formatprescribed by CPCB for Model DEPs. Finally, it emphasizes the details of action plans along with the actionable points, the present status of implementation, gap to be addressed, and proposed timeline for completion. The activities are suggested by keeping in view of the future generation of wastes etc. with timelines for completing the tasks embodies, in short, the waterpolicy matters and litigation factors.

Chapter 10 on ‘Domestic Sewage Management Plan’ & Industrial Waste Management Plan' isa comprehensive account of 'Domestic Sewage & Industrial Waste Management in Churu district. It includes the details of ULB-wise sewage generation, treatment capacity available and treatment capacity utilization, sewerage connectivity, the gap of treatment. The relevant information related to the functioning status of the treatment plant (if exists) and effluent discharge standards used and efficiency of plants are also included. Datasheet duly filled by concerned officials has been presented as per the format prescribed by CPCB for Model DEPs. Finally, it emphasizes the details of action plans along with the actionable points, the present status of implementation, gap to be addressed, and the proposed timeline for completion of therelevant tasks.

Chapter 11 on ‘Air Quality Management Plan' deals with the Status and Inventory of Air Quality Management in the Churu District along with a brief insight on each of the air pollutants. From the collected information, it has been identified that Small Scale units especially stone crushers and mining activities along with Brick Kilns are the major sources ofair pollution in the Churu district. However, emissions from the majority of the industries havebeen found within the permissible limits.

Chapter 12 discusses on ‘Mining Activity Management Plan'. Churu district is rich in mineralresources. Churu is fairly endowed with various minerals whose industrial use has immenselycontributed to the economy of the district.

Chapter 13 on 'Noise Management Plan' deals with the Status and Inventory of noise pollutionin Churu District. Though the study found that the noise level in all the measured locations is within the acceptable limits i.e., 85dBA, drawing conclusive remarks regarding the noise level in the Churu district may not be credible. Therefore, there is a

need to conduct studies at multiple critical locations in the Churu district.

Chapter 14 on ‘Forest Conservation Practices’ covers the general information regarding typesof forest found in Churu district, forest land, the current management practices being adopted.The threats to forest/forest land in context to this district have also been identified and discussed. Finally, different afforestation activities proposed in forest land, as well as city/townarea, are listed along with brief action plans.

Chapter 15 on 'Rural Environment Management Plan' is a comprehensive account of differentaspects of the environment in rural areas of the district.

June 18, 2021

Pilani

Prof. Ajit Pratap Singh
Professor and Dean
Civil Engineering Department
BITS Pilani

Contents

CHAPTER 1: INTRODUCTION

This Chapter covers the background of preparation of district environment plan along with itsaim, objective & scope of the district environment plan. It also discusses about the information on constitution of District Environment Committee / District Specific Task Forces for Environment management in context to **Churu district of Rajasthan**.

1.1 Background of Preparation of District Environment Plan:

Hon'ble National Green Tribunal, New Delhi has passed an order on 15-07-2019 in O.A. No. 710/2017 titled as Shailesh Singh Versus Sheela Hospital and Trauma Centre Shahjahanpur that it is necessary to have a District Environment Plan to be operated by the District Committeeand further vide order dated 26-09-2019 in O.A. No. 360 of 2018 filed by Shree Nath SharmaVs Union of India and others directed that CPCB shall facilitate the District Magistrates in preparation of District Environmental Plan by placing Model plan on its website. This model plan may be adopted as per local requirements by all District under supervision of District Magistrate.

In the above said order, it is stated that among others

"Chief Secretaries may personally monitor compliance of environmental norms (including BMW Rules) with the District Magistrate once every month. The District Magistrates may conduct such monitoring twice every month.

"We find it necessary to add that in view of Constitutional provisions under Articles 243 G, 243 W, 243 ZD read with Schedules 11 and 12 and Rule 15 of the Solid Waste Management Rules, 2016, it is necessary to have a District Environment Plan to be operated by a District Committee (as a part of District Planning Committee under Article 243 ZD) with representatives from Panchayats, Local Bodies, Regional Officers, State PCB and a suitable officer representing the administration, which may in turn be chaired and monitored by the District Magistrate. Such District Environment Plans and Constitution of District Committee may be placed on the website of Districts concerned. The monthly report of monitoring by theDistrict Magistrate may be furnished to the Chief Secretary and may be placed on the websiteof the District and kept on such websites for a period of one year. This may be made

operative from 1.08.2019. Compliance of this direction may also be seen by the Chief

Secretaries of the States/UTs. This may not only comply with mandate of law but provide an institutional mechanism for effective monitoring of environment norms."

Keeping in view of above facts, it has been planned to prepare the Environment Development Plan of **Churu District** in such a way so that District environment plan not only outline the present status and gaps in implementation but also identify agencies responsible, requirement of infrastructure facilities for sewage treatment, waste management, monitoring environmental quality etc. It should also provide timelines for implementation, identify local issues, constraints in implementation, priority action areas and issues requiring more attention.

Based on the District Environment Plans, State Environment Plans and National EnvironmentPlan shall be prepared. It is required to ensure that information pertaining to all District Environment Plans is captured into State Environment Plans and National Environment Plan.

1.2 Aim, Objective & Scope of the District Environment Plan

The aims and objectives of this District Environment Plan (DEP) are set as given below:

- To ensure conservation of environment and natural resources at district level.
- Restore ecological balance.
- To achieve the Sustainable Development Goals (SDGs) and district level targets withinthe prescribed timeline.
- To ensure sustainability at district level following the principles of resource efficiency.
- To ensure decentralized micro level planning, execution and monitoring regardingenvironment conservation.
- To incorporate all facets of environmental conservation in micro level planning.
- To harness active participation of all stakeholders in planned environment conservationactions.
- Assess, Mitigate and monitor adverse impacts of various pollution sources at districtlevel.
- Capacity building of stakeholder, department, agencies, organizations and individuals at district level to understand and implement micro level environmental conservation actions.

- To harness inter-departmental coordination for implementation of action plans.
- To develop local knowledge centres and expertise for developing environmental conservation strategies at district level.
- To develop and implement micro monitoring system at district level.

1.3 Honourable N.G.T. Directions (Important NGT/Supreme Court/ High Court Cases on Environment Management (e.g., OA 673/2018; OA 681/2018/ OA 606/2018, etc.)

a. Hon'ble NGT in the last one year has issued several directions in various matters which have been based on status brought out by the CPCB on their website and status reports filed before the Tribunal.

b. As per honorable NGT order dated 15.07.2019 in O. A. No 710-713/2017, O.A. No. 606/2018, it is the duties and responsibilities of various stakeholders to make the solid waste management plan a successful and implementable action.

c. Thereafter, vide order dated 26.09.2019 in the present matter, it was observed: - (i)"This Tribunal in O.A. No. 606/2018, while dealing with the compliance of Municipal Solid Waste Management Rules, 2016 also flagged other issues and required monitoring at the level of the Chief Secretaries and the District Magistrates. The Chief Secretaries of all the States/UTs have appeared before this Tribunal, including the Chief Secretary of State of Rajasthan and directions have been issued for continuous monitoring and filing of further reports. (ii) Vide order dated 12.09.2019, while fixing a schedule for further appearance of the Chief Secretaries of all the States/UTs, direction has been issued to compile information with reference to the following specific thematic areas viz.:

    - Compliance to Solid Waste Rules including Legacy Waste.
    - Compliance to Bio-medical Waste Rules.
    - Compliance to Construction & Demolition Waste.
    - Compliance to Hazardous Waste Rules.
    - Compliance to E-waste Rules.
    - 351 Polluter Stretches in the country.
    - 122 Non-attainment cities.
    - 100 industrial clusters.
    - Status of STPs and re-use of treated water.

- Status of CETPs/ETPs including performance.
- Ground water extraction/contamination and re- charge.
- Air pollution including noise pollution.
- Illegal sand mining.
- Rejuvenation of water bodies.

d. Hon'ble National Green Tribunal (NGT) has ordered Pan-India Directions on various issues relating to environment management and these are to be executed by the Central and State Governments and concerned institutions. Further, the Directions are required to be executed at District Level covering all cities, towns and villages.

e. The role and responsibilities of enforcement are with District Collectors/Magistrates, Pollution Control Boards, Municipal Bodies, Public Health Engineering Departments and others.

f. The present state level execution and monitoring mechanism on various State and Central Government's Schemes are monitored by Chief Ministers/ Chief Secretarieswith DMs/DCs.

g. Various Directions of NGT to be covered in District Environment Management Plan (DEMP).

h. Information about any District Specific case (if any) and Committee/Task Force Constituted has also been discussed.

1.4 Information about Constitution of District Environment Committee / District SpecificTask Forces for Environment management

In view of these directions, District collector of Churu letter no. **40(18) () General/EC/2019/03 to 24**/ dated **01.01.2021** and Letter no. 40(18) () General/EC/2019/164 dated 09.04.2019 constituted District Environment Committee with representatives from Village Panchayats, Municipal Councils, Regional Offices, Rajasthan State Pollution Control Board, Department of Environment and an officer representing the administration for preparing District Environment plan. Prof. Ajit Pratap Singh, BITS Pilani has been given the work of preparation

of the District Environment Plan in association with **Ms. Sabita Dahiya, DCF, Churu and R.O., RSPCB, Sikar and Executive Officers of respective Nagar Palika, etc.**

As per the OA no. 360/2018 titled as Shree Nath Sharma V/s Union of India, the Hon'ble

NGT vide order dated 26.09.2019 has directed to constitute District Environment Committee for preparation and monitoring of District Environment Plan. Accordingly, District Environment Committee was constituted with representatives from Panchayats, Local Bodies, Regional Officer, Rajasthan State PCB and all concerned officials representing the district administration, in compliance to the said orders of the Hon'ble NGT. This District Committee has been chaired and monitored by the **Churu District Magistrate**. The District Level Environment Committee constituted by the District Collector, Churu, which is given in **Table1.1**:

Table 1.1. District Environment Committee – Churu District

S. No.	Name	Designation
1.	District Collector and District Magistrate, Churu	Chairperson
2.	Superintendent of Police, Churu	Member
3.	Chief Executive Officer, Zilla Parishad, Churu	Member
4.	Chief Medical Officer, Ratangarh	Member
5.	Commissioner, Nagar Parishad Churu	Member
6.	Regional Officer, RSPCB, Sikar	Member
7.	Regional Manager, RIICO, Churu	Member
8.	General manager, District Industries Center, Churu	Member
9.	Deputy Director, Agriculture, Churu	Member
10.	Executive Engineer, Water Resources Department, Taranagar	Member
11.	Superintending Engineer, Water Resources Department, Sikar	Member
12.	Superintending Engineer, Public Health Engineering Department, Churu	Member
13.	Scientist, Groundwater Department, Churu	Member
14.	District Transport Officer, Churu	Member
15.	Distict Education Officer, Primary and Secondary Education, Churu	Member
16.	Inspector, factory and boilers department	Member
17.	Two experts from District (Nominated by the State Government)	Member
18.	Ms. Sabita Dahiya, DCF, Churu	Member Secretary and Nodal Officer

Different meetings of the District Environment Committee were held from time to time (e.g. 17/02/2021, 09/04/2021, etc.) to formulate the District Environment Plan for Churu District. The responsibility of all respective officials and every Municipal councils/Nagarpalika or Village panchayat were fixed. The details regarding various functions of the DEC, powers of the DEC and reports to be submitted by the DEC have also been notified. Subsequently, questionnaire forms have been prepared to get authentic data in line with the model District Environment Plan (DEP) of CPCB and floated among all concerned representatives at variouslevels. They have been asked fill the questionnaire by providing their response for specific datacovering following seven thematic areas.

- Waste Management Plan
    - Solid Waste Management Plan
    - Plastic Waste Management
    - C&D Waste Management
    - Biomedical Waste Management
    - Hazardous Waste Management
    - E-Waste Waste Management
- Water Quality Management Plan
- Domestic Sewage Management Plan
- Industrial Wastewater Management Plan
- Air Quality Management Plan
- Mining Activity Management plan
- Noise Pollution Management Plan
- Conservation of Water bodies
- Prevention of Illegal sand mining
- Environment Threats
- Soil and Agriculture Land

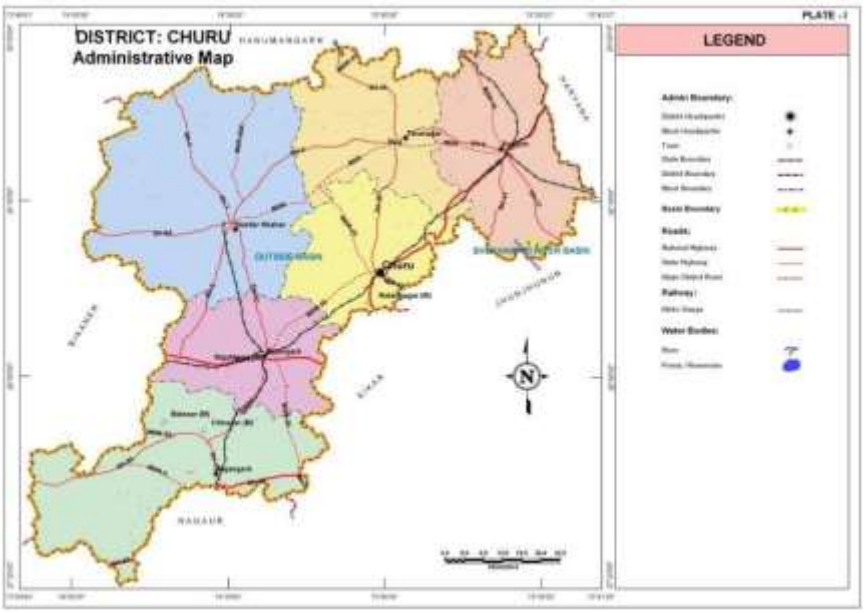
The awareness about preparation of District Environment Plans among the stakeholders of each department were created in a time bound manner and action plans formulated to implement it.

CHAPTER 2: BRIEF PROFILE OF THE DISTRICT

2.1 Administrative Profile of District

Recognized as an entry gate to the great Thar Desert, Churu is located in the desert area of Rajasthan. The district is located in the eastern Rajasthan between 27º 24' to 29º 00' North latitude and 73º 40' to 75º 41' East longitudes. It is bounded by Sri Ganganagar and Hanumangarh districts in the North, by Sikar and Jhunjhunu and Hissar district of Haryana in the East, by Nagaur in the South, and in the West by Bikaner. Churu, like an oasis, situated in the middle of the shifting golden sand dunes, opens the gate to the great desert of Thar. The total area of the district is 13,85,898 hectares. It is occupied nearly

4.92 percent of the area of the state and stands eighth in respect of area amongst the district of Rajasthan. The district covers 6 Tehsils Churu, Ratangarh, Taranagar, Rajgarh, Sardarshahar, and Sujangarh. The major attractions of the Churu district are its Havellies. The district does not have a properly evolved drainage system, except for a negligible part in the east which is part of Shekhawati River Basin, almost the whole of the district is part of an 'Outside' Basin. Figure 2.1 describes the current



map of the Churu district.

(**Source**: Ground water department, Rajasthan)

Figure 2.1. District map of Churu

2.2 Physiography

Churu district is located very near to northern extension of Aravalli hills which is trending NE-SW direction and rising to a maximum height of about 500 m above mean sea level in the area adjoining to district boundary. However, the major part of the district is covered with an extensive blanket of sand, through which low-lying isolated hill rocks of hard rock occur. Thesand dunes which are mostly of settled nature and interdunal hallows form undulating topography. The regional trend of these sand dunes are along NE-SW or NNE-SSW direction.The district has a gentle slope towards north or north-west, with the highest and lowest altitude being over 500 m and less than 230 m respectively above mean sea level.

2.3. Topography

District Churu is a part of the Great Indian Thar Desert. The surface is covered with sand and characterized by dunes. The general topography is almost an undulating plain area except for some hillocks in the south. The district is part of Outside Basin and its small part is coming under the Shekhawati River basin. The general topographic elevation in the district is between 250 m to 300 m above mean sea level. Elevation ranges from a minimum of 199.2 m above mean sea level in Rajgarh block in the north-eastern part of the district and a maximum of
470.7 m above mean sea level In Sujangarh block in the southern part of the district. Figure 2.2presents the spatial variation of topography over the entire district of Churu.

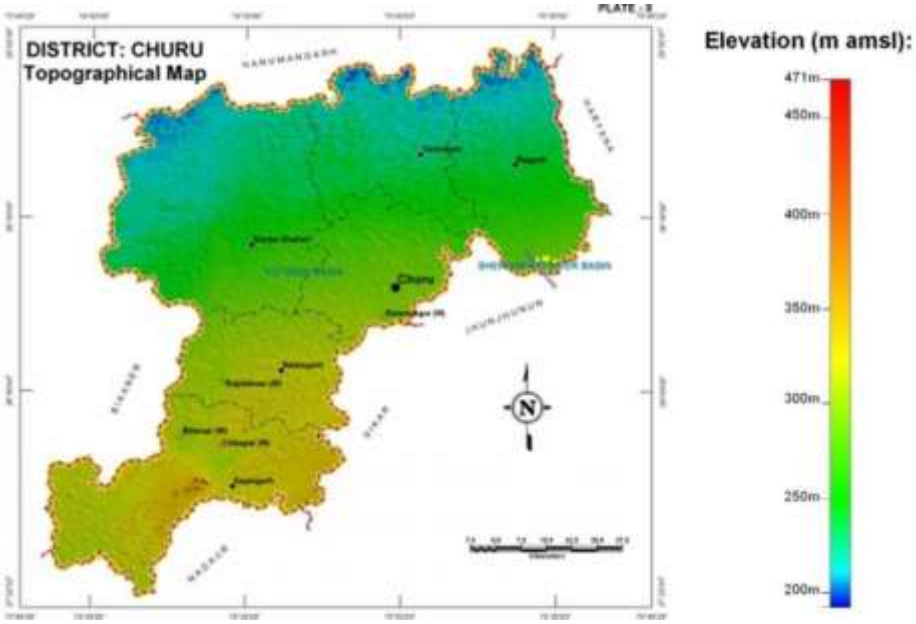


Figure 2.2. Spatial variation of elevation in the Churu district

The block-wise statistics related to topography are presented in **Table 2.1**.

Table 2.1. Block wise minimum and maximum elevation

S. No.	Block name	Minimum Elevation	Maximum Elevation
1.	Churu	233.6	322.4
2.	Rajgarh	199.2	301.1
3.	Ratangarh	274.7	366.9
4.	Sardarshahar	200.0	311.1
5.	Sujangarh	287.0	470.7
6.	Taranagar	200.0	281.8

2.4. Drainage

There is no major river system in the district, except for a few short, intermittent and ephemeral channels. The largest drainage course is the Kantli river which enters the district in the south- eastern side from Jhunjhunu district and disappears near Rajgarh, discharging storm runoff only in the period of high rainfall.

Recent studies of Landsat imageries have revealed the extension of the present course of Kantliriver, north of Rajgarh, up to the district border, from where it has taken westward swing. Themosaic of Landsat imagery has also indicated frequent shifting of the Kantli river course from eastward to the present situation which probably joined the river Saraswati course, passing from the nearby area in recent time.

2.5. Geology and Soil

The whole central and northern part of the district is occupied with primarily eolian sand and partly by fluvial deposits. The southern part of the district has some exposures of hard rock covered by Marwar Super Group which includes the rock formation of sandstone, shales, and limestone. The small south-western part of the district, in Sujangarh block, occupies Erinpura granite & gneiss. **Table 2.2** presents the different formations encountered in the Churu district.

The northern part of the district is covered with sand dunes while the southern part is occupiedby desert soils. The desert soils are usually light yellowish-brown to yellowish-brown, calcareous sands with little clay. Their hydraulic conductivity goes up to 13.6 cm/h, while theminimum available moisture recorded was 1.1 percent. The large fine sand

fraction reflects their being mainly of Aeolian origin.

Table 2.2. Formations encountered in the Churu district

Super Group	Group	Formation
	Recent to sub-recent	Wind-blown sand and older alluvium
Unconformity		
	Palaeocene	Gravel Beds, Claystone, Shale and Sandstone
Marwar	Nagaur, Bilara, and Jodhpur	Nagaur Series (Sandstone, Shales, Evaporite sequence), Bilara formation (Limestone & Shales), Jodhpur formation (Sandstone & Shales)
Delhi		Schists and Quartzite's

The other kinds of soil occurring in the district are red desert soils and saline soils of the depression. The red desert soils occupy a narrow belt in the southern and western parts of the district (south of Sardarshahar and around Ratangarh). They are typically deep brown, non- calcareous, loamy sands and sandy loams, partially derived from sandstone and alluvial deposits. The hydraulic conductivity of the profile examined near Fatehgarh ranged from 0.5 to 2.5 Cm/h. Minimum available moisture recorded 1.38 percent. The saline soils are found inlow interdunal areas and areas of fine texture. Generally, they are saline or sodic having low permeability value and impeded drainage.

2.6. Geomorphology

The description of the geomorphological units that are encountered in the district is given in **Table 2.3** and the spatial distribution of these geomorphological units is presented in **Figure 2.3.**

Table 2.3. Description of geomorphological units of Churu district

Origin	Landform Unit	Description
Aeolian	Dune Valley Complex	The cluster of dunes and interdunal spaceswith undulating topography formed due to wind-blown activity, comprising of unconsolidated sand and silt.
	Eolian Plain	Formed by aeolian activity, with sand dunes of varying height, size, and slope. Long stretches of the sand sheet. Gently sloping flat to undulating plain, comprised of fine tomedium-grained sand and silt. Also scattered xerophytic vegetation.
Origin	**Landform Unit**	**Description**
	Eolian Plain (Reclaimed)	Gently sloping with a sheet of sand or sand dunes, scattered xerophytic vegetation.
	Interdunal Depression	Slightly depressed area in between the dunalcomplex showing moisture and fine sediments.
	Sandy Plain	Formed of aeolian activity, wind-blown sandwith gentle sloping to undulating plain, comprising of coarse sand, fine sand, silt and clay.
Denudational	Buried Pediment	Pediment covers essentially with relativelythicker alluvial, colluvial or weathered materials.
Fluvial	Alluvial Plain (Sandy)	Flat to gentle undulating plain formed due tofluvial activity, mainly consists of gravels, sand, silt and clay with unconsolidated material of varying lithology, predominantly sand along the river.

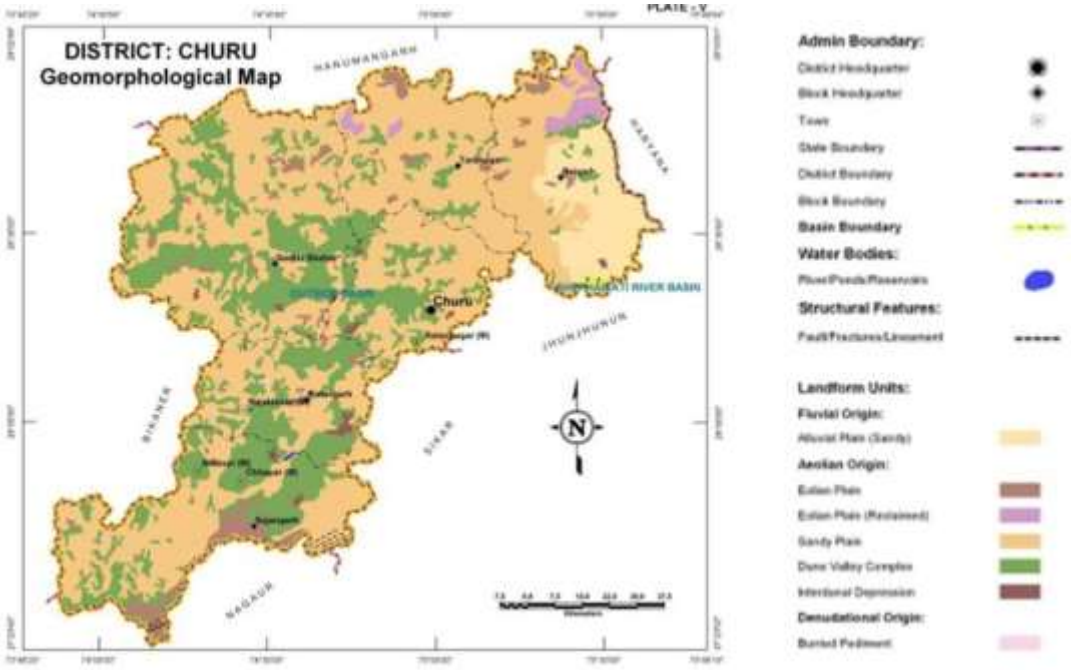


Figure 2.3. Spatial variation of Geomorphological units in the Churu district

2.7. Irrigation

The principal means of irrigation in the district are wells though the small area is irrigated by tanks also. Groundwater plays an important role in irrigation and is utilized through dugwells, dug cum bored wells, and tube wells.

2.8. Administrative setup

The Churu district presently composed of six sub-divisions viz., Churu, Ratangarh, Rajgarh, Sujangarh, Sardarshahar & Taranagar, intending to have better control and smooth working thesub-division have divided into six Tehsil and six Panchayat Samities. There are also 10 towns, 857 numbers of inhabited, and 55 uninhabited villages in the district.

2.9. Connectivity

Air: The nearest airport is in Jaipur (206 Km.). Rail: Churu district is served by meter gauge lines of Northern and Western Railways. Road: Churu district is well connected by roads with important destinations of the state. The National Highway No.11 (Agra-Bikaner) passesthrough the district.

2.10. Aquifers

Water-bearing formations in the Churu district range from unconsolidated alluvium to semi consolidated sandstones and consolidated schistose rocks. The older and younger alluvium constituted primarily sand of windblown and fluvial origin forms aquifers covering 71% of the district area. Next, the most prominent aquifers in the district are sandstones (17.5%) followed by schist (6.8%) and limestone (4.7%) aquifers. The hardrock aquifers are prominent in the southern and partly in the western part of the district. The description of each occurrence and the aerial extent of each zone is presented in Table 2.4.

Table 2.4. Description of aquifer units encountered in Churu district

Aquifer in Potential Zone	Area (sqkm)	% age of district	Description of the unit/Occurrence
Younger Alluvium	1,976.7	14.3	It is largely constituted of Aeolian and Fluvial sand, silt, clay, gravel and pebbles in varying proportions.
Older Alluvium	7,854.0	56.7	This litho unit comprises of a mixture of heterogeneous fine to medium- grained sand, silt, and Kankar.
Bilara Limestone	655.0	4.7	It is grey to buff coloured hard and compact.
Nagaur & Jodhpur Sandstone	2,415.1	17.5	Buff to reddish-brown in colour, fine to medium grained hard and compact sandstone.
Schist	943.2	6.8	Medium to fine grained compact rock. The litho units are soft, friable and have closely spaced cleavage.

2.11. Stage of ground water development

Apart from the Taranagar block which is completely saline, the rest of the five blocks fall into different categories of the stage of groundwater development as shown in Table 2.5. While Sardarshahar is within the 'Safe' category the Sujangarh and Rajgarh blocks are in the 'Over Exploited' category warranting the need for conservation measures.

Table 2.5. Categories of blocks based on the groundwater development in Churu

Categorization on the basis of stage of development of ground water	Block Name
Safe	Sardarshahar
Semi-Critical	Ratangarh, Churu
Over Exploited	Sujangarh, Rajgarh
Saline	Taranagar

More insight on the ground water quantity and quality based on the water samples collected inthe borewells of the district is expounded in **Chapter 9**. For better visualization of the variation,thematic maps have been developed and presented which are further used in drawing the conclusion and the management plans.

2.12. Closure

As per Hon'ble NGT Order dated 26/09/2018 in O.A 360/2018, inventories have been generated for twelve ULB's of the Churu District, format developed by CPCB "O.A 360 NGT District information plan.xlsx. The data used for preparing District Environment Plan is basedon the data provided by all representatives of ULB's in the format given by CPCB, as well as data accessed from relevant state web portals i.e. Department of Mines and Geology, Central Ground Water Board, Ministry of micro small and medium enterprises, Environment Department of Rajasthan, Rajasthan State pollution control board (RSPCB), Rajasthan State Industrial Development & Investment Corporation, Churu District Collectorate, Ministry of Water Resources, River Development and Ganga Rejuvenation.

Documents referred for the preparation of DEP include state sewerage and wastewater policy,Reports of MSME-Development Institute, Hydrological atlas of Rajasthan, Reports of the industrial potential survey, reports of aquifer mapping and groundwater management by CGWB Rajasthan, Groundwater brochure of the Churu district.

The representatives of each urban local body (ULB) have been contacted for the information related to seven thematic areas such as Waste Management Plan, Water Quality Management Plan, Domestic Sewage Management Plan, Industrial Wastewater Management Plan, Air Quality Management Plan, Mining Activity Management plan, Noise Pollution Management Plan. Besides the attributes of each ULB, population details as per the 2011 census are also collected. Because of urbanization, the population of each ULB is projected and is used in preparing the action plans.

The questionnaire floated and the duly filled formats from all the twelve ULB's are appendedand the outcomes of the inventory are discussed in the subsequent Chapters.

CHAPTER 3: SOLID WASTE MANAGEMENT

This Chapter covers the present scenario of solid waste management of Churu district in general and it's status in different urban local bodies (ULBs) particularly. Datasheet duly filled by concerned officials as provided by CPCB for Model DEPs. Finally, it emphasises the details of action plans along with the actionable points, the present status of implementation, gap to be addressed, and proposed timeline for completion.

3.1 Present status of solid waste management

Solid waste management is one of the most important services for maintaining the quality of life in urban as well as rural areas and for ensuring better standards of health and sanitation. Due to the rapid growth in the population of India, this service falls short of the desired level as the systems adopted are inefficient. Institutional weakness, shortage of human and financial resources, improper choice of technology, inadequate coverage, and lack of short- and long-term planning are responsible for the inadequacy of services.

Solid wastes, which include bio-medical, municipal and hazardous wastes is a major concern and an eyesore in urban areas. The unregulated disposal of wastes may affect the quality of groundwater in the area through the infiltration of water-soluble substances.

Rajasthan solid waste management policy has been notified by the Government of Rajasthan in the year 2019. The proposed policy on Solid Waste Management (SWM) in Rajasthan is in line with the SWM Rules, 2016 and provides a comprehensive vision for SWM, enabling frameworks and strategies to manage the challenges of SWM in Rajasthan. The policy provides a stimulus to the waste management economy, and promotes environmental up-gradation.

This Policy acts as a key instrument in highlighting the vision and strategic goals of the State Government for the development of solid waste management in a sustainable manner. It lays down a detailed roadmap of reduction, reuse, and recycling of waste through innovative technology, consumer service, and education for envisioning the environmental, social, cultural, economic, and technological, and public health concerns. Management of solid waste is a larger challenge not only because of its adverse health and environmental impacts but also due to huge

quantities of waste generated. Most Urban Local Bodies (ULBs) lack the capability to handle such huge quantities of solid waste due to financial and institutional frailty. Local authorities struggle from insufficient funds, resources, infrastructure, and appropriate strategies to improve solid waste management.

The Government of Rajasthan intends to adopt the 5R approach (Reduce, Reuse, Recycle, Recover and Remove) by imparting thrust on collection, segregation, improving data and analytics,minimizing environmental impacts, creating a market for recyclable products, and aiming towards sustainable development. The SWM plan should consider a long-term planning horizon of 20–25 years. Short-term implementation plans covering 5 years each should be slotted within the long- term plan for ease of implementation. The short-term plan should be reviewed and updated once every year for any midcourse correction as required. Local bodies should ensure that the short- term plan is aligned with long-term planning and implementation. The SWM plan should be according to the SWM Rules 2016.

As per the Solid Waste Management Rules, 2016, the urban local authorities themselves have responsibilities in managing solid waste in their jurisdictions. Churu comprises 10 urban local bodies (ULB's) where the generation of solid waste is predominant. These are Churu, Bidasar, Chhapar, Rajaldesar, Rajgarh, Ratangarh, Ratannagar, Sardarsahar, Sujangarh, Taranagar. Relevant data were collected from these ULBs in the model format in MS Excel. Data were authenticated and were analyzed. The data obtained from the local municipalities is shown in **Table 3.1** below:

Table 3.1: Quantity of solid waste generated by each ULB

ULB	Name	Population as per2021	Quantity in [MT/day]	As per the standards [MT/day]
ULB1	Nagar Parishad Churu	137071	52.73	54.82
ULB2	Nagar Palika Bidasar	41787	16.0	16.71
ULB3	Nagar Palika Chhapar	22260	6.0	8.90
ULB4	Nagar Palika Rajaldesar	31056	6.0	12.42
ULB5	Nagar Palika Rajgarh	68197	24.0	27.27
ULB6	Nagar Palika Ratangarh	81029	36.3	32.41
ULB7	Nagar Palika Ratannagar	14755	6.89	5.90
ULB8	Nagar Palika Sardarsahar	111447	28.81	44.57
ULB9	Nagar Palika Sujangarh	117136	38.84	46.85
ULB10	Nagar Palika Taranagar	38729	14.0	15.49

Note: Population of 2021 is obtained by projecting the historic trends

3.1.1. Status of solid waste management in the Churu district

As per the data provided by the representatives of each ULB, it is observed that a total of 245.5 metric tons of solid waste is generated every day. On average, the typical composition of wet wasteis around 54% and dry waste is 46%. Further, the average per capita waste generation is around 413 grams per day. This observation is in line with the conclusion i.e., it is estimated that solid waste generated in small, medium, and large cities/ towns are 0.1 Kg, 0.3-0.4 Kg, and 0.5 Kg per capita per day respectively as specified by the Central Pollution Control Board (CPCB) New Delhi. An interesting observation has been made from the data interpretation. As evident from **Table 3.1**, the actual total solid waste that is being generated is close to the typical observation by CPCB. However, a substantial deviation is observed in the case of Rajaldesar, and Sardarsahar.

Besides solid waste generation, notable quantities of waste are being generated through street sweeping in Nagar Palika Churu (ULB-6). Additionally, notable quantity is being generated in allother ULB's.

Authorities of Churu have strictly adhered to the guidelines of Rajasthan Solid Waste Management Policy and Strategy, 2019 and have been attempting to collect the waste. The door-to-door waste collection system is efficiently operational in Churu. From the data collected from Executive officers and Junior engineers, it is observed that in all the ULB's, the exercise of door to door waste collection is successfully implemented except in Chappar where the collection is achieved 90%. In rural areas, the collection is expected to be achieved between 45 to 60%.

As per the guidelines of Rajasthan solid waste management policy and strategy, 2019 waste segregation is in practice. Attempts have been made to collect wastes by segregating wet and drywaste separately. The wastes have been collected twice a week. However, segregation at the source is quite challenging and it has to be practice in a much more effective and efficient way. The frequency of door-to-door collection among the ULB is strongly correlated with the density of population, collection system, and climatic conditions. The waste thus collected is finally transferred to the solid waste dumping sites. A geotagged image of the solid waste dumping site of Sujangarh is shown in **Figure 3.1**. For a better understanding of

the correlation between the population and solid waste generated, transient images have been accessed from Google earth as

shown in **Figure 3.1**. From **Figure 3.1**, it is evident that the dumping site is constructed recently and it is anticipated that the generation of solid waste is increasing over the years which is obvious.However, the concern to be noted here is the need to identify the localities for dumping the waste strategically as the population of each ULB is expected to grow over the years. Similar inferences can be drawn from **Figures 3.2 to Figure 3.8** for different ULBs e.g., Bidasar, Chappar,Rajaldesar, Ratangarh and Churu.

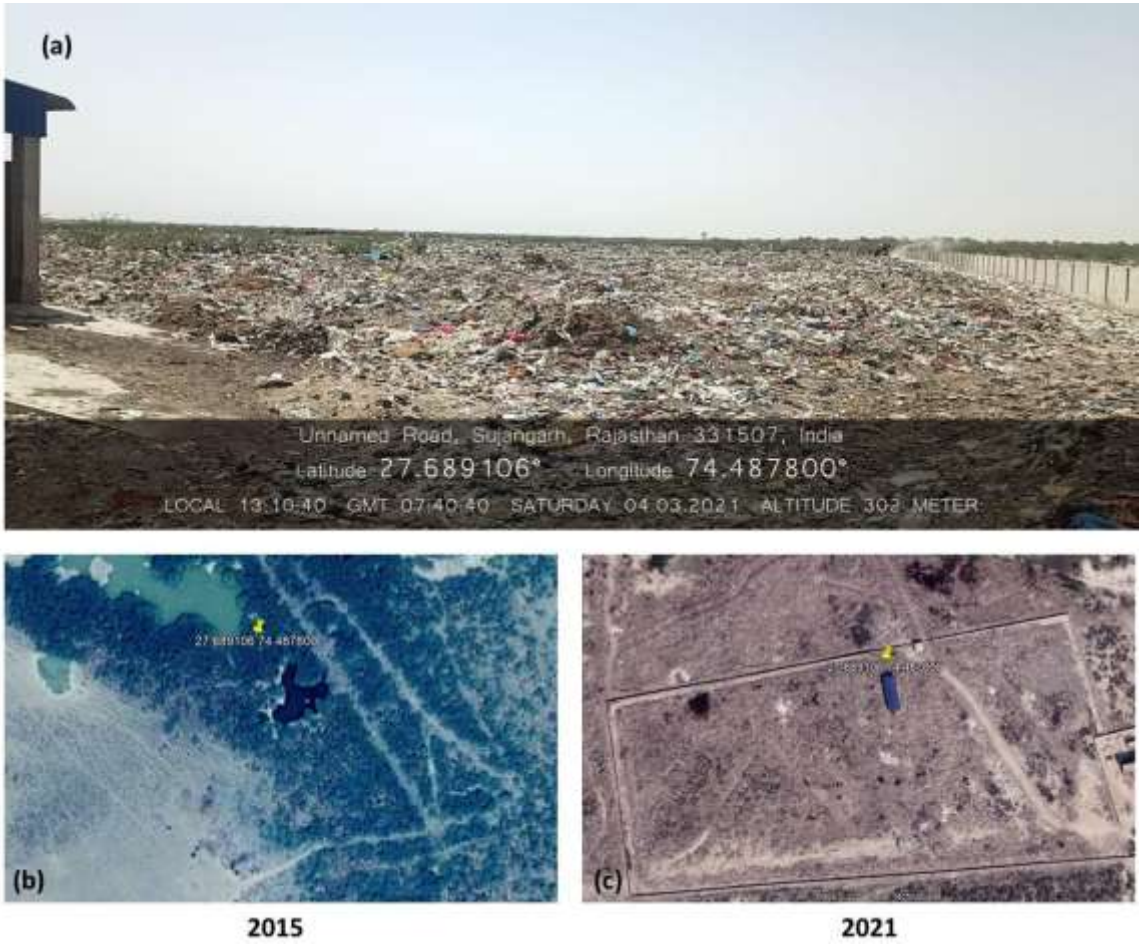


Figure 3.1(a). Field view of solid waste site of Sujangarh, Churu on 04-03-2021, **(b)** Satelliteview of a landfill site in the year 2015, **(c)** Satellite view of a landfill site in the year 2021.

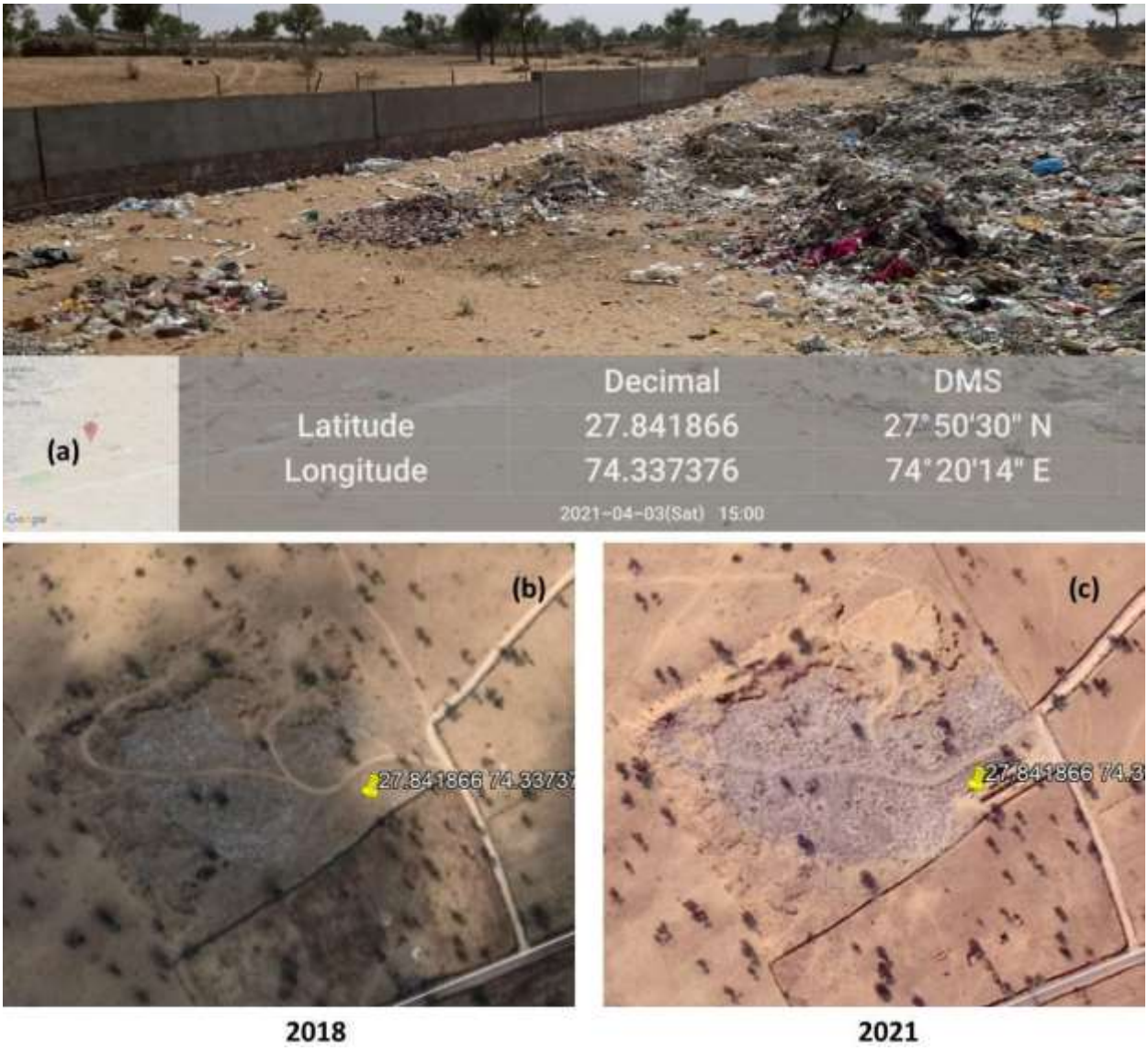


Figure 3.2. (a) Field view of solid waste site of Bidasar, Churu on 03-04-2021, **(b)** Satellite viewof landfill site in the year 2015, **(c)** Satellite view of landfill site in the year 2021.

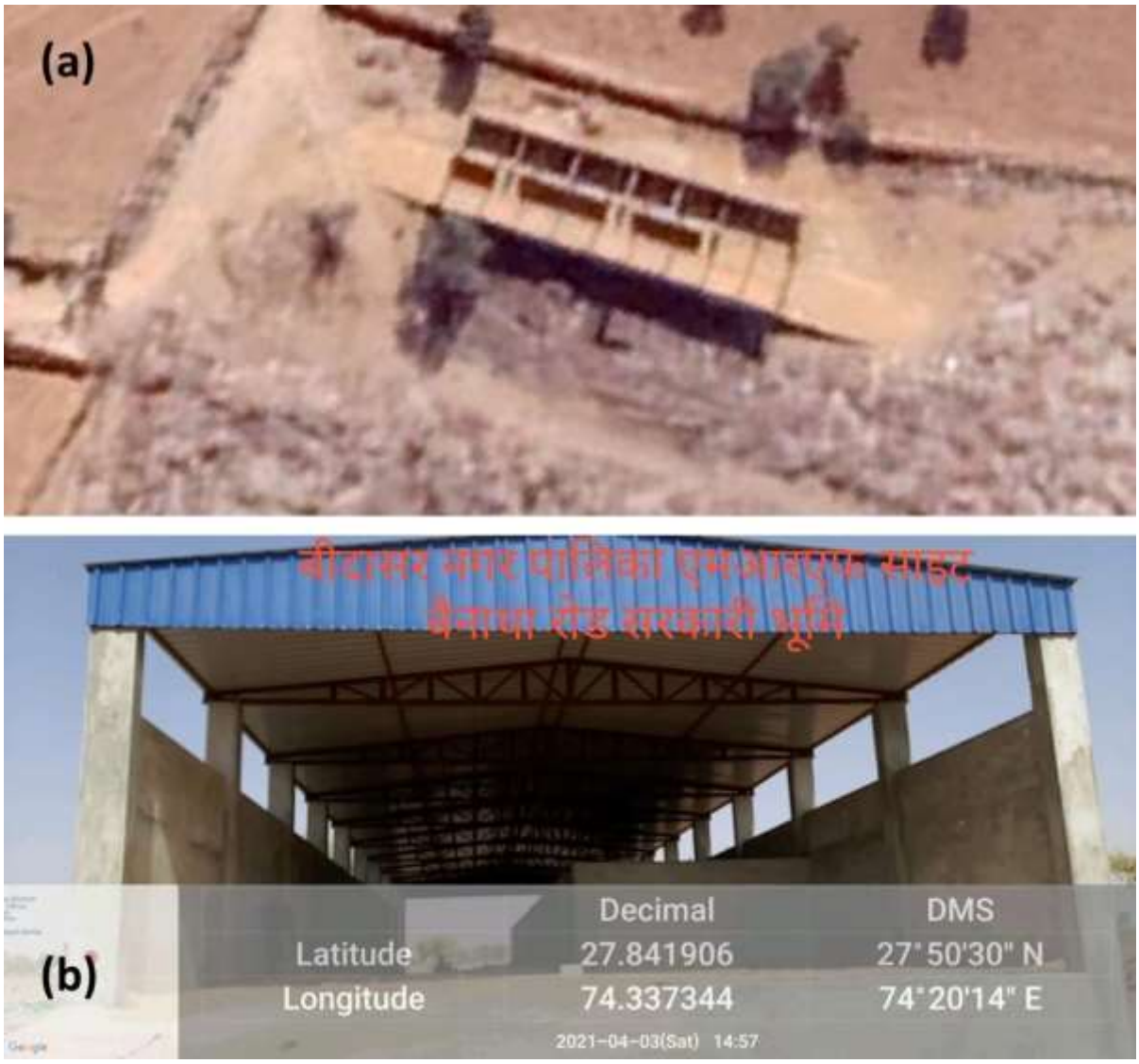


Figure 3.3. (a) Satellite view of MRF facility at Bidasar, (b) Field view of solid waste site of Bidasar, Churu district.

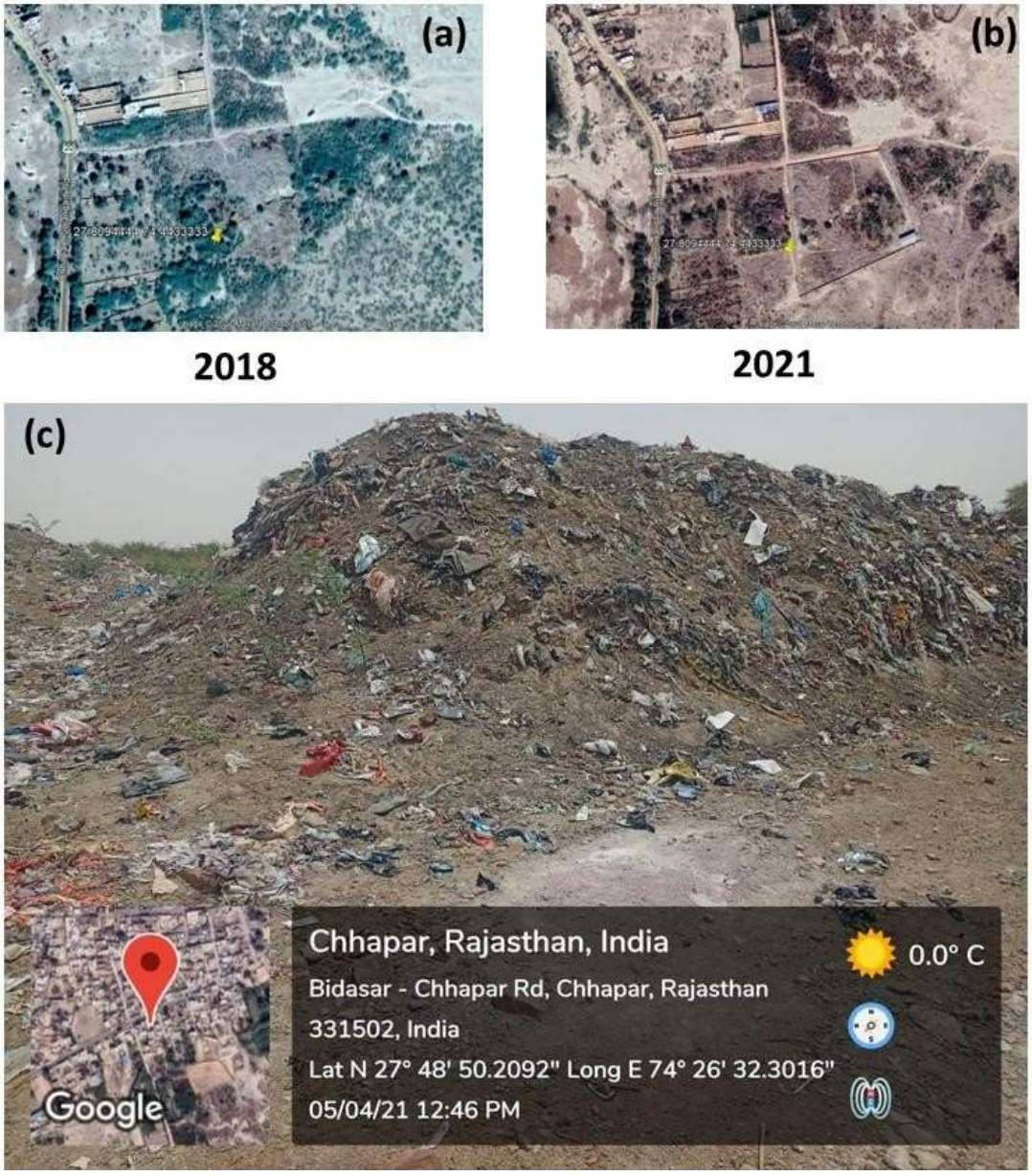


Figure 3.4. Satellite view of landfill site at Chappar in: (a) 2018 (b) 2021
(c) Field view of landfill site at Chappar, Churu district.

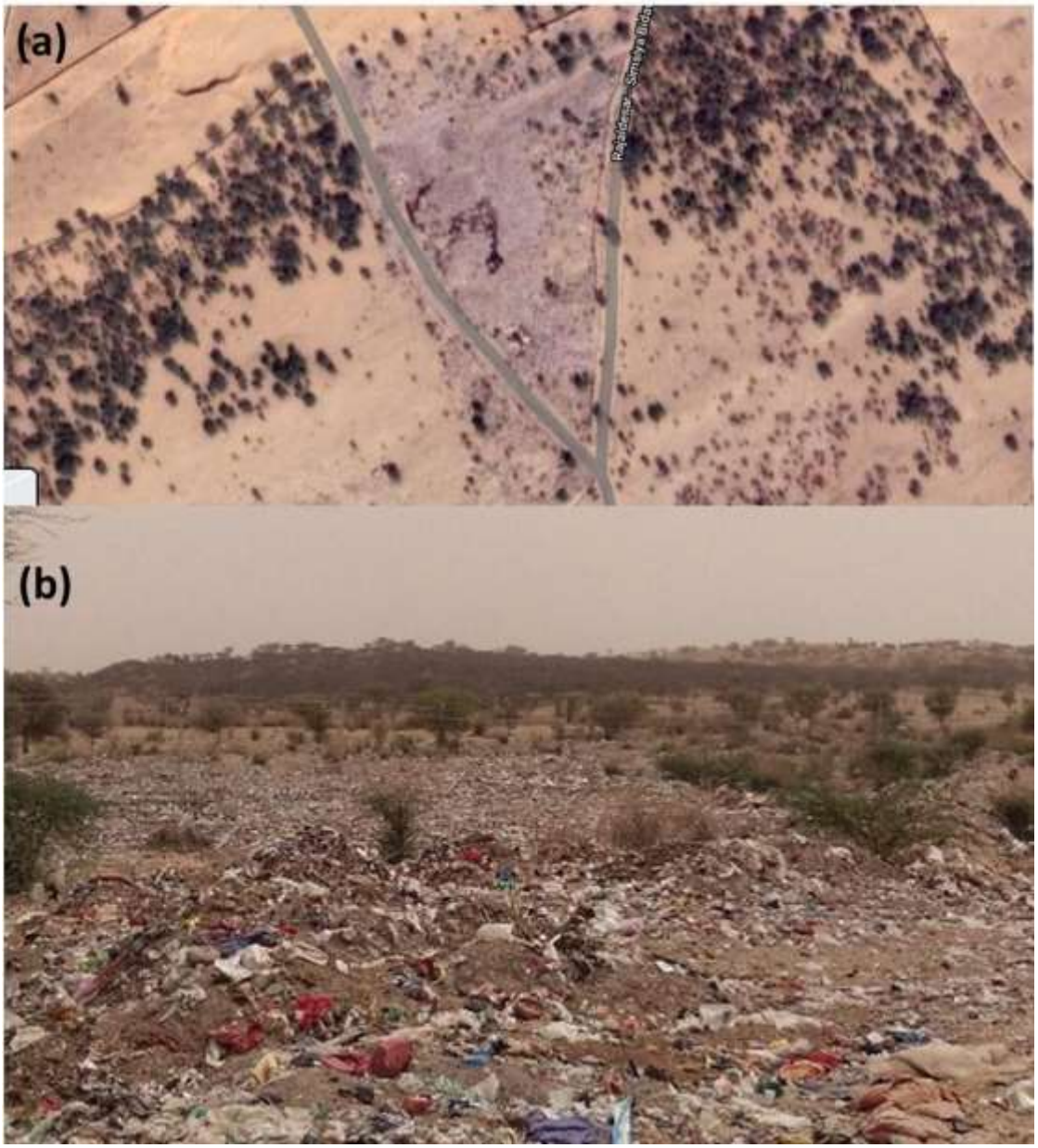


Figure 3.6. (a) Satellite view of landfill site in Rajaldesar (b) Field view of landfill site in Rajaldesar, Churu (Currently no official site is allotted for Rajaldesar).

Figure 3.5. (a). Satellite view of MRF facility at Chappar (b). Field view of MRF facility at Chappar, Churu

Figure 3.8. (a) Satellite view of land fill site in Churu, **(b)** Field images of land fill site in ChuruNagar Parishad.

Figure 3.7. (a) Satellite view of MRF facility at Ratangarh, Churu (b) Field view of MRF facility at Ratangarh, Churu district.

Auto tippers, tractors, mini vehicles are the primary collection vehicles used for the collection of household wastes, which are loaded at a predesignated nodal point in the wards of MCs. The Compactor/ mini trucks collect the waste from the hotels, restaurants, and marriage halls directly. From the responses obtained from each ULB, it is noticed that there is no uniform system followedacross all the ULB for the collection of solid waste. As per the guidelines of SWM, 2016, it is imperative to switch to electric vehicles for the collection of waste.

For the effective utilization of solid waste, MRF (material recycling facilities) are recommended in SWM 2016. MRF at ULB6 i.e. Nagar Palika Ratangarh, Nagar Palika Sujangarh are installed and is currently operational. The field image of MRF at Bidasar is shown in Figure 3.3. As per thedetails obtained from the meticulous survey, the MRF at Bidasar is under construction. As of the month of data collection (April- 2021), 80% of the ULB's do not have MRF centers. However, theconstruction of MRF centers in all the ULB is under progress except ULB 4 and ULB 7 i.e., Rajaldesar and Ratannagar respectively. From the collected data, it is observed that ULBs that arethe major contributors of solid waste do not have an existing MRF which is a need for the hour. The baseline data pertaining to different environmental attributes for a solid waste management plan under the present scenario are given in **Tables 3.2 to 3.5**.

3.1.2 Management Options for Solid waste

Legacy Waste

As can be seen from the photographs shown above, a large quantity of waste exists as the legacy waste in different dumpsites. The top states that dump waste unprocessed in dumpsites are Uttar Pradesh, Maharashtra, Rajasthan, Tamil Nadu, Karnataka, and Delhi. Out of the total solid waste generated in India, 5% is recycled, 18% is composted and the rest 77% is in dumpsites. The numberof dumpsites and quantity of waste dumped annually in tonnes in Rajasthan is 195 and 2,133,564respectively which should be a concern for all of us including Churu.

The recent increase of the waste dumped can be owed to many factors like the growth of the e- commerce industry from shopping to ordering food. Many brand owners have shifted from larger stock-keeping unit size to smaller stock-keeping unit size due to changing market scenario. Shifting of public consumer preferences to daily use plastic products like bottles, and food containers. GST on recyclables makes it uneconomical for

waste-pickers and to collect low-value waste. The main technologies for reclaiming land sites in India are bio capping and biomining. Biomining is the process of using microorganisms (microbes) to extract metals of economic interest from rock ores or mine waste. This biological decomposition of the waste decreases the volume of the waste by 40%. This is a low-cost solution compared to capping to remove the garbage hills and their lingering ill effects. The major issues of bio capping are subsidence, leachate and water contamination, soil waterlogging, and the release of toxic gases like methane.

It achieves permanent near-zero emission of harmful gases (such as methane and ammonia) and leachate. Biomining also helps to recover soil from decomposed mixed waste.

Constraints and Motivating factors for at Source Segregation

Household attitude: The way households co-operate and respond to waste management issues is influenced by their education; therefore, the public's education is an essential element of the success of any waste management program.

- **Technical/Educational:** Knowledge is important to predict waste segregation behaviour. Basically, increasing knowledge will translate into a change in behaviour. Knowledge of household segregation is about where, what, when, and how to practice in a real life.
- **Environmental:** The surroundings in which people dwell play a major part in nurturing their mindset whether to practice source segregation or not. A locality near to landfill will never practice the same but instead, have an adverse impact altogether by dumping their waste untreated.
- **Financial:** Financial background plays an important factor in source segregation. It has been observed that people who are not practicing source segregation, face the difficulty ofthe lack of facility.
- **Institution:** Factors such as lack of implementation, weak enforcement, uncertainty over roles and responsibilities amongst governing authorities and limited stakeholder coordination have all contributed towards this disconnect between policy and practice.
- **Legal:** Enforcement of legal attributes in such sensitive issues tends to force the individual into waste segregation with the fear of penalties or legal actions to be taken upon him.

Duplication of effort: It has been noticed on numerous occasions we tend to deal more in terms of paperwork and less output on the field and this in return leads to duplication of effort where more than one project or intervention is needlessly implementing similar activities. This leads to wastage of available resources as well as their underutilization.

Unsustainability of Municipal Solid Waste Management: The major sources of dumping of solid waste are landfills and these often end as producing a legacy of wastes because the major part of this waste is unsegregated and untreated.

Lack of legislation: Poor implementation of laws often leads to inefficiencies in society. There is inadequate governance, or the absence of clearly defined processes, roles, and decision-making responsibilities.

No pre-defined roles: Developed countries like Germany have pre-defined roles when they deal with waste management with testing of even leachate released but this is absent in developing countries.

Motivating factors for source segregation:

- **Infrastructure:** Effective solid waste management is a major challenge in cities with high population density. Achieving sustainable development within a country experiencing rapid population growth and improvements in living standards is made more difficult in many countries because it is a diverse country with many different religious groups, cultures and traditions and all these problems can be easily dealt with by solid infrastructure.
- **Awareness:** Public awareness and attitudes to waste can affect the population's willingness to cooperate and participate in waste segregation practices. General awareness and information on the social, economic and environmental benefits of the successful practice are important factors that need to be continuously communicated to all sectors of the population.
- **Workshops:** Lack of knowledge is one of the main reasons why households did not separate their household waste and there should be an ongoing effort to educate those thatare not separating at their residents and also reinforce the lessons to those separating at their house.
- **Regular collection:** Discipline creates an environment among people where people engage themselves on a regular basis and if policies are implemented on regular basis people tendto show active participation.

- **Incentives:** Incentive-driven drives gain huge attention among people even in a short period and thus create a sense of motivation for any work among the masses.
- **Enforced legislation:** Effective enforcement of environmental laws and regulations is crucial for proper environmental management; this drives fear of penalty or legal action and thus forces people to take the particular action as desired by policies.

3.1.3 Baseline Data for District Environment Plan

The baseline data has been collected from the district officials. The population of the district for the years 2021, 2036 and 2051 have been predicted by taking into consideration of the populationgrowth from the last 5 decennial censuses starting from the years 1971 to 2011. Accordingly, District Environment Management Plan (DEMP) has been prepared for the years 2036 & 2051 **asgiven Table 3.2A**. As the developmental activities in any area depend upon the overall vision andmission of the district, hence the proposed DEMP shall have to be updated after every 5 years depending on the overall growth and requirements of the district.

Table 3.2A: Population Information

S. No.	Year	ULB-1 Churu	ULB-2 Bidas	ULB-3 Chappar	ULB-4 Rajaldesar	ULB-5 Rajgarh	ULB-6 Ratangarh	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar
1	1971	52502	11268	9681	12872	23179	31506	5390	37703	39073	12716
2	1981	62070	17814	11711	15236	30379	43366	7638	56388	55546	15435
3	1991	82852	23256	15535	19538	43696	55079	9346	67954	70843	21477
4	2001	101874	30107	17909	22836	51640	63486	11018	81394	83846	27066
5	2011	120157	35683	19744	27419	59193	71124	12841	95911	101523	32640
6	2021	137071	41787	22260	31056	68197	81029	14755	111447	117136	38729
7	2036	162442	50943	26034	36512	81703	95887	17722	136596	140556	49941
8	2051	187813	60099	29808	41967	95209	110748	20803	163959	164975	63644

Table- 3.2B: Report on inventory of total solid waste Generation

Attributes	Unit	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldesar	ULB-5 Rajgarh	ULB-6 Ratangarh	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar
Population	[Nos as per 2011 census]	119846	35709	19744	27434	59193	71124	12841	96056	101528	32640
Population	[Projected Nos in 2021]	137071	41787	22260	31056	68197	81029	14755	111447	117136	38729
Total solid wasteGeneration	MT/Day	52.73	16.00	6.0	6.0	24	36.3	6.89	28.81	38.84	14
Qty. of Dry WasteGenerated	[in MT/Day] or [Not estimated]	21.0	5.2	2.0	2.0	10.6	17.5	3.6	16.0	20.25	5.5
Qty. of Wet Waste Generated	[in MT/Day] or [Not estimated]	17.2	4.3	1.5	1.6	9.3	14.25	3.0	12.81	16.57	4.5
Qty. of C&D Waste Generated	[in MT/Day] or [Not estimated]	5.27	3.00	0.5	-	2.4	0.9	0.3	2.88	1.45	2.0
Qty. of Street Sweeping	[in MT/Day]or [Not estimated]	9.3	2.00	2	1.5	1.68	1.36	Not estimated	2.0	18.14	2.0
Qty. of Drain Silt	[in MT/Day]or [Not estimated]	Not estimated	1.50	Not Estimated	0.905	Not estimated	2.26	Not estimated	Not estimated	Not estimated	Not estimated
Qty. of Domestic Hazardous Waste (DHW)collected	[in MT/Day]or [No Facility]	Being Collected along with MSW	Being Collected along with MSW	Not Estimated	Not Estimated	Being Collected along with MSW	0.031	Not Facility	Being Collected along with MSW	Being Collected along with MSW	Being Collected along with MSW
Qty. of Other Waste (Horticulture, sanitarywaste, etc.)	[in MT/Day]or [Qty not estimated]	Not estimated	Being Collected along with MSW	Not Estimated	Not estimated	Not estimated	Not estimated	Not estimated	Not estimated	1.0	Not estimated
No. of Old dump sites	[Nos.] or [None]	1	0	1	2	0	1	1	0	1	0
Qty stored in dumpsites	[MT] or [Not estimated]	135132	24038	Not Estimated	Not Estimated	4050	12818	Completely filled	4528.78	46660.6	Not estimated
No. of Sanitary landfills	[Nos.] or [None]	0	0	0	0	0	0	0	0	0	0
No of wards	Nos.	60	35	25	35	40	35	20	55	60	25

Table 3.2C: Compliance by Bulk Waste Generators

Attributes	Unit	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldesar	ULB-5 Rajgarh	ULB-6 Ratangarh	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar
No of BW Generators	[numbers] or [inventory not done]	4*	0	0	Not Done	0	0	0	0	0	0
No of on-site facilities for Wet Waste	[numbers] or [No data]	0	0	No Data	0	0	No data	0	0	0	0

*Churu: Bulk waste generators are identified by the ULB. Only 4 hotels were found who generate approx. 70-90 kg per day of waste. Notices were issued to allfour BWG's to have decentralized processing plant for wet waste at their premises.

Table 3.2D: Compliance in segregated waste Collection of SW

Attributes	Unit	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldesar	ULB-5 Rajgarh	ULB-6 Ratangarh	ULB-7 Ratan nagar	ULB-8 Sardar sahar	ULB-9 Sujangarh	ULB-10 Taranagar
Total generation	MT/Day	52.73	16	6.0	6.0	24	36.3	6.89	28.81	36.84	14
Dry Waste	[in MT/Day collected] or [Collection Not initiated]	8.3	3.00	2.4	Collection Not initiated	13.20	27.21	4.19	5.0	14.73	4.00
Wet Waste	[in MT/Day collected] or [Collection Not initiated]	5.05	4.00	3.6	Collection Not initiated	10.8	4.54	2.4	3.0	7.31	10
C&D Waste	[in MT/Day collected] or [Collection Not initiated]	5.27*	3.00	0.5$	Collection Not initiated	2.4	0.9	0.3	2.88	1.45*	2#

*Churu and Sujangarh: Public notice has been issued. All citizens and contractors have been publicly warned for this. The place has been identified for C&D waste and Vehicles are being put to collect C&D waste from the city.
$Chhappar: Separate storage, collection and transportation of construction and demolition waste is being done from the tractor trolley of the municipality and the collected waste is being used in development works.
#Taranagar: A separate Tractor is being used for C&D waste.

Table 3.3: Status and Recommendations related to Waste Management Operations

Attributes	Unit	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldesar	ULB-5 Rajgarh	ULB-6 Ratangarh	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar
Door to Door Collection	[100%] / [partial %] / [not initiated]	100	100%	90%	100	100	100	100	100	90	95
Mechanical Road Sweeping	[100%] / [partial%] / [notinitiated]	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated
Manual Sweeping	[100%] / [partial%] / [notinitiated]	100	100	100	100	100	100	100	100	100	100
Segregated Waste Transport	[100%] / [partial %] / [not initiated]	[Partial 10%]	[Partial 20%]	Not Initiated	Not Initiated	[Partial 15%]	100%	Not Initiated	[Partial 15%]	[Partial 20%]	[Partial 15%]
Digesters (Bio-methanation)	[% of WW] / [notinitiated]	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	0	Not Initiated	Not Initiated	Not Initiated
Composting operation	[% of WW] / [not initiated]	8 Composting pits	Not Initiated	1 Composting units of 500 kg Capacity (Tender is issued)	Not Initiated	Not Initiated	Not Initiated	Not Initiated (No Land available)	Not Initiated	2 Composting units of 500 kg Capacity each	Not Initiated
MRF Operation & its Capacity	[MRF used] / [not installed], Capacity	Work In Progress (Work order has been issued)	Work In Progress, 5TPD Capacity	Not Initiated	Not Initiated	Not Available (Under Construction)	Not Installed	Not Installed (No Land available)	Under Construction, 10.0 TPD*	MRF Used, 16TPD Capacity	Ready for use
Use of Sanitary Landfill	percentage	No SLF	No SLF	Not Initiated	Not Initiated	No SLF	No SLF	0	No SLF	No SLF	No SLF
Reclamation of old dumpsites	Initiated /Not Initiated	Tendering is under process for bioremediati	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Initiated	Initiated	Not Initiated	Not Initiated	Not Initiated

		on									
Linkage with Waste to Energy Boilers / Cement Plants	Initiated /Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated
Linkage with Recyclers	Initiated /Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated
Attributes	Unit	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldesar	ULB-5 Rajgarh	ULB-6 Ratangarh	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar
Linkage with TSDF / CBMWTF	Initiated /Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated
Involvement of NGOs	Initiated /Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Initiated	Initiated	Not Initiated	Not Initiated	Not Initiated
Linkage with Producers / Brand Owners	Initiated /Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated
Authorisation of Waste Pickers	Yes/No	Initiated	Not Initiated	Not Initiated	Not Initiated	Initiated	Initiated	Initiated	Initiated	Not Initiated	Initiated
Issuance of ID Cards	Initiated /Not Initiated	Not Initiated	Initiated	Not Initiated	Not Initiated	Not Initiated	Initiated	Initiated	Not Initiated	Not Initiated	Not Initiated
Available	Not Available	Partially Available		Work is in under process							

* Sardarsahar: Construction of MRF facility has been stopped in compliance of stay order issued by Honourable High Court Jodhpur dated 05.02.2021.

Table 3.4A: Status of Waste Management Operations

Attributes	**Unit**	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldesar	ULB-5 Rajgarh	ULB-6 Ratangarh	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar
Waste Collection Trolleys	[Nos. Required] / [Nos. Available]	11	4	1	Nil	5	0	4 req., 2 ava.	6	9 trolly	4
Mini Collection Trucks/Auto Tippers	[Nos. Required] / [Nos. Available]	32 Auto tippers	9 Auto tippers	5	05 Auto tippers, 02 Tractors	1	16	1 req. 0 ava.	16 Auto tippers and 01 Bind Loader	2 garbage capacitor/ 20 Auto tippers	1
Segregated Transport	[yes] / [no] / [% area covered]	5 Auto tippers covering 10% area	9 Auto tippers covering 75% area	Not available	Nil	16 Auto tippers covering 65% area	Yes	No	5 Auto tippers provided with partition,, covering 15% area	20 Auto tippers covering 20% area	10 Auto tippers covering 25% area
Bulk Waste Trucks	[Nos. Required] / [Nos. Available]	1	0	0	0	1	0	0	1	2	0
Waste Transfer points	[Nos. Required] / [Nos. Available] /[Not available]	Not Required as disposal site is within 10 Km of haul distance	Not Required as disposal site is within 10 Km of haul distance	Not Required as disposal site is within 10 Km of haul distance	Not Required as disposal site is within 10 Km of haul distance	Not Required as disposal site is within 10 Km of haul distance	Not Required as disposal site is within 10 Km of haul distance	Not Required as disposal site is within 10 Km of haul distance	Not Required as disposal site is within 10 Km of haul distance	Not Required as disposal site is within 10 Km of haul distance	Not Required as disposal site is within 10 Km of haul distance
Bio-methanation units	[Nos. Required] / [Nos. Available], & Capacity	Not Available	Not Available	0	Not Available	Not Available	0	0	Not Available	Not Available	Not Available
Composting units	[Nos. Required] / [Nos. Available], & Capacity	8 Composting units available	Not Available	1 Composting units of 500 kg Capacity (Tender is issued)	Not Available (No land available)	Not Available	Not Available	Not Available	Not Available	2 Composting units of 500 kg Capacity each	Not Available

Material Recovery Facilities	[used or installed] / [not available], Nos. & capacity	Not Available (Under Construction)	Work In Progress, (5TPD Capacity)	Installed	Not Available (No land available)	Not Available (Under Construction)	Installed	Not Available	Not Available (Under Construction)	MRF Used, 16TPD Capacity	Ready for use, Construction is over
Waste to Energy (if applicable)	[Required] / [Nos. Available]	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
Waste to RDF	[Nos. Required] / [Nos. Available]	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
Sanitary Land fills	[Nos] / [Nos. Available]	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
Capacity of sanitary landfills	MT/Day	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
Waste Deposit Centers (DHW)	[Nos] / [Nos. Available], Capacity	0	0	0	0	0	0	0	1	1	1
Attributes	**Unit**	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldesar	ULB-5 Rajgarh	ULB-6 Ratangarh	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar
Other facilities	Nos.	NA	NA	0%	05 Auto Tipper (You should include it in second row of this Table)	NA	0	0	NA	NA	NA
Available	**Not Available**	**Partially Available**		**Under Process**							

Table 3.4B: Status and Recommendations related to Waste Management Operations

Attributes	**Units**	**ULB-1 Churu**	**ULB-2 Bidasar**	**ULB-3 Chappar**	**ULB-4 Rajaldesar**	**ULB-5 Rajgarh**	**ULB-6 Ratangarh**	**ULB-7 Ratannagar**	**ULB-8 Sardarsahar**	**ULB-9 Sujangarh**	**ULB-10 Taranagar**
Authorizationof waste pickers	Initiated /Not Initiated	Initiated	Initiated	Not Initiated	Not Initiated	Initiated	Initiated	Initiated	Initiated	Not Initiated	Initiated
Linkage withTSDF / CBMWTF	Initiated /Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated
Involvementof NGOs	Initiated /Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Initiated	Initiated	Not Initiated	Not Initiated	Not Initiated
Linkage withProducers / Brand Owners	Initiated /Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated
Issuance ofID Cards	Initiated /Not Initiated	Not Initiated	Initiated	Not Initiated	Not Initiated	Not Initiated	Initiated	Initiated	Not Initiated	Not Initiated	Not Initiated
Initiated	Not initiated										

Table 3.5A. Notification and Implementation of By-Laws

Attributes	Unit	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldesar	ULB-5 Rajgarh	ULB-6 Ratangarh	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar
Notification of By-laws	Nos.	Notified	Notified	Notified	Not Initiated	Notified	Done	Done	Notified	Notified	Notified
Implementation of by-laws	Nos.	In Progress	Implement ed	Done	Not Initiated	In Progress	Done	Done	In Progress	In Progress	In Progress

Table 3.5B: Status and Recommendations on Adequacy of Financial Status of ULB for MSW Management

Attributes	Unit	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldesar	ULB-5 Rajgarh	ULB-6 Ratangarh	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar
CAPEX Required	[INR in Crore] / [Not required]	8.0	2.0	0.50	1.0	1.0	1.5	Not Required	1.0	1.32	Not Required
OPEX	[INR per Year in Crore] / [%of requirement]	4.50	0.50	20%	1.5	1.50	2.0	0	1.50	1.20	Not Required
Adequacy of OPEX	[Yes] / [No]	No	Yes	Yes	No	No	No	No	No	No	No

3.1.4. Projected quantity of solid waste generation in Churu district

From the collected information, a positive correlation of 0.93 is observed between population andthe quantity of solid waste generated. With urbanization, it is expected that the population of Churudistrict is likely to increase which will consequently increase the quantity of solid waste generation.

For a better understanding of the trend in increase, the population growth over the years is shownin **Figure 3.7** below. Considering the increase in population, the probable solid waste that may be generated is also estimated. A linear mathematical relation is proposed by considering the standards mentioned in CPCB to determine solid waste generation. The proposed equation is shown in Eq. (4.1).

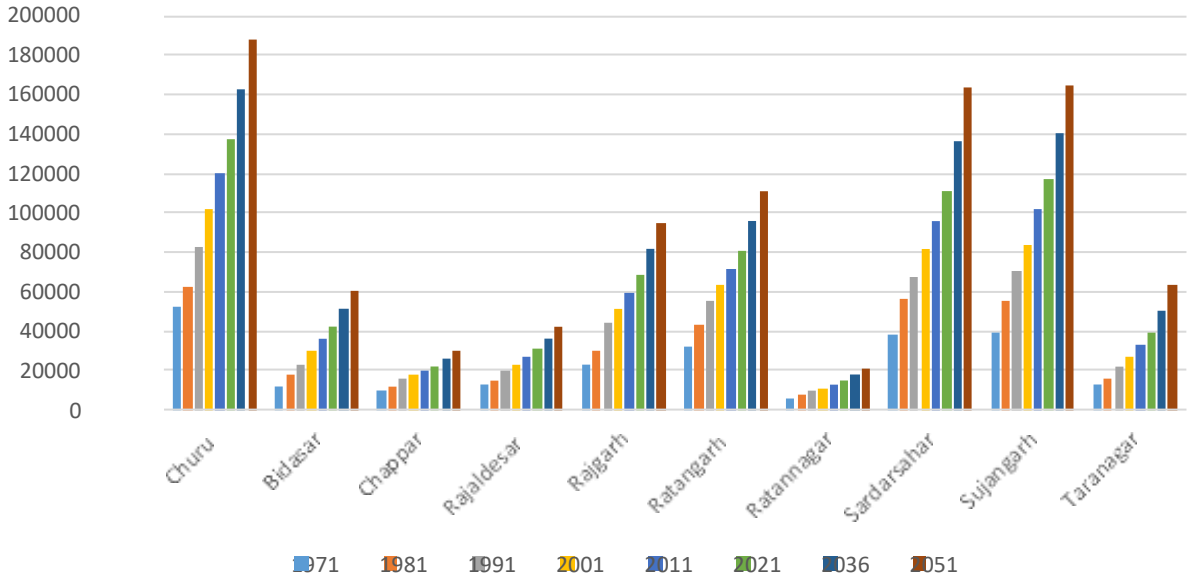


Figure 3.7: Projected population trends in each of the ULB's

$$W = 0.075\ RP + 0.45\ UP \qquad \text{Eq. (4.1)}$$

Where, W is the waste generated in kg per day; RP is the rural population; UP is the urban population. An inventory of probable solid waste that is going to be generated for the coming yearsis projected for the years 2036 and 2051 as shown in **Figure 3.8**. These estimates aid in procuringthe essential infrastructure to meet the future demand.

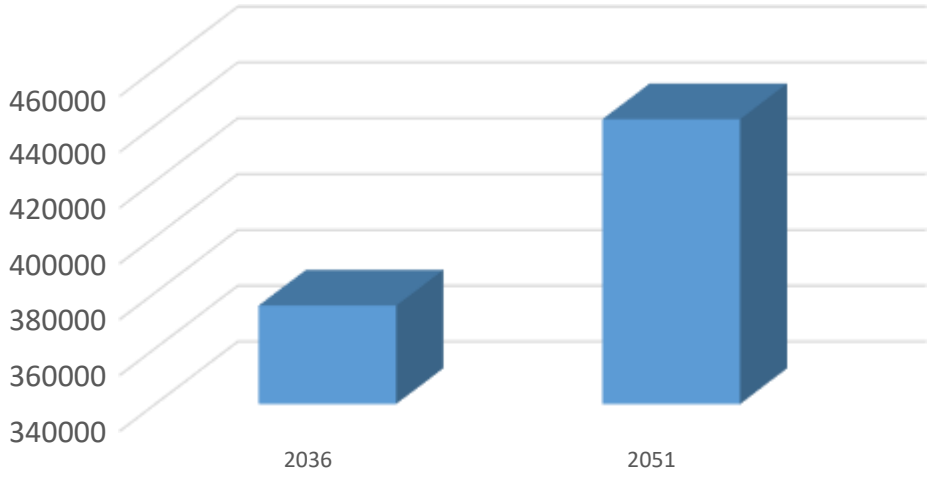


Figure 3.8: Estimated solid waste generation for the year 2036 and 2051

As per honorable NGT order dated 15.07.2019 in O. A. No 710-713/2017, O.A. No. 606/2018, it is the duties and responsibilities of various stakeholders to make the solid waste management plan a successful and implementable action. For the effective utilization of solid waste management in the Churu district, the following plan is proposed as shown in **Figure 3.9**.

Step-1: From the collected information, it is observed that the door to door collection is not in practice in all the rural areas. It is recommended that all the municipal councils, Nagar Palika, andvillage panchayats should enforce the implementation of door to door collection.

Step-2: The practice of waste segregation should be implemented at the household level. All the bulk generators should be identified and necessary infrastructure such as dustbins should be provided within the vicinity to ensure the proposed disposal of waste.

Step-3: Separate collection of Wet Waste (+ Sanitary Waste), Dry Waste (+ Domestic Hazardouswaste) and Street Sweeping should be ensured in all parts of the district.

Step-4: Since it is a well-established fact that solid waste generation depends on the income levels, unlike following a fixed frequency throughout the district, deciding the frequency based on the quantum of waste generated should be considered to plan the activities. Wet waste should be collected on a daily basis.

Step-5: Adopting the cluster-based approach helps in the effective management of solid waste disposal. To optimize the resources and infrastructure, the transfer points and treatment facilities can be installed in each cluster. It is recommended to form clusters that will consequently help inthe effective management of solid waste collection and disposal in

rural areas of the Churu district.

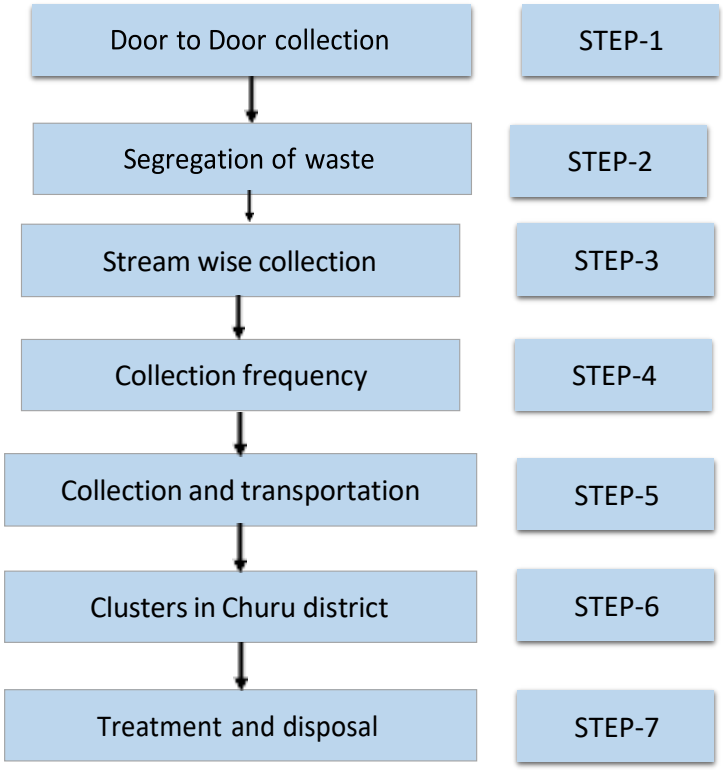


Figure 3.9: Framework for the effective solid waste management in Churu

A brief overview of the existing practices for solid waste management in all the ULB's of Churu are presented in **Table 3.2 to Table 3.5**.

The details of measurable and quantifiable targets, responsibilities of various departments with timelines for completing the tasks considering the next 10-year projections are made as presentedin **Table 3.6**.

Table 3.6: Status and Recommendations on Adequacy of Financial Status of ULB for MSW Management

Sr. No.	Action Point	Present Status	Gap	Timeline	Department
1.	Door to Door Collection of Solid Waste	It is implemented in all ULBs. AllULBs have achieved the target of 100% collection of solid waste except Chappar, Sujangarh and Taranagar (ULB-3, ULB-9 and ULB-10) which have also achieved a 90%, 90% and 95%target respectively.	The target of the remaining 10% door to door collection is to be achieved by the Nagar Palika Chappar,Sujangarh andTaranagar.	The target of the remaining 10% collectionis to be achieved by the Chappar, Sujangarh andTaranagar Nagar Palika by June 2021	LSG Department (Municipal Bodies)
2.	Collection, Segregation, Transport, Disposalas per Rules	It is achieved completely in Ratangarh and is partially achieved in ULB-1, ULB-2, ULB-5, ULB-8, ULB-9, and ULB-10. Three ULBs, namely ULB-3, ULB-4 and ULB-7 are yet to initiate the process of segregated transport.	100% should beachieved in all the ULB's. This includesadditional efforts in a few of the ULB's and needs to kick start in a few ULB's.	The identified gap shouldbe fulfilled in 9 months ofduration. Solid waste management to be done in accordance with the prevailing laws. The land is to be identified and acquiredwithin 2 years to meet the2036 requirement.Facilities are to be developed within the nexttwo years to meet the present requirement.	LSG Department (Municipal Bodies)
3.	Segregation at Source	As per the data collected, it is apparent that all ULB's have created awareness to segregate dryand wet waste at the source.	Segregation of wastes should be done in a much more effective way. Also, only segregating the waste atsource will not the serve the purpose if it is not transported, processedand disposed properly.There is a lot of scope toadopt integrated way ofhandling the waste byeach ULB. It should be extended to all the rural parts of the districts.	It should be achieved to implement it in the next one year.	LSG Department (Municipal Bodies)
4.	Road Sweeping and Disposal of Waste Collected	Road sweeping is a common practice and is implemented in twodifferent ways i.e. mechanical sweeping and manual sweeping.The technology of mechanical sweeping is not initiated in any of the	Infrastructure formechanical sweepingmay be procured to all the ULBs. This willenhance the efficiency and frequency of waste collection. Also, eachroad sweeping person must	2 years	LSG Department (Municipal Bodies)

Sr. No.	Action Point	Present Status	Gap	Timeline	Department
		ULBs.	be equipped with masks while sweeping the roads.		
5.	Material Recover Facility	It is only available ULB3, ULB6, and ULB9. In ULB-10, facilty is ready for use. Construction work is in progress in ULB-1, ULB-2, ULB-5, and ULB-8. No land isavailable for Rajaldesar (ULB-4). Ratannagar (ULB-7) has no MRF facility.	ULB4 and ULB7 have to take necessary actions to install MRF centers immediately.	1.5 years	LSG Department (Municipal Bodies)
6.	Recycling of materials	Not effective	Recycling of wastesshould be done through a systematic process that is currently missing in most of the ULBs.	It should be achieved to implement in the next twoyears (i.e. by June 2023).	LSG Department (Municipal Bodies)
7.	Composting & Utilisation of Compost	As per the inventory collected, it is noticed that this technique is not well harnessed in any of the ULBs.Churu (ULB-1) has 8 composting units.	All ULB's has to plan for the installation of compost pits. They should also developbusiness model of utilization of compost to sustain themseves	9 months	LSG Department (Municipal Bodies)
8.	Waste to EnergyPlant or Linkage	It is not initiated by any of the ULB	All the ULB's has to take necessary actions in promoting the waste to energy or to initiate alinkage with an existing plant	3 years	LSG Department (Municipal Bodies)
9.	Landfill Availability	60% of the ULB has old dumpsites. ULB-2, ULB-5, ULB- 8, and ULB-10 do not have any dumpsites. Sanitary Landfills donot exist in any of the ULBs.	There are no proper plans available currently with ULBs to handle the legacy waste.	Techniques like Bio mining and/or bio capingshould be explored toreduce the volume of waste at landfill sites. It should be achieved toimplement in the nextfive years (i.e. by June 2026). Also, the provision of sanitary landfills in each ULB has to be explored in the next5 years.	LSG Department (Municipal Bodies)

Sr. No.	Action Point	Present Status	Gap	Timeline	Department
10.	Reclamation of old dumpsite (Ifavailable)	It is in practice in only ULB6 and ULB7. Tendering is under processfor bioremediation in Churu (ULB-1)	The rest of the ULB's should initiate theprocess of reclamationof old dumpsites.	The main technologiesfor reclaiming land sites such as bioremediation, bio capping and bio- mining are to be explored within the next two years.	LSG Department (Municipal Bodies)
11.	Strengthening of Manpower as required in ULBs	The number of manpower is not sufficient. They are also not awareof recent best practices applicable in the field.	The gap between bestpractices to be adopted.	All concerned staffmembers to be trained toimpart adequateknowledge for proper implementation of sustainable SWM withinthe next two years. Also,logistic infrastructure tobe made available from the financial budget bythe Government to conduct trainingprograms/ workshops starting from Financial Years 2021-22 onwards.	LSG Department (Municipal Bodies)/ Village Panchayat
12.	Authorisation of Waste Pickers (Issuance of ID cards)	It is initiated only in ULB 1,ULB5, ULB6, ULB 7, ULB8, and ULB 10 which accounts for only60%	The rest of the ULBshas to initiate the process of authorizationof waster pickerimmediately.	It is should be started within the next 6 months by involving NGOs and self-help groups byproviding incentives to them.	LSG Department (Municipal Bodies)
13.	IEC Activity	Information EducationCommunication (IEC) has been practiced by all ULBs to generate awareness among the masses.	Awareness programmesshould be organised at agiven interval of time by each ULB.	It means the process ofworking with individuals,communities & societies to develop communication strategiesto promote positive behaviour such IEC activity should be followed continuously through various means.	LSG Department (Municipal Bodies), NGOs, Educational Institutes, etc.
14.	Training of staff	Staff learns the process in atraditional way.	Programs are not being conducted currently in amethodical manner.	A systematic trainingprogram/workshop should be organised oncein a two year to share thebest practices to beadopted by ULBs inhandling solid waste management.	LSG Department (Municipal Bodies)/ Village Panchayat, University
15.	Monitoring andReview	District Administration under the guidance of the District Collector has been monitoring the progress of solid waste management regularly on	Time-bound delivery ofthe outcomes	The district collector hasbeen monitoring / reviewing the performance of their respective ULB/Panchayats on solidwaste management.However, He/she may	District Collector or his/her representative, District

Sr. No.	Action Point	Present Status	Gap	Timeline	Department
		monthly basis.		constitute a district-levelexpert committee forsuggestions and better implementation. Peopleshould also be made accountable if they do not perform.	administration, RSPCB, LSG Department (Municipal Bodies)/ Village Panchayat

CHAPTER 4. PLASTIC WASTE MANAGEMENT

This Chapter covers the present scenario of plastic waste management of the Churu district in general and its status in different urban local bodies (ULBs) particularly. Datasheet duly filled by concerned officials has been analysed. Finally, it emphasises the details of action plans along with the actionable points, present status of implementation, gap to be addressed, and proposed time line for completion. The activities are suggested by keeping in view of the future generation of wastes etc. with timelines for completing the tasks.

4.1 Present scenario in the district

As per the report of Local Self Government Department, Rajasthan published in the year 2019, onan average, the total plastic waste being generated in Rajasthan is about 4% of the solid waste that is generated. It is becoming increasingly clear that plastics are posing significant environmental and health challenges in communities. Plastics are disturbing local ecological balances as they areeasily admixed in water and land as micro-plastics. In their macro-form, they act as physical barriers that degrade soil quality and even ingested by livestock and other fauna to find its way in the human food chain. Plastics cause blockages in drains and streams resulting in severe floods and obstruction to runoffs.

According to the Rule 12 of Plastic Waste Management (Amendment) Rules, 2018 prescribed by Ministry of Environment, Forest and Climate Change (MoEF&CC), the enforcing authorities forplastic waste management shall be as given below:

1. The State Pollution Control Board in respect of a Union territory shall be the authority for enforcement of the provisions of these rules relating to registration, manufacture of plastic products and multi-layered packaging, processing and disposal of plastic wastes.

2. The concerned Secretary-in-charge of LSG shall be the authority for enforcement of the provisions of these rules relating to waste management by waste generator, use of plastic carry bags, plastic sheets or like, covers made of plastic sheets.

3. The concerned Gram Panchayat shall be the authority for enforcement of the provisions of theserules relating to waste management by the waste generator, use of plastic carry bags, plastic sheetsor like, covers made of plastic sheets in the rural area of the State or a Union Territory.

4. The authorities referred to in sub-rules (1) to (3) shall take the assistance of the District

Magistrate or the Deputy Commissioner within the territorial limits of the jurisdiction of the concerned district in the enforcement of the provisions of these rules.

Plastic waste disposal methods are often basic and uninformed that further exacerbate the challenge. The open burning of plastics generates toxic emissions such as carbon monoxide, dioxins, and nitrides. Low-quality plastics that are common in rural areas also leach out toxic additives and substances. Policy measures are focused on segregation, collection, and in certain cases banning the use of certain categories of plastics altogether. However, most of this had traditionally been focused on urban India. In 2016, the plastic waste rules were extended for rural areas for the first time, with specific duties demarcated for Gram Panchayats. The lack of segregation of plastic waste, the absence of organized systems of collection and efficient aggregation, poor economic value in low-grade (thin) plastics and the livelihoods associated with plastic production have been the key categories of challenges.

Technically, plastics are divided into two categories as shown in **Figure 4.1**. Typically, plastic waste to be managed in accordance with the Plastic Waste Management (Amendment) Rules, 2018 with an emphasis on the 3R /4R principles of Reduce, Reuse, Recycle and Recovery. Segregated dry waste from all Municipal Councils should typically be dispatched to MRF centers that are installed in a few of the ULB's of the Churu district. Subsequently, the collected waste is further segregated manually into multiple categories such as plastic, paper, glass, coconut shell, clothes, and metal. Recyclables plastic waste are baled and sold to vendors through an auctioning process. The non-recyclable plastic waste is baled and transported to cement factories. Unfortunately, this is not in practice in majority of the ULB.

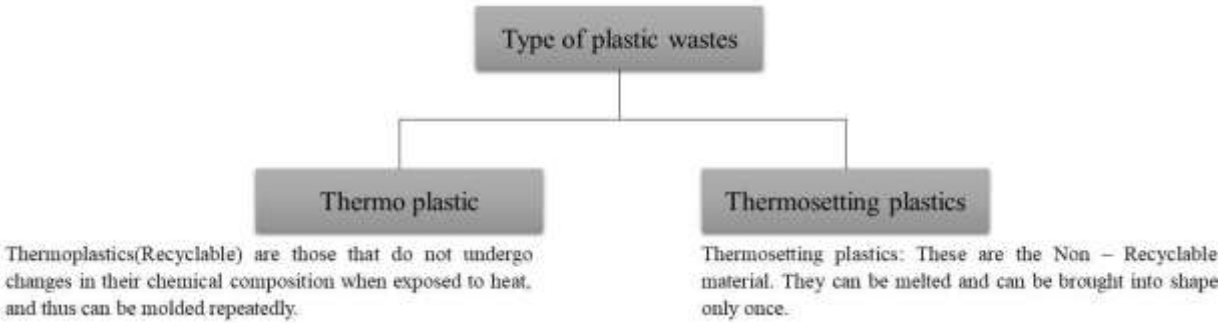


Figure 4.1. Types of plastic wastes

A study has been conducted in some selected parts of Rajasthan and it is noticed that the solid waste generation of all categories with different communities is 48179.1gm/month. Among this quantity of waste, the share of waste refuse and garbage category is 3112.2gm/months for papers and products, while for plastics it is 3832.8gm/month, glass content comprises waste is 1262.1gm/month and quantity of garbage category as kitchen waste is 39972gm/month (Anil, 2015). This observation in line with the conclusions drawn in the report of Local Self Government Department, Rajasthan report published in 2019. Owing to this, the percentage of plastic in the generated solid waste can be treated to be lying between 4% to 7%. To minimize the percent of plastic waste that is being generated in Churu, various actions have been enforced in all the ULB's.The list of actions taken in each of the ULB's is collated with the help of a survey and telephonic conversations with the representatives of each ULB as shown in **Tables 4.1 to 4.7**.

Table 4.1: Inventory of plastic waste generation

Attributes	Unit	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldesar	ULB-5 Rajgarh	ULB-6 Ratangarh	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar
Population	[Nos as per 2011 census]	120157	35683	19744	27419	59193	71124	12841	95911	101523	32640
Population (Projected)	[Nos as per 2021	137071	41787	22260	31056	68197	81029	14755	111447	117136	38729
Estimated Quantity of plastic wastegenerated	MT/day] / [Not Estimated]	4.5	1.5	0.175 TPD	Not Estimated	1.68	0.9	0.3	2	1	2

Table 4.2: Implementation of Collection

Attributes	Unit	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldesar	ULB-5 Rajgarh	ULB-6 Ratangarh	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar
Door to Door collection	[100%] / [partial %] / [not initiated]	100	100	90	100	100	100	100	100	100	100
Segregated Waste collection	[100%] / [partial %]	10%	100	0%	100	15	0	0	15	20	25
Plastic waste collection at Material Recovery Facility	[MRF used] / [not installed]	Not installed (Under construction)	Work isin progress	MRF used	Not installed	Not installed (Under construction90 % complete)	MRF used	Not installed	Not installed (Under construction)	MRF used	MRF is Ready for use
Authorization ofPW pickers	[Nos] / [not initiated]	15	Not Initiated	Not Initiated	Not Initiated	34	25	Not Initiated	7	Not Initiated	0
PW collection Centers	[Nos] / [not established]	0	Not established	Not established	Not established	1	1	Not established	1	Not established	0

Table 4.3: Establishment of linkage with Stakeholders

Attributes	Unit	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldesar	ULB-5 Rajgarh	ULB-6 Ratangarh	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar
Population (Projected)	[Nos as per 2021	137071	41787	22260	31056	68197	81029	14755	111447	117136	38729
Established linkage with PROs of Producers	[Nos] / [not established]	Not Established	Not Established	Not Established	Not Established	Not Established	Not Established	Not Established	Not Established	Not Established	Not Established
Established linkage with NGOs	[Nos] / [not established]	Not Established	Not Established	Not Established	Not Established	Not Established	Not Established	Not Established	Not Established	Not Established	Not Established

Table 4.4: Availability of facilities for Recycling or utilization of PW

Attributes	Unit	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldesar	ULB-5 Rajgarh	ULB-6 Ratangarh	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar
Population (Projected)	[Nos as per 2021	137071	41787	22260	31056	68197	81029	14755	111447	117136	38729
No. of PW recyclers	[Nos]	0	0	0	0	0	0	0	0	0	0
No Manufacturers	[Nos]	0	0	0	0	0	0	0	0	0	0
No of pyrolysis oil plants	[Nos]	0	0	0	0	0	0	0	0	0	0
Plastic pyrolysis	[Quantityin MT sent per Month]	0	0	0	0	0	0	0	0	0	0
Use in road making	[QuantityMT used per Month]	0	0	0	0	0	0	0	0	0	0
Co-processing in Cement Kiln	[Quantityin MT sent per Month]	110	100 Kg till date	0	0	0	0	0	0	7 kg	0

Table 4.5: Implementation of PW Management Rules, 2016

Attributes	Unit	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldesar	ULB-5 Rajgarh	ULB-6 Ratangarh	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar
Population (Projected)	[Nos as per 2021	137071	41787	22260	31056	68197	81029	14755	111447	117136	38729
Sealing of units producing < 50-micron plastic	[All sealed] / [Partial] / [no action]	*Not Applicable	*Not Applicable	*Not Applicable	*Not Applicable	*Not Applicable	*Not Applicable	*Not Applicable	*Not Applicable	*Not Applicable	*Not Applicable
Prohibiting sale of carry bags < 50 micron	[Prohibited] / [Partial] / [no action]	Partial	Prohibited	Partial	Partial	Partial	Prohibited	Prohibited	Partial	Partial	Partial
Ban on Carry bags and other single use plastics as notified by State Government	[Implemented] / [Partial] / [no action] / [No Ban]	Partial	**Implemented	Partial	Partial	Partial	**Implemented	Partial	Partial	Partial	Partial

***No unit is registered by RPCB and is operating within the Churu District.**

****All size of plastic carry bags has been banned by State Government vide notification dated 21.07.2010**

Table 4.6: Implementation of Extended Producers Responsibility (EPR) through Producers/Brand-owners

Attributes	Unit	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldesar	ULB-5 Rajgarh	ULB-6 Ratangarh	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar
Population (Projected)	[Nos as per 2021	137071	41787	22260	31056	68197	81029	14755	111447	117136	38729
No of Producers associated with ULBs	[Nos] / [None]	None	None	None	None	None	None	None	None	None	None
Financial support by Producers / Brand owners to ULBs	[Nos] / [None]	None	None	None	None	None	None	**none**	None	None	None
Amount of PRO Support	[Rs]	0	0	0	0	0	0	0	0	0	0
Infrastructure support by Producers / Brand owners to ULBs	[Nos of Producers] / [None]	None	None	None	None	None	None	None	None	None	None
No of collection centers established by Producers / Brand owners to ULBs	[Nos] / [None]	None	None	None	None	None	None	None	None	None	None

Table 4.7. List of actions and cumulative status in each of the ULB to minimize the plastic waste generation between Jan 2019 to Dec 2020

Nam of ULB	Actions/ Laws enforced to minimize the plastic waste generation	Cumulative status						
		Ban of Plastics bags	Recycle of Plastic Waste	Authorization of PW pickers	Amount of Plastic waste Collected (TPD)	Amount of Plastic Waste recycled (TPD)	Amount of Plastic Waste Dumped Untreated (TPD)	Supply to cement factories/Kilns for coprocessing T
ULB-1 Churu	Implementation of ban on plastics below <50 microns' thickness and single use plastics. Also Compliance of Plastic Waste as per Rule 05 and 06 of PWM Rules 2016	Yes, Partial	No	15	0.35	0	3.1	0.110T
ULB-2 Bidasar	Implementation of ban on plastics below <50 microns' thickness and single use plastics. Also Compliance of Plastic Waste as per Rule 05 and 06 of PWM Rules 2016	Yes, Implemented	No	Not initiated	0	0	1.05	0.100T
ULB-3 Chappar	Implementation of ban on plastics below <50 microns' thickness and single use plastics. Also Compliance of Plastic Waste as per Rule 05 and 06 of PWM Rules 2016	Yes, Partial	No	Not initiated	0.3	0	0.26	0
ULB-4 Rajaldesar	Implementation of ban on plastics below <50 microns' thickness and single use plastics. Also Compliance of Plastic Waste as per Rule 05 and 06 of PWM Rules 2016	Yes, Partial	No	Not initiated	0	0	0.78	0
ULB-5 Rajgarh	Implementation of ban on plastics below <50 microns' thickness and single use plastics. Also Compliance of Plastic Waste as per Rule 05 and 06 of PWM Rules 2016	Yes, Partial	No	34	0.26	0	1.46	0
		Ban of Plastics bags	Recycle of Plastic Waste	Authorization of PW pickers	Amount of Plastic waste Collected (TPD)	Amount of Plastic Waste recycled (TPD)	Amount of Plastic Waste Dumped Untreated (TPD)	Supply to cement factories/Kilns for coprocessing T

Nam of ULB	Actions/ Laws enforced to minimize the plastic waste generation	Cumulative status						
		Ban of Plastics bags	Recycle of Plastic Waste	Authorization of PW pickers	Amount of Plastic waste Collected (TPD)	Amount of Plastic Waste recycled (TPD)	Amount of Plastic Waste Dumped Untreated (TPD)	Supply to cement factories/Kilns for coprocessing T
ULB-6 Ratangarh	Implementation of ban on plastics below <50 microns' thickness and single use plastics. Also Compliance of Plastic Waste as per Rule 05 and 06 of PWM Rules 2016	Yes, Implemented	No	25	0.2	0	1.84	0
ULB-7 Ratannagar	Implementation of ban on plastics below <50 microns' thickness and single use plastics. Also Compliance of Plastic Waste as per Rule 05 and 06 of PWM Rules 2016	Yes, Implemented	No	Not initiated	0	0	0.37	0
ULB-8 Sardarsahar	Implementation of ban on plastics below <50 microns' thickness and single use plastics. Also Compliance of Plastic Waste as per Rule 05 and 06 of PWM Rules 2016	Yes, Partial	No	7	0.4	0	2.41	0
ULB-9 Sujangarh	Implementation of ban on plastics below <50 microns' thickness and single use plastics. Also Compliance of Plastic Waste as per Rule 05 and 06 of PWM Rules 2016	Yes, Partial	No	Not initiated	0.5	0	2.45	0.007T
ULB-10 Taranagar	Implementation of ban on plastics below <50 microns' thickness and single use plastics. Also Compliance of Plastic Waste as per Rule 05 and 06 of PWM Rules 2016	Yes, Ppartial	No	Not initiated	0.24	0	0.73	0

From the attributes of Table 4.7, the following observations have been inferred:

- The collected plastic waste is being supplied to the nearest cement factories in ULB-1, ULB-2, and ULB-9. Authorization of plastic waste pickers should be given prime importance to ensure the effective collection of plastic waste. This exercise will also promote and create awareness that plastic waste is being collected individually. From the collected inventory data, it is noticed that notable quantity of plastic is being generated in majority of the ULB's. Unfortunately, the collected data infers to the fact that the plastic waste is not being recycled. 30% of the ULB are still to achieve the prohibition of plasticbags (<50 micron). ULBs should ensure corrective measures to ban carry bags and other single use plastics.
- In all the ULB's, implementation of the ban on plastics below <50 microns' thickness and single-use plastics has been done. Also, though the compliance of Plastic Waste as per Rule05 and 06 of PWM Rules 2016 has been attempted, it is felt that it should be executed moresystematically. Awareness programs to be conducted to inculcate best practices. All the rural areas should also be considered for the complete elimination of plastic usage. A detailed inspection by each ULB is also recommended to get an accurate inventory of plastic waste generation and its usage through different means.
- The segregated plastic to the cement plants is minimal from all the ULBs. Churu, Bidasar, and Sujangarh have sent a small quantity of seized plastics to the cement kilns for co- processing. All ULBs must ensure segregation and collection of plastic waste through MRF centers. They should collaborate with appropriate NGOs and authorize well-equipped plastic waste pickers to improve the efficiency of the collection system.
- It is inferred that the concept of clusters would help in the effective management of plastic waste. The ULB which is not practicing the transfer of plastic waste can coordinate with the nearest ULB and transfer the quantity that is being generated by them to minimize the overall transportation cost. This activity may also help to generated revenue for the development of each ULB.
- Distance and the quantity of plastic waste generated in an ULB could be the vital factors that is impairing to transport the plastic waste to the cement factory. Under these prevailing

conditions, the concept of clusters would help in the effective management of plastic waste. The ULB which is not practicing the transfer of plastic waste can coordinate with the nearest ULB and transfer the quantity that is being generated. This activity may also help to generate revenue for the development of each ULB.

4.2. Implementation of plastic waste management rule, 2016

A short survey is conducted to collect the status of implementation of plastic waste management rules, 2016 and the collated information is shown in **Table 4.5**. From the collected attributes, it is evident that seven (Churu, Chappar, Rajaldesar, Rajgarh, Ratannagar, Sardarsahar, Sujangarh and Taranagar) out of ten ULBs need to enforce the implementation of policies mentioned in PWM, 2016 in a much more aggressive way to prohibit sales of Carry bags < 50 microns and banning on Carry bags and other single-use plastics as notified by the State Government completely. Though Bidasar, Ratangarh, and Ratannagar prohibited sales of Carry bags < 50 microns, they should create awareness among the masses to inculcate best practices for not using plastic carry bags and other single-use plastics.

4.3 Projection of future generation of plastic wastes

Collection, segregation, processing and disposal of plastic waste is a serious concern. In fact, government and local authorities has banned some type of plastic even though the utilisation of plastic (in various forms of households items) has been increasing day by day resulting a steep increase in plastic wastes, industrial items and vehicles etc. On the basis of present data/ information available, the future plastic waste generation is given in **Table 4.8**. This estimation is based on the per capita present contribution in urban and in rural areas. It is well known fact that increase in earning leads to generation of more plastic wastes.

Table 4.8: Future Assessment of plastic waste generation in Churu District

	Year-wise assessment of Plastic waste generation(Ton/day)			
Year	**2011**	**2021**	**2036**	**2051**
Total Plastic Waste Generationin Churu District	21.55	24.95	30.35	36.13
Plastic Waste Generation inRural Areas of Churu	7.02	8.23	10.23	12.46
Plastic Waste Generation in Urban Areas of Churu	14.52	16.72	20.12	23.66
ULB-1 Churu	3.03	3.45	4.09	4.73
ULB-2 Bidasar	0.90	1.05	1.28	1.51
ULB-3 Chappar	0.50	0.56	0.66	0.75
ULB-4 Rajaldesar	0.69	0.78	0.92	1.06
ULB-5 Rajgarh	1.49	1.72	2.06	2.40
ULB-6 Ratangarh	1.79	2.04	2.42	2.79
ULB-7 Ratannagar	0.32	0.37	0.45	0.52
ULB-8 Sardarsahar	2.42	2.81	3.44	4.13
ULB-9 Sujangarh	2.56	2.95	3.54	4.16
ULB-10 Taranagar	0.82	0.98	1.26	1.60

4.4 Recommendations for the effective management of plastic waste

Plastic waste after due recycling can be used in road construction, as RDF, in cement kilns, power plants, etc. A few of the areas in which plastic waste can be used are mentioned below:

1. Utilization of Plastic Waste in Road Construction:

As per circular from PWD letter No. SE/Road/2018- 19/D-707 dated 04/04/2019 for road construction, it has been suggested that plastic waste has great potential for bituminous construction. If added in small dosages (5-10%) by weight of bitumen, it helps in improving Marshall Stability, Strength, Fatigue Life and other desirable properties of bituminous mix and improves longevity and pavement performance, but uniform coating of plastic to be ensured. Thegenerated plastic waste should also be used in the construction of PMGSY roads.

2. Co-processing of Plastic Waste as Refuse Derived Fuel (RDF):

Co-processing refers to the use of waste materials in industry process such as cement kilns or anyother large combustion plants. Co-processing indicates substitution of primary fuel by waste as raw material, or materials recovered from waste. Waste materials such as plastic wastes, used forco-processing are referred as Refuse Derived Fuel. Co-processing of plastic waste offers advantages for cement industry or power plants in saving fossil fuels or raw material consumption and thus contributing in more eco-efficient ways of production.

3. Strengthening the governance by local governing bodies

Every local body shall be responsible for development and setting up of infrastructure for segregation, collection, storage, transportation, processing and disposal of the plastic waste eitheron its own or by engaging agencies or producers.

The local body shall be responsible for setting up, operationalization and co-ordination of the wastemanagement system and for performing the associated functions, namely

a) ensuring segregation, collection, storage, transportation, processing and disposal of plastic waste
b) ensuring that no damage is caused to the environment during this process
c) ensuring channelization of recyclable plastic waste fraction to recyclers
d) ensuring processing and disposal on non-recyclable fraction of plastic waste in accordance withthe guidelines issued by the Central Pollution Control Board
e) creating awareness among all stake holders about their responsibilities
f) engaging civil societies or groups working with waste pickers
g) ensuring that open burning of plastic waste does not take place.

The local body for setting up of system for plastic waste management shall seek assistance of producers and such system shall be set up within one year from the date of final publication of these rules in the Official Gazette of India. The local bodies are recommended to frame bye-lawsincorporating the provisions of these rules.

The proposed action plan for management of plastic waste is presented in **Table 4.9**.

Table 4.9: Status and action plan for plastic waste management

Sr. No.	Action Point	Present Status	Gap	Timeline	Department
1.	To develop and set up infrastructure for segregation, collection, storage, transportation, processing and disposal of the plastic.	As per the data collected, it is apparent that all ULB's have created awareness to segregate plastic at the source. However, collection, storage, transportation, processing anddisposal of the plastic in an effective manner is not in practice currently.	Collection, storage,processing and disposalof the plastic needsattention to all ULBs.	The complete process should be placed withinnext one year to achievethe target of segregation, processingand disposal of plastic.	LSG Department (Municipal Bodies)
2.	Creating MaterialRecovery Facility(MRF)	It is operational only in Chappar, Ratangarh,Sujangarh, and Taranagar ULBs. The MRF in 4 ULBs Churu, Bidasar, Rajgarh and Sardarshahar is under construction stage and shall be ready to operate soon. Besides, these, in Rajaldesar and Ratannagar, an MRF facility is proposed.	Rajaldesar andRatannagar have to take necessary actions in installing an MRF centres in their respective ULB's.	All ULBs must install an MRF facility within next one year. Theyshould also maintain record of amount ofcollection of plasticwaste on daily basis.	LSG Department (Municipal Bodies)
3.	To frame bye laws incorporating theprovision of Plastic WasteManagement Rule	It is being partially implemented in all ULBs.Bidasar, Ratangarh, and Ratannagar have prohibitedsales of Carry bags < 50 microns. The remaining sevenULBs (Churu, Chappar, Rajaldesar, Rajgarh, Ratannagar, Sardarsahar,Sujangarh and Taranagar)need to enforce the implementation of policies mentioned in PWM, 2016 in amuch more aggressive way toprohibit sales of Carry bags < 50 microns and banning onother single-use plastics completely.	There is a need to create awareness among the masses to inculcate best practicesfor not using plastic carry bags and othersingle-use plastics.	All ULBs must prohibitsales of Carry bags < 50microns and ban on Carry bags and other single-use plastics completely within the next six months. They should createawareness programsmonthly to inculcate best practices for not using single-use plastics till this objective is fulfilled.	State LevelMonitoring Committee under The administrative control of DoE

Sr. No.	Action Point	Present Status	Gap	Timeline	Department
4.	The ULBs shallseize banned plastic carry bagsand impose fine ondefaulters as per provision of theRajasthan Municipalities Act, 2009 (Article 258)	It is implemented. Churu, Bidasar and Sujangarh haveseized 110 kg, 100kg and 7 kgof plastics respectively and supplied for co-processing in cement kilns..	All ULB's have to act seriously on seizing theplastic bags in casethey find any violationof the Act.	Since it is a policy- related issue, it is recommended to implement it within 3months.	Local self-government
5.	Organize IEC/BCC activities andawareness programmes in various districts involving Municipalities & other stake-holders.	No notable activities are being conducted to bring awareness by any of the ULBs	Local self- governmentsand NGO's need toactively participate. Self-helping groupscan also be formed to conduct theseactivities.	At least 6 activities per year may be organized to bring awareness among the people.	Local self-government / Non-government organizations, Self-helping groups
6.	To take steps forinimizing generation ofplastic waste and segregate plasticwaste at the source.	No specific measures arebeing taken	Surprise inspection activities should beconducted in each of the ULB's and it should be extended toall the rural areas.	Activities performedto segregate plasticwaste at the sourceshould be recorded. Continuous monitoring and inspection is essentialthrough competent authorities.	Local self- government/ Non-government organizations, Self-helping groups
7.	Recycling throughPyrolysis	It is not in practice in any ofthe ULB	All the ULB's should initiate the process ofthermal decomposition of plastic waste.		Local self-government
8.	Recycling throughuse in Roads	Plastic waste is not being usedin the road construction in anyof the ULB's	Local self-governmentshould promote theprospects of the using plastic waste in the road construction especially roads constructed under PMGSY.	This action can be takenin the next 2 years. If not a new road, plastic waste can also be used in the upgradation and maintenance activitiesof road network	Local self-government
9.	Co-processing in Kilns	Three out of ten ULB's, have only sent a minimal amount ofplastic to cement kilns in the past.	ULB generating relatively less quantity of plastic waste and faraway from cement factories shouldcoordinate with thenearest ULB which hasalready planned to transport the plastic waste to cement factory.	It may be brought to practice on monthly basis once a proper collectionand Segregation isdeveloped.	Local self-government

CHAPTER 5: CONSTRUCTION & DEMOLITION WASTE MANAGEMENT

This Chapter covers the present scenario of construction and demolition waste management of the Churu district in general and its status in different urban local bodies (ULBs) particularly. Finally, it emphasises the details of action plans along with the actionable points, present status of implementation, gap to be addressed, and proposed time line for completion with financial cost required. The activities are suggested by keeping in view of the future generation of wastes etc. with timelines for completing the tasks considering next 10-year projections.

5.1 Present scenario

The Construction & Demolition (C & D) Waste comprises of building materials, debris and rubbleresulting from construction, re-modeling, repair and demolition of any civil structure produced inthe district is presently being dumped on Road side and mostly filled in low lying areas.

The Construction and Demolition (C&D) waste management and utilization strategy is intended to help facilitate the implementation of the C&D Waste Rules 2016 to ensure that ULBs across the country are able to adopt proper C&D waste management and recycled products find appropriate and adequate utilization. Although India produces enormous amounts of C&D waste and volumes are expected to grow further with time, there are no reliable estimates of generation volume, eitherat the local or national level. Management of the waste has historically been poor, with a very small fraction diverted for reuse and the rest dumped, often in an unauthorized manner, causing myriad environmental problems. The C&D Waste Rules 2016 laid out detailed duties and responsibilities of different stakeholders ranging from waste generators to ULBs to state and central government ministries and agencies. It also provided templates for documents needed for each management step to ease implementation. However, implementation of these Rules has not been to the full extent, despite guidelines and advisories in support of the Rules being issued by different agencies such as CPWD, BMTPC, MoHUA, etc. Delhi and Ahmedabad have pioneered C&D waste management in India with adoption of Public Private Partnership (PPP) which is regarded as sustainable. Best practice in India and abroad shows that 80-90% of C&D waste can be reused after processing in a variety of applications including landscaping, earth works and civil engineering applications. Processing

technology is also not complicated, comprising mainly of crushing, screening and washing to recover coarse and fine recycled aggregates, which can then be used directly or converted into pre-cast products. Independent testing has confirmed that the quality of products made from recycled aggregates can meet relevant standards and cost of such products can also be competitive with that of conventional products provided transportation distances are not prohibitive. BIS and the Indian Roads Congress have also come up with standardsprescribing limits up to which recycled aggregates can be safely used in different applications.

Despite such prospects, C&D waste management and utilization has not progressed as envisaged under the 2016 Rules due to several factors. The biggest challenges are at the ULB level. In addition to land, financial resources and personnel constraints, ULB capacities to develop the management and business model are limited. In the absence of adequate state level facilitation, ULBs continue to dedicate their limited resources towards MSW, which is seen as a higher priority by the public. Additionally, the construction industry has its own set of challenges. Demolition hashistorically been dominated by small players with entrenched ways of working which often involve "getting rid" of the waste to cut costs. On the other hand, recycled products are perceived as inferior in quality and there are concerns about their economic viability. In these context, without a coordinated effort, implementation at the necessary scale will still remain a challenge for all its stakeholders. Ministry of Housing and Urban Affairs along with its specialized agencies and/or empaneled consultants shall handhold the ULBs for C&D waste management. An ad hoc expert task force needs to be created for developing a standard methodology for inventorisation and characterization of C&D waste. An online webportal, as part of the existing Swachh Bharat Mission portal, may be used for data agglomeration for proper inventorisation as well as for dissemination of best practices, toolkits on technology, management and business models, etc. In parallel, facilitation by state level agencies and departments (such as Urban Development) needs to be accelerated to ensure wide implementation throughout each state, and not just in a few pioneer cities. Special emphasis should be placed on the needs of smaller towns where the generation may not be enough to justify a large central processing facility.

Sustained engagement with the 4 construction industry will also be important, in collaboration with industry associations such as BAI, CREDAI, etc., addressing both their roles as responsible generators of waste and potential users of recycled products. Finally,

there needs to be a push to promote utilization of recycled products through a variety of channels including public procurement, development of standards and certification, green rating, quality assurance, GST rebates, and so on. This multi-faceted facilitation strategy, in collaboration with a wide range of stakeholders, needs to be sustained over the medium term, till the time a viable market for recycledproducts develops, allowing the private sector to profitably pursue recycling on its own.

As part of the on-going support to Resource Efficiency Strategy of NITI Aayog and European Delegation to India, the European Union Resource Efficiency Initiative for India (EU-REI),a consortium led by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH withThe Energy and Resources Institute (TERI), Confederation of the Indian Industry (CII) and adelphi proposed to develop a comprehensive Construction and Demolition (C&D) waste management strategy to promote circular economy in India. The goal of the strategy is to provide a framework of implementation of the C&D Waste Management Rules, 2016. Primary beneficiaries of the strategy will be the Urban Local Bodies (ULBs), Central and State Public Works Departments (CPWD & SPWD), Local Contractors. The strategy will strengthen the existing policy framework by Ministry of Environment, Forests and Climate Change (MoEFCC) as well as entrust Building Materials & Technology Promotion Council (BMTPC), Ministry of Housing and Urban Affairs (MoHUA) to further develop the implementation road map. Furthermore, the study will create additional value for relevant regulatory (e.g., Central Pollution Control Board) and implementingbodies, such as public enterprises involved in infrastructure development tasked with managementof C&D waste. In addition, the paper will inform strategic decision making on resource efficiencyat NITI Aayog.

5.2 Typical steps of processing C&D waste

Recycling of C&D waste starts with segregation of unwanted residual material such as plastic, wood, metal fragments, etc (constituting 10% of the total waste as per the TIFAC composition). The remaining bulky waste is fed into crushers and reduced to smaller and smaller sizes, with size fractions separated depending on end use. Fines are typically best recovered with a “wet process”. A simplified diagram depicting C&D waste processing is shown in **Figure 5.1.**

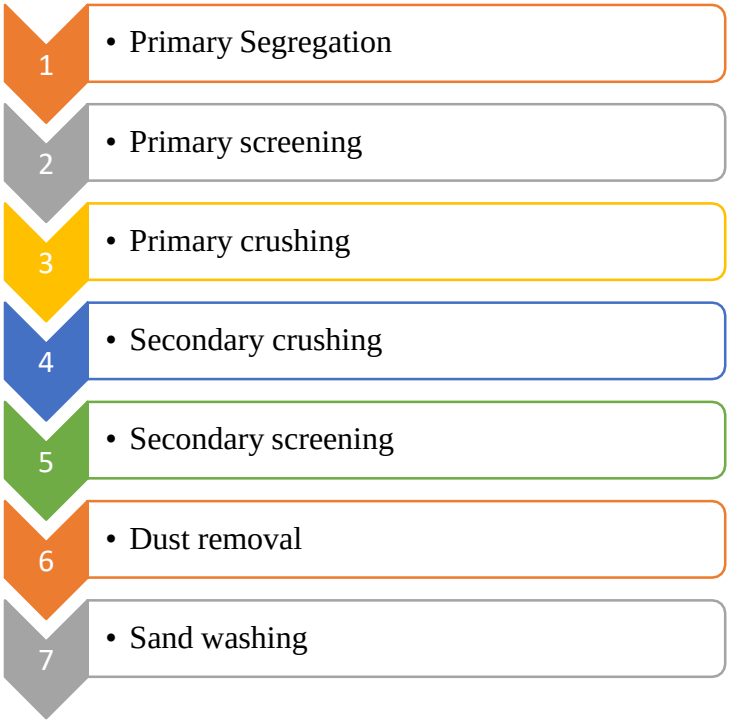


Figure 5.1: Typical steps involved in the recycling of C&D waste

These coarse and fine aggregates of various sizes can be used directly as recycled aggregates in construction or used to manufacture a range of pre-cast products. Products made from recycled aggregates typically tend to have a cost advantage over conventional products since natural aggregates are transported over long distances in most places. This holds true as long as the collection and transportation cost of C&D waste does not become exceedingly high due to long transportation distances.

5.3 Recommendations of National Building Code of India (2005)

As per National Building Code (NBC-CED 46) of India, 2005, part 11, the recycled aggregatescan be used in the following areas.

1. Concrete for bulk fills
2. Bank protection
3. Base/fill of drainage structures
4. Pavements
5. Sidewalks
6. Kerbs and gutters

Up to 30% percent of natural crushed coarse aggregate can be replaced by the recycled concrete aggregate. This can be increased up to 50% percentage for pavements and other where under pure compression specific to the standards and practices pertaining to construction of roads.

The Indian Roads Congress (IRC) has issued 'IRC-121:2017 Guidelines for Use of C&D Waste in Road Sector' outlining what kind of materials from recycled C&D waste and in what proportion,may be safely used for specific road construction/repair application.

5.4 Status of C&D Waste Management in ULB's

A detailed survey has been conducted in all the ULB's to collect the details of quantity of C&D waste. The existing C& D sites of Bidasar and Chhapar are shown in **Figure 5.2**. The summary ofthe collected data is shown in **Tables 5.1 to 5.4**.

Fig. 5.2A: C&D Dumping Yard Site in Bidasar Nagarpalika, Churu

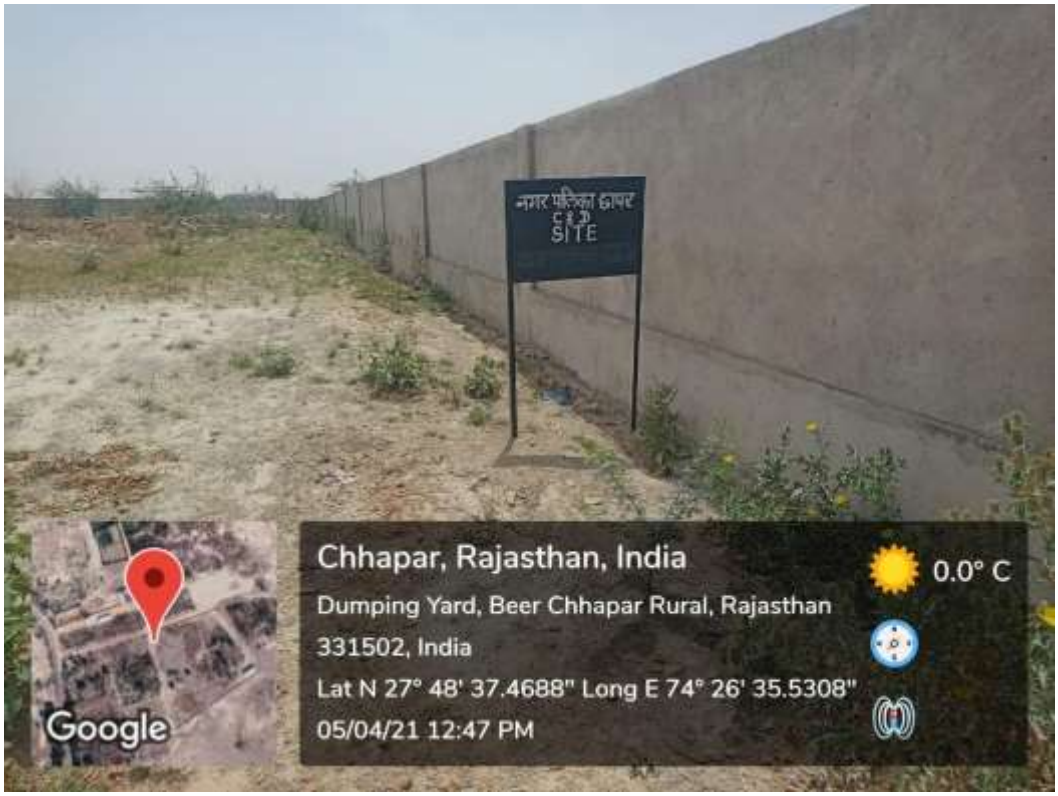


Fig. 5.2B: C&D Dumping Yard Site in Chhapar Nagarpalika, Churu

5.5 Identified challenges and roadblocks for utilizing C&D waste in construction

There remains a host of challenges and roadblocks faced by both government agencies and the private sector that are hindering a wider and quicker adoption of C&D waste management initiatives. It is important to properly understand these challenges so that proposed actions can target them effectively.

5.5.1. Municipal bodies/local authorities

Local authorities/municipal bodies have the most important role in planning and implementing C&D waste management in their respective jurisdictions under the 2016 Rules. Even if the collection, transport and processing is actually contracted out to a private entity, the local authority is ultimately responsible for the overall performance of the management scheme. However, local authorities/municipal bodies appear to be the weakest link hindering rapid adoption of initiatives and face several challenges. Several factors are responsible for this, including:

a) Officials may understand the broader aspects of C&D waste management but require support to develop tailor-made solutions to their specific circumstances;

b) ULB’s do not have adequate capacities and trained personnel to take up the initiatives;

c) ULB’s do not have financial resources to hire a consultant for an initial feasibility study and/ora DPR;

e) C&D waste management is considered a low priority (the public is more concerned aboutMSW), especially in the absence of strong coordination/facilitation by state-level agencies.

Table 5.1: Inventory of C&D waste generation

Attributes	Unit	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldesar	ULB-5 Rajgarh	ULB-6 Ratangar	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar
Population	[Nos as per 2011census]	120157	35683	19744	27419	59193	71124	12841	95911	101523	32640
Population (Projected)	[Nos in2021 Projected]	137071	41787	22260	31056	68197	81029	14755	111447	117136	38729
Estimated Quantity	[Kg/Day] / [Not estimated]	5270	300	350	Not estimated	2400	1000	Not estimated	2880	1600	Not estimated

Table 5.2: Establishment of C&D Waste Deposition centers

Attributes	Unit	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldesar	ULB-5 Rajgarh	ULB-6 Ratangar	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar
Population (Projected)	[Nos in2021 Projected]	137071	41787	22260	31056	68197	81029	14755	111447	117136	38729
Establishment of Deposition Points	[Yes] /[No]	Yes	No	Yes	No	Yes	Yes	No	Yes	Yes	Yes
C&D Deposition point identified	[Yes] /[No]	Yes	Yes	yes	No	Yes	Yes	No	Yes	Yes	Yes

Table 5.3: Implementation of By-Laws for CD Waste Management

Attributes	Unit	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldesar	ULB-5 Rajgarh	ULB-6 Ratangar	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar
Population	[Nos as per 2011census]	120157	35683	19744	27419	59193	71124	12841	95911	101523	32640
Population (Projected)	[Nos in2021 Projected]	137071	41787	22260	31056	68197	81029	14755	111447	117136	38729
Implementation of By-laws	[notified] / [not notified]	Notified	Notified	Notified	Notified	Notified	Notified	Not Initiated	Notified	Notified	Notified
Collection of Deposition / disposal Charges	[Initiated] / [Not initiated]	Not Initiated	Not Initiated	Not Initiated	Not Notified	Not Initiated	Initiated	Not Initiated	Not Initiated	Not Initiated	Not Initiated

Table- 5.4: Establishment of C&D Waste recycling plant or linkage with such facility

Attributes	Unit	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldesar	ULB-5 Rajgarh	ULB-6 Ratangar	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar
Population	[Nos as per 2011census]	120157	35683	19744	27419	59193	71124	12841	95911	101523	32640
Population (Projected)	[Nos in2021 Projected]	137071	41787	22260	31056	68197	81029	14755	111447	117136	38729
Establishment CD Waste Recycling Plant	[Established] / [Sentto shared Facility] / [No facility exists]	No Facility exists	No facility exists	No facility exists	No facility exists	No Facility exists	No facility exists	No facility exists	No Facility exists	No Facility exists	No Facility exists
Capacity of CD Waste Recycling Plant	[MT/Day] / [Not available]	Not available	Not available	Not available	Not available	Not available	Not available	Not available	Not available	Not available	Not available

b) Lack of monitoring capacity/resources

Local authorities/municipal bodies typically suffer from chronic shortages in personnel and resources. They are hard pressed to monitor, collect and dispose MSW adequately, a matter of greater concern to the public, and initiating a new C&D waste management system is an additional responsibility to them for which they feel unprepared. Most cities do not have demolition permits and therefore demolition sites and practices are poorly monitored, if at all. An ideal management plan would require the creation of a new C&D waste monitoring system, as envisioned by the 2016 Rules, for which effective coordination would be required between the ULB's Building Department and the Waste Management Department.

c) Lack of capacity and experience in C&D waste management

In addition to the overall capacity/resource issues, C&D waste management is a relatively new topic that many municipal officials have little awareness or experience of. Experience shows that even after capacity development workshops are held, local authorities/municipal bodies are unsure of how to proceed with waste estimation, feasibility planning, tendering and so on. In many cases, inexperience or prior negative experience with PPPs may be an additional cause of hesitation. The ability to hire a consultant for a feasibility study is limited by funding shortages; even when consultants are hired there is sometimes no guarantee that they will provide appropriate guidance.

d) Concern about finances and business case

Due to chronic financial pressures, local authorities/municipal bodies are instinctively wary of any new commitments that appear to them as a new source of expenditure. During capacity development workshops it is typically difficult to convince them about the successful business case employed in the Delhi and Ahmedabad models. The tipping fee paid to the contracted party by the ULB is seen as an unjustified burden when in reality it may not be a net expense given that:

a) the ULB saves money by not having to haul bulky C&D waste, and b) the 2016 Rules allow the ULB to impose charges on waste generators; tipping fees can be paid from this revenue. In some cases, urban officials have even proposed that the contracted party actually pay the ULB rather than receiving a tipping fee for each tonne of C&D waste, and/or share profits from selling recycled products with the ULB. Not surprisingly, this deters potential investors since recycled C&D wasteproducts are still a nascent market in India.

e) Lack of awareness and concern

The construction industry is entrenched in its ways and is historically used to turning a blind eye to how C&D waste is disposed; getting them to change their ways is likely to be a difficult and gradual task. At the same time, there is little awareness about **C**&D waste recycling and utilisationbeyond using rubble as a filling material

f) Dominance of the unorganized sector in demolition

The demolition sector is overwhelmingly dominated by small players in the unorganized sector, the only exception being a handful of specialized companies whose niche is high-tech demolition related to large infrastructure projects. This naturally makes it difficult for urban officials to monitor and regulate small demolition contractors who are typically not registeredand are used to getting away with disposing of C&D waste in unauthorized locations.

g) Lack of confidence in recycled products

The experience in Delhi and Ahmedabad has shown that the market for recycled products made from C&D waste is still quite weak in India. Engagement with the construction industry repeatedly demonstrates that potential buyers are hesitant about such recycled products that they perceive tobe inferior in quality. Even when informed about the updated BIS standard (383) that allows recycled aggregates in many applications, potential buyers appear risk averse, pointing to their clients who seem to prefer “conventional” products.

h) Poor economic viability of recycled products

Currently aggregates are taxed at 5% and manufactured products are taxed at 18% making the useof recycled products economically unviable for customers. GST relaxation for C&D waste recycled products including manufactured products such as tiles, paver blocks, bricks, sand and aggregates may be considered.

i) Low engagement by public construction agencies

State government agencies such as PWD, Housing Development Board/Authority, City Development Authority, public sector utility companies, etc. are involved in significant construction/demolition work. As per the 2016 Rules, these entities are supposed to coordinate with local municipal bodies about proper disposal of their C&D waste, implement in-situ utilization of C&D waste in their own projects wherever feasible, and adopt policies to

buy recycled products. However, engagement has remained weak, partly as a result of coordination challenges between state and local government level entities.

The proposed action plan for management of C&D waste is presented in **Table 5.5**.

Table 5.5: Action plan for C&D waste management

Sr. No.	Action Point	Present Status	Gap	Timeline	Department
1.	Inventorisation of C&D waste	All ULB's of Churu districtexcept ULB4, ULB7, ULB10 are currently maintaining theinventory of C&D waste being generated.	It is imperative to collect the statistics ofC&D waste being generated.	8 months	Local self-government
2	Establishment of C&D was tedeposition centers	All ULB's except ULB2,ULB4, ULB7 have establishedthe deposition centers as per the statistics collected.	Necessary actions are to be taken for the successful establishment of depositioncenters.	2 years	Local self-government
3.	Identification of C&D was tede position centers	All ULB's of Churu district except ULB4, ULB7, have identified the deposition centers.	Locations should be identified in ULB4 and ULB7 for the establishment of C&Dwaste deposition centers.	9 months	Local self-governments
4	Implementation of bye laws	All ULB's except ULB7 have notified regarding the implementation of bye-laws	Necessary actions are to be taken by LSG's to notify the implementation ofby-laws	9 months	Local self-governments
5	Collection of Deposition and disposal charges	Its implementation is underpractice only in ULB6	ULB's except ULB6 should take necessary action to collect the deposition and disposal charges	9 months	Local self-governments
6	Establishment of C&D was tere cycling center	None of the ULB's in Churu district have established C&D recycling centers	ULB's with no existing facilities shouldtake appropriate actions to establish the recycling center as it is anticipated that the C&D waste is going to increase in the near future	2 years	Local self-governments

CHAPTER 6: BIO MEDICAL WASTE MANAGEMENT

This Chapter mainly deals with the current status of bio-medical waste management in Churu district in general and its status in different urban local bodies (ULBs) particularly. Datasheet dulyfilled by concerned officials has been presented as per the format prescribed by CPCB for ModelDEPs. Finally, it emphasizes the details of action plans along with the actionable points, present status of implementation, gap to be addressed, and proposed time line for completion. The activities are suggested by keeping in view of the future generation of wastes etc. with timelines for completing the tasks considering next 15-year projections.

6.1 Present scenario disposal of hospitals biomedical waste: -

HCF's operating in District Churu have obtained connectivity with M/s Instromedix India Pvt. Ltd, operating its plant at Agra Road, Jaipur, for Collection, Transportation Treatment and Disposal of BMW, after due agreement with Municopal Council, Churu. Keeping in view of the fact that the disposal of biomedical waste is one of the important steps for protecting the environment, Municipal Council Jhunjhunu has also finalized land for installing CBMWTF in Jhunjhunu district and they have to take EC approval in due course of time. This site will serve the requirement of 3 districts, namely, Churu, Jhunjhunu and Sikar.

All vehicles transporting biomedical wastes have installed GPS system for its proper monitoring and to ensure that the collection of biomedical waste has been done appropriately. The location ofvehicles has also been tracked through GPS systems for their effective monitoring. It has been confirmed by the CMHO that the bio-medical waste disposal from all government hospitals has been done as per the prescribed rule. In case of non-compliance of disposal of bio-medical waste, instructions were issued to take strict actions against the respective Government/private hospitals and/or contractor as per rules. Presently the newly established Primary Health Centers do not have contract of disposal of bio-medical wastes with any company, which shall be completed very soon. The list of actions taken in each of the ULB's is collated with the help of a survey and telephonic conversations with the representatives of each ULB as shown in **Tables 6.1 to 6.7**. Also, data have been collected from Regional Officer, Rajasthan State Pollution Control Board, Sikar.

Table 6.1: Inventory of Biomedical Waste Generation in Churu District

S.No	Attributes	Unit	Total	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldesar	ULB-5 Rajgarh	ULB-6 Ratangar	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar
1a	Population	[Nos as per 2011 census]	2039547	120157	35683	19744	27419	59193	71124	12841	95911	101523	32640
1b	Population (Projected)	[Nos in 2021 Projected]	2377891	137071	41787	22260	31056	68197	81029	14755	111447	117136	38729
2	Total no. of Bedded Hospitals	[Nos] / [No inventory]	212	121	04	01	01	29	01	01	18	23	13
3	Total no. of non-bedded HCF	[Nos] / [No inventory]	33	16	00	00	00	04	01	00	02	08	02
3a	Total no. Clinics	[Nos] / [No inventory]	10	04	00	00	00	01	00	00	01	03	01
3b	No of Veterinary Hospitals	[Nos] / [No inventory]	00	00	00	00	00	00	00	00	00	00	00
3c	Pathlabs	[Nos] / [No inventory]	21	10	00	00	00	03	01	00	01	05	01
3d	Dental Clinics	[Nos] / [No inventory]	01	01	00	00	00	00	00	00	00	00	00
3e	Blood Banks	[Nos] / [No inventory]	01	01	00	00	00	00	00	00	00	00	00
3f	Animal Houses	[Nos] / [No inventory]	00	00	00	00	00	00	00	00	00	00	00
3g	Bio-research Labs	[Nos] / [No inventory]	00	00	00	00	00	00	00	00	00	00	00
3h	Others	[Nos] / [No inventory]	00	00	00	00	00	00	00	00	00	00	00

Table 6.2: Inventory of Biomedical Waste Generation in Churu District

Attributes	Unit	Total	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldesar	ULB-5 Rajgarh	ULB-6 Ratangar	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar
Bedded HCFs	[Nos Authorized]	212	121	04	01	01	29	01	01	18	23	13
Non-bedded HCFs	[Nos Authorized]	33	16	00	00	00	04	01	00	02	08	02

Table 6.3: Biomedical Waste Treatment and Disposal Facilities (CBMWTFs)

Attributes	Unit	Total	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldesar	ULB-5 Rajgarh	ULB-6 Ratangar	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar
Population	[Nos as per 2011census]	2039547	120157	35683	19744	27419	59193	71124	12841	95911	101523	32640
Population (Projected)	[Nos in2021 Projected]	2377891	137071	41787	22260	31056	68197	81029	14755	111447	117136	38729
No of CBMWTFs	[Nos] / None	00	00	00	00	00	00	00	00	00	00	00
Linkage with CBMWTFs	[Yes] / [no linkage]	HCF's operating in District Churu have obtained connectivity with M/s Instromedix India Pvt Ltd, operating its plant at Agra Road, Jaipur, for Collection, Transportation Treatment and Disposal of BMW, after due agreement with ULBs of Churu. Municipal Council Jhunjhunu has finalizedland for installing CBMWTF in Jhunjhunu district and they have to take EC approval. This site will serve the requirement of 3 district Jhunjhunu, Churu and Sikar.										
Capacity of CBMWTFs	[Adequate] / [Not adequate]	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Requirements of CBMWTFs	[Require] / [not required]	*Required	*Required	*Required	*Required	*Required	*Required	*Required	*Required	*Required	*Required	*Required
Captive Disposal Facilities of HCFs	[Nos] / [None]	None	None	None	None	None	None	None	None	None	None	None

*Required: One site is required to serve the requirements of entire Churu, Jhunjhunu and Sikar districts.

Table 6.4: Compliance by CBMWTFs

Attributes	Unit	Total	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldes	ULB-5 Rajgarh	ULB-6 Ratangar	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar
Compliance to standards	[Meeting] /[Not meeting] /[NA]											
Barcode tracking by HCFs / CBMWTFs	[100%] / [Partly %] /[None]	None	None	None	None	None	None	None	None	None	None	None
Daily BMW lifting by CBMWTFs	[Kg / day]	*	*	*	*	*	*	*	*	*	*	*

*The details of Daily BMW lifting by CBMWTFs is given in Tables 6.6 and 6.7

Table 6.5: Status of Compliance by Healthcare Facilities

Attributes	Unit	Total	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldesar	ULB-5 Rajgarh	ULB-6 Ratangar	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar
Pre-segregation	[100%] / [partly %] /[None]	90 %	90 %	90 %	90 %	90 %	90 %	90 %	90 %	90 %	90 %	90 %
Linkage with CBMWTFs	[100%] / [partly %] /[None]	M/s Instromedix India Ltd , Agra Road Jaipur has been presently authorised by ULB for collection, Transportation, Treatment and Disposalof BMW waste from all Health Care Facilities located in District Churu.										

Table 6.6: Quantity of Bio Medical Waste sent to TSDF site from Churu District in January 2021

Date	Red (kg/day)	Yellow (kg/day)	Blue (kg/day)	White (kg/day)	Total (kg/day)
01-Jan-21	46	109	71	0	226
02-Jan-21	38	100	73	0	211
03-Jan-21	28	100	66	0	194
04-Jan-21	26	83	62	0	171
05-Jan-21	35	66	28	2	131
06-Jan-21	53	85	46	0	184
07-Jan-21	18	47	23	4	92
08-Jan-21	427	105	44	2	578
09-Jan-21	33.5	128	56	4	221.5
10-Jan-21	24.45	82	61	0	167.45
11-Jan-21	33	127	87	0	247
12-Jan-21	33	77	61	0	171
13-Jan-21	36	84	49	0	169
14-Jan-21	25	58	33	1	117
15-Jan-21	24	38	26	0	88
16-Jan-21	77	152	65	0	294
17-Jan-21	29	66	64	0	159
18-Jan-21	36	45	23	3	107
19-Jan-21	53	71	36	1	161
20-Jan-21	85	122	18	0	225
21-Jan-21	60	96	29	2	187
22-Jan-21	53	75	38	0	166
23-Jan-21	43	57	30	0	130
24-Jan-21	27	59	31	0	117
25-Jan-21	60	94	69	0	223
26-Jan-21	9	49	15	2	75
27-Jan-21	75	63	55	0	193
28-Jan-21	57	107	66	2	232
29-Jan-21	53	71	55	0	179
30-Jan-21	36	55	40	0	131
31-Jan-21	14	31	38	0	83
TOTAL	1646.95	2502	1458	23	5629.95
				Avg. BMW	181.61

Table 6.7: Quantity of Bio Medical Waste sent to TSDF site from Churu District in February2021

Date	Red (kg/day)	Yellow (kg/day)	Blue (kg/day)	White (kg/day)	Total (kg/day)
01-Feb-21	27	142	27	0	196
02-Feb-21	31	85	20	0	136
03-Feb-21	39	98	70	1	208
04-Feb-21	40	46	34	0	120
05-Feb-21	23	95	29	0	147
06-Feb-21	28	37	55	1	121
07-Feb-21	29	70	29	0	128
08-Feb-21	19	98	39	2	158
09-Feb-21	43	102	63	1	209
10-Feb-21	47	100	59	0	206
11-Feb-21	24	71	70	0	165
12-Feb-21	25	82	52	0	159
13-Feb-21	28	58	39	1	126
14-Feb-21	15	93	20	1	129
15-Feb-21	35	110	61	0	206
16-Feb-21	23	47	42	0	112
17-Feb-21	30	118	43	1	192
18-Feb-21	42	73	67	1	183
19-Feb-21	33	28	40	0	101
20-Feb-21	18	59	18	1	96
21-Feb-21	33	87	41	0	161
22-Feb-21	20	70	53	0	143
23-Feb-21	36	77	57	1	171
24-Feb-21	24	109	20	0	153
25-Feb-21	29	110	19	0	158
26-Feb-21	19	77	49	1	146
27-Feb-21	33	77	18	0	128
28-Feb-21	39	56	20	0	115
TOTAL	832	2275	1154	12	4273
				Avg. BMW (kg/day)	152.61

6.2 Projection of future generation of Biomedical Wastes

Government of India has released “New Health Care Policy” in March 2017 to provide better health facilities and services to the entire population of India. According to WHO norms presently country is not meeting the availability of hospital beds for per 1000 population. As per the new health care policy total number of beds required in Churu district is given in **Table**

6.8. The total biomedical waste generation based on the total hospital bed requirement is givenin **Table 6.9**.

Table 6.8: Requirement of hospital beds for Churu District

Items	Total requirement in Urban Area		Total requirement inRural Area		Total requirement in Churu District	
Year	2036	2051	2036	2051	2036	2051
ICU Beds	439	516	1172	1428	1611	1945
Other HospitalBeds	1158	1362	3091	3766	4249	5127
Total	1597	1878	4263	5194	5860	7072
Remarks: Total requirements of hospital beds are on the basis New health care policy, 2017 and ICU beds requirements (0.55 beds/ 1000 population) is based on the findings of researchpapers.						

Table 6.9: Future Assessment of Biomedical waste generation for Churu District

Year	District Population	Total Beds	Total Biomedical waste generated (Ton/day) in Churu District
2036	2929773	5860	9.08
2051	2929773	7072	10.96
Remarks: Future assessment of biomedical waste generation is made on the basis of generation of biomedical waste per bed (as per published research data/ information)			

6.3. Implementation strategy of Bio-medical waste management

As in other solid waste management strategy, the first objective should be to achieve minimization and prevention of waste as much as possible. The next plan of action should be to ensure that biomedical wastes are not mixed with other waste and shall be collected and segregated at the site of generation itself. Segregation of waste into various categories has beengiven in Schedule-I of the Rules and Regulations. Biomedical waste can be collected in containers or bags of different colours for appropriate treatment. The colour coding, the type of container, and treatment options should be followed strictly as per the guidelines.

Some of the following essential points must be kept in mind while handling biomedical wastes:

1. Segregate waste at the point of generation.

2. Infectious wastes must not be mixed with safe general non-hazardous waste.
3. Loose garbage should not be thrown.
4. Colour-coded bins must be used all the times.
5. The garbage should not be thrown from the height.

The investment for an on-site waste management system in an individual health care setting is very high. In contrast, an integrated common treatment and disposal facility cost a maximum of IRS. 3—15/ kg/ day with an added benefit of no capital investment being required. The company/private entrepreneur setting up such a centralized facility will tend to make a profit of about 30 per cent, making it a sustainable venture. The advantages of a centralized facility are a reduction in pollution and energy consumption, streamlined collection, and treatment of waste.

The details of measurable and quantifiable targets, responsibilities of various departments with timelines for completing the tasks are presented in **Table 6.10**.

Table 6.10: Status and Recommendations on Adequacy of Status of ULB for Bio-medical Waste Management

Sr. No.	Action Point	Present Status	Gap	Timeline	Department
1.	Inventorisation of Medical facilities producing Bio- Medical Waste	Inventorisation hasbeen done in all ULBs	Not applicable	Once the facilities are established, they are recorded withdue pproval.	Medical &Health Department
2.	Preparation of Inventory ofBiomedical WasteGeneration	Under process	Proper quantification and recordkeeping is required	Data on bio-medical waste generation, treatment &disposal whichare to be updated quarterly .	Medical &Health Department and RSPCB
3.	Capacity building/trainingof HCFs	For proper management of the waste in the healthcare facilities the technicalrequirements of wastehandling are needed to be understood andpracticed by each category of the staff in accordance with the BMWM Rules, 2016.	No systematic process	It shouldbe completed within one year.	RSPCB & Medical &Health Department and RSPCB
4.	Authorisation of such facilities bySPCB/PCCs	HCF's operating in District Churu haveobtained connectivitywith M/s InstromedixIndia Pvt Ltd, operatingits plant in Jaipur, forCollection, Transportation Treatment and Disposalof BMW, after dueagreement	Though process is placed, it is important to implement the same in an effective manner to authorize eligible HCFs and	It should be completed within oneyear.	RSPCB

		with NagarParishad Churu.	clinical asper the prescribednorms.		
5.	Availability of CBMWTFs or Linkage	All ULBs have linkagewith M/s InstromedixIndia Pvt Ltd, AgraRoad, Jaipur, for Collection, Transportation Treatment and Disposal of BMW, after dueagreement with NagarParishad Churu.	Not applicable	Nagar Parishad Jhunjhunu has finalized landfor installing CBMWTF in Jhunjhunu district. The facility shall becompleted by June 2022. This facilityshall be used for Churu, Jhunjhunu andSikar districts.	Med. & Health Dpt. and RSPCB.
6.	Regular Inspection ofCBMWTFs	Performed (when)Presently Bio-medical wastes has been sent toM/s Instromedix India Pvt. Ltd, Agra Road, Jaipur which has been monitored by Jaipur Authorities	Not applicable	Once CBMWTF is established in Jhunjhunu, itshallbe monitored regularly andrandomly by the state officials includingChuru.	Team decidedby DistrictCollector
7.	Regular Inspection of HCFs	Performed by CMHO and team	Not applicable	More frequent Visits arerequired.	Team decided By District Collector
8.	Bar Code System	Implementation Status	Process of approving policy decisions	Shall be Functional byJune 30, 2021.	Med & Health Dpt.

CHAPTER 7: E-WASTE MANAGEMENT

This Chapter mainly deals with the current status of E-waste management in Churu district in general and its status in different urban local bodies (ULBs) particularly. Datasheet duly filled by concerned officials has been presented as per the format prescribed by CPCB for Model DEPs. Finally, it emphasizes the details of action plans along with the actionable points, present status of implementation, gap to be addressed, and proposed time line for completion.

7.1 Present scenario E-Waste management: -

The electronic goods contain hazardous materials like lead, mercury, cadmium and arsenic, which has been posing threats not only to the environment but also causing risks to the health of human beings. The risk factors of e-toxins related to our health and environment are harmful to lungs and kidneys, and peripheral nervous systems, increased risk of cancer, acute and chronic effects on plants, animals and micro-organisms.

E-waste or electronic waste can be defined as the electronic products nearing the end of their useful life such as discarded products like PCs, TV sets, cell phones, fax machines, microwave ovens, audio equipment, batteries, and the like. Most of the consumers are either unaware or ignore that computer and electronic equipment contain toxic materials and heavy metals. These materials, if thrown in the municipal solid waste stream, will end up in a landfill, or if incinerated, potentially create an unsafe environment by contaminating the land, water and air.

7.2. Implementation of E-Waste management

To reduce the environmental impact caused by improper disposal, and at the same time increase recycling, an efficient and effective computer and recycling depot should be facilitated for residents and business groups. These computer and other electronic equipment recycling depot should be able to collect all types of computer and electronic equipment such as monitors, central processing units (CPUs), laptop computers, printers, keyboards, fax machines, hard drives, modems, speakers, power sources, TV sets, VCRs, stereos, cellular phones, and wiring for recycling and reuse.

Also, proper awareness campaign on e-waste should be launched at frequent interval of time to keep e-waste out of landfills and incinerators. It is estimated that a major portion of electronic items is stored due to uncertainty of how to manage it. Due to this problem, later

on, they get easily mixed with municipal solid waste, which are finally disposed of to the landfills. Such terrible situations can be avoided appropriate attention are given on urgent basis by the consumers, manufacturers, local self-governments, and the public.

Some of the waste minimization techniques are as follows:

1. Inventory management, proper control over the materials used in manufacturing process isan important way to reduce waste generation.
2. All materials be approved prior to purchase, and evaluated.
3. Ensure that only the needed quantity is ordered.
4. Production process modification.
5. Volume reduction. This technique removes the hazardous portion of a waste from a non- hazardous portion and reduces the volume and thus cost of disposing of a waste material. It can be achieved by source segregation and waste concentration.
6. Recovery and reuse.
7. Extended producer responsibility (EPR). Government intervention is necessary to implement EPR on products such as electric bulbs, tube lights, batteries, computers, TV sets, which cannot be handled individually or locally and which need expertise in their disposal.
8. Separate days and facilities may be set apart for disposal of non-degradable but reusable and recyclable waste such as select e-waste items. These may be collected and stored in RRUs and may be made available for the users on charge.
9. It is important to adopt a 'permit — process approach' while handling modern hazardous waste operations. This requires complex engineering and scientific facility, adequacy of trained operators, safety systems and proper expertise to be secured for compliance, enforcement, issues connected with such management schemes. In the context of high technological revolution catching up in the Indian economy, the possibility of huge

   accumulation of e-waste, the problem of e-waste management aggravates the overall solid waste management. Effective 'permit—process approach' is critical to monitor the performance of operating e-waste disposal. It is worthwhile to consider separate enforcement agencies for this purpose.

10. Most important and critical point is the prevention of waste rather than managing it. It is possible if the electronic parts which are in working condition can be donated for reuse andfor extending the lives of valuable products. Reuse also benefits society. It is therefore high time for the management to take measures for prevention of e-waste in a well-planned manner rather than having a 'wait and watch' policy. Not only will it save some anticipated disaster, but will also show the way to tackle this menace with proper E-waste managementstrategies.

The list of actions taken in each of the ULB's is collated with the help of a survey and telephonic conversations with the representatives of each ULB as shown in **Tables 7.1 to 7.4**. Also, data havebeen collected from Regional Officer, Rajasthan State Pollution Control Board, Sikar.

Table 7.1: Status of facilitating authorized collection of E-Waste

Attributes	Unit	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldesar	ULB-5 Rajgarh	ULB-6 Ratangar	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar
Population	[Nos as per 2011 census]	120157	35683	19744	27419	59193	71124	12841	95911	101523	32640
Population(Projected)	[Nos in2021 Projected]	137071	41787	22260	31056	68197	81029	14755	111447	117136	38729
Collection centers established by ULB in District	[Nos] / [None]	None	None	None	None	None	None	None	None	None	None
Collection centers established by Producers or their PROs in the District	[Nos] / [None]	One, Churu Customer care, Subhash Chowk, Ojhaki Gali, Churu	None	None	None	None	None	None	One, Gintala Mobile & Service Center, Opp. Police Station , Sardarsahar	None	None
Does the district has linkage with authorized E-Waste recyclers / Dismantler	[Yes] / [No]	No	No	No	No	No	No	No	No	No	No
No authorized E-Waste recyclers / Dismantler	[Nos] / [None]	None	None	None	None	None	None	None	None	None	None

Table 7.2: Status of Collection of E-Waste

Attributes	Unit	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldesar	ULB-5 Rajgarh	ULB-6 Ratangarh	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar
Authorizing E-Waste collectors	[Authorized] / [None]	None	None	None	None	None	None	No	None	None	None
Involvement of NGOs	[Yes] / [No] / [Nos]	No	No	No	No	No	No	No	No	No	No
Does Producers have approached NGOs/ Informal Sector for setting up Collection Centers.	[Yes] / [No] /[Nos]	No	No	No	No	No	No	No	No	No	No
Does ULBs have linkage with authorized Recyclers / Dismantlers	[Yes] / [No]	No	No	No	No	No	No	No	No	No	No

Table 7.3: Control E-Waste related pollution

Attributes	Unit	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldesar	ULB-5 Rajgarh	ULB-6 Ratangarh	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar
Population	[Nos as per 2011 census]	120157	35683	19744	27419	59193	71124	12841	95911	101523	32640
Population (Projected)	[Nos in 2021 Projected]	137071	41787	22260	31056	68197	81029	14755	111447	117136	38729
Does informal trading, dismantling, and recycling of e-waste exists in District	[Yes] / [No]	No	No	No	No	No	No	No	No	No	No
Does the administration closed illegal E-Waste recycling in the District	[Yes] / [No] / [Nos]	Data Not available with ULB	No	No	No	Data Not available with ULB	No	No	Data Not available with ULB	Data Not available with ULB	Data Not available with ULB
No of actions taken to close illegal trading or processing of E-Waste	[Nos]	0	0	0	0	0	0	0	0	0	0

Table 7.4: Creation of Awareness on E-Waste handling and disposal

Attributes	Unit	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldesar	ULB-5 Rajgarh	ULB-6 Ratangarh	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar
Population	[Nos as per 2011 census]	120157	35683	19744	27419	59193	71124	12841	95911	101523	32640
Population (Projected)	[Nos in 2021 Projected]	137071	41787	22260	31056	68197	81029	14755	111447	117136	38729
Does PROs / Producers conducted any District level Awareness Campaigns	[Yes] / [No] / [Nos]	No	No	No	No	No	No	No	No	No	No
Does District Administration conducted any District level Awareness Campaigns	[Yes] / [No] / [Nos]	No	No	No	No	No	No	No	No	No	No

7.3 Projection of future generation of E-Wastes

Currently, collection and disposal of E-Waste is not the focused area for all of us. In India onlyabout 10% E-Waste was collected in year 2018-19 and it was about 3.5 % in year 2017-18. Useof electrical vehicles, installation of solar panels, Computers, laptops and mobile phones etc. will increase in future and that will lead to generate huge quantity of E-Waste that has to be handled properly. Presently no data is available on E-Waste with the district authority. On thebasis of published data future plastic waste generation is given in **Table 7.5**.

Table: 7.5: Future Assessment of E-waste generation

Year	District Population	Total Projected E-waste (Ton/year) in the District
2036	2929773	3202
2051	3535887	5201
Remarks: Future assessment is based on the per capita present contribution (0.812 kg/ capita/ yr) with an increase of average 2% per year.		

CHAPTER 8: HAZARDOUS WASTE MANAGEMENT

Hazardous waste means any waste which by reason of characteristics such as physical, chemical,biological, reactive, toxic, flammable, explosive or corrosive, causes danger or is likely to cause danger to health or environment, whether alone or in contact with other wastes.

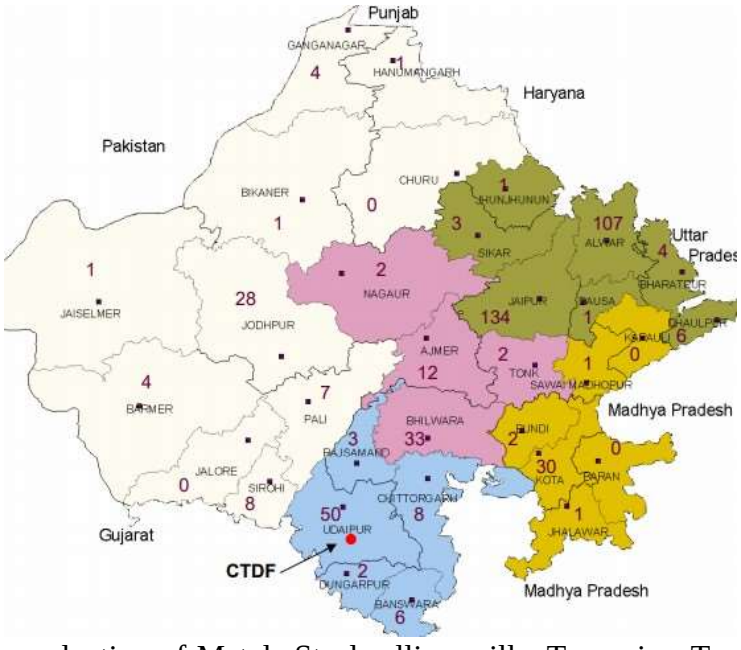
Hazardous waste is primarily generated from industrial activities and is required to be managed in an environmentally safe manner. The management of the hazardous waste is regulated as per the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 (HOWMRules, 2016), notified by Ministry of Environment, Forest and Climate Change, Govt. of India under the Environment (Protection) Act, 1986.

The HOWM Rules, 2016, lays down provisions with respect to generation, packaging, storage, transportation, recycling/reprocessing, utilization, treatment, disposal, etc. of hazardous waste and obtaining authorization from the concerned State Pollution Control Board (SPCB) / Pollution Control Committee (PCC) for the same. The HOWM Rules, 2016, also lays down the responsibility of occupier of hazardous waste for their safe and environmentally sound management following the waste management hierarchy viz. prevention, minimization, reuse, recycle, recovery, utilization and lastly safe disposal.

The recycling and utilization as resource or energy recovery of hazardous waste are preferential option over disposal of hazardous waste since it conserves resources and leads to reduction of carbon foot print. Utilization of hazardous waste by co-processing in cement Kiln has proven a sustainable option because there is a dual benefit in terms of utilizing the waste as supplementary fuel as well as alternative raw material. The HOWM Rules, 2016, has stipulated provisions aboutsuch utilization of hazardous waste as resource or energy recovery. The HOWM Rules, 2016, stipulates provisions for maintaining records and filing annual returns pertaining to hazardous waste generation and their management. As per Rule 20(2) of the HOWM Rules, 2016, the occupier handling hazardous waste and operator of the disposal facility are required to submit the annual return (about hazardous wastes generation, storage, recycling, utilization, disposal, etc.) in the prescribed Form to SPCB/PCC by 30th June of every financial year. Based on which, SPCBs/PCCs are required to prepare annual inventory of the waste generated, recycled, utilized, disposed, etc. for the respective State/UT and submit the same to CPCB by 30th September of every financial year in accordance with the provisions stipulated under Rule 20(3) of the

HOWMRules, 2016. And, as per Rule 20(4) of the HOWM Rules, 2016, CPCB is required to prepare consolidated report on management of hazardous wastes and submit the same to the Ministry.

Under the provisions of the Hazardous Waste (Management & Handling) Rules, 1989, the State Board of Rajasthan had submitted the status of implementation of the rules in the State to the Hon'ble Supreme Court through its affidavit in July, 1997. Hazardous Waste (Management & Handling) Rules, 1989 were subsequently superseded by Hazardous Waste (Management, Handling & Transboundary Movement) Rules, 2008, vide notification dated 24/09/2008. The State Board of Rajasthan is regularly conducting survey, inspections of hazardous waste generating units in light of the amended rules and presently identified 763 units up to 30/6/2009 which are covered under the Schedule "1" and "2" of the amended Hazardous Waste (Management, Handling & Transboundary Movement) Rules, 2008. The summary of district wise hazardous waste generating units are presented in **Figure 8.1**. The type of industries, sector wise in the districts include Cement, Ceramic, Chemical, Chlor alkali, Common Treatment Facility, Drugs & Pharmaceuticals, Dyes & Dye intermediate, Electronics, Engineering, Fertilizer, Mining, Paints, Varnish & Ink, Pesticides, Petrochemical. Petroleum Drilling / Storage, Primary production of Zinc/Lead/



Copper, Secondary production of Metals Steel rolling mills, Tanneries, Textile, and Waste oil re-refiners.

Figure 8.1: Total number of hazardous was generating units in each district

With special emphasis on the hazardous waste generation in Jhunjhunu, a survey is

conducted in each ULB and the inventory of hazardous waste generation is collected and the collated information is shown in Table 8.1A to Table 8.1C. In addition to the inventory of hazardous data, considering the inventory of solid waste generation, it is noticed that domestic hazardous waste is being collected at the household level without separating it at the source and notable quantities has been found in ULB-6 (Ratangarh). For the effective management, it is recommended to separate it at the source. From the collated information, it is evident that no sources generating hazardous waste exist in Churu district. Since no hazardous waste is being emitted from the existing industries, no essential resources are required for the mitigations activities.

Table 8.1A. Inventory of Hazardous Waste

Attributes	Unit	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldesar	ULB-5 Rajgarh	ULB-6 Ratangar	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar
No of HW Generating Industry	[Nos.]	00	NA	NA	NA	NA	NA	NA	NA	NA	NA
Quantity of HW	[MT/Annum]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Quantity of Incinierable HW	[MT/Annum]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Quantity of land-fillable HW	[MT/Annum]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Quantity of Recyclable / utilizable HW	[MT/Annum]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Contaminated Sites and illegal industrial hazardous waste dumpsites: Nil											
Attributes	Unit	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldesar	ULB-5 Rajgarh	ULB-6 Ratangar	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar
No of HW dumpsites	[Nos] / [None]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Probable Contaminated Sites	[Nos] (provide list)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 8.1B. Inventory of Hazardous Waste

Authorization by SPCBs/PCCs											
Attributes	Unit	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldesar	ULB-5 Rajgarh	ULB-6 Ratangar	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar
No of industries authorized	[Nos]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Display Boardof HW Generation in front of Gate	[Nos]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Availability of Common Hazardous Waste TSDF											
Attributes	Unit	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldesar	ULB-5 Rajgarh	ULB-6 Ratangar	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar
CommonTSDF	[Exists] /[No] / [Sent to Other District within State]	*No	*No	*No	*No	*No	*No	*No	*No	*No	*No
Industries linkage with TSDF	[Nos.]	*No	*No	*No	*No	*No	*No	*No	*No	*No	*No

* Presently no Hazardous waste generation unit is operating in District Churu.

Table 8.1C. Inventory of Hazardous Waste

Linkage of ULBs in District with Common TSDF											
Attributes	Unit	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldesar	ULB-5 Rajgarh	ULB-6 Ratangar	ULB-7 Ratannagar	ULB-8 Sardar sahar	ULB-9 Sujan garh	ULB-10 Tara nagar
ULBs linkedto Common TSDFs for Domestic Hazardous Waste	[Yes] / [No]	Common TSDF is available at Udaipur and maintained by Udaipur Chamberof Commerce andIndustries (UCCI), Udaipur.Hazardous waste generate from aforesaid unit is been sent to UCCI for disposal .	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

CHAPTER 9: WATER QUALITY MANAGEMENT PLAN

Churu district is located in the dry state of the country. Churu, like an oasis, situated in the middleof the shifting golden sand dunes, opens the gate to the great desert of Thar. There is no major river system in the district, except for a few short, intermittent and ephemeral channels. The largest drainage course is Kantli river which enters the district in the south-eastern side from Jhunjhunu district and disappears near Rajgarh, discharging storm runoff only in the period of high rainfall. Recent studies of Landsat imageries have revealed the extension of present course of Kantli river, north of Rajgarh, up to district border, from where it has taken westward swing. The mosaic of Landsat imagery has also indicated frequent shifting of Kantli river course from eastward to present situation which probably joined the river Saraswati course, passing from the nearby area in recent time. The water obtained from this flowing river is used for irrigation purpose. However, ground water is the main source of water supply for irrigation purpose in this district. The demandfor water has been on the rise as there has been rapid increase in the population. As mentioned earlier, the important source of water in the regions of Churu is groundwater as fresh surface waterresources are limited. Groundwater is used for domestic, agricultural and industrial purposes in these regions. Water bearing formations in Churu district range from unconsolidated alluvium to semi consolidated sandstones and consolidated schistose rocks. The older and younger alluvium constituted of primarily sand of windblown and fluvial origin forms aquifers covering 71% of thedistrict area. The next most prominent aquifers in the district are sandstones (17.5%) followed by schist (6.8%) and limestone (4.7%) aquifers. The hard rock aquifers are prominent in southern andpartly in western part of the district. Ground water being the main source of water supply for drinking purpose in this district, due to low level of water and salty ground water, the Public Health Engineering Department (PHED) serving canal water through the scheme namely "Aapani Yojna"in the District for drinking purpose.

9.1 Groundwater scenario

Based on the nature of rock type and their porosity, the aquifer system of Churu district may be sub-divided broadly into following hydrogeological units. For

better visualization, the spatial distribution of different hydrogeological units is presented in **Figure 9.1**.

A) UNCONSOLIDATED FORMATION

1. Ground Water in Pre-Cambrian Crystalline basement

The rocks of basement complex are mainly Granite gneisses and schist, which occur as outcrop orshallow sub outcrop around Sujangarh and central south part of the district which form poor aquifer. Ground water occurs confined conditions in weathered portion of rock unit and in joints, fractures and other weak zones. The extent of weathering in the area is generally low and varies from 2 to 10 m in thickness. The yield of dug wells tapping these formations is generally poor which depends upon the extent of weathering and diameter of the well. The specific yield estimatedrange between 0.5 to 1.0 percent.

2. Aquifer of Bilara Limestone

The Bilara limestone overlying the basement crystalline rocks and Jodhpur sandstone, is associatedwith evaporate sequence which include gypsum, anhydrite and halite crystalline beds. The formation is uplifted due to faulting and exposed only the south western part of the district. In eastern part of the district it is totally eroded due to up throwing of faulted strata and in western part of the district it occurs below Nagaur group of rocks / these limestone evaporates are deep settled. The ground water in faulted zone of limestone are fresh and the aquifer yield copious discharge. However, in other area even hydraulic characteristics are favourable the water is too saline for most of the purposes.

3. Aquifer of Nagaur Group

The Nagaur group is composed of medium to fine grained sandstone, siltstone and shale, which often contains gypsum crystals. These formations are exposed in narrow belt between the major fault and basement crystalline rocks in south western part of the district. In this uplifted area theseformations form discontinuous phreatic aquifer. The thickness of saturated zone varies from few meters to about 30 meters. The transmissivity of aquifer is low ranging from 2.5 to 50 m^2 /day. The specific yield of the aquifer is estimated as 1%.

B) SEMI-CONSOLIDATED FORMATION

Palna series of Eocene age comprise fine to coarse grained well sorted sandstone, white to grey orpinkish in colour and are soft. Locally it is gravelly and intercalated with clay beds. It is underlain by Nagaur sandstone and topped by quaternary alluvium. Its thickness gradually increases towards west or south west, in western part of the basin and in eastern part it appears to be totally eroded.

C) UNCONSOLIDATED FORMATION

Aquifer of quaternary alluvium and aeolian sand. The major part of the district is covered with aeolian sand and quaternary alluvium which forms the chief source of ground water in the district.The alluvium comprises of fine to coarse grained sand, with gravel and pebbles, silt and clay withKankar. In western part of the district, it overlies the shale and palna sandstone, while in eastern part of the district, these are laid down over the eroded basement of pre Cambrian granite gneiss and Jodhpur sandstone.

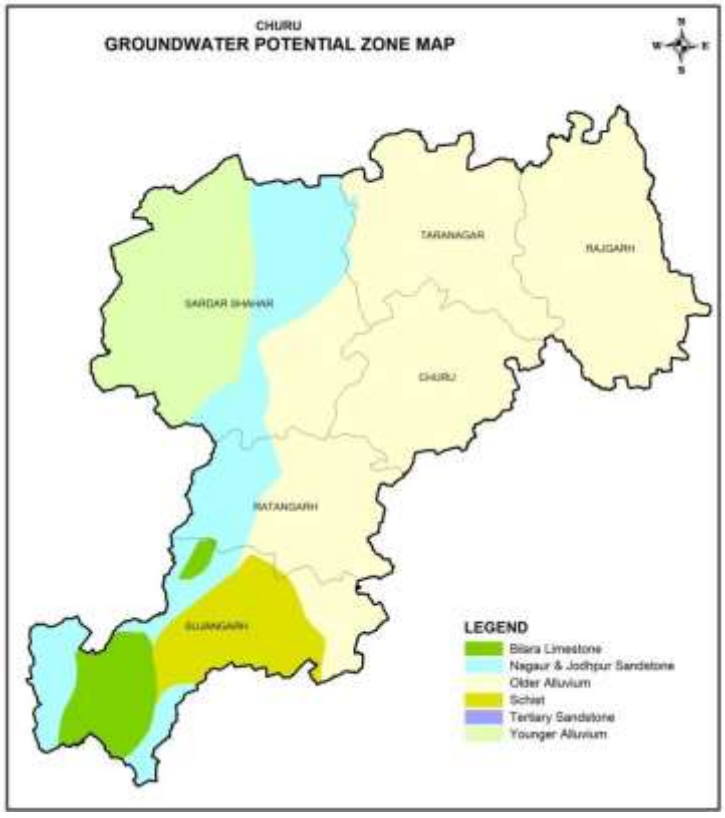


Figure 9.1. Hydrogeological map of Churu district (Source: CGWB)

9.2. Depth of water level

From the study conducted by CGWB (CGWB, 2019), it is observed that groundwater quality has been deteriorating due to rapid development and industrialization. Also, the population increase has put pressure on the groundwater. Therefore, there is a need for scientific planning in development of groundwater under different hydrogeological situation and to evolve effective management practices with involvement of community for better ground water governance. In view of emergent challenges in the ground water sector in the state there is an urgent need for comprehensive and realistic information pertaining to various aspects of groundwater resource available in different hydrogeological setting through a process of systematic data collection, compilation, data generation, analysis and synthesis. The water quality and quantity of ground water is monitored at few discrete wells in the district.

Therefore, mapping the ground water level, quality of ground water over the entire region of Churudistrict is the need of the hour. Considering this in view, a detailed study is performed by collatingthe information available with CGWB and Ministry of Jal Shakti. For better understanding of thescenario, water level and water quality is discussed separately.

Systematic and regular monitoring of ground water levels brings out the changes taking place in the groundwater regime. The maps so generated are of immense help for regional groundwater flow modelling which serves as a groundwater management tool to provide the necessary advanceinformation to the user agencies to prepare contingency plans in case of unfavorable groundwaterrecharge situation. The data also has immense utility in deciding the legal issues arising out of conflicting interests of groundwater users.

Water level data in Churu is monitored at 223 discrete locations. Among these borewells, 148 borewells are dug wells (DW) and 75 are piezo metric wells (PW). The spatial distribution of thesemonitoring wells is shown in **Figure 9.2**.

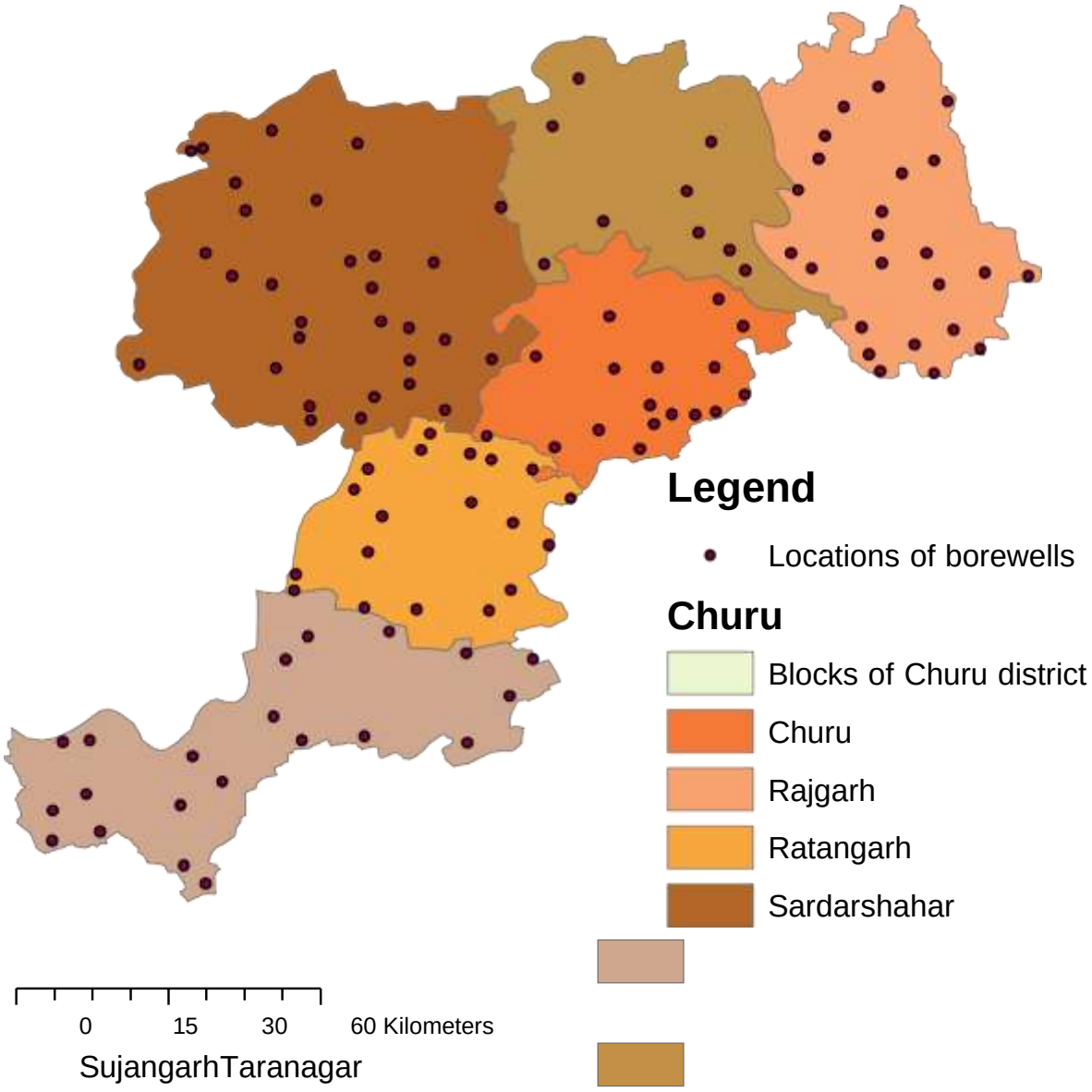


Figure 9.2: Spatial distribution of monitoring wells

The water level at these discrete locations during pre-monsoon season and post-monsoon season is reported by CGWB. The spatial variation of the water level during 2018 is shown in Figure 9.3.It may be noted that the localities of damaged and dry wells are not shown in the **Figure 9.3**.

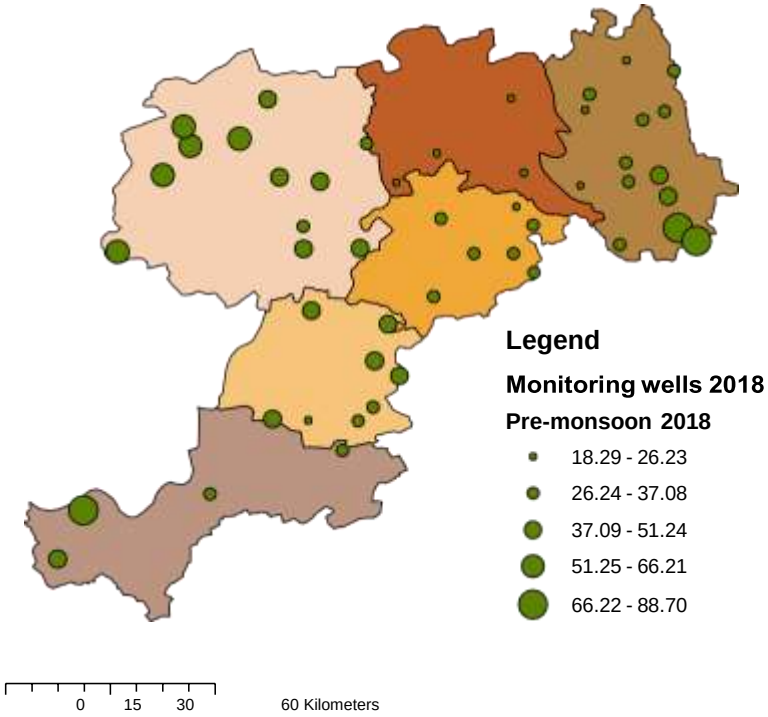


Figure 9.3. Water level data (m) in the wells during pre-monsoon well in the year 2018

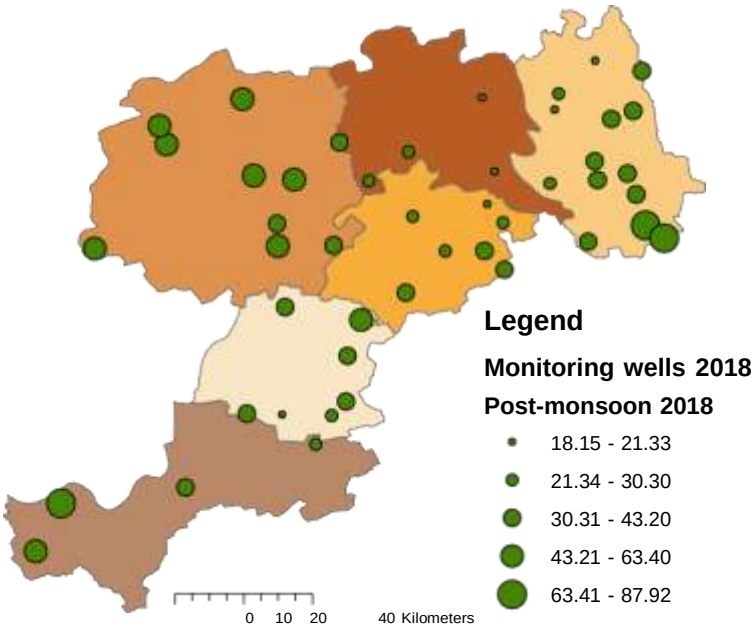


Figure 9.4. Water level data (m) in the wells during post-monsoon well in the year 2018

Equivalent data for the pre monsoon and post monsoon season during 2019 is shown in **Figure**

9.5 and Figure 9.6.

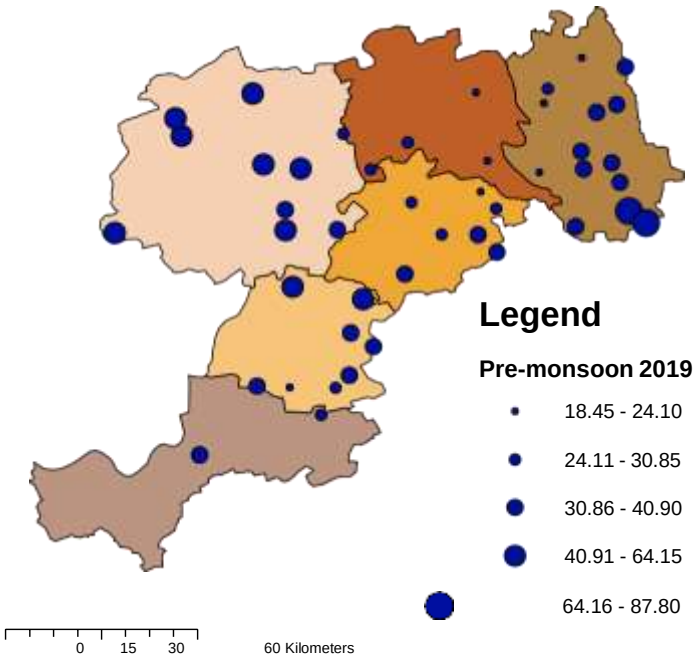


Figure 9.5. Water level data in the wells during pre-monsoon well in the year 2019

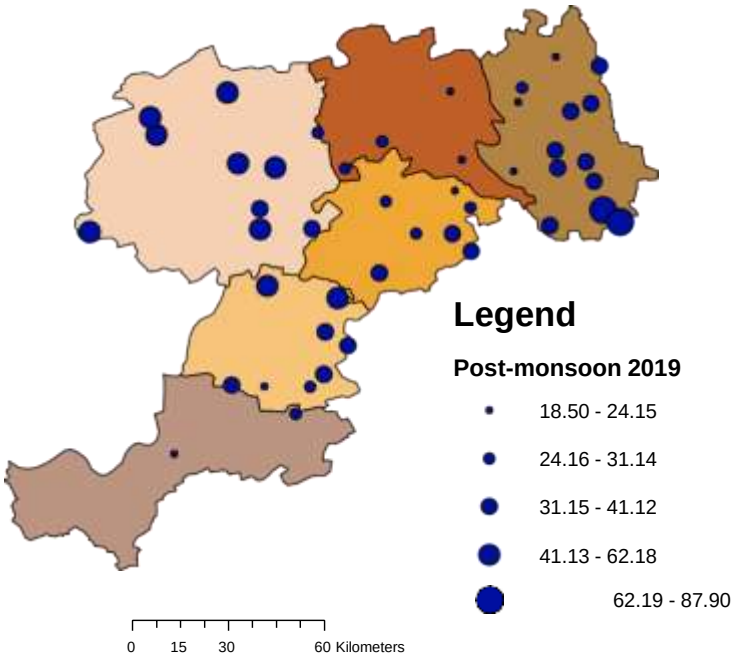


Figure 9.6. Water level data in the wells during post-monsoon well in the year 2019

For a better understanding of water level in the district, statistical analysis is performed and thegraphical summary of it is presented is presented in **Figure 9.7**.

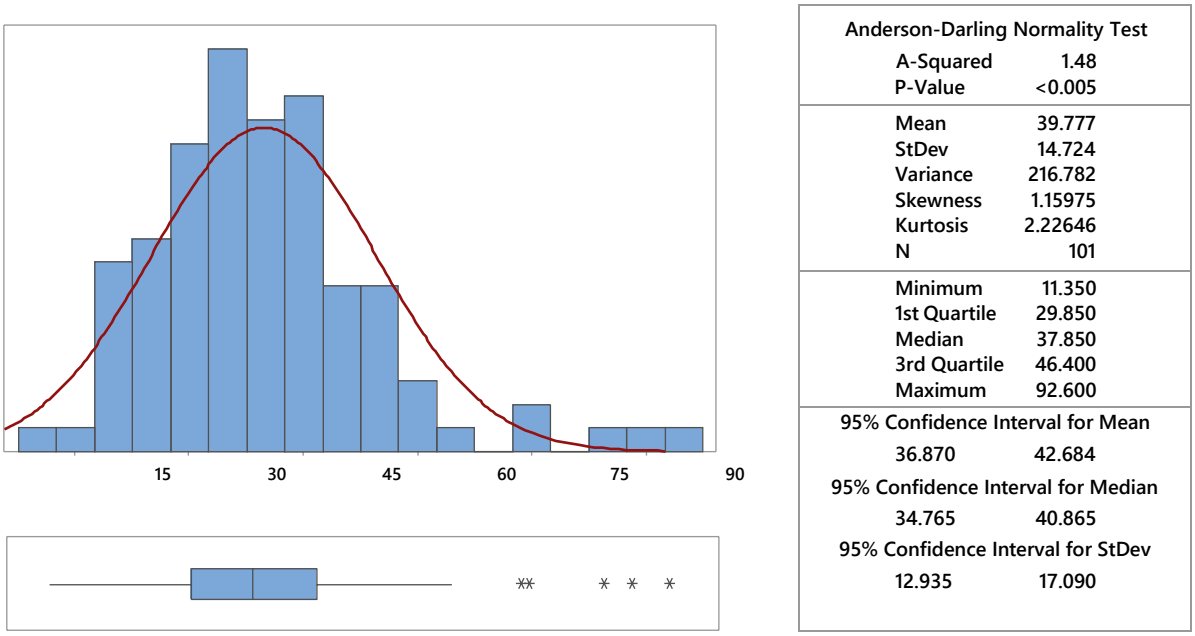


Figure 9.7. Graphical summary depicting the variation of water level in Churu district pre-monsoon season 2019

From **Figure 9.7**, it is evident that the variation of water level over the monitoring wells is notable.Nearly the water level at 26 borewells is below 29.85 meters while the water level in another 25 borewells is greater than 46.4 meters. The average water level of all the monitoring well is 39.77. Though the graphical summary presents a brief overview of water level in all the borewells in Churu district, the variation at the ungagged locations remains unmapped. An information on the water level over the entire Churu helps in the management of existing water resources. Considering this, spatial interpolation techniques are used to map the variation of water level over the entire district.

Kriging interpolation techniques are used to determine the spatial variation of the water level overthe entire region and the obtained variation is presented in **Figure 9.8**. Equivalent analysis is madefor post-monsoon 2019 period and the findings are presented in **Figure 9.9**.

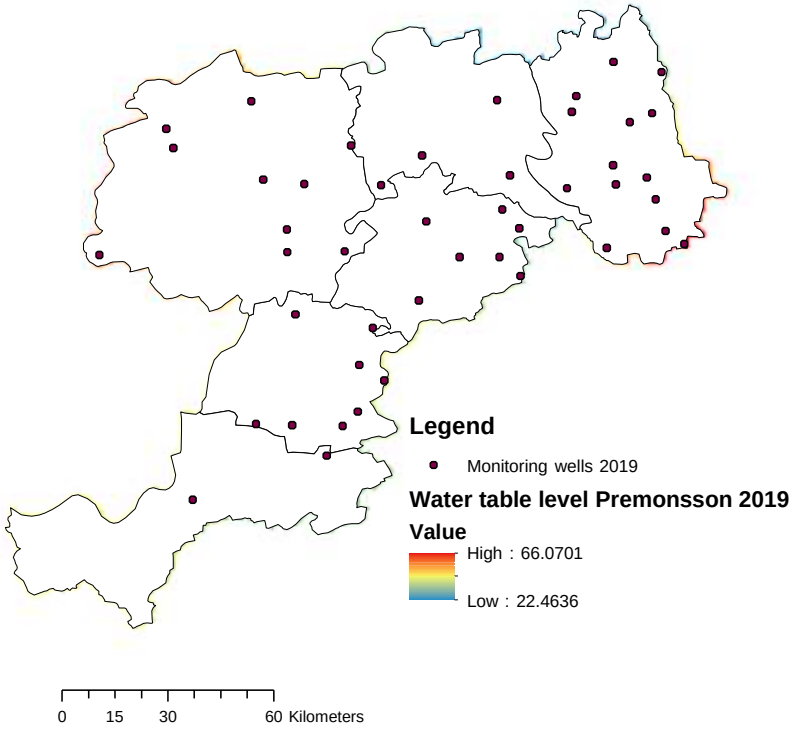


Figure 9.8. Variation of water level over Churu (Pre-monsoon, 2019)

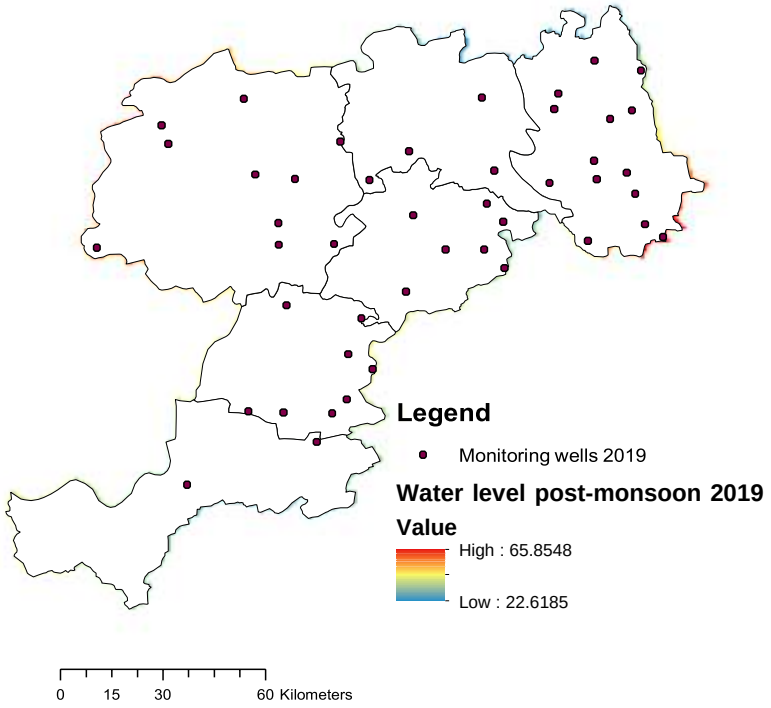


Figure 9.9. Variation of water level over Churu (Post-monsoon, 2019)

Among the monitored villages, 68% of the villages experienced a negative fluctuations and 32% of the villages experienced positive fluctuation of the water levels.

9.2 Ground water quality

The quality of ground water is alkaline in major part of the district. Presence of excess fluoride, nitrate, iron and electrical conductivity in ground water has been reported from some pockets in the district. Detailed analysis of water samples collected from each of the blocks is available in the portal of Jal Jeevan Mission (https://ejalshakti.gov.in/). The details of quality parameters such as Turbidity (NTU), Arsenic (mg/l), Fluoride (mg/l), Iron (mg/l), Chloride(mg/l), Nitrate (mg/l), Sulphates (mg/l), Calcium(mg/l), Magnesium (mg/l), Manganese (mg/l), Copper (mg/l), E -Coli (MPN /100 ml), pH(pH), Salinity (mg/l), TDS (mg/l), Hardness (mg/l), Residual Chlorine (mg/l), Alkalinity (mg/l), Aluminum (mg/l), Coliform (MPN/100ml) are analyzed under the supervision of Department of Drinking water and sanitation. The block wise statistics are analyzed and the findings are presented in **Table 9.1** below. The block wise comparison of water quality parameters is analyzed and the graphical summary of each variable is presented in **Figures 9.10-9.15**.

Table 9.1: Mean water quality of each block in Churu district

ULB/Number of samples		**Fluoride (mg/l)**	**Chloride (mg/l)**	**Nitrate (mg/l)**	**pH (pH)**	**TDS (mg/l)**	**Hardness (mg/l)**	**Alkalinity (mg/l)**
Bidasar (n=148)	Min	0.2	20	0	7.0	130	50	150
	Max	7.7	6300	240	8.2	6760	2010	800
	Avg	1.18	431.19	53.36	7.95	1299.37	605.9	450.86
Churu (n=690)	Min	0.02	10	5	7	10	30	10
	Max	8.2	9650	440	8.7	9380	3000	2810
	Avg	0.79	798.46	51.7	7.5	2438.24	524.16	307.26
Rajgarh (n=645)	Min	0.01	20	3	6.0	30	40	10
	Max	8.4	5150	240	9.1	9650	3840	2780
	Avg	0.75	389.7	27.57	7.37	1135.08	367.7	160.54
Ratangarh	Min	0.03	10	4	7	20	20	20
	Max	7.6	5300	400	9.1	9100	2500	1520

(n=365)	Avg	1.22	828.31	50.86	7.62	2324.01	577.06	473.86
Sardarshahar (n=425)	Min	0.1	0	5	7.0	280	30	40
	Max	3.8	2820	290	8.2	6060	2000	340
	Avg	0.675	302.09	34.65	7.43	1135.11	235.76	250.94
Sujangarh (n=301)	Min	0.01	20	5	6.4	140	40	40
	Max	10	8620	350	9.1	9810	2550	1830
	Avg	1.78	1100.16	62.85	7.62	2981.70	644.04	478.27
Taranagar (n=534)	Min	0	30	4	7.1	0.31	60	20
	Max	3.0	2740	230	7.9	5060	2060	500
	Avg	0.19	71.30	7.22	7.43	357.95	129.45	118.03

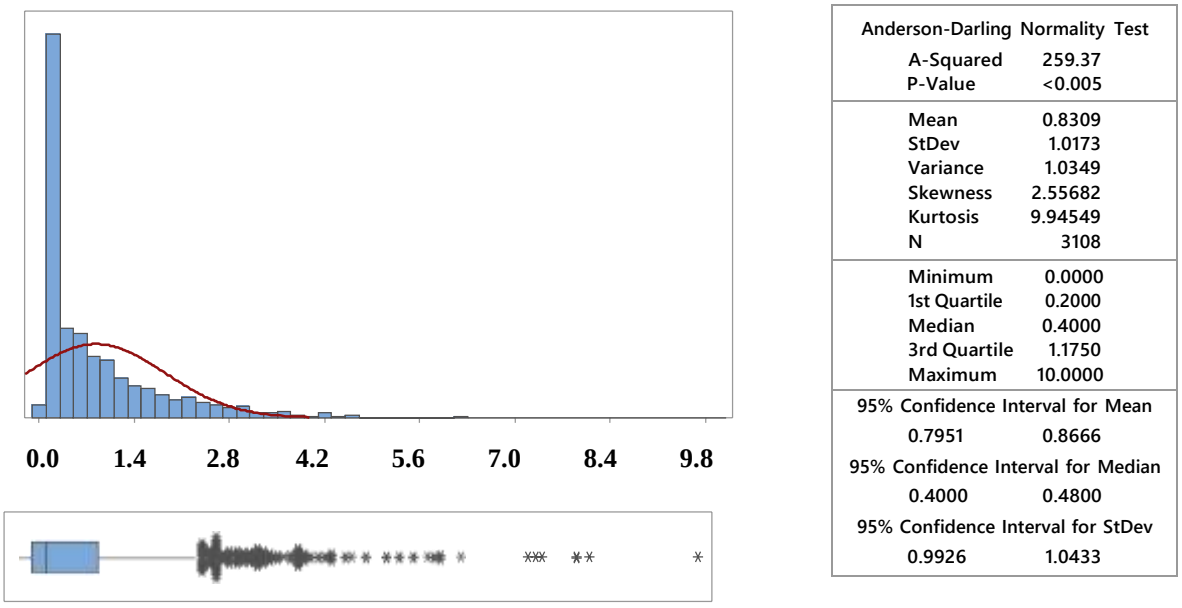
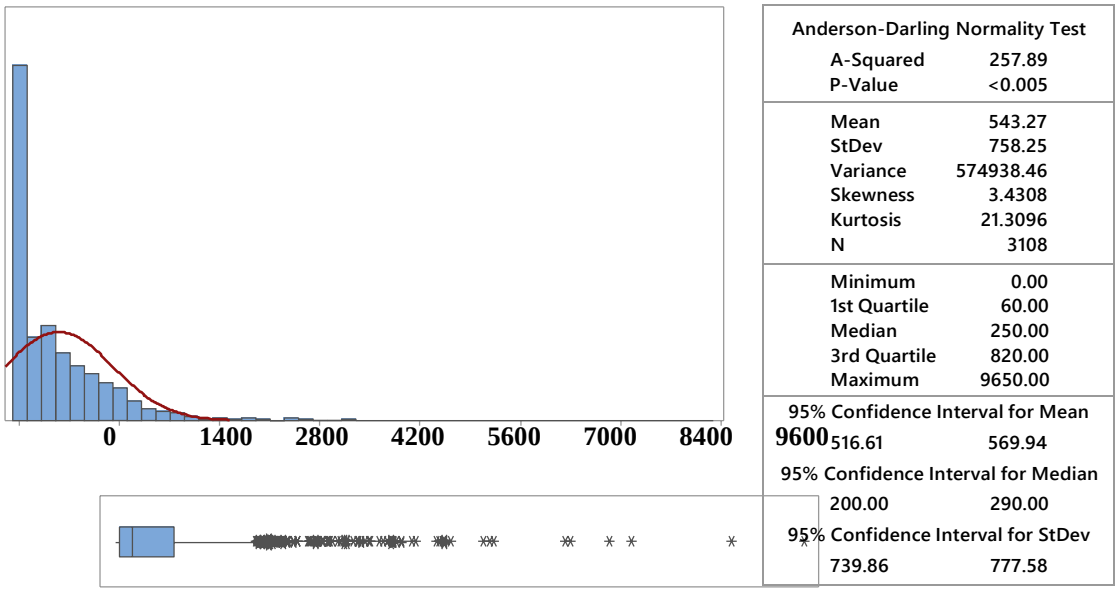
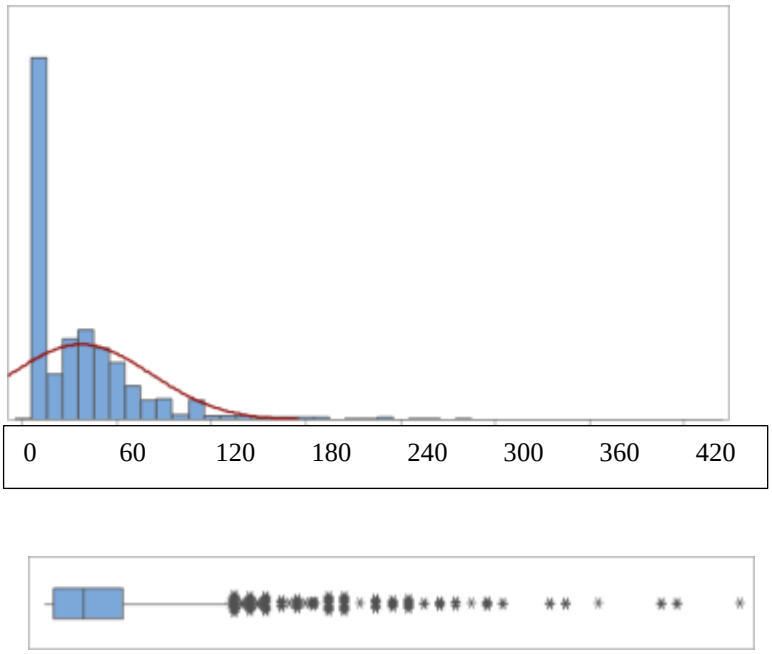


Figure 9.10. Statistical comparison of fluoride concentration in the blocks of Churu



Anderson-Darling Normality Test	
A-Squared	257.89
P-Value	<0.005
Mean	543.27
StDev	758.25
Variance	574938.46
Skewness	3.4308
Kurtosis	21.3096
N	3108
Minimum	0.00
1st Quartile	60.00
Median	250.00
3rd Quartile	820.00
Maximum	9650.00
95% Confidence Interval for Mean	
516.61	569.94
95% Confidence Interval for Median	
200.00	290.00
95% Confidence Interval for StDev	
739.86	777.58

Figure 9.11. Statistical comparison of chloride concentration in the blocks of Churu



Anderson-Darling Normality Test	
A-Squared	228.48
P-Value	<0.005
Mean	36.921
StDev	44.678
Variance	1996.126
Skewness	3.1338
Kurtosis	14.9886
N	3107
Minimum	0.000
1st Quartile	6.000
Median	25.000
3rd Quartile	50.000
Maximum	440.000
95% Confidence Interval for Mean	
35.350	38.493
95% Confidence Interval for Median	
22.384	30.000
95% Confidence Interval for StDev	
43.594	45.818

Figure 9.12. Statistical comparison of nitrate concentration in the blocks of Churu

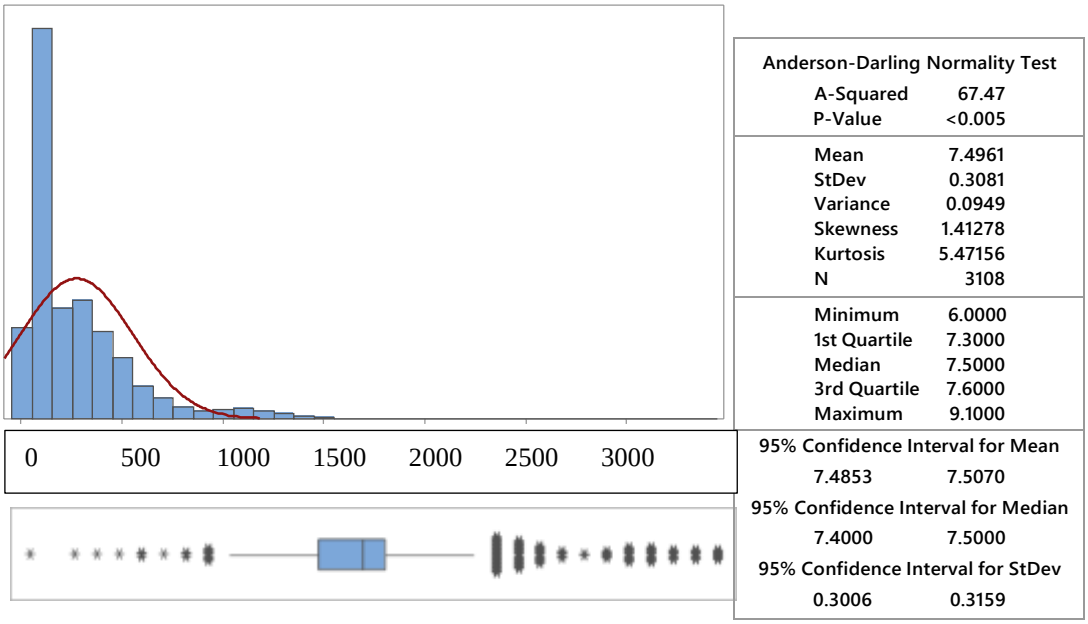


Figure 9.13. Statistical comparison of pH concentration in the blocks of Churu

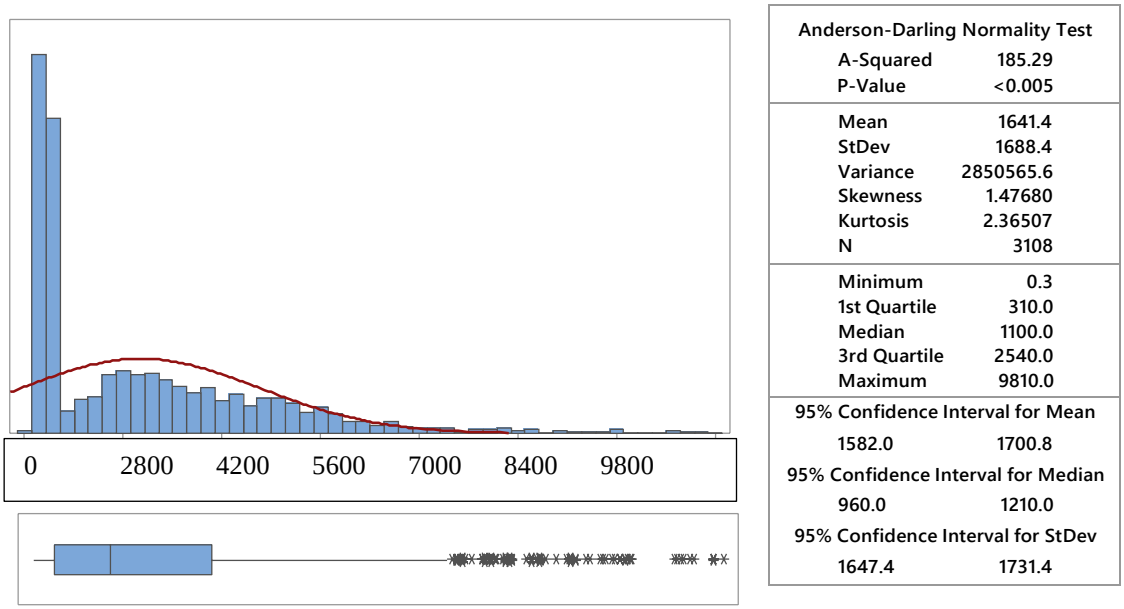


Figure 9.14. Statistical comparison of TDS concentration in the blocks of Churu

9.3. GROUND WATER RELATED ISSUES AND PROBLEMS

All the blocks in the district are over-exploited except Sardarshahar where stage of ground water development has exceeded 100 % leaving no further scope for ground water development. Theseblocks require judicious development of ground water. The quality of ground water is alkaline in major parts of the district. Presence of excess fluoride, nitrate, iron and electrical conductivity in

ground water has been reported from some pockets in the district.

Stage of ground water development in all the blocks in the district has exceeded 100%, which indicates that the scope of ground water development is already exhausted and the blocks have been categorized as “over-exploited”. There is no scope for further development of ground water for irrigation or industrial use. However, exploratory drilling can be taken up in unexploredarea for estimation of aquifer parameters. There is need to control and regulate ground water development in the entire district.

9.4. GROUND WATER DEVELOPMENT AND MANAGEMENT STRATEGY

In view of the ground water level, quality and the current practices as observed from the inventory of water quality and quantity data, the following recommendations are proposed.

- As the stage of ground water development in the district as a whole is 92.59%, practically no scope is left for construction of new ground water abstraction structures for irrigation purposes except for drinking water supply. However, out of six blocks, only one block viz. Sardarshahar block falls under safe category where a very limited scope of future ground water development exists owing to salinity hazard.
- Watershed development and control of soil erosion activities should be encouraged in thearea under different programmes.
- Surface run off can be harnessed by constructing tanks at feasible sites in the eastern part of the district for supplementing irrigation potential to increase the agricultural production.
- In areas affected with salinity hazard, salt tolerant crops should be encouraged for cultivation.
- Most parts of the district suffer from salinity problem, it is essential to

precisely identify the fresh water aquifers through borehole logging to avoid failure of tubewells in saline belt. Cement sealing should also be invariably done precisely to seal off the saline aquifer.

- Over-exploitation may disturb the hydrochemical balance of fresh and saline water interface leading to contamination of saline water ingress. Therefore, proper care should be taken to avoid over-exploitation. Clustering of tube wells should also be avoided.
- There is need to educate people to make them aware of importance of ground water, better practices of water use available in domestic, irrigation and industrial sectors, present

  ground water scenario, need and means of water conservation, artificial recharge techniques etc.
- Desalination and defluorosis plants may be installed in the areas /villages facing ground water salinity and fluoride hazards.
- Area is underlined by unsaturated moderate thickness of alluvial which provides sufficient scope of artificially augmentation of the ground water body as alluvial formation has very good storage and transmission capacity in the district.
- The surplus water during the rainfall can be used for artificial recharge through the various techniques feasible in alluvial and hard rock terrain. In alluvial area, following ways of recharge techniques may be adopted.
  i) Roof top/paved area rain water harvesting for recharge to ground water in urban and industrial area.
  ii) Village water runoff/roof top water harvesting by dug wells/percolation tanks in rural area.
  iii) Construction of recharge shafts with gabion structures in nalas.
  iv) Recharge by dug well/percolation pit in agriculture farm. In hard rock terrain nala bunding, anicuts, dug wells, percolation tanks etc. are feasible structures which may be used to recharge the ground water body. Technical guidance is provided to various organizations as and when approached.
- Mass awareness programmes should be arranged at local level to make common mass aware of importance of ground water resources, its better

practices of use in domestic, irrigation and industrial fronts, present status of ground water scenario, its conservation etc.

- Training programmes should be arranged at local level to teach the common mass of various techniques of artificial augmentation to ground water resources.

9.5. Status and Inventory of water resources in Churu District

A short survey is conducted to collect the information of Water Resources Management Information and Inventory of water resources in Churu District and the collated information is shown in **Tables 9.2 to 9.9.**

Table 9.2A: Inventory of water resources in District

Attributes	Unit	ULB-1 ChuruPop.	ULB-2 Bidasar Pop.	ULB-3 Chappar Pop.	ULB-4 Rajaldesar Pop.	ULB-5 Rajgarh Pop.	ULB-6 Ratangarh Pop.	ULB-7 Ratanna gar Pop.	ULB-8 Sardarsa har Pop.	ULB-9 Sujangarh Pop.	ULB-10 Taranagar Pop.
Population	[Nos as per projectedin 2021]	139371	41392	22903	29694	68664	84616	14907	111257	117767	37862
Rivers	Nos.	0	0	0	0	0	0	0	0	0	0
Length of Coastline	meter	0	0	0	0	0	0	0	-	0	0
Nalas/Drains meeting Rivers	Nos.	0	0	0	0	5	0	0	3	0	0
Lakes / Ponds	Nos.	0	0	0	0	0	0	0	0	0	0
Total Quantity ofsewage and industrial discharge in District	MLD	13.60	2.35	1.65	2.85	5.49	8.12	1.19	8.99	6.97	3.03

Table 9.2B: Details of Rivers in District

S. No.	Name of River	Entry Point	Exit Point	Length
1.	No River	No river is originated orflowing through Churu district	-	-

Table 9.2C: List of Dam in District Churu under Water Resources Division, Sikar

S. No.	Name of Dams	Tehsil	FTL In Ft	GS in Mcft	LS (Mcft)	CCA in Ha
1	No Dams in Distt.Churu	-	-	-	-	-

Table 9.2D: List of Dam in District Churu under Panchayat Raj Department

S. No.	Name of Dams	Gram Panchayat	PanchayatSamittee	Capacity InMCFT	CCA in Ha
1	No Dams in Distt. Churu	-	-	-	-

Table 9.3: Control of Groundwater Water Quality

Attributes	**Unit**	**ULB-1 Churu Pop.**	**ULB-2 Bidasar Pop.**	**ULB-3 Chappar Pop.**	**ULB-4 Rajaldesar Pop.**	**ULB-5 Rajgarh Pop.**	**ULB-6 Ratangarh Pop.**	**ULB-7 Ratannagar Pop.**	**ULB-8 Sardarsahar Pop.**	**ULB-9 Sujangarh Pop.**	**ULB-10 Taranagar Pop.**
Population	[Nos as per projected in 2021]	139371	41392	22903	29694	68664	84616	14907	111257	117767	37862
Estimated numberof bore-wells	[Nos]	145	15	11	55	45	97	20	66	57	0
No of permissions given for extraction of groundwater	[Nos]	145	15	11	55	45	97	20	66	57	0
Number of groundwater polluted areas	[Nos]	0	0	0	0	0	0	0	0	0	0
Groundwater Availability	[adequate] /[not adequate]	Adequate	Not Adequate	Not Adequate	Not Adequate	Not Adequate	Not Adequate	Adequate	Adequate	Not Adequate	Not Adequate

Table 9.4: Availability of Water Quality Data

Attributes	**Unit**	ULB-1 ChuruPop.	ULB-2 Bidasar Pop.	ULB-3 Chappar Pop.	ULB-4 Rajaldesar Pop.	ULB-5 Rajgarh Pop.	ULB-6 Ratangarh Pop.	ULB-7 Ratanna gar Pop.	ULB-8 Sardarsa har Pop.	ULB-9 Sujangarh Pop.	ULB-10 Taranagar Pop.
Population	[Nos as per projectedin 2021]	139371	41392	22903	29694	68664	84616	14907	111257	117767	37862
Creation of monitoring cell	[Yes] / [No]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Access to Surface waterand groundwater quality data at DM office	[Available] or [Not available]	Available	Available	Available	Available	Available	Available	Available	Available	Available	Available

Table 9.5: Control of River Side Activities

Attributes	**Unit**	ULB-1 ChuruPop.	ULB-2 Bidasar Pop.	ULB-3 Chappar Pop.	ULB-4 Rajaldesar Pop.	ULB-5 Rajgarh Pop.	ULB-6 Ratangarh Pop.	ULB-7 Ratanna gar Pop.	ULB-8 Sardarsa har Pop.	ULB-9 Sujangarh Pop.	ULB-10 Taranagar Pop.
Population	[Nos as per projected in 2021]	139371	41392	22903	29694	68664	84616	14907	111257	117767	37862
River Sideopen defecation	[Fully Controlled] / [Partly controlled] /[noMeasures taken]	NA*	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dumping ofSW on riverbanks	[Fully Controlled] / [Partly controlled] / [no Measures taken]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Control measures for idol immersion	[Measures taken] /[Measures taken post immersion] / [No Measurestaken]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

*NA-Not Applicable

Table 9.6: Control of Water Pollution in Rivers

Attributes	**Unit**	ULB-1 ChuruPop.	ULB-2 Bidasar Pop.	ULB-3 Chappar Pop.	ULB-4 Rajaldesar Pop.	ULB-5 Rajgarh Pop.	ULB-6 Ratangarh Pop.	ULB-7 Ratanna gar Pop.	ULB-8 Sardarsa har Pop.	ULB-9 Sujangarh Pop.	ULB-10 Taranagar Pop.
Population	[Nos as per projected in2021]	139371	41392	22903	29694	68664	84616	14907	111257	117767	37862
Percentage of untreated sewage	[%] (automatic SM1g/SM1 a)	6.7*	4.2*	2.2*	3.1*	1.8*	8.1	1.5*	4.1*	11.7*	3.9*
Monitoring of Action Plans forRejuvenation ofRivers	[Monitored] / [Not monitored] [not applicable]	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable

No of directions given to industriesfor Discharge of Untreated industrial wastewater in last 12 months	[Nos]	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable

*Churu Municipal Council: The present treatment capacity is 7.00 MLD and 90% of targeted population is connected in 2021. As per 2021 projected population, quantity of sewage generated in the Municipal Council is 13.7 MLD hence another STP plant of 7.0 MLD would be required with complete sewerage network connectivity for all households.

*Nagarpalika Rajgarh : The present treatment capacity is 5.00 MLD and 90% of targeted population is connected in 2021. As per 2021 projected population, quantity of sewage generated in the Municipal Council is 6.8 MLD hence another STP plant of 3.0 MLD would be required with complete sewerage network connectivity for all households.

Table 9.7: Awareness Activities

Attributes	**Unit**	ULB-1 ChuruPop.	ULB-2 Bidasar Pop.	ULB-3 Chappar Pop.	ULB-4 Rajaldesar Pop.	ULB-5 Rajgarh Pop.	ULB-6 Ratangarh Pop.	ULB-7 Ratannagar Pop.	ULB-8 Sardarsahar Pop.	ULB-9 Sujangarh Pop.	ULB-10 Taranagar Pop.
Population	[Nos as per projected in 2021]	139371	41392	22903	29694	68664	84616	14907	111257	117767	37862
District level campaigns on protection of water quality	[Nos in previous year]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Creation of DistrictOil Spill Crisis Management Group	[Created] / [Not Created]										
Preparation District Oil Spill Disaster Contingency Plan	[Prepared] /[Not Prepared]										

Table 9.8: Protection of Flood plains

Attributes	**Unit**	ULB-1 ChuruPop.	ULB-2 Bidasar Pop.	ULB-3 Chappar Pop.	ULB-4 Rajaldesar Pop.	ULB-5 Rajgarh Pop.	ULB-6 Ratangarh Pop.	ULB-7 Ratannagar Pop.	ULB-8 Sardarsahar Pop.	ULB-9 Sujangarh Pop.	ULB-10 Taranagar Pop.
Population	[Nos as per projectedin 2021]	139371	41392	22903	29694	68664	84616	14907	111257	117767	37862
Encroachment of flood plains is regulated.	[Yes] / [No]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Area affected	Hectare	NA*	NA	NA	NA	NA	NA	NA	NA	NA	NA
Population affected	Nos	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

***NA-Not Applicable

Table 9.9: Rainwater Harvesting

Attributes	**Unit**	ULB-1 Churu Pop.	ULB-2 Bidasar Pop.	ULB-3 Chappar Pop.	ULB-4 Rajaldesar Pop.	ULB-5 Rajgarh Pop.	ULB-6 Ratangarh Pop.	ULB-7 Ratannagar Pop.	ULB-8 Sardarsahar Pop.	ULB-9 Sujangarh Pop.	ULB-10 Taranagar Pop.
Population	[Nos as per 2011 census]	118473	14238	23303	43953	18209	23335	18469	64094	29751	21666
Action plan forRain water harvesting	[Implemented] / [Not implemented]	Implemented	Implemented	Implemented	Implemented	Implemented	Implemented	Implemented	Implemented	Implemented	Implemented

Implemented	Not implemented

9.6 Implementation strategy of Water Resources Management Plan

The details of measurable and quantifiable targets, responsibilities of various departments withtimelines for completing the tasks are presented in **Table 9.10**

Table 9.10: Action plan for Water Resources Management Plan

No.	Action Points	Strategy and approach	Stake holders responsible
1 .	Inventory of water resources in District	Inventory of water resources in District covering Rivers, canals and other natural/ man made water bodies, Nalas/ Drains meeting Rivers Lakes / Ponds, etc. which is to be completed within June, 2020	CEO ZillaParishad DFO ULBs
2.	Collection of Water Quality Data	IoT enabled water quality sensors are to beinstalled in each of the monitoring wells tomake the data collection centralized. This ensures the collection of water quality data without any errors.	EE PHED
3.	Control of Groundwater Water Quality & Quantity	Water quality of samples is analyzed and the meticulous analysis of historic datarevealed that the water resources in Churu district is over exploited.	EE PHED, ULBs, GroundWater Department
4.	Control of Riverside Activities	River side activities like River Side open defecation, Dumping of SW on river banks, Idol immersion etc. to be controlled	District Administration EE PHED, BDOs EO of ULBs
5.	AwarenessActivities	District level campaigns on protection of water quality and Control of Water Pollution in Rivers/Canals and other water bodies.	EE PHEBDOs
6.	Protection of Flood plains	Encroachment of flood plains to beregulated.	District Administration Circle Officers,
7.	Rainwater Harvesting	A separate action plan for Rain water harvesting in line with Government policywould be prepared.	District Administration, EO of ULBs, BDOs
8.	Repair and treatment of water bodies/Talav	Water bodies for the restoration/ repair/and treatment work should be identified.	Dist. Admin BDOs, ForestDeptt ULB officials,CEO zila Parishad, Landand Water resource Department
9.	Aqua life and Ecologicalchanges	Due to Construction of Dams/Canal or other projects, study of any negativeimpact and their mitigation plans	Water Resource Department
10.	Awarenessprograms	Awareness programs on water quality, rainwater harvesting should be conducted in each of the localities in Churu district.ULB's can collaborate with the local educational institutions to conduct the awareness programs.	ULB's

CHAPTER 10: DOMESTIC SEWAGE & INDUSTRIAL WASTE MANAGEMENT

This Chapter includes the details of ULB wise sewage generation, treatment capacity available and treatment capacity utilization, sewerage connectivity, gap of treatment. The relevant information related to functioning status of treatment plant (if exists) and effluent discharge standards used and efficiency of plants are also included. Datasheet duly filled by concerned officials has been presented as per the format prescribed by CPCB for Model DEPs. Finally, it emphasizes the details of action plans along with the actionable points, present status of implementation, gap to be addressed, and proposed time line for completion of the relevant tasks. The activities are suggested by keeping in view of the future generation of wastes etc.

10.1 Present scenario of domestic sewage management

Safe potable water supply and hygienic sanitation facilities are basic essential requirements for healthy community and is to be given top priority. The safe water supply is essential throughoutthe year in all towns, urban centers and rural villages but it is quite challenging to maintain adequate quantity of supply of water in acute summer seasons. Similarly, hygienic sanitation facilities by means of appropriate treatment options are must to achieve proper living standardsand quality of life of the people both in urban and rural areas. It also becomes important becauseabout 80% of water used by the community comes out from houses and apartments, mostly coming from the kitchen, bathroom, and laundry sources. Things like dishwashing, the garbagedisposal, and of course baths and showers are included in the mix in the form of waste water which unless properly collected, conveyed, treated and safely disposed off may eventually contaminate our valuable land and water resources, cause environmental degradation and causeof various health issues. The provision of safe drinking water alone cannot be sufficient to break the chain of water borne diseases. The safe disposal of wastewater is even much more important. Whenever, wastewater is disposed, it is essential to adopt appropriate treatment technologies to prevent any injury or health hazards. The total amount of sewage waste generated from each of the Urban Local Body (ULB) in 2021 is shown in **Figure 10.1**.

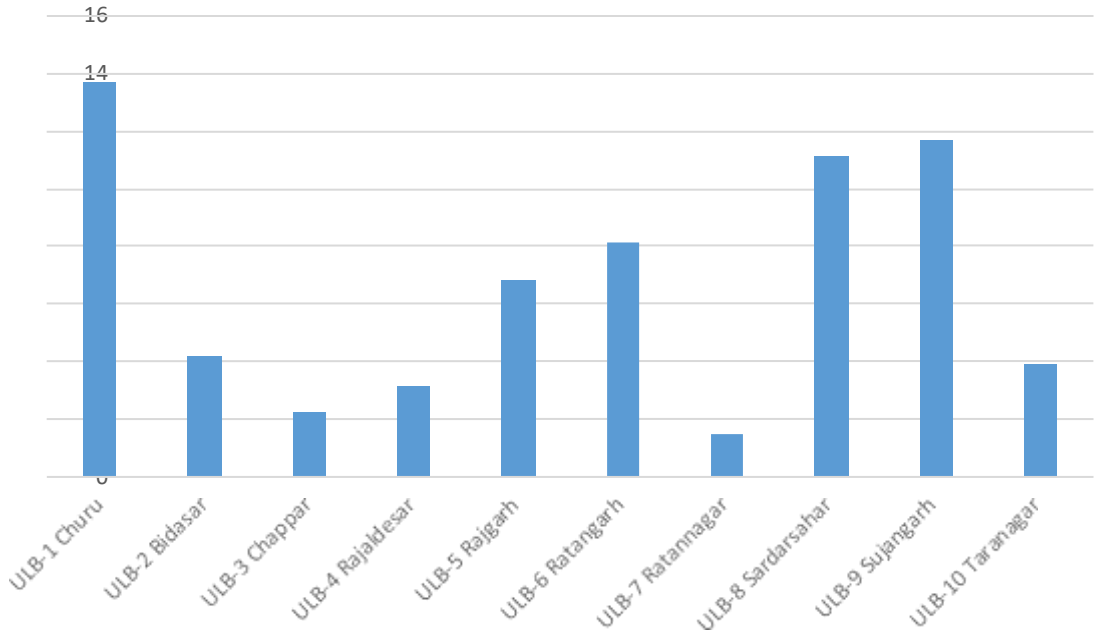


Figure 10.1: Amount of domestic sewage (in MT) generated in each ULB

For mapping the current scenario of the existing domestic sewage management practices, a survey with the representatives of each ULB has been conducted and the details of the inventory available is collated as summarized in **Tables 10.1 to 10.3**.

Currently all ULBs of Churu district either do not have appropriate domestic sewage treatmentcapacity facility or they do not have sufficient sewerage networks to transport it from its source (households) to the treatment plant. From the collected information, it is noticed that all the households in ULB's are not connected to sewage management infrastructure either at home or though proper drain across ULB to Sewage Treatment Plant. For instance, in Sardarsahar nagarpalika, 37 wards out of 40 wards are fully covered with sewerage network as on March 2021 and remaining wards are yet to be connected/covered. Currently, 10332 households out of total 11500 are connected with the sewerage network and the remaining 1168 households are yet to be connected. Similar gap is found in Rajgarh and Churu ULBs where 3000 a large number of households are yet to be connected with sewerage networks. As a result, only a small fraction of the sewage collected from these households is treated efficiently either at primary or secondary sewage treatment plants under current circumstances. Also, no systematic plan has been found to reuse this treated wastewater. The treated wastewater and sludge could be used effectively for crop irrigation or for public

parks, sports fields, etc. provided certain quality constraints are met. Irrigational use of treated wastewater from STPs should not be regarded as just primitive and inferior method of getting rid of wastewater or sludge. Properlydesigned and operated, irrigation systems can be convenient and low cost methods, comparablewith tertiary treatment and capable of satisfying environmental criteria. The reuse of treated effluents has definitely much wider application especially in arid or semi-arid regions.

The remaining domestic wastewater/ human excreta generated from urban population in different ULBs of Churu district is either being disposed in the form of on-site sanitation like septic tank/soak pit or, bathroom and kitchen wastewater are being disposed into side road drains or directly on roads, thereby creating unhygienic conditions or, open defecation has beentaking place due to non-availability of sanitation facilities. Though the septic tanks are an accepted onsite treatment, as the septic tanks are not designed and maintained properly, the effluent does not confirm to the standards. Due to poor maintenance, septic tanks do not function properly and often overflow into drains.

The untreated or partially treated sewage of about 47.3 MLD out of 66.3 MLD generated by them flows onto the land in low lying area, which mixes into the soil or water bodies directly or indirectly. It can also degrade quality of groundwater. Considering the increasing population, which consequently rises the amount of domestic sewage generation, there is a great need to speed up the process of connecting all households to the STP Plants.

Very few STP's are installed in the Churu district. Only 3 out of 10 ULB's have installed STPs. The geotagged image of STP in Sardarsahar, Ratangarh and Sujangarh are shown in **Figures 10.2, 10.3 and 10.4** respectively.

Figure 10.2A: Existing STP located on Gilgichiya road, Sardarsahar (Capacity of plant is

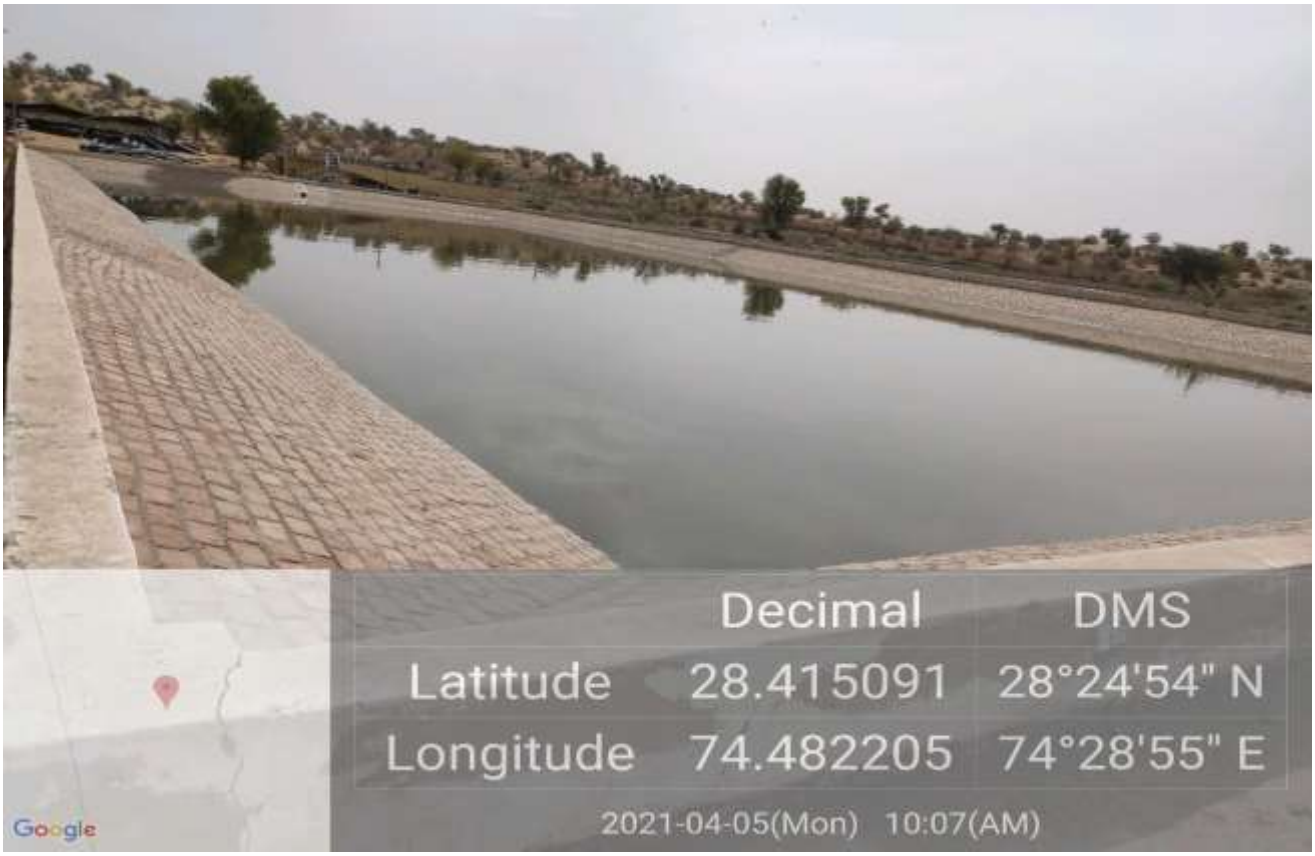


Figure 10.2B: Existing STP located on Bikaner road, Sardarsahar (Capacity of plant is 5.0 MLD)

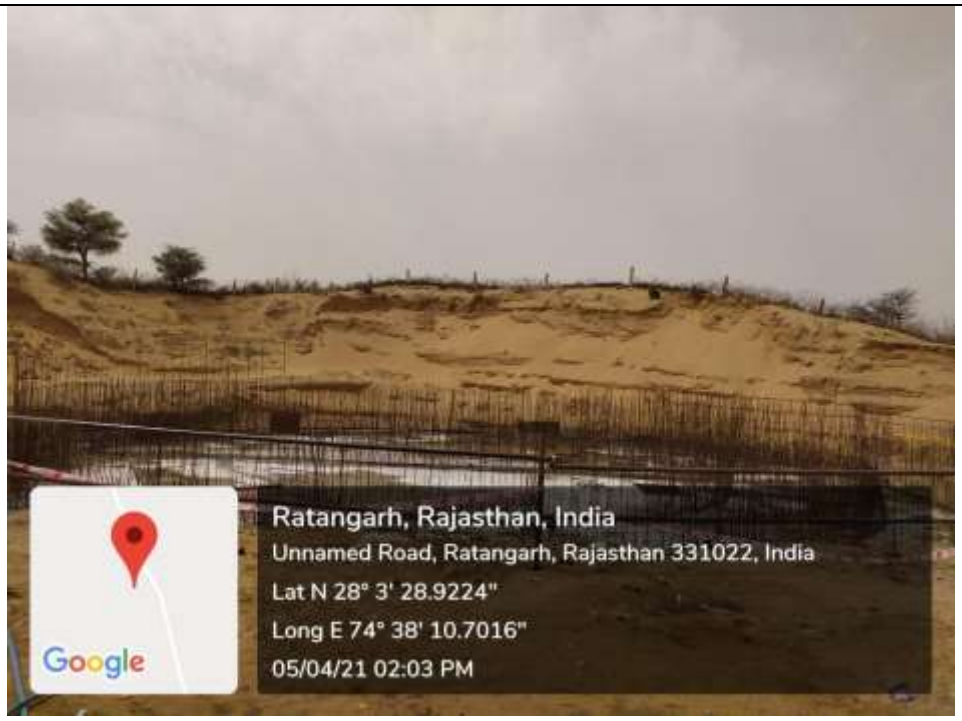


Figure 10.3A: STP-1 under construction in Ratangarh (Capacity of plant is 3.8 MLD)

Figure 10.3B: STP-2 under construction in Ratangarh (Capacity of plant is 6.1 MLD)

Figure 10.4A: STP-1 under construction in Sujangarh Rural (Capacity of plant is 5.5 MLD)

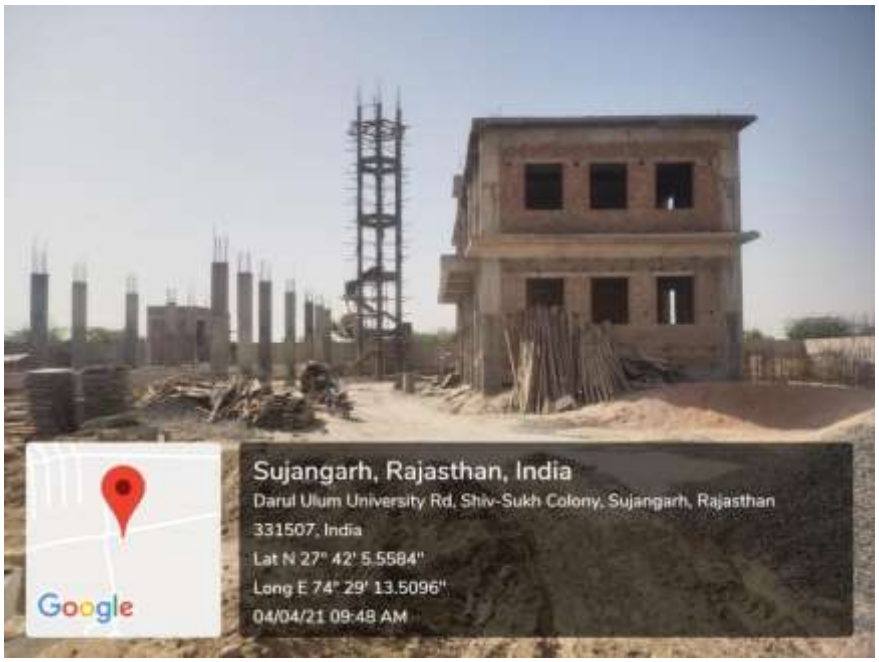


Figure 10.4B: STP-2&3 located at the same place under construction in Sujangarh Rural (Capacity of each plant is 1.5 MLD)

Figure 10.4C: STP-4 under construction in Sujangarh Rural (Capacity of plant is 2.0 MLD)

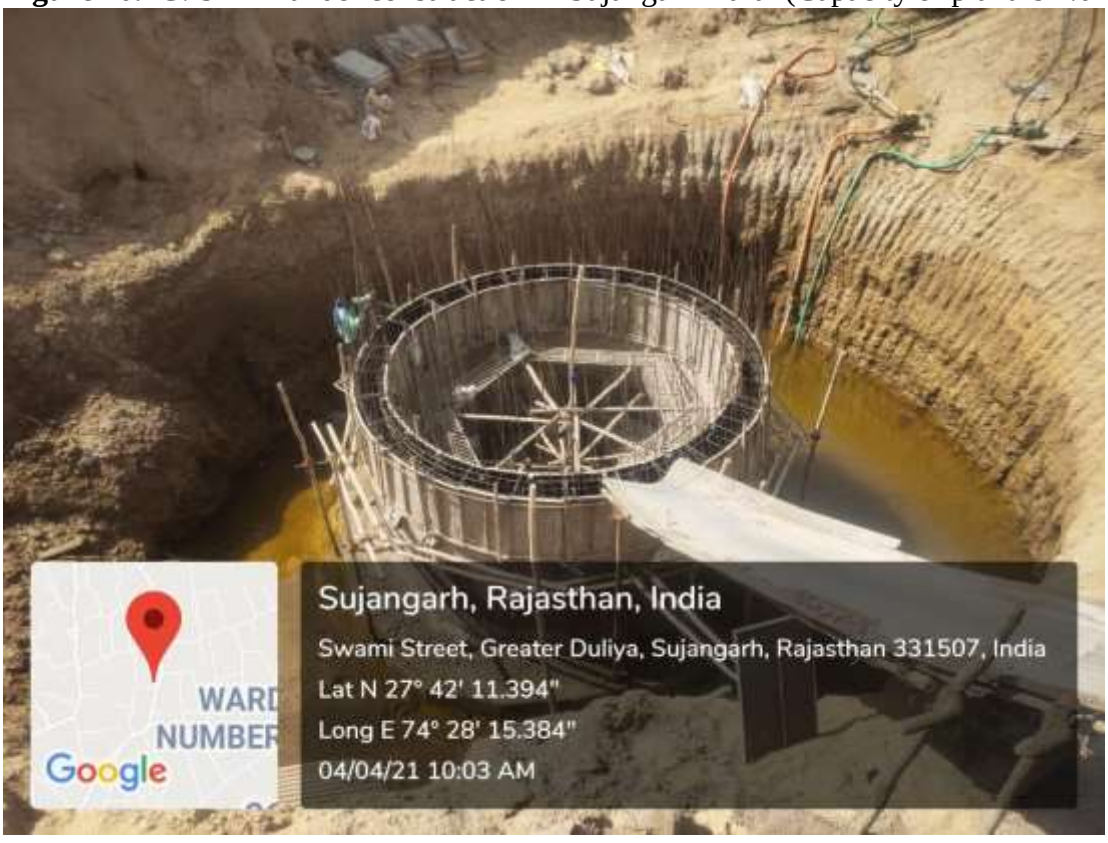


Figure 10.4D: One Pump house for low laying area under construction in Sujangarh Rural (Capacity of plant is 1.0 MLD)

In Sadarsahar, there exists two stabilization ponds: a 5.0 MLD STP plant (near Bikaner Road),and another 2.0 MLD STP plant (near Gilgichiya Road). Both are functional. Also, 03 SBR based STP plants of 2.3 MLD, 1.6 MLD, and 3.4 MLD capacity (with 7.3 MLD total capacity) have been proposed alongwith complete sewerage network connectivity for all households.

Rajgarh Nagarpalika has currently a STP of 5.00 MLD capacity and 90% of targeted population is connected with sewerage network. As per 2021 projected population, quantity of sewage generated in the Municipal Council is 6.8 MLD hence another STP plant of 3.0 MLD would be required with complete sewerage network connectivity for all households.

In Sujangarh, four number of STPs with a total capacity 10.5 MLD are being installed and are currently under construction stage which are expected to be completed by May 2021 and shall be operational by August 2021. The individual capacity of these STPs are 5.5MLD, 2.0 MLD, 1.5 MLD and 1.5 MLD respectively.

Churu Nagar Parishad has a STP of 7.00 MLD capacity and about 90% of targeted population is connected with the sewerage network. As per 2021 projected population, quantity of sewage generated in the Municipal Council is 13.7 MLD hence another STP plant of 7.0 MLD would be required with complete sewerage network connectivity for all households.

Bidasar, Chappar, Rajaldesar, Ratannagar, Taranagar Nagarpalika do not have any STP as on date. They should plan to install STP by June 2025. Also, Nagarpalika Rajaldesar should resolving the land issues to initiate the process with the earliest.

The status and the number of STPs required in each of the ULB is presented in **Table 10.1**. The details of adequacies of available infrastructure for sewage treatment and Sewerage Network are given in **Table 10.2 and Table 10.3 respectively**.

Though STP's are located in a few of the ULB's, it is noticed that the quantity of untreated waste is relatively on a higher side. Lack of connectivity between household and the STP's is identified as the prime reason. Very few towns in the district has a sewerage network. Moreover, the percentage of population covered under the sewerage network is still on a

lowerside. Therefore, there is a great need to propel the connectivity between the household and theSTP units.

It is therefore necessary to develop sewerage networks by connecting all households to installedSewage Treatment Plants (STPs). Also those ULBs who do not have STP as on date should immediately plan to set up suitable STP of adequate capacity.

Table 10.1: Inventory of Sewage Management

Attributes	Unit	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldesar	ULB-5 Rajgarh	ULB-6 Ratangarh	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar
Population	[Nos as per projected in 2021]	137071	41787	22260	31056	68197	81029	14755	111447	117136	38729
Total Quantity of Sewage generated in District from towns in 2021	[MLD]	13.7	4.2	2.2	3.1	6.8	8.1	1.5	11.1	11.7	3.9
Total Quantity of Sewage to be generated in District from towns in 2036	[MLD]	16.2	5.1	2.6	3.7	8.2	9.6	1.8	13.7	14.1	5
No of Class-II towns and above	[Nos]	0	0	0	0	1	1	0	0	0	0
No of Class-I towns and above	[Nos]	1	0	0	0	0	0	0	1	1	0
No of Towns needing STPs	[Nos]	01 additional [Already installed]*	01 [STP should be installed by June 2025]**	01 [STP should be installed by June 2025]**	01 [STP should be installed by June 2025]**	01 additional [Already installed]*	01 [STP is under constructionshall be installed by July 2024] $	01 [STP should be installed by June 2025]**	03, Proposed [2.3 MLD, 1.6 MLD, and 3.4 MLD] $	04 Nos., [STPs are under construction withtotal Capacity 10.5 MLD] $	01 [STP should be installed byJune 2025]**
No of STPs installed	[Nos]	1 STP [7 MLD]	0	0	0	1 STP [5 MLD)	0	0	2 STPs [5 MLD, 2 MLD]	0	0
Quantity of treated sewage flowing into Rivers (directly or indirectly)	[MLD]	0	0	0	0	0	0	0	0	0	0
Quantity of untreated or partially treated sewage (directly or indirectly)	[MLD]	6.7*	4.2*	2.2*	3.1*	1.8*	8.1	1.5*	4.1*	11.7*	3.9*
Quantity of sewage flowing into lakes	[MLD]	0	0	-	0	0	0	0	0	0	0
Number of industrial townships	[Nos]	1	1	0	0	3	1	0	1	1	1

*Churu Municipal Council: The present treatment capacity is 7.00 MLD and 90% of targeted population is connected in 2021. As per 2021 projected population, quantity of sewage generated in the Municipal Council is 13.7 MLD hence another STP plant of 7.0 MLD would be required with complete sewerage network connectivity for all households.

*Nagarpalika Rajgarh : The present treatment capacity is 5.00 MLD and 90% of targeted population is connected in 2021. As per 2021 projected population, quantity of sewagegenerated in the Municipal Council is 6.8 MLD hence another STP plant of 3.0 MLD would be required with complete sewerage network connectivity for all households.

**Bidasar, Chappar, Rajaldesar, Ratannagar, Taranagar Nagarpalika: There is no STP available in ULB-2 Bidasar, ULB-3 Chappar, ULB-4 Rajaldesar, ULB-7 Ratannagar, ULB-10 Taranagar. They should plan to install STP by June 2025. Also, Nagarpalika Rajaldesar should resolving the land issues to initiate the process with the earliest.

$Sardarsahar Nagarpalika: The present treatment capacity is 7.00 MLD (5.0 + 2.0 MLD) and 90% of targeted population is connected in 2021. They are based on stabilizationpond technology. As per 2021 projected population, quantity of sewage generated in the Nagarpalika is 11.1 MLD hence another 03 SBR based STP plants of 2.3 MLD, 1.6 MLD, and 3.4 MLD capacity (with 7.3 MLD total capacity) have been proposed alongwith complete sewerage network connectivity for all households. Presently, they have temporary dumping site for disposal of solid waste because their designated land for solid waste disposal site under dispute. Also, Nagarpalika Sardarsahar should resolve the land issues to initiate the process with the earliest.

$Sujangarh: 04 Nos., Total Capacity 10.5 MLD [Installation of STPs of capacity 5.5MLD, 2.0 MLD, 1.5 MLD and 1.5 MLD are under construction stage which shall be completed by May 2021 and shall be operational by August 2021].

$Ratangarh: 200 Crore Sewerage network of 136 km length has been started in January 2021 which may be completed by December 2023. Work of STP is also under construction, which may be completed by December 2023. This plant will be operational from July 2024. They have to speed up the process of construction of STP and connecting all households to the STP Plants.

Table 10.2: Adequacy of Available Infrastructure for Sewage Treatment

Attributes	Unit	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldesar	ULB-5 Rajgarh	ULB-6 Ratangarh	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar
Population	[Nos as per projected in 2021]	137071	41787	22260	31056	68197	81029	14755	111447	117136	38729
Total Quantity of Sewage generated in District from towns in 2021	[MLD]	13.7	4.2	2.2	3.1	6.8	8.1	1.5	11.1	11.7	3.9
Total Quantity of Sewage to be generated in District from towns in 2036	[MLD]	16.2	5.1	2.6	3.7	8.2	9.6	1.8	13.7	14.1	5
% sewage treated in STPs	percentage	51.1 *	0	0	0	73.5*	0	0	63.06	0	0
Total available Treatment Capacity	[MLD]	7.0	0	0	0	0	0	0	7.0	0	0
Additional treatment capacity required	[MLD]	7.0 *	4.2 **	2.2 **	3.1 **	3.0 *	8.1 $	1.5 **	4.1 $	11.7 $	3.9 **

*Churu Municipal Council: The present treatment capacity is 7.00 MLD and 90% of targeted population is connected in 2021. As per 2021 projected population, quantity of sewage generated in the Municipal Council is 13.7 MLD hence another STP plant of 7.0 MLD would be required with complete sewerage network connectivity for all households.

*Nagarpalika Rajgarh : The present treatment capacity is 5.00 MLD and 90% of targeted population is connected in 2021. As per 2021 projected population, quantity of sewage generated in the Municipal Council is 6.8 MLD hence another STP plant of 3.0 MLD would be required with complete sewerage network connectivity for all households.

$Ratangarh: 200 Crore Sewerage network of 136 km length has been started in January 2021 which may be completed by December 2023. Work of STP is also under construction, which may be completed by December 2023. This plant will be operational from July 2024. They have to speed up the process of construction of STP and connecting all households to the STP Plants.

$Sardarsahar Nagarpalika: The present treatment capacity is 7.00 MLD (5.0 + 2.0 MLD) and 90% of targeted population is connected in 2021. They are based on stabilization pond technology. As per 2021 projected population, quantity of sewage generated in the Nagarpalika is 11.1 MLD hence another 03 SBR based STP plants of 2.3 MLD, 1.6 MLD, and 3.4 MLD capacity (with 7.3 MLD total capacity) have been proposed alongwith complete sewerage network connectivity for all households. Presently, they have temporary dumping site for disposal of solid waste because their designated land for solid waste disposal site under dispute. Also, Nagarpalika Sardarsahar should resolve the land issues to initiate the process with the earliest.

$Sujangarh: 04 Nos., Total Capacity 10.5 MLD [Installation of STPs of capacity 5.5MLD, 2.0 MLD, 1.5 MLD and 1.5 MLD are under construction stage which shall be completed by May 2021 and shall be operationalby August 2021].

**Bidasar, Chappar, Rajaldesar, Ratannagar, Taranagar Nagarpalika: There is no STP available in ULB-2 Bidasar, ULB-3 Chappar, ULB-4 Rajaldesar, ULB-7 Ratannagar, ULB-10 Taranagar. They should plan to install STP by June 2025. Also, Nagarpalika Rajaldesar should resolving the land issues to initiate the process with the earliest.

Table 10.3: Adequacy of Sewerage Network

Attributes	Unit	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldesar	ULB-5 Rajgarh	ULB-6 Ratangarh	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar
Population	[Nos as per projected in 2021]	137071	41787	22260	31056	68197	81029	14755	111447	117136	38729
Total Quantity of Sewage generated in District from towns in 2021	[MLD]	13.7	4.2	2.2	3.1	6.8	8.1	1.5	11.1	11.7	3.9
Total Quantity of Sewage to be generated in District from towns in 2036	[MLD]	16.2	5.1	2.6	3.7	8.2	9.6	1.8	13.7	14.1	5
No of ULBs having partial underground sewerage network	[Nos]	01	0	0	0	01	0	0	01	01	0
No of towns not having sewerage network	[Nos]	01	01	01	01	01	01	01	01	0	01
% population covered under sewerage network as on March 2021	[percentage]	51%	0	0	0	70%	0	0	63%	0	0

**Bidasar, Chappar, Rajaldesar, Ratannagar, Taranagar Nagarpalika: There is no STP available in ULB-2 Bidasar, ULB-3 Chappar, ULB-4 Rajaldesar, ULB-7 Ratannagar, ULB-10 Taranagar. They should plan to install STP by June 2025. Also, Nagarpalika Rajaldesar should resolving the land issues to initiate the process with the earliest.

*Churu Municipal Council: The present treatment capacity is 7.00 MLD and 90% of targeted population is connected in 2021. As per 2021 projected population, quantity of sewage generated in the Municipal Council is 13.7 MLD hence another STP plant of 7.0 MLD would be required with complete sewerage network connectivity for all households.

*Rajgarh Nagarpalika: The present treatment capacity is 5.00 MLD and 90% of targeted population is connected in 2021. As per 2021 projected population, quantity of sewage generated in the Municipal Council is 6.8 MLD hence another STP plant of 3.0 MLD would be required with complete sewerage network connectivity for all households.

$Ratangarh: 200 Crore Sewerage network of 136 km length has been started in January 2021 which may be completed by December 2023. Work of STP is also under construction, which may be completed by December 2023. This plant will be operational from July 2024. They have to speed up the process of construction of STP and connecting all households to the STP Plants.

$Sardarsahar Nagarpalika: The present treatment capacity is 7.00 MLD (5.0 + 2.0 MLD) and 90% of targeted population is connected in 2021. They are based on stabilization pond technology. As per 2021 projected population, quantity of sewage generated in the Nagarpalika is 11.1 MLD hence another 03 SBR based STP plants of 2.3 MLD, 1.6 MLD, and 3.4 MLD capacity (with 7.3 MLD total capacity) have been proposed alongwith complete sewerage network connectivity for all households. Presently, they have temporary dumping site for disposal of solid waste because their designated land for solid waste disposal site under dispute. Also, Nagarpalika Sardarsahar should resolve the land issues to initiate the process with the earliest.

$Sujangarh: 04 Nos., Total Capacity 10.5 MLD [Installation of STPs of capacity 5.5MLD, 2.0 MLD, 1.5 MLD and 1.5 MLD are under construction stage which shall be completed by May 2021 and shall be operationalby August 2021].

10.2 Projection of future generation of domestic wastewater

Adequate quantity of generation of wastewater should be considered while designing collection, conveyance, treatment and safe disposal systems. The quantity of domestic waste water has been estimated for the year 2021, 2036 and 2036 as shown in **Table 10.4.**

Table 10.4: Future Assessment of generation of domestic wastewater

Year	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajal desar	ULB-5 Raj garh	ULB-6 Ratan garh	ULB-7 Ratan nagar	ULB-8 Sardar sahar	ULB-9 Sujan garh	ULB-10 Tara nagar
2021	13.7	4.2	2.2	3.1	6.8	8.1	1.5	11.1	11.7	3.9
2036	16.2	5.1	2.6	3.7	8.2	9.6	1.8	13.7	14.1	5
2051	18.8	6	3	4.2	9.5	11.1	2.1	16.4	16.5	6.4

The capacity requirement of STPs varies 15-20% for years 2021 and 2036 in different ULBs. As in SBR technology based STPs can handle flowrate quantity with a variation of 20-25% in an effective manner by changing the cycle duration and oxygen requirement, SBR technology may be used in these towns to meet not only the current requirement but also they can be used for future requirement of year 2036.

10.3 Inventory of Industrial development scenario in the district

RIICO Industrial Areas of Bhiwadi, Neemrana, Alwar, Jodhpur, Kota, etc. are falling under the category 'A' or 'AA' class and having all infrastructure facilities including drain, even provision of sewer / CETP exists in the scheme. However, in the Churu district, all 9 Industrial Areas fall under category 'C', and there is no drainage provision in the scheme. Recently, the scheme of a new Industrial Area, Sardarshahar extension, was approved by RIICO Head office, Jaipur, without drain/sewer / CETP. All existing units in RIICO Industrial Areas in Churu district are zero discharge units, and stormwater flows naturally. So, there is no chance of mixing Industrial waste with stormwater.

Mostly, existing units in RIICO Industrial Area have their own toilet facility in their premises as per their requirements. Presently, the following type of units are running in RIICO Industrial Area:

Wooden handicraft / Furniture

Cement base tile / Interlock Tile / Gamla / Jali

Oil mills

Aata mills

Fabrication / Engineering Udyog

Plaster of Paris

Stone cutting and polishing

Guar gum

Artificial Jewellery, etc.

The newly coming Industrial Area, Sardarshahar extension in Churu district, was inaugurated by Honourable C.M. in October 2020. Details are as follows:

Land Acquired - 221.05 acres

Total Plot Planned - 252

Vacant Plot - 252

Plot allotted - nil

Area reserved for solid waste disposal site - 1.95 hectare

The assessment of quantity of production of industrial wastes and wastewater become challenging and difficult without knowing the current industrial status of the district and its future growth plan. The Rajasthan Industrial Development and Investment Corporation (RIICO) has developed nine industrial areas in Churu district. They are Churu, Sadulpur I & II phase, Sadulpur III phase, Sardarshar, Sujangarh, Ratangarh, Taranagar, Bidasar and Sardarshar extension. The current status of progress of these industrial area is depicted in **Table 10.5**.

Table 10.5: Details of Industrial areas in Churu district

S. No.	Name of I.A.	Plot Planned	Plots Allotted	Construction units	Production Units
1.	Churu	222	216	3	211
2.	Sadulpur I & II phase	60	56	2	54
3.	Sadulpur III phase	121	54	7	43
4.	Sardarshar	295	294	7	286
5.	Sujangarh	65	63	-	62
6.	Ratangarh	279	259	4	238
7.	Taranagar	81	73	12	47
8.	Bidasar	167	124	10	21
9.	Sardarshar Ext.	252	-	-	-
	Total	1542	1139	45	962

Sources – Office of Senior Regional Manager, RIICO Churu.

Industrial development is not only required for the economic growth of the area but also required to meet the social responsibilities in one way or other. Agriculture is the main income source of rural population, which is not sufficient to improve the living standardof people. There is a need to identify suitable type of industries to be established in the district. A brief overview of the existing industrial profile of Churu district is presented in **Table 10.6.**

Table 10.2. Details of existing industrial area

S. No.	Name ofI.A	Date of Existing I.A.	Total Area. (acres)	Plot Planned	Plots Allotted	Vacant Plot	Construction	Production
1	Churu	24.5.79	82.56	222	216	6	3	211
2	Sadulpur I & II phase	2.11.79	47.94	60	56	4	2	54
3	Sadulpur III phase	20.2.97	72.84	121	54	67	7	43
4	Sardarshar	24.9.82	93.75	295	294	1	7	286
5	Sujangarh	26.3.81	29.90	65	63	2	-	62
6	Ratangarh	28.9.84	264.75	279	259	20	4	238
7	Taranagar	11.1.96	62.50	81	73	8	12	47
8	Bidasar	9.09.98	83.40	167	124	43	10	21
9.	Sardarshar Ext.	10.2020	221.05	252	-	252	-	-

Taking into consideration various advantages offered by the district, a few of the potential industrial projects have been identified. While identifying such projects the factors considered were availability of material resources, infrastructural facilities incentives for setting up to industries needs of the local population and industries etc. Keeping in view these factors. Efforts have been made to present a "SWOT" (strengths, weaknesses, opportunities and threats analysis) analysis in the following paragraphs: **Trade** Ample opportunities for trade of following industrial products in Churu.

- Oil, Dal, Aata & Spices Mills
- Spears Part of Industrial Machinery
- Auto Mobile Spears Part
- Dairy Products

- Agriculture Products
- Wooden handicraft / Furniture
- Cement base tile / Interlock Tile / Gamla / Jali
- Fabrication / Engineering Udyog
- Plaster of Paris
- Stone cutting and polishing
- Guar gum
- Artificial Jewellery etc.

Churu district is backward area in perspective of industries due to lack of infrastructure facilities, metallic entity, forests. Real entrepreneurs and incessant famine are the prominent reasons for industrial backwardness of the district. Millet, kidney-bean, moth, gram, mustard, tara mira and groundnuts are cropped abundantly in this area. The agriculture is based on the monsoon out rightly. In some tehsils, irrigation is made by extracting water from wells but itis not successful due to salty and deep water. Hence, the future of agriculture based units is dependent on Monsoon. Only masonry and marble stones are available as a metallic in the district. Masonry stones are available in Randhisar Hill, Lodasar, Biramsar and Gopalpura where stone grit units are establishing. Marble stones are extracted in village Dunkar, tehsil Sujangarh that are colored linear but not superior to other marbles. There is potentiality of setting up some more units manufacturing Marble Tiles in the area.

Role and Responsibilities of Authorities and actions require for Domestic Sewage Management and Industrial development scenario

In view of the existing inventory, sewage connections, population and industrial development, the following action plans (shown in **Table 10.7**) are proposed for the effective management of domestic sewage management.

Table 10.6: Action plan for domestic sewage and industrial wastewater/wastes management plan

S. N.	Action Points	Responsible Authorities	Strategy and approach & Time frame
1.	Inventory of Sewage Management	ULBs/ Village Panchayat	All ULBs/ Village Panchayat should complete the survey and identification all Households to ensure proper drainage and management of sewage. They should validate the projection of sewage generation rate and evaluate options for disposal system within one year.
2.	Adequacy of Available Infrastructure for Sewage Treatment	ULBs/ Village Panchayat	• All ULBs/ Village Panchayat must find out thetreatment facility required and available within oneyear and make a plan for better wastes water management. • Some Household may have its own Sewagemanagement infrastructure so as to pull down this water to maintain water level in earth and to reuse this water at various other domestic works after removing contaminants. i.e., Grey water after removing contaminants may be used in gardens, toilet flushing etc. • All households should be connected to sewage management infrastructure either at home or though proper drain across ULB to Sewage treatment Plant.
3.	Adequacy of Sewerage Network	ULBs/ Village Panchayat	• Proper sewerage systems to be constructed to connect all Households under each ULB to ensure total sewage management. • Churu Municipal Council: The present treatment capacity is 7.00 MLD and 90% of targetedpopulation is connected in 2021. As per 2021 projected population, quantity of sewage generated in the Municipal Council is 13.7 MLD hence another STP plant of 7.0 MLD would be required with complete sewerage network connectivity for allhouseholds by June 2024 • Rajgarh Nagarpalika: The present treatmentcapacity is 5.00 MLD and 90% of targetedpopulation is connected in 2021. As per 2021 projected population, quantity of sewage generated
			in the Municipal Council is 6.8 MLD hence anotherSTP plant of 3.0 MLD would be required withcomplete sewerage network connectivity for all households. This should be achieved by June 2024. • Ratangarh: Rs. 200 Crore Sewerage network of 136km length has been started in January 2021 which may be completed by December 2023. Work of STPis also under construction, which may be completedby December 2023. This plant should be operationalfrom July 2024. The process of construction of STPand connecting all households to the STP Plants to be speed up so that the treatment plant should be operational with its full capacity by July 2024. • Sardarsahar Nagarpalika: The present treatment capacity is 7.00 MLD (5.0 + 2.0 MLD) and 90% oftargeted

			population is connected in 2021. They are based on stabilization pond technology. As per 2021projected population, quantity of sewage generated in the Nagarpalika is 11.1 MLD hence another 03 SBR based STP plants of 2.3 MLD, 1.6 MLD, and 3.4 MLD capacity (with 7.3 MLD total capacity) have been proposed alongwith complete sewerage network connectivity for all households. The process of construction of three STPs and connecting all households to the STP Plants to be speed up so that these plants should be operational with its full capacity by July 2024. • Sujangarh: 04 Nos., Total Capacity 10.5 MLD [Installation of STPs of capacity 5.5MLD, 2.0 MLD, 1.5 MLD and 1.5 MLD are under construction stage which shall be completed by May 2021 and should be operational by August 2021. The process of laying of sewerage network and households connections to be made with these three STPs so thatthese plants should be operational with its full capacity by August 2021. • Bidasar, Chappar, Rajaldesar, Ratannagar,Taranagar Nagarpalika: There is no STP available inULB-2 Bidasar, ULB-3 Chappar, ULB-4 Rajaldesar, ULB-7 Ratannagar, ULB-10 Taranagar.They should plan to install STP by June 2025. Also,Nagarpalika Rajaldesar should resolving the land issues to initiate the process with the earliest. All these Nagarpalika must ensure that the process of laying of sewerage network and households connections are made with newly installed STPs sothat these plants should be operational with its full capacity by June 2025 onwards.
4.	Creating a geospatial data	ULB and LSG	If a digital database of the existing inventory is made, it would be easy to classify the connected and unconnected household. This also help to determine the optimal path for the connection between the householdand the STP units
5.	Creating a plan of reuse of treated effluents of STPs for irrigating public parks, agriculture, horticulture etc.	ULB and LSG	Rather getting rid of the treated or partially treated effluents from STPs, municipal authorities should workfor conserving the resources of treated effluents (bothwater + nutrients) by exploring its value addition inirrigation. As a case study, an attempt should be made so that farming is in-built into a waste disposal scheme.by a value addition concept of using treated effluentaccording to its water + nutrient + soil conditioning value. Every Nagarpalika/Municipal Council must havecase study of this type in their locality by June 2025.

6.	Inventory of Industrial areas	RIICO/ District admin./RSPCB	Mapping of type of industries and institutions and monitoring of level of pollution emissions (Air, Water,land or noise pollution) along with disposal mode by them. This task would be completed by June 2022. Responsible agency would ensure that pollution emissions by the industries do not exceed the prescribedlimit.
7.	Provision of sanitation facilities for labourers/workers in industrial areas	RIICO	There must be sanitation facilities for labourers/workersin the industrial areas. RIICO should ensure that all workers have proper sanitation facilities. This task shallbe completed by June 2022.
8.	Provision of storm-water drain in all industrial areas and drainage facilities	RIICO	There must be storm-water drain facilities in the industrial areas. However, it must be ensured that it should carry only storm-water. No industrial wastewater should flow in such drains. RIICO should ensure that storm water drains are provided with flow measurement devices. This task shall be completed by June 2022.
9.	Monitoring and Review	District Collector	District collector will monitor/review the performance of their respective ULB/ Panchayats/ RSPCB/ RIICO /PHED/ WRD/ GWD on the respective issues related to concern department and may constitute district level expert committee for advice.

CHAPTER 11: AIR QUALITY MANAGEMENT PLAN

Under National Ambient Air Quality Standards, 2009; 12 pollutants are notified based on short term & long term monitoring for Industrial/residential and Sensitive/ecological areas, i.e., PM_{10}, $PM_{2.5}$, SO_2, NO_2, NH3, Pb, O_3, CO, Ni, As, benzo [a] pyrene (B[a]P) and Benzene. Under National Air Monitoring Program (NAMP), a huge quantity of data generates annually for prescribed parameters, i.e., PM_{10}, SO_2 and NO_2. CPCB evaluated the concept of Air Quality Index (AQI) utilizing the data of ambient air quality to ascertain the quality of air in terms of its probable impact on health and environment. A brief insight on each of the air pollutants is described below:

11.1. Major Air Pollutants

The most common outdoor air pollutants are discussed below (https://www.blf.org.uk/)

11.1.1. Particulate matter ($PM_{2.5}$ and PM_{10})

Particulate matter is a mix of solids and liquids, including carbon, complex organic chemicals, sulphates, nitrates, mineral dust, and water suspended in the air. PM varies in size. Some particles, such as dust, soot, dirt or smoke are large or dark enough to be seen with the naked eye. But the most damaging particles are the smaller particles, known as PM_{10} and $PM_{2.5}$.

11.1.2. Nitrogen Oxides (NO, NO_2, NO_x)

Nitrogen oxides are a group of seven gases and compounds composed of nitrogen and oxygen, sometimes collectively known as NO_x gases. The two most common and hazardous oxides of nitrogen are nitric oxide (NO) and nitrogen dioxide (NO_2).

11.1.3. Sulphur Dioxide (SO_2)

Sulfur dioxide, or SO_2 is a colorless gas with a strong odor, similar to a just-struck match. It is formed when fuel containing sulfur, such as coal and oil, is burned, creating air pollution.

11.1.4. Carbon Monoxide (CO)

Carbon monoxide is a colorless, highly poisonous gas. Under pressure, it becomes a liquid. It is produced by burning gasoline, natural gas, charcoal, wood, and other fuels.

11.1.5. Benzene, Toluene and Xylene (BTX)

Benzene, toluene, xylene, and formaldehyde are well-known indoor air pollutants, especially afterhouse decoration. They are also common pollutants in the working places of the plastic industry, chemical industry, and leather industry

11.1.6. Ammonia (NH_3)

Ammonia pollution is pollution by the chemical ammonia (NH_3) – a compound of nitrogen and hydrogen which is a byproduct of agriculture and industry.

11.1.7. Ozone(O_3)

Ground-level ozone is a colorless and highly irritating gas that forms just above the earth's surface. It is called a "secondary" pollutant because it is produced when two primary pollutants react in sunlight and stagnant air. These two primary pollutants are nitrogen oxides (NO_x) and volatile organic compounds (VOCs).

11.2. Air Quality Index

Air quality index is calculated based on averages of all pollutant concentrations measured in a full hour, a full 8 hours, or a full day. The schematic illustration involved in the computation of AQI is shown in **Figure 11.1**. To calculate an hourly air quality index, we average at least 90 measured data points of pollution concentration from a full hour. The classification of regions based on AQIis shown in **Figure 11.2**.

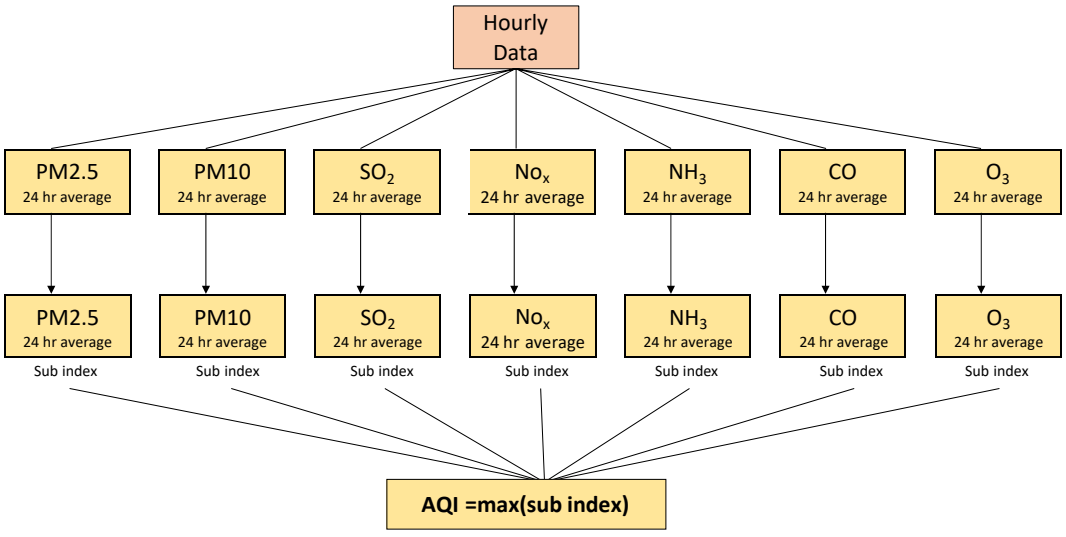


Figure 11.1. Computation of AQI

AQI	Remark	Color Code	Possible Health Impacts
0-50	Good		Minimal impact
51-100	Satisfactory		Minor breathing discomfort to sensitive people
101-200	Moderate		Breathing discomfort to the people with lungs, asthma and heart diseases
201-300	Poor		Breathing discomfort to most people on prolonged exposure
301-400	Very Poor		Respiratory illness on prolonged exposure
401-500	Severe		Affects healthy people and seriously impacts those with existing diseases

Figure 11.2. AQI ranges, Remarks, and possible health impacts

11.3. Status and Inventory of Air Quality Management in Churu District

A short survey is conducted to collect the information of Air Quality Management Information and Inventory of air quality management in Churu District and the collated information is shown in **Tables 11.1 and 11.2**.

Table 11.1: Inventory of Air Quality Management in Churu district

No.	Action Areas	Details of Data Requirement	Unit/ Status	RSPCB
AQ1	**Availability ofAir Quality Monitoring Network in District**			
AQ1a		Manual Air Quality monitoring stations of SPCBs /CPCB	[Nos] / [None]	None
AQ1c		Automatic monitoring stations Operatedby SPCBs / CPCB	[Nos] / [None]	None
AQ2	**Inventory of Air Pollution Sources**			
AQ2a		Identification of prominent air polluting sources	[Large Industry] / [Small Industry] / [Unpaved Roads] / [Burning of Waste Stubble] / [Brick Kiln] / [Industrial Estate] / [Others] (Multiple selection)	Unpaved Roads & Industrial Estate burning waste wood, Small Scale units especially stone crushers and mining activities along with Brick Kilns. Also few Plaster of Paris Manufacturing Units and Wood Seasoning plants are operative in Sardarsahar.
AQ2b		No of Non-Attainment Cities	[Nos / [None]	None
No.	**Action Areas**	**Details of Data Requirement**	**Unit/ Status**	**RSPCB**
AQ2c		Action Plans fornon-attainment cities	[Prepared] / [Notyet prepared]	NA

AQ3	**Availability of Air Quality Monitoring Dataat DMs Office**			
AQ3a		Access to air quality data fromSPCBs & CPCB through Dashboard	[Available] / [Notyet Available]	Not yet Available
AQ4	**Control of Industrial Air Pollution**			
AQ4a		No of Industries meeting Standards	**224**	
AQ4b		No of Industriesnot meeting discharge Standards	**54**	Stone crusher units located at Biramsar, Lodsar, Randhisar were not found complying with the norms prescribed by State Pollution Control Board.In continuation to that show cause notices were issued to these units. Project Proponents later on rectified the deficiencies and submitted reply of thesame to this office , which are now found to be adequate
AQ5	**Control of Non-industrial Air Pollution sources**			
AQ5a		Control open burning of Stubble – during winter	[Nos of fireincidents]	0
AQ5b		Control Open burning of Waste – Nos of actions Taken	[Nos]	0
AQ5c		Control of forestfires	[SOP available] /[No SoP]	
AQ5d		Vehicle pollution check centers	[% ULBs covered]	-Not available-
AQ5e		Dust Suppression Vehicles	[% ULBs covered]	-Not available-
AQ6	**Development ofAir Pollution complaint redressal system**			
AQ6a		Mobile App / Online based air pollution complaint redressing systemof SPCBs.	[Available] / [Not available]	Available (Sameer)

Table 11.2: Inventory of Air Polluting Industries in the Churu District

Attributes	Unit	Total No. in district	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldeser	ULB-5 Rajgarh	ULB-6 Ratangar	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar
Type of Industries	[Nos]	671	**Mainly wood seasoning units. Approx. 92 units established/ operating as per records**	Mainly food procudct units. Apprx. 12 units established/operating as per records	No units registered in Chappar area	No units are registered in Rajdesar area	Mainly brick klins and food processing units. Approx. 77 units established/operating as per records	No units are registered in ratangar area	Mainly stone crushers and stone cutting units. Apprpx. 95 units established/operating as per standards	Mainly wood seasoning and Guar Gum units Apprpx. 126 units established/operating as per standards	Mainly stone crushers units. Apprx. 213 units established/operating as per records	Mainly paster of paris manufactring units. Approx. 56 units established/operating as per records
No of Crushers in the District	[Nos]	140	00	02	00	00	04	00	18	00	116	02

S

11.4. Monitoring real-time air pollution

Large amount of granular data relating to the concentration of each air pollutants in India is available and it is made accessible to every citizen by Central Pollution Control Board (CPCB), India (https://app.cpcbccr.com/AQI_India/). Though there are numerous monitoring stations spread over the country, there exist no monitoring stations in Churu district. The locations of monitoring stations within the proximity of Churu are shown in **Figure 11.3**. For better understanding of the distribution of air pollution over the entire Churu the historic data of SO_2 emissions is accessed from TROPOMI Explorer (https://showcase.earthengine.app/) as shown in **Figure 11.4**. Though the imagery obtained from TROPOMI Explorer helps in the visualizing thevariation of air quality over the years, due to the limited functionalities, it does not enable the userto study at a specific region of interest.

Figure 11.3: Locations of monitoring stations within the proximity of Churu district

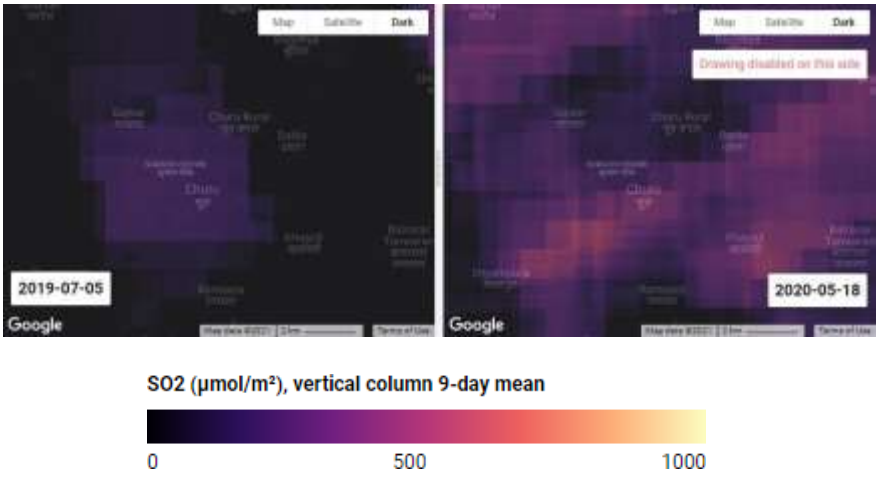


Figure 11.4: Variation of SO_2 over the Churu region

9.5. Inventory of Air Pollution Management Plan

A detailed survey is carried out in each ULB and the obtained information is collated as shown in **Tables 11.1 and 11.2**. From the collected information, it has been identified that Small Scale unitsespecially stone crushers and mining activities along with Brick Kilns are the major sources of airpollution in Churu district. From the data collected from each of the ULB, it is noticed that emissions from 80.5% of the industries are within the permissible limits. Stone crusher units located at Biramsar, Lodsar, Randhisar were not found complying with the norms prescribed by State Pollution Control Board. In continuation to that show cause notices were issued to these units. Project Proponents later on rectified the deficiencies and submitted reply of the same to this office , which are now found to be adequate. Considering the existing inventory, a detailed actionplan is developed as shown in **Table 11.3**.

Table 11.3: Air Pollution Management Plan

Sr. No.	Action Point	Present Status	Gap	Strategy and approach &Timeline	Responsible Authorities/Department
1.	Availability ofAir QualityMonitoring Network inDistrict	There is no existing air quality monitoringnetwork in the district. A location (district capital) is chosen for the installation of monitoring station.	There is a need of several monitoring stations in Churu	Online measuring system with public display board is to be installed within one year at least at one place in every ULBby December 2022.	Local self-government,RSPCB
2.	Inventory of air polluting industries inDistrict	No systematic data isavailable.	Data need to be collected from bricks kilns and anysuch polluting sources.	Inventory of all air polluting industries is to be mappedalong with type of pollutant releasing, discharge,concentration and details ofcontrol device by December 2021.	RSPCB/ RIICO
3.	Identification ofhot spot	No such hot spot has be identified presently.	Details of critical locationare not available.	Hot spot in relation to air pollution is to be identified within one year and plan is to be made to keep AQI as per norms.	RSPCB
4.	Monitoring the discharge of emissions from Industry	Real time monitoring ofair pollution will help tocontrol and keep trackof the pollution levels from the industries.	Data need to be collected from bricks kilns and anysuch polluting sources.	December 2021	RSPCB
5.	Targeting 100% LPG access in households	A study published in Lancet has shown how premature deaths fromhousehold air pollution is responsible for healthcost that is equivalent to close to 1 per cent of thestate's GDP in Rajasthan	Maximizing clean energyaccess and enabling 100 percent coverage of household with reliable LPG connection. At the same time eliminate use of solid fuels from open eateries and restaurants and link this withtheir commercial license.	By 2022	Local self-government
6.	Improve walking and cycling	No programs thatpromote walking andcycling are in place in Churu	To Promote the use of cyclesfor the trips within 5km	Tracks should beconstructed by each ULBsand Gram Panchayats.	ULBs/ Village Panchayats
7.	Electric vehicle programme:	No policies are in place	Promote the use of electric vehicles by proposing 100% exemption of taxes for electric	By December 2024	State and CentralGovernment

Sr. No.	Action Point	Present Status	Gap	Strategy and approach &Timeline	Responsible Authorities/Department
			vehicle.		
8.	Clean fuel initiative	No policies are inplace	Discounts for theregistration of LPG andCNG vehicles should be implemented.	By December 2022	State and Central Government
9.	Traffic Movement plan	City Traffic movement plan has been prepared time to time by local Police.Bye -pass is to beconstructedfor movement of heavy vehicles whereverfeasible.		It should be ensured that air pollution be minimized at hot spots while educating public acceptability within one year. Bye -pass is to be constructed for movement ofheavy vehicles wherever feasible within next 5 years.	Traffic Police, PWD
10.	Vehicle pollution checkcenters	Random checks are being done to ensure whether public follow best practices.	Proper record to be made available online with their names and vehicle numbersso that people avoid to break the rules.	Data availability should bemade online by June 2022.	RTO, Local Police
11.	Dust Suppression Vehicles/Roads	Much of this dust is onthe ground and when dry, it can be thrown up into the air by trucks and other vehicles.	If road conditions are poor bicyclists and two-wheeler motorcyclists face problems.	It should be ensured that dust from the road should not be thrown up into the air by vehicles, especially ifroad condition become poor.Proper speed limit must be specified with proper signage at critical locations whenever required.	RTO, Local Police, PWD
12.	Awareness Activities	The details of districtlevel campaigns on effect of air pollution isnot available.	Such information should be made available online at RSPCB website.	District level campaigns on effect of air pollutioncontinuously.	RSPCB/ RIICO/ District Admin/ EducationalInstitutes
13.	Monitoring and Review	This is continuously being done by the District Administration		District collector or his representative should monitor/review theerformance of their respective ULB/ Panchayats/ RSPCB/RIICO/PHED/WRD/ GWD on the respective issues related to concern department and may constitute district levelexpert committee for suggestions.	District Administration

CHAPTER 12. MINING WASTE MANAGEMENT PLAN

Churu is fairly endowed with various minerals whose industrial use has immensely contributed tothe economy of the district. Particularly this district is rich in masonry stone mineral resources. The important metallic and non-metallic minerals found in the district are copper, limestone, masonry stone, marble and Gypsum. The mining activity in the district is administrated by assistant mining Churu under the control of Superintending Mining Engineer-Bikaner circle and Additional Director mines, Jodhpur zone. The geological survey and prospecting activity are conducted by the geologists and senior geologist of the office of the senior geologist Nagaur under the administrative control of additional director geology, Bikaner zone.

The list of various minerals that are found in Churu district are mentioned below:

Masonry stone: Phyllite, slate and quartzite minerals of Bidasar, Biramsar, Dungras, Charla, Manpura, Dhingaria, Parewea, Sarotia, and Gopalapura mines are utilized as building stones. There were about 117 mines of masonary in operation covering 102 hectares of area.

Stone Ballast: Rhyolite is mines from Randhisar and Loadsar hill for use as road material. Nearly 66 mines of stones ballast were in operation and mining was happening in 52 hectares.

Gypsum: isolated patches of gypsum are seen at several places around Taranagar. Gypsite occursat 0.3m to 1.5m below the surface. The occurrence of gypsum found near sidhmukh. Nearly 3 permits of Gypsum are in operations covering 4.79 hectares.

Marble: Rupeli and Dunkar are found in several places of the district. Nearly 17 mines of Marblewere operational with the mining area of 24.42 hectares.

Sandstone: The availability of this mineral is more intense in Bidasar. Nearly 22 licenses have been given for the mining operations. The areal extent of mining was about 0.55 hectares.

Earth(Ordinary/Brick clay): Nearly 10 mines and 30S TP permits were there for brick earth operations. The aerial extent of the mining is nearly 40 hectares.

Granite: The Granite/ Rhyolite are deposited around Dhan Malsisar, Bhimsar, Shyanan, Govindpura and Rejari of Rajgarh and Sujangarh tehsil.

Cooper: The known copper occurrence in Churu district are recorded from Bidasar-Dariba and Biramsar area. From old records it appears that the copper at Bidasar-Dariba was discovered in the

year 1753. There were evidences of its part existence is old silted up quarry and a heap of slag near about it. The copper mineralization is also reported from Biramsar area. The mineralization at both the localities is confined to Delhi super group. These are most argillaceous rocks altered into schistbearing quartz veins after stained by copper carbonates.

Limestone: Limestone occurrences are located near Asrasar, and NW of Mundra. Department is carried out exploration work near villages Saru and Kalyansar. In this area 15 boreholes were drilled which indicate area possess cement grade limestone.

(a) Limestone of Saru- Kalyansar area: Isolated exposures of limestone of limestone near Saru and Kalyansar village of tehsil Bidasar were investigated scantily limestone exposures of fine to medium grained, grey and brownish in color are found. The limestone belongs to Naguar formation of Marwar supergroup. The limestone has got depth of about 10 meters. The upper beds are cherty and having more magnesium oxides but the quality improves with depth beyond 2 meters. From the analysis of samples of Kalyansar limestone has CaObetween 42 to 53.2%, MgO 0.8 to 14.41%, SiO2 1.44 to 23.54. Analysis of Saru limestoneshown CaO between 49.28 to 52.92%, MgO between 0.6% to 17.12% and SiO2 between 1.38 to 5.68%.

(b) Inyara: As the outcrop of limestone is concretionary in nature and in almost horizontally bedded, therefore on analysis it has high CaO values ranging between 41.12 to 50.12%, MgO between 0.6% to 7.24%.

(c) Asarasar: The limestone in this region is concretionary in nature, horizontally bedded therefore its analysis has high CaO values ranging from 39.2% to 50.12%, MgO varying between 0.41 to 11.68%.

(d) Parewara: The limestone of this locality is also concretionary in nature.

(e) Dunkar, Charla, Balera area: Exposures of impure limestone are located in part of Dunkar, Balera and Charla area. Limestone of these areas are dirty, while to light gray in color, fine to medium grained with crisis-cross fractures are filled by ferruginous material. In south west of Dunkar village, there exist mining leases for extraction of ultramafic rock blocks.

The historic details of the mining area, production, sale value, revenue and employment in Churudistrict is shown in **Tables 12.1- 12.3.**

Table 12.1. Inventory details of minerals for the year 2015-2016

S. No.	Mineral	Leases	Area	Production	Sale value	Revenue	Employment
			Hectares	Tons	Lac. Rs	Rs	Nos
1	Marble	53	118.44	108253	3788.85500	25885000	212
2	Masonry Stone	156	125.95	3936998	6889.74650	90658360	1716
3	Sand stone QL	22	0.55	168981	270.36960	3886572	110
4	Brick Earth	11+29	33	405240	6483.84000	10131013	400

Table 12.2. Inventory details of minerals for the year 2016-2017

S. No.	Mineral	Leases	Area	Production	Sale value	Revenue	Employment
			Hectares	Tons	Lac. Rs	Rs	Nos
1	Marble	47	103.92	58243	2038.50500	13978490	188
2	Masonry Stone	158	130.15	4514155	8125.47900	131934377	1896
3	Sand stone QL	22	0.55	137543	220.06880	3163520	110
4	Brick Earth	10+18	25.00	214014	3424.22400	4922325	375

Table 12.3. Inventory details of minerals for the year 2017-2018

S. No	Mineral	Leases	Area	Production	Sale value	Revenue	Employment
			Hectares	Tons	Lac. Rs	Rs	Nos
1	Marble	46	99.6858	42213	1688.52000	12668275	184
2	Masonry Stone	183	151.49403	6110139	10998.25020	258107557	2196
3	Sand stone QL	22	0.55	37663	60.26080	1008755	110
4	Gypsum	03	4.79	0.00	0.00	0.00	0.00
5	Brick Earth	12+21	30.00	256816	4109.05600	3186524	495

A survey is conducted in the district including all the ULB's to collect the details of the inventory and the collated information is shown in **Table 12.4**. Details of compliance to environmental conditions are presented in **Table 12.5** and the Mining related environmental complaints are presented in **Table 12.6**.

Table 12.4: Inventory of mining in Churu district

Attributes	Unit	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldeser	ULB-5 Rajgarh	ULB-6 Ratangar	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar	Total in the district
Population	[Nos as per 2011 census]	120157	35683	19744	27419	59193	71124	12841	95911	101523	32640	2039547
Population (Projected)	[Nos in2021 Projected]	137071	41787	22260	31056	68197	81029	14755	111447	117136	38729	2377891
Type of Mining Activity	[Sand Mining] / [Iron Ore] / [Bauxite] / [Coal] / Other [specify]Multiple selection in order of magnitude of operations	NIL	Sand Stone QL@)	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	Masonry Stone ML*=183 Marble ML*=17 Brick Earth (ML*+ STP#) = 10+30 Gypsum Permit = 03
No of Mining licenses given in the District	[Nos]	0	22 (Sand Stone QL)	0	0	0	0	0	0	0	0	243
Area coveredunder mining	[Sq Km]	NIL	0.005109	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	2.233
Area of District	[Sq Km]											13,858
Sand Mining	[Yes] / [No]	No	No	No	No	No	No	No	No	No	No	No
Area of sandMining	[River bed] / [Estuary] / [Non -river deposit]	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL

ULB1-Nagar Palika Churu, ULB2- Nagar Palika Bidasar, ULB3, Nagar Palika Chhapar, ULB4- Nagar Palika Rajaldesar, ULB5- Nagar Palika Rajgarh, ULB6 -Nagar Palika Ratangarh, ULB7- Nagar Palika Ratannagar, ULB8- Nagar Palika Sardarsahar, ULB9- Nagar Palika Sujangarh, ULB10-Nagar Palika Taranagar
*ML = Mining Lease; #STP = Short Term Permit; @QL = Query License/Lease

Table-12.5: Compliance to Environmental Conditions

Attributes	Unit	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldeser	ULB-5 Rajgarh	ULB-6 Ratangar	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar	Total in the district
Population	[Nos as per 2011census]	120157	35683	19744	27419	59193	71124	12841	95911	101523	32640	2039547
Population(Projected)	[Nos in2021 Projected]	137071	41787	22260	31056	68197	81029	14755	111447	117136	38729	2377891
No of Mining areas meeting Environmental Clearance Conditions	[Nos]	0	22	0	0	0	0	0	0	0	0	243
No of Mining areas meeting Consent Conditions of SPCBs / PCCs	[Nos]	0	22	0	0	0	0	0	0	0	0	243

Table-12.6: Mining related environmental Complaints

Attributes	Unit	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldeser	ULB-5 Rajgarh	ULB-6 Ratangar	ULB-7 Ratannagar	ULB-8 Sardarsahar	ULB-9 Sujangarh	ULB-10 Taranagar	Total in the district
No of pollution related complaints against Mining Operations inlast 1 year	[Nos]	0	0	0	0	0	01	0	0	02	0	03
No of Miningoperations suspended forviolations to environmental norms	[Nos]	0	0	0	0	0	0	0	0	0	0	0
No of directionsissued by SPCBs	[Nos]	0	0	0	0	0	0	0	0	0	0	0

From the data collected, it is noticed that various pollution related concerns due to mining is raised in ULB6 -Nagar Palika Ratangarh and ULB9- Nagar Palika Sujangarh. Owing to the intense mining activities being happening in Churu district, mining department has to regular conducts sudden visits and monitor if the activities are taking place within the permissible limits. The major concern of mining operations is open-cast mining, which severely affects theland use pattern. The major environmental impacts of mining operations are degradation of land, pollution of surface and groundwater resources, pollution of air, deforestation including loss of flora and fauna, rehabilitation of affected population including tribal and impact on historical monuments and religious places.

These mining activities will eventually contribute to the degradation of air quality, impart noise pollution and may also cause water pollution in some instances. To minimize the impact of these activities, the following actions may be taken

Measures to control air pollution

-Spraying of haulage/mine roads with water, use of dust extractors.

-Road carrying capacity studies shall be carried out in the mining belt area as well as the junctions wherein heavy movement of trucks carrying ores will be there.

-Trucks of larger carrying capacity shall be used for transport of ores to reduce air pollution and traffic congestion.

- Designated routes shall be provided or plan for transport of ores avoiding environmental sensitive areas.

- Monitoring shall be done that whether the trucks transporting ores are covered or not. Transport department in coordination with GSPCB shall monitor the activity.

- LSG, ULB in association with RSPCB should multiply the resources and increase the numbers of Ambient air monitoring locations. Since only one monitoring station is planned in Churu district, it should be imperative to plan for various others locations.

Measures to control noise pollution

Regular maintenance of machinery should be ensured.

Measures to control water pollution

The effluents from the mining plants should be treated before releasing from the plants.

The action points for the effective management of mining activities is presented in **Table 12.7**.

Table 12.7: Mining activity Management Plan

Action area	Objective	Responsibility	Present status	Time schedule
Inventory of mining in Churu district	To maintain the record and statusof mines and mining lease area	Assistant Mining Engineer, Churu,	Already maintained. However, all information should be accessible to the public through interactive website of mining department	June 2022
Monitoring	To restrict theillegal mining activities and to check if the emissions are within the permissible limits	Assistant Mining Engineer, Churu,	Regular checking isdone by the mining department to prevent the illegal mining and illegal transportation of minerals.	June 2022

Chapter 13: Noise Pollution Management Plan

Noise can be defined as unwanted or undesired sound and Noise pollution simply means when there is a lot of noise in the environment which is consequentially harms the environment and public wellbeing. Like smoking, noise pollution affects active and passive recipients when noise levels cross certain safe boundaries. Noise pollution affects both human health and behavior. Noise is among the most pervasive pollutants today. But it is an inescapable by-product of urbanization and industrialization. CPCB set standards for noise pollution in 1989 and the Ministry of Environment and Forests (MOEF) formulated Noise Pollution Rules only in 2000.

Noise pollution is caused in the areas of mining i.e. during the time of blasting, operation of power drillers and while cutting the stones. The level of noise pollution may become intense during the festive seasons especially during the Diwali.

13.1 Status and Inventory of noise pollution in Churu district

A detailed information regarding inventory available for measuring the noise pollution is collected and the obtained information is shown in **Tables 13.1 and 13.2**.

Table 13.1: Inventory of Noise levels monitoring equipment

S.No	Attributes	No. of noise measuring devices with district administration	No. of noise measuring devices with SPCBs
1	ULB-1 Churu	0	01
2	ULB-2 Bidasar	0	0
3	ULB-3 Chappar	0	0
4	ULB-4 Rajaldes	0	0
5	ULB-5 Rajgarh	0	0
6	ULB-6 Ratangar	0	0
7	ULB-7 Ratannagar	0	0
8	ULB-8 Sardarsahar	0	0
9	ULB-9 Sujangarh	0	0
10	ULB-10 Taranagar	0	0

Table 13.2. Inventory of Capability to conduct noise level monitoring by State agency / District authorities

S. No.	Attributes	Capability to conduct noise level monitoring by State agency / District authorities	No of complaints received on noise pollution in last 1 year
1	ULB-1 Churu	0	1
2	ULB-2 Bidasar	0	02
3	ULB-3 Chappar	0	1
4	ULB-4 Rajaldes	0	0
5	ULB-5 Rajgarh	0	0
6	ULB-6 Ratangar	0	02
7	ULB-7 Ratannagar	0	0
8	ULB-8 Sardarsahar	0	03
9	ULB-9 Sujangarh	0	0
10	ULB-10 Taranagar	0	1

The monthly noise monitoring has been carried out by the State Board Laboratory for Residential, Commercial and Industrial Purpose in Churu City. A sample of the same is given in **Table 13.3**. From the attributes of **Table 13.3**, it is evident that the noise level on all the measured locations is

within the acceptable limits i.e., 85dBA. Drawing conclusive remarks regarding the noise level in Jhunjhunu district may not be credible. Therefore, there is a great need to conduct studies at multiple locations in Churu district. A short survey is conducted to collect the information of noise pollution management information and inventory in Churu District and the collated information is shown in **Table 13.4**.

13.2. Implementation strategy for Noise Pollution Management Plan

The details of measurable and quantifiable targets, with timelines for completing the tasks are presented in **Table 13.5**.

Table 13.3: Details of monthly noise monitoring data carried out by the State Board Laboratory in Churu City

Sr. No.	Location	September 2020		October 2020		November 2020		December 2020		January 2021		February 2021	
		Day Time	Night Time	Day Time	Night Time	Day Time	Night Time	Day Time	Night Time	Day Time	Night Time	Day Time	Night Time
		Leq	Leq	Leq	Leq	Leq	Leq	Leq	Leq	Leq	Leq	Leq	Leq
1	Near Pankha Circle, Churu	72.6	*ND	75.8	*ND	73.4	*ND	74.1	*ND	73.8	63.9	72.9	66.5
2	Housing Board, Churu	47.0	*ND	57.5	*ND	48.9	*ND	55.2	*ND	65.1	57.2	66.9	53.2
3	Govt. D.B. General Hospital, Churu	60.7	*ND	56.7	*ND	56.3	*ND	59.1	*ND	56.0	67.8	58.6	53.2
4	RIICO Industrial Area, Churu	71.1	*ND	68.4	*ND	65.1	*ND	67.0	*ND	69.2	51.8	61.5	53.1

*ND= Not Done. Acceptable noise limits = 85 dBA

Table 13.4: Compliance to ambient noise standards

Attributes	Unit	ULB-1 Churu	ULB-2 Bidasar	ULB-3 Chappar	ULB-4 Rajaldes	ULB-5 Rajgarh	ULB-6 Ratang ar	ULB-7 Ratannagar	ULB-8 Sardarsa har	ULB-9 Sujangarh	ULB-10 Taranagar
Implementation of Ambient noise standards in residential and silent zones	[Regular Activity] / [Occasional] / [Never]	-	-	-	-	-	-	-	-	-	-
Noise monitoring studyin each ULB of the district	[carried out] / [not carried out]	-	-	-	-	-	-	-	-	-	-
Sign boards in towns and citiesin silent zones	[Installed] / [Partial] / [Not Installed]	-	-	-	-	-	-	-	-	-	-

Table 13.5: Action plan for Noise Pollution Management

Action area	Objective	Responsibility	Action to be taken	Timeline
Noise measuring devices	To measure the noiseat the desired locations	ULB, RSPCB	Since only one noise measuring device in available inChuru city, conducting studies in all ULB's at regularintervals would be challenging. Therefore, noise measuring devices are to be procured	By April, 2022
Noise level Monitoring	For establishing the ambient noise level	ULB, RSPCB	Noise levels should be monitored in each ULB on regular basis	By May 2022
Compliances of standards	To maintain the noise levels below the standards set by CPCB	ULB, RSPCB	1. Proper Categorization of areas into industrial, commercial residential or silence areas/zones has tobe done. 2. Sign boards are to be installed in Silent zones evenat panchayat levels. 3. Loudspeaker or a public address system should not be allowed to be used without obtaining written permission from the authority and not allowed to beused at night (between 10.00 p.m. to 6.00 a.m.) 4. Special team for monitoring during festivals seasonhas to be formed. 5. Transport department will have to take steps for monitoring/ checking of vehicles to ensure environmental norms are followed by the vehicles 6. Complaints record and redressal system should bemade in place.	By May 2022

CHAPTER 14: FOREST CONSERVATION PRACTICES

This Chapter covers the general information regarding types of forest found in **Churu district**, forest land and the current management practices being adopted. The threats to forest / forest land in context to this district have also been identified and discussed. Finally, different afforestation activities proposed in forest land as well as city/town area are listed along with abrief action plans.

14.1 General Information Regarding Types Of Forest In The District

The district comprises of **13858 sq. kms** of geographical area, out of which **73.73** sq. kms is covered with forest, which is around 0.52% of total ditsrict. This includes **7.19** sq. kms reserved forest, 48.57 sq. kms protected forest and 17.95 sq. kms under unclassified forest. **The per capita forest is approximately 0.0036 Ha (as per Census 2011), which is very low compared to average per capita forest cover of 0.02 of Rajasthan and country's average of 0.06 Ha per capita.**

The terrain of district is generally plain with few hillocks of Aravali range running from North East to South West, like Randhisar, Biramsar, Gopalpura, Chadwas, Kodasar, Charla, Dungras etc. Apart from these, rest of the area is covered with sand dunes, which makes it eastern boundary of Thar desert. Churu is the only district in state with no perennial or seasonalrivers whatsoever.

The district has very adverse climatic condition as the temperature varies from 0 degrees in winters to 50 degrees in summers. The average annual rainfall in this area is around 25mm. Primarily this area has vegetation that is mainly found in desert areas like trees of Acacia, Ber/ziziphyus, tortalis, Khejri and Kumtha etc. and shrubs of thor, phog etc. On hillocks of Aravalirange, the species commonly found are thor, kumtha, dansren, ber, guggal and grass like dhaman, karad and sheen etc.

Details of the local vegetation is given below:

1. Vegetation found on sand dunes

    - *Phog (Calligonum polygonoides)*
    - *Bui (Aerva pseudotomento*sa½]
    - *Aak (Calotropis procer*a½]
    - *Kheenp (Leptadenia pyrotechnica)*

- *Saniya (Crotalaria burhia),*
- *Tumba (Citrullus colocynthis),*
- *Thor (Euphorbia spp)*

2. Vegetation fund on loamy sand

- Khejri *(Prosopis sineraria),*
- Rohida *(Tecomella undulata),*
- Neem *(Azadiracta indica),*
- Ber *(Zizyphus spp),*
- Jaal *(Salvadora spp),*
- Kankeda *(Maytenus emarginata),*
- Hingot *(Balanites aegyptica),*
- Kair *(Capparis decidua),*
- Pharash *(Temarix articulata),*

Forests is subjected to tremendous biotic pressure everywhere and in spite of advancement of science, rural population still are dependent of these resources. Unscientific and often, over exploitation has left these forests degraded along with all its components. These forests mightbe under degraded condition due to illegal cutting of trees and land encroachment. The income from forest produce is low. Thus, protecting and restoring such patches are essential to improve the environment, increase biodiversity and sustained forest produce. In addition, plantations done on non forest land especially community lands are being taken up to increase forest cover in the district.

The different ranges covered under Churu Forest Division are Churu, Sardarshahar, Taranagar, Rajgarh, Ratangarh, Sujangarh and TalChhapar. the details of which are given in **Table 14.1**:

Table 14.1: Details of forest cover range- wise

Range	Panchayat Samiti Region	Forest Area (in hectares)
Churu	Churu	1983.34
Sardarshahar	Sardarshahar	1005.62
Taranagar	Taranagar	532.43
Sujangarh	Sujangarh, Bidasar	765.94
Ratangarh	Ratangarh	443.63
Rajgarh	Rajgarh,Sidhmuk	1844.53
Talchhapar	-	797.78 (Nagaur District 281.5Hect.)
	Total	7373.27

The forestry development project taken up in this area mainly focus on Sand Dune Stabilisationunder climate change scheme of state govt. In addition, in past, Canal Side development projectwas taken up in addition to Government of Japan aided project for the promotion of greenery.

As per statistics of 2019-20, there are 13 nurseries in Churu district, the details are given in Table 14.2**:**

Table 14.2: Number of Plants raised in Nurseries (in lakhs) during 2019-20

Panchayat Samiti	Range Name	Name of Nursery	Permanent/ Temporary	Number of Plants (in Lakhs)		
				For Distribution	For Departmental Plantation	Total
1	2	3	4	5	6	7
Churu	Churu	Churu	Permanent	0.016	0.00	0.016
Churu	Churu	PMC Churu	Temporary	0.10	0.33	0.43
Churu	Churu	Gajsar	Temporary	0.25	0.32	0.57
Rajgarh	Rajgarh	NursaryBeed Rajgarh (leelki)	Permanent	1.05	0.00	1.05
Rajgarh	Rajgarh	Range Campus Rajgarh	Permanent	0.02	0.00	0.02
Bidasar	Sujangarh	Nursary Sandwa	Permanent	0.02	0.18	0.20

Ratangarh	Ratangarh	Rajaldesar	Permanent	0.27	0.07	0.34
Ratangarh	Ratangarh	Ratangarh	Permanent	0.03	0.06	0.09
Taranagar	Taranagar	Bhutiya (Taranagar)	Temporary	1.25	0.00	1.25
Taranagar	Taranagar	Bhaleri	Temporary	1.00	0.00	1.00
Taranagar	Taranagar	Taranagar	Permanent	0.20	0.00	0.20
Taranagar	Taranagar	Megsar	Temporary	1.00	0.00	1.00
Sardarshahar	Sardarshahar	Range Campus	Permanent	0.72	0.45	1.17
Total				5.926	1.41	7.336

Tal Chhapar Sanctuary

Tal chhapar was declared a 'Reserved Area' for the protection of wild animals and birds in 1962, vide notification No. F. 7 (379) Revenue A/59 dated 19.09.62. This area was finally notified as reserved forest in 1966 under section 20 of Rajasthan forest Act 1953 and published in Rajasthan Gazette on Sep. 8, 1966 due to the importance of flora & fauna of Tal Chhapar Sanctuary. At the time of final notification total area of the block was 2014.25 acre (815 Ha.), out of which final notification of Wildlife Sanctuary was issued for 719 Ha after settling the rights of people in 23-08-1998.

This Reserve, locally known as Tal Chhapar is located on the fringe of the Great Indian Thar Desert is nestled a unique refuge of the most elegant Antelope encountered in India “The Black Buck”. Tal Chhapar sanctuary with almost flat tract and interspersed shallow low lying areas has open grassland with scattered Acacia and prosopis trees which give it an appearance of a typical Savanna. The word “Tal” means plane land. It is also a home of about 17 species of mammals, 293 species of indigenous and migratory birds, 12 species of snakes, 4 species of lizards etc.

The sanctuary area is mostly covered by grasses with a very few & sparse trees of Prosopis cineraria, Salvadora Spp., Zizyphus S pp. (Ber), capparis Spp. (Ker), Azadirachta Spp. etc. Grasses found in the area are Sewan, Doob, Dhaman & Lampla, Lana, Moth etc. The area become green during rainy season but again dries up during summer season. Some area of sanctuary having less vegetative cover & hence needs to be improved for the betterment of the fauna, existing therein.

Tal chhapar wildlife sanctuary is a unique protected area which bears fair population of Blackbuck in a small area of 719 Ha. In real sense it is a Blackbuck sanctuary. Wild animals found in the sanctuary are Blackbuck, fox, Chinkara, Jungle cat wolf etc., the detail of which is given in **Table 14.3**. Besides these animal species, many migratory birds also visit the area during winter.

Table 14.3: Most Common Wild Species of Tal Chhapar

Wild animal	Scientific Name	Number
Black Buck	Antilope certicarpa	3328
Indian Gazelle	Gazella gazella	127
Blue Bull	Boselaphus tragocamelus	114
Jungle Cat	Felis chaus	36
Desert Cat	Felis lybica	41
Indian Fox	Vulpes bengalensis	53
Desert Fox	Vulpes bucapus	81
Wild Boar	Sus scrufa	201
Indian Porcupine	Hystrix indica	11
Birds of prey	-	349
Indian peafowl/Peacock	Paw cristatus	219

Though it is a small sanctuary but it's very unique in his biodiverse ecosystem. Presently, very small number of tourists visit this sanctuary. Efforts are being made to increase sustainable eco-tourism so that employment benefits can be realised by surrounding villagers. For achieving this purpose at one hand extension activities need to be taken up to popularize this reserve and at the other hand adequate facilities need to be developed in surrounding areas to provide suitable accommodation and fooding to Indian and foreign tourists.

The demarcated boundaries of Talchhapar wildlife Sanctuary are shown in the **Figure 14.1**. In view of wildlife protection, the forest department Churu to increase the wildlife protection activity and for the effective implementation, inventory maps were prepared and the possible regions are identified. The map showing the identified areas is shown in **Figure 14.2**.

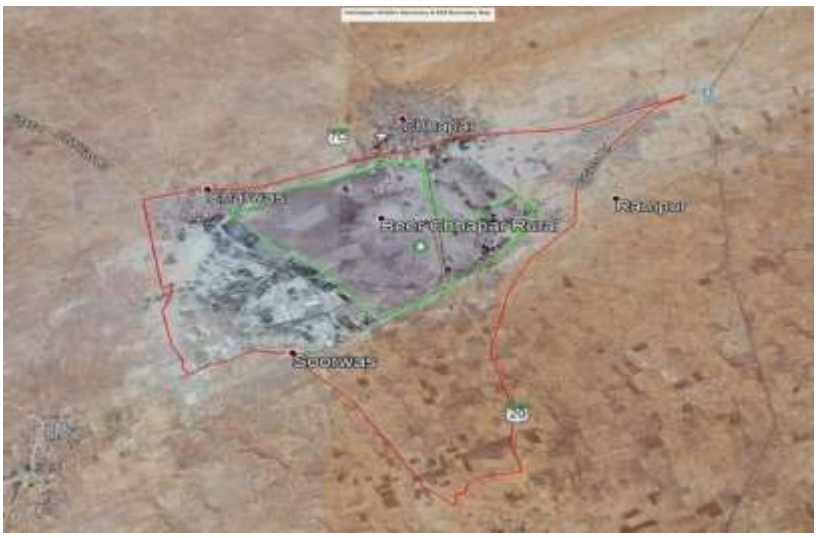


Figure 14.1: Talchhapar Wildlife Sanctuary

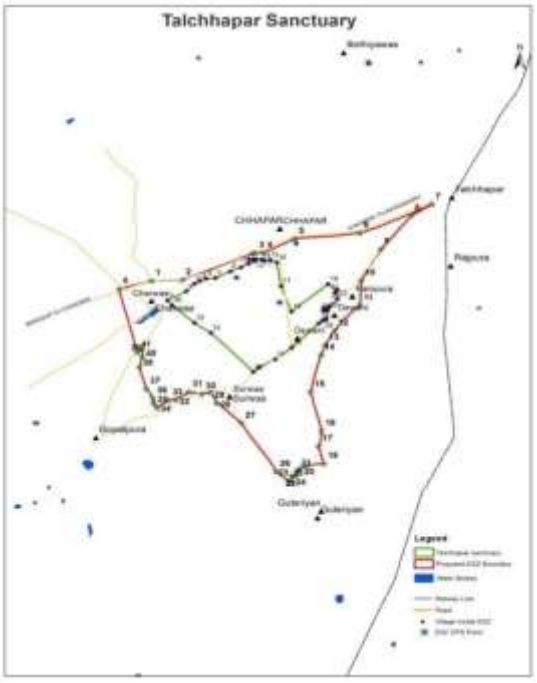


Figure 14.2: Map showing the reserved forest land Talchhapar wildlife Sanctuary

Practices to Increase Green Cover in Churu District

The forest department has also initiated various forestry activities in recent times through mitigation efforts to reduce environmental pollution, some of which are summarized below:

Activity	Action Plan
Afforestation	Details given below
Development of Urban Forest	Details given below
Reclaiming of Degraded Forest Land	Details given below
Road side plantation	Details given below
Forestry activities to increase environmental awareness among people.	Details given below
Any other activity (District Specific)	Details given below

The existing status and forest development practices done in different ranges of Churu districtcan be observed through **Figures 14.3 to 14.7**:

Table 14.4: Actions taken/ Planned for the development of forest cover range-wise duringYear 2020-21

Actions taken	Status of Progress
Afforestation has been done in 511 Ha land located in Churu, Ratangarh, Rajgarh, Taranagar, Sujangarh ranges. This is comprising of 200 Ha under Climate Change scheme, 19 vrikshakunj and Ring Pit or other plantation in 311 hectares in mnarega. A total 2,08,800 number of plants have been afforested.	Completed
MGNREGA: Under MGNREGA scheme, 393 number of works have been sanctioned with an amount Rs. 6601.05 Lakhs.	Under Progress
In the year 2020-21, Under Rajiv Gandhi Water Conservation Scheme, 21 number of works have been sanctioned Under MANREGA.	Under Progress

The range wise afforestation work planned under different schemes during 2020-21 has beensummarized in **Table 14.5** and given below:

Table 14.5: Range- wise Planning of plantation under different schemes in the year

Division	Name of Forest Department	Scheme Name	Name of Range	Allotted		Number of plants to be planted
				Name of workplace	Area (in Hact.)	
Bikaner	Churu	Climate Change	Sujangarh	S.D.S Malsisar	10	6000
			Sujangarh	S.D.S Tehandesar	10	6000
			Ratangarh	S.D.S Aalsar	10	6000
			Ratangarh	S.D.S Sehela	10	6000
			Churu	S.D.S Churu A	13	7800
			Churu	Beed Ratanagar	30	18000
			Churu	S.D.S Gantel	20	12000
			Churu	S.D.S Dandu	10	6000
			Churu	S.D.S BeedGajsar	18	10800
			Sardarshahar	S.D.S Harpalsar	32	19200
			Sardarshahar	S.D.S Bayla	25	15000
			Sardarshahar	S.D.S aspalsarBada	12	7200
			Total		**200**	**1,20,000**
		MNAREGA	Churu	All blocks	**311**	**88,800**
		Grand Total			**511**	**208800**

Figure 14.3: Plantation in Range Sardarshahar Division, Churu

Figure 14.4: Control of illegal mining in Sujangarh range by constructing pucca boundary wall in forest area

Table 14.6: Distribution of plants under different schemes for the year 2020-21 (Number of Plants in Lakhs)

District	Name of Forest Department	Scheme	Residue plants from distribution in the year 2019-20	Plants ready for distribution in theyear 2020-21	Total (5+6)	With Charge Distribution	Free Distribution	Total (8+9)	Plants residues from distribution(7-10)
Churu	Churu	Farm Forestry	0.00	0.40	0.42	0.42	0.00	0.42	0.00
		Toll Plant	0.09	0.15	0.24	0.14	0.0030	0.143	0.097
		MNAREGA	0.45	4.75	5.20	3.926	1.235	5.161	0.039
		Campa	0.065	0.00	0.065	0.032	0.033	0.065	0.00
Total			**0.625**	**5.30**	**5.925**	**4.518**	**1.271**	**5.789**	**0.136**

Table 14.7: Distribution of plants under Farm Forestry for the year 2020-21

District	District Target		Division	Division Target		Division-wise Achievement							
	Area Covered under Public & forest lands	No. of seedlings in lakhs planted on public and forest land		Area Covered under Public & forest lands	No. of seedlings in lakhs planted on public and forest land (Number)	Pt. No.51(a) Area Covered under Public & forest lands		Area Covered under Public & forest lands (8+9)	No. of seedlings in lakhs planted on public and forest land (Number)				
						by Forest Dept.	by other Dept.		by planting saplings		by seeds sowing/cutting		Total
									by Forest Dept.	by other Dept.	by Forest Dept.	by other Dept.	by planting sowing/ cutting
	Ha.	No. in Lakhs		Ha.	No. in Lakhs	Ha.			No. in Lakhs		No. in Lakhs		No. in Lakhs
Churu	486	3.160	Churu	486	3.16	511	433	944	2.09	2.17	0	0	4.26

District Specific - Plantation through Ring-Pit method by NREGS funding

Having sandy soil and saline water, along with extreme temperatures in the district, it is not easy to grow vegetation in this region. To combat the adverse climatic conditions, ring pit technique has been used in the district to grow trees with excellent results. This technique provides avenue for regular watering and protection from grazing.

A network of nurseries have been established to support the plantation drive in district ith major funding component from NREGS scheme.

During year 2020-21, 1001 RKM (running km) area was covered under plantation by ring pit method through NREGS funding and around 1 lakh plants were planted with a survival rate of more than 90%.

Figure 14.5: Ring Pit plantation under MNREGS Scheme, Range Rajgarh ,Churu

Figure 14.6: SDS Dandu located in Range Churu Division, Churu

Figure 14.7: Forest protection measures-Nursery Taranagar range Taranagar division Churu

Development of Urban Forests

Nature Park has been developed in heart of the city after removing encroachment of forest landto promote healthier lifestyle and environmental awareness as shown in **Figure 14.8**. It attracts lakhs of visitors every year and acts as green lungs of the city.

Green spaces in form of Vriksh Kunj have been developed under MJSA scheme and NREGS scheme.

Figure 14.8: Nature Park, Churu

All ULBs (Nagar parishad's & Nagarpalika's) in the district will be developed by Roadsides, Parks, Gap plantations,Community plantations. Plantations of Avenue, Flowering, Fruiting, Shadytrees/shrubs/

Figure 14.9: MJSA City Phase II, Ridkhala, Churu

Forestry activities to increase environmental awareness among people

Forestry activities such as plantations, wild life protection & conservation, eco-tourism activities, construction of pucca walls, check posts, watch towers, water harvesting structures, water conservation structures etc. were initiated to increase environmental awareness among people as shown in **Figure 14.10**.

Figure 14.10: Awareness programme, Churu

Forest Department and Water Conservation

One of the most important works done by the department is the construction of water bodies for water storage, groundwater recharge, and wildlife consumption with funds from the forestdepartment and NREGS. During FY 2020-21, a total of 17 small, medium, and large water storage ponds were constructed by the forest department under the NREGS scheme and departmental schemes.

FY 2020-21	
Water Body	No.
Large Pucca Water Ponds	5
Small Water storage structures- kunds	3
Old water storage bodies renovation works	2
Small WHS/talai	2
Mini-percolation Tanks in Sanctuary Tal Chhapar	3
Micro-percolation bodies	2

Road side Plantation

To develop a green belt along the national and state highways, forest department takes up roadside plantation works, in consonance with National Forest Policy goals. During FY 2020-21, a total of 29000 plants were planted in a stretch of 290km in Churu district.

Figure 14.11: Pond Constructed under Mnerga Range Rajgarh Churu

Figure 14.12: Grassland Leel ki Beedd Area, Churu

Figure 14.13: Pasture Development Work, Sadu Badi Range Sujangarh Churu

Figure 14.14: Pasture Development Work, Sadu Badi Range Sujangarh Churu

Works Done under DMFT Scheme in Mining Areas

Range name	Work Name	Duration	Amount Spent
Sujangarh	Percolation Tank in Kodasar Forest Area	2016-18	3-00
	Plantation in Gopalpura Forest Block	2016-18	3-00
	Solar Plant and pump setin Gopalpura Nursery	2019-20	5-00
	Chain link Fencing in Gopalpura nursery	2019-20	1-00

Social Forestry - Plantations by Forest Department outside Forest Areas

A total of 2,08,800 saplings have been planted by the Forest Department in 511 hectares and a total of 5,78,900 saplings have been distributed to farmers, village dwellers, government, non-government institutions and others.

Activities carried out by Other Departments

Eco Club

The environment related activities has been carried out by a total of 253 Eco Clubs that are functioning in various schools and colleges. Every year, on the occasion of Van Mahotsav, saplings are planted by Eco Club. A total of 64,599 saplings have been reported to be planted in the year 2020-21. They also adopt appropriate measures to conserve all the planted plants and to protect them from watering, hoeing, weeding and cold. Works are being done by CO Scout Guides to spread awareness regarding eco club for environmental awareness, seminar, sanitation campaign, public consciousness rally, eradication of polythene and non-use of plastic in polythene in cities. In addition, they do different activities every month such as rally, organizing different environment day, making and distributing free of cost clothes bags through competition, waste management, manufacture of compost manure, wildlife conservation campaign, activities for water conservation are included.

District Collector, Churu closely monitors the 18 target given by H'ble NGT to

combat pollution of all kinds and to promote sustainable development. In addition, promotion of polythene / plastic eradication, tree plantation work and environment development activities,

which are being promoted in association with all the District Education Officers and the Eco Club.

However, there is a greater need to integrate the functioning of various departments, clubs withwork of forest department to have long term impact.

As per the direction of the Hon'ble High Court in the cradle dated May 20, 2019 (with regard to the writ petition no. 11153/2011), action plan was formulated to plant 100 saplings at each gram panchayat level. About 65012 plants were planted in 254 gram panchayats of the districtin the year 2019 and replacement of plants has been done this year. In this regard, the Chairman directed that the site-wise current status report of the said plants planted in the cradle of the orders of the Hon'ble Court should be sent by the concerned Development Officer.

Plantation by Other Departments

Table 14.8: Distribution of plants in Different Departments Churu district

jtokj ulZfj;k ls forfjr ik/kk dh lwpuk fnukad 30-11-2020 rd

Ø-la-	foHkkx	pw:	jktx<	rkjkuxj	jrux<	ljnkj'kgj	ltkux<	;ksx
1	lkoZtfud fuekZ.k foHkkx	0	0	0	0	0	0	0
2	iapk;r lfefr @ xke iapk;r	1765	33953	62460	3095	14630	1955	117858
3	ft-f'k- vf/kdkjh ek/;fed f'k{kk	4676	3067	24410	500	4230	0	36883
4	ft-f'k- vf/kdkjh izkFkfed f'k{kk	2146	4350	15590	1400	4230	0	27716
5	efgyk ,oa cky fodkl foHkkx	250	0	0	0	25	0	275
6	tuLokLF; vfHk;kfU=dh foHkkx	150	0	1890	0	0	0	2040
7	ftyk m/kksx@fjdk fyfeVsM pw:	0	0	0	0	0	0	0
8	fpfdRlk ,oa LokLF; foHkkx	640	810	4770	70	50	0	6340
9	vk;qosn	106	400	1355	0	0	0	1861
10	jln foHkkx	0	0	0	0	0	0	0

11	lk'kikyu foHkkx	431	250	1675	0	345	0	2701
12	fo/kkr foHkkx	0	630	170	0	115	0	915
13	iqfyl foHkkx	446	0	890	100	0	0	1436
14	uxj ikfydk	0	0	0	0	0	0	0
15	LakLFkk,@egksRlo	3225	0	0	100	1675	2	5002
16	Lkgdkjhrk foHkkx	0	0	160	0	0	0	160
17	lkfjogu foHkkx	0	0	0	0	0	0	0
18	d`f"kZ foHkkx	0	0	0	0	0	0	0
19	tynk; foHkkx	0	0	0	0	0	0	0
20	Jsyos	500	1500	0	0	100	0	2100
21	LdkmV xkbM	0	0	180	0	0	0	180
22	miHkksDrk eap@ U;k;ky;	0	0	0	0	2500	0	2500
23	vU; foHkkx	4366	2500	11525	500	1700	0	20591
;ksx foHkkxksa dk forfjr		18701	47460	125075	5765	29600	1957	228558
24	d`"kd ,o vU; vketu	14551	7334	154813	24013	39841	0	240552
egk;ksx		33252	54794	279888	29778	69441	1957	469110

Future Action Plan

1. Afforestation activities to be taken up on non forest land as well as city/town area

To increase green cover, afforestation should be carried out to increase the green cover and create harmony with nature. The area should be afforested with variety of local sapling. This will help to have polyculture.

Keeping in view of these facts, this region has been afforested with variety of local sapling. Afforestation activities will be proposed in the forest land as well as city/town area and more **urban green spaces** will be developed.

2. Reclaiming of Degraded Forest Land

Reclamation can be done by adopting soil conservation measures such as constructing MPT's, PT's, Nadi's, Talai's, Dams, Trenches, LSCD's, Anicuts, Water Harvesting Structures, WaterConservation Structures etc.

3. Road side plantation

Road side plantations will be carried out in next 10 years on National Highways,

State Highways, MDR's, Village roads in different schemes & will try to cover all roads in the district.

4. Soil & Water Management Zones to be Developed

- Adequate soil water conservation measures will be taken up in areas adjacent to habituated areas and old water bodies will be restores and green belt will be developed around water bodies.
- New water harvesting structures at appropriate places will be constructed and renovationof existing structures will be taken up so that rain water harvesting is done in an effectivemanner.
- Artificial water holes/guzzlers will be provided wherever necessary.

5. Eco-tourism Promotion

During year 2019-20, a total of 7730 tourists visited in Tal Chhapar sanctuary. Eco-tourismis very essential component for local people, tourist for awareness about wildlife. Tal Chhapar sanctuary has large potential to attract ecotourism and religious tourism as Salasar religious place is close by. It is a prominent birding destination as well.

Figure 14.15: Tal Chappar Wild life Sanctuary Churu Division

Figure 14.16: Tal Chappar Wild life Sanctuary Churu Division

Figure 14.17: Indian Spot Billed Duck Tal Chappar Wild life SanctuaryChuru Division

Declaring More Conservation Areas

Leel ki Beed Churu has great potential to be developed as Chinkara deer conservation reserveand a birding destination. In addition, Ratan Nagar beed near

Churu city may be developed asreserve forest area to harvest grasses and to develop as a shelter belt against the shifting sand dunes and loos in peak summers.

Figure 14.18: Leel ki Beed Churu Division

Eco-System Services Centered Approach of Conservation

To shift focus of forest development from cources of tangible goods like timber, grasses, fodder etc to provider of invaluable intangible services like provision of clean air, ground water recharge, micro-climate regulation, temperature stabilization and aesthetical value to thesociety.

This would require dedicated study to ascertain monetary value of forest in this arid region.

Issues

Issues that are to be considered while managing these forest and grasslands are summarized asunder:

1. Land encroachment
2. Grazing and fodder pressure from the villages
3. Implications of the past management
4. Lack of inventory on grasslands
5. Spread of unpalatable grasses and weeds

CHAPTER 15: RURAL ENVIRONMENT MANAGEMENT PLAN

15.1 Introduction

The challenges are different in urban and rural areas. The main reasons for environmental pollution in rural areas are open defecation, water coming out of the houses, cattle dung, and solid waste. Although a small quantity of wastes has been used in agriculture by the rural community, there are many scopes to deal with environment-related issues in rural areas. There is a lack of awareness among rural people due to a limited education standard, low literacy rate, economic challenges, and social barriers. A large number of villages are out of reach of essential services.

As per census 2011, the total population of Churu district is 2039547 comprising of 1463312 of rural population and 576235 of urban population. The projected district total population foryear 2021 is about 2377891 which is expected to have a rural population of 1714424 and urbanpopulation of 663467. The rural population is about 72.1% of total district population. Though emphasis was given to assess overall environment of district in all previous chapters, it is felt that an exclusive chapter should also be introduced to discuss best practices dealing with environment related issues in rural areas.

As Churu district is spread geographically in the desert, people used to defecate in the open due to the availability of sufficient space. They also have the traditional belief that open defecation is conducive to health though open defecation pollutes the environment and invites the spreading of many types of diseases. Under the Swachh Bharat Mission (Grameen) scheme,an action plan has been prepared in two phases for cleanliness to improve the environment and people's health. The first phase plans to make the community aware of the construction of toilets and make them aware of their uses to eliminate open defecation at the community level. The second phase deals with the management of solid and liquid wastes in those villages declared free from open defecation by preparing a village-wise detailed action plan through village panchayat through community participation.

For the management of solid and liquid wastes, a detailed action plan has been prepared through the Swachh Bharat Mission (Gramin) scheme for environmental improvement at various levels,in which individual toilets are to be constructed in the first phase and information

communication and education (IEC) on solid and liquid waste to the community in the second phase. The campaign of community awareness has been carried out through proper planning.

The challenges and action points in urban areas have been derived keeping in view of the fact that the highest volumes of waste are generated in these centers. The challenges differ in urban and rural areas. The infrastructure to supply water and energy and manage wastewater in many cases in rural areas simply does not exist, and economic and social barriers put basic services even out of reach for a large number of people. However, there is also substantial potential to harvest the value of waste streams that are smaller or more intermittent to benefit rural communities. For example, decentralized resource recovery systems could be developed, particularly for sewage, food, animal, and agricultural waste. Recovery of resources from wastestreams has long been practiced by the rural population, but may be not in a systematic way.

In the coming times, supply of food, water, and energy to all will be made more difficult by population growth and increasing standards of living. Innovation will be needed to augment supplies, improve distribution, reduce waste, increase efficiency, and reduce demand in the rural area as well. Because the food-water-energy nexus is so tightly interwoven, potential solutions or demands in one area often have repercussions in another.

15.2 Current Status

There exists a large number of success stories that have been achieved by the active participation of the rural community in collaboration with village panchayats and district administration. An overview of a few examples is given in the subsequent section to explain the gravity and necessity of improving the

livelihood of the rural community.

Toilets of eligible families were constructed in the state under the Swachh Bharat Mission (Gramin) to satisfy the needs of the last common person of the rural areas. To improve and maintain the goal of making open defecation free (ODF) in rural areas of Churu district, rigorous campaign was carried out to improve the status of toilets (one pit to two pit toilets, retrofitting etc.). We need to maintain the environment of the rural community clean and safe by bringing behavioral changes in the mindsets of the people to take care of their health and the cleanliness of their surroundings.

The state government has been trying not only to make open defecation free society in the rural areas under the Swachh Bharat Mission but also they have been working to develop a system

for proper management of solid and liquid wastes. Rural Development and Panchayati Raj Department have planned to adopt the technology of reuse and recycling of wastewater generated from houses in every Gram Panchayats to develop composts at the community and household level. On an experimental basis, the state government has identified a number of gram panchayats to prepare a detailed action plan for solid and liquid waste management.

First Phase Year (2014-15 to 2019-20)

In the first phase of the Swachh Bharat Mission (Gramin) scheme, the construction ofindividual toilets and a community awareness campaign for open defecation free (ODF) was apriority. The Churu district was declared the state's third district after achieving a 100 percent target as per baseline survey 2012. The district also organized a number of community participation programs. The Churu district has received national and state-level honors on community participation-based action plans and innovations made in which the district head, district collector, and district coordinator were honored at a particular function. Severalnational and international media agencies have covered and appreciated the work done in the district. The physical progress achieved during the first phase of the Churu district is given in **Table 15.1**.

Table 15.1: Physical progress achieved during the first phase of the Churu district

Description	Target achieved (Numbers)
Personal Toilet Construction & Payment	86799
Community Sanitation Complex	457
Model Toilets	210
Anganwadi Toilets Construction	419
School Toilets Construction	1311

Open defecation-free campaigns were organized to establish community participation. It encouraged the district when national- and state-level agencies appreciated the efforts, the most important being that at the village level, people stopped defecating in the open and started using toilets that has a vital role in environmental improvement (**Figure 15.1**).

Fig. 15.1(a): International media coverage

Fig. 15.1(b): O.D.F. Site Visit by foreign delegates in the Churu district

Fig. 15.1(c): IEC activity

Fig. 15.1(e): Honourable Minister of State for Rural and Panchayati Raj, Government of Rajasthan, honoured at the state level when the Churu district was declared ODF during 2017-18

Fig. 15.1(d): Site Visit by visitors in the district

Fig. 15.1(f) Director, Swachh Bharat Mission (Rural) Government of India, Shri Nipun Vinayak (IAS) and District Collector Churu Smt. Archana Singh while observing community participation based ODF Gram Panchayats in the first phase of Swachh Bharat Mission Scheme

Second Phase

In the second phase of Swachh Bharat Mission (Gramin) scheme, Revenue village-wise Detailed Project Reports (DPRs) would be prepared for solid and liquid waste management. Convergence work has to be done in the Swachh Bharat Mission (Rural) 15th Finance Commission and MNREGA scheme under the proposed action plan. The district administration would be the nodal agency of Swachh Bharat Mission (Gramin). The government scheme are proposed for the financial year 2021-22 as given in **Table 15.2**.

Table 15.2: Target to be achieved in Churu district during second phase

Description	Proposed Target (Numbers)
Total Gram Panchayat in the district	304
Total revenue in the district	854
Proposed for the year 2021	342
Detailed action plan prepared	245
Work started	137
Community sanitation complex	151

Construction of individual toilets	5448
Total proposed budget	7861.12

According to the guidelines of the Swachh Bharat Mission (Gramin) scheme, solid and liquid wastes management should be done in the second phase of the scheme in open defecation-free gram panchayats. It involves constructing soak pits for grey-water management, sewerage construction, water storage plant, solid waste management, garbage collection center, community-level garbage bins, garbage sorting center, etc. This work has to be done by convergence with the development schemes available under rural development schemes. After being completely free from open defecation by the district, a detailed action plan is being prepared with Gram Panchayat and community participation. There are a number of examples in Churu District where best practices are being initiated successfully for environmental improvement at various levels under the Swachh Bharat Mission. A few examples are given insubsequent sections.

15.2.1 Gram Panchayat Gogasar, Ratangarh

According to Census 2011 information the location code or village code of Gogasar village is070596. Gogasar village is located in Ratangarh Tehsil of Churu district in Rajasthan, India. It is situated 18km away from sub-district headquarter Ratangarh and 63km away from district headquarter Churu. As per 2009 stats, Gogasar village is also a gram panchayat. The total geographical area of village is 879.53 hectares. Gogasar has a total population of 4,402 people. There are about 735 houses in Gogasar village. As per 2019 stats, Gogasar villages comes under Sardarshahar assembly & Churu parliamentary constituency.

Solid and Liquid Waste Management

Drainage problem of wastewater

Gram Panchayat Gogasar was selected from Ratangarh Tehsil of Churu district in Rajasthan, in which there was a huge problem of accumulated sewage and rainy water (**Figure 15.2**).

Figure 15.2: Status of locality before start of work

There are 1057 families in Gram Panchayat Gogasar. The Gram Panchayat used to experiencethe severe problem of solid and liquid waste management. In the Gram Panchayat, there were heaps of garbage and cattle dung in public places, streets, squares, and the drainage problem of wastewater coming out of the houses. The wastewater gets stagnated in the middle of the village, forming Ginani, located near to the main entrance of the community health center and the Sanskrit upper primary school in the village. As a result, the school's window is not possibleto open due to the smell and mosquitoes. There used to be always a risk of spreading of diseases

due to unhygienic conditions. People used to complain about it. Villagers demanded that the collected water located in the middle of the village should be removed so that the primary health center and Sanskrit upper primary school operating in the village could be utilized in a better environment without any risk from mosquitoes and foul smell. The public representativesand employees of Gram Panchayat visited the locality and agreed for their active participation.

Due to awareness and active involvement of residents, Gram Panchayat Gogasar was declaredas the first ODF of the Ratangarh block in the first phase of the Swachh Bharat Mission scheme. A meeting was organized at the community level in the Gram Panchayat to encourage the GramPanchayat from the district and block level,

and in the meeting, information was given about various schemes for environmental improvement so that the Gram Panchayat would work with enthusiasm. As a result, interest was created among the people, and an action plan of Rs 46.00 lakh was prepared for the solid and liquid waste management of the Gram Panchayat through Swachh Bharat Mission (Gram), 15th Finance Commission, and MNREGA scheme. In the proposed action plan, the main demand/problem of the Gram Panchayat has been taken for the disposal of the wastewater collected in the middle of the village. At the technical level, the action plan of the Gram Panchayat was prepared, in which the construction of drains for the management of grey-water coming out of the houses of the Gram Panchayat, the construction of community and individual soak pits, and the construction of soak channels. The drainage facility of wastewater located in the middle of the Gram Panchayat was provided to carry it one km away from the village through drain (nala) and soak channels. The drainage problem solved, which was proved to be a boon for the village. Gogasar is now determined further to improve the environment, make a clean and beautiful gram panchayat.

The community participated actively to perform the task (**Figure 15.3**). The efforts of villagers,public representatives and traders were appreciated. While giving their views and at the same time it was decided to give public cooperation financial support, a team was formed for this task. The committee prepared a plan on how to drain the water from the locality. They prepared the plan and shared the complete information at the panchayat level. The information of the entire work was also made available to all concerned officials of panchayat samite and districtlevels.

Figure 15.3: Community participation tour

The work of main drainage system with proper drainage soak pit was constructed (**Figures 15.4(A**) to **(C)**. The locality looks clean and beautiful (**Figure 15.3(D)**). As a result, the risk of spreading of diseases due to unhygienic conditions is minimized and local people are quite happy and enthusiastic about these initiatives.

Figure 15.4(A): Magic pit construction for grey water

Figure 15.4(B): Construction of soak pit for grey-water management

Figure 15.4(C): Recharging well for grey water management

Figure 15.4(D): Status of locality after completion of work with proper drainage facilities

Solid Waste Management

There was a serious problem of wet and dry waste piling up on the main roads and outside thehouses in Gram Panchayat Gogasar. As a result, there used to be always a risk of spreading of diseases due to unhygienic conditions. People used to complain about it. Finally, a site was identified by the people. Awareness among the people was created. The efforts of villagers, public representatives and traders were appreciated (**Figure 15.5**).

Figure 15.5(A): Overview and Location Identification for Solid Waste management

Figure 15.5(B): Creating an environment for garbage collection

Figure 15.5(C): Garbage collection center at Gram Panchayat Gogasar after construction

The above case study clearly demonstrates that with collective initiatives and efforts by the community and planning, support and encouragement by the Government can not only change the livelihood of our environment but also improve the living standard of rural population at large extent.

15.2.2 Village Godash in Gram Panchayat Aandsinghpura, Taranagar

Village Godash, is located in Gram Panchayat Aandsinghpura of block Taranagar Churu district in Rajasthan.

Godash is a medium size village located in Taranagar Tehsil of Churu district, Rajasthan with total 246 families residing. As per 2011 population Census, the Godas village has population of 1384 of which 692 are males while 692 are females with 246 houses. Godas village has lower literacy rate compared to Rajasthan. In 2011, literacy rate of Godas village was 62.09 %as compared to 66.11 % of Rajasthan. The total geographical area of village is 977.66 hectares. The general information of village is given in **Table 15.3**:

Table 15.3A: Population

Data	Total
Population (as per census 2011	1384
Current Population (as on March 2021)	1730
Domestic Animals	2310

Table 15.3B: Area of the village

Type of land	Arable / Private	Grassland / Communal / Government	Other Land	Total Land
Area (in Hact.)	952.4	15.2	10	977.66

Status of drinkable water:- The main source of drinking water is groundwater which has current groundwater level at 308 feet.

Table 15.3C: Status of drinkable water

Source of water	Supply of tap water (Public Stand Posts)	Hand pump	Wells	Pond
Number	16	0	0	1

Current status of sludge management with solid liquid waste and sewage:-Table 15.3D: Types of toilets built in the village

Type of toilet	One pit	Two pit	Community Single Pit	Other	Family without toilets
Number of family	325	5	2	-	16

Current system of solid waste management

The current generation of liquid and solid waste are given in **Table 15.4**. Some of the salient data points are also given in **Figure 15.6**. Accordingly, meeting was organized for cooperation and financial support through public participation

(**Figure 15.7**).

Table 15.4: Status of generation of solid and liquid wastes

Solid Waste Generation	
(a) Biodegradable Wastes (in Kg)	
Dung	20000
Kitchen Waste	135
Foliage	43
From Community Units	450
(b) Non- Biodegradable Wastes (in Kg)	
Recyclables	3 Kg
Non-Recyclables	68.50 Kg
Liquid Waste (Grey Water) in Liters	
From Households	46654
From Public Water Point Non-commercial Units	800

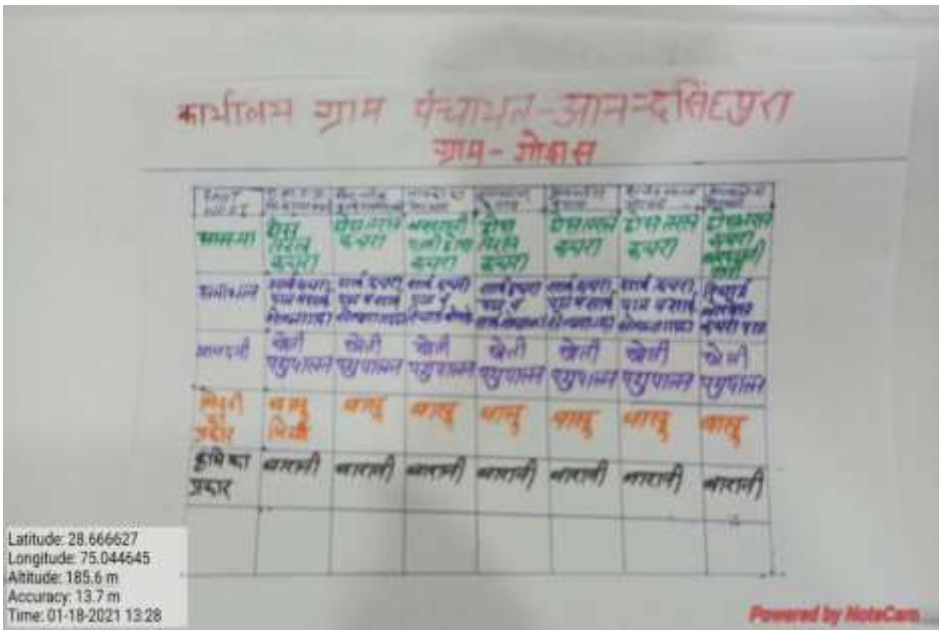


Fig. 15.6A: Transect Walk

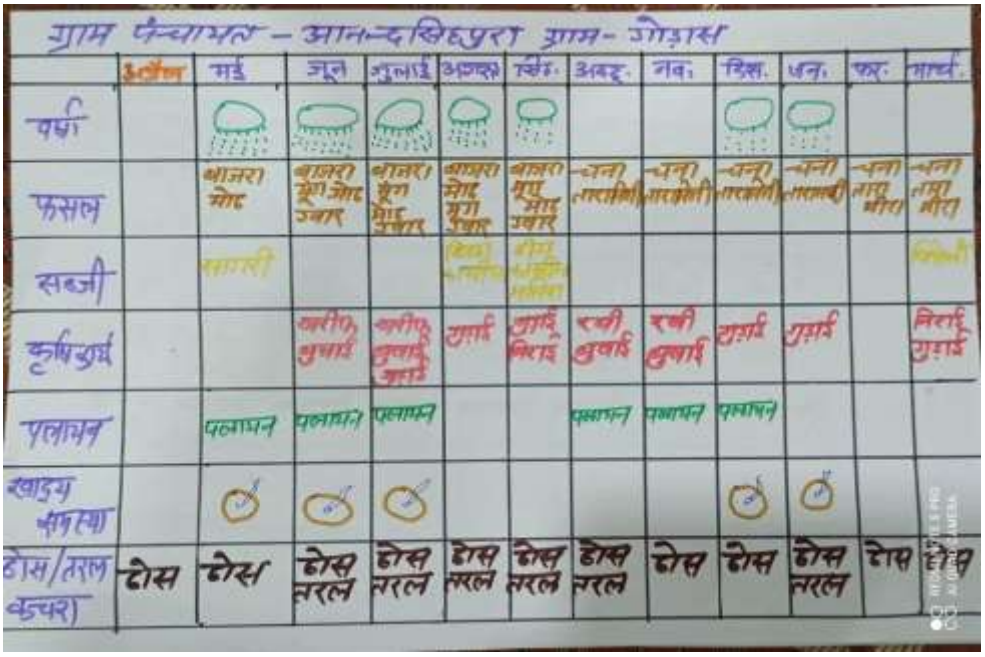


Figure 15.6B: Seasonal Mapping

Figure 15.7: Meeting to discuss the plan and DPR Preparation for Godash Village (Taranagar)

Garbage are scattered in different places in front of the houses and in the village and garbagecontainers are not placed in public places currently.

Figure 15.8A: Current status of dumping sites of biodegradable waste from Individual Households (Vermicomposting for IHH and Dust Bin for Community Waste are required)

Figure 15.8B: Proposed Resource Recovery Center in Godash Village (Taranagar)

Current system of management of liquid waste / grey-water

The contaminated water coming out from the houses and PSP stand are spreading in the open (**Figure 15.9**). The existing drains are not effective and overflowing over the roads/streets. There should be provision of community magic pit with appropriate size of the chamber, which should be connected to storm water pipe line. Habitants should be encouraged to constructindividual Sock pit / magic pits wherever it is required.

Figure 15.9A: Current status of wastewater due to PSP Stand

Figure 15.9B: Current status of wastewater generated from Households

Figure 15.9C: Current status of provision of draining wastewater from individual households (Individual Soak pit is required)

Figure 15.9D: Current status of stagnation of wastewater (Construction of drain and Community Leach pit by Connecting Multiple Household with Chamber is required)

Figure 15.9E: Current status of stagnation of Grey wastewater on Main Road (*Aam Rasta*) (Community Sock pit/ Leach Pit and Individual Sock Pit for individual household is required)

As can be observed from the above Figures, contaminated water coming out from the houses are spreading in the open spaces and onto the roads. The existing drains are not effective and overflowing over the roads/streets. District administration has taken an initiative to address these environmental issues after analyzing problem of solid and liquid waste management. The proposed activity to be carried out for waste management in the village is given in **Table 15.5**. The rural participatory/ interactive tools like transit walk / resource map / seasonal map / matrix ranking / chapati-illustration etc. have been used to prepare detailed project report (DPR) for implementing the project.

Table 15.5: Proposed activity to be carried out for waste management

Activity	**Number**
Individual Compost Pit (Numbers)	3
Community Compost Pit (Numbers)	2
Individual Sockpit (Numbers)	19
Community Dust Bin (Numbers)	04
Transportation (Tricycle/Camel cart)	Tricycle 1 Camel Cart 2
Community Magic Sockpit (Numbers)	23
New Drain Construction (in m)	150
Recharge Bore well (Numbers)	4
Roadside Plantation (Numbers)	2
Resource recovery Center (Numbers)	1

15.3 Environment management plan

In rural areas also, the Environmental Management Plan should be implemented with all mitigation measures for each activity so that adverse environmental impacts can be minimizedas a result of the activities.

Like cities, by managing solid and liquid waste in rural areas and wastewater flowing waste inthe village street, the locality will eliminate that waste. They will be disposed of at the local level, which will employ the people at the village level itself. Thus, liquid waste managementwill be executed concretely in different ways with the significant participation of people fromrural areas, public representatives, NGOs.

- In this direction, meaningful efforts for the effective disposal of waste have to be started. Like cities, wet waste comes out daily in villages, for which solid and liquid waste management is unavoidable.
- To realize the vision of "Clean Rajasthan Healthy Rajasthan", solid and liquid waste needs to be disposed of daily so that our village houses will be clean and the health of the rural population would be ensured under a clean environment.

- Solid and liquid waste management is a new concept in rural areas. The role of public representatives and various state government departments is also vital in its practical implementation.
- In the first phase of Swachh Bharat Mission (Rural), it was the priority to provide clean toilets to every household and every person and to make the rural areas open defecation-free.
- In the second phase of this mission, a target has been set to keep the village open defecation-free and ensure the system of solid and liquid waste management in the village.
- After that, the solid and liquid waste disposal of this waste will be performed by different methods.
- For the solid waste management of the villages, the services of sanitation workers will be used to collect garbage from the house and community level. Wet and dry waste from homes will be collected separately.
- Three-wheeler vehicles, pushcarts, e-rickshaws, auto tippers, and public garbage vessels will be used to transport collected waste.
- Composting at home for garbage processing and disposal, for a family of 5-6 members,two manure pits will be made between 100-150 houses.
- According to the amount of wet waste at the community level and the village panchayat level, composting yards can be built so that that garbage can be composted for 2 to 3 months.
- Compost unit and R.R.C. can be established in rural areas as per requirement according to population/amount of waste generated for solid waste management.
- Plastic is fatal for the environment, from the pollution of river drains, water sources, etc., its side effects are being seen on humans, aquatic animals, pets, etc. State Government is committed to the effective management of plastic waste at the village level. Plastic waste collection for recycling and reusing plastic.

The following components of environment are equally important in rural areas as well:

- Land Environment
- Water Environment
- Air Environment
- Noise Environment
- Solid Waste.

Land environment, anticipated impact and mitigation measures

Existing status of baseline conditions of land use should be determined by studying the changesin the land use pattern in the past 10 years by collecting data from secondary sources such as

census records, agricultural census and land records. The land use pattern covering forest land,total irrigated land, non-irrigated land, and cultivable waste.

Water environment, anticipated impact and mitigation measures

In view of the declining water level, various structures such as recharge pits, recharge trenches, recharge shaft, Trench with recharge well, shaft with recharge well, recharge through abandoned hand pumps, abandoned tube well, recharge well, percolation tank, and roof top rain water harvesting systems should be promoted.

Air environment, anticipated impact and mitigation measures

Baseline data of air pollutant parameters extending an area of 2 Km from the village should bemonitored at a number of locations. Description of baseline data of ambient air parameters namely RSPM, nitrogen dioxide, Sulphur dioxide, and carbon monoxide are to be collected. One season data is to be monitored other than monsoon as per the CPCB Norms. Sampling locations are to be located as per CPCB norms. Number and locations of Ambient Air quality monitoring (AAQM) stations should be decided based on the nature of project, meteorologicalconditions, topography, selected pollution pockets in the area and likely impact areas. Vegetation buffers along the road network can minimize the build– up of pollution levels in urban areas and in the rural areas lying within the proximity of industries as they act as pollutionsinks. Heavy roadside planting in the form of shelterbelts can

result in reduction in airborne lead.

Noise environment, anticipated impact and mitigation measures

Noise pollution is caused in the areas of mining i.e. during the time of blasting, operation of power drillers and while cutting the stones. The level of noise pollution may become intense during the festive seasons especially during the Diwali. The creation of green belt is particularly advisable on the perimeter of aerodromes, along railway lines and arterial roads, through or past built up areas and adjoining industrial zones.

Solid waste, anticipated impact and mitigation measures

Present data available on solid waste generated in the area are to be collected. If possible, the present quantities of wastes – hazardous household wastes, electronic wastes, biomedical and non-hazardous generated in the study are to be collected and presented. Many of the solid wastes having economic values but put for disposal can be recycled for reuse. For example, food, cow dung, leaves, vegetable, paper, wood, plastics, old cloth etc. However, some of the

wastes are not recyclable. These are carbon paper, thermo coal etc. When recyclable solid wastes are subjected to decomposition, bio-gas could be produced under favorable conditions. These systems of recycling may be there at the village level organized by Gram Panchayats with technical support from Governments or non-government organizations. Community bio- gas or recycle of waste for productive use should be planned and public should be encouraged to adapt in participative approach:

Waste Management at Block and Village Level

Most population dwells in the villages, which contribute almost 14.63 lakh of its totalpopulation and evidently generate a huge waste and needs to have proper plan for waste management as shown in **Figure 15.10**. Hence, the Plan is formulated on the following standard:

1. Each village should have a properly demarcated place for both dry & wet solid wastedisposal where each Gram Panchayat can deposit their dry wastes.

2. Every Panchayat Samiti should appoint **waste management committee,** which wouldsupport to look after the matter related to management of the disposal sites.
3. A composting unit should be developed to make compost of possible waste. Utilizationof this compost as fertilizer should be done by every village.
4. The incineration of wastes is strictly prohibited.
5. Segregation of recyclable materials should be practiced by the Panchayat Samitis and asper the quantity of the waste each Gram Panchayat should be paid.
6. Non-recyclable waste should be transported to micro-sanitary land fill site by the Panchayat Samitis.
7. The collected recyclable waste from each village should finally be transported to the District recyclable waste collection point by the Panchayat Samitis and for this PanchayatSamitis should be paid the applicable rate.

Figure 15.10: Suggested Flow of Solid Waste at Village, Panchayat and Block Level

15.4. Implementation strategy for Rural Waste Management Plan

The details of measurable and quantifiable targets, with timelines for completing the tasks arepresented in **Table 15.6**.

Table 15.6: Action Plans

Activity	Objectives	Status	Responsible Functionary(ies)	Expected Time afterapproval of DEP
Administration	Every GP should appoint awaste management committeea collection cart, which issupport to look after the matterrelated management of the disposal sites.	Not Initiated	Panchayat Sachiv and Sarpanch of Gram Panchayat	6 months
Segregation	Each village should have a properly demarcated place for both dry & wet solid waste disposal.	Not Initiated	CO, DDC and WardMembers	9 months
Collection	Collection and transportation (to block level collection point)of dry waste should be done by Each Gram Panchayat.	Not Initiated	BDO and Gram Pradhan	12 months
Conceptual isolation ofdry waste.	An isolation center for dry waste at block level should beset up by Pachayat Samiti.	Not initiated	DDC, BDO, CO and Pramukh	3 months
Non- recyclable waste & Landfill	Non-recyclable waste should be transported to specifically demarcated micro sanitary landfill site by the Panchayat Samitis			12 months
Awareness	Gram Sabha should be organized with possible gears (i.e. posters, hoardings,handbills…etc.) specifically topromote the segregation of dry & wet waste.	Partial		6 months
Budgeting forBlock level	Proper estimation and budget preparation for waste management activities year wise budget requirement.	Not initiated	BDO and Executive Officer, Panchayat Samiti	6 months

Gram Panchayats (GPs): According to the Rule 22 of Solid Waste Management Rules 2016, necessary infrastructure shall be created by the GPs, either directly or engaging agencies within the time frame suggested in Table 15.7 below or as decided by Panchayati Raj Department, Rajasthan.

Table 15.7: Action Plans

S. No.	Activities	Timeline (fromthe date of notification)
1.	Preparation of DPRs	6 months
2.	Identification of suitable sites for Resource Recovery Centres (RRCs)	1 year
3.	Construction of Resource Recovery Centres (RRCs)	2 years
4.	Landfill sites	1 year
5.	Procurement of community dustbins, tricycles, push carts, safety equipment, etc.	2 years
6.	Training and engaging Swachhata *Sakhis* and labours	1 year
7.	Construction of compost pits	1 year
8.	Construction of community leach pits	1 year
9.	Construction of soak pits near hand-pumps	1 year
10.	Engaging labours to collect and transport and segregate waste from door to door	2 years
11.	Enforcing waste generators to practice segregation of bio degradable, recyclable, combustible, sanitary waste, domestichazardous waste and inert solid waste at source	2 years

The timelines will be applicable with effect from the date of notification and are in accordance with the Hon'ble National Green Tribunal (NGT) judgments and rulings.

Closure

The development of rural areas should be done in more effective and efficient way by taking into consideration of clusters of villages together so that villages can not only preserve and nurture the essence of the rural community life but also get all facilities without compromising with the healthy natural environment. Accordingly, the development of such selected clusters should be planned and implemented jointly by the village panchayats, district administration and public participation. The plan has to be developed keeping in view of different elements such as Health, 24/7 Piped water supply, road connectivity, sanitation, agri services & processing, education, environment, solid & liquid waste management and drainage facility, etc.

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