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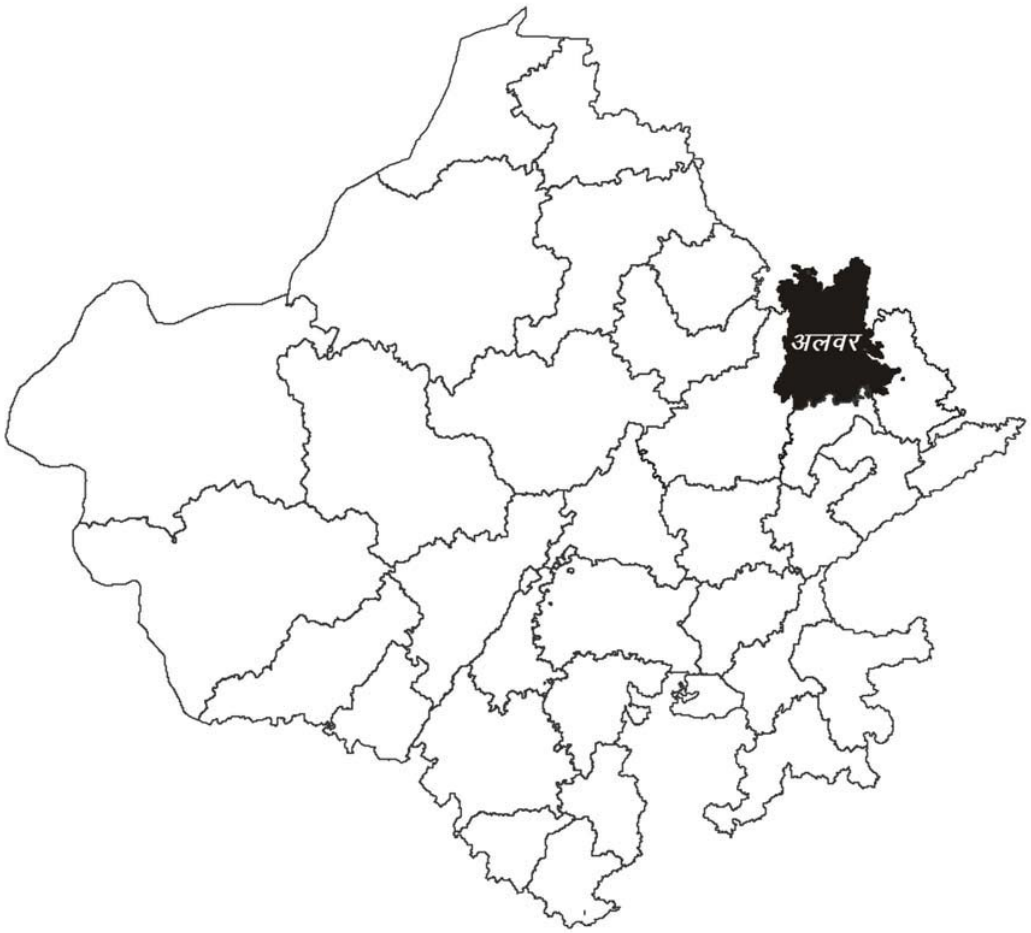
ENVIRONMENTAL MASTER PLAN

ALWAR DISTRICT



(For areas covered under Aravali Notification dated 7th May, 1992)

GOVERNMENT OF RAJASTHAN
JAIPUR

सत्यमेव जयते

राजस्थान राज–पत्र
विशेषांक

RAJASTHAN GAZETTE
Extraordinary

साधिकार प्रकाशित

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भाग 1 (ख)

महत्वपूर्ण सरकारी आज्ञायें।

पर्यावरण विभाग

अधिसूचना

जयपुर, अगस्त 26, 2011

संख्या प. 5(अलवर मास्टर प्लान) पर्या./2005 :– पर्यावरण एवं वन मंत्रालय, भारत सरकार की अधिसूचना संख्या का.आ. 319 (अ), दिनांक 07 मई, 1992 एवं एस.ओ. 1189 (ई), दिनांक 29–11–1999 के अधीन अपेक्षित अलवर जिले के विकास कार्यक्रमों में पर्यावरणीय आवश्यकताओं को समाहित करते हुए राज्य सरकार द्वारा मंत्रिमण्डल के अनुमोदनपरान्त एतद्द्वारा पर्यावरणीय वृहद्ध योजना (पर्यावरणीय मास्टर प्लान) प्रचलित की जाती है।

इस अधिसूचना द्वारा प्रचलित वृहद्ध योजना तत्काल प्रभाव से लागू होगी एवं इसके लागू होने के बाद अलवर जिले में विकास कार्यक्रमों का संचालन पर्यावरण वृहद्ध योजनाओं के प्रावधानों के अनुसार ही किया जा सकेगा। ऊपर लिखित पर्यावरणीय वृहद्ध योजना की उपलब्धता निम्नानुसार होगी :–

1. कार्यालय निदेशक एवं शासन उप सचिव, पर्यावरण विभाग, उत्तर–पश्चिमी खण्ड, शासन सचिवालय, जयपुर।
2. कार्यालय सदस्य सचिव, राजस्थान राज्य प्रदूषण नियंत्रण मण्डल, झालाना डूंगरी, जयपुर।
3. कार्यालय जिला कलक्टर, अलवर, (राज.)
4. कार्यालय मुख्य कार्यकारी अधिकारी, जिला परिषद अलवर, (राज.)
5. कार्यालय क्षेत्रीय अधिकारी, राजस्थान राज्य प्रदूषण नियंत्रण मण्डल, अलवर।
6. कार्यालय खनिज अभियन्ता, अलवर, (राज.)
7. कार्यालय खनिज अभियंता, जयपुर, जिला जयपुर (राज.)

सुलभ संदर्भ हेतु पर्यावरणीय वृहद्ध योजना पर्यावरण विभाग की वेबसाइट www.environment.rajasthan.gov.in राजस्थान प्रदूषण नियंत्रण मण्डल की वेबसाइट www.rpcb.nic.in पर भी संधारित की जा रही है।

मधुसूदन तिवाडी,
निदेशक एवं उ. शा. स.
पर्यावरण विभाग
राजस्थान,जयपुर।

राज्य केन्द्रीय मुद्रणालय, जयपुर।

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BOD	-	Biochemical Oxygen Demand
CCA	-	Catchment command area
CGWB	-	Central Ground Water Board
CPCB	-	Central Pollution Control Board
COD	-	Chemical Oxygen Demand
DG	-	Diesel generator
EMP	-	Environmental Management Plan
FCC	-	False Colour Composite
GDP	-	Gross Domestic Product
GIS	-	Geographical Information System
Ha	-	Hectares
Kg	-	Kilo
Km	-	Kilometres
Leq	-	Level equivalent
MIA	-	Matsya Industrial Area
MT	-	Matric tonnes
MLD	-	Million Litres per day
MSL	-	Mean Sea Level
NCR	-	National Capital Region
NE	-	North East
NGO	-	Non-Governmental Organization
NW	-	North West
OB	-	Over Burden
OIA	-	Old Industrial Area
PAN	-	Protected Area Network
PF	-	Protected Forests
RF	-	Reserved Forests
RIICO	-	Rajasthan Industrial Development & Investment Corporation
RPM	-	Respirable Particulate Matter
RSPCB	-	Rajasthan State Pollution Control Board
SE	-	South East
SPM	-	Suspended Particulate Matter
STR	-	Sariska Tiger Reserve
SW	-	South West
TDS	-	Total dissolved solids
TPD	-	Tonnes per day
TSS	-	Total suspended solids
UF	-	Unreserved Forests
UIT	-	Urban Improvement Trust
USEPA	-	United States Environmental Protection Agency
WHO	-	World Health Organization

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

1. Alwar district, in the State of Rajasthan, is covered under Aravali Notification dated 7th May, 1992 issued by Ministry of Environment & Forests, Government of India. This notification restricts some processes and operations on certain categories of land in the district. The following is the categories of land in the district whereon these processes and operations are restricted:

   (i) All reserved forests, protected forests or any other area shown as "forest in the land records maintained by the State Government as on the date of this notification in relation to the Alwar District of the State of Rajasthan.

   (ii) All areas shown as: -

   (a) Gair Mumkin Pahar, or
   (b) Gair Mumkin Rada, or
   (c) Gair Mumkin Behed, or
   (d) Banjad Beed, or
   (e) Rundh.

   in the land records maintained by the State Government as on the date of this notification in relation to the Alwar district of the State of Rajasthan.

   (iii) All areas of Sariska National Park and Sariska Sanctuary notified under the Wildlife (Protection) Act, 1972 (53 of 1972).

   The Ministry of Environment & Forests, Government of India vide its Gazette Notification No. S.O. 1189 (E) dated November 29th, 1999, delegating the power conferred on it to State Government of Rajasthan, *interalia* directed the State Government to initiate steps to prepare a Master Plan for the development of the area covered by the Aravali Notification integrating environmental concerns and keeping in view the future land use of the area. The Notification has envisaged that the Master Plan shall be prepared by the concerned state agency, approved by the competent authority and finally published, within two years from the date of issue of this notification, in accordance with the procedures laid down in the Town & Country Planning Act or any other similar Act of the respective State Government. The State Government concerned shall implement the Master Plan forthwith after its final publication. The Rajasthan State Pollution Control Board, in pursuance to the aforesaid notification, has taken up preparation of Environmental Master Plan of Alwar District.

2. The district is situated in the north-east of Rajasthan between latitudes 27°03' and 28°14' North and longitudes 76°07' and 77°13' East. It covers an area of 8380 square kilometers. The district occupies about 2.45% of the total area of State.

   The entire Alwar district is also part of National Capital Region (NCR). This plan of NCR was formulated in 1985, to check the unprecedented growth of Delhi and to plan and promote a balanced and harmonious development around national capital. As per the plan, Alwar and Bhiwadi are identified as regional centres and to be developed for siting of industries and other economic activities on the priority basis.

3. The district consists of 12 tehsils and is endowed with rich and varied natural resources. The climate of the district can be classified as semi-arid. Hot summer, cold winter and a fairly good monsoon season characterise the climate of the district. There is good agricultural activity and a number industrial areas are also operating. The industrial areas are mainly in the northern and central part of the district and a few are in southern part of the district. These are:
   - Matsya Industrial Area (MIA) Alwar and MIA (Extension), Alwar
   - Rajgarh Industrial Area and Rajgarh (Extension), Rajgarh
   - Khairthal Industrial Area and Khairthal (Extension), Khairthal
   - Kherali Industrial Area, Kherali

- Thana Ghazi Industrial Area, Thana Ghazi
- Old Industrial Area, Alwar
- Bhiwadi Industrial Area, Bhiwadi
- Rampur Mundana Industrial Area
- Khushkhera Industrial Area, Khushkhera
- Chopanki Industrial Area, Chopanki
- Saare Khurd Industrial Area, Saare Khurd
- Behror Industrial Area, Behror
- Shahjahanpur Industrial Area, Shahjahanpur
- Neemrana Industrial Area, Neemrana
- Sotanala Industrial Area, Sotanala
- Kot Kasim Industrial Area, Kot Kasim (yet to be developed)

4. Environmental Status of the District

Air Quality: The existing air quality parameters indicates that the suspended particulate matter (SPM) concentration is above permissible limits in northern part of the district, in Khairthal area and areas in and around Alwar town and in the southern part of the district. The respirable particulate matter (RPM) has also been found to be above permissible limit at some locations. The concentration of gaseous pollutants is within the acceptable limits.

***Water Resources*:** The State Remote Sensing Department, Jodhpur has identified 108 nos. of macro and 664 nos. of micro watersheds in the district. There is no river in the district, which is perennial on its entire course. Ruparel, Sabi, Chuhar Sidh and Landoha are the rivers that flow through the district and carry the drainage of the hills. Several of these rivers and their tributaries have been impounded at suitable sites and the water is used for irrigation purposes and for recharge of ground water.

The State Irrigation Department has constructed a number of medium and minor irrigation projects in the district, the details of which are as under:

Sl No.	Project Class	No. Of projects	Live Storage (million m^3)	CCA (in Ha)
1	Medium	1	26.45	4846.50
2	Minor	146	195.26	40592.67

With the available rainfall, the irrigation department could generate the water potential upto 205.74 million m^3 of water annually. This availability of surface water could meet the irrigation requirement of 22590 ha of command area. For rest of the requirement, ground water is used. The creation of bund not only helps in irrigation but also in recharge of the ground water.

The surface water potential in the district is not promising, therefore the thrust is on utilisation of ground water resources for meeting drinking, irrigational and industrial requirement. In most of the blocks, the level of ground water exploitation has reached at the alarming level leaving no further scope for future development. The existing ground water resources, therefore, is the primary guiding criteria for planning further activities in the district. The status of the ground water in the district is as under:

a. Net annual GW availability	912.3019 mcm
b. Annual gross draft	1112.0723 mcm
c. GW availability for future irrigation development (considering domestic draft for 2025)	(-)272.1083 mcm
d. Stage of GW development	121.90 %

Category of blocks :	
a. Over exploited	11 (Behror, Bansur, Kathumar, Kishangarh, Kotkasim, Laxmangarh, Mandawar, Neemrana, Rajgarh, Reni, Tijara
b. Critical	2 (Ramgarh, Umrain)
c. Semi-critical	1 Thana Gazi
d. Safe	Nil

Water/Effluent Quality: The water quality monitored at bore well, open well and some water bodies exhibit the water quality parameters within the acceptable limits. The effluent from Old Industrial Area (OIA), Matsya Industrial Area (MIA), Khairthal Industrial Area, Khushkhera Industrial Area and Neemrana Industrial Areas exhibit the effluent quality parameters above the permissible limits. A common effluent treatment plant (CETP) has been constructed at Bhiwadi Industrial area to treat domestic and industrial effluent but its functioning is not satisfactory. At Shahjahanpur, the effluent is being treated by the industries at the industry premises itself which require moderate upgradation for efficient functioning.

The towns of the district do not have proper sewerage collection, conveyance and treatment facilities. This is also one of the sources of water pollution in the district.

Noise Level: The noise level trend in the district reveals that the same is within the prescribed limits. The noise level status for the Alwar town has been found to be high during the festival of Deepawali.

Soil Distribution: The soil of loam type occurs in major part of the Alwar district specially in Umred, Behror, Thana Ghazi, Kathumar, Bansur & Mundawar. However, sand, sand clay loam and clay loam also occurs in other tehsils of the district. The soil map of the district, based on the data of National Bureau of Soil Science and Land Use Planning (NBSS & LUP) is presented in the report.

Land Use Pattern: The land use pattern of the district was interpreted based on satellite data of 5th April, 2001. Based on the satellite data, the following land use pattern/cover of the district was identified.

Area of various land use/cover classes				
#	**Level-I**	**Level-II**	**Area**	
			Sq.Km.	**%**
1.	**Built-up land**	(i) Urban	86.95	1.03
		(ii) Rural	7.33	0.08
		(iii) Industrial	16.53	0.20
		Sub-total:	110.81	1.31
2.	**Agricultural land**	(i) Crop land	3297.76	39.35
		(ii) Fallow land	1741.18	20.77
		Sub-total:	5038.94	60.12
3.	**Vegetation Cover**	(i) Dense forest	631.31	7.53
		(ii) Open forest	536.78	6.40
		(iii) Scrubs	376.10	4.49
		Sub-total:	1544.19	18.42

Area of various land use/cover classes				
#	Level-I	Level-II	Area	
			Sq.Km.	%
4.	**Wasteland**	(i) Salt affected land	172.00	2.05
		(ii) Barren rocky land	990.62	11.82
		(iii) Gullied land	507.91	6.06
		Sub-total:	1670.53	19.93
5.	**Mining Area**	Mining area	9.88	0.12
6.	**Water Bodies**	Surface water bodies	5.65	0.06
		Total Area:	**8380.00**	

Land Classification as per Aravali Notification, 1992: Ministry of Environment & Forests, Government of India vide its notification dated 7th May, 1992, has restricted developmental activities on the following categories of land.

(i) All reserved forests, protected forests or any other area shown as "forest in the land records maintained by the State Government as on the date of this notification in relation to the Alwar District of the State of Rajasthan.

(ii) All areas shown as: -

(c) Gair Mumkin Pahar, or
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in the land records maintained by the State Government as on the date of this notification in relation to the Alwar district of the State of Rajasthan.

(iii) All areas of Sariska National Park and Sariska Sanctuary notified under the Wildlife (Protection) Act, 1972 (53 of 1972).

The extent of the above categories of land, tehsilwise has been prepared on a GIS Platform and the same is presented in Chapter-III. For preparing the map showing the areas as per the Aravali Notification, 1992, rundh has been assumed to be of the forest category. The extent of the above categories of land, village wise is appended as Annexure-III.

Forest Land/Cover: The total forest area of Alwar region is 90302.88 Ha excluding the Sariska Sanctuary. This includes the following:

- Reserve forest area - 40108.62 Ha
- Protected forest area - 36068.96 Ha
- Unclassified forest area - 14125.30 Ha

Total - 90302.88 Ha

The above is spread in Alwar, Thana Ghazi, Rajgarh, Behrod, Bansur, Kishangarh Bas and Lakchhmangarh tehsils. In the Sariska Tiger Project, the classification of forestland is as under:

a. Sariska Wildlife Sanctuary

- Reserve forest area - 39705.00 Ha
- Protected forest area - 9494.54 Ha

Total - 49,199.54 Ha or 492 sq.kms.

b. Forest Blocks other than Sariska Wildlife Sanctuary

- Reserve forest area - 20,792.52 Ha
- Protected forest area - 16,620.84 Ha

Total - 37,413.36 Ha or 374 sq.kms.
Total area of STR - 866 sq. kms.

The exploitation of the forest resources in the district took place for many decades and the expected regeneration of the resources did not take place due to various reasons. As such, the carrying capacity of the forest resources is already exhausted.

The existing protected area network (PAN) in Sariska Tiger Reserve is widely scattered and reported to have become ecological island with severely depleted corridors. It is reported that there is serious threat to wildlife population due to islanding of the PAN areas. As a result genetic variability is taking place for want of linking corridors with PAN areas. The small sized population and simple structure tend to be more susceptible to the loss than large geographically dispersed and sub-divided population. It has been felt to increase the number of protected areas depending upon the genetic variation and bio-geographic distribution of species and ecosystems and linking them with broad, stable and balanced considers so that the physical and ecological boundaries of fauna coincide. For this purpose, the following two actions have been proposed by the STR authorities:

- *Development of corridor*: Development of corridor upto Jamua-Ramgarh sanctuary in Jaipur West Division. For this purpose, an area of 450 sq. kms. has been identified for inclusion.
- *Extension of boundaries of Sariska Wildlife Sanctuary*: For this purpose, an area of 234 sq. kms has been identified for inclusion in the sanctuary.

***Demographic & Socio-Economic Setup*:** As per the District Census Report 2001, the population of Alwar district is as under:

Sl No.	Population	Total	Total Male	Total Female
1	Total	29,92,592	15,86,752	14,05,840
2	Rural	25,57,653	13,49,768	12,07,885
3	Urban	4,34,939	2,36,984	1,97,955
Tehsil-wise break-up				
1	Behror	3,05,688	1,59,502	1,46,186
2	Mundawar	1,97,582	1,03,015	94,567
3	Kotkasim	1,17687	61,712	55,975
4	Tijara	2,80,772	1,53,970	1,26,802
5	Kishangarh Bas	1,61,629	84,967	76,662
6	Ramgarh	2,01,757	1,05,952	95,805
7	Alwar	5,68,530	3,03,999	2,64,531
8	Bansur	2,14,351	1,12,580	1,01,771
9	Thana Ghazi	1,89,977	99,870	90,107
10	Rajgarh	3,06,226	1,62,466	1,43,760
11	Lachhmangarh	2,41,708	1,28,045	1,13,663
12	Kathumar	2,06,685	1,10,674	96,011

The district has maintained decadal population growth of around 30% since last two decades. The sex ratio 886 *i.e.* 886 females to 1000 males. The work participation rate

is 48.7%. The proportion of main workers and marginal workers is 31.7% and 17.1% respectively.

The statistics relating to cultivators, agriculture labourers etc. is as under:

Sl No.	Particulars	Composition
1	Proportion of cultivators to total workers	62.1%
2	Proportion of agriculture labourers to total workers	8.8%
3	Proportion of workers in household industries to total workers	2.1%
4	Percentage of other workers to total workers	27.0%

***Mineral Resources*:** A variety of minerals both metallic and non-metallic are found in Alwar district. The metallic minerals include copper, iron and manganese while non-metallic minerals include barytes, silica sand, quartz, yellow ochre, pyrophylite, soapstone, limestone, granite and marble etc. The list of the operating mines is as under:

Sl No.	Mineral	No. of Mines
1	Major Minerals	14
2	Marble	174
3	Lime Stone	02
4	Granite	01
5	Chirt	04
6	Patti Katla	05
7	Masonary Stone	67

5. Carrying Capacity of the District

- The air quality data in northern and central part of the district reveals the levels above the permissible limits. In the southern part, at one location, the suspended particulate matter has been found to be above permissible limits.
- The surface water availability is poor and there is increased dependence on the ground water for drinking, irrigation and industrial usage. The status of ground water in most of the blocks is under overexploited stage and therefore calls for careful planning to ensure availability to the consumers in future.
- The forests resources have already been degraded beyond their carrying capacity and therefore calls for strategies at all levels to enhance the vegetative cover to promote eco-restoration in the district.
- The land resource is another resource which is likely to be stressed as the district is part of the NCR and there is likely to be growth of industries, residential complexes etc. There is need to protect the precious agriculture land to ensure sustained output of crops.

Based on the above, the following environmental targets have been considered for planning:

- ***Ground water***: Conservation and optimal use of the ground water. The priority of ground water allocation should be drinking, agriculture and lastly industrial consumption. Change in priority may be considered if the projects are linked to ground water recharge schemes and provided that nearby human consumptions of the ground water on the long run is ensured.

- ***Forest Resources***: Initiation of efforts at every level to enhance vegetative cover immediately. The emphasis needs to be given on planting the indigenous species and "*ethno-forestry*" practices for eco-restoration.
- ***Land Resources***: To protect the prime agriculture land and green belt. For this purpose, diversion of agriculture land for non-agriculture purpose should be considered only in exceptional cases. In areas where mining activities are being carried out, it should be planned in such a way that ***end footprint of mining*** is not left upon and the final mine closure planning & implementation contribute to overall eco-restoration effort in the district.

6. Environmental Master Plan

6.1 The Environmental Master Plan *interalia* consists of recommendations for establishment of industries and the new mining projects in the district. Tehsilwise recommendations for the establishment of industries and opening of the mines are embodied in Chapter-VI. Summary of the recommendations is as under:

6.2 Applicability of the Environmental Master Plan

Ministry of Environment & Forests, Government of India, vide its Gazette Notification No. S.O. 1189 (E) dated 29th November, 1999 *interalia* directed the State Government to prepare a Master Plan for the development of the areas covered by the Aravali Notification, integrating environmental concerns and keeping in view the future land use of the area. The Environmental Master Plan of Alwar district is prepared in pursuance to the aforesaid Notification issued by Ministry of Environment & Forests, Government of India and accordingly, the recommendations embodied in this Environmental Master Plan are applicable for the following categories of lands:

(i) All reserved forests, protected forests or any other area shown as "forest in the land records maintained by the State Government as on the date of this notification in relation to the Alwar District of the State of Rajasthan.

(ii) All areas shown as: -

(e) Gair Mumkin Pahar, or
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(iii) All areas of Sariska National Park and Sariska Sanctuary notified under the Wildlife (Protection) Act, 1972 (53 of 1972).

6.3 Recommendations - Environmental Master Plan

Section-A: General Policy Approach

This includes the following:

- The crusher zones should preferably be established near to the mining complexes. The establishment of crushers at isolate locations should be considered in cases where it is not cost effective to establish them near mines.
- For the mine block having area of 100 ha or more, no objection should be accorded for the entire block to facilitate establishment of mines.
- All the mining operations should be kept at least 25 metres away from the forest blocks as per the provision contained in the State Mineral Policy of

Government of Rajasthan. The green belt may be developed by such units on the forest area side.

- In the industrial/residential areas, land should be identified for plantation/green belt development and for each of the developmental/industrial schemes, sufficient plantation may be undertaken in all the available spaces. The plant species should be selected in consultation with the Forest Department. Such areas should not be compounded later on for establishment of industries.
- Reclamation of the waste from mining and industrial operations should be linked with forestry projects.
- Maintaining of the plant should be carried out till the crown of the tree is achieved above the browsing level.
- All the industrial operations should be encouraged to use non-conventional and renewable energy resources.
- For the areas near the industries/mines, the workers should be provided with alternate energy sources to protect the forest wood.
- As per the rule of State Government of Rajasthan, agriculture land to the extent of 2500 sq m could be converted into industrial category and for this purpose, permission of the State Government is not required. This rule has been enacted to stop the population drain to urban centres and to make available the employment opportunities in the rural areas. Such conversions may be allowed for small-scale industries only but not for the medium/large red & orange category industries.
- Seeing the criticality of the ground water resource, the high water consuming industries should not be permitted in the notified area in the district.
- The RIICO may come up with identification for establishment of industrial area for the engineering based industries.
- Consideration may be given for identification of an institutional area for establishing engineering, medical and other colleges in the district.
- The provision of combined effluent treatment facilities/hazardous waste treatment facility within/outside the industrial area and other associated requirement should form part of the infrastructure provided to industries. The final outlet point of the effluent from each of the industrial area should be decided.
- The drain carrying the storm run-off should be separate from those carrying the industrial and/or domestic effluent in the industrial areas and the townships wherever feasible depending upon the pollution potential of the industrial effluent. The drains carrying the industrial effluent should discharge them in domestic effluent drains only when the effluent meets the prescribed criteria.
- Since in most of the blocks, the ground water status is either over exploited or critical, conservation of ground water is essential to promote it's sustainable use. For this purpose, the following measures are suggested:

  - Crop planning based on rainfall and moisture availability
  - Encouraging adoption of water saving devices like sprinkler and drip irrigation systems
  - Regulation of ground water development
  - Augmentation of ground water through artificial recharge. This should be made compulsory to all ground water users
  - Promoting roof-top rainwater harvesting in urban areas and housing complexes. This may form a point in consent to operate granted by the Rajasthan State Pollution Control Board.
  - Soil moisture conservation through watershed treatment
  - Revival of traditional village ponds and tanks
  - Creating ground water sanctuaries by locating alternate water sources and declaring them as reserved for drinking and domestic purposes.
  - Industries to take steps to avoid degradation of ground water quality in the vicinity of protection zones.

- Use of fertilizers, pesticides/insecticides need to be governed by the ground water conditions of the area
- Encouraging use of saline water in growing salt tolerant crops. Saline water can also be used after blending with fresh water for domestic purpose other than drinking. Use of saline water and simultaneous recharge of fresh water will also lessen the problem of salinity
- Promoting recycling/reuse of water. Reclaimed water after treatment can be used for irrigation, cooling, algal and pisciculture and other industrial uses.
- The solid waste from major cities/towns needs to be disposed off in scientifically located and designated sites and structures for recycling and reuse.

- As per the Draft Regional Plan-2021 of NCR, prepared by National Capital Regional Planning Board, the area of Alwar (which a part of NCR) falls in seismic zone IV as per the seismic zone map of Indian Standards IS 1893. This makes the area liable to MSK intensity of "VIII" and is considered as High Risk Zone. The whole urban development must therefore be ensured for safety against an intensity "VII" probability of occurrence and upgraded for required seismic resistance in buildings and infrastructure as found necessary.
- Emphasis should be given on construction, operation and maintenance of Common Effluent Treatment Plant (CETP), Effluent Treatment Plant (ETP) and Sewage Treatment Plant (STP) wherever required in the industrial areas. The treated effluent should be reutilised to the extent possible.
- Rainwater harvesting measures to be encouraged for the major industrial and residential complexes.
- Sufficient plantation may be undertaken in all the available spaces in the industrial areas. The plantation areas should not be compounded at latter stage for establishment of industries.
- New industrial area should be planned after considering the zoning of industries, CETP, proper drainage and final disposal upto end point, disposal sites/facilities for hazardous/non-hazardous waste and proper plantation. Solid waste dumping site should be identified within the industrial area. Alternately, it may be linked to some external solid waste-dumping site for proper disposal of solid waste from the industrial area. Identification of such lands should be done by State Government / local bodies together with the local entrepreneurs associations who should be encouraged to set up a trust / society to properly develop and maintain it.

Section-B: Mining & Industrial Development

Opening of New Mines and Operation of Existing Ones

The district is endowed with rich mineral deposits of both minor and major category. The following factors will govern the opening of new mines and operation of the existing ones:

- Environmental quality of the area
- Depth of ground water table
- Extent of areas covered under Aravali Notification dated 7th May, 1992
- Proposed Eco-sensitive zone around Critical Tiger Habitate of Sariska Tiger Reserve.
- Terminal land use of the mining locations

All the developmental, mining and industrial activities are required to be operated in such a manner as to contribute and supplement to the overall efforts of environmental conservation/upgradation in the district. After the mining operations gets finished, the

end footprint of mining should not be left upon and the associated mining activities need to be a part of the overall exercise for eco-restoration of the district.

In the district, the extent of Critical Tiger Habitate (CTH) of Sariska Tiger Reserve exists over an area of 881 sq kms. Opening of any developmental activities will have adverse impact on the flora and fauna in the area. Owing to the impact on wildlife and legal restrictions, mining, industrial and other developmental activities can't be permitted in this area.

In the compliance of the Hon'ble Supreme Court order dated 04.12.06 in Writ Petition (Civil) No. 460/04, wherein all the State Government & Union Territories are required to notify certain area around National Parks/Sanctuaries as Eco-Sensitive Zone around the Critical Tiger Habitat (CTH) of Sariska Tiger Reserve. Furthermore, in compliance of section 38 (v) of the wildlife (Protection) Act, 1972, State Government is required to notify a buffer or peripheral area around the Critical Tiger Habitat (CTH). Critical Tiger Habitat (CTH) & the buffer thus notified shall together constitute the tiger reserve. Thus, the proposed Eco-Sensitive Zone & the buffer after being notified may not be the preferred zone for mining, industrial or other developmental activities.

While permitting the mining in the district on lands (other than the CTH of Sariska Tiger Reserve & forest lands) covered under Aravali Notification, 1992 due consideration need to be given on the terminal land use once the mine operations are finished and conservation of ground water. The terminal land use may be creating water pool in the abandoned mines, gradual side slopes of the abandoned pits, barricading the abandoned mines from safety point of view and creating a green belt around the abandoned mines. The depth of ground water level is another factor governing the mining operations and in cases where mining operations are proposed below ground water level, mine should be permitted subject to the condition that measures are taken to recharge the ground water and that the nearby human settlements are not affected by such operations. The environmental conditions, which need to be imposed on such mines to promote environmentally benign mining practices in the region, are outlined in the next section.

The following is therefore recommended:

- *No mining, industrial or other developmental activity to be permitted within the boundary of CTH of Sariska Tiger Reserve. The proposed Eco- Sensitive Zone around CTH of Sariska Tiger Reserve and the buffer may also not be the preferred zones for mining activity once the same are notified. As such, these areas may be considered for banning the mining activities.*
- *On other categories of land, which are restricted as per Aravali Notification, 1992, in our considered view, mining & industrial activities may be permitted provided such operations contribute/supplement to the overall eco-restoration measures. After the mining operations are over, the end footprint of mining should not be left upon and terminal land use after the mining activities may be kept suitable for creating pool for recharge of the ground water which is a severely stressed resource in the district. In a similar fashion, the industrial activities should also take up efforts, which should be a part of the overall environmental upgradation exercise. Permitting such activities should be associated with certain conditions embodied in the next section for the aforesaid efforts. The mining and industrial activities need strict compliance of the above, and other conditions, which may be imposed from time to time.*
- *The areas, which have been identified as hot spots in terms of air quality, will require appropriate and effective air pollution control measures to operate industries and mine. These areas will require intense monitoring for the air quality parameters and proper remedial measures to control air pollution.*

Tehsil-wise recommendations for new mining projects are presented in Table-E.1. The non-preferred location for mining are those which are likely to fall under Sariska Tiger Reserve and its extension, the proposed corridor and the areas where air pollution level has been found to be above acceptable limit. Though in locations that fall under Sariska Tiger Reserve Extension and the proposed corridor may not be permitted once they are notified; the permitting of mining operations in areas with high air pollution level will require effective air pollution control measures. The suggestions for promoting sustainable mining and industrial activities are presented in the next section.

Table-E.1: Recommendations for mining activities in the district

Sl No.	Tehsil	Mineral to be mined	Preferred location[1]	Locations not preferred[2]	Remarks
1	Alwar	Masonary Stone	▪ Umrain ▪ Jatiyana ▪ Bilandi ▪ Satana ▪ Ghagholi ▪ Thekada	▪ Sahodi[3] ▪ Kithur- Mahrampur	Even for preferred locations, the recommendations for sustainable mining to be implemented. Ambient air quality is required to be monitored closely.
2	Kishangarh Bas	Masonary Stone Quartz & Silica sand	--	▪ Nangliya Mahond ▪ Chatarpur-Kultajpur	Ambient air quality is required to be monitored closely. The mines to take effective air pollution control measures.
3	Tijara	Masonary Stone	▪ Hasanpur Mafi ▪ Neemli Baghor ▪ Bhalesar	▪ Mayapur ▪ Khohari	Even for preferred locations, the recommendations for sustainable mining to be implemented.
4	Thana Ghazi	Masonary stone & Marble	The proposed mining blocks are: ▪ Narainpur ▪ Jeetpur Goojran ▪ Jhiri Jagannathpura *Mining blocks falling under extension of STR, if any and proposed corridor are not preferred locations.*		Even for preferred locations, the recommendations for sustainable mining to be implemented.
5	Behror	No mining in near future has been indicated			
6	Bansur	Granite Masonary stone Silica sand	▪ Kothal ▪ Hameerpur ▪ Mundali	▪ Ratanpura ▪ Indrada ▪ Harsora ▪ Narol Chula	Even for preferred locations, the recommendations for sustainable mining to be implemented. Ambient air quality is required to be monitored closely.

1 If any of the blocks falls under the proposed extension area of the Sariska Tiger Reserve or proposed corridor, the same may be categorised as non-preferred category.

2 Since the extent of proposed extension of STR or proposed corridor is not available, therefore the proposed mining blocks could not be identified under *not preferred category*.

3 If Sahodi area falls under extension of STR or proposed corridor, the same may not be the preferred block for mining.

Sl No.	Tehsil	Mineral to be mined	Preferred location	Locations not preferred	Remarks
7	Mundawar	Masonary stone	▪ Ranoth-Raipur	▪ Sheopur-Rainagar ▪ Sanoli-Bhungara	Even for preferred locations, the recommendations for sustainable mining are to be implemented. Ambient air quality is required to be monitored closely.
8	Rajgarh	Marble Soapstone & quartz	▪ Mallana Gordhanpura ▪ Tilwad ▪ Nangal Chandel		The mining blocks proposed may fall under area of proposed corridor and therefore not preferred
9	Ramgarh	Masonary stone	▪ Goleta ▪ Neekach-Nakhnol ▪ Kota Kala ▪ Khor Nangali ▪ Hazipur-Navgaon ▪ Odela-Manaki ▪ Rasoolpur Bandholi	--	Even for preferred locations, the recommendations for sustainable mining are to be implemented. Ambient air quality is required to be monitored closely.
10	Laxmangarh	Masonary Stone	▪ Khera Mangalsingh	--	Even for preferred locations, the recommendations for sustainable mining to be implemented.
11	Kot Kasim	Masonary stone	--	Khohra Thakran - Magha ka Majra	Ambient air quality is required to be monitored closely. The mines to take effective pollution control measures.
12	Kathumar	No mining in near future has been proposed			

6.4 Recommendations for Environmental Master Plan

6.4.1 Tehsil Alwar

A. Existing Environmental Scenario

In the Alwar Tehsil exists the town Alwar, which is the district headquarters. Delhi–Alwar road and Delhi-Jaipur road are two important roads, which connects the city. In this tehsil, two industrial sites *viz.* Matsya Industrial Area (MIA) and Old Industrial Area (OIA) and their extensions exist. There are a number of forest blocks in the tehsil. The other categories of land, restricted as per Aravali Notification, 1992 occur in this area in addition to some portion of buffer zone of Sariska Tiger Reserve.

Mines of silica sand, soapstone and masonary stone are operating in this tehsil. Future mining blocks are planned at Thekda, Kithur-Mahrampur, Umrain, Sahodi, Jatiyana, Bilandi, Satana and Ghagholi to mine masonary stone.

The air quality parameters encompassing Alwar City, OIA and MIA have been found to be above acceptable limit. The proposed mining blocks are away from Sariska Reserve Forests except the Sahodi area, which is near to it. The status of ground water, air quality in and around Alwar City and the areas of Sariska Tiger Reserve nearby are the guiding criteria for locating the mining & industrial units. The depth to water varies between 5.10 metres to 30.10 metres in older alluvium and 7.45 metres to 21.40 metres in quartzite zone. The existing environmental scenario call for strict air pollution control by the mining owners, least disturbance to ground water to ensure drinking water to the nearby habitats and growing of vegetation wherever possible for ecological restoration.

B. Applicability of Recommendations

The recommendations for sustainable mining and industrial practices are applicable for the category of lands found as per Aravali Notification. The lands as per Aravali Notification that are found in the tehsil are forestland, Sariska Tiger Reserve Area, Gair Mumkin Pahar, Gair Mumkin Rada and Gair Mumkin Behed.

Since eco-sensitive zone around critical Tiger Habitate of Sariska has been proposed, the eco-sensitive zone and buffer will also be restricted for developmental activities once the same is notified.

C. Recommendations

Keeping in view the environmental scenario, the following good management practice may be considered for opening of mines in the proposed mining blocks for promoting environmentally benign mining design and mitigation practices and establishment of industrial operations:

- **Mining operations**

  - The minimum lease area of the mines should be 1.0 ha or as decided by the Government of India under the relevant Rules, whichever is higher.
  - The boundary of the mine lease should be clearly demarcated.
  - At Sahodi area, a safety zone / green belt of 25 m width should be developed beyond this wall on the adjoining Sariska area side. The species of plants should be selected in consultation with Forest Department.
  - Controlled blasting with adequate safety measures should be resorted to, for extraction of minerals.
  - As far as possible, the approach road should be metalled. However, if there is any kutcha road, regular water sprinkling should be done.

- The environmental monitoring of air quality for SPM, RPM, SO_2, NO_x and CO should be carried out six monthly. If the air quality level is above the permissible level, the frequency should be increased to quarterly/monthly depending upon the pollution level.
- Adequate measures should be taken to control the noise level in the project.
- The mine owner should submit the yearly expenditure statement to pollution control board in respect of the pollution control measures taken including that on plantation and its maintenance.
- Garland drains should be constructed to arrest the silt from the surface runoff.
- Persons in working areas should use dust masks.
- The mine owners should construct effluent treatment for the mine water, if any.
- The mine owner should give due emphasis on reuse of the OB material to the extent possible. However, in case where such practice is not feasible, separate space should be earmarked for dumping of the OB material. Such sites should be approved in consultation with District Mining Engineer and State Pollution Control Board. Physical and biological reclamation of OB material should be the responsibility of the mine owner.
- The plantation of forestry plant species as well as fruit bearing trees in and around the mining complexes should be considered. Such areas should be fenced from out side for protection. Maintaining of the plant should be the responsibility of the mine owner till the crown of the tree is achieved above the browsing level.
- For the mines wherein excavation goes below the ground level, terminal land may be rendered in the shape as shown in Figure-E.1 for storage of water or to facilitate the recharge of already stressed ground water resource.
- The mining operations beyond the level at which ground water occurs may be permitted provided that the nearby villages and human settlements are not affected by it and that the mine operators take appropriate measures for conservation/recharge of ground water. In such cases, consent/clearance of Ground Water Board may be obtained.

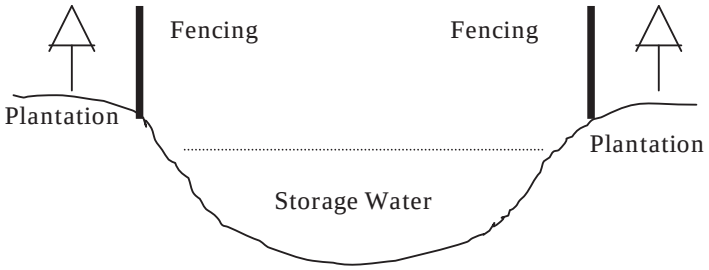


Figure-E.1: Final Land use by creating water bodies in mine pits

- **Industrial Operations**

- Since the water is one of the critical resources in the district, the establishment of high water consuming industries should not be permitted in the district in the notified area.
- The industries should preferably be permitted in industrial areas of MIA and OIA. Establishment of industries outside the industrial area should be

permitted in case it is not feasible to locate them within the premises of industrial area.

- In the vicinity of the red category industries, developing residential plots within the periphery of 500 m should be discouraged.
- Sufficient plantation may be undertaken in all the available spaces in the industrial area. The plant species should be selected in consultation with the State Forest Department. The plantation areas should not be compounded later on for establishment of industries.
- Emphasis should be given on construction, operation and maintenance of Common Effluent Treatment Plants (CETPs), ETPs and Sewage Treatment Plants (STPs) wherever required in the industrial area. The final outlet point of the treated effluent should be decided for each of the industrial area.
- All the air-polluting industries should have effective air pollution control devices.
- Suitable site for solid waste dumping should be identified for each of the industrial area.
- The provision of combined effluent treatment facilities should form part of infrastructure provided to the industries.
- The rainwater harvesting measures by the industrial units should be encouraged.

6.4.2 Tehsil Kishangarh Bas

A. Existing Environmental Scenario

In the Tehsil Kishangarh Bas, there exist two small towns namely Kishangarh Bas and Khairthal. Delhi–Alwar road is the important road passing through Kishangarh Bas. In this tehsil, one industrial site *viz.* Khairthal Industrial Area exists. Khairthal (Extension) is also planned and some industries are operating in the industrial area. In addition to the above, some mines of masonry stone and granite also exist.

There are a number of forest blocks existing in this tehsil area. The other categories of land restricted as per Aravali Notification also exist in this area. The air quality parameters have been projected to be beyond the acceptable limits at some locations. The depth to water ranges from 4.35 m to 27.0 m in older alluvium and around 26.85 m in quartzite zone. The mining blocks proposed are at Chatarpur-Kultajpur (masonary stone) and Nagliya Mahond (masonary stone, quartz and silica sand).

The minerals here also exist on the pastureland. The proposed mining blocks are away from Sariska Reserve Forests. The status of ground water is in overexploited category. The status of ground water, air quality in and around Khairthal and land covered under Aravali Notification, 1992 are the prime considerations for locating the mines and industrial units. The existing environmental scenario call for strict air pollution control by the mining owners, least disturbance to ground water to ensure drinking water to the nearby habitats and growing of vegetation wherever possible for ecological restoration and development of pasture land.

B. Applicability of Recommendations

The recommendations for sustainable mining and industrial practices are applicable for the category of lands found as per Aravali Notification in the tehsil. The lands as per Aravali Notification that are found in the tehsil are forestland, Gair Mumkin Pahar, Gair Mumkin Rada, Gair Mumkin Behed and Banjar Beed.

C. Recommendations

Keeping in view the environmental scenario, the following good management practice may be considered for opening of mines in the proposed mining blocks for promoting environmentally benign mining practices and establishment of industrial operations:

- **Mining operations**

  - The minimum lease area of the mines should be 1.0 ha or as decided by the Government of India under the relevant Rules, whichever is higher.
  - The boundary of the mine lease should be clearly demarcated.
  - A safety zone of 25 m from forest areas should be maintained as per Mineral Policy of Government of Rajasthan. This safety zone may be considered for plantation.
  - Controlled blasting with adequate safety measures should be resorted to, for extraction of minerals.
  - As far as possible, the approach road should be metalled. However, if there is any kutcha road, regular water sprinkling should be done.
  - The environmental monitoring of air quality for SPM, RPM, SO_2, NO_x and CO should be carried out six monthly. If the air quality level is above the permissible level, the frequency should be increased to quarterly/monthly depending upon the pollution level.
  - Adequate measures should be taken to control the noise level in the project.
  - The mine owner should submit the yearly expenditure statement to pollution control board in respect of the pollution control measures taken including that on plantation and its maintenance.
  - Garland drains should be constructed to arrest the silt from the surface runoff.
  - Persons in working areas should use dust masks.
  - The mine owners should construct effluent treatment for the mine water if any.
  - The mine owner should give due emphasis on reuse of the OB material to the extent possible. However, in case where such practice is not feasible, separate space should be earmarked for dumping of the OB material. Such sites should be approved in consultation with District Mining Engineer and State Pollution Control Board. Physical and biological reclamation of OB material should be the responsibility of the mine owner.
  - The plantation of forestry plant species as well as fruit bearing trees in and around the mining complexes should be considered. Such areas should be fenced from out side for protection. Maintaining of the plant should be the responsibility of the mine owner till the crown of the tree is achieved above the browsing level.
  - For the mines wherein excavation goes below the ground level, terminal land may be rendered in the shape as shown in Figure-E.2 for storage of water or to facilitate the recharge of already stressed ground water resource.
  - For mining operations on pasture land, alternate pastureland may be identified and developed for grazing of the livestock.

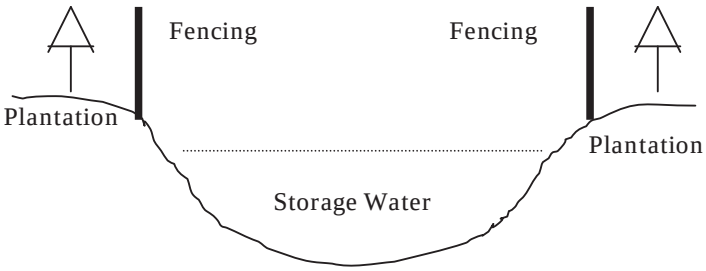


Figure-E.2: Final Land use by creating water bodies in mine pits

- The mining operations beyond the level at which ground water occurs may be permitted provided that the nearby villages and human settlements are not affected by it and the mine operators take appropriate measures for conservation/recharge of ground water. In such cases, consent/clearance of Ground Water Board may be obtained.

- **Industrial Operations**

  - Since the water is one of the critical resources in the district, establishment of high water consuming industries should not be permitted in the district in the notified area.
  - The industries should preferably be permitted in industrial areas of Khairthal. Establishment of industries outside the industrial area should be permitted only if it is not feasible to locate them within the premises of industrial areas.
  - Sufficient plantation may be undertaken in all the available spaces in the industrial area. The plant species should be selected in consultation with the State Forest Department. The plantation areas should not be compounded later on for establishment of industries.
  - The provision of combined effluent treatment facilities should form part of the infrastructure provided to industries. The treated effluent should be reused to the extent possible.
  - All the air-polluting industries should have effective air pollution control devices.
  - The rainwater harvesting measures by the industrial units should be encouraged.

6.4.3 Tehsil Tijara

A. Existing Environmental Scenario

In the Tijara Tehsil exists the Tijara town. Delhi–Alwar-Jaipur road is an important road, which connects the city. In this tehsil, five industrial sites *viz.* Bhiwadi Industrial Area, Rampur Mundana, Khushkhera Industrial Area, Chopanki Industrial Area and Sarekhurd Industrial Area exists. In addition to the above, some mines of masonry stone at Neemli and Chaupanaki and industries like Arahm Spinning Mills, SRF Ltd etc. exist in the tehsil.

In this tehsil, the areas covered under Aravali Notification except areas of Sariska Tiger Reserve and Sanctuary exist in this tehsil. The depth to water varies from 4.47 metres to 23.65 metres. The future mining blocks are planned at Mayapur, Khohri, Hasanpur Mafi, Neemli Baghor and Bhalesar.

The air quality parameters have been found to be above acceptable limits due to mining areas and nearby industrial areas at some locations. The status of ground water remains in overexploited category. The status of availability of water, air quality and lands category as per the Aravali Notification, 1992 and surface runoff from mines remain the primary criteria for locating the mines and industrial units. In the areas where SPM contours are projected to be higher, projects will require effective air pollution control measures.

B. Applicability of Recommendations

The recommendations for sustainable mining and industrial practices are applicable for the category of lands found as per Aravali Notification in the tehsil. The lands as per Aravali Notification that are found in the tehsil are forestland, Gair Mumkin Pahar, Gair Mumkin Rada and Gair Mumkin Behed.

C. Recommendations

Keeping in view the environmental scenario, the following good management practice may be considered for opening of mines in the proposed areas for promoting environmentally benign mining practices and establishment of industrial operations:

- **Mining operations**

  - The minimum lease area of the mines should be 1.0 ha or as decided by the Government of India under the relevant Rules, whichever is higher.
  - The boundary of the mine lease should be clearly demarcated.
  - A safety zone of 25 m from forest areas should be maintained as per Mineral Policy of Government of Rajasthan. This safety zone may be considered for plantation.
  - Controlled blasting with adequate safety measures should be resorted to, for extraction of minerals.
  - As far as possible, the approach road should be metalled. However, if there is any kutcha road, regular water sprinkling should be done.
  - The environmental monitoring of air quality for SPM, RPM, SO_2, NO_x and CO should be carried out six monthly. If the air quality level is above the permissible level, the frequency should be increased to quarterly/monthly depending upon the pollution level.
  - Adequate measures should be taken to control the noise level in the project.
  - The mine owner should submit the yearly expenditure statement to pollution control board in respect of the pollution control measures taken including that on plantation and its maintenance.
  - Garland drains should be constructed to arrest the silt from the surface runoff.

- Persons in working areas should use dust masks.
- The mine owners should construct effluent treatment for the mine water if any.
- The mine owner should give due emphasis on reuse of the OB material to the extent possible. However, in case where such practice is not feasible, separate space should be earmarked for dumping of the OB material. Such sites should be approved in consultation with District Mining Engineer and State Pollution Control Board. Physical and biological reclamation of OB material should be the responsibility of the mine owner.
- For the mine complexes, plantation of forestry plant species and fruit bearing trees should be considered. Such areas should be fenced from out side to protect it. Maintaining of the plant should be the responsibility of the mine owner till the crown of the tree is achieved above the browsing level.
- For the mines wherein excavation goes below the ground level, terminal land may be rendered in the shape as shown in Figure-E.3 for storage of water and to facilitate the recharge of already stressed ground water resource.
- The mining operations beyond the level at which ground water occurs may be permitted provided that the nearby villages and human settlements are not affected by it and the mine operators take appropriate measures for conservation/recharge of ground water. In such cases, consent/clearance of Ground Water Board may be obtained.

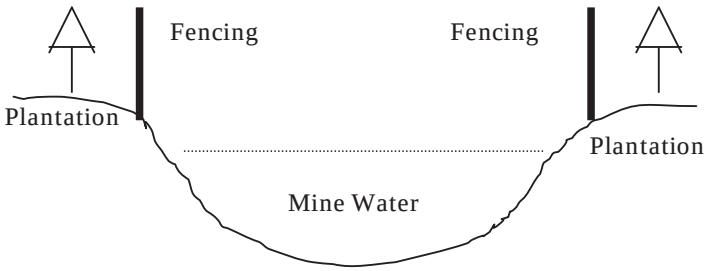


Figure-E.3: Final Land use by creating water bodies in mine pits

- **Industrial Operations**

- Since water is one of the critical resources in the district, the high water consuming industries should not be permitted in the notified area of the district.
- The industries should preferably be permitted in industrial areas of Bhiwadi, Rampur Mundana, Khushkhera, Chopanki and Sarekhurd. Establishment of industries outside the industrial area should be permitted only if it is not feasible to locate them within the premises of industrial areas.
- Diversion of green land in the notified area for industrial purpose should be discouraged.
- Sufficient plantation may be undertaken in all the available spaces in the industrial areas. Such spaces should not be compounded later on for establishment of industries.
- Emphasis should be given on construction, operation and maintenance of Common Effluent Treatment Plants (CETPs), ETPs and sewage treatment plants (STPs) wherever required in the industrial area. The reuse of treated water should be encouraged.
- The air-polluting industries should effective air pollution control devices.
- The provision of combined effluent treatment facilities should form part of infrastructure provided to the industries.

- The rainwater harvesting measures by the industrial units should be encouraged.
- Existing CETPs may be upgraded to be able to treat effluent discharge.
- Effort should be made to provide for separate drain system for storm water run-off and industrial effluent as far as possible and wherever required.

6.4.4 Tehsil Thana Ghazi

A. Existing Environmental Scenario

Thana Ghazi Tehsil is on the south-west part of the district. Delhi–Alwar-Jaipur passes through Thana Ghazi. In this tehsil, one industrial site *i.e.* Thana Ghazi Industrial area is planned and at present only one industrial unit is operating. The categories of land covered under Aravali Notification exist in the tehsil area. Some part of core area of Sariska Tiger Reserve, it's adjoining & preliminary notified area also exist. Some mines of soapstone, iron, dolomite and marble exist in the tehsil. The tehsil has good potential of marble. The mining blocks proposed here are at Narainpur (masonary stone), Jetpur-Goojran (masonary stone) and Jhiri-Jagannathpura (marble).

The air quality parameters have been projected to be above acceptable limits at some locations. In this tehsil, the depth to water in older alluvium varies from 16.15 metres to 30.10 metres and in slate, it is 0.90 metre to 30.45 metres. The proposed mining blocks are away from Sariska Reserve Forests. Though significant decline in post-monsoon water is not predicted in major part of the tehsil, on the long run, the status of ground water resource may be critical.

Here the mining blocks in the Sariska extension areas and corridor may not be the preferred one because the same has been proposed for conservation of the wildlife. However, in other areas, the air quality, ground water and lands restricted as per Aravali Notification, 1992 are the deciding criteria for mining and industrial operations.

B. Applicability of Recommendations

The recommendations for sustainable mining and industrial practices are applicable for the category of lands found as per Aravali Notification in the tehsil. The lands as per Aravali Notification that are found in the tehsil are forestland, Sariska Area, Gair Mumkin Pahar, Gair Mumkin Rada, Gair Mumkin Behed and Banjar Beed.

Since eco-sensitive zones around Critical Tiger Habitat of Sariska Tiger Reserves has been proposed, the eco-sensitive zone and the buffer will also be restricted areas for development.

C. Recommendations

Keeping in view the environmental scenario, the following good management practice may be considered for opening of mines in the proposed blocks for promoting environmentally benign mining practices and establishment of industrial operations:

- **Mining operations**

  - The minimum lease area of the mines should be 1.0 ha or as decided by the Government of India under the relevant Rules, whichever is higher.
  - The boundary of the mine lease should be clearly demarcated.
  - For mining near forest areas, safety zone of 25 m width should be maintained around the forest area. This safety zone may be considered for plantation purpose. The plant species may be selected in consultation with the forest department.

- Controlled blasting with adequate safety measures should be resorted to, for extraction of minerals.
- The approach road should be pucca and be sprinkled with water to prevent the dust particles becoming airborne.
- The environmental monitoring of air quality for SPM, RPM, SO_2, NO_x and CO should be carried out six monthly. If the air quality level is above the permissible level, the frequency should be increased to quarterly/monthly depending upon the pollution level.
- Adequate measures should be taken to control the noise level in the project.
- The mine owner should submit the yearly expenditure statement to pollution control board in respect of the pollution control measures taken including that on plantation and its maintenance.
- Garland drains should be constructed to arrest the silt from the runoff.
- Persons in working areas should use dust masks.
- The mine owners should construct effluent treatment for the mine water if any.
- The mine owner should give due emphasis on reuse of the OB material to the extent possible. However, in case where such practice is not feasible, separate space should be earmarked for dumping of the OB material. Such sites should be approved in consultation with District Mining Engineer and State Pollution Control Board. Physical and biological reclamation of OB material should be the responsibility of the mine owner.
- For the mine complexes, plantation of forestry plant species and fruit bearing trees should be considered. Such areas should be fenced from out side to protect it. Maintaining of the plant should be the responsibility of the mine owner till the crown of the tree is achieved above the browsing level.
- For the mines wherein excavation goes below the ground level, terminal land may be rendered in the shape as shown in Figure-E.4 for storage of water and to facilitate the recharge of already stressed ground water resource.

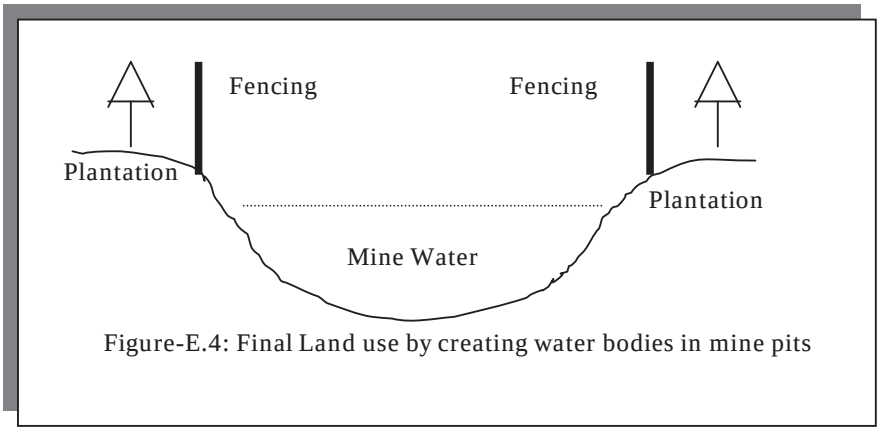


Figure-E.4: Final Land use by creating water bodies in mine pits

- The mining operations beyond the level at which ground water occurs may be permitted provided that the nearby villages and human settlements are not affected by it and the mine operators take appropriate measures for conservation/recharge of ground water. In such cases, consent/clearance of Ground Water Board may be obtained.

- **Industrial Operations**

- Since the water is one of the critical resources in the district, the heavy water consuming industries should not be permitted in the notified area in the district.
- The industries should preferably be permitted in Thana Ghazi Industrial area. Establishment of industries outside the industrial area should be permitted

only if it is not feasible to locate the same within the premises of the industrial area.
- The rainwater harvesting measures by the industrial units should be encouraged.
- Sufficient plantation may be carried out in the available spaces in the industrial area. The plant species should be selected in consultation with the Forest Department. Such areas should not be compounded later on for establishment of industrial units.

6.4.5 Tehsil Behrod

A. Existing Environmental Scenario

In this tehsil, town Behrod, also the tehsil headquarter is situated on the Delhi-Jaipur Highway. In this tehsil, four industrial sites *viz.* Behrod Industrial Area, Shahjahanpur Industrial Area, Neemrana Industrial area and Sota Nalla Industrial Areas exist. The Sota Nalla Industrial Area is on the boundary line of the district with Jaipur. The air quality in Behror and the nearby locations is beyond permissible limits because of the heavy traffic density on the National Highway and operation of some air polluting industries in the industrial area.

In this tehsil, mining has not been proposed in the near future. Occurrence of some protected forest area and other lands, which are restricted as per Aravali Notification is there in this tehsil area. The area is away from Sariska Reserve Forests. The ground water status has been estimated to be in overexploited category. The depth to water ranges from 16.20 metres to 37.30 metres.

The air quality status, ground water status and the occurrence of land as per Aravali Notification, 1992 are the primary criteria for locating the mining and industrial units. Since the air quality scenario is poor in this area, opening of mines and industrial units will require proper air pollution control systems.

B. Applicability of Recommendations

The recommendations for sustainable mining and industrial practices are applicable for the category of lands found as per Aravali Notification in the tehsil.

C. Recommendations

In this tehsil, opening of mines and industries will require implementation of proper air pollution control systems. The following management practice may be considered for opening of mines for promoting environmentally benign mining practices and establishment of industrial operations:

- **Mining operations**
  - The minimum lease area of the mines should be 1.0 ha or as decided by the Government of India under the relevant Rules, whichever is higher.
  - The boundary of the mine lease should be clearly demarcated.
  - A safety zone of 25 m should be maintained as per Mineral Policy of Government of Rajasthan. Such zones may be considered for plantation.
  - Controlled blasting with adequate safety measures should be resorted to, for extraction of minerals.
  - As far as possible the approach road should be metalled. However if there is any kutcha road, the regular water sprinkling should be done.
  - The environmental monitoring of air quality for SPM, RPM, SO_2, NO_x and CO should be carried out on fortnightly basis. If the air quality level is below the

permissible level, the frequency may be decreased to monthly/quarterly depending upon the pollution level.

- Adequate measures should be taken to control the noise level in the project.
- The mine owner should submit the yearly expenditure statement to pollution control board in respect of the pollution control measures taken including that on plantation and its maintenance.
- Garland drains should be constructed to arrest the silt from the runoff.
- Persons in working areas should use dust masks.
- The mine owners should construct effluent treatment for the mine water if any.
- The mine owner should give due emphasis on reuse of the OB material to the extent possible. However, in case where such practice is not feasible, separate space should be earmarked for dumping of the OB material. Such sites should be approved in consultation with District Mining Engineer and State Pollution Control Board. Physical and biological reclamation of OB material should be the responsibility of the mine owner.
- Plantation of forestry plant species and fruit bearing trees in and around the mining complex should be considered. Such areas should be fenced from out side to protect it. Maintaining of the plant should be the responsibility of the mine owner till the crown of the tree is achieved above the browsing level.
- For the mines wherein excavation goes below the ground level, terminal land may be rendered in the shape as shown in Figure-E.5 for storage of water and to facilitate the recharge of already stressed ground water resource.
- The mining operations beyond the level at which ground water occurs may be permitted provided that the nearby villages and human settlements are not affected by it and the mine operators take appropriate measures for conservation/recharge of ground water. In such cases, consent/clearance of Ground Water Board may be obtained.

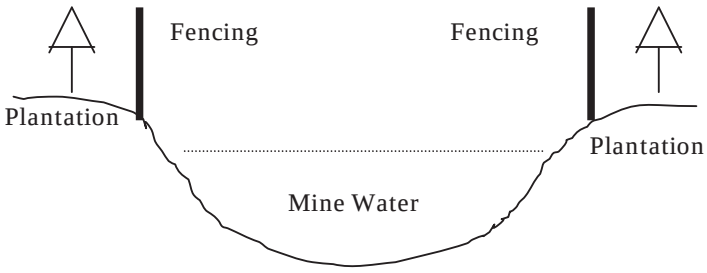


Figure-E.5: Final Land use by creating water bodies in mine pits

- **Industrial Operations**

- Since the water is one of the critical resources in the district, the high water consuming industries should not be permitted in the notified area.
- Since the air quality in this industrial area remains poor due to industries and plying of vehicles, establishment of air polluting industries with effective air pollution control measures should be permitted.
- The industries should preferably be permitted in industrial areas of Behror, Sota Nala, Shahjahanpur and Neemrana. Establishment of industries outside the industrial area should be permitted only if the same is not feasible within the premises of industrial areas.
- Sufficient plantation should be carried out in the available spaces in the industrial area. The plant species should be selected in consultation with the

forest department. Such areas should not be compounded later on for establishment of industries.

- Emphasis would be given on construction, operation and maintenance of Common Effluent Treatment Plant (CETPs), ETPs and STPs wherever required in the industrial areas. The treated effluent should be re-utilised to the extent possible.
- The rainwater harvesting measures by the industrial units should be encouraged.

6.4.6 Tehsil Bansur

A. Existing Environmental Scenario

In this tehsil, town Bansur is the tehsil headquarters. This town is connected by road with Alwar, Thana Ghazi and Behror. In this tehsil, the areas restricted as per Aravali Notification exist. The adjoining area of Sariska Tiger Sanctuary exists in this tehsil. In this tehsil, no industrial site has been planned. However, some mines of masonry stone are operating.

The air quality parameters have been found to be within acceptable limits except at some locations where SPM contours show higher SPM level at some locations. Except for Mundli and Ratanpura mining blocks, situated at the boundary of adjoining areas of Sariska Tiger Reserve, the other proposed mining areas *i.e.* Harsora, Narol-Chula, Kothal, Hameerpur and Indrada are away from it. In this tehsil also, the status of ground water is under overexploited category. The depth to water in older alluvium varies from 4.20 metres to 18.90 metres.

B. Applicability of Recommendations

The recommendations for sustainable mining and industrial practices are applicable for the category of lands found as per Aravali Notification in the tehsil. This includes forest land, Sariska Area, Gair Mumkin Pahar, Gair Mumkin Rada and Gair Mumkin Behed. Since eco-sensitive zones around Critical Tiger Habitat of Sariska Tiger Reserves has been proposed, the eco-sensitive zone and the buffer will also be restricted areas for development.

C. Recommendations

The ground water status and the lands as per Aravali Notification, 1992 are the considerations for locating the mining and industrial units. Keeping in view the environmental scenario, the following management practice may be considered for opening of mines for promoting environmentally benign mining design and mitigation practices and establishment of industrial operations:

- **Mining operations**
  - The minimum lease area of the mines should be 1.0 ha or as decided by the Government of India under the relevant Rules, whichever is higher.
  - The boundary of the mine lease should be clearly demarcated.
  - In case of opening of mines near Forest area / Sariska Tiger Reserve, a safety zone of 25 m shall be maintained as per Mineral Policy of Government of Rajasthan and a green belt should be developed on such land. The plant species may be of forestry type.
  - Controlled blasting with adequate safety measures should be resorted to, for extraction of minerals.
  - As far as possible the approach road should be metalled. However if there is any kutcha road, the regular water sprinkling should be done.
  - The environmental monitoring of air quality for SPM, RPM, SO_2, NO_x and CO should be carried out six monthly. If the air quality level is above the

permissible level, the frequency should be increased to quarterly/monthly depending upon the pollution level.

- Adequate measures should be taken to control the noise level in the project.
- The mine owner should submit the yearly expenditure statement to pollution control board in respect of the pollution control measures taken including that on plantation and its maintenance.
- Garland drains should be constructed to arrest the silt from the surface run-off.
- Persons in working areas should use dust masks.
- The mine owners should construct effluent treatment for the mine water if any.
- The mine owner should give due emphasis on reuse of the OB material to the extent possible. However, in case where such practice is not feasible, separate space should be earmarked for dumping of the OB material. Such sites should be approved in consultation with District Mining Engineer and State Pollution Control Board. Physical and biological reclamation of OB material should be the responsibility of the mine owner.
- Plantation of forestry plant species and fruit bearing trees in and around the mining complex should be considered. Such areas should be fenced from out side to protect it. Maintaining of the plant should be the responsibility of the mine owner till the crown of the tree is achieved above the browsing level.
- For the mines wherein excavation goes below the ground level, terminal land may be rendered in the shape as shown in Figure-E.6 for storage of water and to facilitate the recharge of already stressed ground water resource.
- The mining operations beyond the level at which ground water occurs may be permitted provided that the nearby villages and human settlements are not affected by it and the mine operators take appropriate measures for conservation/recharge of ground water. In such cases, consent/clearance of Ground Water Board is essential.

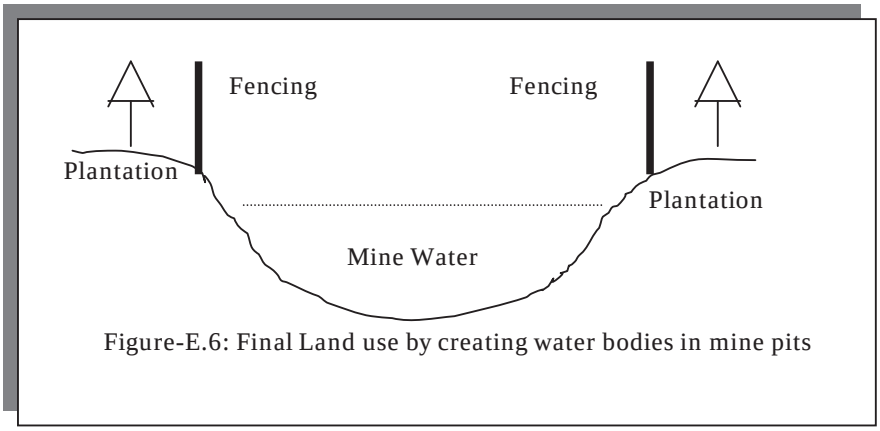


Figure-E.6: Final Land use by creating water bodies in mine pits

- **Industrial Operations**

- The industries should preferably be located in the industrial areas developed at other places in the district. Isolate locations of the industries may be considered in case locating the same is not feasible in the industrial areas. However, under such cases, the units should have pollution control technology to meet the standards specified by Rajasthan State Pollution Control Board and other central agencies.
- The high water consuming industries should not be permitted in the notified area in the district.

6.4.7 Tehsil Mundawar

A. Existing Environmental Scenario

Mundawar Tehsil is on the northern part of the district having tehsil headquarter at Mundawar. No industrial site has been planned in this tehsil. No forest block exists in the district though there are other categories of lands, which are restricted as per Aravali Notification. There are some mines of masonary stone and patti katla *etc.* in this tehsil. The air quality parameters have been projected to be above acceptable limits. The northern part of the tehsil falls under hot spot zone in terms of air quality.

The mining of masonary stone from Sheopur-Rainagar, Sanoli Bhungara and Ranoth-Raipur mining blocks are proposed. The status of ground water in this tehsil is also found to be overexploited. The depth to water ranges between 8.80 metres to 28.35 metres. The air quality, ground water status and the lands restricted as per Aravali Notification, 1992 are the guiding criteria for locating the mining and industrial units. Since the northern part of the tehsil is under the hot spot zone, opening of mining and industrial operations will require effective air pollution control measures.

B. Applicability of Recommendations

The recommendations for sustainable mining and industrial practices are applicable for the category of lands found as per Aravali Notification in the tehsil. This includes forestland and Gair Mumkin Pahar.

C. Recommendations

In general, the following management practice may be considered for opening of mines for promoting environmentally benign mining practices and establishment of industrial operations:

- **Mining operations**

  - The minimum lease area of the mines should be 1.0 ha or as decided by the Government of India under the relevant Rules, whichever is higher.
  - The boundary of the mine lease should be clearly demarcated.
  - A safety zone of 25 m from the forest boundary should be maintained as per Mineral Policy of Government of Rajasthan. This safety zone may be considered for plantation.
  - Controlled blasting with adequate safety measures should be resorted to, for extraction of minerals.
  - As far as possible the approach road should be metalled. However if there is any kutcha road, the regular water sprinkling should be done.
  - The environmental monitoring of air quality for SPM, RPM, SO_2, NO_x and CO should be carried out six monthly. If the air quality level is above the permissible level, the frequency should be increased to quarterly/monthly depending upon the pollution level.
  - Adequate measures should be taken to control the noise level in the project.
  - The mine owner should submit the yearly expenditure statement to pollution control board in respect of the pollution control measures taken including that on plantation and its maintenance.
  - Garland drains should be constructed to arrest the silt from the surface run-off.
  - Persons in working areas should use dust masks.
  - The mine owners should construct effluent treatment for the mine water if any.
  - The mine owner should give due emphasis on reuse of the OB material to the extent possible. However, in case where such practice is not feasible, separate space should be earmarked for dumping of the OB material. Such sites should be approved in consultation with District Mining Engineer and State Pollution

Control Board. Physical and biological reclamation of OB material should be the responsibility of the mine owner.

- Plantation of forestry plant species and fruit bearing trees in and around the mining complex should be considered. Such areas should be fenced from out side to protect it. Maintaining of the plant should be the responsibility of the mine owner till the crown of the tree is achieved above the browsing level.
- For the mines wherein excavation goes below the ground level, terminal land may be rendered in the shape as shown in Figure-E.7 for storage of water and to facilitate the recharge of already stressed ground water resource.
- The mining operations beyond the level at which ground water occurs may be permitted provided that the nearby villages and human settlements are not affected by it and that the mine operators take appropriate measures for conservation/recharge of ground water. In such cases, consent/clearance of Ground Water Board may be obtained.

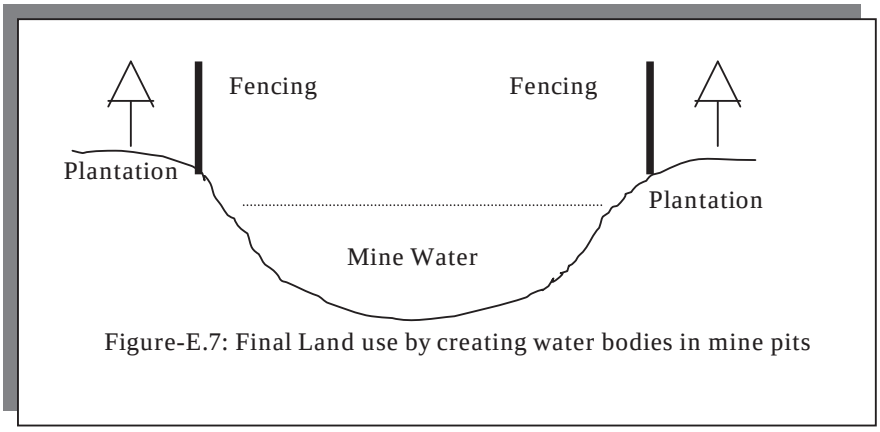


Figure-E.7: Final Land use by creating water bodies in mine pits

- **Industrial Operations**

- The industries should preferably be located in the industrial areas developed at other places in the district. Isolate locations of the industries may be considered in case the same is not feasible in the industrial areas. However, under such cases, the units should have pollution control technology to meet the standards specified by Rajasthan State Pollution Control Board and other central agencies.
- The high water consuming industries should not be permitted in the notified area in the tehsil.

6.4.8 Tehsil Rajgarh

A. Existing Environmental Scenario

Tehsil Rajgarh is situated on the southern part of the district having its headquarter at Rajgarh. Rajgarh is connected to Alwar by Road and Delhi-Jaipur railway line passes through Rajgarh. Some forests blocks including core area of Sariska Tiger Reserve and some prelimary-notified area exist in this tehsil. Apart from this, other categories of land on which development is restricted as per Aravali Notification, 1992 also exist in the tehsil.

Two industrial sites *viz.* Rajgarh Industrial Area (RIA) and Rajgarh Industrial Area (extension) are operating at Rajgarh. In addition to the above, there are some mines of silica sand, masonary stone, soapstone and marble. The air quality parameters around

Rajgarh IA have been found to be above acceptable limits. There are some marble reserves near the preliminary notified area of STR as well.

The two proposed mining blocks *i.e.* Mallana Gordhanpura and Tilwad are for the extraction of marble. In addition to the above, Nangal Chandel area is proposed for mining soapstone and quartz. While the proposed marble blocks are near to the preliminary notified areas, the soapstone/quartz block is away from it. A number of steps have been observed to improve the environmental scenario in terms of air quality, effluent treatment and afforestation in the mining areas. Here also, the ground water has been estimated to fall under overexploited category. The depth to water in older alluvium varies from 23.00 metres to 30.30 metres and in quartzite, it is 5.15 metres to 36.30 metres.

B. Applicability of Recommendations

The recommendations for sustainable mining and industrial practices are applicable for the category of lands found as per Aravali Notification in the tehsil. This includes forestland, Sariska Tiger Reserve area, Gair Mumkin Pahar, Gair Mumkin Rada, Gair Mumkin Behed and Banjar Beed. Such restrictions will also be applicable on proposed extension of Sarika Tiger Reserve area and corridor once the same are notified by the State Government.

C. Recommendations

The ground water status and areas proposed for the corridor and extension of the boundaries of Sariska Tiger Reserve remains the primary criteria for locating the mining and industrial units. Because of the proposals for corridor and extension of boundaries of Sariska Tiger Reserve, the mining and industrial sites in this zone may not be preferred once these areas get notified by the State Government. However, some management practices are suggested here for opening of mines, if any, in future:

- **Mining operations**

  - The minimum lease area of the mines should be 1.0 ha or as decided by the Government of India under the relevant Rules, whichever is higher.
  - The boundary of the mine lease should be clearly demarcated.
  - For mining blocks near forest area / Sariska Tiger Reserve (STR), a safety zone of 25 m around forest/STR should be maintained and a green belt be developed on safety zone. The plant species may be of forestry type.
  - Controlled blasting with adequate safety measures should be resorted to, for extraction of minerals.
  - As far as possible the approach road should be metalled. However if there is any kutcha road, the regular water sprinkling should be done.
  - The environmental monitoring of air quality for SPM, RPM, SO_2, NO_x and CO should be carried out six monthly. If the air quality level is above the permissible level, the frequency should be increased to quarterly/monthly depending upon the pollution level.
  - Adequate measures should be taken to control the blast induced noise and vibration level in the project.
  - The mine owner should submit the yearly expenditure statement to Pollution Control Board in respect of the pollution control measures taken including that on plantation and its maintenance.
  - Garland drains should be constructed to arrest the silt from the mines.
  - Persons in working areas should use dust masks.
  - The mine owners should construct effluent treatment for the mine water if any.
  - The mine owner should give due emphasis on reuse of the OB material to the extent possible. However, in case where such practice is not feasible, separate space should be earmarked for dumping of the OB material. Such sites should

be approved in consultation with District Mining Engineer and State Pollution Control Board. Physical and biological reclamation of OB material should be the responsibility of the mine owner.

- Plantation of forestry plant species and fruit bearing trees in and around the mining complex should be considered. Such areas should be fenced from out side to protect it. Maintaining of the plant should be the responsibility of the mine owner till the crown of the tree is achieved above the browsing level.
- For the mines wherein excavation goes below the ground level, terminal land may be rendered in the shape as shown in Figure-E.8 for storage of water and to facilitate the recharge of already stressed ground water resource.
- The mining operations beyond the level at which ground water occurs may be permitted provided that the nearby villages and human settlements are not affected by it and that the mine operators take appropriate measures for conservation/recharge of ground water. In such cases, consent/clearance of Ground Water Board may be obtained.

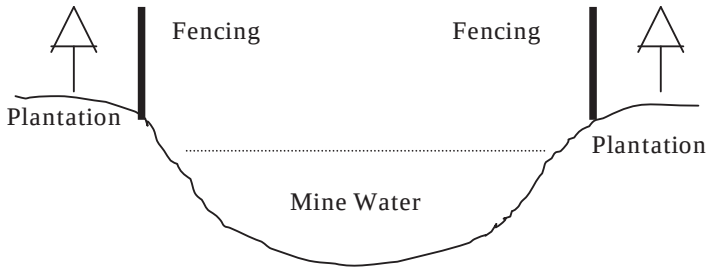


Figure-E.8: Final Land use by creating water bodies in mine pits

- **Industrial Operations**

- Since the water is one of the critical resources in the district, the water consuming industries should not be permitted in the notified area.
- The industries should preferably be permitted in industrial areas of Rajgarh Industrial Area and Rajgarh Industrial Area (Extension). Establishment of industries outside the industrial area should be permitted only if siting of industry within the premises of the industrial area is not feasible.
- The rainwater harvesting measures by the industrial units should be encouraged.
- Sufficient plantation may be carried out on available spaces in the industrial area. The plant species may be selected in consultation with the State Forest Department. Such areas should not be compounded later on for establishment of industries.

6.4.9 Tehsil Ramgarh

A. Existing Environmental Scenario

Tehsil Ramgarh exists on the eastern part of the district with Ramgarh town as its headquarters. Delhi–Alwar road is an important road, which passes through Ramgarh. In this tehsil, no industrial site has so far been planned. In this area, there exist categories of lands that are covered under Aravali Notification, 1992.

Here, some mines of chirt and masonary stone are operating. The proposed mining blocks are for masonary stone located at Goleta, Neekach-Naakhnol, Kota Kala, Khor Nangali, Hazipur-Naogaon, Odela-Manki and Rasoolpur-Bandholi. The air quality parameters have been found to be within acceptable limits at most locations. The ground water potential has been found to be critical. The depth to water varies from 2.40 metres to 17.20 metres.

B. Applicability of Recommendations

The recommendations for sustainable mining and industrial practices are applicable for the category of lands found as per Aravali Notification in the tehsil. This includes forest land, Gair Mumkin Pahar, Gair Mumkin Rada, Gair Mumkin Behed and Banjar Beed.

C. Recommendations

Developmental and mining activities in this area require considerations for conservation of ground water and minimisation of land degradation and eco-restoration efforts through plantation. Keeping in view the environmental scenario, the following management practice may be considered for opening of mines for promoting environmentally benign mining practices and establishment of industrial operations:

- **Mining operations**

  - The minimum lease area of the mines should be 1.0 ha or as decided by the Government of India under the relevant Rules, whichever is higher.
  - The boundary of the mine lease should be clearly demarcated.
  - A minimum of 25 m wide safety zone should be maintained around the forest area as per Mineral Policy of Government of Rajasthan. Plantation on this safety zone should be carried out in consultation with the State Forest Department.
  - Controlled blasting with adequate safety measures should be resorted to, for extraction of minerals.
  - As far as possible the approach road should be metalled. However if there is any kutcha road, the regular water sprinkling should be done.
  - The environmental monitoring of air quality for SPM, RPM, SO_2, NO_x and CO should be carried out six monthly. If the air quality level is above the permissible level, the frequency should be increased to quarterly/monthly depending upon the pollution level.
  - Adequate measures should be taken to control the noise level in the project.
  - The mine owner should submit the yearly expenditure statement to pollution control board in respect of the pollution control measures taken including that on plantation and its maintenance.
  - Garland drains should be constructed to arrest the silt from the surface runoff in the mines.
  - Persons in working areas should use dust masks.
  - The mine owners should construct effluent treatment for the mine water if any.
  - The mine owner should give due emphasis on reuse of the OB material to the extent possible. However, in case where such practice is not feasible, separate space should be earmarked for dumping of the OB material. Such sites should be approved in consultation with District Mining Engineer and State Pollution Control Board. Physical and biological reclamation of OB material should be the responsibility of the mine owner.
  - Plantation of forestry plant species and fruit bearing trees in and around the mining complex should be considered. Such areas should be fenced from out side to protect it. Maintaining of the plant should be the responsibility of the mine owner till the crown of the tree is achieved above the browsing level.

- For the mines wherein excavation goes below the ground level, terminal land may be rendered in the shape as shown in Figure-E.9 for storage of water and to facilitate the recharge of already stressed ground water resource.
- The mining operations beyond the level at which ground water occurs may be permitted provided that the nearby villages and human settlements are not affected by it and the mine operators take appropriate measures for conservation/recharge of ground water. In such cases, consent/clearance of Ground Water Board may be obtained.

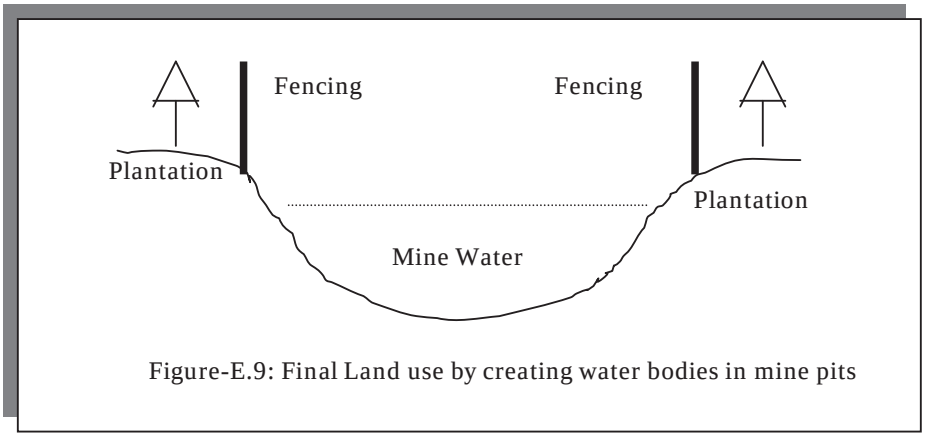


Figure-E.9: Final Land use by creating water bodies in mine pits

- **Industrial Operations**

- The industries should preferably be located in the industrial areas developed at other places in the district. Isolate locations of the industries may be considered in case the same is not feasible in the industrial areas. However, under such cases, the units should have pollution control technology to meet the standards specified by Rajasthan State Pollution Control Board and other central agencies.
- The high water consuming industries should not be permitted in the notified areas.

6.4.10 Tehsil Laxmangarh

A. Existing Environmental Scenario

Tehsil Laxmangarh is situated on the south-eastern part of the district having Laxmangarh as its headquarters. It is connected to Alwar Town though Malakhera by metalled road. No industrial township has been planned in this tehsil. Apart from forest blocks, the categories of lands restricted as per Aravali Notification also exist here. At present, there is one mine of soapstone operating in the tehsil. The one mining block proposed in this area is of masonary stone at Khera Mangal Singh.

There is no problem of air pollution in the tehsil. At some locations, the SPM contour is at 200 $\mu g/m^3$ that is the acceptable limit. The proposed mining block is away from Sariska Reserve Forests. The ground water status remains in a overexploited state over major portion of the tehsil. The depth to water in older alluvium varies between 5.95 metres to 19.00 metres.

B. Applicability of Recommendations

The recommendations for sustainable mining and industrial practices are applicable for the category of lands found as per Aravali Notification in the tehsil. This includes forestland, Gair Mumkin Pahar and Gair Mumkin Rada.

C. Recommendations

The mining and developmental activities in the region require considerations for ground water and minimisation of land degradation and ecological restoration efforts through plantation. Keeping in view the environmental scenario, the following management practice may be considered for opening of mines for promoting environmentally benign mining practices and establishment of industrial operations:

- **Mining operations**

  - The minimum lease area of the mines should be 1.0 ha or as decided by the Government of India under the relevant Rules, whichever is higher.
  - The boundary of the mine lease should be clearly demarcated.
  - A minimum of 25 m wide safety zone should be maintained around the forest area as per Mineral Policy of Government of Rajasthan. Plantation on this safety zone should be carried out in consultation with the State Forest Department.
  - Controlled blasting with adequate safety measures should be resorted to, for extraction of minerals.
  - As far as possible the approach road should be metalled. However if there is any kutcha road, the regular water sprinkling should be done.
  - The environmental monitoring of air quality for SPM, RPM, SO_2, NO_x and CO should be carried out six monthly. If the air quality level is above the permissible level, the frequency should be increased to quarterly/monthly depending upon the pollution level.
  - Adequate measures should be taken to control the noise level in the project.
  - The mine owner should submit the yearly expenditure statement to pollution control board in respect of the pollution control measures taken including that on plantation and its maintenance.
  - Garland drains should be constructed to arrest the silt from the surface runoff in the mines.
  - Persons in working areas should use dust masks.
  - The mine owners should construct effluent treatment for the mine water if any.
  - The mine owner should give due emphasis on reuse of the OB material to the extent possible. However, in case where such practice is not feasible, separate space should be earmarked for dumping of the OB material. Such sites should be approved in consultation with District Mining Engineer and State Pollution Control Board. Physical and biological reclamation of OB material should be the responsibility of the mine owner.
  - Plantation of forestry plant species and fruit bearing trees in and around the mining complex should be considered. Such areas should be fenced from out side to protect it. Maintaining of the plant should be the responsibility of the mine owner till the crown of the tree is achieved above the browsing level.
  - For the mines wherein excavation goes below the ground level, terminal land may be rendered in the shape as shown in Figure-E.10 for storage of water and to facilitate the recharge of already stressed ground water resource.
  - The mining operations beyond the level at which ground water occurs may be permitted provided that the nearby villages and human settlements are not affected by it and the mine operators take appropriate measures for conservation/recharge of ground water. In such cases, consent/clearance of Ground Water Board may be obtained.

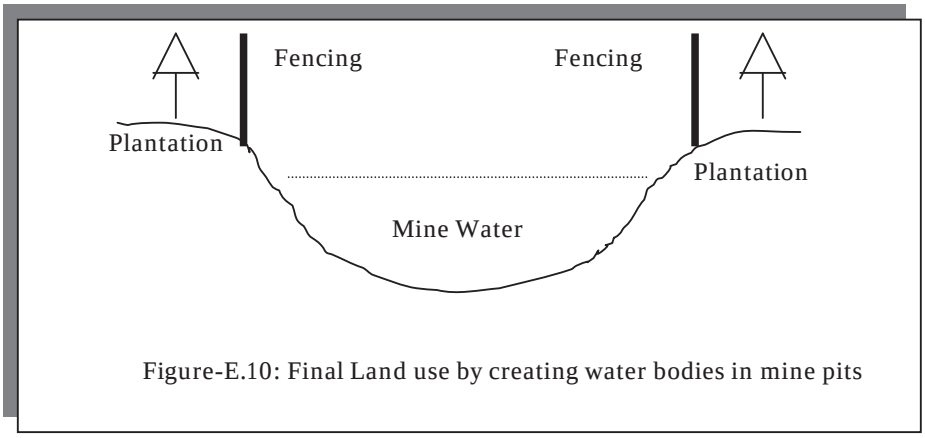


Figure-E.10: Final Land use by creating water bodies in mine pits

- **Industrial Operations**

  - The industries should preferably be located in the industrial areas developed at other places in the district. Isolate locations of the industries may be considered in case the same is not feasible in the industrial areas. However, under such cases, the units should have pollution control technology to meet the standards specified by Rajasthan State Pollution Control Board and other central agencies.
  - The high water consuming industries should not be permitted in the notified area.

6.4.11 Tehsil Kot Kasim

A. Existing Environmental Scenario

Tehsil Kot Kasim is situated in the northern part of the district having its headquarters at Kot Kasim. It is connected to district headquarter via Kishangarh Bas by metalled road. In this tehsil, one industrial site has been planned at Kot Kasim on 500 Acres of land. The land that are restricted as per Aravali Notification exist in this tehsil. At present, there are some mines of masonary stone. The mine of masonary stone has also been proposed at Khohra Thakran- Magha ka Majra.

There does not seem to be problem of air quality in the tehsil except in northern and eastern part where it is projected to be higher. Since the proposed mining location falls in hot spot zone in terms of air quality, opening of industries and mine will require effective pollution control measures. The status of ground water remains in overexploited category. The depth to water ranges from 5.20 metres to 9.95 metres.

B. Applicability of Recommendations

The recommendations for sustainable mining and industrial practices are applicable for the category of lands found as per Aravali Notification in the tehsil. This includes forestland, Gair Mumkin Pahar, Gair Mumkin Rada and Gair Mumkin Beehed.

C. Recommendations

The following management practice may be considered for opening of mines for promoting environmentally benign practices and establishment of industrial operations:

- **Mining operations**

  - The minimum lease area of the mines should be 1.0 ha or as decided by the Government of India under the relevant Rules, whichever is higher.
  - The boundary of the mine lease should be clearly demarcated.
  - A minimum of 25 m wide safety zone should be maintained around the forest area as per Mineral Policy of Government of Rajasthan. Plantation on this safety zone should be carried out in consultation with the State Forest Department.
  - Controlled blasting with adequate safety measures should be resorted to for extraction of minerals.
  - As far as possible the approach road should be metalled. However if there is any kutcha road, the regular water sprinkling should be done.
  - The environmental monitoring of air quality for SPM, RPM, SO_2, NO_x and CO should be carried out six monthly. If the air quality level is above the permissible level, the frequency should be increased to quarterly.
  - Adequate measures should be taken to control the noise level in the project.
  - The mine owner should submit the yearly expenditure statement to pollution control board in respect of the pollution control measures taken.
  - Garland drains should be constructed to arrest the silt from the mines.
  - Persons in working areas should use dust masks.
  - The mine owners should construct effluent treatment for the mine water if any.
  - Plantation of forestry plant species and fruit bearing trees in and around the mining complex should be considered. Such areas should be fenced from out side to protect it. Maintaining of the plant should be the responsibility of the mine owner till the crown of the tree is achieved above the browsing level.
  - If the mine is deep below the ground level and the ground water is encountered, the final shape of the land may be rendered as shown in Figure-E.11 for storage of water and to facilitate recharge of ground water.
  - The mining operations beyond the level at which ground water occurs may be permitted provided that the nearby villages and human settlements are not affected by it and that the mine operators take appropriate measures for conservation/recharge of ground water. In such cases, consent/clearance of Ground Water Board may be obtained.

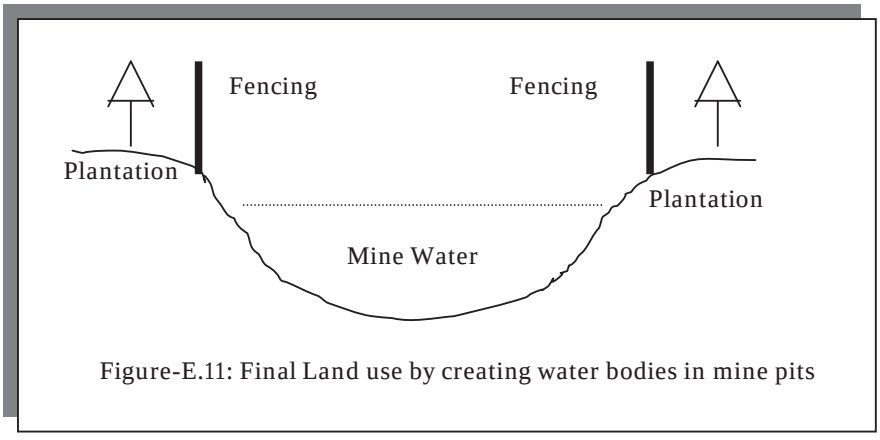


Figure-E.11: Final Land use by creating water bodies in mine pits

- **Industrial Operations**

  - Since the water is one of the critical resources in the district, the high water consuming industries should not be permitted in the notified area.
  - The industries should preferably be permitted in the proposed Kot Kasim Industrial area. Establishment of industries outside the industrial area should be permitted only if siting within the industrial area is not feasible.
  - The rainwater harvesting measuring by the industrial units should be encouraged.
  - Emphasis would be given on construction, operation and maintenance of Common Effluent Treatment Plant (CETP), ETPs and STPs wherever required in the industrial area. The treated effluent should be re-utilised to the extent possible.
  - Since the industrial area has not yet been developed, the following points may be considered by RIICO while developing the industrial estate:
    - Common effluent treatment plant/ hazardous waste treatment facilities and other associated requirements to be part of the infrastructure provided to the industries.
    - The storm water drains may be separate from the waste water/ effluent conveyance systems, depending upon the pollution potential of effluent.
    - Sufficient plantation may be undertaken in all the available spaces in the industrial area. Such areas should not be compounded later on for the establishment of industries.

6.4.12 Tehsil Kathumar

A. Existing Environmental Scenario

Tehsil Kathumar is in the south-eastern part of the district having its headquarters at Kathumar. It is connected to district headquarter by metalled road. In this tehsil, there is one industrial site *i.e.* Kherli Industrial Area. Forest blocks exist in the tehsil and other categories of restricted land as per Aravali notification do not exist.

In this tehsil, no mine is operating at present and also no mine has been planned for the near future. The air quality parameters have been found to be within acceptable limits. Here also, the status of ground water development is in safe stage. The availability of water remains the primary criteria for locating the industrial units. The depth to water in older alluvium ranges between 6.10 metres to 22.90 metres and in saline water zones it ranges between 7.60 metres to 13.75 metres.

B. Applicability of Recommendations

The recommendations for sustainable mining and industrial practices are applicable for the category of lands found as per Aravali Notification in the tehsil. This includes forestland.

C. Recommendations

Keeping in view the environmental scenario, the following good management practice may be considered for establishment of industrial units:

- **Industrial Operations**

  - Since the water is one of the critical resources in the district, the high water consuming industries should not be permitted in the notified area.

- The industries should preferably be permitted in industrial area. Establishment of industries outside the industrial area should be permitted only if siting of the same is not feasible in the industrial area premises.
- The rainwater harvesting measuring by the industrial units should be encouraged.
- Emphasis would be given on construction, operation and maintenance of Common Effluent Treatment Plant (CETP), ETPs and STPs wherever required in the industrial area. The treated effluent should be re-utilised to the extent possible.
- Sufficient plantation may be undertaken in all the available spaces in the industrial area. Such areas should not be compounded later on for the establishment of industries.

6.5 Sites for Disposal of Municipal Solid Waste

The following sites are identified for disposal of municipal solid waste in the district:

Sl No.	Name of the Town	Location of the site identified	Water Level (below ground level)
1	Alwar	Rundh Dhuninath, MIA, Khasara No. 208, 209/617	18 m-23 m
2	Behror	In the village Ganga Bishan in between Khasara No. 896-899	38 m-42 m
3	Rajgarh	In the village Machadi in Khasara No. 1074 & 1075	30 m-35 m
4	Khairthal	Village Husainpur, Khasara No. 1503 and 1511	--
5	Tijara	1 km from the village Alaka in Khasara No. 147 & 148	--
6	Kherali	Village Sonkhar, Khasra no. 4	--

For safe disposal of the municipal solid waste, the following conditions are recommended:

- Construction of protective wall around the site with gate against the flow of surface water
- An impervious layer should be laid down at the site to check the percolation of polluted water
- There should be no source of drinking water within 400 m from the site
- Industrial waste and other waste water should be properly treated before the disposal

6.6 Bio-medical Waste Management

For treatment of bio-medical waste, Government of Rajasthan has assigned the work of establishment of combined bio-medical waste treatment facility at Alwar to M/s Hoswin Incinerator, Indore at the following rates:

a. Rs. 2.95 per bed per day from the hospitals having indoor facility.
b. Rs 700.00 per month from pathological labs, diagnostic centre and blood banks.
c. Rs 550.00 per month from all other medical institutions generating bio-medical waste, OPD clinics.
d. The above rates include collection, transportation, storage and disposal of biomedical waste generated within a radius of 150 kilometres as per guidelines issued by CPCB and as per Bio-medical Waste Rules.

6.7 Hazardous Waste Management

The units generating the hazardous waste in the industrial area have provided landfill facilities within factory premises to store the waste individually. It is recommended that a centralised unit be established for collection, treatment/disposal of the hazardous waste generated by industrial units in the District. RIICO may take lead in this direction. Alternately the industry owner may form a trust/society to deal with the hazardous waste generated from various locations.

Land for disposal of hazardous waste, a Committee of GM (DIC), RIICO, RPCB & BMA was constituted under the chairmanship of SDM, Tijara. This Committee has identified land measuring 88-11 bigha of village Indora in Tijara Tehsil and the same has been sent to SDM Tijara for reserving it. Besides this site, three more sites have been identified in village Gwalda, Indora & Joria which are under consideration by RPCB/District Administration. Comparatively better site will be selected and developed if found suitable for hazardous waste management.

6.8 Guidelines for disposal of solid waste from Industrial Areas

For disposal of solid waste from industrial areas, it is suggested that site should be identified within the industrial area premises itself. In case it is not feasible, this may be linked to some external identified locations. The market for these waste materials should be explored for reuse. The following guidelines are suggested for the management of solid waste from the industrial areas:

- Characterisation of solid waste from the industrial areas including its leaching characteristics
- The inert material may be used for filling up of low-lying areas.
- Physical and biological reclamation of the heaps once they are no more active. This may be carried out after making certain amendments in the waste material.
- For solid waste under hazardous category, such waste should be dealt as per the relevant provisions of Environment (Protection) Act, 1986 and its Rules.

6.9 Plantation for Eco-restoration

For promoting eco-restoration in the district, plantation may be carried out at places to achieve 33% vegetation cover in the district. The type of plants should preferably be indigenous forestry type. However, fruit bearing tress may also be considered for this purpose. Due consideration should be given to *ethno-forestry* practices to promote ecological restoration. A tentative list of plants, which may be considered for planation purpose, is as under:

A. Shrubs

Common Name	Botanical Name
Kanghi	*Abutilon indicum*
Khair	*Acacia catechu*
Biswal	*A pennata*
Kanchan	*Bauhinia acuminate*
Bougainvillea	*Bougainvillea spectabilis*

Common Name	Botanical Name
Bottle brush	*Collistemon citrinus*
Karaunda	*Carissa spinarus*
Nebu	*Citrus limon*
Scarlet brush	*Hamelia patens*
Jasum	*Hibiscus rosa-sinansis*
Lantana	*Lantana camara*
Mehdi	*Law sonia inermis*
Sazina	*Moringa otuifera*
Kaner	*Nerium indicum*
Harsinghar	*Nyctanthus arbor-tristis*

B. Tree

Common Name	Botanical Name
Silver wattle	*Acacia dealbata*
Gandh	*Acacia jarnesiana*
Black wattle	*A. mearnsii*
Babool	*A. Nilotica*
Beal	*Aegle marmelos*
Maharuk	*Alianthus excelsa*
Siris	*Albizia lebbeck*
Subabul	*Albizia moluccana*
Kala siris	*Albizia odoratissima*
White siris	*A. Procera*
Seetaphal	*Anona squamosa*
Kadamba	*Authocephalus chinensis*
Harin	*Aphanamixis polystachya*
Kathal	*Atrocarpus heterophyllus*
Khairwal	*Bauhinia purpurea*
Astha	*Bauhinia recemosa*
Semla	*B. semla*
Kachnar	*B. varigata*
Dhak	*Butea monosperma*
Amaltas	*Cassia fistula*
Yellow pink cassia	*Cassia sp.*

Common Name	Botanical Name
Jungali saru	*Casuarina equisetifolia*
Shisham	*Dalbergia latifolia*
Gulmohar	*Delonix rogia*
Amla	*Emblica officinalis*
Rubber tree	*Ficus elastica*
Bargad	*F. Banghalensic*
Gular	*F. Glomerata*
Pipal	*F. Religiosa*
Phalsa	*Grewia subinequalis*
Mahwa	*Madhuca longifolia*
Ashok	*Saraca asoka*
Imli	*Tamarindus indica*
Arjuna	*Terminalia arguna*
Ber	*Zizyphus mauritiana*

6.10 Drainage System For Bhiwadi, Khuskhera and Chopanki to prevent flow of water to Haryana

Bhiwadi: The entire topographical slope of Bhiwadi Region is towards Haryana. RIICO has constructed internal drains for a length of 80 kms for catering the industrial effluents as well as storm water and this entire water is collected at one pumping station and pumped through 4.20 kms pressure pipeline and 2.0 kms gravity pipeline to dispose off at Alwar Road in Rajasthan portion. During rainy season, the flow may increase resulting in flow towards Haryana.

Khushkhera: The prevent flow of water from Khushkhera towards Haryana, a separate disposal system upto Sabi river has been framed for which land acquisition proposal in a length of 3.54 kms has been framed. This entire land falls in Rajasthan territory.

Chopanki: For disposal of flow from Chopanki to Sabi river via Khushkhera, preparation of feasibility report has been taken up. Entire land of disposal system falls in Rajasthan territory.

6.11 Guidelines for Mine Solid Waste (Over Burden) Management

The best way of solid waste management is to use-it-up. That part of solid waste not used in quarry backfilling may be disposed of in the form of dump or reclamation of low lying areas.

The use of dump material will depends on its quality (physical & chemical characteristics). If the dump is composed of igneous or metamorphic or any very hard and compact rock, its crushing strength bearing strength etc. should be tested in the laboratory for its suitability as construction material/road metal etc. and may be used suitably. The softer ones, i.e. those coming out from sedimentary deposits should be

better used for backfilling the quarries. Such materials can also be used for stabilizing slopes by forming "ripraps"

For biological reclamation of over burden dumps, preservation of the topsoil is very important. It is to be collected separately by scraping the top 10-150 cm layer (depending upon the soil profile) and stored properly to preserve its biolife and physical properties. In Indian condition (tropical climate) such scraped soil prove to be vulnerable to erosion, and if lost, may create serious ecological damage by forming siltation on surrounding land and water and also creating loss of topsoil, a worthy natural resource; as nature takes several years to form 1 cm of topsoil.

Hence it will not be justified to loose the topsoil by getting mixed with subsoil or OB. Thus a calendar programme may be chalked out to reuse topsoil for its (most rapid use) on back-filled quarries even without requiring preservation through long time.

Dump management

Volume of solid waste, which cannot be used-up by any means may be allowed to form "waste dumps". The following guidelines may be used management of mine dumps:

- Its topsoil should be scrapped first to use somewhere else or to store for future use. During site selection for forming such waste dumps, the important consideration could be topography, hydro-geology and land use pattern.
- The final shape of waste dump should be such that the surfaces are stable. The overall slope of the OB dump permissible in the coal sector is 28^{o}. In this case also, the overall slope may be 28% from the horizontal. Since the size of HEMM used will be smaller, the berm width may be kept 20 m.
- Long slopes allow high surface runoff and hence high erosion, so the slope surfaces should be of short length so that the vertical fall in individual terrace does not exceed 20 m. The side slopes may be kept at the angle of repose of the material i.e. 37^{o} or so.
- Drainage lines (grassed water ways) should be constructed to prevent runoff on slope and gully erosion.
- Any gully, if formed even after above care, should be plugged at different places on the slope (across the length of the gully) at a distance of 1 to 2 m such that base of upper barrier is slightly below the top of the next barrier down slope.
- The dumps should be bounded by toe-barriers around the base. These should be low height walls with sloping walls outside so that the base is wider than the top with openings at selected sites so that the water can be collected at suitable sites and allowed to flow through planned avenue and not to create any land degradation.

A typical sketch of the over burden dump is provided on next page as Figure-E.12.

6.12 Review of the Environmental Master Plan

The recommendation embodied in this report need to be reviewed after a certain period to take stock of the prevailing environmental conditions vis-à-vis the recommendations and for issual of the revised guidelines / policy options if required. It is recommended that this Report may be reviewed after a period of 10 years for the aforesaid purpose.

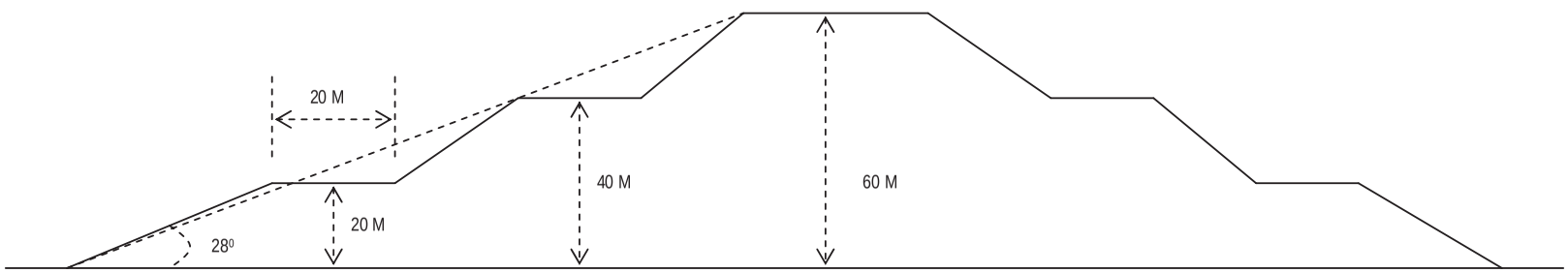


Fig – E.12: A typical section of External OB Dump

CHAPTER - I
INTRODUCTION

CHAPTER-I
INTRODUCTION

1.0 Introduction

Alwar district, in the State of Rajasthan, is covered under Aravali Notification dated 7th May, 1992 issued by Ministry of Environment & Forests, Government of India. This notification restricts some processes and operations on certain categories of land in the district. The following are the categories of land in the district whereon these processes and operations are restricted:

(i) All reserved forests, protected forests or any other area shown as "forest in the land record maintained by the State Government as on the date of this notification in relation to the Alwar District of the State of Rajasthan.

(ii) All areas shown as: -

(a) Gair Mumkin Pahar, or
(b) Gair Mumkin Rada, or
(c) Gair Mumkin Behed, or
(d) Banjad Beed, or
(e) Rundh.

in the land records maintained by the State Government as on the date of this notification in relation to the Alwar district of the State of Rajasthan.

(iii) All areas of Sariska National Park and Sariska Sanctuary notified under the Wildlife (Protection) Act, 1972 (53 of 1972).

The Ministry of Environment & Forests, Government of India vide its Gazette Notification No. S.O. 1189 (E) dated 29th November, 1999, delegating the power conferred on it to State Government of Rajasthan, *interalia* directed the State Government to initiate steps to prepare a Master Plan for the development of the area covered by the Aravali Notification integrating environmental concerns and keeping in view the future land use of the area. The Notification has envisaged that the Master Plan shall be prepared by the concerned state agency, approved by the competent authority and finally published, within two years from the date of issue of this notification, in accordance with the procedures laid down in the Town & Country Planning Act or any other similar Act of the respective State Government. The State Government concerned shall implement the Master Plan forthwith after its final publication. The Rajasthan State Pollution Control Board, in pursuance to the aforesaid notification, has taken up preparation of Environmental Master Plan of Alwar District. They have retained M/s Central Mine Planning & Design Institute (CMPDI) Limited, a subsidiary of Coal India Limited (a Government of India Enterprise), having its registered office at Gondwana Place, Kanke Road, Ranchi- 834 008 in the State of Jharkhand, as consultant for this project.

1.1 Objectives of the Master Plan

This Master Plan has been prepared with the following objectives:

- Study of the natural resource base and the ecosystem dynamics in the district of Alwar in Aravali Region indicating the specific areas listed in Aravali Notification, 1992.
- Study of existing status of air, land, water, forest and biodiversity resources and the threats these resources are currently facing.
- Study that how these resources have been utilised by the human population over time leading to review of traditional practices of using the resources vis-à-vis modern methods of management and exploitation systems.
- Evaluation of stresses on the systems – stress caused by industrialisation, tourism and pilgrimage, mining activities etc.
- Delineation of trade offs that have to be made in different regions between environment and development through traditional or proposed institutions for resource management.
- Futuristic evaluation and assessment of above on a time scale.
- Preparation of Environmental Master Plan using compatible modelling technique supported by GIS system

1.3 Scope of Work

The following is the scope of the present study for preparation of Environmental Master Plan of Alwar district:

- **Mining and Other Industrial Operations**

  - Prepare inventory of the environmental upgradation measures undertaken by all the mining companies and other individual operations in the Aravali Hill region.
  - Specify additional measures, if any, required for achieving environmentally compatible conditions.

- **Air Environment**

  - Identification of existing and anticipated points, line and area sources of atmospheric pollutants in the Aravali area along with identification of critical areas / hot spots.
  - Assessment of pollution assimilation potential of critical air sheds/cities/hot spots.
  - Stipulation of permissible emission levels for emission for point, line and area sources with associated preventive and control technologies.
  - Futuristic emission of air quality on a time scale with present growth of existing activities and controlled growth of future activities.
  - Existing and future environmental impacts on the existing environmental attributes.

- **Noise Environment**

  - Identification of point, line and area sources of noise and identification of high noise level zones requiring mitigation measures.
  - Existing and future impacts on the existing environmental attributes.

- **Water Environment**

  - Identification of point and non-point sources of water pollution and assessment of pollution loads.
  - Evaluation of the impact of waste discharges and mining activities on water bodies in the proposed area of study and suggest alternate options or mitigation measures.

- **Land Environment**

  - Identification of mines working in the region, mining areas, forest areas, specified areas covered under Aravali Notification, 1992 and other prevailing environmental attributes along with mapping of each of them using GIS.
  - Assessment of pollution loads due to municipal, mining overburden and industrial solid wastes generated in the region.
  - Evaluation of impacts on account of above on the existing environmental attributes.
  - Identify appropriate sites from proposed alternatives or suggest guidelines for selecting a new site for solid waste disposal including method of treatment and disposal.

- **Biological Environment**

  - Inventory of flora, fauna, rare and endangered species.
  - Collection of information on terrestrial and aquatic eco-systems.
  - Estimation of developmental possibilities offered by the resources and their current use pattern.

- **Estimation of Carrying Capacity & Evaluation of Regional Developmental Plans**

  - Estimation of supportive and assimilative capacities based on the analysis of most limiting and for most critical environmental areas.
  - Evaluation of regional and sectoral plans vis-à-vis carrying capacity analysis.

- **Recommendations**

  - Based on criteria of sustainability and evaluation of regional and sectoral plans recommended for technological and polity reforms for Environmental Master Plan.

1.4 The Draft Environmental Master Plan was discussed in a meeting at Alwar on 17/01/2005. Additional District Collector, Alwar, chaired the meeting. The representatives from various departments *e.g.* forests, mining, industries, RIICO, Regional Offices of Pollution Control Board, ground water, irrigation etc. attended the meeting and provided their valuable comments/suggestions on the Draft Environmental Master Plan.

Based on the comments/suggestions provided by district authorities, the Draft Final Report was prepared and submitted. This report was discussed in a meeting on 1st June, 2005 with concerned Secretaries and Heads of various Departments of Government of Rajasthan. This report has been finalised after incorporating the comments/suggestions provided as outcome of the above meeting.

CHAPTER - II
HISTORICAL PROFILE

CHAPTER-II
HISTORICAL PROFILE

2.0 History

The erstwhile state of Alwar, in north-eastern Rajasthan, is possibly the oldest kingdom in kingdom-studded Rajasthan. In 1500 BC, it formed part of the Matsya territories of Viratnagar (present day Bairat), which also encompassed Bharatpur, Dholpur and Karauli. History becomes inextricably bound with mythology, as it was here in the ancient kingdom of Matsya that the Kauravas embarked on the cattle-rustling mission, which precipitated the war between them and their kinsfolk, the Pandavas. This battle formed the basis of Mahabharata.

There are many theories about the origin of the name Alwar. According to one view, the city derived its name from the Salwa tribe and was originally Salwapur, then Salwar, Halawar and then Alwar. According to another school of thought, it was known as Aravalpur or the city of Aravalis. Some other holds that city is named after Alaval Khan Mewati. A research conducted during the reign of Maharaja Jey Singh of Alwar revealed that Maharaja Alaghraj, second son of Maharaja Kakil of Amber ruled the area in the eleventh century and his territory extended upto the present city of Alwar. He founded the city of Alpur in 1106 Vikram Samvat (1049 AD) after his own name which eventually became Alwar. It was formally spelt Ulwar but in the reign of Jey Singh, the spelling was changed to Alwar.

Descendants of Bahadura Nahara defended the Alwar fort against the Mus in 1427. Alwar's fortunes were inextricably bound with those of Mewat, which was contiguous with Delhi. As Alwar was located on the strategic south-western tier of Delhi, this of course rankled with Mughals, who mounted numerous military forays into the region, only conquering after great difficulty. Alwar was later granted to Sawai Jai Singh of Jaipur by Aurangzeb only to be retaken when the emperor visited the city and noted the great strategical virtue of its fortress. The Jats of Bharatpur then threw their hat into the ring, briefly overrunning the region, and installing themselves in the Alwar fort. They were evicted by the Lalawat Narukas (descendants of the Kachhwaha prince of Amber, Naru) between 1775 and 1782 under the leadership of the Naruka Thakur (noble) Pratap Singh. His descendants were great patrons of the arts, commissioning the transcription of numerous sacred and scholarly texts and encouraging painters and artisans to visit the Alwar court. In 1803, the British invested the Alwar Thakur with the title of Maharaja as thanks for their support in a battle against the Marathas. This friendly alliance was short-lived, however, with the Maharaja of Alwar strongly resenting British interference in governance when a British Resident was installed in the city. Following independence, Alwar was merged with the other princely states of Bharatpur, Karauli and Dholpur, forming the United State of Matsya, a name which reflected the fact that those states all comprised the ancient Matsya kingdom. In 1949, Matsya was merged with the state of Rajasthan.

2.1 Geographical Location

The district is situated in the north-east of Rajasthan between latitudes 27°03' and 28°14' North and longitudes 76°07' and 77°13' East. It covers an area of 8380 square kilometres. The district occupies about 2.45% of the total area of State. Based on the area, the district is 17th largest in the state. It is bound in north and north-east by Gurgaon district of Haryana State and Bharatpur district of Rajasthan State. On the north-west, the district is bound by Rewari district of Haryana State. Jaipur district bounds Alwar district on the south-west and southern side. Dausa district encompasses Alwar district on the southern side.

The whole Alwar district is also part of National Capital Region (NCR). This plan of NCR was formulated in 1985, to check the unprecedented growth of Delhi and to plan and promote a balanced and harmonious development around national capital. As per the plan, Alwar and Bhiwadi are identified as regional centres and to be developed for siting of industries and other economic activities on the priority basis.

2.2 Profile of the District

The district has an undulating topography of low Aravali Hills, intersperse with fertile alluvial plains and aolian rolling sand dunes of low heights. Alwar district, on account of its comparatively higher rainfall and fertile land, is a densely populated district of Rajasthan having an average population density of 357 persons/sq km.

The district has following 12 Tehsils and 14 Panchayat Samities or Development Blocks:

Table-2.1: Tehsils of Alwar Districts

1	Alwar	7	Thana Ghazi
2	Ramgarh	8	Kishangarh Bas
3	Bansur	9	Mandawar
4	Behrod	10	Tijara
5	Lachhmangarh	11	Kot Kasim
6	Rajgarh	12	Kathumar

Table-2.2: Blocks of Alwar District

1	Kishangarh Bas	8	Rajgarh
2	Govindgarh	9	Umrain
3	Tijara	10	Neemrana
4	Mundawar	11	Ramgarh
5	Kot Kasim	12	Behrod
6	Thana Ghazi	13	Reni
7	Bansur	14	Kathumar

PLATE NO. 2.1

Legend

Tehsils

The map of the district showing tehsil boundary is placed at Plate No. 2.1. Alwar district has some towns of importance viz. Alwar, Rajgarh, Behror, Khairthal, Azarka and Thana Ghazi all of which owe their significance due to their location on the main highways, roads and rail roads. Alwar city, the main hub of industrial and trading activities is joined to Delhi in the north by a broad gauge railway line (150 kms) and to Jaipur, the capital of Rajasthan State (148 kms).

The district is traversed by national highway no. 8 passing through Behrod, an important marketing centre and Shahjahanpur, a newly established industrial town for manufacturing of liquors. There are several state highways traversing this district, which provide easy accessibility by surface transport to the towns and villages. The most notable state highway traverses across the district from south-west to north-east, starting from Thana Ghazi and passing through Alwar City to meet Nauganwa and finally joining at Faridabad in the state of Haryana. The other highways of local importance are all weather-metalled roads criss-crossing the countryside to provide road accessibility to all major towns and important villages.

The district has par excellence a rural population (85.46% as per 2001 census). Agrarian pursuits are still of great importance as urbanisation have been at a low pace. Alwar city, the main urban centre, extends over an area of 80 sq kms. It is one of those cities of Rajsthan, which have shown decennial growth rate of over 40%.

Alwar is a medieval city, founded by feudal Maharaja of formerly Alwar State. The city underwent a chequered history in the past due to frequent invasions of Mughal emperors, who for long kept the Rajput warriors on toes to exercise the Mughal hegemony over land, people's religion and the revenue. It was only in the British Raj, that peace prevailed in Alwar and all over Rajasthan and since then the economic development started under the sovereignty of British Rule. Construction of railway tracts and metalled roads in the district indeed started a new impetus for industrialisation, modernisation and trading, all of which have now gained a *terra firma* with the administrative and financial support of State Government.

CHAPTER - III
NATURAL RESOURCE BASE OF DISTRICT

CHAPTER-III
NATURAL RESOURCE BASE OF DISTRICT

3.0 Natural Resource Base

The district is endowed with rich and varied resource base in terms of forest resources, mineral wealth, land *etc.* which is described in the subsequent sections in this chapter alongwith the environmental setup.

3.1 Air Quality Profile

3.1.1 Meteorology

Winds

Winds are strongest (13.1 km/h) in June and lightest (5.6 km/hr) in November. The micro-meteorological data reveals that in most of the time, the calm conditions prevail. The predominant wind directions are NW, SW, SE and NE. During the cold weather periods, the winds are generally light. Violent and dust raising winds are experienced in the entire district during summer. Winds are generally stronger over the western part of the district than the eastern part. In the summer season, there is import of sand by stong winds from Jaipur & Jhunjhunu districts.

Climate & Rainfall

The climate of the district can be classified as semi-arid. Hot summer, cold winter and a fairly good monsoon season characterize it. The normal rainfall figure in the district is 61.00 mm. However, the deviation from the average rainfall figure during the period 1996-1999 is reported to be 7.03 mm to 13.27 mm above the average figure.

Temperature

The cold season starts from about middle of November and continues till the end of February. January is the coldest month of the year with mean daily maximum temperature at 21.8 ^{o}C and mean daily minimum temperature at 7.7^{o}C. Both day and night temperatures increase rapidly from March onwards. May and June are the hottest months of the year. There is appreciable fall in temperature with onset of south-west monsoon by the end of June. After the withdrawl of monsoon in mid-September, the day temperature increases for a brief period. The night temperature however, continues to fall gradually.

Relative Humidity

The air is generally dry except in the south-west monsoon season. In the summer months, the relative humidity is very low, often less than 20% in the afternoon. However, the relative humidity values are much higher

during monsoon season. August is the most humid month with mean daily relative humidity of 80% in the morning and 70% in the afternoon.

3.1.2 Air Quality

For assessment of the air quality in the district, the data generated under a CPCB sponsored study and the data embodied in the report for preparation of zonig atlas of the district were compiled. There are some sources of air pollution in the district, which are located in the industrial areas operating under the jurisdiction of Rajasthan Industrial Development & Investment Corporation (RIICO). The air quality data in terms of particulate emissions and gaseous emissions, compiled for various locations in the district, are as under:

Table-3.1: Concentration of SPM and RPM during the Period 2001-2004

Station	SPM Concentration (μg/m^3)		RPM Concentration (μg/m^3)	
	Minimum	Maximum	Minimum	Maximum
Thana Ghazi	121	197	36	58
Ramnagar	96	156	27	41
Behrod	116	170	31	51
Lachhamangarh	105	153	27	41
MIA	116	370	30	231
Kushalgarh	95	143	21	39
Karoli	95	172	23	48
Ramgarh	107	184	25	52
RO Building, Alwar	140	502	35	201
BIDA/DIC Office	189	343	95	118
RO Office, Bhiwadi	180	288	47	93
Khairthal	361	400	--	--
Shahjahanpur	--	823	--	--
Neemrana	--	1220	--	--
Ulaheri	384	414	--	--
Baswa Gate, Rajgarh	338	468	54	87
Jhiri	--	245	--	110
Sare Khurd	--	463	--	--
Alwar Procersor, Khairthal	--	361	--	--
Navodaya Vidyalaya, Khairthal	--	400	--	--
RIICO Guest House, Bhiwadi	--	275	--	--
Main Gate, M/s Tripti Cement, Behror	--	1623	--	--

(Source: Zonig Atlas for siting of industries (From Environmnetal Considerations) of Alwar District, CPCB & RSPCB and Study of Environmnetal Problems of Aravali Hills & Preparation of Action Plan for restoration of Environmnetal Quality – Alwar district, CPCB)

Table-3.2: Concentration of SO_2 and NO_x during the Period 2001-2004

Station	SO_2 Concentration ($\mu g/m^3$)		NO_x Concentration ($\mu g/m^3$)	
	Minimum	Maximum	Minimum	Maximum
Thana Ghazi	9	19	9	21
Ramnagar	7	19	8	21
Behrod	7	18	9	20
Lachhamangarh	7	17	8	19
MIA	8	22	10	80
Kushalgarh	7	15	6	18
Karoli	8	21	9	23
Ramgarh	6	19	6	21
RO Building, Alwar	15	18	65	81
BIDA/DIC Office	4	23	19	37
RO Office, Bhiwadi	4	11	20	31
Khairthal	6.75	25.58	7.56	14.34
Shahjahanpur	9.60	--	52	--
Neemrana	1.05	--	6.5	--
Ulaheri	5.56	8.13	16.67	18.67
Baswa Gate, Rajgarh	--	4.98	--	18.20
Alwar Procercer, Khairthal	--	25.58	--	14.34
Novodaya Vidyalaya, Khairthal	--	6.75	--	7.56

(Source: Zonig Atlas for siting of industries (From Environmnetal Considerations) of Alwar District, CPCB & RSPCB and Study of Environmnetal Problems of Aravali Hills & Preparation of Action Plan for restoration of Environmnetal Quality – Alwar district, CPCB)

The air quality distribution in respect of SPM and RPM in the district is shown in Plate-3.1 & Plate-3.2 respectively.

3.2 Water Resources

3.2.1 Surface Water Resources & Drainage Pattern

The State Remote Sensing Department, Jodhpur has identified 108 nos. of macro and 664 nos. of micro watersheds in the district. There is no river in the district, which is perennial on its entire course. Ruparel, Sabi, Chuhar Sidh and Landoha are the only rivers that flow through the district and carry the drainage of the hills. Several of these rivers and their tributaries have been impounded at suitable sites and the water is used for irrigation purposes. The following are the main rivers in the district:

Sabi River: Sabi is the largest river of the district. Rising from Sewar hills (in Jaipur District), it enters Bansur tehsil of Alwar district from the west and forms the boundary of Alwar district for about 25 kms in the west. It flows in a general north-eastern direction for about 97 kms in or along the borders of the district passing through Bansur, Behrod, Mandawar, Kishangarh and Tijara tehsils. The catchment area of the river is about 2795 sq kms. And it has a maximum yield of 5,640 million cubic feet of water. It carries away the water of the western slope of the central range of the Aravali Hills. After entering Rewari

tehsil of Haryana state, it empties its water in the Najafgarh lake. The bed of the river is sandy and the banks are very high and consequently, it confers no benefit to the agriculturist. Its floods endanger Rewari in time of abnormal rainfall. The tributaries of this river in the district are:

- Nala Soha
- Nala Gunha Shanpur
- Nala machi
- Nala Hamirpur
- Nala Ismailpur
- Nala Rasgan & Adawal
- Nala Inderi, and
- River Sonamukhi

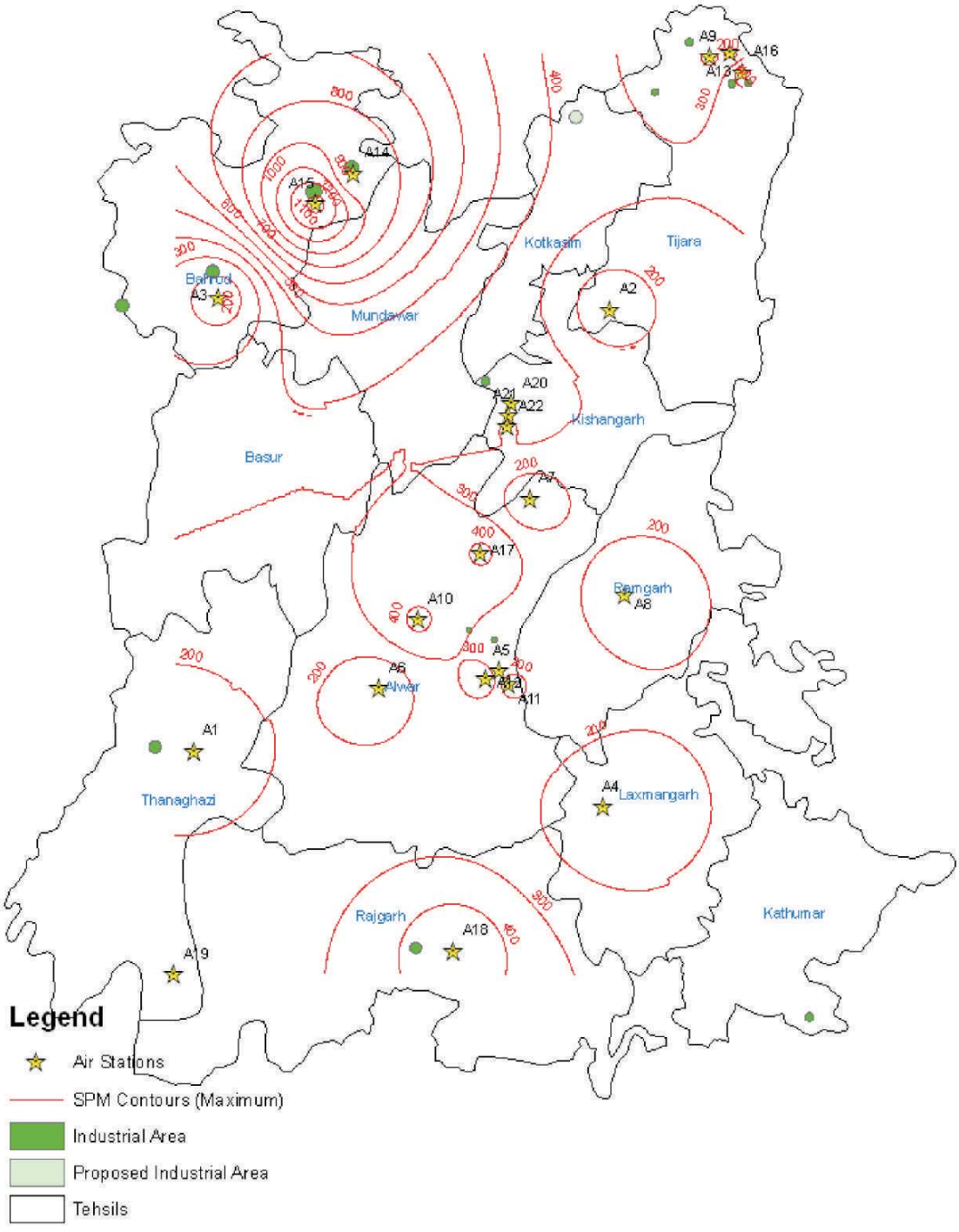
Ruparel: The Ruparel, also known as the Barah or Laswari, rises from Udainath hills in Thana Ghazi tehsil and finally terminates in the Bharatpur District. It passes through the Sariska Forest from south to north and then turns towards east from Bara, about 19 kms south of Alwar City on the Alwar-Jaipur road. At this point (Bara), the river leaves the hilly tract and enters the fertile central plains of the district where its water is utilised for irrigation purpose in various ways. An 8 kms long feeder channel from Bara weir to Jai Samand Lake has been constructed for diverting the Alwar share of water to Jai Samand. The stream passes through the villages Chand Pahari, Mohabbatpur, Sohanpur, Jatpur, Chototi, Khunteta and Koat. It flow east for about 81 kms through the centre of Alwar District before entering the Bharatpur district where its water is impounded in Sikri Bund to utilise its winter flow for rabi crops. A masonary (pucca) pickup annually irrigates 1,500 acres of land. Its entire catchment area is about 1,538 sq kms and has a maximum yield of 5,330 million cubic feet. The following are the principal tributaries of Ruparel River:

- Narainpur & Tal Braksh
- Kali Ghati
- Bhartihari
- Hamirpur
- Binak
- Golaira, Kali Khol
- Sukri
- Sham Ganga
- Nala Karot, and
- Chhind streams

It bed is sandy in which at places some vegetables and watermelons are cultivated.

Of the total basin area of the Ruparel river, 2404 km^2 are suitable for irrigation as per a study conducted by a foreign consultant. Out of this, some 414 km^2 are under the command of existing irrigation projects. The total mean annual natural surface water potential of the basin amounts to 210 million m^3. At present, the total area intercepted by dams in the basin is 2942.4 km^2 or 76% of the entire basin. With the construction of 8 new minor projects proposed by Irrigation Department, the total intercepted area would reach some 90% of the total basin area, leaving practically no scope for further increase of the area intercepted by dams.

PLATE NO. 3.1


A9
A16
A13
A14
A15
Kotkasim
Tijara
Bahrod
A3
A2
Mundawar
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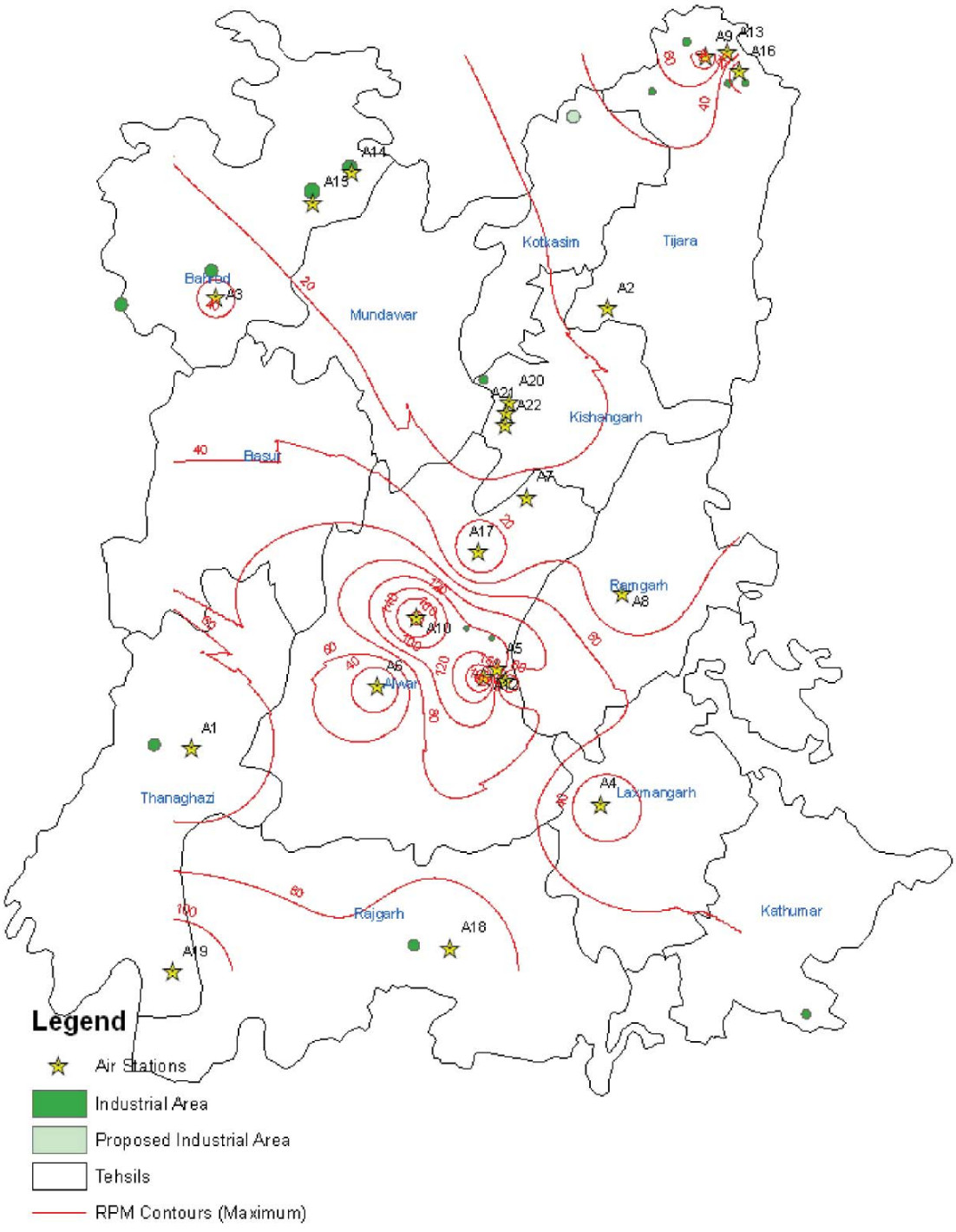
A21
A22
Kishangarh
Basur
A7
A17
A10
Bansgarh
A8
A5
A6
Alwar
A12
A11
A1
Thanaghazi
A4
Laxmangarh
Rajgarh
A18
Kathumar
A19
Legend
Air Stations
SPM Contours (Maximum)
Industrial Area
Proposed Industrial Area
Tehsils

PLATE NO. 3.2


A9
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Bahrod
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Mundawar
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A21
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Kishangarh
Basuri
A7
A17
Bhangarh
A8
A10
A5
A6
Alwar
A1
Thanaghazi
A4
Laxmangarh
Rajgarh
A18
A19
Kathumar
Legend
Air Stations
Industrial Area
Proposed Industrial Area
Tehsils
RPM Contours (Maximum)

The river basin simulation studies show a surface water surplus of 72 million m^3/year, with 50% dependability in the planning stage in the year 1995, reducing to 52 after completion of the proposed minor irrigation dams, and increasing to 78 million m^3/year by the year 2045. At the final planning stage, the surplus in a 75% dependable climatic state is 50 million m^3/year, and with 25% dependability, it is 193 million m^3/year. As per the study, part of these surpluses may be economically infeasible to harness, and the more logical solution may involve an inter-state agreement.

With the implementation of all the planned irrigation projects, the total CCA in the basin would reach 45.6 kha, which is 19% of the total irrigable land. However, results of the simulation studies show that, mainly because of the sharp increase in higher priority non-irrigation water demands, the area which can actually be irrigated, even in a good year (25% dependability) would rapidly reduce, and reach at the end of the Planning Period just 6.8 kha or 14.90% of the total developed CCA, and all of it is projected to be, by then, under an advanced cropping pattern.

The area outside the command of irrigation projects, which can be irrigated by wells only, could reach in a good year, a maximum of 37.3 kha (15.50% of the irrigable land) with the present level of high priority demand, assuming that ground water abstraction would be restricted to the utilizable safe yield of the aquifers. But with projected increase in these demands, the simulation studies show that no ground water would ultimately be left for an economically viable irrigation by wells, outside the command area of surface water irrigation projects.

The gap between the potentially irrigable land and the maximum, which can be economically irrigated with the water available in the basin, can be narrowed only if water is imported to this basin, which appears to be a doubtful possibility from the economic point of view.

Most of the Basin's aquifers (over 90% of their area) are alluvial, which lend themselves to relatively good well yields and large-scale ground water storage. However, having studied the geological and water quality conditions, artificial ground water recharge as a significant component in the water resource management of this basin could not be recommended.

Domestic water demand projections show an increase from a total of about 58 Mm^3/year in 1995 to 102 Mm^3/year in 2015 and 190 in the year 2045. Adding to this livestock and industrial water demand, the respective totals are approximately 75, 125 and 221 Mm^3/year.

Based on the study of the Ruparel basin, it was recommended that water requirement of all non-irrigation sectors within the basin can be satisfied with a high degree of reliability from ground water sources, but the demand for the planned industrial growth may not be possible to meet in dry years.

Chunar Sidh: It rises from Chunar Sidh hills in Alwar tehsil and flows from west to east upto Piproli from where it changes its course towards north and finally enters Gurgaon district of Haryana. It flows for about 48 kms in Alwar district and floods a portion of Ramgarh sub-tehsil during rains rendering it suitable for winter sowing. Its tributaries in the district are the nallas of Ghatla Bassi, Shahpur, Mach Tehadpur, Sota and river Khilora Bundi. Its entire catchment area is 616 sq kms and 12 bunds have been constructed in its catchment area.

The Landoha River: This river traces its origin from Kala Pahar, which forms the eastern boundary of the district. Most of the water from the south-western slopes of Kala Pahar, a range of Aravali Hills, flows into the Landoha River which is immediately held up in its journey in the plains by Atariya Bund. It runs from north to south in its initial stage, then turns towards east near Sheikhpur, crosses the Delhi-Alwar road near Nauganwa and eventually enters Gurgaon district of Haryana near Shakarpur. The catchment area of this river in Alwar district is 611 sq kms. It floods nearly 2023 hectares of agricultural land in sub-tehsil Ramgarh. Its tributaries in the district are Holani, Jiroli, Ismailpur, Chairanwera, Sotaka and Gol nallas and river Bilaspur. Fifteen bunds have been constructed in the catchment area of this river in the district.

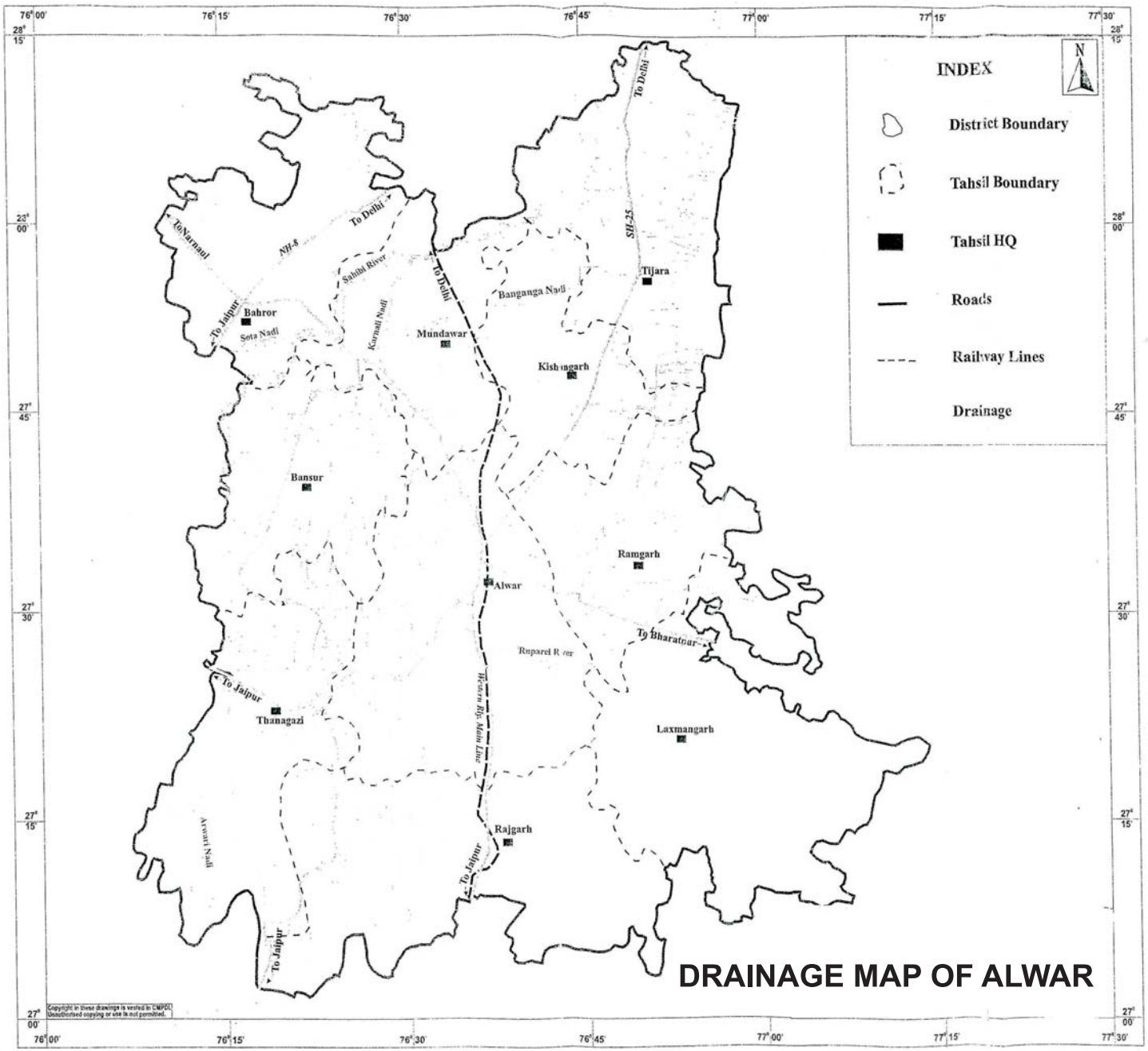
The Banganga River: This river neither rises in nor passes through Alwar district but simply touches it near Ukari village on its eastern border. It carries the entire water of the southern hills of Thana Ghazi and Rajgarh tehsils. Its tributaries confer great benefit to agriculture in the district. The catchment area of this river in the district is about 1416 sq kms. The Dehri (flood irrigated) area of the tributaries of this river is about 4451 hectares. About 41 bunds have been constructed in its catchment area. Its tributaries in the district are the nallas of Pratapgarh, Randana Chhapopli, Devti, Kodu, Roopbas, Rajore, Ghowar, Kuncha Pahar and rivers Kundala and Nehri.

The drainage map of the district is placed in Plate No. 3.3.

3.2.2 Lakes and Tanks in the District

There is no natural lake in the district. However, there are about 150 artificial lakes and tanks. The history of some of these can be traced to as far as the second century A.D. Baghola Bund (tank) near Rajgarh is said to have been built by Gujaras in 145 AD and Bund Talao was built nearly 1700 years ago. Another old bund is that of Deoti which was built by Bar Gujar chiefs of the place before occupation of Deoti by Kachhawas of Marwar. Some of the bunds like Babariya, Salim Sagar in Alwar Fort were constructed during the time of Moghuls when Alwar Forest was considered to be a haunt of wild animals and the favourite shikargah of Moghul emperors. Lateron, Maharaja Pratap Singh, founder of Alwar State built two Pratap Bunds at Alwar and Rajgarh. His successor Maharaja Vinay Singh constructed Silserh, Baleta and Tijara tanks during his time. Inlaki and Thonsari bunds were constructed during the period of Maharaja Balwant Singh of Tijara and Bakhtawar Singh of Alwar respectively. The next stage of development of bunds was from 1891 to 1900 in which all the old bunds were renovated and new bunds were constructed during the time of Maharaja Jey Singh. The important among these are *Hans*

PLATE NO. 3.3



DRAINAGE MAP OF ALWAR

Sarovar and Jey Samand (1910), Vijay Sagar (1903), Training Bund (1922) and Mangalsar (1924). The inventory of the existing bunds and tanks in the district is shown in Annexure-I. Short descriptions of some of the important tanks are placed below:

Jey Samand Bund

This bund was first constructed in the year 1910 after the settlement of Ruparel dispute with the former Bharatpur State. The Alwar share of Ruparel water is carried to the Jey Samand bund through the feeding channels connecting the bund with Bara weir. This bund was breached in the year 1917 and was constructed in the year 1918-19. It is situated in the hills between Ballana and Liwari villages, about 6 kms south of Alwar. The bund can be approached by metalled road.

The independent catchment area of Jey Samand Bund is 69.4 units, one unit being equivalent to about 2.5 sq kms hilly area and 52 sq kms of plain area, according to the figures finally adopted in Ruparel dispute. The storage capacity of bunds is 952 million cubic feet. The bund consists of an earthen embankment with a masonry core wall with the exception of breached portion repaired in 1917. The maximum height of the bund is about 10 metres. The bund has two main canals. Canal no. 1 has discharge capacity of 129 cusecs and is about 6 kms long and has 3 minors. Canal no. 2 has discharge capacity of 82 cusecs and is about 5 kms in length. This bund has total CCA of 4790 Ha.

Siliserh Bund

This bund is situated about 13 kms south-west of Alwar town and is connected by a road which branches off from National Highway No. 8 about 10 kms from Alwar City towards Jaipur. It was constructed by Maharaja Vinay Singh in the year 1845 on a tributary of Ruparel and consists of a double storied Rest House situated on the left side of the bund and a road leading upto the Rest House has also been constructed. It is a holiday resort for tourists. The people of Alwar town frequently visit this place for picnic all round the year and especially on the occasion of fair of Sitala Devi in April.

The water of this bund is carried by means of twin pucca canals for irrigation of gardens in Alwar town. Besides, it also irrigates some agricultural land every year. Its storage capacity is 492 million cubic feet and the catchment area is about 1124 Ha.

Baleta Bund

This is a small bund constructed by Maharaja vinay Singh near village Baleta on a tributary of Ruparel. About 23 kms south-west of Alwar city, this bund is situated between two hills. Its catchment area is 26 sq kms and it has astorage capacity of 100 million cubic feet. It consists of an earthen embankment with a pucca wall, 853 metres in length and a maximum height of 8 metres.

Mansarovar

This bund is situated between two hills 15 kms east of Alwar town on the Alwar-Mathura road. It was constructed by Maharaja Jey Singh in the year 1910. The water of a tributary of Chuhar Sidh has been impounded by embankment 1,311 metres long in the east and 3,658 metres long in the south. It has a capacity of 340 million cubic feet and a catchment area of 92.16 sq kms. The length of the bund is 1494 metres.

Vijay Sagar

This bund is situated between two hills on a tributary of the Chuhar Sidh, 10 km north of Alwar City, on Alwar-Behrod road. It was constructed in the year 1903. Since the yield of the tank was not good, training bunds were constructed across Chuhar Sidh and Chandoli Bhandwara and a canal was dug connecting this with Vijai Sagar Lake, to supplement it. The independent catchment area of this tank is 52 sq kms and it has a capacity of 308 million cubic feet. A beautiful palace known as Vijay Mandir Palace was built by Maharaja Jey Singh on a small hills platform on the northern side of the embankment. There is a beautiful temple of Shri Sitaram ji Maharaja within the premises of the palace, which is often visited by devotees from Alwar City in large numbers, especially on the occasion of Ram Navami every year.

Training Bund

This bund has been constructed across Chuhar Sidh River at a distance of about 11 kms north of Alwar City. It was constructed in the year 1922 to feed the Vijay Sagar Lake. Its catchment area is 123 sq kms and has a storage capacity of 206 million cubic feet.

The State Irrigation Department has constructed a number of medium and minor irrigation projects in the district, the details of which are embodies in Annexure-I. The summary of these projects is shown in Table-3.3.

Table-3.3: Summary of Irrigation Projects in Alwar District

Sl No.	Project Class	No. Of projects	Live Storage (million m^3)	CCA (in Ha)
1	Medium	1	26.45	4846.50
2	Minor	146	195.26	40592.67

(Source: Irrigation Department, Government of Rajasthan)

With the available rainfall, the irrigation department could generate the water potential upto 205.74 million m^3 of water annually. This availability of surface water could meet the irrigation requirement of 22590 ha of command area. For rest of the requirement, ground water is used. The creation of bund not only helps in irrigation but also in recharge of the ground water.

3.2.3 Springs

The district has four important springs at Narainji, Pandupol, Bharatrihari and Bani Talbraksh. The flow of the Narainji is utilised for irrigation and the other springs are allowed to flow freely. Besides these, one hot spring and two cold springs have been observed near the Talbraksh temple. There springs occur at the nose of Talbirach anticline, which is faulted. The temperature of the water of hot spring was 40°C on 5.4.1968 and 35°C on 25.7.1968; the discharge of the hot spring was 3 m^3/ hr on 5.4.1968 where as on 25.7.1968 it was 3.8 m^3/ hr. The temperature of water from one of the cold springs just adjoining the hot spring was 19°C and the discharge was 2.5 m^3/ hr on 5.4.1968.

3.2.4 Ground Water

Aquifer System

Principal aquifer in the district is quaternary alluvium, besides it, Bhilwara and Delhi Supergroup of rocks *i.e.* quartzites gneisses, schists, limestone, phyllites and post-Delhi granites also form aquifers. In general, yield of tube wells in the principal aquifer *i.e.* quaternary alluvium varies for 10 to 50 m^3/ hr.

Ground Water System Behaviour

Depth to water level in the district varies from 4 to 52 m below ground level. Major part of the district shows declining trend in the water level ranging in general from 0 to 2 metres/year except at north-eastern part of the district.

Ground Water Quality

Ground water quality in the district is, by and large, fresh having electrical conductance values with in 3000 m mhos/cm at 25°C. However, brackish water with electrical conductance values 3000 to 10120 m mhos/cm at 25°C is found in the eastern & south-eastern part of the district. The fluoride to ground water varies from 0.26 to 6.83 mg/l. The fluoride contents more than permissible limits *i.e.* 1.5 mg/l is found in the northern, north-western & eastern parts of the district. The ground water quality data of hydrograh network stations is presented in Table-3.4.

Ground Water Resources

State Ground Water Department has carried out the estimation of ground water in association with Central Ground Water Board. The ground water potential of the district as on 01.01.2001 is shown in Table-3.5. The summary of the results is presented in the Table-3.6.

Table-3.4: Water Quality of Hydrograh Network Stations – Alwar District

Sl No.	Well No.	Location	pH	Specific[1] Conductivity	Value expressed in ppm							Value expressed in mg/litre						
					CO_3	HCO_3	Cl	SO_4	NO_3	PO_4	Hardness[2]	Ca	Mg	Na	K	F	Fe	SiO_2
1	54A-2C1	Alwar	9.00	1630	24	12	298	130	270	<0.10	700	200	49	55	7	0.81	0.49	8.30
2	54A-2D4	Bagar	9.00	4060	72	305	128	220	1	<0.10	480	20	104	736	19	2.68	0.34	16.5
3	54A-3C2A	Baran	9.00	380	24	98	142	22	Trac.	<0.10	160	32	19	14	5	0.36	1.59	15.65
4	54A-3D1	Baroda Meo	8.70	3990	72	488	1633	194	500	<0.10	820	88	147	575	8	1.50	0.36	1.30
5	54A-1C6	Baskripalnagar	8.90	2600	72	366	170	77	420	<0.10	340	20	70	483	2	0.83	0.18	11.80
6	54A-1C8	Bhindusi	9.00	1130	84	342	177	60	1	<0.10	200	12	41	166	20	1.29	0.35	13.65
7	54A-4D3	Gadi Sawairam	9.00	505	108	49	1910	19	1	<0.10	250	60	24	9	3	0.40	1.14	19.85
8	54A-2D3	Gansoli (Kurd)	9.00	3150	96	305	199	272	100	<0.10	330	20	68	621	14	0.41	0.21	10.25
9	54A-4B3	Ghatamordi	7.90	480	Nil	146	21	38	2	<0.10	180	28	27	28	4	0.36	0.76	11.60
10	54A-1D2	Hasanpura	8.50	1285	36	171	213	42	280	<0.10	620	28	134	23	2	0.43	0.19	16.2
11	54A-2B3	Jagatpura	9.00	600	84	134	710	19	25	<0.10	250	20	44	41	2	0.63	--	13.05
12	54A-3D3	Jhaladala	9.10	1980	120	415	241	114	8	<0.10	400	20	85	149	Tr	1.01	0.12	17.75
13	54A-2C3	Jindoli	8.65	1265	36	342	241	66	10	<0.10	550	40	109	55	Tr	0.55	0.96	13.55
14	54A-1C5	Kadian	9.00	1650	120	598	270	58	15	<0.10	50	8	7	359	4	2.84	2.34	13.15
15	54E-3A2	Kathumar	8.80	2450	96	390	299	235	90	<0.10	500	12	114	359	2	0.80	3.92	11.60
16	53D-4C1	Kot Kasim	8.90	1430	48	329	341	130	13	<0.10	300	28	56	189	23	0.36	0.58	11.10
17	54A-3D2	Lachhmangarh	8.30	6970	Trace	85	35	1145	170	<0.10	1000	120	170	1242	4	0.15	0.12	9.75
18	54A-1B5	Majri Kalan	9.00	5490	120	12	35	1942	280	<0.10	450	20	97	1081	3	3.21	0.39	10.45
19	54A-1C3A	Mundawar	9.10	1410	120	281	390	118	8	<0.10	170	20	29	262	3	1.28	0.41	20.60
20	54A-1D3	Nimli	8.25	560	Nil	207	390	26	29	<0.10	220	40	29	23	10	0.20	0.23	13.20
21	54A-1B6	Neemrana	8.20	430	Nil	171	43	41	21	<0.10	210	20	39	23	2	0.13	0.39	17.70
22	54A-2D2	Naogaonwa	9.00	6260	120	378	43	1421	440	<0.10	300	24	58	759	975	0.93	0.18	1.05
23	54A-3A2	Pratapgarh	8.75	2790	36	134	469	435	180	<0.10	370	36	68	506	2	0.20	0.13	13.65
24	54A-4C2	Rajgarh	8.60	525	24	122	497	51	20	<0.10	230	20	44	23	2	0.43	0.22	19.90
25	54A-2D1	Ramgarh	8.20	2530	Nil	866	50	294	42	<0.09	350	20	73	442	19	3.13	0.13	9.85
26	54A-1B2	Sodawas	8.70	3580	72	427	50	376	4	<0.10	620	20	139	575	Tr	0.58	0.35	10.55
27	54A-1C1	Tatarpur	9.20	1350	84	134	57	100	40	<0.10	250	40	36	202	2	1.07	0.87	1.65
28	54A-4B1	Tehla	8.00	2160	Nil	183	603	321	120	<0.10	630	80	117	207	4	0.64	0.32	34.80
29	54E-3A4	Titpuri	8.20	7060	Nil	122	653	853	29	<0.10	1750	120	353	897	6	0.41	0.55	14.75
30	54A-4B2	Todi Ka Bas	8.20	1000	Nil	183	674	22	21	<0.10	330	48	51	92	2	1.20	0.89	42.70
31	54A-2C4	Vijay Mandir	8.30	2710	Trace	512	71	322	3	<0.10	340	44	56	494	5	2.67	0.54	15.25

[Source: Ground Water Year Book 1998-99; Cental Ground Water Board (Western Region), Jaipur]

[1] in micro siemens/cm at 25° C

[2] Total Hardness as $CaCO_3$

Table-3.5: Ground Water Potential of Alwar District as on 01/01/2001 (Source: CGWB, Western Region, Jaipur)

Block	Area of Block (sq.km)	Potential Zone Area (sq.km)	Net annual ground water availability (mcm)	Existing gross ground water draft for irrigation (mcm)	Existing gross ground water draft for domestic and industrial use (MCM)	Existing gross ground water draft for all uses (mcm)	Allocation for domestic & industrial requirement as on year 2025 (mcm)	Net ground water availability for future irrigation development (mcm)	State of ground water development (%)	Whether signinificant decline in pre-monsoon level (Yes/No)	Whether signinificant decline in post-monsoon level (Yes/No)	Category
Behror	351.69	334.60	40.9893	75.8250	3.2230	79.0480	9.0300	- 43.8657	192.85	Yes	Yes	Over Exploit.
Bansur	664.43	604.12	93.9340	100.6170	1.9976	102.6146	5.5800	- 12.2630	109.24	Yes	Yes	Over Exploit.
Kathumar	569.99	362.35	48.8555	89.4450	2.8594	92.3044	8.0500	- 48.6395	188.93	Yes	Yes	Over Exploit.
Kishangarh	526.46	351.76	59.6422	75.0450	3.3087	78.3537	8.2718	- 23.6746	131.37	Yes	Yes	Over Exploit.
		61.46	4.0911	5.7330	0.4698	6.2028	0.6553	- 2.2977	151.62	Yes	Yes	Over Exploit.
Total (Block)		413.22	63.7333	80.7780	3.7785	84.5565	8.9276	- 25.9723	132.67			Over Exploit.
Kotkasim	344.43	306.59	59.8871	82.2960	1.9922	84.2882	3.3200	- 25.7289	140.75	Yes	Yes	Over Exploit.
Laxmangarh	623.95	415.01	54.1183	69.7650	2.2214	71.9864	7.9000	- 23.6467	133.02	Yes	Yes	Over Exploit.
Mundawar	577.26	545.78	71.1692	116.5380	2.3681	118.9061	5.3800	- 50.7488	167.08	Yes	Yes	Over Exploit.
Neemrana	378.82	327.43	45.2082	45.5046	2.8273	48.3319	4.4500	- 4.7464	106.91	Yes	Yes	Over Exploit.
Rajgarh	1034.21	78.80	9.3110	13.9320	1.8203	15.7523	6.0427	- 10.8637	169.18	Yes	Yes	Over Exploit.
		377.15	24.9167	30.5100	1.4428	31.9528	3.5076	- 9.1009	128.24	Yes	Yes	Over Exploit.
Total (Block)		455.95	34.2277	44.4420	3.2631	47.7051	9.5503	- 19.7646	139.38			Over Exploit.
Ramgarh	616.97	568.46	84.1513	74.6040	3.3598	77.9638	6.2400	3.3073	92.05	Yes	Yes	Critical
Reni	392.05	248.23	25.2118	29.5470	0.7957	30.8420	2.3000	- 6.6352	120.35	Yes	Yes	Over Exploit.
		82.81	5.3334	9.6630	0.4909	10.1539	0.7700	- 5.0996	190.38	Yes	Yes	Over Exploit.
Total (Block)		331.04	30.5452	39.2100	1.2866	40.4965	3.0700	- 11.7048	132.58			Over Exploit.
Thana Ghazi	1060.33	168.38	24.3461	12.8160	0.7654	12.5814	1.1314	10.5987	54.66	Yes	Yes	Critical
		584.55	39.9050	32.4300	1.2249	33.6549	3.9286	3.5464	84.34	Yes	No	Semi-critical
Total (Block)		752.93	64.7511	45.2460	1.9903	47.2363	5.0600	14.4451	72.95			Semi-critical
Tijara	673.48	611.52	112.1722	115.1730	4.8742	119.8472	14.4800	- 17.4803	106.84	Yes	Yes	Over Exploit.
Umren	906.39	690.04	98.2138	70.4640	11.5307	81.9947	25.8268	1.9230	53.49	Yes	Yes	Critical
		106.77	10.3457	13.6900	1.1125	14.7928	3.9579	- 7.2922	142.98	Yes	Yes	Over Exploit.
Total (Block)		790.81	108.5595	84.1440	12.5432	98.7872	29.7847	- 5.3092	89.10			Critical
Total of District Potential Zones		6825.81	912.3019	1063.5876	48.4847	1112.0723	120.8226	- 272.1083	121.90			
Kathumar		200.89	27.0995	11.2400	0.2099	11.4499	0.0000	15.8595	42.25	Yes	No	Safe
Laxmangarh		175.51	18.3301	09.0850	0.2183	9.3003	0.0000	09.2451	50.75	Yes	No	Safe
Total		376.40	45.4296	20.3250	0.4282	20.7502	0.0000	25.1046	45.85			

Table-3.6: Summary of the Ground Water Resources of the District

a. Net annual ground water availability	912.3019 mcm
b. Annual gross draft	1112.0723 mcm
c. Ground water availability for future irrigation development (considering domestic draft for 2025)	(-) 272.1083 mcm
d. Stage of ground water development	121.90 %
Category of blocks - a. Over exploited	11 (Behror, Bansur, Kathumar, Kishangarh, Kotkasim, Laxmangarh, Mandawar, Neemrana, Rajgarh, Reni, Tijara
b. Critical	2 (Ramgarh, Umrain)
c. Semi-critical	1 Thana Gazi
d. Safe	Nil

Depth of Ground Water Level

The depth of ground water level varies from block to block. The variation in depth of ground water level, as per the study conducted by State Ground Water Department is as under:

Table-3.7: Depth of ground water level

Sl No.	Block	Depth of Ground Water
1	Behror	16.20 m – 37.30 m
2	Bansur	4.20 m – 18.90 m
3	Kathumar	6.10 m – 22.90 m
4	Kishangarh	4.35 m – 27.70 m
5	Kot Kasim	5.20 m – 9.95 m
6	Laxmangarh	5.95 m – 19.00 m (Ao Zone) & 9.90m-16.30 m (AoS zone)
7	Mundawar	25.35 m – 37.45 m
8	Rajgarh	23.00m-30.30 m (in older alluvium) 5.15 m – 36.30 m (in quartzite)
9	Ramgarh	2.40 m – 17.20 m
10	Reni	14.05 m – 31.20 m (in older alluvium) 27.85 m – 28.60 m (in slate zone)
11	Thana Ghazi	16.15 m – 30.10 m (in older alluvium) 0.90 m – 30.45 m (in slate zone)
12	Tijara	4.47 m – 23.65 m

Issues of Concern

Depleting ground water resources and declining water levels are issues of concern as far as ground water is concerned in the district. The average depletion of ground water level (1995-2004) in the district is about 2.90 metres. The maximum depletion was recorded in Neemrana block being 10.65 metres while minimum in Thana Ghazi block being 0.26 metres. The depletion in water table is mainly due to:

- Ground water being the only source for the water requirement for various uses
- Increase in number of tubewells for irrigation/domestic/industrial purposes
- Increasing population and urbanisation
- Increasing industrialisation
- Low rainfall

It is evident that due to inadequate availability of surface water, there is pressure on the ground water resource to meet the domestic, industrial and irrigational requirement in the district.

3.2.5 Water / Effluent Quality

In order to have an idea of the water/effluent quality status in the district, the data from a CPCB sponsored project and from Rajasthan State Pollution Control Board were compiled. The water quality of lakes, open well and tube-well was found to be as per Table-3.8 to Table-3.9:

Table-3.8: Status of Water Quality in the District

Sl No.	Parameters	Value (in mg/l except pH)				
		Borewell (MIA)	Agyar Dam	Openwell (Ramgarh)	Jaisamand Lake	Lake Siliser
1	Colour	2	12	2	6-26	4
2	Turbidity	2	--	2-4	--	6
3	PH	7.02-7.53	7.44	7.28-8.13	6.88-7.23	6.75
4	Hardness	224-276	1880	132-190	--	--
5	Nitrate	2.02-4.84	--	1.36-2.36	--	--
6	Alkalinity	248-406	--	58-136	68-120	110
7	MPN/100 ml	6-16	--	6-12	--	--
8	Dissolved Oxygen	--	3.80	--	4.2-4.6	4.5
9	BOD (3 days, 27^{o} C)	--	--	--	12-16	8
10	Dissolved Solids	--	3088.00	--	186-468	552

Effluent Quality

Table-3.9: Effluent Quality Status in the district

Parameter	Value in mg/litre except pH				
	Shahjahanpur		Neemrana	Bhiwadi (CETP)	Mine water (Marble Mine)
	ETP Outlet1	ETP outlet[2]			
pH	7.5	7.4	7.7	6.43	7.90
TSS	78	86	215	160	52
TDS	1690	1740	1720	--	354
COD	213	213	320	596	40
BOD	79	29	--	47	<5.0
Oil & Grease	4	7	3	4	<1.0

Table-3.9 (Contd.)**:** Effluent Quality Status in the district

Parameter	Value in mg/litre except pH			
	MIA	OIA	Khairthal IA	Khushkhera IA
pH	7.97	7.41	7.10	7.53
TSS	324	188	194	314
TDS	1690	1412	1520	1720
COD	314	402	260	706
Oil & Grease	<1.0	<1.0	<1.0	<1.0
Fluorides	1.12	1.19	1.25	1.24
Colour	509	147	264	227

For other industrial areas, the effluent discharging units have their own effluent treatment facilities.

The surface water quality is not as good at Alwar and its surroundings. The water quality deteriorates because there is no proper sewerage system in Alwar City, Rajgarh and other townships. The effluent from MIA and OIA find its way into the Agyar Dam, which acts as a major sink. The domestic effluent from the townships is discharged without any treatment.

3.3 Noise Level Status

The noise level monitoring has been carried out under CPCB sponsored project and by the State Pollution Control itself. The summary of the noise level status, based on the noise level data, across the district is as under:

[1] ETP outlet of M/s Vanasthali Textiles Industries Ltd
[2] ETP outlet of M/s Electrolux Kelvinator Ltd

Table-3.10: Noise Level Status in the District (Min Leq values)

Location	Time	Value in dB(A)			
		Summer	Monsoon	Post-Monsoon	Winter
Thana Ghazi	Day	47.1	46.3	46.8	46.3
	Night	40.3	39.2	39.6	38.3
Behrod	Day	46.7	45.3	45.8	45.3
	Night	36.1	38.1	39.1	40.1
Ramgarh	Day	48.3	44.3	46.5	46.3
	Night	42.3	41.3	40.8	41.3
Kushalgarh	Day	43.1	40.9	42.5	41.3
	Night	38.6	37.3	38.2	39.3
Karoli	Day	41.2	40.3	42.3	41.3
	Night	35.2	34.3	34.8	33.1
Bhiwadi	Day	--	49.3	--	--
Rajgarh	Day	--	47.1	--	--
Neemrana	Day	--	49.2	--	--
Shahjahanpur	Day	--	48.5	--	--
Gordhanpura	Day	--	43.7	--	--
Tilwad	Day	--	42.1	--	--
Khoh	Day	--	42.3	--	--

Table-3.11: Noise Level Status in the District (Max Leq values)

Location	Time	Value in dB(A)			
		Summer	Monsoon	Post-Monsoon	Winter
Thana Ghazi	Day	51.8	51.9	52.3	52.3
	Night	49.5	48.3	45.0	46.1
Behrod	Day	51.4	51.3	50.6	48.3
	Night	48.5	49.3	46.2	46.3
Ramgarh	Day	54.6	52.9	50.8	51.3
	Night	52.7	51.9	50.1	48.3
Kushalgarh	Day	48.6	47.2	47.1	48.3
	Night	46.4	45.9	45.0	46.3
Karoli	Day	48.2	46.3	45.8	45.3
	Night	44.1	43.2	43.1	46.3
Bhiwadi	Day	--	57.4	--	--
Rajgarh	Day	--	52.1	--	--
Neemrana	Day	--	56.4	--	--
Shahjahanpur	Day	--	53.8	--	--
Gordhanpura	Day	--	47.7	--	--
Tilwad	Day	--	47.1	--	--
Khoh	day	--	47.2	--	--

Table-3.12: Noise Level Status in Alwar City on the Occassion of Deepawali Festival

Sl No.	Nature of Area	Year of Monitoring	Observation Type	Value in dB(A)
1	Sensitive area	2002	Leq in dB(A)	45.5-78.6
			L_{max}	50.0-90.5
			L_{min}	42.5-72.8
2	Commercial area	2002	Leq in dB(A)	45.0-87.7
			L_{max}	57.5-99.8
			L_{min}	42.4-75.6
3	Residential area	2002	Leq in dB(A)	52.9-78.6
			L_{max}	52.9-100.7
			L_{min}	43.9-76.8

The distribution of noise level is shown in Plate-3.4 & Plate-3.5 for maximum day noise and night noise level respectively. The trend reveals that there is no impact (except during festival times in town) as far as ambient noise level is concerned.

3.4 Geology & Mining Potential

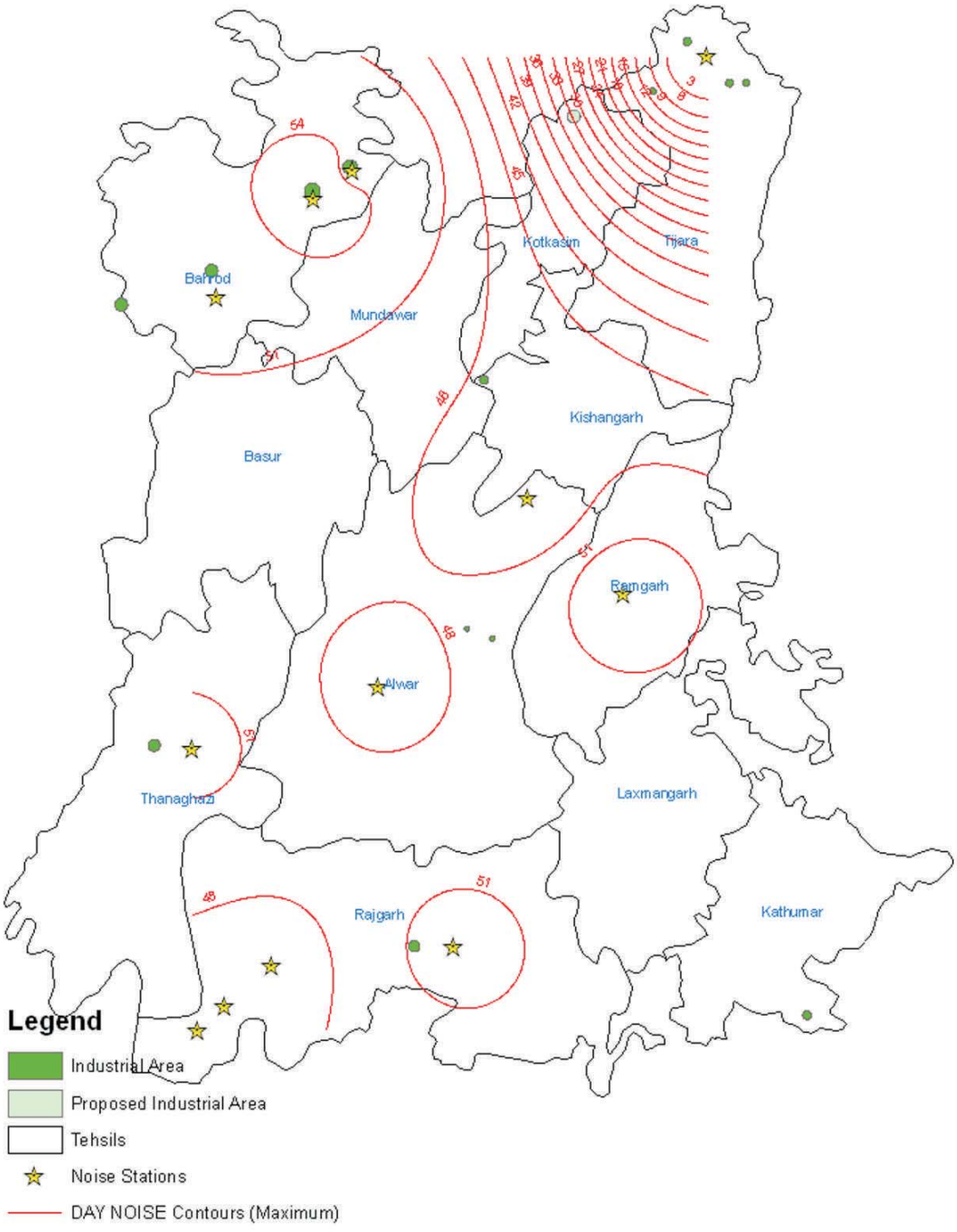
3.4.1 Geology

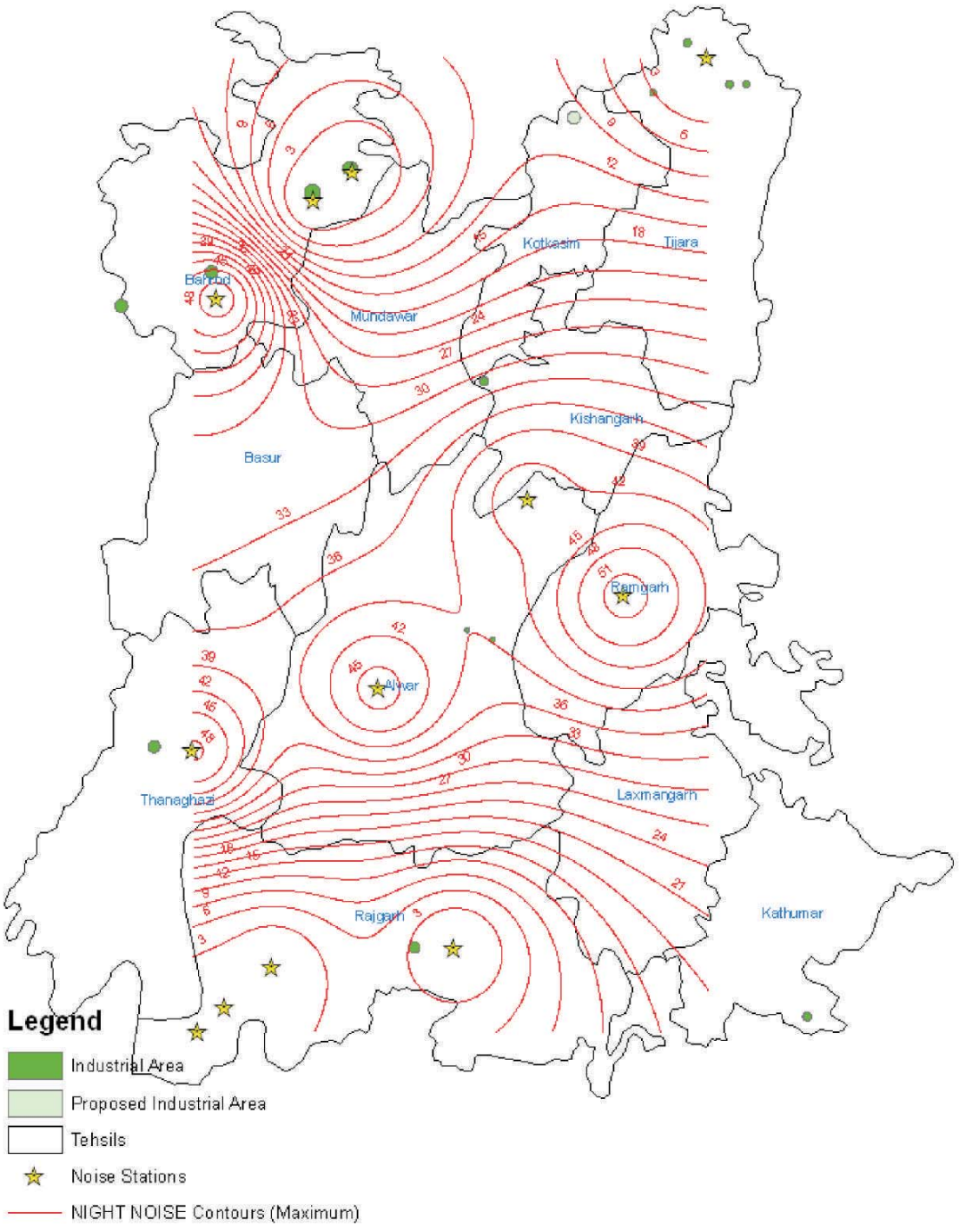
The district comprises *Precambrian* metamorphics and igneous rocks, belonging to the Mangalwar Complex of the Pre-Delhi (Archean) and Raialo, Alwar and Ajabgarh Groups, in ascending order of superposition, belonging to the Delhi Supergroup (Lower to Middle Proterozoic) and post-Delhi igneous intrusives Alluvium and Aeolian sediments mark the older formations. The Mangalwar Complex comprising quartzite, mica schist, crystalline limestone, conglomerate and granite, occur as isolated exposures in the southern part. These are un-conformably overlain by the Raialo Group comprising predominantly calcareous formations with volcanics and subordinate quartzite. These lie in the core part of regional folds, defined the main structural pattern of the area and contain a basal conglomerate and arkose quartzite unit, followed by a sequence of argillaceous and impure calcareous rocks.

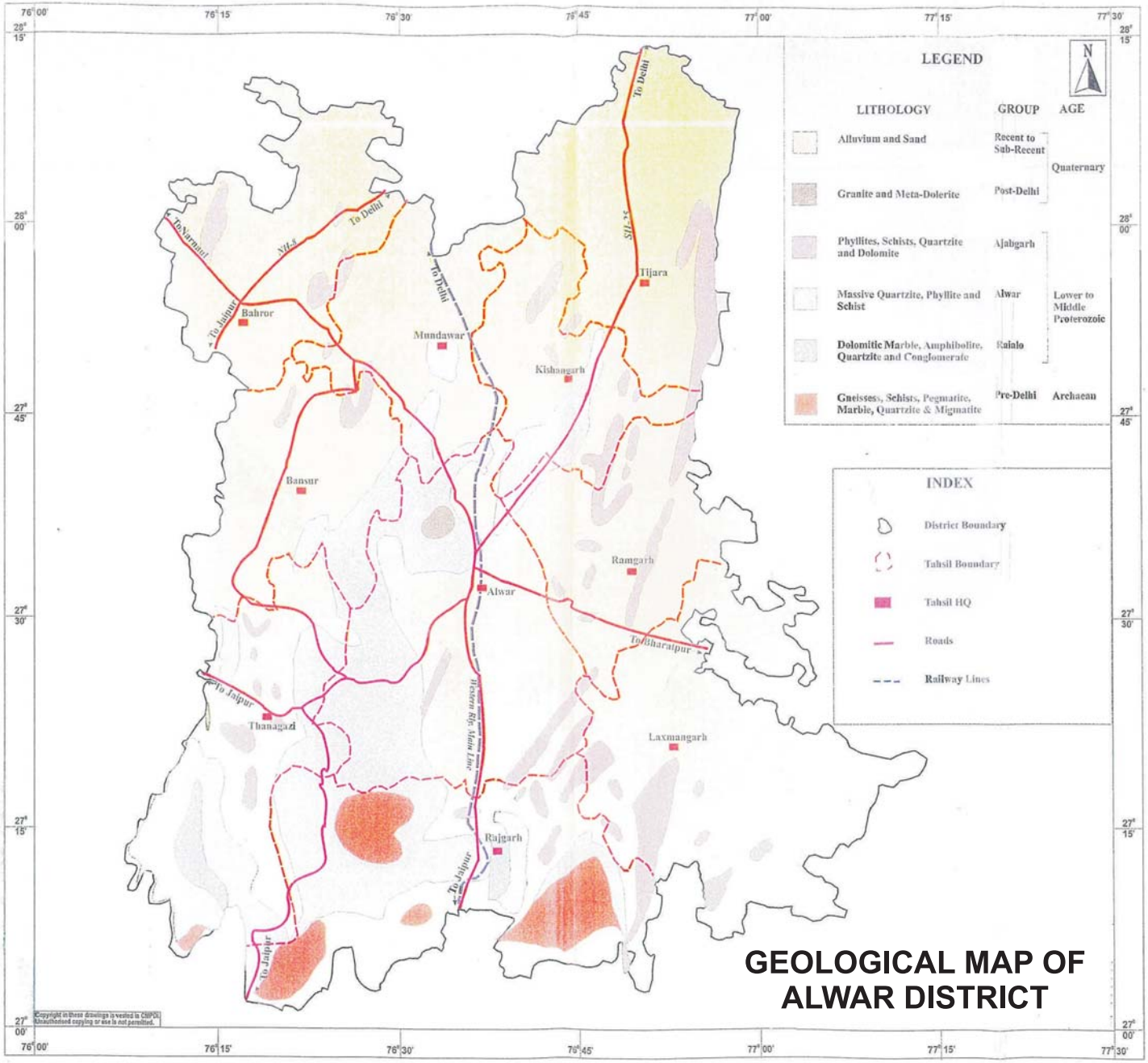
Upper Protozoic	Post Delhi	Intrusives
		Arauli formation
	Ajabgarh group	Bhadkol formation Thana Ghazi formation Sariska Formation Kushalgarh formation
Middle Protozoic Super group	Alwar Group	Pratapgarh formation Kankvadi formation Rajgarh formation
	Local Unconformity	
	Railo Group	Tehla formation Dogeta formation
	Unconformity	
Lower Protozoic	Delhi East	Pre-Aravali formation to Archian

In the northern part, the Alwar Group passes conformably into the Ajabgarh Group, with the gradual change from dominantly arenaceous facies to argillaceous facies. The post-Delhi intrusives include sills and dykes of amphibolite, plutons of granite of variable dimensions and pegmatite. NNE-SSW trending large-scale folds and faults affect the rocks of the Delhi super-group.

Rock formations belonging to Delhi super group exists right from south of Delhi, through Ajmer to the north-east of state of Gujrat in the form of Aravali Hill chain. In this region, the rock formations of Delhi Super group can be divided into the following three categories:


54
51
48
45
42
Kotkasim
Tijara
Bahrod
Mundawar
Kishangarh
Basur
Bansgarh
Alwar
Thanagazi
Laxmangarh
Rajgarh
Kathumar
Legend
Industrial Area
Proposed Industrial Area
Tehsils
Noise Stations
DAY NOISE Contours (Maximum)


Kotkasim
Tijara
Bahrod
Mundawar
Kishangarh
Basur
Ramgarh
Alwar
Thanaghazi
Laxmangarh
Rajgarh
Kathumar
Legend
Industrial Area
Proposed Industrial Area
Tehsils
Noise Stations
NIGHT NOISE Contours (Maximum)


LEGEND
LITHOLOGY
GROUP
AGE
Alluvium and Sand
Recent to Sub-Recent
Quaternary
Granite and Meta-Dolerite
Post-Delhi
Phyllites, Schists, Quartzite and Dolomite
Ajabgarh
Massive Quartzite, Phyllite and Schist
Alwar
Lower to Middle Proterozoic
Dolomitic Marble, Amphibolite, Quartzite and Conglomerate
Raialo
Gneisses, Schists, Pegmatite, Marble, Quartzite & Migmatite
Pre-Delhi
Archaean
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District Boundary
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Tahsil HQ
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Kishangarh
Tijara
SH-15
Bansur
Ramgarh
Alwar
To Bharatpur
To Jaipur
Thanagazi
Western Rly. Main Line
Laxmangarh
Rajgarh
To Jaipur
To Jaipur
GEOLOGICAL MAP OF ALWAR DISTRICT
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- Railo group
- Alwar group
- Ajabgarh group

The rocks of pre-Delhi group occur in the form of quartzite, schist and impure marble near Rajgarh, Ratanpura, Surer and Kaled while granite occurs near Golana, Reni and Mundia. The metamorphic rocks of Delhi Super Group were deformed many a time and consequently given rise to different structures. Due to various temperature and pressure levels, under green schist facaes, formation of various metamorphic minerals and rocks occurred. The geological map of the district is shown in Plate-3.6.

3.4.2 Minerals

A variety of minerals both metallic and non-metallic are found in Alwar district. The metallic minerals include copper, iron and manganese while non-metallic minerals include barytes, silica sand, quartz, yellow ochre, pyrophylite, soapstone, limestone, granite and marble etc.

Details of minerals deposits, both major and minor as per Minerals Manual, in the district are as below:

Major Minerals

Copper: The abundance of copper deposits has been demarcated at different locations in the district. Among them, Kho Dariba, Pratapgarh and Bhagoni are the areas having major copper deposits. In Kho Dariba, there is 56, 00,000 tonnes of deposits having copper content of 2.46%. In Bhagoni, the deposits occur to the tune of 5,20,00,000 tonnes having copper content of 1.07%. In Pratapgarh, the deposits are having copper concentration of 0.50%.

Iron: Low-grade iron ore deposits have been reported from nearby areas of Purana Rajgarh, Khanpur, Bileta, Bhangarh, Bamanwas, Kusalgarh etc.

Barytes: The Baryte is massive and light pink in colour. Other prominent deposits are located near Bhakheda, Jharoli, Pehal, Reni, Dera, Sainpuri, Ravan Dehra, Umren, Zahir ka Khera, Madhogarh, Ferompur, Gorah, Gujari and Bhagat ka bas etc. This mineral is used in dyeing industry and oil wells.

Soapstone and Pyrophyllite: Significance occurrence of soapstone and pyrophyllite are located near villages Sirawas, Ragoda (tehsil-Alwar), Bagor (Tehsil- Tijara), Dhani Gujaran, Bavadi Bamanvas, Nangal, Bhatpura, Samore, Natala (tehsil- Thanagazi), Nangal, Chandel (Tehsil-Rajgarh), Khora Karwali, Berla (Tehsil-Laxmanagarh). The soapstone of these areas is of DDT grade.

Limestone: Limestone of slate colour occurs in abundance in the district and is being mined since a long time. Limestone bands are located near villages Malana, Rajgarh Berli, Asan, Ramroli, Pai ka Gwada, Andwadi, Fatehpura, Kuncha, Dhaulan, Palwa etc. Near Malana, limestone is exposed for a strike length of about 2.20 kms with average width of 90 metres. A total of 22 million tones of cement grade limestone reserves have been estimated in this area. In

Berli area, limestone band is exposed for a length of 1.20 kms and width about 100 metres.

Felspar & Quartz: Vein quartz and zoned pegmatite having felspar are located near villages Adhira, Hamirpur (Tehsil-Bansur), Ragoda (Tehsil-Alwar), Tatarpur (Tehsil- Mandawar), Thatra (Tehsil- Rajgarh) Kho Ratakhurd, Raipur, Bedhin, Badkan, Kali Pahari (Tehsil-Thanagazhi) etc. The white and smoke colour quartz which is semi-transparent and used for glass making industries, is also found here.

Silica sand: Silica sand has been located near Narayani area. It is white in colour and fine grained. Reserves of 64640 tonnes with 98% silica have been estimated in this area. Silica sand is also found as gritty quartzite near Ghyaspur extending from Narayanpur to Bilia for about 1 kilometre length. Silica sand is also located in Nathusar area where investigations have been done by the State Department. The silica sand of Ghatra area was washed in the ceramic laboratory of the department. It was found that by washing, it can be improved from 91.9% silica to 98.36%. Iron could be reduced from 0.48% to 0.32% with sand recovery of 63%. The estimated reserves in this area are about 1.2 million tones. Small lenses of silica sand are also located near Sahroli and Chapra areas.

Red & Yellow Ochre: Red & Yellow Ochre has been reported near village Bidaska (tehsil- Laxamangarh), Neemla Guwara (Tehsil Thanagazhi), Nalpir (Tehsil-Behror). Both red and yellow ochre are suitable for paint and pigment industries.

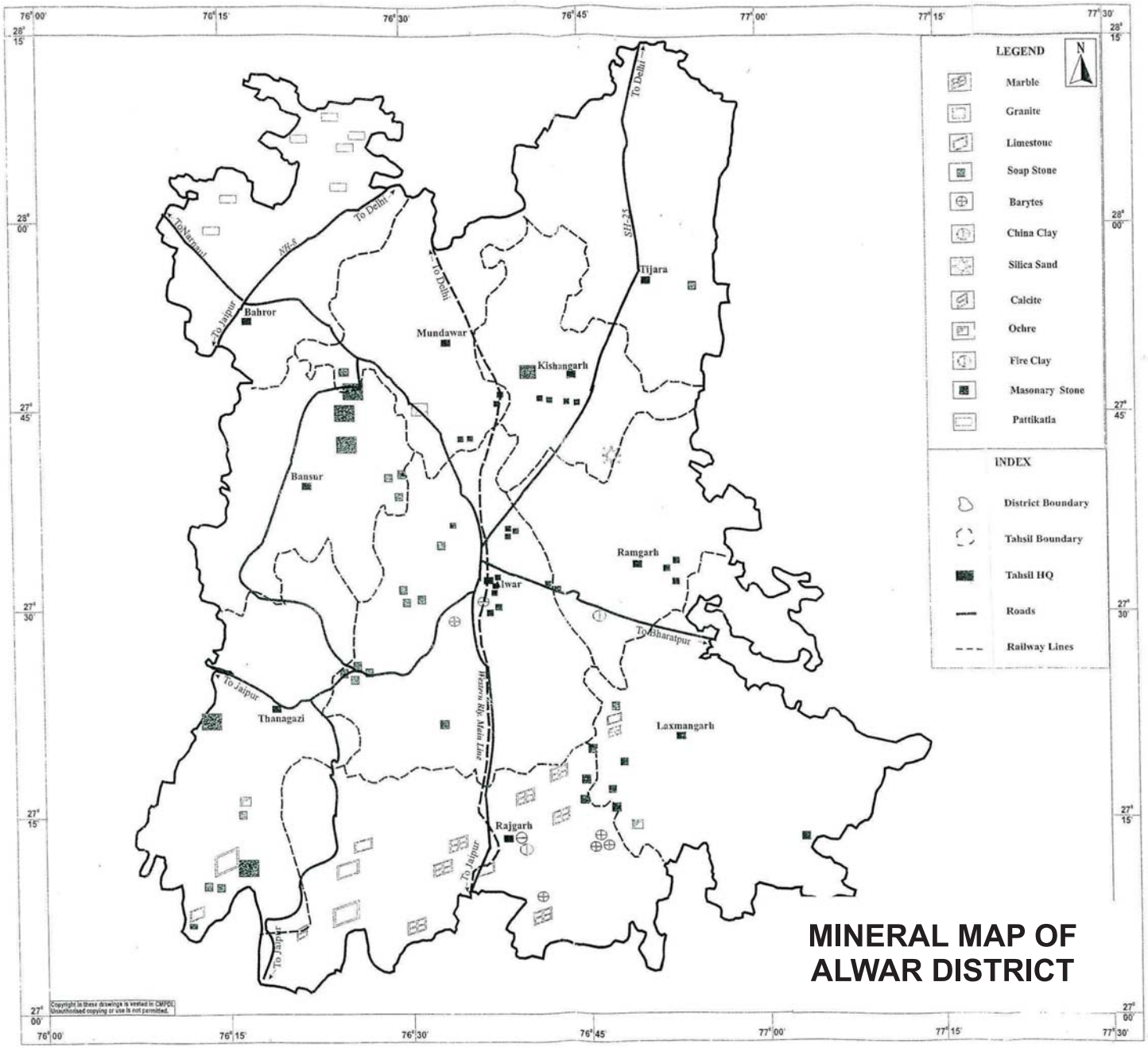
Minor Minerals

Slate: Slate deposits are located near village Tesing, Nibhor, Bassi, Mestabas etc. These are thinly cleavable with buff to dark grey colour. Alwar district is sole producer of slate in the state. Slates are being used as building stones and have now developed good market of slate tiles, mainly used for paneling.

Graphite: Minor occurrence of graphite has been located near villages Jadoli and Tagoda. Being low in carbon content, these deposits are economically viable.
Granite: Granite occurrences have been reported from different localities in the district *viz.* Harsora, Devson, Maluwas in tehsil Bansur, Khairthal (tehsil-Kishangarh Bas) and near Dhuninath temple in tehsil Thanagazhi. Granite is coarse to medium grained having various shades of grey to pink. State department has established reserves of 28 million cubic metre in this area.

Masonry Stone: The masonry stone, in the form of quartzite rocks, is found in the district in abundance. Grit is also being produced from this masonry stone.

Marbal/Dolomite: Good quality marble is available in small areas in Alwar district around villages Dadikar, Kaled, Nalgaon and Kushalgarh. Other known occurrences are near Malana, Govardhanpura etc. In Palpur-Kho area dolomite is exposed in an area of about 3 kilometers length and 2 kms width. In this belt, three probable zones of S.M.S. grade dolomite were delineated. The tentative reserves are about 200 million tones. In tehsil Rajgarh, the approximate



reserve of marble is around 3500 million tonnes (in villages Gordhanpura, Mallana, Kho-Palpur, Tilwar, Tilwari, Kalwad, Dundpuri, Berli, Toda Jaisinghpura & Baldeogarh) whereas in tehsil Thana Ghazi (in villages Kalsi Kala Guwada, Jhiri, Jagannathpura, Samra etc.) it is around 125 million tonnes. At present it is being quarried as marble.

Besides above, other minor minerals like bajri, chert, brick earth and shale also occur and are being mined in the district. The mineral map of the district is shown in Plate-3.7.

Mineral Based Industries

RIICO has developed industrial areas in Alwar, Behrod, Neemrana, Shahjahanpur, Bhiwadi and Rajgarh. In all these industrial zones, the mineral based industrial units are in prominence. The number of these units is upto 2000 and there is potential for setting up of various industries. Major mineral based industries are:

- Marble & granite cutting & polishing units
- Gang saw units
- Mineral grinding units
- Units manufacturing chips
- Slate stone cutting units
- Lime kilns
- Brick kilns
- Potteries
- Ceramic tiles
- Barium Chemicals
- Mini cement plant
- Grit crusher
- Spark plug
- Sanitary ware
- LT & HT insulators

As per the information gathered from Zila Khanij Udyog Sangh, Alwar, the State government received about Rs 15 crores in the form of royalty, sales tax, excise, road tax from the mining enterprises. Around 7500 labourers are employed in the mining industry and about 1500 in the transport business. In the mining sector, there is an investment of about Rs 50 crores whereas in the transport sector, it is around Rs 26 crores. In the mineral based industrial sector, there is an investment of around Rs 160 crores. The employment of manpower is around 12,000. The inventory of operating mines has been provided in Annexure-II. The summary of the operating mines in the district is as under:

Table-3.13: Summary of the Operating Mines in the District

Sl No.	Mineral	No. of Mines
1	Major Minerals	14
2	Marble	174
3	Lime Stone	02

Sl No.	Mineral	No. of Mines
4	Granite	01
5	Chirt	04
6	Patti Katla	05
7	Masonary Stone	67

The list of the existing and the proposed mining blocks in the district is shown in Table-3.14 and Table-3.15 respectively.

Table-3.14: List of Existing Major Mining Blocks in the District

Sl No.	Mining Block	Tehsil	Mineral
1	Gordhanpura	Rajgarh	Marble
2	Mallana	Rajgarh	Marble
3	Tilwar	Rajgarh	Marble
4	Khoh-Palpur	Rajgarh	Marble
5	Baldeogarh	Rajgarh	Marble
6	Nangal Chandel	Rajgarh	Quartz, Soapstone
7	Natata	Thana Ghazi	Marble
8	Samra & Dhani Neejra	Thana Ghazi	Soapstone
9	Jagganathpura	Thana Ghazi	Marble
10	Jhiri	Thana Ghazi	Marble
11	Neemwala Guada	Thana Ghazi	Marble
12	Narainpur	Thana Ghazi	Masonary Stone
13	Kothal	Bansur	Masonary Stone
14	Mukandpura	Bansur	Masonary Stone
15	Harsora	Bansur	Granite
16	Hameerpur	Bansur	Masonary Stone
17	Tatarpur	Mundawar	Quartz, Felspar
18	Ulahera	Mundawar	Patti Katla
19	Sagar Jadid	Mundawar	Patti Katla
20	Sheopur	Mundawar	Masonary Stone, Patti Katla
21	Idgah	Kishangarh Bas	Masonary Stone
22	Husepur	Kishangarh Bas	Masonary Stone
23	Tarwala	Kishangarh Bas	Granite
24	Chaupanki	Tijara	Masonary Stone
25	Neemli	Tijara	Masonary Stone
26	Khohra Karmali	Ramgarh	Soapstone, Silica sand
27	Neemli	Tijara	Masonary Stone
28	Seerawas	Alwar	Soapstone, Silica sand
29	Tehadpur	Alwar	Masonary Stone
30	Ulaheri	Alwar	Masonary Stone
31	Dhobi Ghatta	Alwar	Masonary Stone
32	Bhoogor	Alwar	Masonary Stone
33	Umrain	Alwar	Masonary Stone
34	Sahodi	Alwar	Masonary Stone
35	Golata	Ramgarh	Masonary Stone
36	Baghodi	Ramgarh	Masonary Stone
37	Sainthali	Ramgarh	Masonary Stone
38	Berla	Laxmangarh	Masonary Stone
39	Bilandi	Alwar	Masonary Stone
40	Khohra	Laxmangarh	Masonary Stone
41	Doroli	Rajgarh	Masonary Stone
42	Baswa Gate	Rajgarh	Silica sand

Sl No.	Mining Block	Tehsil	Mineral
43	Nangal Dharma	Rajgarh	Soap stone
44	Khundroth	Behror	Slate stone
45	Giloth	Behror	Slate Stone
46	Mandhan	Behror	Slate stone
47	Jhakhrana	Behror	Slate stone
48	Bhaisar	Behror	Slate stone
49	Rewana	Behror	Cheja Pathar

Table-3.15: Proposed Mining Blocks in the District

Sl No.	Mining Block	Tehsil	Mineral
1	Mayapur	Tijara	Masonary Stone
2	Khohri	Tijara	Masonary Stone
3	Hasanpur Mafi	Tijara	Masonary Stone
4	Neemli Baghor	Tijara	Masonary Stone
5	Khohra Thakran – Magha Ka Majra	Kot Kasim	Masonary Stone
6	Bhalesar	Tijara	Masonary Stone
7	Chatarpur-Kultajpur	Kishangarh Bas	Masonary Stone
8	Thekda	Alwar	Masonary Stone
9	Nangliya Mahond	Kishangarh Bas	Mas. Stone, Quartz, Silica Sand
10	Sheopur-Rainagar	Mundawar	Masonary Stone
11	Sanoli-Bhungara	Mundawar	Masonary Stone
12	Ranoth-Raipur	Mundawar	Masonary Stone
13	Harsora	Bansur	Granite
14	Narol-Chula	Bansur	Granite
15	Kothal	Bansur	Masonary Stone
16	Hameerpur	Bansur	Masonary Stone
17	Mundli	Bansur	Masonary Stone
18	Ratanpura	Bansur	Masonary Stone
19	Indrada	Bansur	Mas. Stone, Silica sand
20	Kithur-Mahrampur	Alwar	Masonary Stone
21	Umrain	Alwar	Masonary Stone
22	Sahodi	Alwar	Masonary Stone
23	Jatiyana	Alwar	Masonary Stone
24	Bilandi	Alwar	Masonary Stone
25	Satana	Alwar	Masonary Stone
26	Ghagholi	Alwar	Masonary Stone
27	Goleta	Ramgarh	Masonary Stone
28	Neekach-Nakhnol	Ramgarh	Masonary Stone
29	Kota Kala	Ramgarh	Masonary Stone
30	Khor Nangali	Ramgarh	Masonary Stone
31	Hazipur-Navgaon	Ramgarh	Masonary Stone
32	Odela-Manki	Ramgarh	Masonary Stone
33	Rasoolpur-Bandholi	Ramgarh	Masonary Stone
34	Narainpur	Thana Ghazi	Masonary Stone
35	Jetpur Goojran	Thana Ghazi	Masonary Stone
36	Mallana Gordhanpura	Rajgarh	Marble
37	Tilwar	Rajgarh	Marble
38	Nangal Chandel	Rajgarh	Soapstone, Quartz
39	Jhiri Jagannathpura	Thana Ghazi	Marble
40	Khera Mangalsingh	Laxmangarh	Masonary Stone

The location of the existing mining blocks and the proposed mining blocks is shown in Plate-3.8 and Plate-3.9.

Existing Environmnetal Status in Mining Areas

There exists good resource of mineral in the district; as such a number of mining operations are being carried out at different locations. Most prominent among them are barytes, silica sand, soapstone, masonary stone, dolomite and marble. The marble mines are generally confined to the southern part of the district in Rajgarh and Thana Ghazi Tehsils. There are only a few major mineral mines having lease of more than 5 ha of land. Majority of mines are operating to extract minor minerals and they are having lease area of around 1.0 ha. Ministry of Environmnet & Forests (MoEF), Government of India, while granting envionmental clearance to the mining project stipulates certin conditions which interalia include:

- Scientifically reclaimation/rehabilitation of the mined out areas. Maintenance of plantation to be carried out till the crown of tree is achieved above the grazing level.
- Excavation of the hillocks not to go beyond the ground level.
- Obtain consent to operate from the State Pollution Control Board
- Stack separately the topsoil and use it for vegetation of reclaimed areas.
- Proper OB Dump reclamation
- Monitor ambient air quality
- Controlled light charge blasting
- Control of noise level
- Garland drains to arrest siltation and prevent run-off into mines.

Apart from the above, the operations of mines are covered under the provisions of:

- The Marble Development & Conservation Rules, 2002 in respect of the marble mines
- The Granite Conservation and Development Rules, 1999 for the granite mines, and
- Other applicable mining regulations in case of minerals other than marble and granite.

The above rules, *interalia*, make provision for the scientific mining of the minerals. The State Department of Mining & Geology has made provisions for submission of eco-friendly mining plans. The following measures, in general, have been observed to be taken by the mine operators:

- Plantation in and around the mining areas
- The mine owners have installed signboards giving details of the mine lease, production capacity, validity of lease etc.
- At some places, construction and operation of effluent treatment plant to treat the mine water
- Provision of tree gaurds at places to protect the plantation
- Water sprinkling on haul roads for dust suppression

Legend

Tehsils

Existing Major Mining Blocks


KHOHRI
BHALESAR
SANOLI-BHUNGARA
KHOHRA THAKRAN-MAGHA KAMAJRA
Bahrod
Kotkasim
Tijara
HASANPUR MAFI
Mundawar
SHEOPUR RAINAGAR
NANGLIYA MAHOND
NEEMLI BAGHOR
CHATARPUR-KULTAJPUR
RANOTH-RAIPUR
Kishangarh
KOTHAL
HARSORA
NAROLI-CHULA
Basur
HAMEERPUR
NEEKACH-NAKHNOL
MUNDLI
KITHUR-MAHRAMPUR KOTAKALA
RATANPURA
THEKDA
KHOR NANGLI
INDRADA
RASOOLPUR-BANDHOLI
JATIYANA
Ramgarh
ODELA-MANKI
GHATOLI
GOLETA
NARAYANPUR
Alwar
UMRAIN
Thanaghazi
SAHODI
BILANDI
Laxmangarh
SATANA
JHIRI JAGANNATHPURA
JEETPUR GOOJRAN
Rajgarh
KHERA MANGAL SINGH
Kathumar
TIDWAD
MALLANA GORDHANPURA
NANGAL CHANDEL
Legend
Tehsils
Proposed Mining Blocks

3.5 Forest Resources

The total forest area of Alwar region is 90302.88 Ha excluding the Sariska Sanctuary. This includes the following:

• Reserve forest area	-	40108.62 Ha
• Protected forest area	-	36068.96 Ha
• Unclassified forest area	-	14125.30 Ha
Total	-	90302.88 Ha

The above is spread in Alwar, Thana Ghazi, Rajgarh, Behrod, Bansur, Kishangarh Bas and Lakchhmangarh Ranges. In the Sariska Tiger Project, the classification of forestland is as under:

a. Sariska Wildlife Sanctuary

• Reserve forest area	-	39705.00 Ha
• Protected forest area	-	9494.54 Ha
Total	-	49,199.54 Ha or 492 sq.kms.

b. Forest Blocks other than Sariska Wildlife Sanctuary

• Reserve forest area	-	20,792.52 Ha
• Protected forest area	-	18119.18 Ha
Total	-	3811.70 Ha or 389 sq.kms.
Total area of STR	**-**	**881 sq. kms.**

A total of 257 forest blocks exist in the district, the details of which are presented in Table-3.16. The map showing the forest blocks is as per the Plate No. 3.10.

In the district, the demarcation of the boundaries of the forest area is not in good shape. As such, there are encroachments on the forestland at some locations. Since the identification of such land is difficult due to poor record of the boundaries of the forest land, timely legal action against such encroachers sufferes.

For the forest management, the rights and concessions are granted in every forest division, which are duly notified in Gazette of Rajasthan Government. A copy of this notification is kept in the office of District Collector and Forest Ranges. The majority of such concessions include grass, fallen dried woods, and manual disposal of such materials, cattle grazing at free of cost or on nominal fee.

The existing protected area network (PAN) in Sariska Tiger Reserve is widely scattered and have become ecological island with severly depleted corridors as reported by the Forest Department of Government of Rajasthan. It is reported that there is serious threat to wildlife population due to islanding of the PAN areas. As a result, genetic variability is taking place for want of linking corridors with PAN areas. The small sized population and simple structure tend to be

more susceptible to the loss than large geographically dispersed and sub-divided population. It has been felt to increase the number of protected areas depending upon the genetic variation and bio-geograhic distribution of species and ecosystems and linking them with broad stable and balanced considers so that the physical and ecological boundaries of fauna coincide. For this purpose, the following two actions have been proposed by the STR authorities:

- *Development of corridor*: Development of corridor upto Jamva-Ramgarh sanctuary in Jaipur West Division. For this purpose, an area of 450 sq. kms. has been identified for inclusion.
- *Extension of boundaries of Sariska Wildlife Sanctuary*: For this purpose, an area of 234 sq. kms has been identified for inclusion in the sanctuary.

3.5.1 Flora in the Region

Most of the forests in this region fall under the "II-Dry Tropical Forests" as per Champion and Seth's revised classification of forest types. The following groups and sub-types along with their subsidiary *edaphic* and *seral* types are recognised in the *working plan*:

Group - 5 : Tropical Dry Decidous Forests

- **Sub-Group-5 B : Northern tropical dry deciduous forests**
- **C 2 : Northern dry mixed deciduous forest**
- **Degradation stages of tropical dry deciduous forests:**
  - DS 1 : Dry deciduous scrub
  - DS 3 : Euphoria scrub
  - DS 4 : Dry grass lands
- **General edaphic types of dry deciduous forests:**
  - E1 : *Anogeissus pendula* forest
  - DS1 : *Anogeissus pendula* scrub.
  - E2 : Boswellia forest.
  - E5 : Butea Forest
  - E9 : Dry bamboo brakes.
- **General seral types of dry deciduous forests:**
  - 1SI : Dry tropical riverain forest
  - 2S1 : Secondary dry deciduous forest

GROUP – 6 : Tropical Thorn Forests

- **Sub-group 6-B : Northern tropical thorn forests**
  - Desert theorn forests
  - DS1. Zizyphus scrub
- **General edaphic, degraded and seral types of thorn**
  - E1. (*Euphorbia* scrub)
  - E2. (*Acacia* senegal forests
  - E4. *Salvadora* scrub
  - 1SI. Desert dune scrub

PLATE NO. 3.10

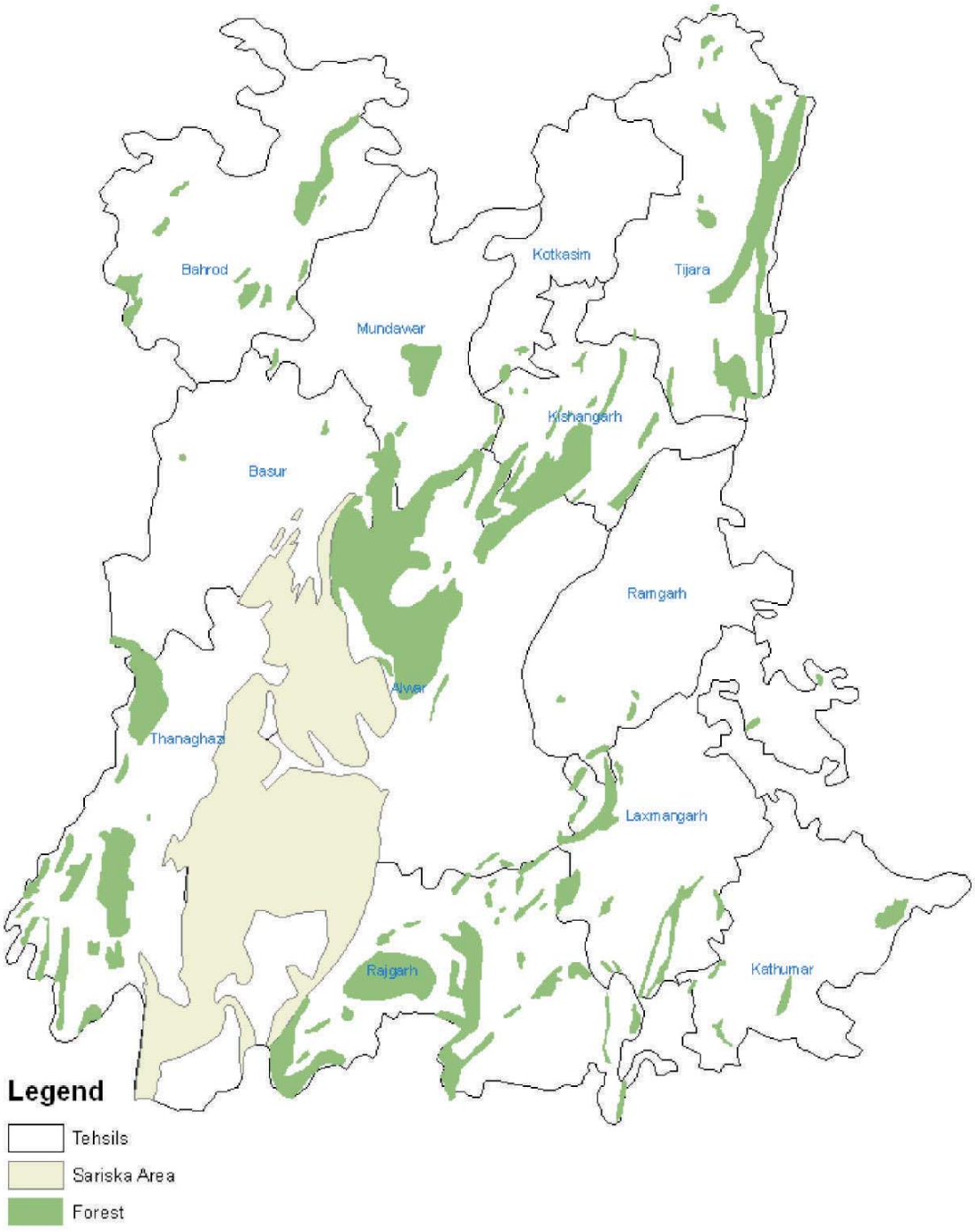

Bahrod
Kotkasim
Tijara
Mundawar
Kishangarh
Basur
Ramgarh
Alwar
Thanagaza
Laxmangarh
Rajgarh
Kathumar
Legend
Tehsils
Sariska Area
Forest

Table-3.16: Forest Blocks in Alwar District

Sl No.	Range	Forest Block	Area (Ha)	Sl No.	Range	Forest Block	Area (Ha)
1	Alwar	Shahpur RF	5951.66	27	Lachhamangarh	Thumrela RF	12.65
2	Alwar	Hazipur RF	854.14	28	Lachhmangarh	Khuntetakalan PF	89.03
3	Alwar	Nidani RF	1570.43	29	Kishangarh Bas	Jajor RF	1717.89
4	Alwar	Bhakheda RF	2885.74	30	Kishangarh Bas	Ismailpur RF	2883.16
5	Alwar	Bhugor RF	76.64	31	Kishangarh Bas	Tijara RF	588.31
6	Alwar	Dadikar RF	2808.73	32	Kishangarh Bas	Indore RF	2290.01
7	Alwar	Seerabas RF	2555.59	33	Kishangarh Bas	Gol RF	368.52
8	Alwar	Saidabas RF	3726.90	34	Behrod	Bardod RF	542.03
9	Thana Ghazi	Pratapgarh-cum-Lodhabas RF	112.55	35	Alwar	Chandoli PF	184.51
10	Thana Ghazi	Pratapgarh-cum-Hamirpur RF	176.54	36	Alwar	Ballaboda PF	31.55
11	Thana Ghazi	Rundh Lodhabas RF	60.70	37	Alwar	Dholidoob PF	41.48
12	Thana Ghazi	Rundh Agar RF	257.23	38	Alwar	Jatiana PF	103.79
13	Thana Ghazi	Rundh Jhiri RF	518.00	39	Alwar	Baladahra PF	73.15
14	Thana Ghazi	Suratgarh RF	194.25	40	Alwar	Umrain PF	537.21
15	Thana Ghazi	Hamirpur RF	273.92	41	Alwar	Barh Kesharpur P	41.00
16	Thana Ghazi	Lalpura RF	114.32	42	Alwar	Hazipur Dadikar P	545.97
17	Thana Ghazi	Pachpadi RF	37.18	43	Alwar	Todiar PF	249.29
18	Thana Ghazi	Madhogarh RF	125.20	44	Alwar	Bhakheda PF	69.33
19	Thana Ghazi	Narayanpur RF	2330.99	45	Alwar	Hazipur Jagir P	321.69
20	Rajgarh	Daulatpura RF	3163.12	46	Thana Ghazi	Pratapgarh PF	168.94
21	Rajgarh	Bighota RF	3047.28	47	Thana Ghazi	Lalpura PF	133.12
22	Rajgarh	Machadi RF	505.86	48	Thana Ghazi	Kaled PF	403.93
23	Lachhamangarh	Maujpur RF	546.58	49	Thana Ghazi	Jagannathpura PF	199.37
24	Lachhamangarh	Saidaka RF	283.53	50	Thana Ghazi	Chandpura PF	144.25
25	Lachhamangarh	Maithana RF	338.42	51	Thana Ghazi	Bhanvata PF	137.42
26	Lachhmangarh	Ghat RF	78.66	52	Thana Ghazi	Kabligarh PF	129.33

.....Table-3.16 continued

Sl No.	Range	Forest Block	Area (Ha)	Sl No.	Range	Forest Block	Area (Ha)
53	Thana Ghazi	Bamanbas PF	127.80	79	Rajgarh	Madhogarh PF	110.44
54	Thana Ghazi	Bandrol PF	88.69	80	Rajgarh	Jeeravali PF	472.99
55	Thana Ghazi	Malutana PF	331.81	81	Rajgarh	Bahali PF	150.75
56	Thana Ghazi	Garh Basai PF	241.98	82	Rajgarh	Kundala PF	1079.37
57	Thana Ghazi	Heensala PF	25.29	83	Rajgarh	Rajpur Bada PF	737.60
58	Thana Ghazi	Pachpadi PF	48.71	84	Rajgarh	Bighota PF	798.87
59	Thana Ghazi	Aagar A & B PF	610.78	85	Rajgarh	Neemala PF	340.55
60	Thana Ghazi	Jhiri PF	456.73	86	Rajgarh	Prempura PF	31.36
61	Thana Ghazi	Bhuriabas PF	175.22	87	Rajgarh	Jhakada PF	524.84
62	Thana Ghazi	Narhet PF	178.82	88	Rajgarh	Thonsdi PF	51.34
63	Thana Ghazi	Aamka PF	202.61	89	Rajgarh	Daulatpura RF	714.55
64	Thana Ghazi	Bhadaj PF	370.96	90	Lachhamangarh	Chimravali PF	495.13
65	Rajgarh	Rajgarh PF	513.32	91	Lachhamangarh	Thumrela PF	178.77
66	Rajgarh	Nangal Dharmu PF	164.00	92	Lachhamangarh	Khutentakalan PF	68.48
67	Rajgarh	Jamdoli PF	372.63	93	Lachhamangarh	Badabas PF	222.20
68	Rajgarh	Bhuleri PF	162.25	94	Lachhamangarh	Maujpur PF	13.30
69	Rajgarh	Ishwana PF	270.30	95	Lachhamangarh	Kheda Mangalsingh PF	364.86
70	Rajgarh	Buchpuri PF	183.96	96	Lachhamangarh	Bhikhahedi Fehdavati PF	347.12
71	Rajgarh	Gonth PF	66.84	97	Lachhamangarh	Sainthali PF	105.95
72	Rajgarh	Bighota RF	1719.40	98	Kishangarh	Jajor PF	773.94
73	Rajgarh	Shrichandpura PF	71.31	99	Kishangarh	Gol PF	750.25
74	Rajgarh	Kundaroli PF	439.23	100	Kishangarh	Banban PF	50.62
75	Rajgarh	Surer PF	925.83	101	Kishangarh	Chaupanki PF	218.93
76	Rajgarh	Babeli PF	115.44	102	Kishangarh	Aadipur Shadipur PF	405.03
77	Rajgarh	Jamdoli PF	1186.59	103	Kishangarh	Elaka PF	17.49
78	Rajgarh	Rajgarh PF	182.87	104	Kishangarh	Milakpur Turk PF	538.76

.....Table-3.16 continued

Sl No.	Range	Forest Block	Area (Ha)	Sl No.	Range	Forest Block	Area (Ha)
105	Kishangarh	Lapala PF	152.62	131	Kishangarh Bas	Chamroda PF	198.98
106	Kishangarh	Gwalada PF	58.82	132	Kishangarh Bas	Chhatarpur PF	63.22
107	Kishangarh	Bhindosi PF	41.51	133	Kishangarh Bas	Mauncha PF	254.83
108	Kishangarh	Bhatkol PF	406.07	134	Kishangarh Bas	Khairthal PF	274.26
109	Kishangarh Bas	Khorikalan PF	214.97	135	Kishangarh Bas	Bambora PF	255.67
110	Kishangarh Bas	Chuhadpur PF	289.75	136	Kishangarh Bas	Raatakalan PF	674.00
111	Kishangarh Bas	Sarenkalan PF	211.75	137	Kishangarh Bas	Bhatkol PF	67.08
112	Kishangarh Bas	Jairoli PF	197.48	138	Kishangarh Bas	Bader Basai P	157.25
113	Kishangarh Bas	Neemali PF	565.94	139	Kishangarh Bas	Nangali Khalil P	329.72
114	Kishangarh Bas	Ghataal PF	92.46	140	Kishangarh Bas	Dohada PF	216.14
115	Kishangarh Bas	Khijarpur PF	78.42	141	Kishangarh Bas	Jatka PF	175.27
116	Kishangarh Bas	Pahad Shamlati PF	939.45	142	Behrod	Nalpur PF	48.82
117	Kishangarh Bas	Berala PF	70.78	143	Behrod	Bardod PF	110.84
118	Kishangarh Bas	Godhan PF	182.02	144	Behrod	Hamzapur PF	78.18
119	Kishangarh Bas	Jatiana PF	43.86	145	Behrod	Kolila PF	64.83
120	Kishangarh Bas	Girwas PF	86.81	146	Behrod	Tasing PF	88.52
121	Kishangarh Bas	Kishangarh PF	146.61	147	Behrod	Nibhor PF	109.06
122	Kishangarh Bas	Kolgaon PF	426.72	148	Behrod	Dumroli PF	55.25
123	Kishangarh Bas	Nibhor	28.57	149	Behrod	Gadhoj PF	136.48
124	Kishangarh Bas	Patanmeo PF	232.86	150	Behrod	Dhindhor PF	151.91
125	Kishangarh Bas	Ismailpur PF	1566.98	151	Behrod	Mohammadpur Nanglian PF	37.41
126	Kishangarh Bas	Chitghana PF	93.32	152	Bansur	Dhamala-ka-Bas RF	600.86
127	Kishangarh Bas	Khanpur PF	49.43	153	Bansur	Hamirpur RF	1227.84
128	Kishangarh Bas	Mothuka PF	91.36	154	Bansur	Bairoj PF	409.71
129	Kishangarh Bas	Ghasoli PF	479.69	155	Bansur	Dhamala-ka-Bas PF	88.06
130	Kishangarh Bas	Khudina PF	106.74	156	Bansur	Dhirpur PF	66.95

.....Table-3.16 continued

Sl No.	Range	Forest Block (Ha)	Area	Sl No.	Range	Forest Block	Area (Ha)
157	Bansur	Hamirpur PF	661.67	183	Rajgarh	Hirnoti UF	41.12
158	Bansur	Tatarpur PF	314.44	184	Rajgarh	Bairer UF	75.20
159	Kishangarh Bas	Chachaka PF	239.50	185	Rajgarh	Nangal Sohan UF	312.34
160	Alwar	Chandoli UF	603.74	186	Rajgarh	Tahtada UF	343.65
161	Alwar	Ghatla UF	300.67	187	Rajgarh	Dera UF	52.50
162	Alwar	Sainpuri UF	67.82	188	Rajgarh	Dagdaga UF	197.01
163	Alwar	Jhadoli UF	102.16	189	Rajgarh	Chhilodi UF	175.10
164	Alwar	Bhuradi UF	28.58	190	Rajgarh	Nayabas Haveli UF	42.22
165	Alwar	Tehadpur UF	196.20	191	Rajgarh	Doroli UF	149.22
166	Alwar	Shahpur UF	46.93	192	Rajgarh	Chandpura UF	76.45
167	Alwar	Dhonkadi UF	62.78	193	Rajgarh	Dhumada UF	72.80
168	Alwar	Baladehara UF	229.99	194	Lachhamangarh	Moongska	3.58
169	Alwar	Nandanhedi	205.17	195	Lachhamangarh	Khohra Malavali PF	392.66
170	Alwar	Nagala Sedu	40.57	196	Lachhamangarh	Kachava PF	150.93
171	Alwar	Naurangabad	167.63	197	Lachhamangarh	Jonakheda PF	278.42
172	Alwar	Thekada	37.17	198	Lachhamangarh	Sehra UF	100.05
173	Thana Ghazi	Angari PF	4.51	199	Lachhamangarh	Jhalatala UF	112.85
174	Rajgarh	Patan	109.72	200	Lachhamangarh	Bidarka UF	496.99
175	Rajgarh	Morodkalan UF	333.64	201	Lachhamangarh	Tilakpur UF	218.03
176	Rajgarh	Odpur UF	267.13	202	Lachhamangarh	Harsana UF	276.73
177	Rajgarh	Kothi Narainpur-A	5.02	203	Lachhamangarh	Lilitoda UF	416.80
178	Rajgarh	Kothi Narainpur-B	92.52	204	Lachhamangarh	Kirodikund UF	231.48
179	Rajgarh	Band Ramsagar UF	180.33	205	Lachhamangarh	Adoli UF	364.11
180	Rajgarh	Manuka UF	198.69	206	Lachhamangarh	Jatwada UF	135.96
181	Rajgarh	Binjari UF	406.38	207	Lachhamangarh	Jaitpur UF	35.82
182	Rajgarh	Pinan UF	33.80	208	Lachhamangarh	Bhanvar UF	183.64

.....Table-3.16 continued

Sl No.	Range	Forest Block	Area (Ha)	Sl No.	Range	Forest Block	Area (Ha)
209	Lachhamangarh	Badsu UF	43.66	235	Behrod	Khaparia UF	127.28
210	Lachhamangarh	Sonkhari UF	118.21	236	Bansur	Bhoori Doongari UF	8.36
211	Lachhamangarh	Sahedi UF	66.04	237	Bansur	Khanpur Mewan UF	40.96
212	Lachhamangarh	Pahadi PF	6.01	238	Bansur	Khareta UF	98.90
213	Lachhamangarh	Daudoli PF	13.33	239	Bansur	Nagal Sigalkar UF	8.85
214	Kishangarh	Ukahedi UF	51.24	240	Bansur	Bairoj UF	161.43
215	Kishangarh	Daungda UF	59.92	241	Bansur	Ajijpur Mewan UF	6.36
216	Kishangarh	Chauravata Lalpuri UF	14.17	242	Bansur	Sureta UF	243.04
217	Kishangarh	Kajakpur UF	65.35	243	Bansur	Badi UF	87.73
218	Kishangarh	Alapur UF	16.62	244	Bansur	Birtoli	46.94
219	Kishangarh	Narana UF	17.91	245	Bansur	Dunwas	15.42
220	Kishangarh	Basaikalan UF	6.00	246	Bansur	Budhin	15.58
221	Kishangarh	Tarbala UF	12.05	247	Bansur	Daatala	43.53
222	Kishangarh	Khedala UF	13.18	248	Bansur	Shahpur	11.18
223	Kishangarh	Takahedi UF	2.43	249	Bansur	Mundawar UF	642.75
224	Kishangarh	Ganj UF	4.38	250	Bansur	Rainagar UF	117.70
225	Kishangarh	Baskripal Nagar UF	4.64	251	Bansur	Mainpur UF	294.27
226	Kishangarh	Tahnoli UF	15.24	252	Bansur	Siakhoh UF	60.79
227	Kishangarh	Ramnagar UF	28.87	253	Bansur	Pehal UF	171.80
228	Kishangarh	Lisana UF	23.22	254	Bansur	Sabalgarh UF	233.20
229	Kishangarh	Raipur Mewan UF	16.44	255	Bansur	Jindoli UF	55.77
230	Behrod	Neemrana UF	757.00	256	Bansur	Sorakha Khurd UF	12.43
231	Behrod	Bhatol UF	203.00	257	Division	Nayabas	2.50
232	Behrod	Nagali Jagir U	7.75				
233	Behrod	Untoli UF	101.34				
234	Behrod	Banhad UF	50.89				

The forest in this area is classified into the following floristic series along with the degraded and derived ones:

(a) Series

(i) *Anogeissus pendula*
(ii) Degraded *Anegeissus pendula*
(iii) *Anogeissus intifolia*
(iv) *Boswellia serrata, Lannea coromandelion*, and
(v) Grass lands

(b) Facies

(i) *Euphorbia nivulia*
(ii) *Dendrocalamus strictus*
(iii) *Acacia leucophloea*
(iv) *Zizyphus numularia*.

These forests occur on a variety of rock and soil formations and thus they vary greatly in composition and quality; edaphic and biotic factors chiefly determine their composition, distribution and quality.

The main economically valuable species are *dhok (Anogeissues pendula*), *Salar (Boswellin serrata),* and *bamboo (Dendrocalamus strictus*). The most common and gregariously occurring species of these forests is *dhok (Anogeissus pendula*), which is generally found on all hilly areas and forms almost pure stands of uniform density on good sites. *Dhok* is generally slow growing, but trees upto one metre girth and upto 12 metres height are not uncommon in favourable localities. At places, where the species has been continuously hacked and grazed, it is found as scrambling bush. Over large areas, the *dhok* forests have been maltreated in the past, leaving them in degraded condition and in extreme cases, the areas have been rendered completely devoid of plants. This is basically due to ill management, irregular cutting for immediate gains by jagirdars and jamindars and also due to pressure of increasing population and livestock resulting in cutting and grazing.

Dhok is mostly gregarious but is also found mixed with khair *(Acacia catechu),* ber *(Zisyphus mauratians),* kakon *(Flacourtis indica),* raunj *(Acacia leucophloea),* tendu *(diospyros melanoxylon),* salar *(Boswellia serrata),* gurjan *(Lannea coromandelica),* safed dhok *(Anogeissus latifolia),* kadu *(Steroulia urons),* jhinja *(Bauhinja racemosa),* Kalan *(Mitragyna parvifolia).*

3.5.2 Injuries to the Forests

In the forests of Alwar district, the following injuries generally occur/possible as per the Working Plan:

- Injuries due to humans

- Forest crimes
- Forest fires
- Mismanagement

- Injuries due to animals
  - Domestic animals
  - Wild animals
  - Small rodents
  - Insects
- Injuries due to atmospheric agencies
  - Frost
  - Famine / drought
  - Air
  - Floods
- Injuries due to plant parasites
  - Bel and apiphytes
  - Fungus

Forest Crimes

The injuries caused by humans mainly include illegal cutting of forest produce, encroachment of forestland for agriculture purposes (this also includes complete destruction of forests), mining (both legal and illegal) including cutting of trees, destruction of top soil and the forest fires for better yield of good quality of grass etc. The other factors include cutting of shrubs, continuously topping of trees for the animals. Use of forest wood for agricultural equipment by villagers and buildings also induce villagers for cutting of trees. The practice of using wood for fuel and manual transportation of woods is being practiced since centuries. This is mainly practiced in Kishangarh Bas and Rajgarh Tehsils. At some places, the coal is being produced from the forest woods and transported outside illegally. Approximately 5400 matric tonnes of wood is estimated to be lost every year due to various aforesaid activities of humans. During the past years, there has been increase in such cases due to occurrence of famine/drought. Since the boundaries of forest blocks are not in proper shape, there has been increased encroachment on such lands. Due to inadequate availability of fodder in drought periods, there have been continous toppings of leaves, and branches of dhok, khejara, babul, peepal etc. Though it is extremely difficult to exactly estimate the destruction caused by such acts, the effects are known only after 5-10 years.

Forest Fires

This includes two types of forest fires *i.e.* incendiary and accidental. For extraction of gond, the fire is being induces in the trees by the locals. In addition, for regeretation of grass in the pastureland, the forest is being induced by *cattle grazers*- under these cases the fire in incendiary. The accidental fire includes those from contractors or other persons, due to smoking of bidi/cigarettes or stoves. Some times such fires occur due to sparks from the passing trains. In the Alwar division, forest fire is reported to occur on 4-6 locations on an average. This is ground fire which damages grass and bushes. This also damages new nurseries and bamboos. The lower portion of the stem of bigger trees gets damaged and trees become hollow.

Forest Mismanagement

The management of forests in the Alwar district remained in good position upto 1947 from the point of view of safety but lateron when the jamindari and jagirdari system were abolished, there was exploitation of dhok, khair and bamboos by jamindars and jagirdars which were under their jurisdiction and a little of the forest land was handed over to Government of Rajasthan. In 1955, after the enactment of Rajasthan Forest Act, the legal protection was provided to the forests but exploitation of forest resources continued through contractors upto 1968. This resulted in not only legal exploitation but also illegal cutting of trees. Lateron, under Forest Conservation Rules, the villagers were granted various forest concessions and rights. Though these included those concessions and rights, which were not applicable for the Alwar district, but the consequences of such rights fell upon these forests also. From 1969 onwards, regular exploitation of these forests continued through State Trading Circle. This also included the rich forests. Though it was initially thought of that exploited forest resources would regenerate but it did not happen. Though on one side these forests faced severe drought or inadequate rain, on the other side there was tremendous pressure of humans and livestock. Consequently, the natural regeneration of the forests could not take place and degradation occurred. The encroachment of forestland has also occurred due to mining activities in the area the main reason being poor demarcation of boundaries of the forest lands.

Domestic Animals

There are a large number of domestic animals in the district, which are mainly dependent on the forests. As such there is stress on the forests due to livestock. The carrying capacity of these forests is not even 1/10 of the grazing requirement. In addition, there is additional stress on the forests due to migratory livestock. As such, the natural regeneration and growth of plantation sufferes. Though the grazing is harmful to the forests, so is the browsing by goats and camels.

Wild Animals

Though there is adverse impact on the forests dur to Neel Gai, Sambher, Cheetal etc. but especially new plants, skin of the plantation *etc.* gets damaged in the reproductive areas. The monkeys also damage the parts of the plants, which come up due to seasonal growth.

Rodents

The main among this category are saheli and wild rats. Saheli consumes seeds and small plants including semal, khazur etc. The rats also affect seeds and soft plants. They affect new plantation areas.

Insects

The termites attack the roots of new plantation and also upto collar. Heartwood borer also affects the new plantation upto collar. There are also other insects, which affects the plantation.

Frost

The frost generally occurs in December-January in winter. Generally the ground frost also occurs here. But at some locations pool frost occurs which adversely affects the plantation. One such frost occurred in 1967, which affected the forests adversely. The occurrence of frost is more or less every year.

Drought

The summer during the month of April to June, has considerable effect on the plantation in the district. The drought gives rise to mortality of plants, reduced regeneration and delayed growth. For a distrit like Alwar, the drought is one of the major factors hindering the growth of forests.

Meteorology

During April to June in the summer season, the hot wind having considerable speed, blow in the district. The trees are uprooted and even the stems are broken sometimes. Due to increased transpiration, the physical stage of the plants deteriorates. The hot winds sometimes blow in the night as well which affects the humans and plants both. In the month of Septempber to January, strong winds blow, which uproot the trees having shallow roots. The nurseries and new plantations are adversely affected by these winds.

Flood and Inundation

The vegetation and trees, on the banks of rivers are uprooted due to loss of soil during floods. The trees, which survive the uprooting, get decomposed due to inundation. Though this does not occur on routine basis but it happens occasionally. The soil gets transported to other places, which adversely affects the vegetation.

Parasitic Plants

Banda which is partially parasitic attacks the branches of salar which consequently gets dried ups. The other parasitic plant like amarbel, which is completely parasitic, attack babul, churel, ber, khejari and even dhok and reduces their lifespan.

Climbers and Apiphytes

The climbers, which affect the plants, are guj, aamali, pilwana, moreda, gudmar etc. Their effect is generally seen near rivers, nallh etc. Apiphytes sometimes affect khajur, khejari etc.

Weeds

The weeds like aadhashishi and kaanti affect the regeneration of forests. Where there is shallow inundation of water, the water hyacinth play havoc on the forests.

Fungus

They destroy the heartwood of khair trees. Root rot of khair trees and drying of dhok forests have also been seen.

3.5.3 Dependence of Locals on Forest Produce

The dependence of local people on the forest produce is in terms of the following:

- *Fuel & Fodder*: Majority of village folk uses woods from forest for the purpose of fuel. In the district, there is considerable number of livestock, which mainly depends on the forests and pastures for fodder. As such, there is pressure on the forests. In the protected forests, permitted grazing by goats and camels have done tremendous harm to the forest produce. Due to drought and demand for fodder, certain varieities of the plants are diminishing rapidly.
- *Wood for building and agricultural equipment*: For construction of buildings and making of agriculture equipment, the wood is being made available to villagers at concessional rate. Mainly the wood of Dhok plants is made available but there is gap between demand and supply. To some extent, this gap is being bridged by neem, sheesham, babul etc.
- *Thorny shrubs for making baarh*: This is being used for the following purposes:
  - For the protection of crops
  - For making baarh for the domestic animals
  - Baarh for the buildings

  For the above, the thorny varieties of plants, shrubs etc. are being used.
- *Grass and pastures*
- *Minor forest produce*: This includes bamboos, tendu etc. Due to inadequate supply, the demand is being made from other states. The tendu leaves are being used for making huts and also for making bidis. Locals get employment for collection of tendu leaves.

3.5.4 List of Flora and Fauna in the District

The list of flora and fauna occurring in the district (as per the working plan) is presented in Table-3.17 and Table-3.18.

Table-3.17: List of flora in Alwar District

Sl No.	Local Name	Botanical Name	Sl No.	Local Name	Botanical Name
1	Aakash Neem	*Millingtonia hortesis*	26	Khair	*Salveora persicca*
2	Aal	*Morinda tinctorea*	27	Jad jamun	*Ujiniea aaperculeta*
3	Aam	*Menjifera indica*	28	Jamrasi	*Illiodendrone galokum*
4	Akol	*Alangium salvifolium*	29	Jungle jalebi	*Pitholobium dalasi*
5	Amaltas Bardian	*Cassia fistula*	30	Jhinjha	*Bohinea rasomossa*
6	Ajan	*Hardvikia byneta*	31	Jhau	*Tamarix dathoka*
7	Amla	*Amblica-a-kisinelis*	32	Jakarenda	*Jackrenda mymocepholia*
8	Ardu	*Ailanthus excelsa*	33	Jambolia	*Ehrissia leviss*
9	Areetha	*Savandees emergenetis*	34	Tinsa	*Aajinea ujinanciss*
10	Arand	*Recenus comunis*	35	Tun	*Tuna silieta*
11	Aasapala Ashok	*Polyalthea longefolia*	36	Doodhi	*Rhydea tictorea*
12	Imali	*Tamarindus indica*	37	Dhaman	*Grevea tellepholea*
13	Kachnar	*Bauhinia verigata*	38	Dhoban	*Dalburgiea penniculeta*
14	Kadam	*Anthocepelus kandaba*	39	Dhavada	*Anogiessis latifolia*
15	Kalam	*Mitragyana paravifolia*	40	Neem	*Azadirachta indica*
16	Kadwala	*Holarina entidaecentrica*	41	Naganithor	*Opunetia dilenah*
17	Karanj	*Pongomea pinnata*	42	Neebu	*Cytus medica*
18	Kaldhi dhauk	*Anogisis pendula*	43	Padar	*Stereriosperman sovelence*
19	Kakon	*Flakorshia indica*	44	Paakher	*Ficus lacor*
20	Kaint	*Ferronia limonia*	45	Paras Peepal	*Ficus rumford*
21	Kalsadaria	*Legarsatomia paraviflora*	46	Peepal	*Ficus religissa*
22	Kaljhadia	*Bridallia retusa*	47	Bakain	*Melia azederach*
23	Kapasia, Pula	*Keedia kelisina*	48	Babul	*Acasia nilotica*
24	Kadaya	*Sterkulia urens*	49	Bargad Barh	*Ficus bengalensis*
25	Kari, Umbia	*Milliussa tomentosa*	50	Beeja	*Terracorpus marsupium*

.....Table-3.17 continued

Sl No.	Local Name	Botanical Name	Sl No.	Local Name	Botanical Name
51	Barna	*Crateeva religiossa*	76	Palas, Khakra	*Monosperma*
52	Bel Boli	*Aegle marmelous*	77	Churel	*Holoptelia integriphelea*
53	Katumumber	*Ficus hisipeda*	78	Chanvai	*Centulum album*
54	Kair	*Keparis deseia*	79	Chamkarar	*Gardinea tarzida*
55	Kakaida	*Maitenus imargenati*	80	Chhidwa	*Albejia andoretisima*
56	Kamini Kunti	*Muraya paniculeta*	81	Jamun	*Cyzizium cumini*
57	Kasod	*Cassia syamea*	82	Jal, Pilu	*Celvedora olioedes*
58	Kumtha	*Acasia senegal*	83	Shisham	*Barjia sissu*
59	Kusum	*Shlaychera oliesa*	84	Babul	*Presopris juliflora*
60	Khar	*Acasia catachu*	85	Safeda	*Ucalyptus*
61	Khajur	*Phonix celivistrous*	86	Haldu	*Badayna cardifolia*
62	Khejadi, Raunjh	*Acasia leucophloea*	87	Hingor	*Valenitis vaziptica*
63	Khejada	*Grosopil cenararea*			
64	Riberni, Doodhi	*Ritea tomentosa*			
65	Riberna, Doodhi	*Ritea ticorea*			
66	Guler	*Ficus glomereta*			
67	Gul Mohar	*Delonux rizhea*			
68	Goya Khair	*Dycrostaics senaria*			
69	Gunda, Lasoda	*Cardia dycotoma*			
70	Gadha Palas	*Arithrina indica*			
71	Gugal	*Komifora mukul*			
72	Gurjan	*Lania coromendalia*			
73	Girnar, Jajna	*Choclospermum gasipium*			
74	Ghatbor	*Zizyphus zylopyra*			
75	Chhola, Dhak	*Beutea movasperma*			

.....Table-3.17 continued

- **Small Trees**

Sl No.	Local Name	Botanical Name	Sl No.	Local Name	Botanical Name
1	Basa Shishi	*Zanthium strumerium*	26	Sandeisara	*Delonics leitta*
2	Aakda	*Kelotropis prosera*	27	Saimal	*Bombecs sieba*
3	Aakada (Safed)	*Kelotropis zyzentia*	28	Shahtoot	*Mores alba*
4	Baghijhada	*Akirenthus esperra*	29	Siris (safed), Gurad	*Albijea procera*
5	Aanwala	*Cassia variculleta*	30	Siris (kala)	*Albijea laibak*
6	Arnea	*Chlerodentron viscosame*	31	Menhadi	*Labsonea lermis*
7	Adusa	*Ada toda*	32	Morali	*Lisius europium*
8	Kalisthali	*Grivea flavasence*	33	Neel	*Indigofera tictoria*
9	Kailasparea	*Sacusenega leukopyrus*	34	Negurh	*Vytext nygando*
10	Kailwarea Jal	*Kaperis spynossa*	35	Panwaria	*Cresia tora*
11	Kanter	*Kaperis seperia*	36	Peeli Kanteli	*Barleria priopetus*
12	Kateel	*Kaperis desidya*	37	Pautharia	*Abutilone remosum*
13	Karonda	*Karea spinerum*	38	Bainkal	*Zimnosporia spasnosa*
14	Khini	*Periploka aphyla*	39	Banwarharh	*Faleminzia semialata*
15	Khimpara	*Leptadenea pyrodeknika*	40	Bankapas	*Thespesia lampas*
16	Bistendu	*Diospyrus cardifolia*	41	Boli	*Accassia jacmonsa*
17	Burwan	*Parkinsonea aculeata*	42	Bapni	*Ocimum americanum*
18	Pendula	*Dolikendron felcata*	43	Basuni	*Taforosia hukriana*
19	Porwa	*Sakerbera sweeteneodil*	44	Baiker	*Indigofera cardifolia*
20	Rain (Riberna)	*Mahmuposus hacsendra*	45	Bakera	*Indigofera lonifolia*
21	Rohan	*Soyamida fabrifuga*	46	Bui	
22	Rohni, Roli	*Melotus phylipenesis*	47	Gokhru	*Tribulus terecertis*
23	Roheda	*Techomaila anduleta*	48	Gudsaria	*Grivia hirsuta*
24	Sadad	*Terminelia tomentosa*	49	Gangor	*Grivia tenex*
25	Salar	*Bosvelia careitta*	50	Chironka dhania	*Mollago surviana*

.....Table-3.17 continued

Sl No.	Local Name	Botanical Name	Sl No.	Local Name	Botanical Name
51	Javasa	*Alhago kpalorum*			
52	Phau	*Teperics diaoka*			
53	Fadi Bair	*Zizophus numularia*			
54	Jheel	*Indigofera oblogifolia*			
55	Jhijhano	*Malmosa rubikalis*			
56	Thor	*Euphorbia nibulia*			
57	Thor	*Euphorbia railina*			
58	Tijara	*Pepavar somniferum*			
59	Tilbum	*Vendlendia exerta*			
60	Tulasi	*Osomum sactum*			
61	Van Tulsi	*Pogostimon bangalensis*			
62	Damasa	*Phegonia crotica*			
63	Dasran	*Rasmais rensis*			
64	Dhatura	*Dhatura metal*			
65	Doodhi kadwala	*Holarina entodaecentrica*			
66	Dolphan	*Grivia vilosa*			
67	Dootha	*Euphorbia herta*			
68	Makoh	*Ziziphus cenoplea*			
69	Makoy	*Solenum nygrum*			
70	Marod Fali	*Helictrace eysoro*			
71	Satyanasi	*Orzomon maxicana*			
72	Safed Syali (Harsingar)	*Nictanthis orvortis*			
73	Oont Kanteli	*Lapidegethis tinerbis*			
74	Oonbati	*Agirates conizoydis*			

.....Table-3.17 continued

- **Climbers, Grass, Bamboo & Parasites**

Sl No.	Local Name	Botanical Name	Sl No.	Local Name	Botanical Name
	Climbers		10	Munj	*Saccharum munja*
1	Kewan	*Mukuna prita*	11	Polad polardi	*Apluda mutica*
2	Ktumba	*Kapratia karnosa*	12	Baru	*Sorghum halepense*
3	Goodbail	*Viscum orientel*	13	Baman	*Chloris dolichostachia*
4	Tripatti	*Oxalis conikuletta*	14	Barut	*Saccharus barbetus*
5	Doodhi Bel (Kali bel)	*Evanocorpus frutasence*	15	Sukhala	*Heteropogan contortus*
6	Doojani	*Milischia ariculleta*	16	Seevan	*Havenocloya colonum*
7	Pahadbel	*Sosampemos pariera*	17	Seen	*Sehima nervosum*
8	Palas bel	*Beutia paribieflora*	18	Raatrada	*Themada quadrivalvis*
9	Malkangani	*Silectrus menokuleta*	19	Sensa	*Symbopogan martina*
10	Medasingi	*Cryptolepis bukeneni*	20	Lapala	*Aristida depressa*
11	Naharkanta	*Esperagus dumesus*		**Bamboo**	
12	Neemgiloy	*Teenospora cardifolia*	1	Baans	*Dendokelepus strivutes*
13	Ratti, Chirmu	*Abrus precatorium*	2	Baans	*Benbusa arandinesia*
14	Suka bel	*Aristolokia braketieta*		**Parasites**	
	Grasses		1	Amarbel	*Cascuta reflexa*
1	Anjan	*Sacurus silieris*	2	Baanda	*Lorenthus logiflorus*
2	Karad	*Dichanthium annulatum*			
3	Kaansh	*Saccharum spontaneum*			
4	Khas	*Vetiveria zizanioides*			
5	Ganbel	*Crysopogon grylus*			
6	Gadiala	*Coix gigantea*			
7	Gramana	*Panicum antidotale*			
8	Daab	*Imperata cylindrica*			
9	Doob	*Sahnodon devtailone*			

Table-3.18: List of Fauna in the Alwar District

1. Mammals & Birds

Sl No.	Local Name	English name	Latin Name	Sl No.	Local Name	English name	Latin Name
1	Sher, Bagh, Naher	Tiger	*Panthera tigris*	26	Langoor	Common Langoor	*Presbytis entellus*
2	Tendua	Panther	*Panthera pardus*	27	Nevala	Mongoose	*Herpacitus padvardci*
3	Bhedia	Wolf	*Cannes lupes*	28	Bander	Monkey	*Macaca mulatla*
4	Jungalee Billi	Jungle cat	*Fellis chaus*	29	Sambhar	Sambhar	*Cervus unicolor*
5	Cheeta Billi	Cat Peperd	*Fellis bangalensis*		**Birds**		
6	Jarakh	Striped Hyana	*Hyaena hyaena hyaena*	1	Mor	Common pea fowl	*Pavo cristatus*
7	Geedar, Siyar	Jackal	*Canis aureus*	2	Tota	Rose ring parakeet	*Pssittacula krameri*
8	Solu	Pangolin	*Manes cassicodata*	3	Hiraman tota	Indian large parakeet	*Pssittacula eupatria*
9	Saahi, Sehli	Indian porcupine	*Hystrix indica*	4	Teetar	Grey pretties	*Francolinus pondicereunus*
10	Bijju	Rattle Hummiveger	*Melivora capansis*	5	Kala teetar	Black pretties	*Francolins francolinus*
11	Udbilao	Indian otter	*Luta percpicileta*	6	Kwasil	Grey Pelican	Pelecanus philipensis
12	Chausingha	Four horned antelope	*Tetraceros quardicornis*	7	Kabootar	Bluerock pigeon	*Columba livia*
13	Reechh, Bhalu	Sloth Bear	*Melursus ursinus*	8	Harial	Common pigeon	*Crocopus phonicopterus*
14	Kala Hiran	Black Buck, Indian antelope	*Antelope survikarya*	9	Karchia	Pochard white eyed	*Eithiea nirocca*
15	Jungalee Suar	Wild Boar, Pig	*Sus scrofa chistatus*	10	Klachiri	Indian Robin	*Saxicoloides fulicata*
16	Siyagora	Karakul	*Phalis karakul*	11	Bhat Teetar, Bhatgar	Common Sanu Growse	*Tarokilus agjustus*
17	Chinkara	Indian Gazelle	*Gazella gazella*	12	Chupaka	Sandpier spotted	*Tringa glareola*
18	Cheetal	Spotted deer	*Axis axis*	13	Shikra	Shikra	*Astur bedius*
19	Para	Hog deer	*Axis unisus*	14	Ghirah	Shovelar	*Anas clypeata*
20	Jungalee Kutta	Wild dog	*Cuon alpinus*	15	Safed Latora	Grey shriek	*Lanius excubitor*
21	Lomaree	Fox	*Walpis benalensis*	16	Gauriya	House sparrow	*Passer domesticus*
22	Neel Gaay	Blue bull	*Boselaphus tragocamalus*	17	Jungalee chidi	Yellow throated sparrow	*Zymnoris janokolis*
23	Khargosh	Hare	*Lepus nigricollis*	18	Chamacha	Stunbil	*Platale leucorodia*
24	Chamgadarh	Bat	*Taropus zyzantius*	19	Gazpone	Black winged stilth	*Himanstopus himanstopus*
25	Jhau Chuha	Haze hog	*Hamicyanus oritus*	20	Daukh	Storck painted	*Eyvish leukocephelous*

.....Table-3.18 continued

Sl No.	Local Name	English name	Latin Name	Sl No.	Local Name	English name	Latin Name
21	Ghoghila	Openable Stork	*Anastomus oscitans*	46	Kunj	Common crane	*Grus grus lilcaurdi*
22	Ababil	Common swallow	*Hirundo rustica*	47	Saras	Lawrence crane	*Antegone antigone*
23	Darji, Phudki	Tailor Bird	*Orthotemus lutorius*	48	Kauwa	House crow	*Corcus ruplendence*
24	Chhoti Murgabi	Common teal	*Annas creca*	49	Jungalee Kauwa	Jungle crow	*Corcus macrorimcos*
25	Gurgurra	Cotton teal	*Nettapus coromandelianus*	50	Koyal	Cuckoo	*Udainemis scolopecius*
26	Ram Gangara	Grey Tit	*Parus major*	51	Dubdubi	Devchick	*Podiceps eficolis*
27	Maha lat	Tree pai	*Dendrocitta vegavunda*	52	Pandubbi	Darter snakebird	*Janhiga melnogaster*
28	Raj Giddha	King Vulture	*Cerecozips calvus*	53	Chhoti Fakhta	Little brown dove	*Streptopalia decavato*
29	Safed Giddha	White scavanger	*Neophron percnopterus*	54	Chitta Fakhta	Spotted dove	*Streptopalia chinensis*
30	Pilwaya	Grey Wag Tail	*Motacilla cinerea*	55	Bhujang	Drowngo, Kim Crow	*Dicrurus macrocercus*
31	Dhowan	White Wag Tail	*Motacilla flava*	56	Surkhab	Dee Shelldrek, Brahmani	*Kasarka fesjinai*
32	Putki	Peshi Wobbler	*Prenea socialis*	57	Nakata	Comb duck	*Cirkidiaronis nelnotus*
33	Jalmurgi	Water hen	*Amaurornis phoenicurus*	58	Bugral	Spot Bill	*Anas poecilorhyncha*
34	Baya	Bear Bird	*Ploceus phillippinus*	59	Tarpar	Pintes Duck	*Anas acuta*
35	Kathphora	Woodpecker Golden	*Brakipturnus bengalensis*	60	Ukao	Tony eagle	*Aquil repex*
36	Chil Chil	Common wobbler	*Aragya godet*	61	Surkhia bugla	Kettle egret	*Bubul kusivis*
37	Sat bahin	Jungle wobbler	*Tardoidis somerbilai*	62	Bara Bugla	Large egret	*Egreta alva*
38	Maina	Large Grey Wobbler	*Turdoides malcolmi*	63	Karachhia bagula	Little egret	*Egreta gurget*
39	Neelkanth	Indian Blue Je	*Cocacias benghalensis*	64	Naachan	Flycatcher	*Rhipidura aureola*
40	Papiha	Brain Fever Bird	*Kukulas barius*	65	Doodhraj	Paradise flycatcher	*Tepersiphone paradisis*
41	Bulbul	Redvented bulbul	*Molpestic kaifer*	66	Hans	Grey Leg goose	*Ancer ancer*
42	Aadi	Kut	*Fulica atra*	67	Anjan	Grey Has	*Ardea scenaria*
43	Bara Jal Kowa	Large kormorent	*Phalacrocorax carbo*	68	Andha bagula	Pond Perun, Paddybird	*Ardiolla grazii*
44	Jal Kowa	Little kormorent	*Phalacrocorax niger*	69	Hudhud	Dupu	*Eupuwa eyorus*
45	Kuka	Crow phasent	*Centropus cynensis*	70	Dhanesh	Grey Bornbill	*Tocs byrostrics*

.....Table-3.18 continued

Sl No.	Local Name	English name	Latin Name
71	Kala baaj	Black eyebish	*Sudivish papilosa*
72	Safed baaj	White eyebish	*Threskiornis melanocephalus*
73	Chhoya kilkila	Indian common small kingfisher	*Ansicco edis*
74	Kodial kilkila	Paed kingfisher	*Ceryle edis*
75	Dhobia chil	Brahmani kite	*Balliester hunds*
76	Chil	Common kite	*Milvus migrans*
77	Titodi	Red Bottle pepwing	*Lobipluvia malabarica*
78	Mukt	Indian small lark	*Elloha gulgula*
79	Jalmurgi	Dhurhen	*Gallinula chloropus*
80	Desi maina	Common maina	*Acridotheres ginginianus*
81	Dubchiri	Nite jar	*Keprimucoguss asiatics*
82	Peelak	Golden orione	*Oriolus oriolus*
83	Ullu	Duski horned owl	*Cubo coromendus*
84	Ghugghu	Indian great horned owl	*Cubo cubo*
85	Khusatia, Chugad	Spotted owlet	*Ethin brem*

3.6 Demographic & Socio-Economic Setup

As per the District Census Report 2001, the population of Alwar district is as under:

Table-3.19: Population of Alwar District as per Census Report, 2001

Sl No.	Population	Total	Total Male	Total Female
1	Total	29,92,592	15,86,752	14,05,840
2	Rural	25,57,653	13,49,768	12,07,885
3	Urban	4,34,939	2,36,984	1,97,955
Tehsil-wise break-up				
1	Behror	3,05,688	1,59,502	1,46,186
2	Mundawar	1,97,582	1,03,015	94,567
3	Kotkasim	1,17687	61,712	55,975
4	Tijara	2,80,772	1,53,970	1,26,802
5	Kishangarh Bas	1,61,629	84,967	76,662
6	Ramgarh	2,01,757	1,05,952	95,805
7	Alwar	5,68,530	3,03,999	2,64,531
8	Bansur	2,14,351	1,12,580	1,01,771
9	Thana Ghazi	1,89,977	99,870	90,107
10	Rajgarh	3,06,226	1,62,466	1,43,760
11	Lachhmangarh	2,41,708	1,28,045	1,13,663
12	Kathumar	2,06,685	1,10,674	96,011

The district has maintained decadal population growth of around 30% since last two decades. The sex ratio 886 *i.e.* 886 females to 1000 males. The work participation rate is 48.7%. The proportion of main workers and marginal workers is 31.7% and 17.1% respectively. The area profile is placed at Page No. 54 to Page No. 65.

The statistics relating to cultivaters, agriculture labourers etc. is as under:

Table-3.20: Work force statistics

Sl No.	Particulars	Composition
1	Proportion of cultivators to total workers	62.1%
2	Proportion of agriculture labourers to taotal workers	8.8%
3	Proportion of workers in household industries to total workers	2.1%
4	Percentage of other workers to total workers	27.0%

The population statistics, occupational statistics and literacy level is presented in Plate-3.11 to Plate-3.14.

3.6.1 Social & Cultural activities

Despite the changing pattern of modern social life, the fairs and festivals have retained their religious significance and commercial utility besides being an attraction to the tourist. Undoubtedly, these fairs remain an important source of joy and entertainment to the people in general. But these are also a source of revenue to the government as well as local bodies. Most of the fairs are generally organised on specific dates and are related to some religious or social events of significance. The district has been full of fairs and festivals since ancient period. The important fairs held are as under:

- ***Rath Cattle Fair at Behrod*:** For the improvement of Rath breed in the district, this fair is organised at Behrod. It is held every year in the month of May. The nearest Railway Station is Ateli. The place is well connected by bus routes. A large number of persons congregate in the fair.

- ***Cattle Fair at Kishngarh:*** Like the Rath Cattle fair, this is also organised by Panchayat Samiti, Kishangarh Bas every year in the month of June. The place is connected by bus routes and is at a distance of 9 kms from Khairthal railway station. Principal species and livestock breeds from Mewat region are brought to the fair.

- ***Cattle Fair at Kherli:*** This cattle fair is organised by the Municipal Board, Kherli and is held every year in the month of September. The place is connected by rail and also falls on the bus route. Principal species and livestock breeds from Mewat are brought in the fair. A large number of cattle are brought and sold here.

- ***Jagdishji ka Mela:*** This is the biggest religious fair in the district and is held every year from Asadh Sudi 9 to 11 near village Roop Bas, 6 kms from Alwar City. This place falls on the main bus route from Alwar to Jaipur. People in large number assemble in the fair to pay homage to Jagdishji.

- ***Bharathariji ka Mela:*** This fair is held every year on Bhadra pada badi 8 in village Indokh that is 32 kms from Alwar City. About 10,000 people assemble here to pay homage to Bharathariji. Visitors come here from far and remote places. It is said to be a very ancient place amidst hills where Shri Bharathariji Maharaja spent the closing years of his life. Here, there is a perennial flow of water.

- ***Hanumanji ka Mela:*** This is also a religious fair of the district and is held every year at a place called Pandavpol on the first Tuesday of Bhadrapada Sudi. It is situated at about 67 kms from Alwar city. The nearest railway stations to this place are Alwar and Malakhera.

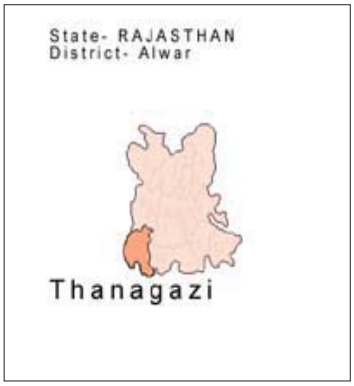
- ***Dahmi Mata ka Mela:*** This fair is held twice in a year on Aswina Sudi 7 and Chaitra Sudi 7 near village Dahmi and is called Dahmi Mata ka Mela. The fair is a religious one and thousands of people assemble in each of these fairs. Visitors from other states whose forefathers have lived in the neighbouring areas of this place also come here for performing the m*undan ceremony* of their children and *gathjora* for every marriage. The place is approachable by bus and is at a distance of about 5 kms. from tehsil headquarters Behrod, a bus station on Delhi-Jaipur route. The nearest railway station is Ateli. In the month of January, the Panchayat Samiti also organises a cattle fair here in which the Mewati breed are brought and sold here.

Area Profile

SubDistrict : **Thanagazi**

District : **Alwar**

State : **Rajasthan**



(*Source : Census of India 2001)*

Number of Households	28,427

Household size	7.0
Proportion of Urban population (%)	0.0

	P	M	F
Population - Total	189,977	99,870	90,107
Population - Rural	189,977	99,870	90,107
Population - Urban	0	0	0
Population (0-6)	40,560	21,167	19,393
SC Population	27,465	14,399	13,066
ST Population	36,249	19,226	17,023

Sex Ratio (females per 1000 males)	902
Sex Ratio (0-6 Years)	916
Sex Ratio (SC)	907
Sex Ratio (ST)	885

	P	M	F
Proportion of SC population (%)	14.5	14.4	14.5
Proportion of ST population (%)	19.1	19.3	18.9

Number of literates	70,931	52,599	18,332
Number of illiterates	119,046	47,271	71,775

Literacy Rate (%)	47.5	66.8	25.9
Illiteracy Rate (%)	79.7	60.1	101.

Total workers	93,125	51,242	41,883
Main workers	63,395	42,846	20,549
Marginal workers	29,730	8,396	21,334
Non workers	96,852	48,628	48,224

Work Participation Rate (%)	49.0	51.3	46.5
Proportion of Main Workers (%)	33.4	42.9	22.8
Proportion of Marginal Workers (%)	15.6	8.4	23.7
Proportion of Non Workers (%)	51.0	48.7	53.5

Cultivators	54,717	27,687	27,030
Agricultural labourers	5,734	2,237	3,497
Workers in household industries	4,890	2,520	2,370
Other workers	27,784	18,798	8,986

Proportion of cultivators to total workers (%)	58.8	54.0	64.5
Proportion of agricultural labourers to total workers (%)	6.2	4.4	8.3
Proportion of workers in household industries to total workers (%)	5.3	4.9	5.7
Percentage of Other workers to total workers (%)	29.8	36.7	21.5

Area Profile

SubDistrict : **Lachhmangarh**

District : **Alwar**

State : **Rajasthan**

(*Source : Census of India 2001)*

Number of Households	35,295

Household size	7.0
Proportion of Urban population (%)	4.2

	P	M	F
Population - Total	241,708	128,045	113,663
Population - Rural	231,619	122,748	108,871
Population - Urban	10,089	5,297	4,792
Population (0-6)	50,399	26,490	23,909
SC Population	44,714	23,669	21,045
ST Population	29,353	15,551	13,802

Sex Ratio (females per 1000 males)	888
Sex Ratio (0-6 Years)	903
Sex Ratio (SC)	889
Sex Ratio (ST)	888

	P	M	F
Proportion of SC population (%)	18.5	18.5	18.5
Proportion of ST population (%)	12.1	12.1	12.1

Number of literates	105,491	74,988	30,503
Number of illiterates	136,217	53,057	83,160

Literacy Rate (%)	55.1	73.8	34.0
Illiteracy Rate (%)	71.2	52.2	92.7

Total workers	138,836	75,908	62,928
Main workers	90,144	57,160	32,984
Marginal workers	48,692	18,748	29,944
Non workers	102,872	52,137	50,735

Work Participation Rate (%)	57.4	59.3	55.4
Proportion of Main Workers (%)	37.3	44.6	29.0
Proportion of Marginal Workers (%)	20.1	14.6	26.3
Proportion of Non Workers (%)	42.6	40.7	44.6

Cultivators	112,898	57,513	55,385
Agricultural labourers	7,422	2,951	4,471
Workers in household industries	1,866	1,220	646
Other workers	16,650	14,224	2,426

Proportion of cultivators to total workers (%)	81.3	75.8	88.0
Proportion of agricultural labourers to total workers (%)	5.3	3.9	7.1
Proportion of workers in household industries to total workers (%)	1.3	1.6	1.0
Percentage of Other Workers to total workers (%)	12.0	18.7	3.9

Area Profile

SubDistrict : **Rajgarh**

District : **Alwar**

State : **Rajasthan**

State- RAJASTHAN
District- Alwar

(*Source : Census of India 2001)*

Number of Households	46,334

Household size	7.0
Proportion of Urban population (%)	8.2

	P	M	F
Population - Total	306,226	162,466	143,760
Population - Rural	281,217	149,124	132,093
Population - Urban	25,009	13,342	11,667
Population (0-6)	59,814	31,593	28,221
SC Population	57,686	30,462	27,224
ST Population	94,335	50,283	44,052

Sex Ratio (females per 1000 males)	885
Sex Ratio (0-6 Years)	893
Sex Ratio (SC)	894
Sex Ratio (ST)	876

	P	M	F
Proportion of SC population (%)	18.8	18.7	18.9
Proportion of ST population (%)	30.8	30.9	30.6

Number of literates	140,561	99,448	41,113
Number of illiterates	165,665	63,018	102,647

Literacy Rate (%)	57.0	76.0	35.6
Illiteracy Rate (%)	67.2	48.2	88.8

Total workers	128,119	74,504	53,615
Main workers	97,019	66,412	30,607
Marginal workers	31,100	8,092	23,008
Non workers	178,107	87,962	90,145

Work Participation Rate (%)	41.8	45.9	37.3
Proportion of Main Workers (%)	31.7	40.9	21.3
Proportion of Marginal Workers (%)	10.2	5.0	16.0
Proportion of Non Workers (%)	58.2	54.1	62.7

Cultivators	86,630	44,502	42,128
Agricultural labourers	9,355	3,326	6,029
Workers in household industries	3,378	2,156	1,222
Other workers	28,756	24,520	4,236

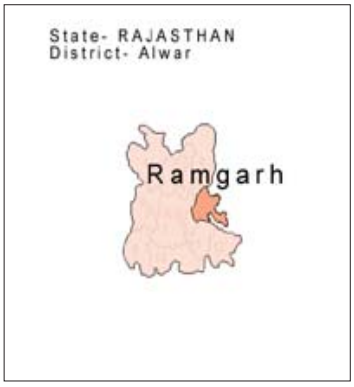
Proportion of cultivators to total workers (%)	67.6	59.7	78.6
Proportion of agricultural labourers to total workers (%)	7.3	4.5	11.2
Proportion of workers in household industries to total workers (%)	2.6	2.9	2.3
Percentage of Other Workers to total workers (%)	22.4	32.9	7.9

Area Profile

SubDistrict : **Ramgarh**

District : **Alwar**

State : **Rajasthan**



(*Source : Census of India 2001)*

Number of Households	29,569

Household size	7.0
Proportion of Urban population (%)	0.0

	P	M	F
Population - Total	201,757	105,952	95,805
Population - Rural	201,757	105,952	95,805
Population - Urban	0	0	0
Population (0-6)	44,349	23,290	21,059
SC Population	35,087	18,475	16,612
ST Population	6,456	3,482	2,974

Sex Ratio (females per 1000 males)	904
Sex Ratio (0-6 Years)	904
Sex Ratio (SC)	899
Sex Ratio (ST)	854

	P	M	F
Proportion of SC population (%)	17.4	17.4	17.3
Proportion of ST population (%)	3.2	3.3	3.1

Number of literates	81,856	58,292	23,564
Number of illiterates	119,901	47,660	72,241

Literacy Rate (%)	52.0	70.5	31.5
Illiteracy Rate (%)	76.2	57.7	96.6

Total workers	89,705	50,642	39,063
Main workers	62,815	44,515	18,300
Marginal workers	26,890	6,127	20,763
Non workers	112,052	55,310	56,742

Work Participation Rate (%)	44.5	47.8	40.8
Proportion of Main Workers (%)	31.1	42.0	19.1
Proportion of Marginal Workers (%)	13.3	5.8	21.7
Proportion of Non Workers (%)	55.5	52.2	59.2

Cultivators	58,831	29,947	28,884
Agricultural labourers	11,694	4,728	6,966
Workers in household industries	1,350	924	426
Other workers	17,830	15,043	2,787

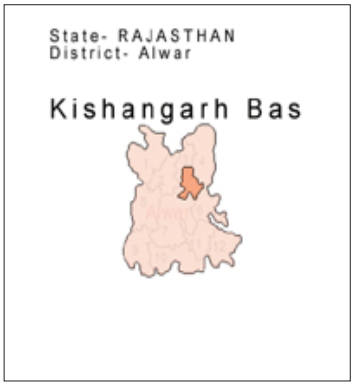
Proportion of cultivators to total workers (%)	65.6	59.1	73.9
Proportion of agricultural labourers to total workers (%)	13.0	9.3	17.8
Proportion of workers in household industries to total workers (%)	1.5	1.8	1.1
Percentage of Other Workers to total workers (%)	19.9	29.7	7.1

Area Profile

SubDistrict : **Kishangarh Bas**

District : **Alwar**

State : **Rajasthan**



(*Source : Census of India 2001)*

Number of Households	24,292

Household size	7.0
Proportion of Urban population (%)	25.7

	P	M	F
Population - Total	161,629	84,967	76,662
Population - Rural	120,151	62,902	57,249
Population - Urban	41,478	22,065	19,413
Population (0-6)	32,965	17,342	15,623
SC Population	33,718	17,774	15,944
ST Population	355	247	108

Sex Ratio (females per 1000 males)	902
Sex Ratio (0-6 Years)	901
Sex Ratio (SC)	897
Sex Ratio (ST)	437

	P	M	F
Proportion of SC population (%)	20.9	20.9	20.8
Proportion of ST population (%)	0.2	0.3	0.1

Number of literates	78,720	51,797	26,923
Number of illiterates	82,909	33,170	49,739

Literacy Rate (%)	61.2	76.6	44.1
Illiteracy Rate (%)	64.4	49.0	81.5

Total workers	69,840	41,581	28,259
Main workers	43,373	36,113	7,260
Marginal workers	26,467	5,468	20,999
Non workers	91,789	43,386	48,403

Work Participation Rate (%)	43.2	48.9	36.9
Proportion of Main Workers (%)	26.8	42.5	9.5
Proportion of Marginal Workers (%)	16.4	6.4	27.4
Proportion of Non Workers (%)	56.8	51.1	63.1

Cultivators	36,736	19,185	17,551
Agricultural labourers	8,628	3,456	5,172
Workers in household industries	1,575	848	727
Other workers	22,901	18,092	4,809

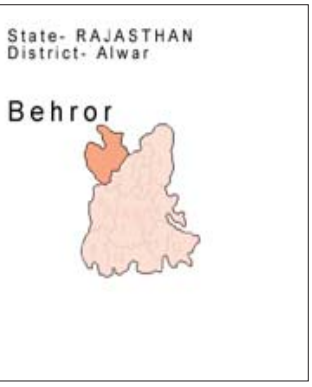
Proportion of cultivators to total workers (%)	52.6	46.1	62.1
Proportion of agricultural labourers to total workers (%)	12.4	8.3	18.3
Proportion of workers in household industries to total workers (%)	2.3	2.0	2.6
Percentage of Other Workers to total workers (%)	32.8	43.5	17.0

Area Profile

SubDistrict : **Behror**

District : **Alwar**

State : **Rajasthan**



(*Source : Census of India 2001)*

Number of Households	49,455

Household size	6.0
Proportion of Urban population (%)	7.5

	P	M	F
Population - Total	305,688	159,502	146,186
Population - Rural	282,832	147,205	135,627
Population - Urban	22,856	12,297	10,559
Population (0-6)	51,614	27,959	23,655
SC Population	47,834	24,919	22,915
ST Population	4,335	2,231	2,104

Sex Ratio (females per 1000 males)	917
Sex Ratio (0-6 Years)	846
Sex Ratio (SC)	920
Sex Ratio (ST)	943

	P	M	F
Proportion of SC population (%)	15.6	15.6	15.7
Proportion of ST population (%)	1.4	1.4	1.4

Number of literates	187,667	116,265	71,402
Number of illiterates	118,021	43,237	74,784

Literacy Rate (%)	73.9	88.4	58.3
Illiteracy Rate (%)	46.5	32.9	61.0

Total workers	163,014	89,152	73,862
Main workers	93,797	67,599	26,198
Marginal workers	69,217	21,553	47,664
Non workers	142,674	70,350	72,324

Work Participation Rate (%)	53.3	55.9	50.5
Proportion of Main Workers (%)	30.7	42.4	17.9
Proportion of Marginal Workers (%)	22.6	13.5	32.6
Proportion of Non Workers (%)	46.7	44.1	49.5

Cultivators	105,382	51,120	54,262
Agricultural labourers	18,507	7,060	11,447
Workers in household industries	2,814	1,604	1,210
Other workers	36,311	29,368	6,943

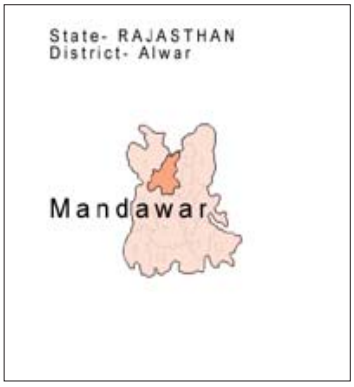
Proportion of cultivators to total workers (%)	64.6	57.3	73.5
Proportion of agricultural labourers to total workers (%)	11.4	7.9	15.5
Proportion of workers in household industries to total workers (%)	1.7	1.8	1.6
Percentage of Other Workers to total workers (%)	22.3	32.9	9.4

Area Profile

SubDistrict : **Mandawar**

District : **Alwar**

State : **Rajasthan**



(*Source : Census of India 2001)*

Number of Households	30,194

Household size	6.0
Proportion of Urban population (%)	0.0

	P	M	F
Population - Total	197,582	103,015	94,567
Population - Rural	197,582	103,015	94,567
Population - Urban	0	0	0
Population (0-6)	35,992	19,366	16,626
SC Population	38,233	19,892	18,341
ST Population	6,137	3,145	2,992

Sex Ratio (females per 1000 males)	918
Sex Ratio (0-6 Years)	859
Sex Ratio (SC)	922
Sex Ratio (ST)	951

	P	M	F
Proportion of SC population (%)	19.4	19.3	19.4
Proportion of ST population (%)	3.1	3.1	3.2

Number of literates	110,905	70,595	40,310
Number of illiterates	86,677	32,420	54,257

Literacy Rate (%)	68.6	84.4	51.7
Illiteracy Rate (%)	53.6	38.8	69.6

Total workers	121,213	64,705	56,508
Main workers	58,124	43,174	14,950
Marginal workers	63,089	21,531	41,558
Non workers	76,369	38,310	38,059

Work Participation Rate (%)	61.3	62.8	59.8
Proportion of Main Workers (%)	29.4	41.9	15.8
Proportion of Marginal Workers (%)	31.9	20.9	43.9
Proportion of Non Workers (%)	38.7	37.2	40.2

Cultivators	85,329	43,148	42,181
Agricultural labourers	15,666	6,609	9,057
Workers in household industries	1,796	1,177	619
Other workers	18,422	13,771	4,651

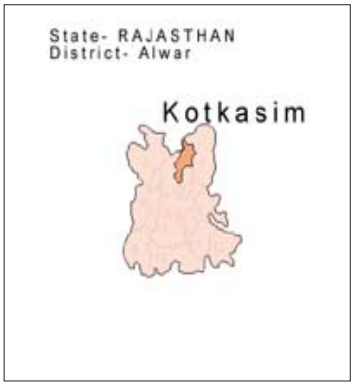
Proportion of cultivators to total workers (%)	70.4	66.7	74.6
Proportion of agricultural labourers to total workers (%)	12.9	10.2	16.0
Proportion of workers in household industries to total workers (%)	1.5	1.8	1.1
Percentage of Other Workers to total workers (%)	15.2	21.3	8.2

Area Profile

SubDistrict : **Kotkasim**

District : **Alwar**

State : **Rajasthan**



(*Source : Census of India 2001)*

Number of Households	18,465

Household size	6.0
Proportion of Urban population (%)	0.0

	P	M	F
Population - Total	117,687	61,712	55,975
Population - Rural	117,687	61,712	55,975
Population - Urban	0	0	0
Population (0-6)	21,563	11,593	9,970
SC Population	22,731	11,796	10,935
ST Population	887	490	397

Sex Ratio (females per 1000 males)	907
Sex Ratio (0-6 Years)	860
Sex Ratio (SC)	927
Sex Ratio (ST)	810

	P	M	F
Proportion of SC population (%)	19.3	19.1	19.5
Proportion of ST population (%)	0.8	0.8	0.7

Number of literates	66,440	42,425	24,015
Number of illiterates	51,247	19,287	31,960

Literacy Rate (%)	69.1	84.6	52.2
Illiteracy Rate (%)	53.3	38.5	69.5

Total workers	60,181	32,825	27,356
Main workers	38,168	26,002	12,166
Marginal workers	22,013	6,823	15,190
Non workers	57,506	28,887	28,619

Work Participation Rate (%)	51.1	53.2	48.9
Proportion of Main Workers (%)	32.4	42.1	21.7
Proportion of Marginal Workers (%)	18.7	11.1	27.1
Proportion of Non Workers (%)	48.9	46.8	51.1

Cultivators	39,809	21,034	18,775
Agricultural labourers	7,997	3,508	4,489
Workers in household industries	1,020	652	368
Other workers	11,355	7,631	3,724

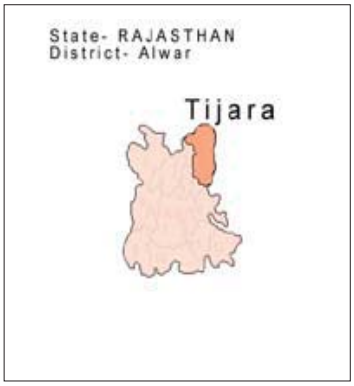
Proportion of cultivators to total workers (%)	66.1	64.1	68.6
Proportion of agricultural labourers to total workers (%)	13.3	10.7	16.4
Proportion of workers in household industries to total workers (%)	1.7	2.0	1.3
Percentage of Other Workers to total workers (%)	18.9	23.2	13.6

Area Profile

SubDistrict : **Tijara**

District : **Alwar**

State : **Rajasthan**



(*Source : Census of India 2001)*

Number of Households	48,118

Household size	6.0
Proportion of Urban population (%)	19.2

	P	M	F
Population - Total	280,772	153,970	126,802
Population - Rural	226,974	121,997	104,977
Population - Urban	53,798	31,973	21,825
Population (0-6)	62,238	32,875	29,363
SC Population	38,163	20,406	17,757
ST Population	595	337	258

Sex Ratio (females per 1000 males)	824
Sex Ratio (0-6 Years)	893
Sex Ratio (SC)	870
Sex Ratio (ST)	766

	P	M	F
Proportion of SC population (%)	13.6	13.3	14.0
Proportion of ST population (%)	0.2	0.2	0.2

Number of literates	127,101	89,843	37,258
Number of illiterates	153,671	64,127	89,544

Literacy Rate (%)	58.2	74.2	38.2
Illiteracy Rate (%)	70.3	53.0	91.9

Total workers	151,716	91,000	60,716
Main workers	85,419	73,379	12,040
Marginal workers	66,297	17,621	48,676
Non workers	129,056	62,970	66,086

Work Participation Rate (%)	54.0	59.1	47.9
Proportion of Main Workers (%)	30.4	47.7	9.5
Proportion of Marginal Workers (%)	23.6	11.4	38.4
Proportion of Non Workers (%)	46.0	40.9	52.1

Cultivators	70,472	42,516	27,956
Agricultural labourers	9,497	4,405	5,092
Workers in household industries	2,084	1,160	924
Other workers	69,663	42,919	26,744

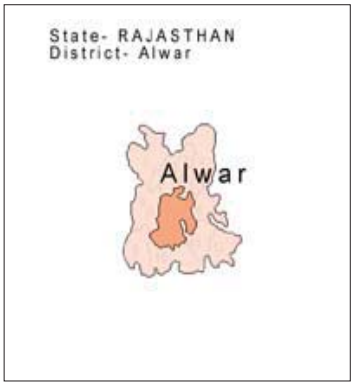
Proportion of cultivators to total workers (%)	46.4	46.7	46.0
Proportion of agricultural labourers to total workers (%)	6.3	4.8	8.4
Proportion of workers in household industries to total workers (%)	1.4	1.3	1.5
Percentage of Other Workers to total workers (%)	45.9	47.2	44.0

Area Profile

SubDistrict : **Alwar**

District : **Alwar**

State : **Rajasthan**



(*Source : Census of India 2001)*

Number of Households	90,782

Household size	6.0
Proportion of Urban population (%)	46.8

	P	M	F
Population - Total	568,530	303,999	264,531
Population - Rural	302,327	160,300	142,027
Population - Urban	266,203	143,699	122,504
Population (0-6)	98,837	52,536	46,301
SC Population	111,497	59,201	52,296
ST Population	27,324	14,754	12,570

Sex Ratio (females per 1000 males)	870
Sex Ratio (0-6 Years)	881
Sex Ratio (SC)	883
Sex Ratio (ST)	852

	P	M	F
Proportion of SC population (%)	19.6	19.5	19.8
Proportion of ST population (%)	4.8	4.9	4.8

Number of literates	318,750	205,054	113,696
Number of illiterates	249,780	98,945	150,835

Literacy Rate (%)	67.9	81.5	52.1
Illiteracy Rate (%)	53.2	39.3	69.1

Total workers	234,630	153,741	80,889
Main workers	178,565	132,589	45,976
Marginal workers	56,065	21,152	34,913
Non workers	333,900	150,258	183,642

Work Participation Rate (%)	41.3	50.6	30.6
Proportion of Main Workers (%)	31.4	43.6	17.4
Proportion of Marginal Workers (%)	9.9	7.0	13.2
Proportion of Non Workers (%)	58.7	49.4	69.4

Cultivators	103,929	54,018	49,911
Agricultural labourers	18,590	7,503	11,087
Workers in household industries	6,385	3,743	2,642
Other workers	105,726	88,477	17,249

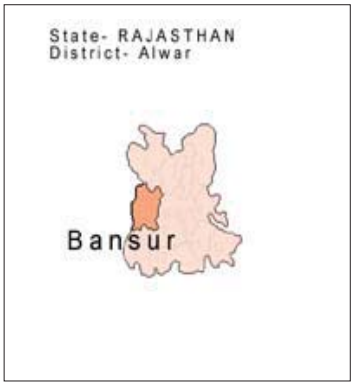
Proportion of cultivators to total workers (%)	44.3	35.1	61.7
Proportion of agricultural labourers to total workers (%)	7.9	4.9	13.7
Proportion of workers in household industries to total workers (%)	2.7	2.4	3.3
Percentage of Other Workers to total workers (%)	45.1	57.5	21.3

Area Profile

SubDistrict : **Bansur**

District : **Alwar**

State : **Rajasthan**



(*Source : Census of India 2001)*

Number of Households	31,023

Household size	7.0
Proportion of Urban population (%)	0.0

	P	M	F
Population - Total	214,351	112,580	101,771
Population - Rural	214,351	112,580	101,771
Population - Urban	0	0	0
Population (0-6)	42,987	22,638	20,349
SC Population	32,954	17,183	15,771
ST Population	9,186	4,790	4,396

Sex Ratio (females per 1000 males)	904
Sex Ratio (0-6 Years)	899
Sex Ratio (SC)	918
Sex Ratio (ST)	918

	P	M	F
Proportion of SC population (%)	15.4	15.3	15.5
Proportion of ST population (%)	4.3	4.3	4.3

Number of literates	98,655	66,890	31,765
Number of illiterates	115,696	45,690	70,006

Literacy Rate (%)	57.6	74.4	39.0
Illiteracy Rate (%)	67.5	50.8	86.0

Total workers	102,401	57,639	44,762
Main workers	64,734	48,463	16,271
Marginal workers	37,667	9,176	28,491
Non workers	111,950	54,941	57,009

Work Participation Rate (%)	47.8	51.2	44.0
Proportion of Main Workers (%)	30.2	43.0	16.0
Proportion of Marginal Workers (%)	17.6	8.2	28.0
Proportion of Non Workers (%)	52.2	48.8	56.0

Cultivators	73,719	38,383	35,336
Agricultural labourers	6,891	2,690	4,201
Workers in household industries	2,181	1,359	822
Other workers	19,610	15,207	4,403

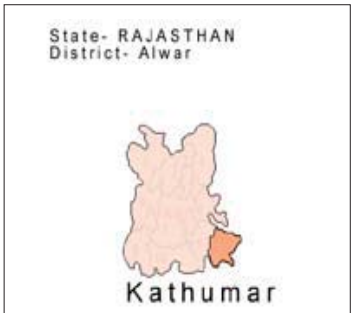
Proportion of cultivators to total workers (%)	72.0	66.6	78.9
Proportion of agricultural labourers to total workers (%)	6.7	4.7	9.4
Proportion of workers in household industries to total workers (%)	2.1	2.4	1.8
Percentage of Other Workers to total workers (%)	19.2	26.4	9.8

Area Profile

SubDistrict : **Kathumar**

District : **Alwar**

State : **Rajasthan**



(*Source : Census of India 2001)*

Number of Households	30,019

Household size	7.0
Proportion of Urban population (%)	7.5

	P	M	F
Population - Total	206,685	110,674	96,011
Population - Rural	191,179	102,363	88,816
Population - Urban	15,506	8,311	7,195
Population (0-6)	40,598	21,522	19,076
SC Population	48,954	26,122	22,832
ST Population	24,693	13,171	11,522

Sex Ratio (females per 1000 males)	868
Sex Ratio (0-6 Years)	886
Sex Ratio (SC)	874
Sex Ratio (ST)	875

	P	M	F
Proportion of SC population (%)	23.7	23.6	23.8
Proportion of ST population (%)	11.9	11.9	12.0

Number of literates	101,204	70,057	31,147
Number of illiterates	105,481	40,617	64,864

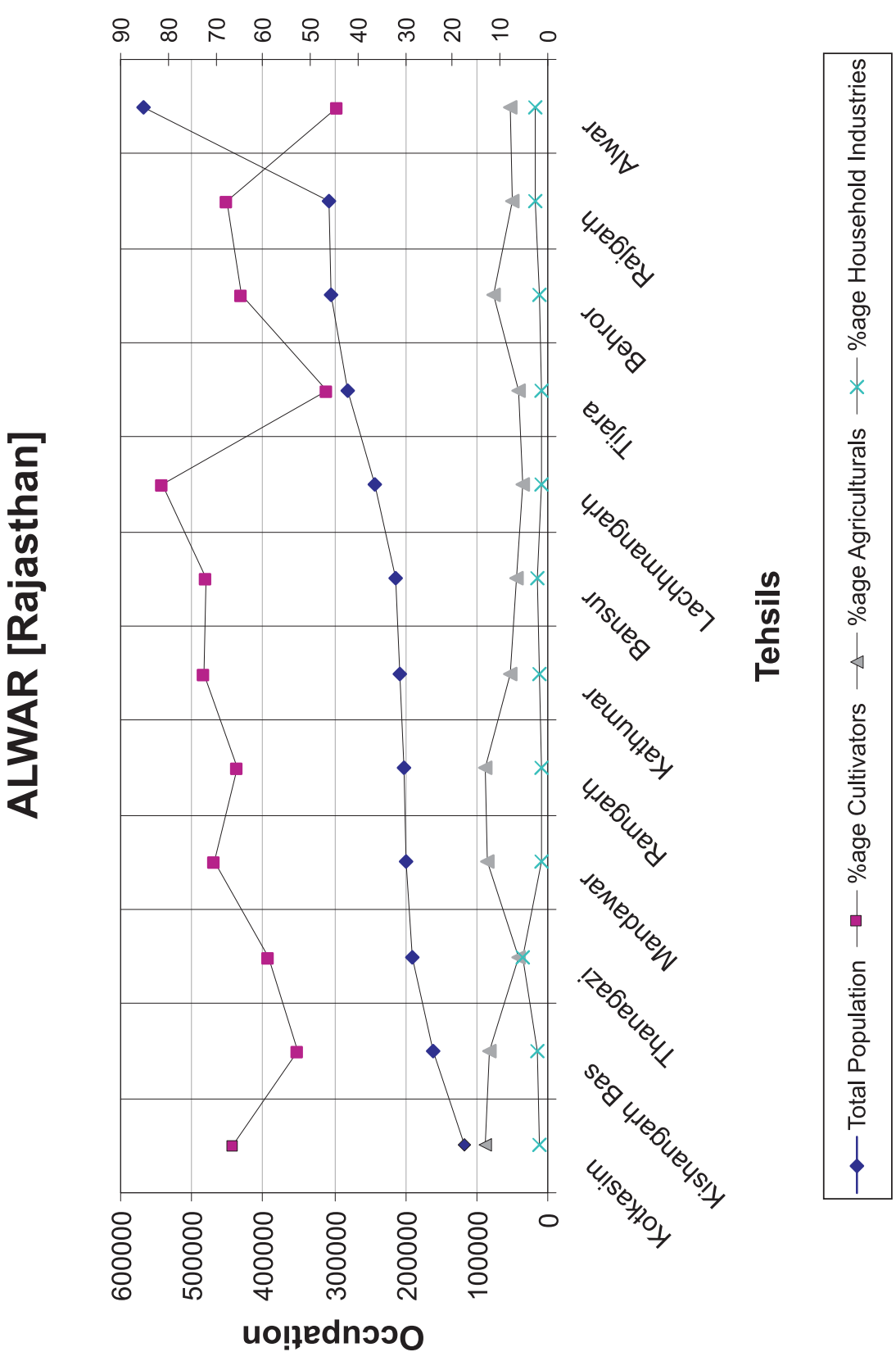
Literacy Rate (%)	60.9	78.6	40.5
Illiteracy Rate (%)	63.5	45.6	84.3

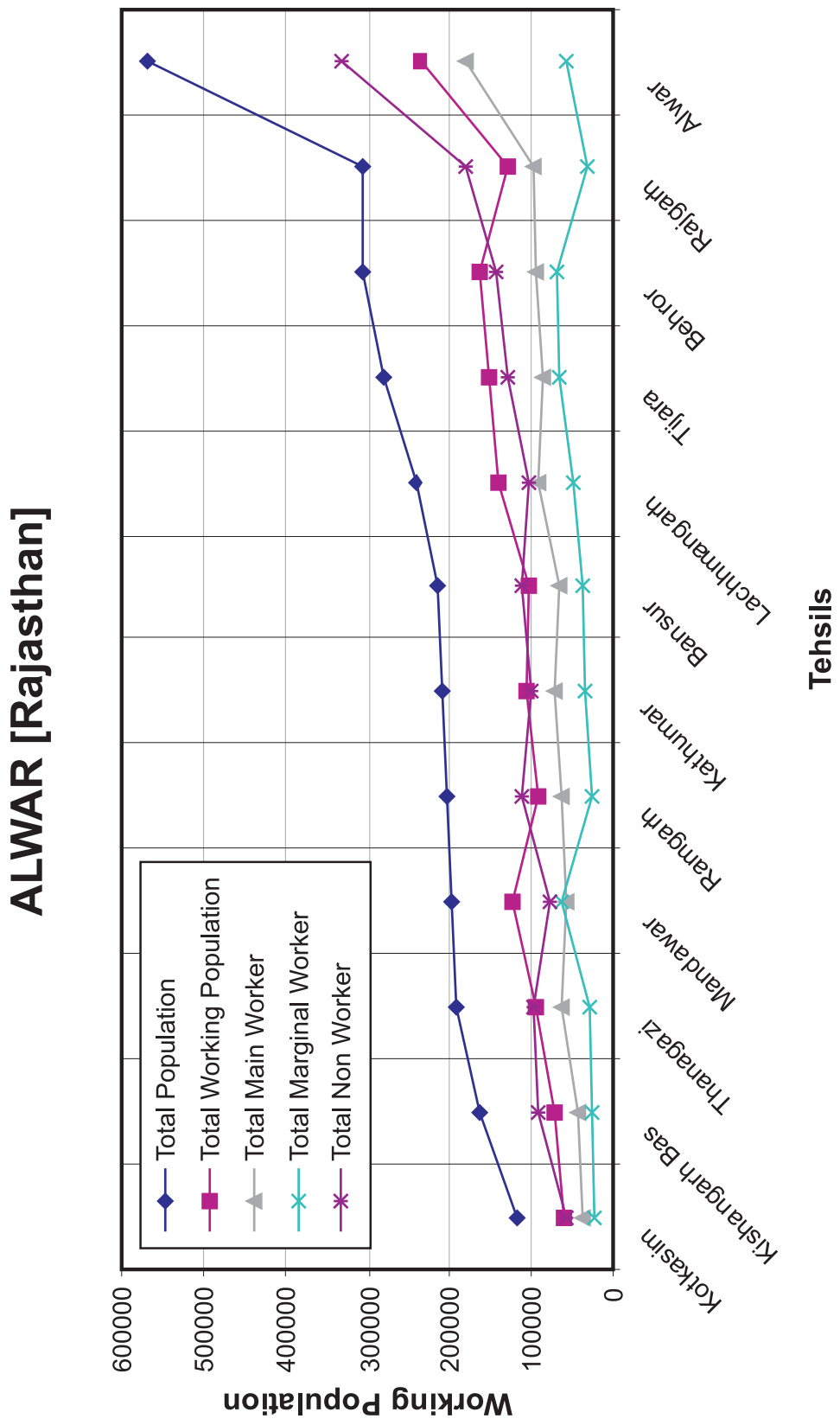
Total workers	105,906	58,872	47,034
Main workers	72,034	48,946	23,088
Marginal workers	33,872	9,926	23,946
Non workers	100,779	51,802	48,977

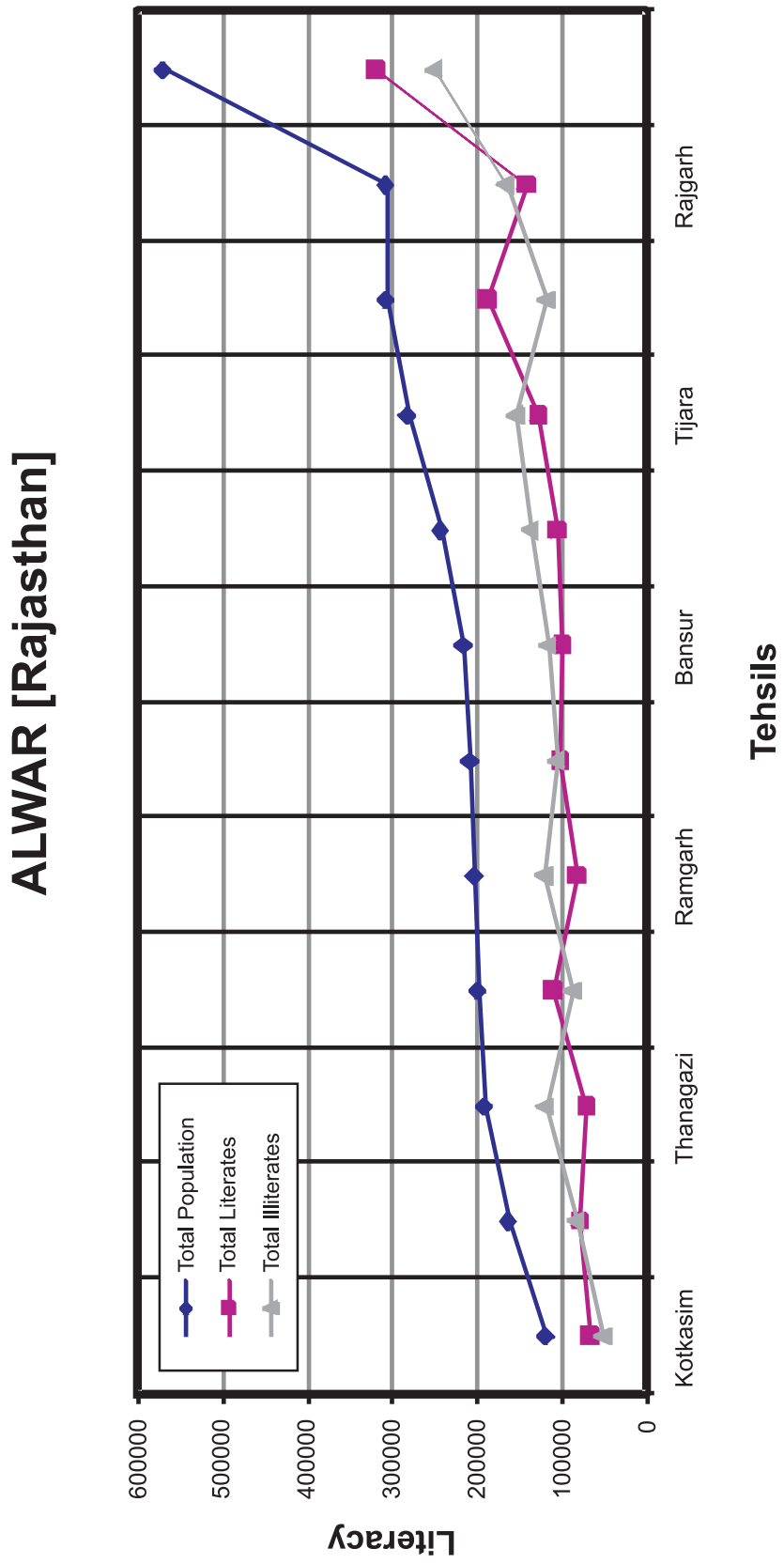
Work Participation Rate (%)	51.2	53.2	49.0
Proportion of Main Workers (%)	34.9	44.2	24.0
Proportion of Marginal Workers (%)	16.4	9.0	24.9
Proportion of Non Workers (%)	48.8	46.8	51.0

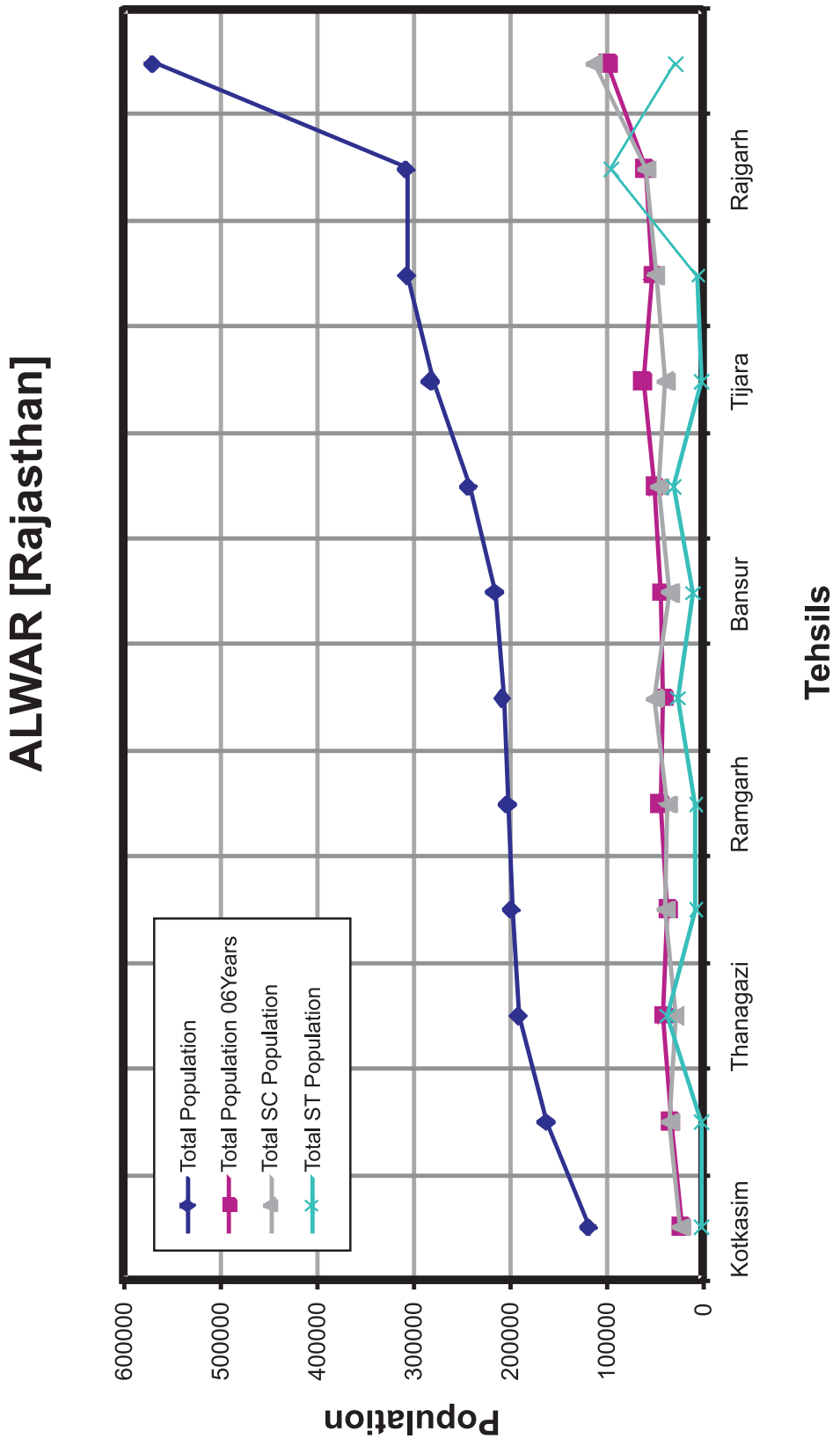
Cultivators	76,755	40,830	35,925
Agricultural labourers	8,461	3,295	5,166
Workers in household industries	1,685	960	725
Other workers	19,005	13,787	5,218

Proportion of cultivators to total workers (%)	72.5	69.4	76.4
Proportion of agricultural labourers to total workers (%)	8.0	5.6	11.0
Proportion of workers in household industries to total workers (%)	1.6	1.6	1.5
Percentage of Other workers to total workers (%)	17.9	23.4	11.1


ALWAR [Rajasthan]
Occupation
600000
500000
400000
300000
200000
100000
0
90
80
70
60
50
40
30
20
10
0
Kotkasim
Kishangarh Bas
Thanagazi
Mandawar
Ramgarh
Kathumar
Bansur
Lachhmangarh
Tijara
Behror
Rajgarh
Alwar
Tehsils
Total Population
%age Cultivators
%age Agriculturals
%age Household Industries


ALWAR [Rajasthan]
Working Population
600000
500000
400000
300000
200000
100000
0
Total Population
Total Working Population
Total Main Worker
Total Marginal Worker
Total Non Worker
Kotkasim
Kishangarh Bas
Thanagazi
Mandawar
Rampgarh
Kathumar
Bansur
Lachhmangarh
Tijara
Behror
Rajgarh
Alwar
Tehsils


ALWAR [Rajasthan]
Literacy
600000
500000
400000
300000
200000
100000
0
Total Population
Total Literates
Total Illiterates
Kotkasim
Thanagazi
Ramgarh
Bansur
Tijara
Rajgarh
Tehsils


ALWAR [Rajasthan]
Population
600000
500000
400000
300000
200000
100000
0
Total Population
Total Population 06Years
Total SC Population
Total ST Population
Kotkasim
Thanagazi
Ramgarh
Bansur
Tijara
Rajgarh
Tehsils

- ***Other fairs:*** The other fairs held in the district are Ram Navami at Vijay Mandir, Teej, Gangaur, Shitalasthmi and Barai at Alwar, Bilali fair at Bansur tehsil, Charandas fair at Dehra (Alwar tehsil), Mataji fair at Dholagarh and Hanumanji fair at Harsora (Bansur Tehsil).

3.6.2 Festivals

The main festivals amongst Hindus are Deewali, Holi, Mahashivratri, Raksha Bandhan, Janmashtami and Dushehara while Muslims observe Id-ul-fitr, Id-ul-Zuha, Moharram, Barawafat and Shab-e-Barat.

3.6.3 Places of Religious, Historical and Archaeological importance and Tourist Interest

The district of Alwar has many religious places, places of historical, archaeological and tourist interest around it.

Alwar: Alwar city is situated mid-way on Delhi-Jaipur line of Western Railway and is connected by road with Jaipur and Delhi. A fort crowns a scarped hill. A steep ascent leads to the fort behind which stands the "Chhatri" of Maharaja Pratap Singh. The city palace separated from the base of hills by Sagar, a picturesque tank, consists of a group of buildings in different styles. The beautiful water reservoir (known as 'Sagar') is located behind the city palace but below the court. There is a museum in a portion of this palace where a collection of manuscripts and paintings are available. One of the outstanding manuscripts is an 80 ft long illustrated one of the Bhagwat and an illuminated copy of Quran in Arabic with Persian translations in red letters. A matchless copy of Sheikh Sadi's Gulistan decorated with miniature paintings is also available here. The museum gallery has a valuable collection of Mughal and Rajasthani paintings. The city palace also contains library paintings and armoury. In the past, there were five gates in the city. A market known as Hope Circus having shops in a circular fashion is well developed.

Rajgarh: Situated at a distance of about 33 kms from Alwar City, it is famous for its old fort known as 'Kankwari" fort. It is said that Dara, son of Shahjahan was kept as a prisoner in this fort. It has a shrine of deity Shri Chaturbhuj. Near Tehla village of this tehsil, is a Nilkantha temple.

Sariska : Situated at a distance of about 35 kms from Alwar City, is famous for its game sanctuary, during the rainy season, this place becomes a tourist hot spot.

Silser: It is a well-known bund of the district and is situated at a distance of 12 kms from Alwar City. A temple of Sheetala Devi exists at this place, where fair is held every year on Chaitra Badi 8. A tourist rest house has been established here. Boating facilities are also available.

Pandavpol: The place,famous from religious and historical point of view, is located about 72 kms away from Alwar City in Sariska valley. There is a temple of Hanumanji where a fair is held every year. It is supposed that the pandavas has spent the period of their *agyatwas* there. There is a natural gate (pol) in the hills after which the place is named as 'Pandavpol'.

The other places of tourist and archaeological importance are Vijai Mandir, Jaisamand Bund, Naldeshwar, and Pratapgarh Fort, Moti Doongari, and Ajabgarh Bhangarh forts, Naraini-ka-Mandir, Talvraksha and Jain Temple at Tijara.

3.7 Land Use Pattern

3.7.1 Physiography

The district is a fairly regular quadrilateral in shape. The Aravali range forms ridges of rocky and precipiton hills for the most part and are parallel. It makes its appearance in the district from the northeast in Tijara subdivision and runs southwards forming the boundary of the district in the northeast for about 24 kms, almost parallel to Alwar-Delhi road, terminating near Navgaon. Another range, a continuation of the Aravalis, comes into prominence at Mundawar and passes through Jindoli and Alwar towards the extreme south-western corner of the district to the Jaipur boundary. This uninterrupted chain of hills runs for about 81 kms from south to north and intersects the district into two parts.

These hills are low in the north and east of the district but become more prominent and more precipitons from the eastern border towards Alwar town and from north to south and congregate in the south. They cover nearly the whole of Thanagazi and Rajgarh tehsils and about one-third of Alwar tehsil and form important features in Bansur, Kishangarh and Tijara tehsils. They enclose between them fertile valleys and high land, which are reserved forests.

Mundawar, Behror and eastern portion of Alwar and Rajgarh tehsils and western portion of Bansur tehsils are level plains with scattered peaks of small hills. The hills on the western border rise boldly and abruptly from the plains on either side presenting an almost impassable wall of rock, and there is located the highest peak in the district 775 m above MSL at Bilahi. In general, the hills decrease in height and breadth from south to north and west to east. The physiographic map of the area is given in Plate-3.15.

3.7.2 Land Use Pattern

Satellite data of the Alwar (of 5th April, 2001) district was processed using EASI/PACE v.7.0 image processing system in order to interpret the various land use/cover classes present in the study area. The FCC was classified for land use/cover classes and the area of each land use/cover is tabulated in Table-3.21. The detailed land use/cover map of the study area is given in Plate-3.16.

Table- 3.21: Area of various land use/cover classes

#	Level-I	Level-II	Area	
			Sq.Km.	%
1.	**Built-up land**	(i) Urban	86.95	1.03
		(ii) Rural	7.33	0.08
		(iii) Industrial	16.53	0.20
		Sub-total:	110.81	1.31
2.	**Agricultural land**	(i) Crop land	3297.76	39.35
		(ii) Fallow land	1741.18	20.77
		Sub-total:	5038.94	60.12

#	Level-I	Level-II	Area	
			Sq.Km.	%
3.	**Vegetation Cover**	(i) Dense forest	631.31	7.53
		(ii) Open forest	536.78	6.40
		(iii) Scrubs	376.10	4.49
		Sub-total:	1544.19	18.42
4.	**Wasteland**	(i) Salt affected land	172.00	2.05
		(ii) Barren rocky land	990.62	11.82
		(iii) Gullied land	507.91	6.06
		Sub-total:	1670.53	19.93
5.	**Mining Area**	Mining area	9.88	0.12
6.	**Water Bodies**	Surface water bodies	5.65	0.06
		Total Area:	**8380.00 sq kms**	

Built-up land

All the man-made constructions covering the land surface are included under this category. It includes urban, rural settlements & industrial complexes. In the study area, the urban settlements identified on the imagery cover an area 86.95 Km^2. Apart from urban settlements, numbers of small villages sporadically located in the area cover 7.33 Km^2 of land, and industrial complexes cover an area of 16.53 km^2. Study indicates that built-up land constitutes only 1.31% of the study area.

Agriculture land

Land primarily used for farming and production of food, fibre and other commercial and horticultural crops falls under this category. It includes crop-land and fallow land. Crop-lands are those agricultural lands where standing crop occurs on the date of satellite imagery. Crops may be either kharif or Rabi. Fallow land is also agricultural land which is taken up for cultivation but temporarily allowed to rest, un-cropped for one or more seasons. These lands are those, which are seen devoid of crops at the time when the imagery is taken.

Analysis of the data indicates that the total area of agriculture land is 5038.94 Km^2 (60.12%) in the study area; out of which 3297.76 Km^2 (39.35%) is the crop-land and 1741.18 Km^2 (20.77%) is the fallow land.

Forest cover

It is an area bearing an association predominantly of trees and other vegetation, capable of producing timber and other forest produce. Forest cover is classified into the following three sub-classes based on crown density as per modified FAO-1963 (Food & Agricultural Organisation of United Nations) norms: (a) dense forest (crown density more than 40%), (b) open/degraded

forest (crown density between 10% to 40%), and (c) scrubs (crown density less than 10%).

Analysis of the satellite data reveals that total area of forest cover in the study area is 1544.19 Km^2 (18.42%); out of which 631.31 Km^2 (7.53%) is the dense forest, 536.78 Km^2 (6.40%) is the open forest and 376.1 Km^2 (4.49%) is the scrubs.

Wasteland

Wasteland is a degraded and under-utilised class of land that has deteriorated on account of natural causes or due to lack of appropriate soil and water management. Wasteland can result from inherent/imposed constraints such as location, environment, chemical and physical properties of the soil or financial or other management constraints (NWDB, 1987).

Analysis of the data reveals that the total area of wasteland in the study area is 1670.53 Km^2 (19.93%); out of which the area of salt affected land is 172.00 km^2 (2.05%), the area of barren rocky land is 990.62 Km^2 (11.82%) and gullied land covers 507.91 km^2 (6.06%).

Mining Area

Analysis of the data reveals that the total mining area, which includes limestone and marble mining, constitutes an area of 9.88 Km^2 (0.12%).

Water bodies

A number of small-impounded water tanks, rivers and streams are present in the study area. Area of water bodies is 5.65 Km^2 (0.06%) in the study area.

3.7.3 Land Classification As per Aravali Notification

Ministry of Environmnet & Forests, Government of India vide its notifiction dated 7th May, 1992, has restricted developmental activities on the following categories of land.

(i) All reserved forests, protected forests or any other area shown as "forest in the land records maintained by the State Government as on the date of this notification in relation to the Alwar District of the State of Rajasthan".

(ii) All areas shown as: -
- (a) Gair Mumkin Pahar, or
- (b) Gair Mumkin Rada, or
- (c) Gair Mumkin Behed, or
- (d) Banjad Beed, or
- (e) Rundh.

in the land records maintained by the State Government as on the date of this notification in relation to the Alwar district of the State of Rajasthan.

(iii) All areas of Sariska National Park and Sariska Sanctuary notified under the Wildlife (Protection) Act, 1972 (53 of 1972).

The extent of the above categories of land, tehsilwise has been prepared on a GIS Platform. This is presented in Plate-3.17 to Plate-3.20. The extent of such categories of land villagewise is appended as Annexure-III. A composite map showing the land covered under Aravali Notification is placed at Plate-3.21.

3.7.4 Soils

The soil of loam type occurs in major part of the Alwar district especially in Umred, Behror, Thana Ghazi, Kathumar, Bansur & Mundawar. However, sand, sand clay loam and clay loam also occurs in other tehsils of the district. These are shown in Table-3.22.

Table-3.22: Type of soil in Alwar District (2000-2001)

Type of Soil	Total Area (ha)	Tehsil where occurs
Loam	320357.93	Umred, Behror, Thana Ghazi, Kathumar, Bansur & Mundawar
Sand	34977.60	Kotkasim, Tijara, Neemrana, Ramgarh, Reni, Behror
Sand Clay Loam	146720.56	Ramgarh, Umren, Lachhmangarh
Clay Loam	39205.00	Reni

(Source: District Statistical Report, Alwar, 2002)

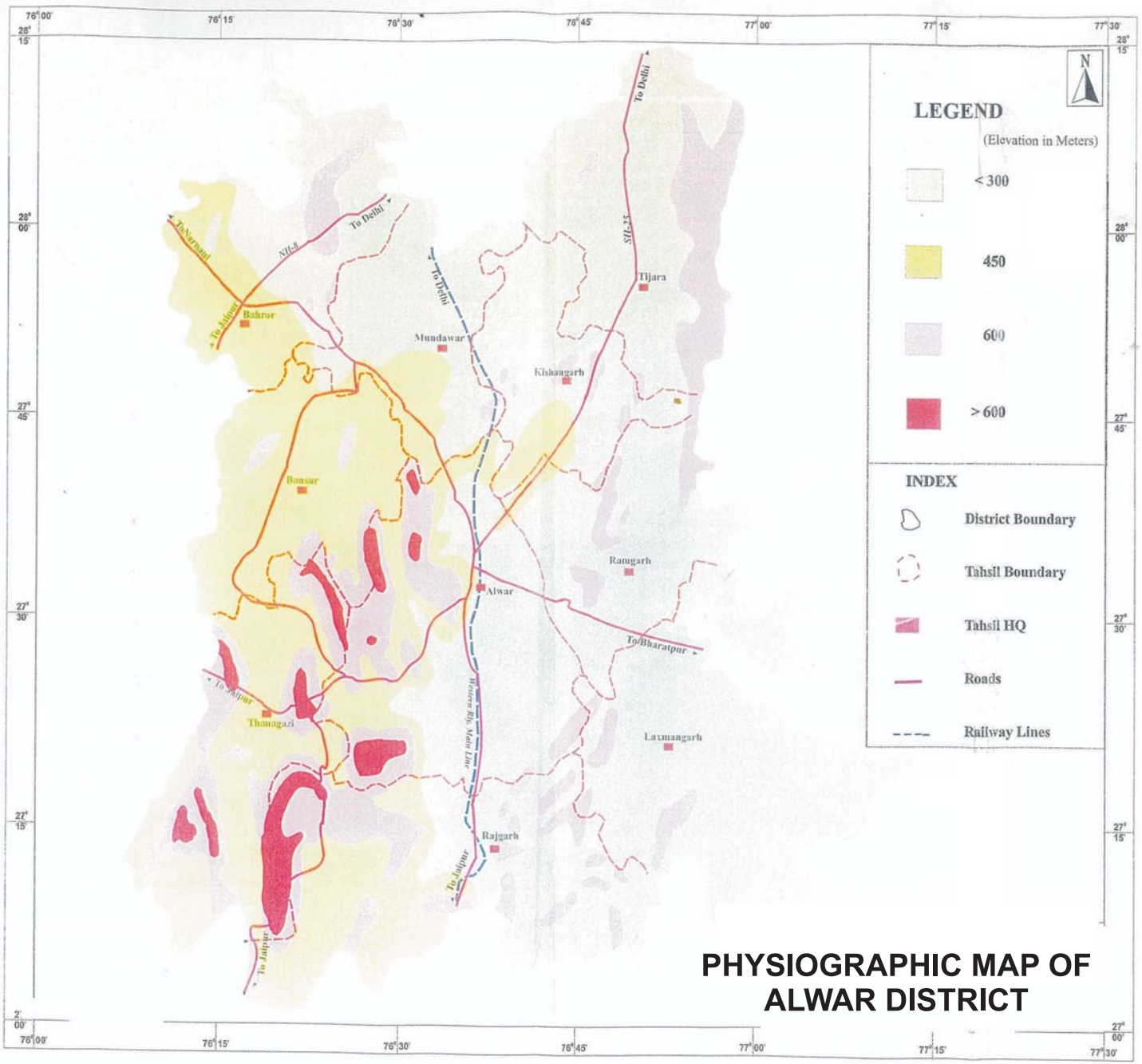
The distribution of different type of soils in Alwar district has been taken from soil map of National Bureau of Soil Survey and Land Use Planning (NBSS & LUP). The details of the soil distribution in the region are given in Plate-3.22.

3.8 Industrial Sites

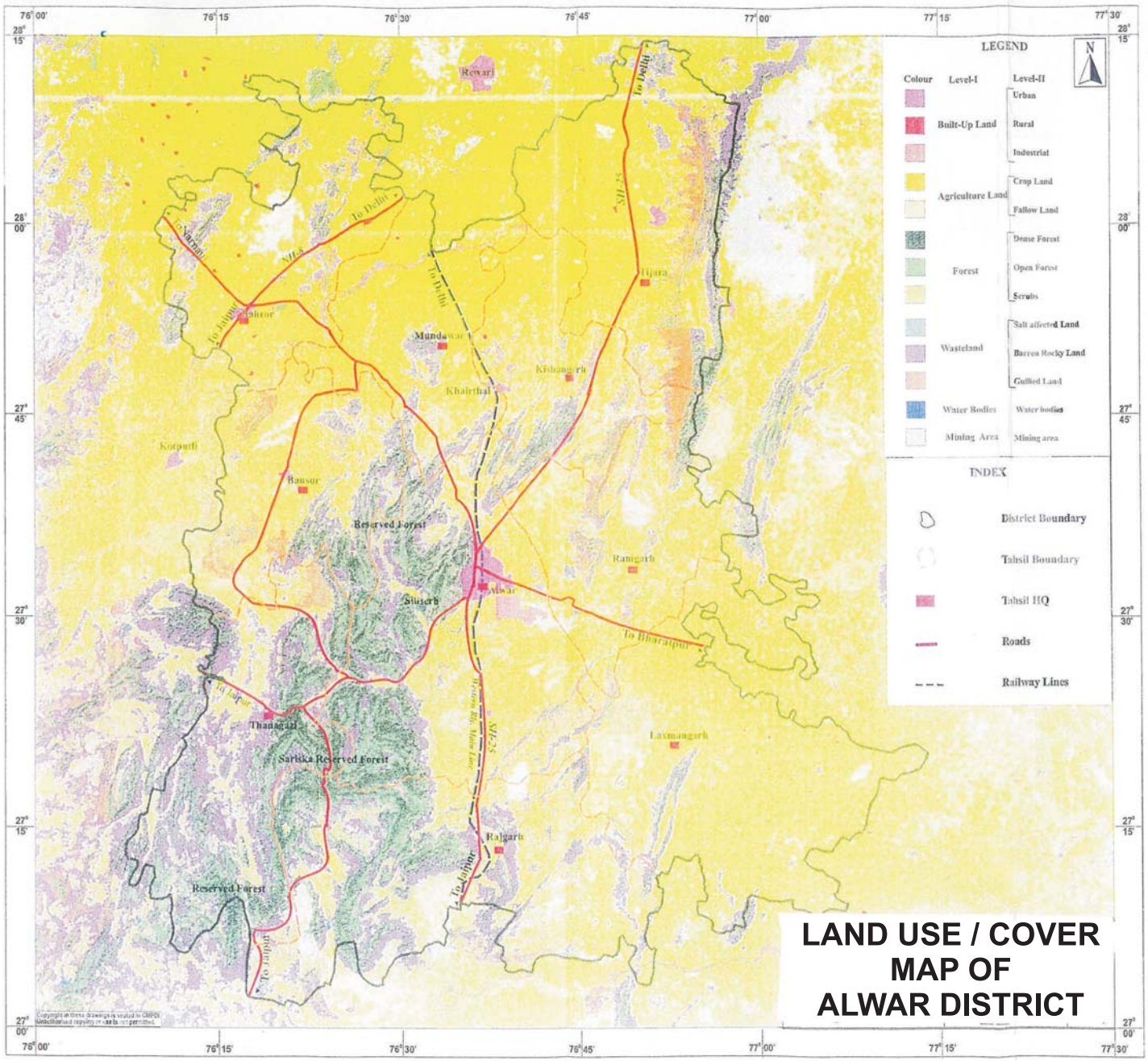
A number of industrial areas have been developed by RIICO in the District whih have been detailed in Table-3.23. The location of industrial areas is shown in Plate-3.1. Apart from the industries, which exists in these industrial locations, there some other industries as well, situated outside the industrial area. The prominent among these are as under:

- Globus Agronics Limited (Distillary) – outide Behror industrial area
- Allied Domecq Spirits & Wine (India) Ltd. – outside Behror industral area
- Mount Shivalik Industries Limited (Beer) – outside Behror industrial area
- Arahm Spinning Mills – outside Bhiwadi industrial areas
- SRF Chemical Industries - outside Bhiwadi industrial areas
- Winsom Breweries - outside Bhiwadi industrial areas
- Kajaria Ceramics - outside Bhiwadi industrial areas

The industries in the districts come under the jurisdiction of Regional Office, RSPCB, Bhiwadi and Regional Office, RSPCB, Alwar. The indisrial areas of Bhiwadi, Rampur Mundana, Saare Khurd, Chopanki and Khushkhera come under the jurisdiction of Regional Office, RSPCB, Bhiwadi whereas the remaining industrial areas come under the jurisdiction of Regional Office, RSPCB, Alwar. The inventory of industries in the Alwar district is summarised in Table-3.24:



PHYSIOGRAPHIC MAP OF ALWAR DISTRICT



LAND USE / COVER MAP OF ALWAR DISTRICT

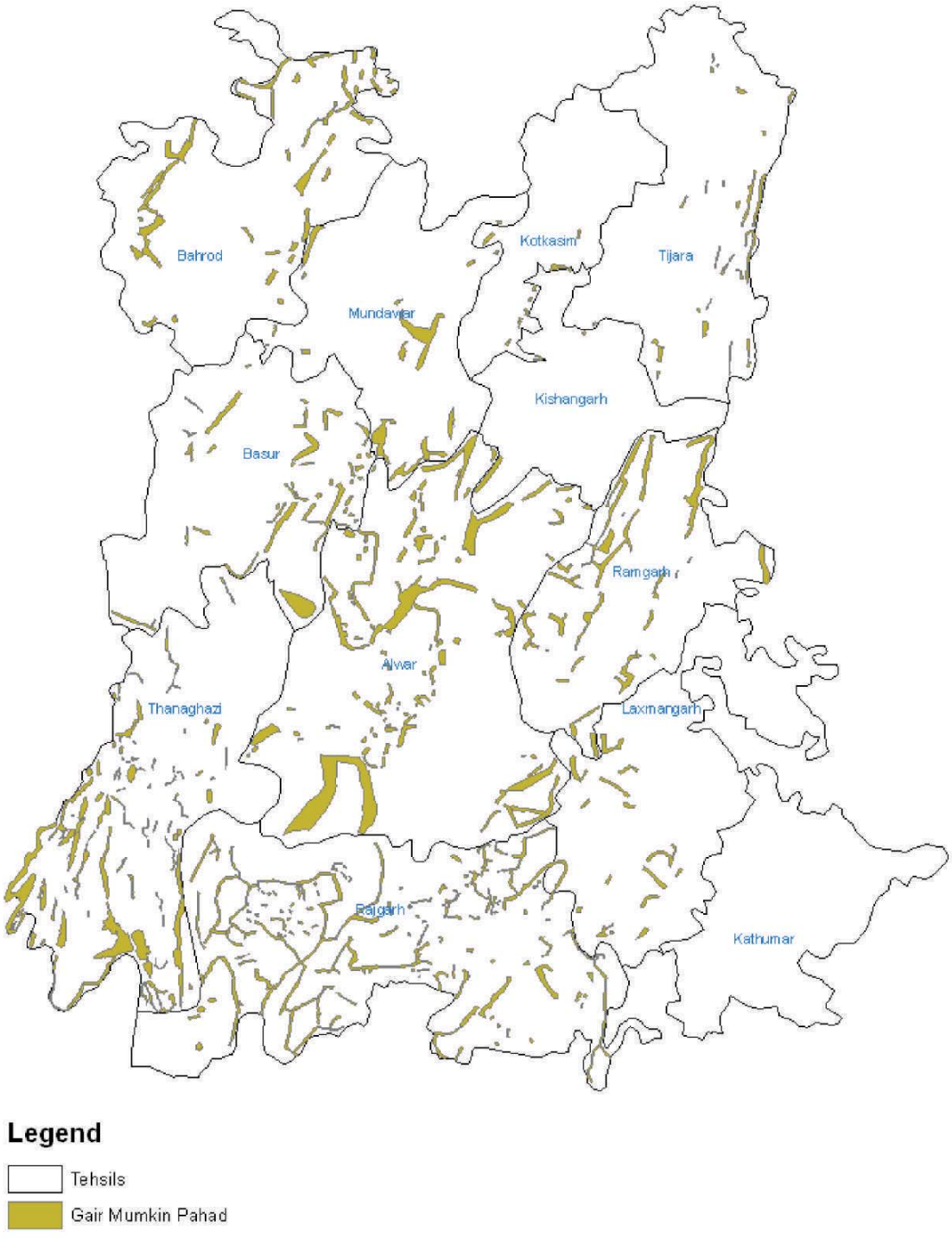

Bahrod
Kotkasim
Tijara
Mundawar
Kishangarh
Basur
Ramgarh
Alwar
Thanaghazi
Laxmangarh
Rajgarh
Kathumar
Legend
Tehsils
Gair Mumkin Pahad

PLATE NO. 3.18

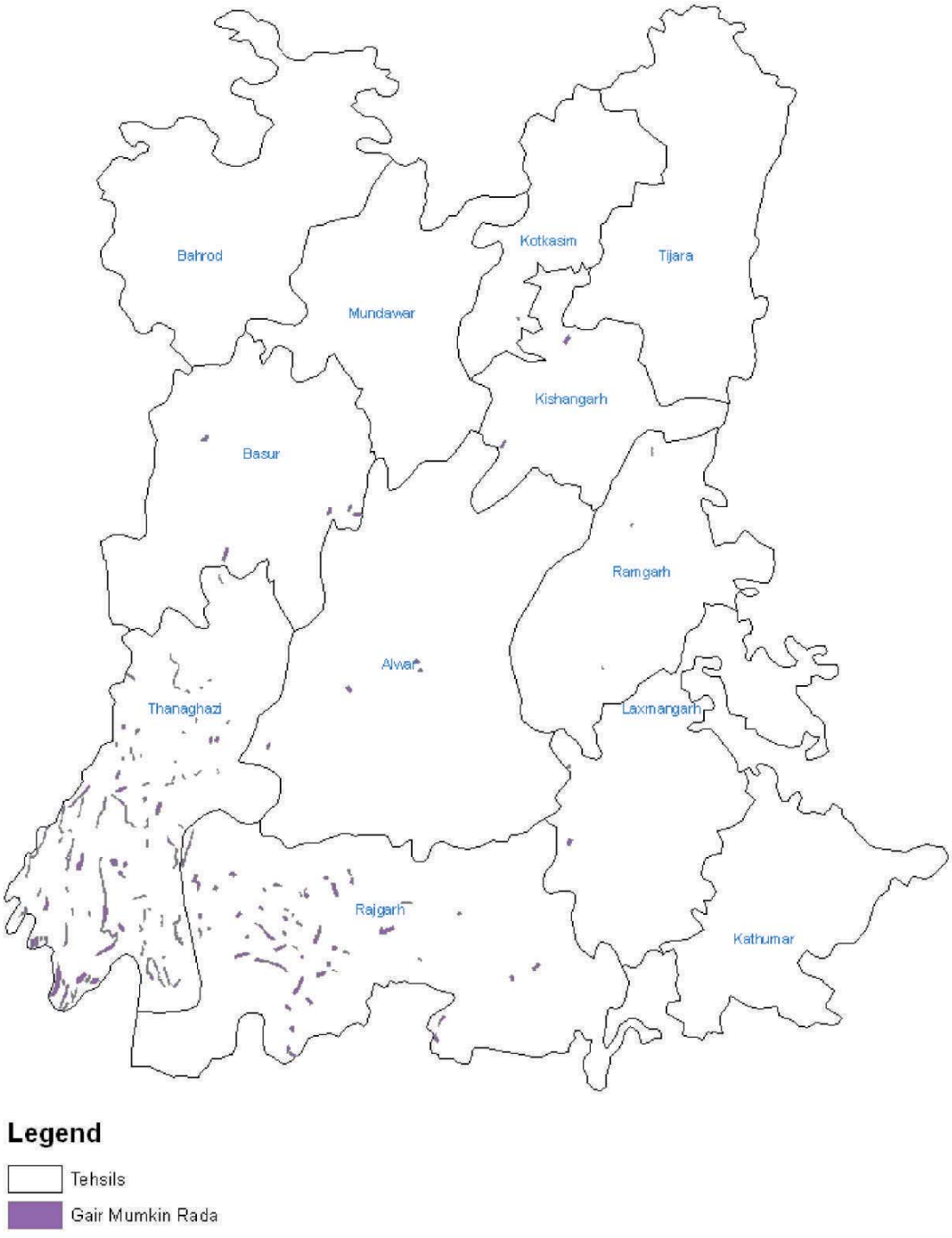
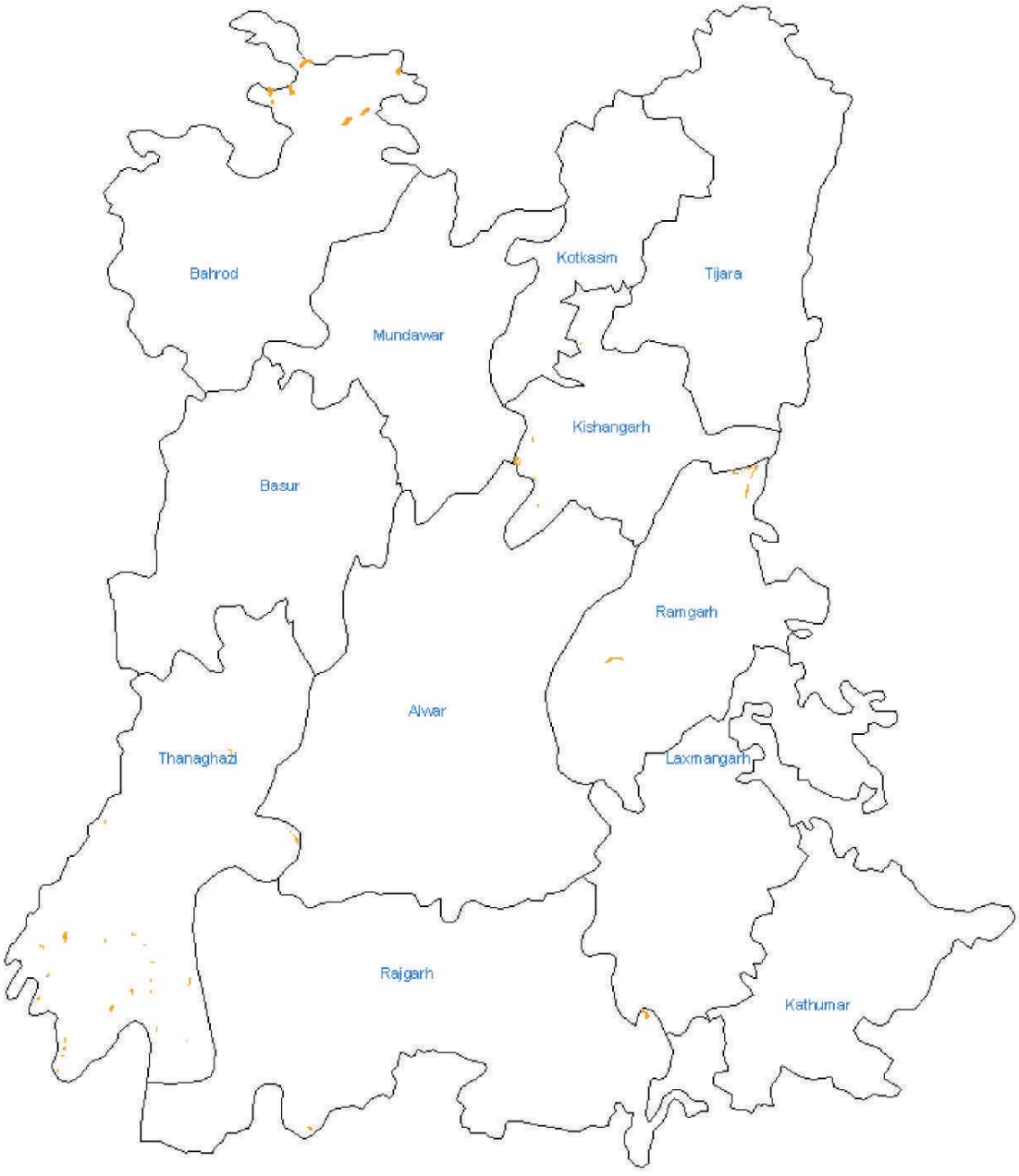

Bahrod
Mundawar
Kotkasim
Tijara
Kishangarh
Basur
Ramgarh
Alwar
Thanaghazi
Laxmangarh
Rajgarh
Kathumar
Legend
Tehsils
Gair Mumkin Rada

PLATE NO. 3.19



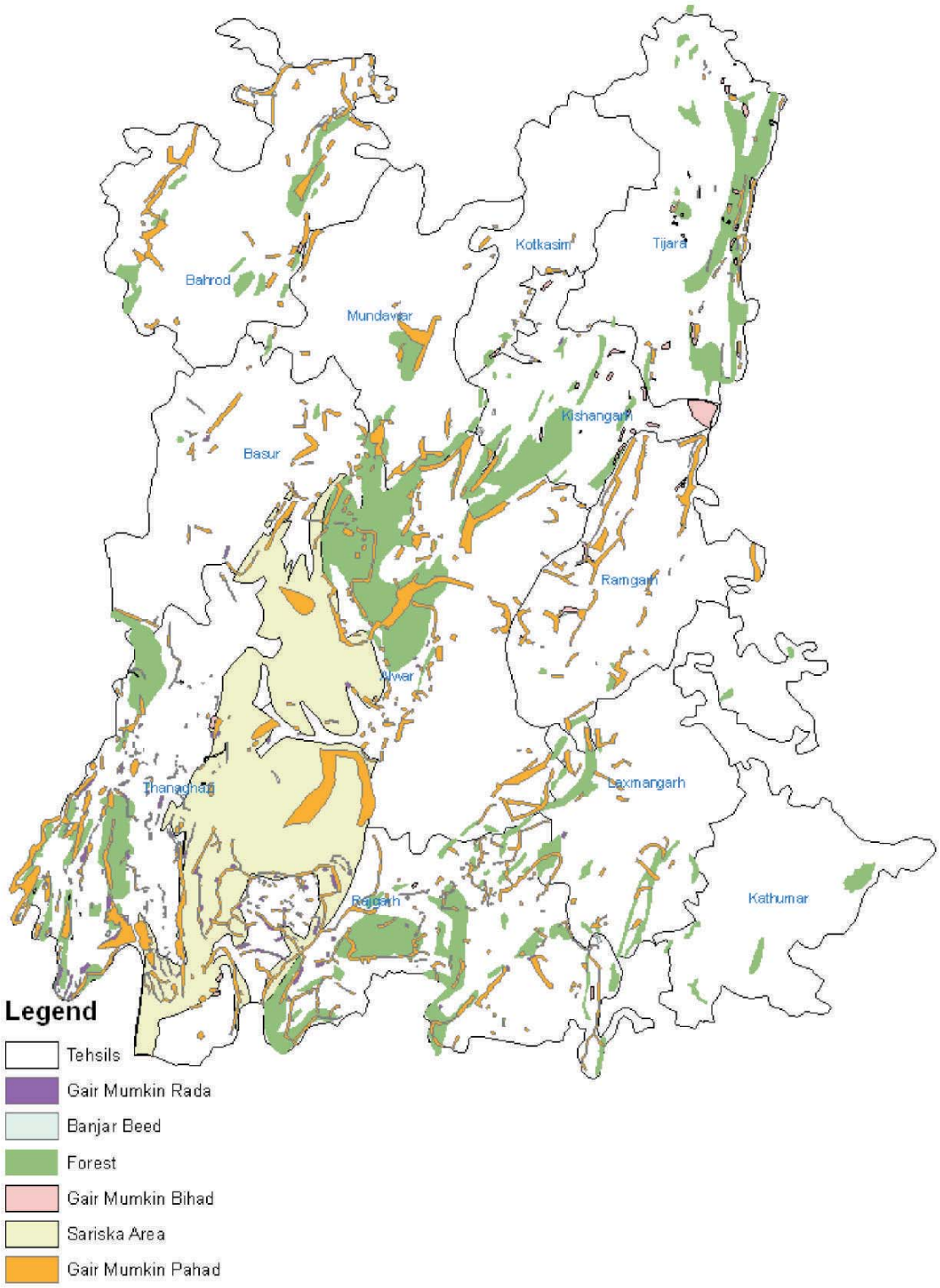
Legend

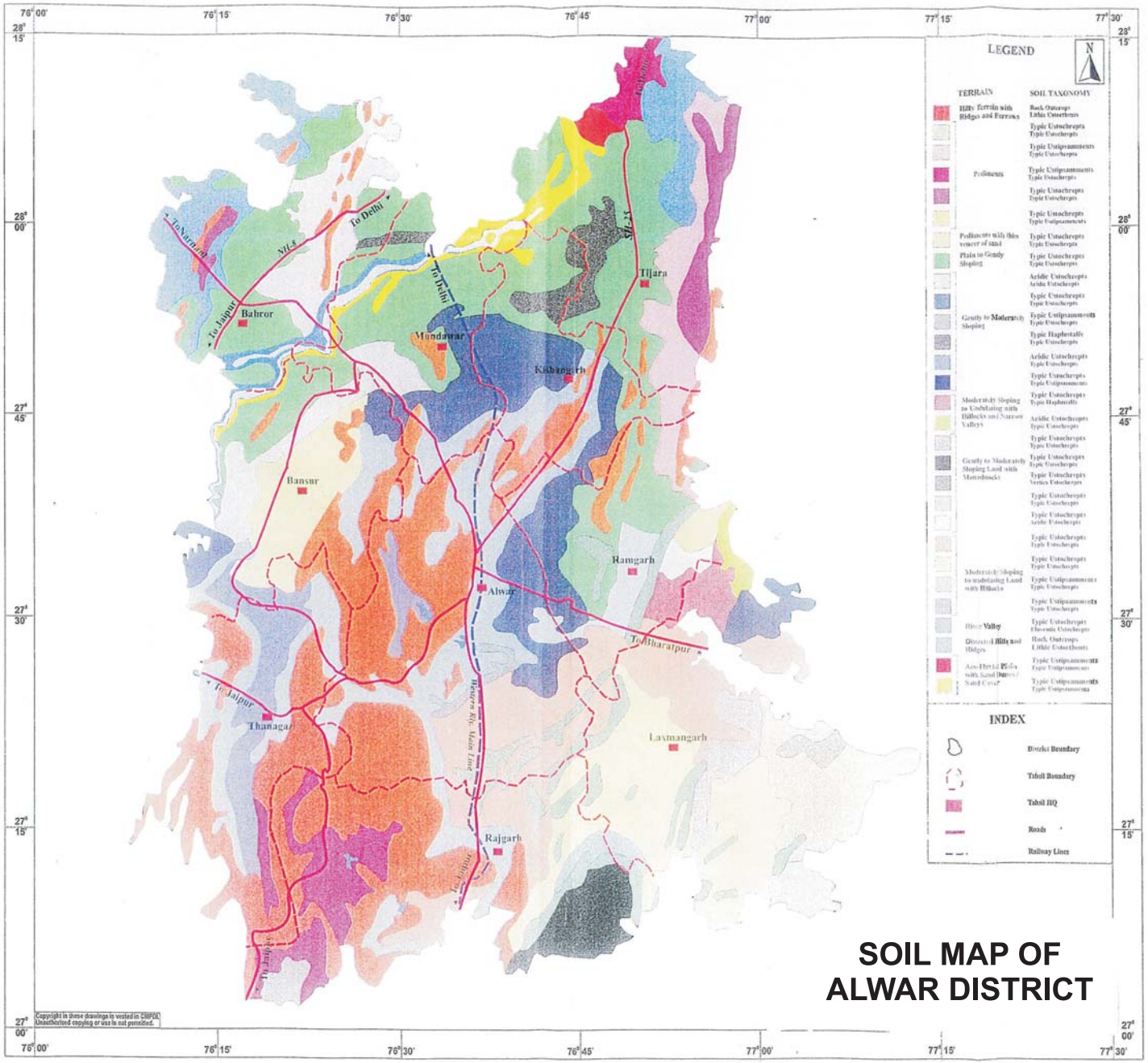
Tehsils

Banjar Beed Area

PLATE NO. 3.20


Bahrod
Mundawar
Kotkasim
Tijara
Kishangarh
Basur
Ramgarh
Alwar
Thanaghazi
Laxmangarh
Rajgarh
Kathumar
Legend
Tehsils
Gair Mumkin Beehad


Kotkasim
Tijara
Bahrod
Mundawar
Kishangarh
Basur
Ramgarh
Alwar
Thanagazi
Laxmangarh
Rajgarh
Kathumar
Legend
Tehsils
Gair Mumkin Rada
Banjar Beed
Forest
Gair Mumkin Bihad
Sariska Area
Gair Mumkin Pahad



SOIL MAP OF ALWAR DISTRICT

Table-3.23: Details of the industrial areas developed by RIICO in Alwar District (as on 31/3/2005)

Sl No.	Name of Industrial area	Land Acquired (Acre)	Land developed (Acre)	Plots Planned		Plots Developed		Plots in production		Future growth planned
				No.	Area (acre)	No.	Area (acre)	No.	Units	
1	MIA Alwar	1872.06	1872.06	704	1421.01	704	1421.01	465	414	NA
2	MIA Alwar (Ext)	435.47	107.73	241	313.61	119	95.56	19	9	NA
3	Rajgarh	16.56	16.56	42	10.74	42	10.62	42	34	NA
4	Rajgarh (Ext)	24.03	24.03	69	15.10	69	15.10	12	7	NA
5	Khairthal	39.06	37.37	89	26.42	89	26.42	89	74	NA
6	Khairthal (Ext)	30.84	30.84	45	22.80	41	22.80	5	4	NA
7	Kherli	8.41	8.41	27	5.08	27	5.08	27	17	NA
8	Thana Ghazi	33.12	00	70	16.23	0	0.00	10	1	NA
9	OIA Alwar	219.25	219.25	56	88.17	56	88.17	56	27	NA
10	Bhiwadi[1]	2075.35	2075.35	1430	1378.17	1430	1378.17	980	859	NA
11	Rampur Mundana	63.28	63.28	271	39.20	271	39.20	39	39	
12	Khushkhera	967.25	815.48	1131	751.61	1131	751.61	46	43	NA
13	Chopanki	802.00	802..00	908	492.00	908	492.00	47	37	450 Acres
14	Sarekhurd	94.59	00	55	74.75	--	--	1	1	NA
15	Behror	320.34	280.81	263	189.19	263	189.19	209	179	--
16	Shahjahanpur	230.09	151.41	190	93.34	190	93.34	105	69	--
17	Neemrana	644.75	644.75	150	473.85	150	473.85	52	32	500 Acres
18	Sotanala	151.91	151.91	80	95.27	80	95.27	7	6	200 Acres
19	EPIP Neemrana 1st Phase	168.73	--	169	120.45	--	--	--	--	--
20	Kot Kasim	--	--	--	--	--	--	--	--	500 Acres

[Note: NA i.e not applicable are the areas wherein future industrial growth is not expected]

[Source: RIICO Alwar, Bhiwadi and Shahjahanpur]

[1] The Bhiwadi Unit-I consists of Bhiwadi and Rampur Mundana Units whereas Bhiwadi Unit-II consists of Khushkhera, Chopanki and Saarekhurd.

Table-3.24: Inventory of Industries in Alwar District

Sl No.	Jurisdiction	No. of industries		
		Red category	Orange Category	Other category
1	RO, Bhiwadi	44	302	77
2	RO, Alwar	134	448	117

(Source: Regional Office, Rajasthan State Pollution Control Board, Bhiwadi & Alwar)

In the Bhiwadi Industrial Area, there is a combined effluent treatment plant installed to treat the estimated effluent to the tune of 5-6 MLD. This treatment plant has been fully commissioned in December, 2004 but the efficiency of the plant is still not satisfactory. The plantation work has also been carried out in the premises and the units generating hazardous waste have installed landfill facilities to treat the waste individually.

Bhiwadi industrial area and nearby industrial areas do not have proper disposal system for final wastewater. All the industrial and domestic wastewater of these areas goes to Haryana due to natural gradient & creates problems due to improper disposal system. This needs special care to treat the industrial and domestic effluent from this area to avoid inter-state problem.

In other industrial areas, the hazardous wastes are managed by industries inividididually. The effluent treatment plants have also been installed by individual units to treat the effluent. The quality of effluent from these industrial areas shows the parameters not conforming to the prescribed standards.

The major air pollution sources in the industrial areas are induction furnaces (both coal and oil fired), DG sets and oil fired boilers and stone crushers. The air pollution control systems include cyclone/multi-cyclone alongwith safe stack height in coal fired boilers, swirl canopyhood alongwith scrubbers, blower and chimney in induction furnaces, safe stack height as per emission regulations in oil fired boilers and in DG sets.

3.9 Pollution Load Assessment

In this section, an attempt has been made to calculate the pollution load for the major activities e.g. transportation and industries in the district.

3.9.1 Transportation

Road transportation facilities and good road network in any area reflects the status of developmental activities in that area. Industrial, commercial and agricultural growth is dependent of the infrastructure facilities available in that region. Transportation plays an important role in the growth of economy.

The number of vehicles registered in the Alwar district has shown steady growth. Table-3.25 shows the annual growth of different type of vehicles registered in Alwar.

Table- 3.25: Annual growth of Vehicles in District

Type of Vehicle	1996-97	1997-98	1998-99	1999-00	2000- 01
Car & Jeep	3618	4205	4931	5317	3868
Private Buses	1370	1457	1662	1795	1303
Motor Cycle, Scooter	56725	63353	73120	81905	89573
Taxi Car	215	239	262	265	130
Truck	6626	7095	8302	8651	8246
Tractor	15910	17205	18983	20616	22032
Other	2175	2354	2371	2392	3388
Total	**86639**	**95908**	**109631**	**120941**	**128540**

(Source: District Statistical Book, Alwar, 2002)

Pollution Load due to Transport Activities

For the present study, the following method given in "**US EPA; Compilation of Air Pollutant Emission Factors; AP 42"** has been used to assess the fugitive emission load due to road lifted dust. According to this method, the quantity of the dust/ m^2 on a road and the amount of silt and moisture content in it are determined. The vehicles crossing a certain point in one hour on this road are also counted. From these data, the fugitive emission load (kg/hr) for a certain length (km) of the paved road is calculated.

The fugitive road lifted emission PM_{10} on the various roads of Alwar due to vehicular transport has been assessed using the above stated method and the data are given in Table-3.26**.** It may be seen from this table that fugitive emission load due to this one factor alone is huge.

Table-3.26: Road Lifted Fugitive Dust Emission

(Values in kg/ day)

Period	Road –A	Road –B	Road –C	Road –D	Road –E	Road –F	Total Load
Two Wheeler	1.7208	4.872	4.872	5.308	2.391	2.391	21.5548
Light Duty Vehicles	47.4336	13.176	13.176	39.000	4.392	4.392	121.5696
Heavy Duty Vehicles	101.4444	28.17	28.17	69.486	5.634	5.634	238.5384

Road –A: Alwar – Bhiwadi road (90 km), Road –B: Alwar – Bharatpur road (50 km)
Road –C: Alwar- Ramgarh road (50 km) Road –D: Jaipur – Delhi NH road (50 km)
Road –E: Alwar- Narnaul road (80 km), Road–F: Alwar – Behror road (50 km)

3.9.2 Mining

Mining in the Alwar district is being carried out in unorganized sector. The mines are very small, in general 100 m x 100 m lease area, and scientific methods for extraction of the minerals were not resorted to. In such small mines, it is difficult to quantify the pollution load, as the emission factors to calculate the pollution load are not available for such small mines.

3.9.3 Industries

A. Industries operating under Regional Office, Alwar

- **Matsya Industrial Area and its surroundings**

Total Industries in the area: App. 220

Following are the major industries in the area:

•	Stone Chips & mineral grinding	-	50
•	Chemical plants	-	50
•	Distillery	-	2
•	Textile Unit	-	1
•	Mini Steel Plant	-	1

Stone Crushers

Stone crushers are major source of fugitive air pollution in the area. As mentioned above, there are 50 stone crushers existing in the area working normally 8 hours a day. Pollution load due to these crushers can be estimated on the basis of the data worked out by **CPCB (PROBES /21/1983-84)**. According to this data, 500 tons of stone crushing capacity contributes 2.8 MT of Suspended Particulate Matter per day. That amounts to 116.7 kg/hr for 500 Mt stone crushing. In the area crushing capacity of the existing stone crushers is observed as 650 MT/ day. The emission load due to these crushers will be thus **3.64 TPD or 151.67 kg/hr** (Considering crusher operating time as 24 hours).

Chemical Plants

The Chemicals plants in the industrial area are mainly the Calcium Chloride manufacturing units. The air pollution source in these units is mainly the coal burning. Normally the installed capacity of the units is 3 TPD of Calcium Chloride and using 1.2 TPD coal. For the purpose of particulate load calculation the ash content in the coal is taken as 34%. In the area approximate installed manufacturing capacity of the existing chemical plants is 150 MT/ day and consuming about 60 TPD coal. The emission load due to these units will be thus **20.4 TPD or 850 kg/hr** (Considering operating time as 24 hours).

Distillery Units

As given in the section above, there are two distilleries operating in the area. To calculate the pollution load from these distilleries the emission factor given in the book titled **" Rapid Assessment of Sources of Air, Water and Land Pollution, WHO"** has been taken. The emission factor for the distillery given in the above book is 4 kg of particulate matter / m^3 of produce. In the area approximate installed manufacturing capacity of the distilleries is 75 m^3/ day. The emission

load due to these units will be thus **300 Kg/day or 16.67 kg/hr** (Considering operating time as 24 hours).

Textile Units

As given in the section above, there is one textile unit operating in the area. To calculate the pollution load from this textile unit the emission factor given in the book titled **" Rapid Assessment of Sources of Air, Water and Land Pollution, WHO"** has been taken. The emission factor for the textile unit given in the above book is 14 kg of particulate matter / ton of produce. In the area installed manufacturing capacity of the textile unit is 5 ton/ day. The emission load due to this unit will be thus **70 Kg/day or 2.92 kg/hr** (Considering operating time as 24 hours).

Mini Steel Plant

For assessing the pollution load from the electric arc furnace of mini steel plants, the draft emission factor given in **"US EPA; Compilation of Air Pollutant Emission Factors; AP 42; Fifth Edition: Volume 1"** has been taken. The emission factor for it is 0.045 kg/ton of steel produced. The approximate capacity of the mini steel plant is 50 ton / day of steel. The emission load from the electric arc furnace of mini steel plants will be thus **2.25 kg/ day or 0.09 kg/hr** (Considering operating time as 24 hours).

- **Old Industrial Area and its surroundings**

Total Industries in the area: App. 35

Following are the major industries in the area:

•	Stone Chips and mineral grinding units	-	20
•	Chemical plants	-	4
•	Refractory unit	-	1
•	Edible Oil	-	3
•	Metal casting	-	3

Stone Crushers

Stone crushers are major source of fugitive air pollution in the area. As mentioned above, there are 20 stone crushers existing in the area working normally 8 hours a day. Pollution load due to these crushers can be estimated on the basis of the data worked out by **CPCB (PROBES /21/1983-84)**. According to this data, 500 tons of stone crushing capacity contributes 2.8 MT of Suspended Particulate Matter per day. That amounts to 5.6 kg/day/ ton stone crushing. In the area crushing capacity of the existing stone crushers is observed as 250 MT/ day. The emission load due to these crushers will be thus **1400 kg/day or 58.33 kg/hr** (Considering crusher operating time as 24 hours).

Chemical Plants

The Chemicals plants in the industrial area produce different type of chemical. The air pollution source in these units is mainly the fuel burning. Coal and oil are the main fuel used in these industries. These units are using app. 1 TPD coal and 1 m^3 /day diesel. For the purpose of particulate load calculation for coal the ash content in the coal is taken as 34%. The emission load from using coal due to these units will be thus **0.34 TPD or 14.17 kg/hr** (Considering operating time as 24 hours). For assessing the pollution load from the boilers using diesel as fuel, the emission factor given in **"US EPA; Compilation of Air Pollutant Emission Factors; AP 42; Fifth Edition: Volume 1"** has been taken. The emission factor for it is 1.2 kg/m^3 of diesel consumed. The emission load from using diesel due to these units will be thus **1.2 kg/ day or 0.05 kg/hr** (Considering operating time as 24 hours).

Refractory unit

The air pollution source in the refractory unit is mainly the fuel burning. Coal is the main fuel used in the industry. This unit is using app. 10 TPD coal. For the purpose of particulate load calculation for coal the ash content in the coal is taken as 34%. The emission load from using coal due to these units will be thus **3.4 TPD or 0.14 kg/hr** (Considering operating time as 24 hours).

Edible Oil Unit

There are three edible oil-manufacturing units operating in the area. To calculate the pollution load from the edible oil-manufacturing units, the emission factor given in the book titled **" Handbook of Emission Factors, Part 2, industrial sources; Ministry of Housing, Physical planning & Environment, Government Publishing Office, The Hague"** has been taken. The emission factor for the edible oil-manufacturing unit given in the above book is 50 - 1200 g / ton of processed material. For the present study the emission factor is assumed that of 750 g / ton of processed material. The manufacturing capacity of the plant is 40 TPD refined oil and 50 TPD Vanaspati. The emission load due to this unit will be thus **67.5 Kg/day or 2.81 kg/hr** (Considering operating time as 24 hours).

Metal casting

The air pollution source in these units is mainly the fuel burning. Coal and oil are the main fuel used in these industries. These units are using app. 1 TPD coal and 1 m^3 /day diesel. For the purpose of particulate load calculation for coal the ash content in the coal is taken as 34%. The emission load from using coal due to these units will be thus **0.34 TPD or 14.17 kg/hr** (Considering operating time as 24 hours). For assessing the pollution load from the boilers using diesel as fuel, the emission factor given in **"US EPA; Compilation of Air Pollutant Emission Factors; AP 42; Fifth Edition: Volume 1"** has been taken. The

emission factor for it is 1.2 kg/m^3 of diesel consumed. The emission load from using diesel due to these units will be thus **1.2 kg/ day or 0.05 kg/hr** (Considering operating time as 24 hours).

- **Behror Industrial Area and its surroundings**

Total Industries in the area: Approx. 64

Following are the major industries in the area:

- Mini Cement Plant - 10
- Brick kilns - 28
- Distillery/breweries - 3
- Mineral grinding (crusher) - 2

Cement Plants

The cement-manufacturing units are the major source of air pollution. As given in the section above, there are 10 mini cement-manufacturing units operating in the area. The dust is the major air pollutant emitted from the cement plant. To calculate the dust load from the cement plant the emission factor given in the book titled **" Handbook of Emission Factors, Part 2, industrial sources; Ministry of Housing, Physical planning & Environment, Government Publishing Office, The Hague"** has been taken. The emission factor for the cement plant given in the above book is 150 g of dust / ton of cement produced. In the area installed manufacturing capacity of the cement plants is 470 MT/ day. The emission load due to these units will be thus **70.5 Kg/day or 2.94 kg/hr** (Considering operating time as 24 hours).

Brick Manufacturing Units

Brick kilns are another source of air pollution in the study area. There are 28 kilns operates during the day in the area.

Emission load due to 28 brick kilns= 4.5 X 28 = **126 kg/hr**

= 1008 kg/day (considering 08 hours operation/day)

Distillery Units

As given in the section above, there are three distilleries operating in the area. To calculate the pollution load from these distilleries the emission factor given in the book titled **" Rapid Assessment of Sources of Air, Water and Land Pollution, WHO"** has been taken. The emission factor for the distillery given in the above book is 4 kg of particulate matter / m^3 of produce. In the area approximate installed manufacturing capacity of the distilleries is 100 m^3/ day. The emission load due to these units will be thus **400 Kg/day or 16.67 kg/hr** (Considering operating time as 24 hours).

Mineral grinding (Crusher)

Stone crushers are major source of fugitive air pollution in the area. As mentioned above, there are 2 crushing units working in the area for normally 8 hours a day. Pollution load due to these crushers can be estimated on the basis of the data worked out by **CPCB (PROBES /21/1983-84)**. According to this data, 500 tons of stone crushing capacity contributes 2.8 MT of Suspended Particulate Matter per day. That amounts to 5.6 kg/day/ ton stone crushing. In the area crushing capacity of the existing stone crushers is observed as 25 MT/ day. The emission load due to these crushers will be thus **140 kg/day or 5.83 kg/hr** (Considering crusher operating time as 24 hours).

- **Khairthal Industrial Area and its surroundings**

Total Industries in the area: App. 21

Following are the major industries in the area:

- Stone Crushers - 3
- Brick Manufacturing unit - 9
- Textile unit - 2
- Oil mills - 7

Stone Crushers

Stone crushers are major source of fugitive air pollution in the area. As mentioned above, there are 3 stone crushers existing in the area working normally 8 hours a day. Pollution load due to these crushers can be estimated on the basis of the data worked out by **CPCB (PROBES /21/1983-84)**. According to this data, 500 tons of stone crushing capacity contributes 2.8 MT of Suspended Particulate Matter per day. That amounts to 5.6 kg/day/ ton stone crushing. In the area crushing capacity of the existing stone crushers is observed as 250 MT/ day. The emission load due to these crushers will be thus 1**400 TPD or 58.33 kg/hr** (Considering crusher operating time as 24 hours).

Brick Manufacturing Units

Brick kilns are another source of air pollution in the study area. There are 9 kilns operates during the day in the area. These brick kilns operate all through out the year except monsoon season.

Emission load due to 9 brick kilns= 4.5 X 9 = 40.5 kg/hr
= 324 kg/day (considering 08 hours operation/day)

Textile unit

As given in the section above, there are 2 textile units operating in the area. To calculate the pollution load from this textile unit the emission factor given in the book titled **" Rapid Assessment of Sources of**

Air, Water and Land Pollution, WHO" has been taken. The emission factor for the textile unit given in the above book is 14 kg of particulate matter / ton of produce. In the area installed manufacturing capacity of the textile unit is 10 ton/ day. The emission load due to this unit will be thus **140 Kg/day or 5.84 kg/hr** (Considering operating time as 24 hours).

Oil mills

Seven edible oil-manufacturing units are operating in the area. To calculate the pollution load from the edible oil-manufacturing unit the emission factor given in the book titled **" Handbook of Emission Factors, Part 2, industrial sources; Ministry of Housing, Physical planning & Environment, Government Publishing Office, The Hague"** has been taken. The emission factor for the edible oil-manufacturing unit given in the above book is 50 - 1200 g / ton of processed material. For the present study the emission factor is assumed that of 750 g / ton of processed material. The manufacturing capacity of the plant is 50 TPD oil. The emission load due to this unit will be thus **37.5 Kg/day or 1.56 kg/hr** (Considering operating time as 24 hours).

- **Rajgarh Industrial Area & its surroundings**

Total Industries in the area: Approx. 40

In this area, stone chips and mineral grinding units are the major industries.

- Stone chips & mineral grinding units - 32

Stone Crushers

Stone crushers are major source of fugitive air pollution in the area. As mentioned above, there are 32 stone crushers existing in the area working normally 8 hours a day. Pollution load due to these crushers can be estimated on the basis of the data worked out by **CPCB (PROBES /21/1983-84)**. According to this data, 500 tons of stone crushing capacity contributes 2.8 MT of Suspended Particulate Matter per day. That amounts to 5.6 kg/day/ ton stone crushing. In the area crushing capacity of the existing stone crushers is observed as 500 MT/ day. The emission load due to these crushers will be thus **2800 kg/day or 116.7 kg/hr** (Considering crusher operating time as 24 hours).

- **Industries on Ramgarh Delhi Road**

Total Industries in the area: App. 10

Following are the broad categories of the industries contributing to air pollution in the area:

- Brick Manufacturing unit - 6

- Chemical Plants - 1
- Textile Plants - 1

Brick Manufacturing Units

Brick kilns are another source of air pollution in the study area. There are 6 kilns operates during the day in the area. These brick kilns operate all through out the year except monsoon season.

Emission load due to 6 brick kilns= 4.5 X 6 = 27.0 kg/hr
= 216 kg/day (considering 08 hours operation/day)

Chemical Plants

The Chemicals plants in the industrial area produce different type of chemical. The air pollution source in these units is mainly the fuel burning. Coal and oil are the main fuel used in these industries. These units are using app. 0.75 TPD coal and 0.5 m^3 /day diesel. For the purpose of particulate load calculation for coal the ash content in the coal is taken as 34%. The emission load from using coal due to these units will be thus **0.26 TPD or 10.83 kg/hr** (Considering operating time as 24 hours). For assessing the pollution load from the boilers using diesel as fuel, the emission factor given in **"US EPA; Compilation of Air Pollutant Emission Factors; AP 42; Fifth Edition: Volume 1"** has been taken. The emission factor for it is 1.2 kg/m^3 of diesel consumed. The emission load from using diesel due to these units will be thus **0.6 kg/ day or 0.025 kg/hr** (Considering operating time as 24 hours).

Textile Units

As given in the section above, there is 1 textile unit operating in the area. To calculate the pollution load from this textile unit the emission factor given in the book titled **" Rapid Assessment of Sources of Air, Water and Land Pollution, WHO"** has been taken. The emission factor for the textile unit given in the above book is 14 kg of particulate matter / ton of produce. In the area installed manufacturing capacity of the textile unit is 5 ton/ day. The emission load due to this unit will be thus **70 Kg/day or 2.92 kg/hr** (Considering operating time as 24 hours).

- **Kathumar Area**

Total no. of industries in the area - Approx. 16
- Brick manufacturing units - 15

Brick Manufacturing Units

Brick kilns are another source of air pollution in the study area. There are 15 kilns operates during the day in the area. These brick kilns operate all through out the year except monsoon season.

Emission load due to 15 brick kilns= 4.5 X 15 = 67.5 kg/hr
= 540 kg/day (considering 08 hours operation/day)

- **Neemrana Industrial Area**

Total Industries in the area: Approx. 12

Following are the broad categories of the industries contributing to air pollution in the area:

- Brewery unit - 1
- Textile Plants - 4
- Glass manufacturing unit - 1

Brewery Unit

As given in the section above, there is one brewery operating in the area. To calculate the pollution load from this brewery the emission factor given in the book titled **" Rapid Assessment of Sources of Air, Water and Land Pollution, WHO"** has been taken. The emission factor for the distillery given in the above book is 4 kg of particulate matter / m^3 of produce. In the unit, installed manufacturing capacity is 300 m^3/ day. The emission load due to these units will be thus **1200 Kg/day or 50.00 kg/hr** (Considering operating time as 24 hours).

Textile Units

As given in the section above, there are 4 textile units operating in the area. To calculate the pollution load from this textile unit the emission factor given in the book titled **" Rapid Assessment of Sources of Air, Water and Land Pollution, WHO"** has been taken. The emission factor for the textile unit given in the above book is 14 kg of particulate matter / ton of produce. In the area installed manufacturing capacity of the textile unit is 35-ton/ day. The emission load due to this unit will be thus **490 Kg/day or 20.42 kg/hr** (Considering operating time as 24 hours).

Glass manufacturing unit

One glass-manufacturing unit is operating in the area. To calculate the pollution load from this unit the emission factor given in the book titled "**Rapid Assessment of Sources of Air, Water and Land Pollution, WHO"** has been taken. The emission factor for the glass unit given in the above book is 1kg of particulate matter / ton of produce and 10 kg of Florine gas / ton of produce. In the area approximate installed manufacturing capacity of the unit is 5-ton/ day. The emission load due to this unit will be thus **5 Kg/day or 0.21 kg/hr** particulate matter and **50 Kg/day or 2.1 kg/hr** Florine gas (Considering operating time as 24 hours).

- **Shahajahanpur Industrial Area**

Total Industries in the area: **Approx.** 16

Following are the major industries in the area:

- Brewery unit - 1
- Textile industry - 1
- Refrigerator manufacturing unit - 1
- Tyre & tube manufacturing unit - 3

Brewery Unit

As given in the section above, there is one Brewery operating in the area. To calculate the pollution load from this brewery the emission factor given in the book titled **"Rapid Assessment of Sources of Air, Water and Land Pollution, WHO"** has been taken. The emission factor for the distillery given in the above book is 4 kg of particulate matter / m^3 of produce. In the unit, installed manufacturing capacity is 110 m^3/ day. The emission load due to these units will be thus **440 Kg/day or 18.33 kg/hr** (Considering operating time as 24 hours).

Textile Units

As given in the section above, there is one textile unit operating in the area. To calculate the pollution load from this textile unit the emission factor given in the book titled **"Rapid Assessment of Sources of Air, Water and Land Pollution, WHO"** has been taken. The emission factor for the textile unit given in the above book is 14 kg of particulate matter / ton of produce. In the area installed manufacturing capacity of the textile unit is 2 ton/ day. The emission load due to this unit will be thus **28 Kg/day or 1.17 kg/hr** (Considering operating time as 24 hours).

Refrigerator manufacturing unit

In the refrigerator-manufacturing unit, normally assembling of various components has been carried out and hardly there is any activity, which generate air pollutant. For alternate power arrangement diesel generator is being used. To calculate the pollution load from this unit the emission factor given in the book titled **"Rapid Assessment of Sources of Air, Water and Land Pollution, WHO"** has been taken. The emission factor for the diesel power generator unit given in the above book is 0.24 kg of particulate matter / m^3 of diesel consumed. It is estimated that about 1 m^3 diesel/ day consumed. The emission load due to this unit will be thus **0.24 Kg/day or 0.01 kg/hr** (Considering operating time as 24 hours).

Tyre & tube manufacturing unit

Emission factors for tyre and tube manufacturing units are not available and also not known to this office. In absence of emission factor, pollution load from these sources could not be calculated.

B. Industries operating under Regional Office, RPCB, Bhiwadi

This consists of the industrial areas of Bhiwadi, Saare Khurd, Chopanaki and Khushkhera and Rampur Mundana and also other industries outside industrial areas. The following are the broad classification of industrial units operating under the jurisdiction of Regional Office, RPCB, Bhiwadi:

- Chemicals - 59
- Iron & steel - 52
- Engineering - 46
- Bulk drug & pharmaceuticals - 26
- Secondary lead reprocessing - 08
- Textiles - 08
- Ceramics - 10
- Paint, enamel and varnish - 09
- Food processing - 08

Chemical Plants

The Chemicals plants in the industrial area produce different type of chemical. The air pollution source in these units is mainly the fuel burning. Coal and oil are the main fuel used in these industries. These units are using app. 45.0 TPD coal and 30 m^3 /day diesel. For the purpose of particulate load calculation for coal the ash content in the coal is taken as 34%. The emission load from using coal due to these units will be thus **15.3 TPD or 637.5 kg/hr** (Considering operating time as 24 hours). For assessing the pollution load from the boilers using diesel as fuel, the emission factor given in **"US EPA; Compilation of Air Pollutant Emission Factors; AP 42; Fifth Edition: Volume 1"** has been taken. The emission factor for it is 1.2 kg/m^3 of diesel consumed. The emission load from using diesel due to these units will be thus 3**6.0 kg/ day or 1.5 kg/hr** (Considering operating time as 24 hours).

Mini Steel Plant

For assessing the pollution load from the electric arc furnace of mini steel plants, the draft emission factor given in **"US EPA; Compilation of Air Pollutant Emission Factors; AP 42; Fifth Edition: Volume 1"** has been taken. The emission factor for it is 0.045 kg/ton of steel produced. The approximate capacity of the mini steel plants is 1000 tons / day of steel. The emission load from the electric arc furnace of mini steel plants will be thus **45.0 kg/ day or 1.875 kg/hr** (Considering operating time as 24 hours).

Engineering (Metal casting)

The air pollution source in these units is mainly the fuel burning. Coal and oil are the main fuel used in these industries. These units are using app. 100 TPD coal and 10 m^3 /day diesel. For the purpose of particulate load calculation for coal the ash content in the coal is taken as 34%. The emission load from using coal due to these units will be thus **34.0 TPD or 1416.67 kg/hr** (Considering operating time as 24 hours). For assessing the pollution load from the boilers using diesel as fuel, the emission factor given in **"US EPA; Compilation of Air Pollutant Emission Factors; AP 42; Fifth Edition: Volume 1"** has been taken. The emission factor for it is 1.2 kg/m^3 of diesel consumed. The emission load from using diesel due to these units will be thus **12.0 kg/ day or 0.5 kg/hr** (Considering operating time as 24 hours).

Secondary lead reprocessing Units

To calculate the pollution load from the Secondary lead reprocessing units, the emission factor given in the book titled **" Handbook of Emission Factors, Part 2, industrial sources; Ministry of Housing, Physical planning & Environment, Government Publishing Office, The Hague"** has been taken. The emission factor for the Secondary lead reprocessing unit given in the above book is 50 - 100 kg / ton of charge in the furnace. For the present study the emission factor is assumed that of 75 kg / ton of charge in the furnace. The manufacturing capacity of the plants in the area is approximately 10 TPD. The emission load due to this unit will be thus **750 Kg/day or 31.25 kg/hr** (Considering operating time as 24 hours).

Textile Units

As given in the section above, there are 4 textile units operating in the area. To calculate the pollution load from this textile unit the emission factor given in the book titled **"Rapid Assessment of Sources of Air, Water and Land Pollution, WHO"** has been taken. The emission factor for the textile unit given in the above book is 14 kg of particulate matter / ton of produce. In the area approximate installed manufacturing capacity of the textile units is 100 ton/ day. The emission load due to this unit will be thus 1**400 Kg/day or 58.33 kg/hr** (Considering operating time as 24 hours).

Ceramics Units

To calculate the pollution load from the Ceramics units, the emission factor given in the book titled **" Handbook of Emission Factors, Part 2, industrial sources; Ministry of Housing, Physical planning & Environment, Government Publishing Office, The Hague"** has been taken. The emission factor for the Ceramics unit given in the above book is HF (from raw material) -250 g / ton of fired clay; SO_2 (from raw material) -150 g / ton of fired clay; NO_X (firing emissions) -750 g / ton of fired clay; CO (firing emissions) -300 g / ton of fired clay; C_XH_Y (firing emissions) -1000 g / ton of fired clay. The manufacturing capacity of the plants operating in the area is taken as 50 TPD of fired clay. The emission load due to this unit will be thus **HF- 12.5 Kg/day or 0.52 kg/hr; SO_2- 7.5 Kg/day or 0.31 kg/hr; NO_X- 37.5 Kg/day or 1.56 kg/hr** ; **CO- 15.0 Kg/day or 0.625 kg/hr; C_XH_Y- 50.0 Kg/day or 2.08 kg/hr** (Considering operating time as 24 hours).

Table-3.27: Total Pollution Load (Particulate Matter) from the Industries in Alwar District

(Value in Kg/Day)

Particulars	MIA	OIA	Behror	Khairthal	Rajgarh	Ramgarh	Kathumar	Neemrana	Sahajahanpur	Bhiwadi
Crushers	3640.00	1400.00	140	1400	2800	--	--	--	--	-
Cement Plant	-	-	70.5	--	--	--	--	--	--	-
Chemical Plants	20400.00	341.20	--	--	--	260.60	--	--	--	15336
Brick manufacturing	--	--	1008	324	--	216.00	540	--	--	-
Textile Units	70.00	--	--	140	--	70.00	--	490.00	28	1400
Brewery/ Distillery	300.00	--	400	--	--	--	--	1200.00	440	-
Mini steel Plant	2.25	--	--	--	--	--	--	--	--	45
Edible Oil Unit	-	67.5	--	37.5	--	--	--	--	--	-
Metal Casting	-	341.2	--	--	--	--	--	--	--	34012
Refractory	-	3400.00	--	--	--	--	--	--	--	-
Glass Manufacturing	-	--	--	--	--	--	--	5.00	--	-
Refrigerator Manufacturing	-	--	--	--	--	--	--	--	0.24	-
Secondary lead reprocessing Units	-	--	--	--	--	--	--	--	--	750
Total	24412.25	5549.9	1618.5	1901.5.50	2800	546.6	540	1695	468.24	51543

Table-3.28: Water Pollution Load from the Industrial Sites

Sl No.	Industrial Area	Effluent Load	Pollution Load (kg/day)				
			BOD	COD	Oil & Grease	TSS	TDS
1	Bhiwadi Industrial Area	6000.00 KLD	282	2376	24.00	960	--
2	MIA	2223.50 KLD	40.8	80.64	3.84	46.08	606.72
3	Neemrana Industrial Area	770.00 KLD	23.41	154.19	4.72	83.50	1222.90
4	Shahjahanpur Industrial Area	880.00 KLD	48.60	33.67	2.41	60.89	159.90
5	Old Industrial Area	127.50 KLD	3.48	26.62	1.04	10.54	--
6	Khairthal Industrial Area	60.00 KLD	1.50	9.06	0.30	3.48	--
7	Behror Industrial Area	6.30 KLD	0.13	0.90	0.02	0.20	--
Outside Industrial Areas							
1	Globus Agronics Limited	600.00 KLD	58.2	168.0	3.0	71.40	--
2	Mount Shivalik Industries Ltd	350.00 KLD	26.2	76.6	1.75	25.5	--
3	Allied Domecq Spirits & Wine (India) Ltd	250.00 KLD	19.75	59.7	1.00	20.00	

3.10 Identificatioin of Sources of Pollution

Identification of sources of air pollution is based on the discussion with pollution control board officials and the data available in respect of the air, noise level and water quality.

Table-3.29: Sources of Air Pollution

Sl No.	Tehsil	Air Pollution Sources		
		Point	Area	Line
1	Behror	Cement plants, Brick Kilns	Behror IA, Shahjahanpur & Neemrana IAs	Roads
2	Mundawar	--	Mining	Roads
3	Kishangarh Bas	Brick kilns	Khairthal IA, Mining	Roads
4	Tijara	--	Bhiwadi IA, Khushkhera IA, Mining, Crusher units	Roads
5	Bansur	--	Mining	Roads
6	Alwar	--	MIA, OIA, Mining, crusher plants	Roads
7	Ramgarh	Brick kilns	Mining	Roads
8	Thana Ghazi	--	Mining	Roads
9	Rajgarh	--	Rajgarh IA, Mining, Crusher units	Roads
10	Laxmangarh	--	Mining	Roads
11	Kot Kasim	--	--	Roads
12	Kathumar	Brick kilns	--	Roads

Table-3.30: Sources of Water Pollution

Sl No.	Tehsil	Water Pollution Sources	
		Point	Non-Point
1	Behror	Industrial Areas, Globus Agronics, Mount Shivalik Industries and Allied Domecq Spirits & Wine (India) Ltd.	Surface runoff from the agriculture land and built-up areas, solid waste dumping
2	Mundawar	--	Surface runoff from the agriculture land and built-up areas, solid waste dumping
3	Kishangarh Bas	Khairthal IA	Surface runoff from the agriculture land and built-up areas, solid waste dumping
4	Tijara	Industrial Areas	Surface runoff from the agriculture land and built-up areas, solid waste dumping
5	Bansur	--	Surface runoff from the agriculture land and built-up areas
6	Alwar	MIA and OIA	Surface runoff from the agriculture land and built-up areas, solid waste dumping
7	Ramgarh	--	Surface runoff from the agriculture land and built-up areas, solid waste dumping
8	Thana Ghazi	--	Surface runoff from the agriculture land and built-up areas, solid waste dumping
9	Rajgarh	--	Surface runoff from the agriculture land and built-up areas, solid waste dumping

Sl No.	Tehsil	Water Pollution Sources	
		Point	Non-Point
10	Laxmangarh	--	Surface runoff from the agriculture land and built-up areas, solid waste dumping
11	Kot Kasim	--	Surface runoff from the agriculture land and built-up areas, solid waste dumping
12	Kathumar	--	Surface runoff from the agriculture land and built-up areas, solid waste dumping

3.11 Mining OB, Municipal Solid Waste Generation and Biomedical Waste Management

The mining in the district is being carried out mainly for masonary stone and marble. The OB generation from the masonary stone mines is negligible. In case of marble mines, the excavated earth and some part of the waste material form the overburden. The overburden generated around 4-5% of the total extraction on an average basis based on the geological features in the area. This is approximately 3.0 million m^3. A part of the OB is being used for other purposes as well and therefore the problem of OB disposal and its subsequent reclamation would be lesser.

The municipal solid waste generation in Alwar District as per the Draft Regional Plan-2021 prepared by National Capital Region Planning Board, is as under:

- Solid waste (garbage) generation in the year 2001 - 180 MT/day
- Projected solid waste generation in the year 2021 - 281 MT/day
- Assigned solid waste generation in the year 2021 - 1043 MT/day

Taking density of solid waste as 0.85 MT/m^3 and height of the landfill as 10.0 metres, the area required for soild waste disposal would be approx 7750 sq. m. annually for the waste generation rate of 180 MT/day. This would increase rapidly in the years to come and would require considerable area for disposal as landfill.

The municipal solid waste generation in Alwar City was 130 MT/day in the year 2002 which increased to 136 MT/day for the year 2004. The expected growth in municipal solid waste generation is around 5 MT/day per year. For collecion of solid waste, the Alwar City is divided into 9 sectors. Each sector has been contracted for the purpose of picking, conveyance and disposal of solid waste. The solid waste disposal site has been planned at Rundh Dhuninath Village behind Ashok Leyland Ltd at MIA. Earlier, the proposal was to allot approx 50 Ha of land for this purpose. However, at present only 12.5 Ha of land has been allotted for this purpose. This site will be used for solid waste disposal of Alwar City as well as bio-medical waste management, treatment and disposal.

Apart from Alwar district, the city municipalies exist in Kherali, Khairthal, Rajgarh, Tijara and Behror. Solid waste generation from these townships are as under:

Table-3.31: Solid Waste Generation in Municipal Townships

Sl No.	Township	Solid waste generation[1]
1	Alwar	1,36,000 kg/day
2	Kherali	31,000 kg/day
3	Khairthal	64,000 kg/day
5	Rajgarh	50,000 kg/day
6	Tijara	40,000 kg/day
7	Behror	46,000 kg/day
	Total	367,000 kg/day

Table-3.32: Quantumn of Domestic Waste Water from Municipalities

Sl No.	Township	Waste Water generation	Pollution Load (Kgs/day)	
			TSS	BOD
1	Alwar	20820 KLD	6246	4164
2	Kherali	1240 KLD	372	248
3	Khairthal	2560 KLD	768	512
4	Rajgarh	2000 KLD	600	400
5	Tijara	1593 KLD	478	319
6	Behror	1826 KLD	548	365
	Total	32039 KLD	9012	6008

(Based on the population of municipalities as per District Statistcial Report, Alwar, 2002)

An assessment of the sewage generated in the district has also been made in the Draft Regional Plan-2021 prepared by National Capital Region Planning Board. The following assessment has been made in respect of sewage generation in the district:

- Sewage generation in the year 2001 - 48 MLD
- Sewage generation projected for the year 2021 - 76 MLD
- Sewage generation assigned for the year 2021 - 210 MLD

The sewage generation from the district is considerable and no sewage treatment facility is available in the district. This requires concerted efforts for planning and execution of sewage collection, conveyance and treatment facilities to minimise the pollution problems due to sewage disposal.

3.12 Utilisation of the Natural Resources

This district has been endowed with the natural resources like minerals, forests etc. Till the formation of Rajasthan State, the forest areas, which were the property of various kingdoms, were leased to private contractors, which resulted in ruthless felling of the forests. After the formation of Rajasthan State, the felling of the trees were regularised but that too were not based on any systematic forestry principle. Thereafter the felling were regularised based on working plan prescriptions. There is still pressure on the forest resources for fuel, fodder, building and agricultural equipment, grazing etc.

The district is rich in minerals. The exploitation of mineral resources was carried out since the earstwhile state period. However, this exploitation continued without giving due consideration to the environmnet. There is need

[1] based on 2001 census

to exploit the mineral resources keeping in view the factors like OB dump reclamation, plantation and post mining land use etc. The development of the nearby areas put pressure on the mineral resources of the district, which may further exert pressure on the other environmnetal ingredients. There is need to promote eco-friendly mining in the district.

In the district, the potentiality of surface water resource is poor. As such, there is greater dependence on the ground water for agricultural, domestic and industrial usage. The ground water resources, in many of the blocks have fallen into dark category. The rainwater harvesting measures does not seem to be undertaken adequately to reduce this trend of excess ground water exploitation. If this trend continues, the district may become water starved in the years to come.

CHAPTER - IV
ENVIRONMENTAL IMPACT ASSESSMENT

CHAPTER-IV
ENVIRONMENTAL IMPACT ASSESSMENT

4.1 Developmental Possibilities

The district has maintained a population growth of about 30% over the last two decades. The district also has good mineral reserve. The district is nearer to Delhi, the capital of India and also since it is included in the NCR and offers potential for the industrial development, it is likely that these activities, associated with growth in urbanisation, mineral & industrial sectors & agriculture, will exert pressure on the existing natural resources.

4.2 Environmental Impact Assessment

The possible impacts of these activities on the natural ingredients are summarised hereunder:

4.2.1 Air Quality

For assessment of air quality, the air quality in industrial zones, urban locations, mining areas and some ambient locations were covered. The air quality data for the industrial areas reveal that in Neemrana, Shahjahanpur and Behror, the suspended particulate matter has already crossed the permissible level. Here the contribution of air pollution appears to be not only from the industries located in the industrial area but also due to heavy traffic on Jaipur-Delhi highway. Both these factors combined together make these areas hot spots in terms of air quality. As such these areas leaves no scope further for air polluting industries. The air pollution level in other industrial areas like MIA, Khairthal and Bhiwadi appears to be approaching the limit prescribed for the air quality and establishment of further air polluting industries may aggravate the air pollution problem unless proper control system is devised and operated. The gaseous pollutants from the industrial areas also affect the health of farmers working in the fields.

The air quality monitored for the mining operations shows the level beyond the prescribed standards in the southern part of the district. This is mainly due to mining & transportation activities. It appears that this air quality level will go down once we move away from the sources of air pollution in the mines. However, since the mines are proposed in the clusters, the mining complex air level may increase due to cumulative effect of air pollution from individual mines. This will necessitate air pollution control strategies in individual mining operations as well as in the mining complexes to protect the workers and the nearest receptors, which may be affected by mining operations.

A composite map showing the proposed mining blocks and SPM contour is placed at Plate-4.1 whereas in Plate-4.2, proposed mining blocks along with RPM contours are shown.

The urban air quality of Alwar town, which has been monitored at RO Office, reveals that SPM concentration has already crossed the permissible level in

terms of SPM and RPM. This is basically attributed to industrial and commercial activities and plying of traffic on the roads. Being the district headquarters, the population and the vehicle quantum is likely to increase thereby further aggravating the air pollution problem. Therefore, future planning will have to take into account air pollution problem.

The concentration of gaseous pollutants is within limit and there appears to be no problem on this account in the years to come.

The hot spots in terms of air quality are presented in Table-4.1.

Table-4.1: Hot Spots in Terms of Air Pollution

Sl No.	Hot Spots Sites
1	Behror Industrial Area
2	Bhiwadi Industrial Area
3	Shahjahanpur Industrial Area
4	Neemrana Industrial Area
5	Khairthal Industrial Area
6	Khushkhera Industrial Area
7	Rajgarh
8	Alwar township/MIA/OIA
9	Jhiri Area

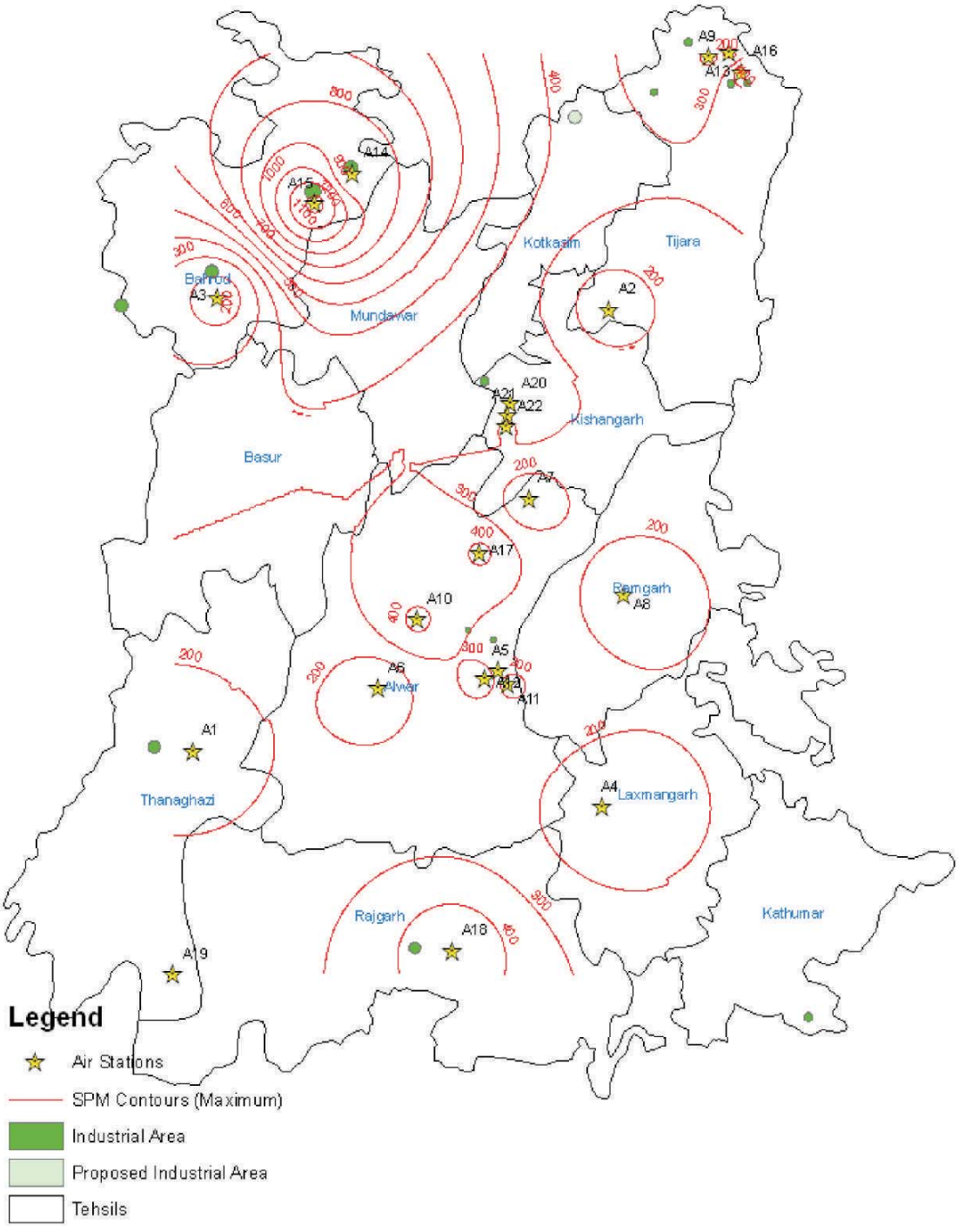
4.2.2 Noise Level

The noise level for the industrial areas, mining areas and urban areas has been considered to assess the impact of noise in the district. The ambient noise level shows that there is insignificant impact due to existing activities due to industrial townships. The level of noise measured at some of the mining complexes shows the level well within the permissible level. However, for the mining operations nearby the Sariska Reserve Forests, the blasting level will require consideration not only from the point of view of noise but vibration (in terms of peak particle velocity) as well.

The noise level has been observed to be occasionally high during Diwali festival time in Alwar Township. The noise level scenario may become adverse within the Behror town because of increased commercial activities and heavy traffic density over the national highway. However, the overall noise level status in the district shows that it is well within the specified limits. As such, future development is not going to have significant impact in the district.

4.2.3 Water Resources

Though the surface water reservoirs / storages has been created by State Irrigation Department by impounding the rivers and other resources at various places, the availability of the surface water resource is inadequate to meet the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A13
A14
A15
A3
Mundawar
Kotkasim
Tijara
A2
A20
A21
A22
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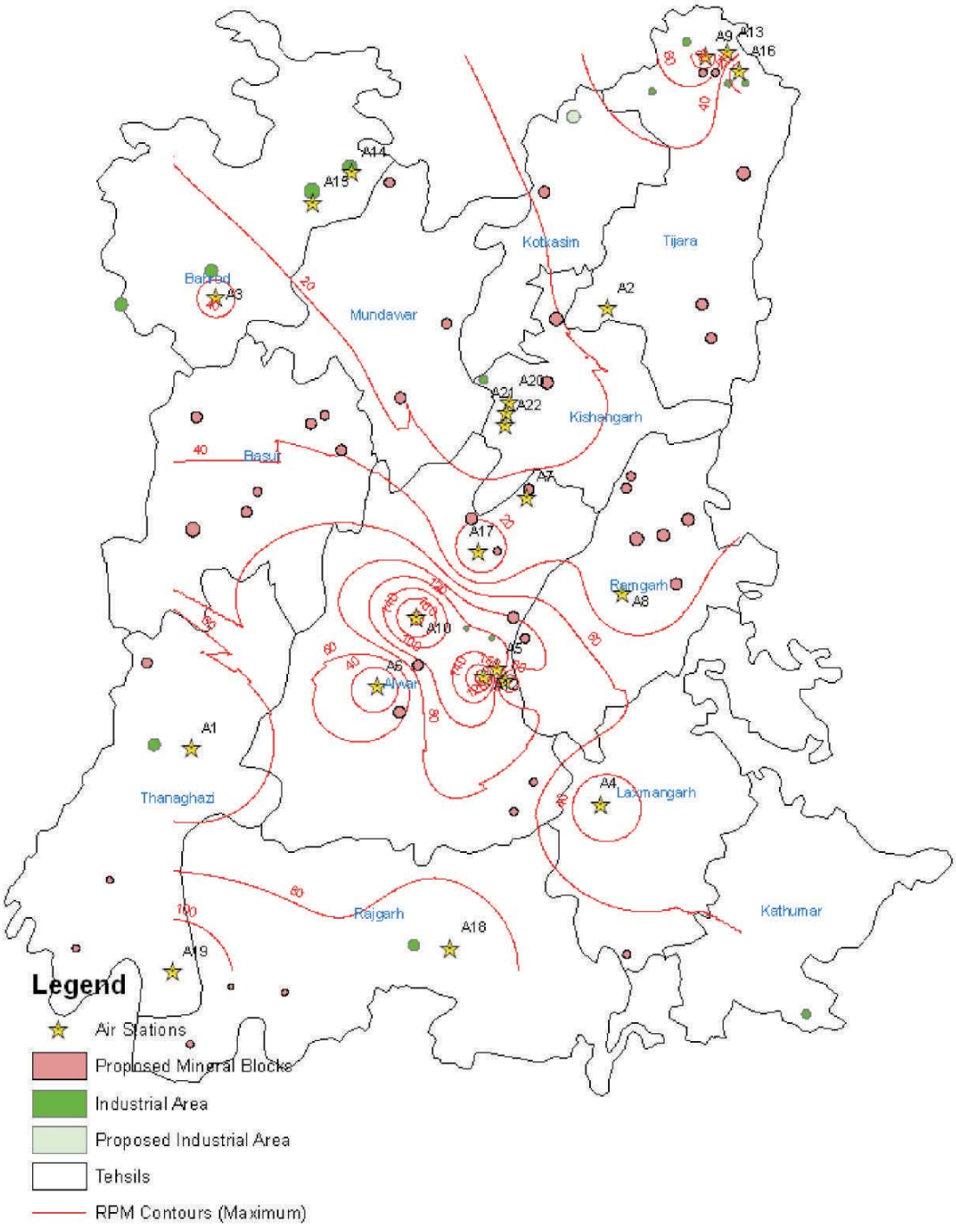
Basur
A7
A17
A10
Bansgarh
A8
A5
A6
Alwar
A12
A11
A1
Thanaghazi
A4
Laxmangarh
Rajgarh
A18
A19
Kathumar
Legend
Air Stations
SPM Contours (Maximum)
Industrial Area
Proposed Industrial Area
Tehsils

PLATE NO. 4.2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A13
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Kotkasim
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Bar-ed
A3
Mundawar
A2
A20
A21
A22
Kishangarh
Basuri
A7
A17
Bangarh
A8
A10
A5
A6
Alwar
A1
Thanaghazi
A4
Laxmangarh
Rajgarh
A18
A19
Kathumar
Legend
Air Stations
Proposed Mineral Blocks
Industrial Area
Proposed Industrial Area
Tehsils
RPM Contours (Maximum)

various requirements in the district. The district population is increasing at the rate of 30% per decade. Due to inclusion in the National Capital Region (NCR), industrial and housing complexes are expected to come up. Increasing population will require food for sustenance. The industrial growth is also anticipated at Thana Ghazi, Kot Kasim and in Neemrana industrial estates. Also there may be expansion of Bhiwadi industrial site. Due to proximity to Delhi, some housing complexes may come up specially in the northern part of the district. All these factors will necessitate water for sustenance. Since the availability of surface water is limited, there will be greater dependence on the ground water resources in the district. At present, the ground resources are being utilised to meet the irrigational, domestic and industrial requirement in the district. The status of ground water in the district indicates that there is significant decline of water level both during pre-monsoon and post-monsoon periods. The exploitation of ground water has reached over 100% in most of the blocks and in some of the blocks it is reaching 100% level. In absence of potential surface water resource, the development envisaged in future in the district will naturally have dependence on the ground water to meet the domestic and industrial requirement. The local availability of surface water and ground water vis-à-vis water demand for future development will therefore necessitate careful consideration.

For assessment of water quality, characteristics of surface water resources i.e. lakes were considered. The characteristics of the same were found to be satisfactory. In the industrial areas, combined effluent from Bhiwadi, Neemrana, Khushkhera, MIA and OIA shows the effluent quality parameters beyond permissible limits. The Bhiwadi, a common effluent treatment plant has been constructed and it is in operation. The effluent from Bhiwadi industrial area gets treated but the treatment plant is not functioning efficiently and therefore the chance of water pollution from this industrial area still exists. The wastewater discharged from industrial areas affect the crop and the ground water. In the north-west part of the district, due to discharge of industrial effluents, there are chances that these will flow to Haryana state causing inter-state problem. There is also wastewater discharged from the mining operations. This wastewater contains high amount of TSS. The mine effluent requires treatment prior to its disposal. In some of the mines, effluent treatment plants have been constructed to treat the mine effluent. Due to future mining operations, the quantum of mine water will increase and the same will require treatment before its disposal/reuse. The potential water pollution sources (hot spots in terms of water pollution) are as under:

Table-4.2: Hot Spots (potential sources) in Terms of Water Pollution

Sl No.	Hot Spots Sites
1	Bhiwadi Industrial Area
2	Neemrana Industrial Area
3	Khairthal Industrial Areas
4	Matsya Industrial Area
5	Khushkhera Industrial Area
6	Old Industrial Area

The domestic wastewater from the townships in the district gets discharged without proper treatment and is a major source of water pollution. A number of residential complexes are likely to come up in the district, which may pose water pollution problem. This will require addressal in the future planning in the district.

The above scenario call for check on water quality at industrial sites and treatment of domestic wastewater and reuse of the treated water and rainwater harvesting to preserve this precious water resource in the district.

4.2.4 Land Resources

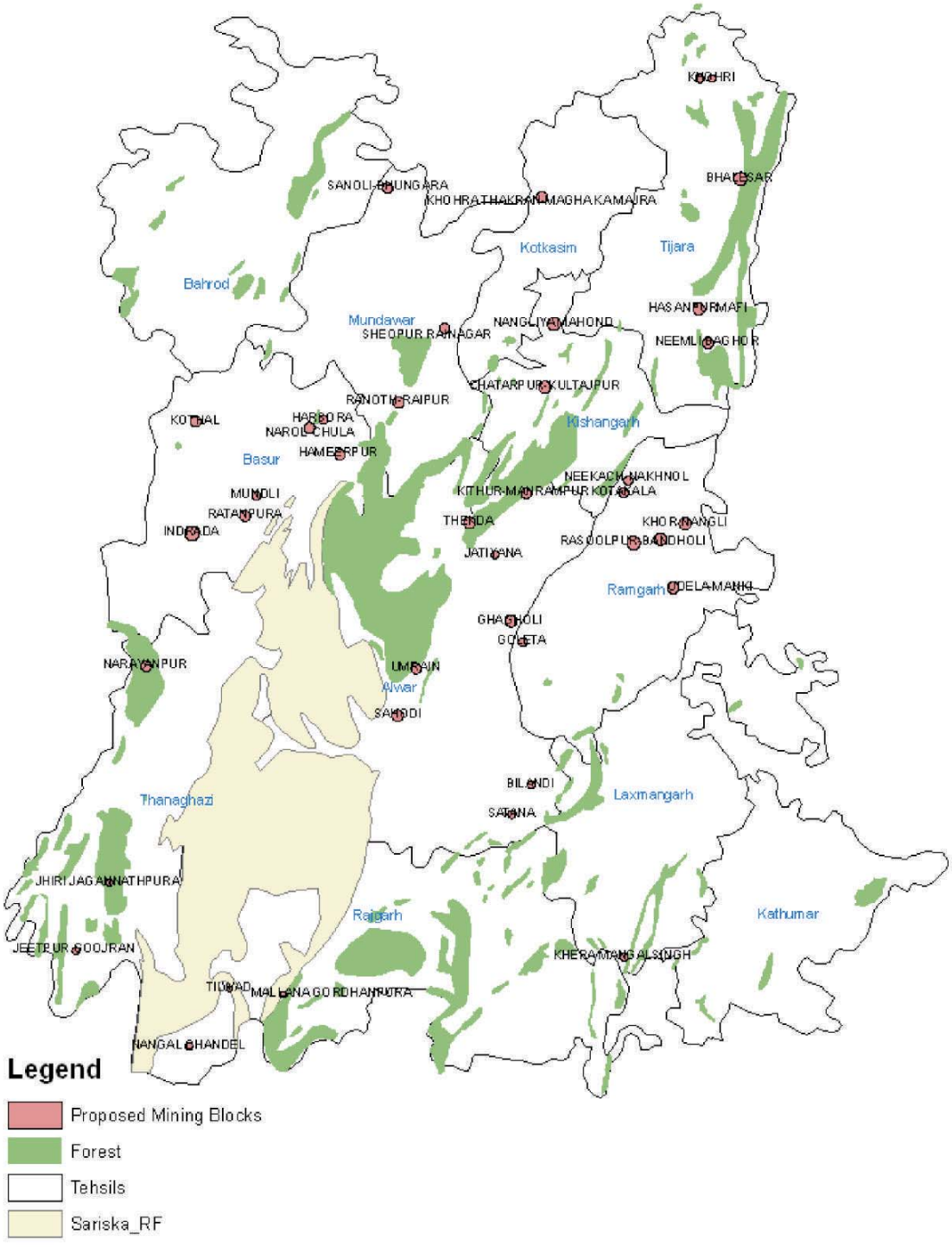
The industrial development and mining activities would require land resources. Since the industries would be planned in various industrial sites, which are being promoted by RIICO, the extension of industrial areas may require prime agricultural land and in some cases, green belt as well. On the other side, the mining is site specific and would require land where the mineral resources occur. The proposed mining blocks along with land covered under Aravali Notification is shown in Plate-4.3 and 4.4.

These industrial and mining activities will have impact on land resources and would therefore require consideration so that change in the land use pattern is minimised. Some salt affected land has also been identified by the remote sensing technique and area of such affected land, unless preventive measures are taken, would go on increasing. The land whereon the developmental activities are restricted as per Aravali Notification have been identified in this report and their use for future growth in the district would necessitate proper reclamation / rehabilitation measures along with other associated environmental consideration to promote environmentally benign systems.

Due to inclusion of the district in NCR, there is possibility of many housing complexes in near future. Also, since the population is increasing at a considerable rate, this may put pressure on the agricultural land for sustenance. The agricultural land also has its own carrying capacity and may not support the ever-growing demand of food and fodder. Careful consideration is therefore required to preserve the agricultural and green land.

4.2.5 Forest Resources

This is one of the prime resources of the district and already has been subjected to improper and unscientific utilisation after independence. The population growth, specially the rural population will have impact on the forest resources for fuel and fodder. A number of forest blocks exist in the district, which are also potential sources of minerals. Due to opening of new mines, housing complexes, the forest land may reduce. The vegetation cover is only around 19% much below the expected level of 33%. Since the developmental activities and population growth have significant impact on the existing resources, careful strategies need to be devised to protect the forest resources and increase the vegetation cover.


KHOHRI
BHIKNSAR
SANOLI-BHUNGARA
KHOHRA THAKRAN MAGHA KAMAIRA
Kotkasim
Tijara
Bahrod
HASANPUR MAFI
Mundawar
SHEOPUR RAINAGAR
NANGLIYA MAHOND
NEEMLI BAGHOR
CHATARPUR KULTAJPUR
RANOTHA RAIPUR
KOTHAL
HARSORA
NAROLI CHULA
Kishangarh
Basur
HAMEERPUR
NEEKACH NAKHNOL
MUNDLI
KITHUR-MANRAMPUR KOTASALA
RATANPURA
THENDA
KHORA NANGLI
INDAWDA
RASOOLPUR BADHOLI
JATIANA
Ramgarh
DELA MANKI
GHASOLI
GOLETA
NARAYANPUR
UMRAIN
Alwar
SAHODI
BILANDI
Laxmangarh
Thanaghazi
SATANA
JHIRI JAGANNATHPURA
Rajgarh
Kathumar
JEETPUR GOOJRAN
KHERA MANGAL SINGH
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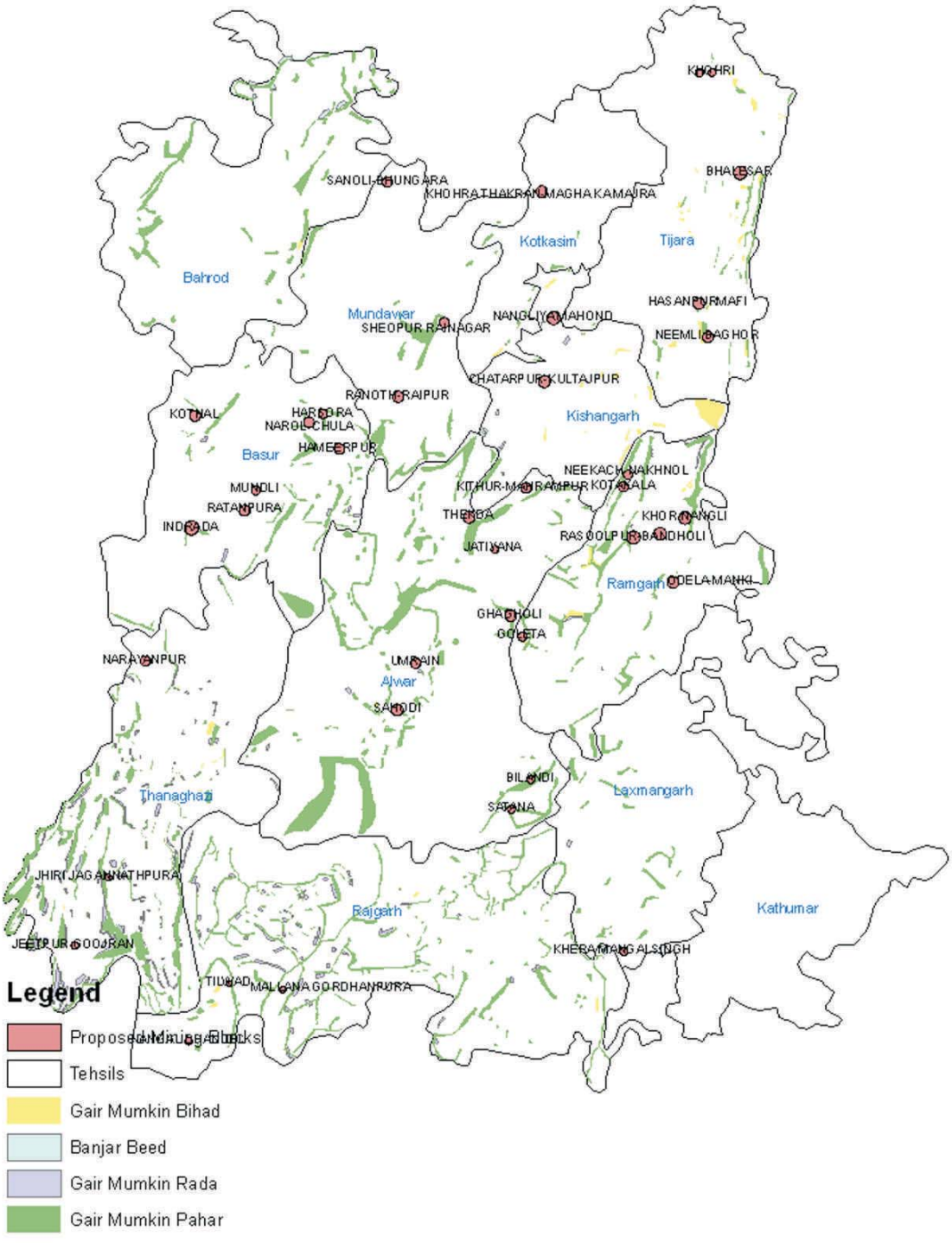
MALLANA GORDHANPURA
NANGAL CHANDEL
Legend
Proposed Mining Blocks
Forest
Tehsils
Sariska_RF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SHEOPUR RANAGAR
NANGLIYA MAHOND
NEEMLI BAGHOR
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KULTAJPUR
RANOTHRAIPUR
KOTNAL
HARSORA
NAROLI CHULA
Kishangarh
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KOTASALA
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MUNDLI
RATANPURA
THERDA
KHORANANGLI
INDAWDA
RASOOLPUR BADHOLI
JATIYANA
Ramgarh
ODELA MANKI
GHATOLI
GOLETA
NARAYANPUR
UMRAIN
Alwar
SAHODI
BILANDI
Laxmangarh
Thanagazi
SATANA
JHIRI JAGANNATHPURA
Rajgarh
Kathumar
JEETPURA GOOJRAN
KHERA MANGAL SINGH
TIJWAD
MALAKANA GORDHANPURA
Legend
Proposed Mining Blocks
Tehsils
Gair Mumkin Bihad
Banjar Beed
Gair Mumkin Rada
Gair Mumkin Pahar

4.2.5 Impact Due to Agricultural activities

The district has good agricultural area to produce crops during the entire period of the year. Agricultural produce are used for sustenance of people, livestock. Due to increase in population, there will be pressure on the land for production of more grains. There may be demand for increased use of insecticides, pesticides and fertilisers. Use of insecticides and pesticides may contaminate ground water in the years to come and the surface runoff may contain the residue having water pollution potential. In addition, there may be some agricultural waste as well though a major part of them is utilised.

4.3 Environmental Status in the mining Areas

The existing environmental status based on the sample surveys in the mining areas are summarised below:

Table-4.3: Environmental protection measures being taken in mining areas

Sl No.	Tehsil	Type of Mine	Environmental Status
1	Alwar	Masonry Stone	▪ Plantation / tree guards ▪ Water sprinkling for dust suppression
2	Rajgarh	Marble / masonry stone etc	▪ Plantation / tree guards ▪ Water sprinkling for dust suppression ▪ Effluent treatment facilities at some places ▪ Reuse of a portion of OB material
3	Thana Ghazi	Marble/soapstone	▪ Plantation / tree guards ▪ Water sprinkling for dust suppression ▪ Reuse of a portion of OB material
4	Bansur	Masonry stone/granite	▪ Plantation / tree guards ▪ Water sprinkling for dust suppression ▪ Reuse of a portion of OB material
5	Mundawar	Masonry stone/ patti katla	▪ Plantation / tree guards ▪ Water sprinkling for dust suppression
6	Kishangarh Bas	Masonry Stone/ Granite	▪ Plantation / tree guards ▪ Water sprinkling for dust suppression ▪ Reuse of a portion of OB material

Sl No.	Tehsil	Type of Mine	Environmental Status
7	Tijara	Masonry Stone etc.	▪ Plantation / tree guards ▪ Water sprinkling for dust suppression
8	Ramgarh	Soap stone/ silica sand	▪ Plantation / tree guards ▪ Water sprinkling for dust suppression
9	Laxmangarh	Masonry stone	▪ Plantation / tree guards ▪ Water sprinkling for dust suppression
10	Behror	Slate stone / Cheja Patthar	▪ Plantation

4.4 Areas Requiring Environmental Protection Measures

Based on the existing environmental status, the following areas have been identified for taking up environmental protection/environmental upgradation measures:

- Behror Industrial Area
- Shahjahanpur Industrial Area
- Neemrana Industrial Area
- Bhiwadi Industrial Area
- Old Industrial Area
- Matsya Industrial Area
- Mining and crushers locations
- Townships *i.e.* Alwar, Kherali, Khairthal, Rajgarh, Tijara and Behror

CHAPTER - V
CARRYING CAPACITY ASSESSMENT

CHAPTER-V
CARRYING CAPACITY ASSESSMENT

5.0 General

The primary objectives of planned development are:

- To fulfil the aspirations of the people from a sustainable source of livelihood and basic essentials of food, clothing, shelter, clean water, education and health.
- To provide the capabilities required for protecting the resource base and enhancing the environmental quality of the region.

The carrying capacity based planning approach ensures meeting the objectives of development as stated above without impairing ecological health. This approach of planning is an exploratory search for alternative paths of development within the carrying capacity of the region. This constraint on development process leads to search for new techniques, inventions and technological innovations that would ensure resource use intensities and residual generations to be within the supportive and assimilative capacity of the region, while using the available resources to generate high value additions and high employment levels. The technology choices would also involve upgradation and substitution of resources. The alternative development scenario has to be sensitive to:

- Distribution of resource endowment *i.e.* supportive capacity
- Environmental media capacities *i.e.* assimilative capacity

The exploratory search for alternatives could be an exhaustive search but in the present study the search is knowledge directed. The knowledge of structure of people, their preferences, study of resource endowment and media assimilative characteristics are necessary inputs for carrying capacity study.

5.1 Development & Environmental Concerns

The unplanned and unscientific mining, industrialisation, large scale deforestation, over exploitation of ground water, urbanisation, rapid growth of population in the past have resulted in air pollution, water pollution, land degradation and deforestation. This situation is aggravated further due to improper agricultural practices and poor infrastructural facilities.

- **Major developmental concerns**

  - Dependence of large population of the region on mining for their sustenance and growth
  - Poor agricultural practices & productivity
  - Dependence on ground water for irrigation
  - Shortage of water in large areas of the region
  - Increasing pressure on land
  - In-migration & growth of population in the region resulting in further pressure on the already strained natural resources
  - Lack of institutions for skill upgradation and absence of institutional mechanism to foster environmental upgradation / conservation

- **Major environmental concerns**

  - Large scale reduction in forest cover & loss of wildlife habitat
  - Discharge of effluents from mining and industrial areas
  - Impact of mining on ground water
  - Inadequate surface water resources to support irrigation
  - Depletion of ground water resources
  - Land degradation due to deforestation, open-pit mining, dumping of overburden and soil erosion
  - Threat to wildlife, flora and fauna due to excessive exploitation of natural resources

5.2 Macro-Scenario

There are three major sections of economy viz. primary, secondary and tertiary, which contribute to Gross Domestic Product (GDP) of any region. The sectoral mix and growth rate influence the composition of GDP and growth rate of economy. Primary sector mainly include agriculture, forestry, livestock, logging, fishing etc. Secondary sector mainly include mining & quarrying, manufacturing, power generation, gas, construction and water supply. The tertiary sector includes transport, communication, trade, finance, and community and personnel services. Keeping the constraints, imposed by the carrying capacity of the basin, each developmental scenario in relation to GDP growth rates are to be examined to assess the feasibility of achieving the desired developmental growth and the growth rate, which is economically and environmentally feasible. Past growth rates that could be achieved and future growth rate projections need to be taken into account while formulating the scenarios.

The major sub-sectors, which are important for carrying capacity analysis & alternative development scenarios are:

- Agriculture
- Mining
- Industry
- Infrastructure development

5.3 Sectoral Scenario – Alwar District

The existing sectoral environmental scenario has been examined in respect of their supportive and assimilative capacity in the region. Though in terms of assimilative capacity, the scenario is good for some of the components but the overall carrying capacity of the following resources are the limiting factors for growth in the district:

A. **Air Quality:** For industrial growth in the district, about 20 industrial areas have been planned out of which one is proposed in future at Kot Kasim. The major industrial areas are in and around Alwar City, Rajgarh, Bhiwadi and four industrial areas are located on Delhi-Jaipur highway. Due to proximity to Delhi, the pressure for industrial

establishment may come in this part of the district. Since the assimilative capacity in most of the industrial areas are exhausted and pressure is likely to be here only, there is need to look for effective air pollution control strategies for the establishment of new industries.

In the mining complexes, the some assimilative capacity in respect of air quality is still left at places as per the data available. Since the mining at a particular location may come up in most of the cases in more than one in number forming mining complexes, efforts will be required to control the air pollution effectively so that it does not strain the assimilative capacity of air at critical locations.

B. **Land:** The factors affecting the land use pattern are increase in mining areas and built-up land areas, expansion of industries, organised solid waste dumping at identified sites, OB dumping, reduction in forest vegetation etc. The land is one of the critical resources for sustenance in the district and agriculture is the main occupation of the population. Due to in-migration of the people from outside, establishment of industrial establishment, expansion of the industrial sites, establishment of housing complexes and increase in urban and rural population will be affecting the extent of prime agricultural land. In addition, increase in population, requirement of food, fuel and fodder for the livestock will affect the land use pattern. Consequently, the supportive capacity of the land may also get exhausted because of ever growing demand for food grains and fodder. For sustenance, this will have to be matched by suitable use of fertiliser and irrigation to achieve better yield of the crop. A portion of the land in the region has been identified as salt affected. Unless proper reclamation efforts are taken, this will further affect the supportive capacity in the region.

The future planning scenario will involve disturbance to the prime agricultural land to the minimum possible extent and vegetation on the lands at various locations to restore the eco-system of the district.

C. Water Resources: The surface water resources in the district comprises of some non-perennial river streams, lakes and tanks. The surface water potential is not promising and Department of Irrigation has constructed a number of tanks in the district with two objectives; the first one is to recharge the ground water regime and the second one is irrigation. Since the potential of surface water resources are limited, there is greater dependence on the ground water to meet domestic, agriculture and industrial requirement. As per the study of the CGWB, the supportive capacity of the ground resources is already strained; in most of the blocks these are over-exploited and present a grim picture for the water requirement projected for the year 2025.

The water resources in the district are the critical one and are basically the primary deciding factor for future growth. Since the growth in industrial sectors, urban housing complexes, and population is likely to be considerable; so is the pressure on this already exhausted supportive capacity of the ground water resources.

This scenario involves developmental alternative for industrial growth having lesser dependence on the ground water and self-sufficiency of the population at village level itself by having at least one pond to meet

the water requirement of livestock and recharge of ground water, through rainwater harvesting. The scenario call for optimal utilisation of ground water through sprinkler and drip irrigation systems and a suitable crop pattern, if possible, to lessen dependence on ground water.

D. **Forests:** The forests resources in the district are already strained due to exploitation of resources for various purposes like fuel, fodder, wood, pastures and minor forest produce. This resource is now left with little supportive capacity for sustenance in the region. The present carrying capacity of the forests, as reported in the Forest Working Plan, is not even $1/10^{th}$ of the fodder requirement of the livestock of the region. There is need to search the alternative schemes to support the requirement of growing population and livestock and expand the vegetation and plantation cover in the district for eco-restoration and to promote sustainable development. The vegetation cover remains at around 19%; much below the required national average of 33%. In future, the establishment/expansion of industrial sites, mining activities, establishment of housing complexes, increase in population and livestock, may further reduce the supportive capacity further. The scenario call for better management practice by providing alterative scheme for fuel and fodder for the village community and their livestock respectively; intensive afforestation by the Forest Department, afforestation by mine / industry owners, public participation through awareness and help of local NGOs.

E. **Mining Activities**

The occurrence of minerals in the district is in abundance and extraction of this resource is being done from the very pre-independence periods. There is occurrence of both major and minor minerals. The majority of mines, which are operating at present, have been planned for masonry stone and marble. The mining activities support the livelihood of may people by providing direct and indirect employment. There are a considerable number of mineral based industries in the district, which also generate employment potential. Besides this, this industry is also a source of handsome revenue to the State exchequer. There is considerable investment in the mining industry and consequently in the transport sector as well.

The mining activities, being the site specific one, degrade land and consequently result in loss of flora and fauna. In addition, they are also the source of air, water pollution and solid waste. The marble blocks, which have got good potential generally, occur within and near to the preliminary notified areas of Sariska Tiger Reserve. The wildlife is very sensitive to blasting induced noise and vibrations. In addition, the masonary mine blocks occur in adjoining areas (buffer zone) of Sariska Tiger Reserve. Opening of mines in the district will require pollution control measures and sound reclamation/rehabilitation practices, controlled blasting and other environmental safeguards. In addition, there has to be mine closure planning (both progressive and final) at the initial stage itself to leave the area after mining in a designated shape.

A corridor is being planned by the Forest Department to break the islanding of the Sariska Tiger Reserve for its good health. In addition, the extension of Sariska Tiger Reserve is also being planned. This scenario requires further consideration in terms of the characteristics of the wild life and strict adherence to the clearance conditions by the mine operators to render the area suitable for the use by the Forest Department.

F. Agriculture

The agriculture is the main occupation of the rural population. The future industrial growth, construction of housing complexes and expansion of urban centre may change the land use pattern. The growing population and livestock will put pressure on this resource and therefore call for strategies to – optimise use of ground water; enhancing productivity to meet grain, fuel and fodder requirement. It will therefore be required to use the prime agricultural land for purposes other than agriculture unless this is very essentially required.

5.4 Environmental Targets

The above analysis indicates that there is stress on the following resources due to population growth, industrial & mining activities etc. in the district:

- Ground water
- Forest resources
- Land resources

There is likelihood of the population migration into the district further affecting its natural resource base. Planning for future activities will therefore call for conservation of this resource for sustainable use and efforts aimed at enhancement of environmental quality/set up. The following environmental targets are therefore considered for planning:

- ***Ground water***: Conservation and optimal use of the ground water. The priority of ground water allocation should be drinking, agriculture and lastly industrial consumption. Change in priority may be considered if the projects are linked to ground water recharge schemes and provided that nearby human consumptions of the ground water on the long run is ensured.
- ***Forest Resources***: Initiation of efforts at every level to enhance vegetative cover immediately. The emphasis needs to be given on planting the indigenous species and "*ethno-forestry*" practices for eco-restoration.
- ***Land Resources***: To protect the prime agriculture land and green belt. For this purpose, diversion of agriculture land for non-agriculture purpose should be considered only in exceptional cases. In areas where mining activities are being carried out, it should be planned in such a way that ***end footprint of mining*** is not left upon and the final mine closure planning & implementation contribute to overall eco-restoration effort in the district.

CHAPTER - VI
ENVIRONMENTAL MASTER PLAN

CHAPTER-VI
ENVIRONMENTAL MASTER PLAN

6.1 General

It is seen from description in previous chapters in this report that the critical environmental factors, which would govern the development of the district are:

- Availability of water
- Land resource
- Forest resources
- Air quality

Considering the above environmental factors, the Environmental Master Plan of Alwar District is prepared. It is described in two sections; the first section contains the general policy approach, which may be followed in general for the district whereas the second section contains the guidelines for the mining and industrial operations in the district.

6.2 Applicability of the Environmental Master Plan

Ministry of Environment & Forests, Government of India, vide its Gazette Notification No. S.O. 1189 (E) dated 29th November, 1999 *interalia* directed the State Government to prepare a Master Plan for the development of the areas covered by the Aravali Notification, integrating environmental concerns and keeping in view the future land use of the area. The Environmental Master Plan of Alwar district is prepared in pursuance to the aforesaid Notification issued by Ministry of Environment & Forests, Government of India and accordingly, the recommendations embodied in this Environmental Master Plan are applicable for the following categories of lands:

(i) All reserved forests, protected forests or any other area shown as "forest in the land records maintained by the State Government as on the date of this notification in relation to the Alwar District of the State of Rajasthan.

(ii) All areas shown as: -
  (a) Gair Mumkin Pahar, or
  (b) Gair Mumkin Rada, or
  (c) Gair Mumkin Behed, or
  (d) Banjad Beed, or
  (e) Rundh.

  in the land records maintained by the State Government as on the date of this notification in relation to the Alwar district of the State of Rajasthan.

(iii) All areas of Sariska National Park and Sariska Sanctuary notified under the Wildlife (Protection) Act, 1972 (53 of 1972).

6.3 Environmental Master Plan

Section-A: General Policy Approach

This includes the following:

- The crusher zones should preferably be established near to the mining complexes. The establishment of crushers at isolate locations should be considered in cases where it is not cost effective to establish them near mines.
- For the mine block having area of 100 ha or more, no objection should be accorded for the entire block to facilitate establishment of mines.
- All the mining operations should be kept at least 25 metres away from the forest blocks as per the provision contained in the State Mineral Policy of Government of Rajasthan. The green belt may be developed by such units on the forest area side.
- In the industrial/residential areas, land should be identified for plantation/green belt development and for each of the developmental/industrial schemes; sufficient plantation may be undertaken in all the available spaces. The plant species should be selected in consultation with the Forest Department. Such areas should not be compounded later on for establishment of industries.
- Reclamation of the waste from mining and industrial operations should be linked with forestry projects.
- Maintaining of the plant should be carried out till the crown of the tree is achieved above the browsing level.
- All the industrial operations should be encouraged to use non-conventional and renewable energy resources.
- For the areas near the industries/mines, the workers should be provided with alternate energy sources to protect the forest wood.
- As per the rule of State Government of Rajasthan, agriculture land to the extent of 2500 sq m could be converted into industrial category and for this purpose; permission of the State Government is not required. This rule has been enacted to stop the population drain to urban centres and to make available the employment opportunities in the rural areas. Such conversions may be allowed for small-scale industries only but not for the medium/large red & orange category industries.
- Seeing the criticality of the ground water resource, the high water consuming industries should not be permitted in the notified area in the district.
- The RIICO may come up with identification for establishment of industrial area for the engineering based industries.
- Consideration may be given for identification of an institutional area for establishing engineering, medical and other colleges in the district.
- The provision of combined effluent treatment facilities/hazardous waste treatment facility within/outside the industrial area and other associated requirement should form part of the infrastructure provided to industries. Such facilities should be developed and operated by the Association/Beneficiaries/Trust of the particular industrial area. RIICO will consider to allot necessary land for facilitating effluent treatment and waste

management. The final outlet point of the effluent from each of the industrial area should be decided.

- The drain carrying the storm run-off should be separate from those carrying the industrial and/or domestic effluent in the industrial areas and the townships wherever feasible depending upon the pollution potential of the industrial effluent. The drains carrying the industrial effluent should discharge them in domestic effluent drains only when the effluent meets the prescribed criteria.
- Since in most of the blocks, the ground water status is either over exploited or critical, conservation of ground water is essential to promote its sustainable use. For this purpose, the following measures are suggested:

  - Crop planning based on rainfall and moisture availability
  - Encouraging adoption of water saving devices like sprinkler and drip irrigation systems
  - Regulation of ground water development
  - Augmentation of ground water through artificial recharge. This should be made compulsory to all ground water users
  - Promoting roof-top rainwater harvesting in urban areas and housing complexes. This may form a point in consent to operate granted by the Rajasthan State Pollution Control Board.
  - Soil moisture conservation through watershed treatment
  - Revival of traditional village ponds and tanks
  - Creating ground water sanctuaries by locating alternate water sources and declaring them as reserved for drinking and domestic purposes.
  - Use of fertilizers, pesticides/insecticides need to be governed by the ground water conditions of the area
  - Encouraging use of saline water in growing salt tolerant crops. Saline water can also be used after blending with fresh water for domestic purpose other than drinking. Use of saline water and simultaneous recharge of fresh water will also lessen the problem of salinity
  - Promoting recycling/reuse of water. Reclaimed water after treatment can be used for irrigation, cooling, algal and pisciculture and other industrial uses.
  - The solid waste from major cities/towns needs to be disposed off in scientifically located and designated sites and structures for recycling and reuse.

- As per the Draft Regional Plan-2021 of NCR, prepared by National Capital Regional Planning Board, the area of Alwar (which a part of NCR) falls in seismic zone IV as per the seismic zone map of Indian Standards IS 1893. This makes the area liable to MSK intensity of “VIII” and is considered as High Risk Zone. The whole urban development must therefore be ensured for safety against an intensity “VII” probability of occurrence and upgraded for required seismic resistance in buildings and infrastructure as found necessary.

- Emphasis should be given on construction, operation and maintenance of Common Effluent Treatment Plant (CETP), Effluent Treatment Plant (ETP) and Sewage Treatment Plant (STP) wherever required in the industrial areas. The treated effluent should be reutilised to the extent possible.

- Rainwater harvesting measures to be encouraged for the major industrial and residential complexes.

- Sufficient plantation may be undertaken in all the available spaces in the industrial areas. The plantation areas should not be compounded at latter stage for establishment of industries.
- New industrial area should be planned after considering the zoning of industries, CETP, proper drainage and final disposal upto end point, disposal sites/facilities for hazardous/non-hazardous waste and proper plantation. Solid waste dumping site should be identified within the industrial area. Alternately, it may be linked to some external solid waste-dumping site for proper disposal of solid waste from the industrial area. Identification of such lands should be done by State Government / local bodies together with the local entrepreneurs associations who should be encouraged to set up a trust / society to properly develop and maintain it.

Section-B: Mining & Industrial Development

Opening of New Mines and Operation of Existing Ones

The district is endowed with rich mineral deposits of both minor and major category. The following factors will govern the opening of new mines and operation of the existing ones:

- Environmental quality of the area
- Depth of ground water table
- Extent of areas covered under Aravali Notification dated 7th May, 1992
- Proposed Eco- Sensitive Zone around Critical Tiger Habitat of Sariska Tiger Reserve.
- Terminal land use of the mining locations

All the developmental, mining and industrial activities are required to be operated in such a manner as to contribute and supplement to the overall efforts of environmental conservation/upgradation in the district. After the mining operations gets finished, the end footprint of mining should not be left upon and the associated mining activities need to be a part of the overall exercise for eco-restoration of the district.

In the district, the extent of Critical Tiger Habitat (CTH) of Sariska Tiger Reserve exists over an area of 881 sq kms. Opening of any developmental activities will have adverse impact on the flora and fauna in the area. Owing to the impact on wildlife and legal restrictions, mining, industrial and other developmental activities can't be permitted in this area.

In the compliance of the Hon'ble Supreme Court order dated 04.12.06 in Writ Petition (Civil) No. 460/04, wherein, all the State Government & Union Territories are required to notify certain area around National Parks/ Sanctuaries as Eco- Sensitive Zone around the Critical Tiger Habitat (CTH) of Sariska Tiger Reserve. Furthermore, in compliance of section **38** (v) of the wildlife (Protection) Act, 1972, State Government is required to notify a buffer or peripheral area around the Critical Tiger Habitat (CTH). Critical Tiger Habitat (CTH) & the buffer thus notified shall together constitute the tiger reserve. Thus, the proposed Eco- Sensitive Zone & the buffer after being notified may not be the preferred zone for mining, industrial or other developmental activities.

While permitting the mining in the district on lands (other than CTH of Sariska Tiger Reserve & forest lands) covered under Aravali Notification, 1992 due consideration need to be given on the terminal land use once the mine operations are finished and

conservation of ground water. The terminal land use may be creating water pool in the abandoned mines, gradual side slopes of the abandoned pits, barricading the abandoned mines from safety ground water level is another factor governing the mining operations and in cases where mining operations are proposed below ground water level, mine should be permitted subject to the condition that measures are taken to recharge the ground water and that the nearby human settlements are not affected by such operations. The environmental conditions, which need to be imposed on such mines to promote environmentally benign mining practices in the region, are outlined in the next section.

The following is therefore recommended:

- *No mining, industrial or other developmental activity to be permitted within the boundary of Sariska Tiger Reserve and Sanctuary. The extension of the boundary of Sariska Sanctuary and the proposed corridor upto Jamva-Ramgarh Sanctuary may also not be the preferred zones for mining activity once the same are notified. As such, these areas may be considered for banning the mining activities.*
- *On other categories of land, which are restricted as per Aravali Notification, 1992, in our considered view, mining & industrial activities may be permitted provided such operations contribute/supplement to the overall eco-restoration measures. After the mining operations are over, the end footprint of mining should not be left upon and terminal land use after the mining activities may be kept suitable for creating pool for recharge of the ground water which is a severely stressed resource in the district. In a similar fashion, the industrial activities should also take up efforts, which should be a part of the overall environmental upgradation exercise. Permitting such activities should be associated with certain conditions embodied in the next section for the aforesaid efforts. The mining and industrial activities need strict compliance of the above, and other conditions, which may be imposed from time to time.*
- *The areas, which have been identified as hot spots in terms of air quality, will require appropriate and effective air pollution control measures to operate industries and mine. These areas will require intense monitoring for the air quality parameters and proper remedial measures to control air pollution.*

Tehsil-wise recommendations for new mining projects are presented in Table-6.1. The non-preferred location for mining are those which are likely to fall under Sariska Tiger Reserve and its extension, the proposed corridor and the areas where air pollution level has been found to be above acceptable limit. Though in locations that fall under Sariska Tiger Reserve Extension and the proposed corridor may not be permitted once they are notified; the permitting of mining operations in areas with high air pollution level will require effective air pollution control measures. The suggestions for promoting sustainable mining and industrial activities are presented in the next section.

Table-6.1: Recommendations for mining activities in the district

Sl No.	Tehsil	Mineral to be mined	Preferred location[1]	Locations not preferred[2]	Remarks
1	Alwar	Masonary Stone	▪ Umrain ▪ Jatiyana ▪ Bilandi ▪ Satana ▪ Ghagholi ▪ Thekada	▪ Sahodi[3] ▪ Kithur- Mahrampur	Even for preferred locations, the recommendations for sustainable mining to be implemented. Ambient air quality is required to be monitored closely.
2	Kishangarh Bas	Masonary Stone Quartz & Silica sand	--	▪ Nangliya Mahond ▪ Chatarpur-Kultajpur	Ambient air quality is required to be monitored closely. The mines to take effective air pollution control measures.
3	Tijara	Masonary Stone	▪ Hasanpur Mafi ▪ Neemli Baghor ▪ Bhalesar	▪ Mayapur ▪ Khohari	Even for preferred locations, the recommendations for sustainable mining to be implemented.
4	Thana Ghazi	Masonary stone & Marble	The proposed mining blocks are: ▪ Narainpur ▪ Jeetpur Goojran ▪ Jhiri Jagannathpura *Mining blocks falling under proposed Eco-sensitive zone around Critical Tiger Habitat of STR, if any and Buffer are not preferred locations.*		Even for preferred locations, the recommendations for sustainable mining to be implemented.
5	Behror	No mining in near future has been indicated			
6	Bansur	Granite Masonary stone Silica sand	▪ Kothal ▪ Hameerpur ▪ Mundali	▪ Ratanpura ▪ Indrada ▪ Harsora ▪ Narol Chula	Even for preferred locations, the recommendations for sustainable mining to be implemented. Ambient air quality is required to be monitored closely.

[1] If any of the blocks falls under the *proposed Eco-sensitive zone around Critical Tiger Habitat of STR, if any and Buffer,* the same may be categorised as non-preferred category.

[3] If Sahodi area falls under eco-sensitive zone around Critical Tiger Habitat of the Sariska Tiger Reserve or Buffer, the same may not be the preferred block for mining.

Sl No.	Tehsil	Mineral to be mined	Preferred location	Locations not preferred	Remarks
7	Mundawar	Masonary stone	▪ Ranoth-Raipur	▪ Sheopur-Rainagar ▪ Sanoli-Bhungara	Even for preferred locations, the recommendations for sustainable mining are to be implemented. Ambient air quality is required to be monitored closely.
8	Rajgarh	Marble Soapstone & quartz	▪ Mallana Gordhanpura ▪ Tilwad ▪ Nangal Chandel		
9	Ramgarh	Masonary stone	▪ Goleta ▪ Neekach-Nakhnol ▪ Kota Kala ▪ Khor Nangali ▪ Hazipur-Navgaon ▪ Odela-Manaki ▪ Rasoolpur Bandholi	--	Even for preferred locations, the recommendations for sustainable mining are to be implemented. Ambient air quality is required to be monitored closely.
10	Laxmangarh	Masonary Stone	▪ Khera Mangalsingh	--	Even for preferred locations, the recommendations for sustainable mining to be implemented.
11	Kot Kasim	Masonary stone	--	Khohra Thakran - Magha ka Majra	Ambient air quality is required to be monitored closely. The mines to take effective pollution control measures.
12	Kathumar	No mining in near future has been proposed			

6.4 Recommendations for Environmental Master Plan

6.4.1 Tehsil Alwar

A. Existing Environmental Scenario

In the Alwar Tehsil exists the town Alwar, which is the district headquarters. Delhi–Alwar road and Delhi-Jaipur road are two important roads, which connects the city. In this tehsil, two industrial sites *viz.* Matsya Industrial Area (MIA) and Old Industrial Area (OIA) and their extensions exist. There are a number of forest blocks in the tehsil. The other categories of land, restricted as per Aravali Notification, 1992 occur in this area in addition to some portion of buffer zone of Sariska Tiger Reserve.

Mines of silica sand, soapstone and masonary stone are operating in this tehsil. Future mining blocks are planned at Thekda, Kithur-Mahrampur, Umrain, Sahodi, Jatiyana, Bilandi, Satana and Ghagholi to mine masonary stone.

The air quality parameters encompassing Alwar City, OIA and MIA have been found to be above acceptable limit. The proposed mining blocks are away from Sariska Reserve Forests except the Sahodi area, which is near to it. The status of ground water, air quality in and around Alwar City and the areas of Sariska Tiger Reserve nearby are the guiding criteria for locating the mining & industrial units. The depth to water varies between 5.10 metres to 30.10 metres in older alluvium and 7.45 metres to 21.40 metres in quartzite zone. The existing environmental scenario call for strict air pollution control by the mining owners, least disturbance to ground water to ensure drinking water to the nearby habitats and growing of vegetation wherever possible for ecological restoration.

B. Applicability of Recommendations

The recommendations for sustainable mining and industrial practices are applicable for the category of lands found as per Aravali Notification. The lands as per Aravali Notification that are found in the tehsil are forestland, Sariska Tiger Reserve Area, Gair Mumkin Pahar, Gair Mumkin Rada and Gair Mumkin Behed.

Since eco-sensitive zone around Critical Tiger Habitat of Sariska has been proposed, the eco-sensitive zone and buffer will also be restricted for developmental activities once the same is notified

C. Recommendations

Keeping in view the environmental scenario, the following good management practice may be considered for opening of mines in the proposed mining blocks for promoting environmentally benign mining design and mitigation practices and establishment of industrial operations:

- **Mining operations**
  - The minimum lease area of the mines should be 1.0 ha or as decided by the Government of India under the relevant Rules, whichever is higher.
  - The boundary of the mine lease should be clearly demarcated.
  - At Sahodi area, a safety zone / green belt of 25m width should be developed beyond this wall on the adjoining Sariska area side. The species of plants should be selected in consultation with Forest Department.

- Controlled blasting with adequate safety measures should be resorted to, for extraction of minerals.
- As far as possible, the approach road should be metalled. However, if there is any kutcha road, regular water sprinkling should be done
- The environmental monitoring of air quality for SPM, RPM, SO_2, NO_x and CO should be carried out six monthly. If the air quality level is above the permissible level, the frequency should be increased to quarterly/monthly depending upon the pollution level.
- Adequate measures should be taken to control the noise level in the project.
- The mine owner should submit the yearly expenditure statement to pollution control board in respect of the pollution control measures taken including that on plantation and its maintenance.
- Garland drains should be constructed to arrest the silt from the surface runoff.
- Persons in working areas should use dust masks.
- The mine owners should construct effluent treatment for the mine water, if any.
- The mine owner should give due emphasis on reuse of the OB material to the extent possible. However, in case where such practice is not feasible, separate space should be earmarked for dumping of the OB material. Such sites should be approved in consultation with District Mining Engineer and State Pollution Control Board. Physical and biological reclamation of OB material should be the responsibility of the mine owner.
- The plantation of forestry plant species as well as fruit bearing trees in and around the mining complexes should be considered. Such areas should be fenced from out side for protection. Maintaining of the plant should be the responsibility of the mine owner till the crown of the tree is achieved above the browsing level.
- For the mines wherein excavation goes below the ground level, terminal land may be rendered in the shape as shown in Figure-6.1 for storage of water or to facilitate the recharge of already stressed ground water resource.
- The mining operations beyond the level at which ground water occurs may be permitted provided that the nearby villages and human settlements are not affected by it and that the mine operators take appropriate measures for conservation/recharge of ground water. In such cases, consent/clearance of Ground Water Board may be obtained.

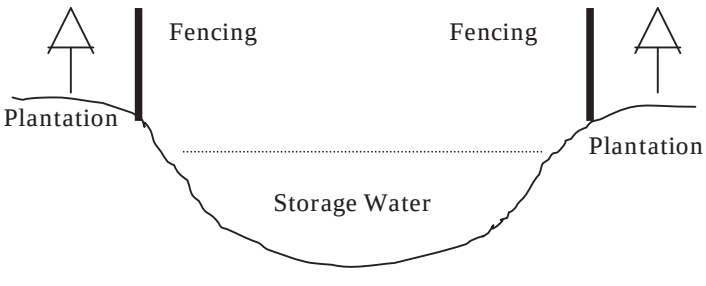

Figure-6.1: Final Land use by creating water bodies in mine pits

- **Industrial Operations**

  - Since the water is one of the critical resources in the district, the establishment of high water consuming industries should not be permitted in the district in the notified area.
  - The industries should preferably be permitted in industrial areas of MIA and OIA. Establishment of industries outside the industrial area should be permitted in case it is not feasible to locate them within the premises of industrial area.
  - In the vicinity of the red category industries, developing residential plots within the periphery of 500 m should be discouraged.
  - Sufficient plantation may be undertaken in all the available spaces in the industrial area. The plant species should be selected in consultation with the State Forest Department. The plantation areas should not be compounded later on for establishment of industries.
  - Emphasis should be given on construction, operation and maintenance of Common Effluent Treatment Plants (CETPs), ETPs and Sewage Treatment Plants (STPs) wherever required in the industrial area. The final outlet point of the treated effluent should be decided for each of the industrial area.
  - All the air-polluting industries should have effective air pollution control devices.
  - Suitable site for solid waste dumping should be identified for each of the industrial area.
  - The provision of combined effluent treatment facilities should form part of infrastructure provided to the industries.
  - The rainwater harvesting measures by the industrial units should be encouraged.

6.4.2 Tehsil Kishangarh Bas

A. Existing Environmental Scenario

In the Tehsil Kishangarh Bas, there exist two small towns namely Kishangarh Bas and Khairthal. Delhi–Alwar road is the important road passing through Kishangarh Bas. In this tehsil, one industrial site *viz.* Khairthal Industrial Area exists. Khairthal (Extension) is also planned and some industries are operating in the industrial area. In addition to the above, some mines of masonry stone and granite also exist.

There are a number of forest blocks existing in this tehsil area. The other categories of land restricted as per Aravali Notification also exist in this area. The air quality parameters have been projected to be beyond the acceptable limits at some locations. The depth to water ranges from 4.35 m to 27.0 m in older alluvium and around 26.85 m in quartzite zone. The mining blocks proposed are at Chatarpur-Kultajpur (masonary stone) and Nagliya Mahond (masonry stone, quartz and silica sand).

The minerals here also exist on the pastureland. The proposed mining blocks are away from Sariska Reserve Forests. The status of ground water is in overexploited category. The status of ground water, air quality in and around

Khairthal and land covered under Aravali Notification, 1992 are the prime considerations for locating the mines and industrial units. The existing environmental scenario call for strict air pollution control by the mining owners, least disturbance to ground water to ensure drinking water to the nearby habitats and growing of vegetation wherever possible for ecological restoration and development of pasture land.

B. Applicability of Recommendations

The recommendations for sustainable mining and industrial practices are applicable for the category of lands found as per Aravali Notification in the tehsil. The lands as per Aravali Notification that are found in the tehsil are forestland, Gair Mumkin Pahar, Gair Mumkin Rada, Gair Mumkin Behed and Banjar Beed.

C. Recommendations

Keeping in view the environmental scenario, the following good management practice may be considered for opening of mines in the proposed mining blocks for promoting environmentally benign mining practices and establishment of industrial operations:

- **Mining operations**

  - The minimum lease area of the mines should be 1.0 ha or as decided by the Government of India under the relevant Rules, whichever is higher
  - The boundary of the mine lease should be clearly demarcated.
  - A safety zone of 25 m from forest areas should be maintained as per Mineral Policy of Government of Rajasthan. This safety zone may be considered for plantation.
  - Controlled blasting with adequate safety measures should be resorted to, for extraction of minerals.
  - As far as possible, the approach road should be metalled. However, if there is any kutcha road, regular water sprinkling should be done.
  - The environmental monitoring of air quality for SPM, RPM, SO_2, NO_x and CO should be carried out six monthly. If the air quality level is above the permissible level, the frequency should be increased to quarterly/monthly depending upon the pollution level.
  - Adequate measures should be taken to control the noise level in the project.
  - The mine owner should submit the yearly expenditure statement to pollution control board in respect of the pollution control measures taken including that on plantation and its maintenance.
  - Garland drains should be constructed to arrest the silt from the surface runoff.
  - Persons in working areas should use dust masks.
  - The mine owners should construct effluent treatment for the mine water if any.
  - The mine owner should give due emphasis on reuse of the OB material to the extent possible. However, in case where such practice is not feasible, separate space should be earmarked for dumping of the OB material. Such sites should be approved in consultation with District

Mining Engineer and State Pollution Control Board. Physical and biological reclamation of OB material should be the responsibility of the mine owner.

- The plantation of forestry plant species as well as fruit bearing trees in and around the mining complexes should be considered. Such areas should be fenced from out side for protection. Maintaining of the plant should be the responsibility of the mine owner till the crown of the tree is achieved above the browsing level.
- For the mines wherein excavation goes below the ground level, terminal land may be rendered in the shape as shown in Figure-6.2 for storage of water or to facilitate the recharge of already stressed ground water resource.
- For mining operations on pasture land, alternate pastureland may be identified and developed for grazing of the livestock.

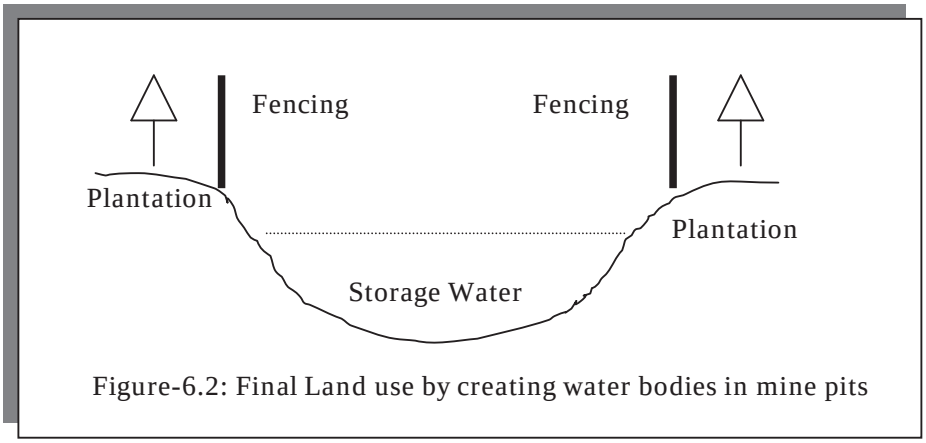

Figure-6.2: Final Land use by creating water bodies in mine pits

- The mining operations beyond the level at which ground water occurs may be permitted provided that the nearby villages and human settlements are not affected by it and the mine operators take appropriate measures for conservation/recharge of ground water. In such cases, consent/clearance of Ground Water Board may be obtained.

- **Industrial Operations**
  - Since the water is one of the critical resources in the district, establishment of high water consuming industries should not be permitted in the district in the notified area.
  - The industries should preferably be permitted in industrial areas of Khairthal. Establishment of industries outside the industrial area should be permitted only if it is not feasible to locate them within the premises of industrial areas.
  - Sufficient plantation may be undertaken in all the available spaces in the industrial area. The plant species should be selected in consultation with the State Forest Department. The plantation areas should not be compounded later on for establishment of industries.
  - The provision of combined effluent treatment facilities should form part of the infrastructure provided to industries. The treated effluent should be reused to the extent possible.

- All the air-polluting industries should have effective air pollution control devices.
- The rainwater harvesting measures by the industrial units should be encouraged.

6.4.3 Tehsil Tijara

A. Existing Environmental Scenario

In the Tijara Tehsil exists the Tijara town. Delhi–Alwar-Jaipur road is an important road, which connects the city. In this tehsil, five industrial sites *viz*. Bhiwadi Industrial Area, Rampur Mundana, Khushkhera Industrial Area, Chopanki Industrial Area and Sarekhurd Industrial Area exists. In addition to the above, some mines of masonry stone at Neemli and Chaupanaki and industries like Arahm Spinning Mills, SRF Ltd etc. exist in the tehsil.

In this tehsil, the areas covered under Aravali Notification except areas of Sariska Tiger Reserve and Sanctuary exist in this tehsil. The depth to water varies from 4.47 metres to 23.65 metres. The future mining blocks are planned at Mayapur, Khohri, Hasanpur Mafi, Neemli Baghor and Bhalesar.

The air quality parameters have been found to be above acceptable limits due to mining areas and nearby industrial areas at some locations. The status of ground water remains in overexploited category. The status of availability of water, air quality and lands category as per the Aravali Notification, 1992 and surface runoff from mines remain the primary criteria for locating the mines and industrial units. In the areas where SPM contours are projected to be higher, projects will require effective air pollution control measures.

B. Applicability of Recommendations

The recommendations for sustainable mining and industrial practices are applicable for the category of lands found as per Aravali Notification in the tehsil. The lands as per Aravali Notification that are found in the tehsil are forestland, Gair Mumkin Pahar, Gair Mumkin Rada and Gair Mumkin Behed.

C. Recommendations

Keeping in view the environmental scenario, the following good management practice may be considered for opening of mines in the proposed areas for promoting environmentally benign mining practices and establishment of industrial operations:

- **Mining operations**

  - The minimum lease area of the mines should be 1.0 ha or as decided by the Government of India under the relevant Rules, whichever is higher.
  - The boundary of the mine lease should be clearly demarcated.
  - A safety zone of 25 m from forest areas should be maintained as per Mineral Policy of Government of Rajasthan. This safety zone may be considered for plantation.

- Controlled blasting with adequate safety measures should be resorted to, for extraction of minerals.
- As far as possible, the approach road should be metalled. However, if there is any kutcha road, regular water sprinkling should be done.
- The environmental monitoring of air quality for SPM, RPM, SO_2, NO_x and CO should be carried out six monthly. If the air quality level is above the permissible level, the frequency should be increased to quarterly/monthly depending upon the pollution level.
- Adequate measures should be taken to control the noise level in the project.
- The mine owner should submit the yearly expenditure statement to pollution control board in respect of the pollution control measures taken including that on plantation and its maintenance.
- Garland drains should be constructed to arrest the silt from the surface runoff.
- Persons in working areas should use dust masks.
- The mine owners should construct effluent treatment for the mine water if any.
- The mine owner should give due emphasis on reuse of the OB material to the extent possible. However, in case where such practice is not feasible, separate space should be earmarked for dumping of the OB material. Such sites should be approved in consultation with District Mining Engineer and State Pollution Control Board. Physical and biological reclamation of OB material should be the responsibility of the mine owner.
- For the mine complexes, plantation of forestry plant species and fruit bearing trees should be considered. Such areas should be fenced from out side to protect it. Maintaining of the plant should be the responsibility of the mine owner till the crown of the tree is achieved above the browsing level.
- For the mines wherein excavation goes below the ground level, terminal land may be rendered in the shape as shown in Figure-6.3 for storage of water and to facilitate the recharge of already stressed ground water resource.
- The mining operations beyond the level at which ground water occurs may be permitted provided that the nearby villages and human settlements are not affected by it and the mine operators take appropriate measures for conservation/recharge of ground water. In such cases, consent/clearance of Ground Water Board may be obtained.

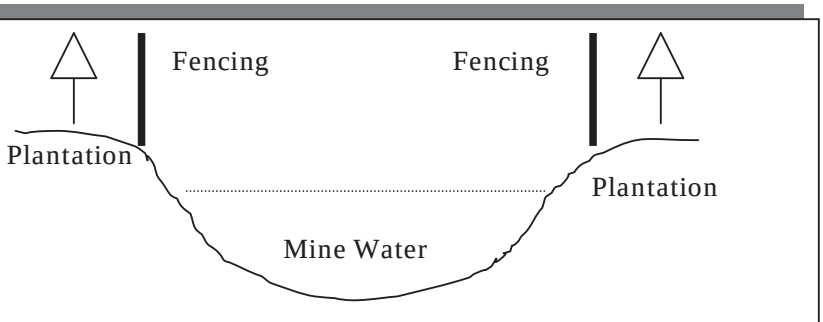

Figure-6.3: Final Land use by creating water bodies in mine pits

- **Industrial Operations**

  - Since water is one of the critical resources in the district, the high water consuming industries should not be permitted in the notified area of the district.
  - The industries should preferably be permitted in industrial areas of Bhiwadi, Rampur Mundana, Khushkhera, Chopanki and Sarekhurd. Establishment of industries outside the industrial area should be permitted only if it is not feasible to locate them within the premises of industrial areas.
  - Diversion of green land in the notified area for industrial purpose should be discouraged.
  - Sufficient plantation may be undertaken in all the available spaces in the industrial areas. Such spaces should not be compounded later on for establishment of industries.
  - Emphasis should be given on construction, operation and maintenance of Common Effluent Treatment Plants (CETPs), ETPs and sewage treatment plants (STPs) wherever required in the industrial area. The reuse of treated water should be encouraged.
  - The air-polluting industries should effective air pollution control devices.
  - The provision of combined effluent treatment facilities should form part of infrastructure provided to the industries.
  - The rainwater harvesting measures by the industrial units should be encouraged.
  - Existing CETPs may be upgraded to be able to treat effluent discharge.
  - Effort should be made to provide for separate drain system for storm water run-off and industrial effluent as far as possible and wherever required.

6.4.4 Tehsil Thana Ghazi

A. Existing Environmental Scenario

Thana Ghazi Tehsil is on the south-west part of the district. Delhi–Alwar-Jaipur passes through Thana Ghazi. In this tehsil, one industrial site *i.e.* Thana Ghazi Industrial area is planned and at present only one industrial unit is operating. The categories of land covered under Aravali Notification exist in the tehsil area. Some part of core area of Sariska Tiger Reserve, it's adjoining & preliminary notified area also exist. Some mines of soapstone, iron, dolomite and marble exist in the tehsil. The tehsil has good potential of marble. The mining blocks proposed here are at Narainpur (masonary stone), Jetpur-Goojran (masonary stone) and Jhiri-Jagannathpura (marble).

The air quality parameters have been projected to be above acceptable limits at some locations. In this tehsil, the depth to water in older alluvium varies from 16.15 metres to 30.10 metres and in slate, it is 0.90 metre to 30.45 metres. The proposed mining blocks are away from Sariska Reserve Forests. Though significant decline in post-monsoon water is not predicted in major part of the tehsil, on the long run, the status of ground water resource may be critical.

Here the mining blocks in the Sariska extension areas and corridor may not be the preferred one because the same has been proposed for conservation of the wildlife. However, in other areas, the air quality, ground water and lands restricted as per Aravali Notification, 1992 are the deciding criteria for mining and industrial operations.

B. Applicability of Recommendations

The recommendations for sustainable mining and industrial practices are applicable for the category of lands found as per Aravali Notification in the tehsil. The lands as per Aravali Notification that are found in the tehsil are forestland, Sariska Area, Gair Mumkin Pahar, Gair Mumkin Rada, Gair Mumkin Behed and Banjar Beed.

Since eco-sensitive zone around Critical Tiger Habitat of Sariska has been proposed, the eco-sensitive zone and buffer will also be restricted for developmental activities once the same is notified.

C. Recommendations

Keeping in view the environmental scenario, the following good management practice may be considered for opening of mines in the proposed blocks for promoting environmentally benign mining practices and establishment of industrial operations:

- **Mining operations**

  - The minimum lease area of the mines should be 1.0 ha or as decided by the Government of India under the relevant Rules, whichever is higher.
  - The boundary of the mine lease should be clearly demarcated.
  - For mining near forest areas, safety zone of 25 m width should be maintained around the forest area. This safety zone may be considered for plantation purpose. The plant species may be selected in consultation with the forest department.
  - Controlled blasting with adequate safety measures should be resorted to, for extraction of minerals.
  - As far as possible, the approach road should be metalled. However, if there is any kutcha road, regular water sprinkling should be done.
  - The environmental monitoring of air quality for SPM, RPM, SO_2, NO_x and CO should be carried out six monthly. If the air quality level is above the permissible level, the frequency should be increased to quarterly/monthly depending upon the pollution level.
  - Adequate measures should be taken to control the noise level in the project.
  - The mine owner should submit the yearly expenditure statement to pollution control board in respect of the pollution control measures taken including that on plantation and its maintenance.
  - Garland drains should be constructed to arrest the silt from the runoff.
  - Persons in working areas should use dust masks.
  - The mine owners should construct effluent treatment for the mine water if any.

- The mine owner should give due emphasis on reuse of the OB material to the extent possible. However, in case where such practice is not feasible, separate space should be earmarked for dumping of the OB material. Such sites should be approved in consultation with District Mining Engineer and State Pollution Control Board. Physical and biological reclamation of OB material should be the responsibility of the mine owner.
- For the mine complexes, plantation of forestry plant species and fruit bearing trees should be considered. Such areas should be fenced from out side to protect it. Maintaining of the plant should be the responsibility of the mine owner till the crown of the tree is achieved above the browsing level.
- For the mines wherein excavation goes below the ground level, terminal land may be rendered in the shape as shown in Figure-6.4 for storage of water and to facilitate the recharge of already stressed ground water resource.
- The mining operations beyond the level at which ground water occurs may be permitted provided that the nearby villages and human settlements are not affected by it and the mine operators take appropriate measures for conservation/recharge of ground water. In such cases, consent/clearance of Ground Water Board may be obtained.

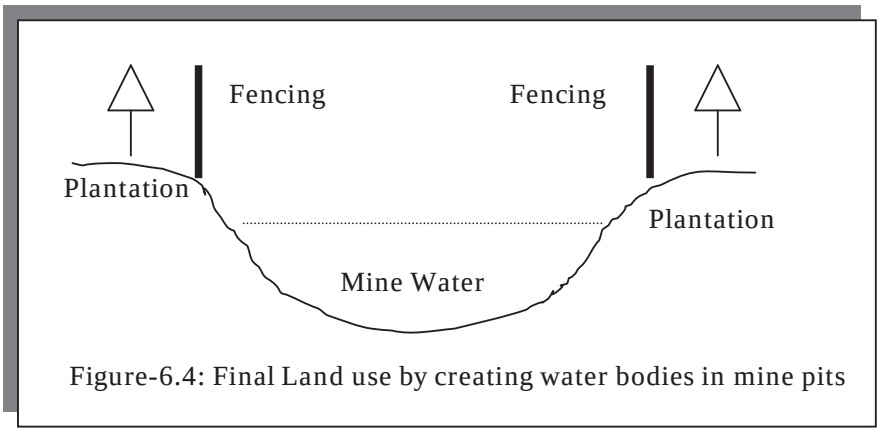

Figure-6.4: Final Land use by creating water bodies in mine pits

- **Industrial Operations**
  - Since the water is one of the critical resources in the district, the heavy water consuming industries should not be permitted in the notified area in the district.
  - The industries should preferably be permitted in Thana Ghazi Industrial area. Establishment of industries outside the industrial area should be permitted only if it is not feasible to locate the same within the premises of the industrial area.
  - The rainwater harvesting measures by the industrial units should be encouraged.
  - Sufficient plantation may be carried out in the available spaces in the industrial area. The plant species should be selected in consultation with the Forest Department. Such areas should not be compounded later on for establishment of industrial units.

6.4.5 Tehsil Behrod

A. Existing Environmental Scenario

In this tehsil, town Behrod, also the tehsil headquarter is situated on the Delhi-Jaipur Highway. In this tehsil, four industrial sites *viz*. Behrod Industrial Area, Shahjahanpur Industrial Area, Neemrana Industrial area and Sota Nalla Industrial Areas exist. The Sota Nalla Industrial Area is on the boundary line of the district with Jaipur. The air quality in Behror and the nearby locations is beyond permissible limits because of the heavy traffic density on the National Highway and operation of some air polluting industries in the industrial area.

In this tehsil, mining has not been proposed in the near future. Occurrence of some protected forest area and other lands, which are restricted as per Aravali Notification is there in this tehsil area. The area is away from Sariska Reserve Forests. The ground water status has been estimated to be in overexploited category. The depth to water ranges from 16.20 metres to 37.30 metres.

The air quality status, ground water status and the occurrence of land as per Aravali Notification, 1992 are the primary criteria for locating the mining and industrial units. Since the air quality scenario is poor in this area, opening of mines and industrial units will require proper air pollution control systems.

B. Applicability of Recommendations

The recommendations for sustainable mining and industrial practices are applicable for the category of lands found as per Aravali Notification in the tehsil.

C. Recommendations

In this tehsil, opening of mines and industries will require implementation of proper air pollution control systems. The following management practice may be considered for opening of mines for promoting environmentally benign mining practices and establishment of industrial operations:

- **Mining operations**

  - The minimum lease area of the mines should be 1.0 ha or as decided by the Government of India under the relevant Rules, whichever is higher.
  - The boundary of the mine lease should be clearly demarcated.
  - The boundary of the mine lease should be clearly demarcated.
  - A safety zone of 25 m should be maintained as per Mineral Policy of Government of Rajasthan. Such zones may be considered for plantation.
  - Controlled blasting with adequate safety measures should be resorted to, for extraction of minerals.
  - As far as possible, the approach road should be metalled. However, if there is any kutcha road, regular water sprinkling should be done.
  - The environmental monitoring of air quality for SPM, RPM, SO_2, NO_x and CO should be carried out on fortnightly basis. If the air quality level

is below the permissible level, the frequency may be decreased to monthly/quarterly depending upon the pollution level.

- Adequate measures should be taken to control the noise level in the project.
- The mine owner should submit the yearly expenditure statement to pollution control board in respect of the pollution control measures taken including that on plantation and its maintenance.
- Garland drains should be constructed to arrest the silt from the runoff.
- Persons in working areas should use dust masks.
- The mine owners should construct effluent treatment for the mine water if any.
- The mine owner should give due emphasis on reuse of the OB material to the extent possible. However, in case where such practice is not feasible, separate space should be earmarked for dumping of the OB material. Such sites should be approved in consultation with District Mining Engineer and State Pollution Control Board. Physical and biological reclamation of OB material should be the responsibility of the mine owner.
- Plantation of forestry plant species and fruit bearing trees in and around the mining complex should be considered. Such areas should be fenced from out side to protect it. Maintaining of the plant should be the responsibility of the mine owner till the crown of the tree is achieved above the browsing level.
- For the mines wherein excavation goes below the ground level, terminal land may be rendered in the shape as shown in Figure-6.5 for storage of water and to facilitate the recharge of already stressed ground water resource.
- The mining operations beyond the level at which ground water occurs may be permitted provided that the nearby villages and human settlements are not affected by it and the mine operators take appropriate measures for conservation/recharge of ground water. In such cases, consent/clearance of Ground Water Board may be obtained.

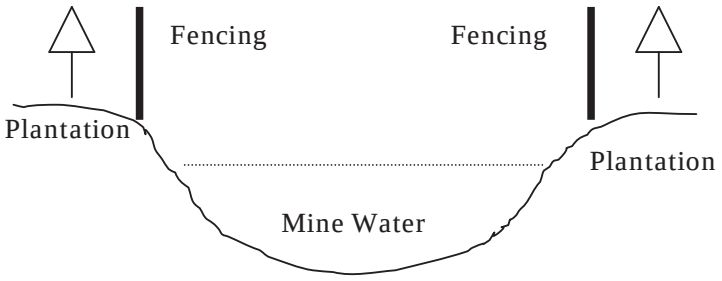

Figure-6.5: Final Land use by creating water bodies in mine pits

- **Industrial Operations**
  - Since the water is one of the critical resources in the district, the high water consuming industries should not be permitted in the notified area.

- Since the air quality in this industrial area remains poor due to industries and plying of vehicles, establishment of air polluting industries with effective air pollution control measures should be permitted.
- The industries should preferably be permitted in industrial areas of Behror, Sota Nala, Shahjahanpur and Neemrana. Establishment of industries outside the industrial area should be permitted only if the same is not feasible within the premises of industrial areas.
- Sufficient plantation should be carried out in the available spaces in the industrial area. The plant species should be selected in consultation with the forest department. Such areas should not be compounded later on for establishment of industries.
- Emphasis would be given on construction, operation and maintenance of Common Effluent Treatment Plant (CETPs), ETPs and STPs wherever required in the industrial areas. The treated effluent should be re-utilised to the extent possible.
- The rainwater harvesting measures by the industrial units should be encouraged.

6.4.6 Tehsil Bansur

A. Existing Environmental Scenario

In this tehsil, town Bansur is the tehsil headquarters. This town is connected by road with Alwar, Thana Ghazi and Behror. In this tehsil, the areas restricted as per Aravali Notification exist. The adjoining area of Sariska Tiger Sanctuary exists in this tehsil. In this tehsil, no industrial site has been planned. However, some mines of masonry stone are operating.

The air quality parameters have been found to be within acceptable limits except at some locations where SPM contours show higher SPM level at some locations. Except for Mundli and Ratanpura mining blocks, situated at the boundary of adjoining areas of Sariska Tiger Reserve, the other proposed mining areas *i.e.* Harsora, Narol-Chula, Kothal, Hameerpur and Indrada are away from it. In this tehsil also, the status of ground water is under overexploited category. The depth to water in older alluvium varies from 4.20 metres to 18.90 metres.

B. Applicability of Recommendations

The recommendations for sustainable mining and industrial practices are applicable for the category of lands found as per Aravali Notification in the tehsil. This includes forest land, Sariska Area, Gair Mumkin Pahar, Gair Mumkin Rada and Gair Mumkin Behed. Since eco-sensitive zone around Critical Tiger Habitat of Sariska has been proposed, the eco-sensitive zone and buffer will also be restricted for developmental activities once the same is notified

C. Recommendations

The ground water status and the lands as per Aravali Notification, 1992 are the considerations for locating the mining and industrial units. Keeping in view the environmental scenario, the following management practice may be considered

for opening of mines for promoting environmentally benign mining design and mitigation practices and establishment of industrial operations:

- **Mining operations**

  - The minimum lease area of the mines should be 1.0 ha or as decided by the Government of India under the relevant Rules, whichever is higher.
  - The boundary of the mine lease should be clearly demarcated.
  - In case of opening of mines near Forest area / Sariska Tiger Reserve, a safety zone of 25 m shall be maintained as per Mineral Policy of Government of Rajasthan and a green belt should be developed on such land. The plant species may be of forestry type.
  - Controlled blasting with adequate safety measures should be resorted to, for extraction of minerals.
  - As far as possible, the approach road should be metalled. However, if there is any kutcha road, regular water sprinkling should be done.
  - The environmental monitoring of air quality for SPM, RPM, SO_2, NO_x and CO should be carried out six monthly. If the air quality level is above the permissible level, the frequency should be increased to quarterly/monthly depending upon the pollution level.
  - Adequate measures should be taken to control the noise level in the project.
  - The mine owner should submit the yearly expenditure statement to pollution control board in respect of the pollution control measures taken including that on plantation and its maintenance.
  - Garland drains should be constructed to arrest the silt from the surface run-off.
  - Persons in working areas should use dust masks.
  - The mine owners should construct effluent treatment for the mine water if any.
  - The mine owner should give due emphasis on reuse of the OB material to the extent possible. However, in case where such practice is not feasible, separate space should be earmarked for dumping of the OB material. Such sites should be approved in consultation with District Mining Engineer and State Pollution Control Board. Physical and biological reclamation of OB material should be the responsibility of the mine owner.
  - Plantation of forestry plant species and fruit bearing trees in and around the mining complex should be considered. Such areas should be fenced from out side to protect it. Maintaining of the plant should be the responsibility of the mine owner till the crown of the tree is achieved above the browsing level.
  - For the mines wherein excavation goes below the ground level, terminal land may be rendered in the shape as shown in Figure-6.6 for storage of water and to facilitate the recharge of already stressed ground water resource.
  - The mining operations beyond the level at which ground water occurs may be permitted provided that the nearby villages and human settlements are not affected by it and the mine operators take appropriate measures for conservation/recharge of ground water. In such cases, consent/clearance of Ground Water Board is essential.

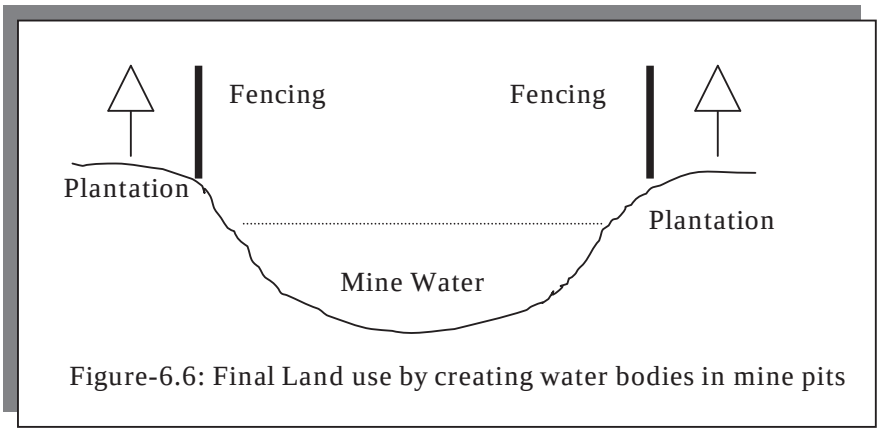

Figure-6.6: Final Land use by creating water bodies in mine pits

- **Industrial Operations**
  - The industries should preferably be located in the industrial areas developed at other places in the district. Isolate locations of the industries may be considered in case locating the same is not feasible in the industrial areas. However, under such cases, the units should have pollution control technology to meet the standards specified by Rajasthan State Pollution Control Board and other central agencies.
  - The high water consuming industries should not be permitted in the notified area in the district.

6.4.7 Tehsil Mundawar

A. Existing Environmental Scenario

Mundawar Tehsil is on the northern part of the district having tehsil headquarter at Mundawar. No industrial site has been planned in this tehsil. No forest block exists in the district though there are other categories of lands, which are restricted as per Aravali Notification. There are some mines of masonry stone and patti katla *etc.* in this tehsil. The air quality parameters have been projected to be above acceptable limits. The northern part of the tehsil falls under hot spot zone in terms of air quality.

The mining of masonary stone from Sheopur-Rainagar, Sanoli Bhungara and Ranoth-Raipur mining blocks are proposed. The status of ground water in this tehsil is also found to be overexploited. The depth to water ranges between 8.80 metres to 28.35 metres. The air quality, ground water status and the lands restricted as per Aravali Notification, 1992 are the guiding criteria for locating the mining and industrial units. Since the northern part of the tehsil is under the hot spot zone, opening of mining and industrial operations will require effective air pollution control measures.

B. Applicability of Recommendations

The recommendations for sustainable mining and industrial practices are applicable for the category of lands found as per Aravali Notification in the tehsil. This includes forestland and Gair Mumkin Pahar.

C. Recommendations

In general, the following management practice may be considered for opening of mines for promoting environmentally benign mining practices and establishment of industrial operations:

- **Mining operations**

  - The minimum lease area of the mines should be 1.0 ha or as decided by the Government of India under the relevant Rules, whichever is higher.
  - The boundary of the mine lease should be clearly demarcated.
  - A safety zone of 25 m from the forest boundary should be maintained as per Mineral Policy of Government of Rajasthan. This safety zone may be considered for plantation.
  - Controlled blasting with adequate safety measures should be resorted to, for extraction of minerals.
  - As far as possible, the approach road should be metalled. However, if there is any kutcha road, regular water sprinkling should be done.
  - The environmental monitoring of air quality for SPM, RPM, SO_2, NO_x and CO should be carried out six monthly. If the air quality level is above the permissible level, the frequency should be increased to quarterly/monthly depending upon the pollution level.
  - Adequate measures should be taken to control the noise level in the project.
  - The mine owner should submit the yearly expenditure statement to pollution control board in respect of the pollution control measures taken including that on plantation and its maintenance.
  - Garland drains should be constructed to arrest the silt from the surface run-off.
  - Persons in working areas should use dust masks.
  - The mine owners should construct effluent treatment for the mine water if any.
  - The mine owner should give due emphasis on reuse of the OB material to the extent possible. However, in case where such practice is not feasible, separate space should be earmarked for dumping of the OB material. Such sites should be approved in consultation with District Mining Engineer and State Pollution Control Board. Physical and biological reclamation of OB material should be the responsibility of the mine owner.
  - Plantation of forestry plant species and fruit bearing trees in and around the mining complex should be considered. Such areas should be fenced from out side to protect it. Maintaining of the plant should be the responsibility of the mine owner till the crown of the tree is achieved above the browsing level.
  - For the mines wherein excavation goes below the ground level, terminal land may be rendered in the shape as shown in Figure-6.7 for storage of water and to facilitate the recharge of already stressed ground water resource.
  - The mining operations beyond the level at which ground water occurs may be permitted provided that the nearby villages and human

settlements are not affected by it and that the mine operators take appropriate measures for conservation/recharge of ground water. In such cases, consent/clearance of Ground Water Board may be obtained.

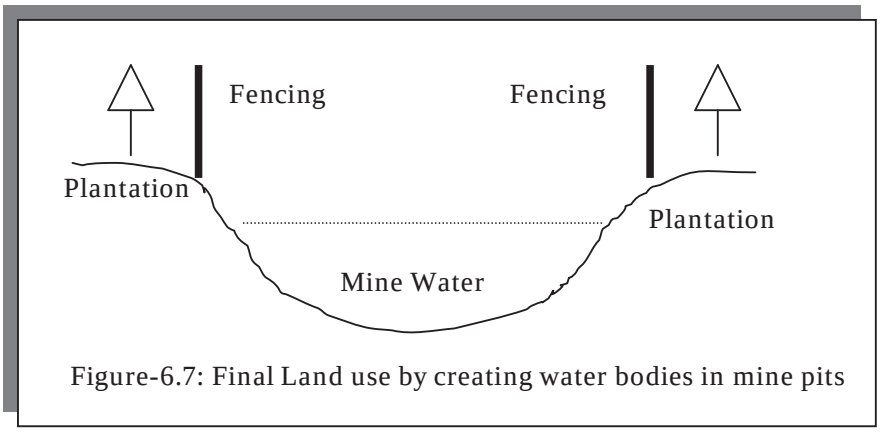

Figure-6.7: Final Land use by creating water bodies in mine pits

- **Industrial Operations**

  - The industries should preferably be located in the industrial areas developed at other places in the district. Isolate locations of the industries may be considered in case the same is not feasible in the industrial areas. However, under such cases, the units should have pollution control technology to meet the standards specified by Rajasthan State Pollution Control Board and other central agencies.
  - The high water consuming industries should not be permitted in the notified area in the tehsil.

6.4.8 Tehsil Rajgarh

A. Existing Environmental Scenario

Tehsil Rajgarh is situated on the southern part of the district having its headquarter at Rajgarh. Rajgarh is connected to Alwar by Road and Delhi-Jaipur railway line passes through Rajgarh. Some forests blocks including core area of Sariska Tiger Reserve and some prelimary-notified area exist in this tehsil. Apart from this, other categories of land on which development is restricted as per Aravali Notification, 1992 also exist in the tehsil.

Two industrial sites *viz.* Rajgarh Industrial Area (RIA) and Rajgarh Industrial Area (extension) are operating at Rajgarh. In addition to the above, there are some mines of silica sand, masonary stone, soapstone and marble. The air quality parameters around Rajgarh IA have been found to be above acceptable limits. There are some marble reserves near the preliminary notified area of STR as well.

The two proposed mining blocks *i.e.* Mallana Gordhanpura and Tilwad are for the extraction of marble. In addition to the above, Nangal Chandel area is proposed for mining soapstone and quartz. While the proposed marble blocks are near to the preliminary notified areas, the soapstone/quartz block is away from it. A number of steps have been observed to improve the environmental scenario in terms of air quality, effluent treatment and afforestation in the mining areas. Here also, the ground water has been estimated to fall under overexploited category. The depth to water in older alluvium varies from 23.00 metres to 30.30 metres and in quartzite, it is 5.15 metres to 36.30 metres.

B. Applicability of Recommendations

The recommendations for sustainable mining and industrial practices are applicable for the category of lands found as per Aravali Notification in the tehsil. This includes forestland, Sariska Tiger Reserve area, Gair Mumkin Pahar, Gair Mumkin Rada, Gair Mumkin Behed and Banjar Beed. Such restrictions will also be applicable on proposed extension of Sarika Tiger Reserve area and corridor once the same are notified by the State Government.

C. Recommendations

The ground water status and areas proposed for the corridor and extension of the boundaries of Sariska Tiger Reserve remains the primary criteria for locating the mining and industrial units. Since eco-sensitive zone around Critical Tiger Habitat of Sariska has been proposed, the eco-sensitive zone and buffer will also be restricted for developmental activities once the same is notified however; some management practices are suggested here for opening of mines, if any, in future:

- **Mining operations**

  - The minimum lease area of the mines should be 1.0 ha or as decided by the Government of India under the relevant Rules, whichever is higher.
  - The boundary of the mine lease should be clearly demarcated.
  - For mining blocks near forest area / Sariska Tiger Reserve (STR), a safety zone of 25 m around forest/STR should be maintained and a green belt be developed on safety zone. The plant species may be of forestry type.
  - Controlled blasting with adequate safety measures should be resorted to, for extraction of minerals.
  - As far as possible, the approach road should be metalled. However, if there is any kutcha road, regular water sprinkling should be done.
  - The environmental monitoring of air quality for SPM, RPM, SO_2, NO_x and CO should be carried out six monthly. If the air quality level is above the permissible level, the frequency should be increased to quarterly/monthly depending upon the pollution level.
  - Adequate measures should be taken to control the blast induced noise and vibration level in the project.
  - The mine owner should submit the yearly expenditure statement to Pollution Control Board in respect of the pollution control measures taken including that on plantation and its maintenance.
  - Garland drains should be constructed to arrest the silt from the mines.

- Persons in working areas should use dust masks.
- The mine owners should construct effluent treatment for the mine water if any.
- The mine owner should give due emphasis on reuse of the OB material to the extent possible. However, in case where such practice is not feasible, separate space should be earmarked for dumping of the OB material. Such sites should be approved in consultation with District Mining Engineer and State Pollution Control Board. Physical and biological reclamation of OB material should be the responsibility of the mine owner.
- Plantation of forestry plant species and fruit bearing trees in and around the mining complex should be considered. Such areas should be fenced from out side to protect it. Maintaining of the plant should be the responsibility of the mine owner till the crown of the tree is achieved above the browsing level.
- For the mines wherein excavation goes below the ground level, terminal land may be rendered in the shape as shown in Figure-6.8 for storage of water and to facilitate the recharge of already stressed ground water resource.
- The mining operations beyond the level at which ground water occurs may be permitted provided that the nearby villages and human settlements are not affected by it and that the mine operators take appropriate measures for conservation/recharge of ground water. In such cases, consent/clearance of Ground Water Board may be obtained.

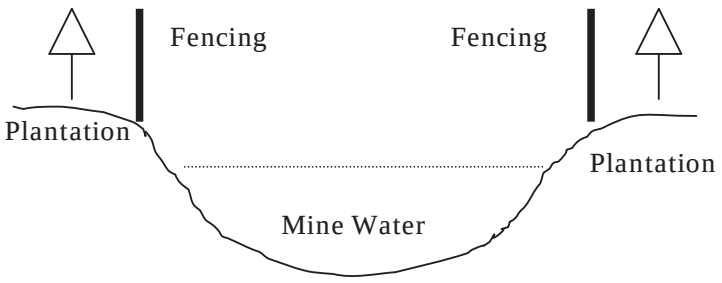

Figure-6.8: Final Land use by creating water bodies in mine pits

- **Industrial Operations**

- Since the water is one of the critical resources in the district, the water consuming industries should not be permitted in the notified area.
- The industries should preferably be permitted in industrial areas of Rajgarh Industrial Area and Rajgarh Industrial Area (Extension). Establishment of industries outside the industrial area should be permitted only if siting of industry within the premises of the industrial area is not feasible.

- The rainwater harvesting measures by the industrial units should be encouraged.
- Sufficient plantation may be carried out on available spaces in the industrial area. The plant species may be selected in consultation with the State Forest Department. Such areas should not be compounded later on for establishment of industries.

6.4.9 Tehsil Ramgarh

A. Existing Environmental Scenario

Tehsil Ramgarh exists on the eastern part of the district with Ramgarh town as its headquarters. Delhi–Alwar road is an important road, which passes through Ramgarh. In this tehsil, no industrial site has so far been planned. In this area, there exist categories of lands that are covered under Aravali Notification, 1992.

Here, some mines of chirt and masonary stone are operating. The proposed mining blocks are for masonary stone located at Goleta, Neekach-Naakhnol, Kota Kala, Khor Nangali, Hazipur-Naogaon, Odela-Manki and Rasoolpur-Bandholi. The air quality parameters have been found to be within acceptable limits at most locations. The ground water potential has been found to be critical. The depth to water varies from 2.40 metres to 17.20 metres.

B. Applicability of Recommendations

The recommendations for sustainable mining and industrial practices are applicable for the category of lands found as per Aravali Notification in the tehsil. This includes forest land, Gair Mumkin Pahar, Gair Mumkin Rada, Gair Mumkin Behed and Banjar Beed.

C. Recommendations

Developmental and mining activities in this area require considerations for conservation of ground water and minimisation of land degradation and eco-restoration efforts through plantation. Keeping in view the environmental scenario, the following management practice may be considered for opening of mines for promoting environmentally benign mining practices and establishment of industrial operations:

- **Mining operations**

  - The minimum lease area of the mines should be 1.0 ha or as decided by the Government of India under the relevant Rules, whichever is higher.
  - The boundary of the mine lease should be clearly demarcated.
  - A minimum of 25 m wide safety zone should be maintained around the forest area as per Mineral Policy of Government of Rajasthan. Plantation on this safety zone should be carried out in consultation with the State Forest Department.
  - Controlled blasting with adequate safety measures should be resorted to, for extraction of minerals.

- As far as possible, the approach road should be metalled. However, if there is any kutcha road, regular water sprinkling should be done.
- The environmental monitoring of air quality for SPM, RPM, SO_2, NO_x and CO should be carried out six monthly. If the air quality level is above the permissible level, the frequency should be increased to quarterly/monthly depending upon the pollution level.
- Adequate measures should be taken to control the noise level in the project.
- The mine owner should submit the yearly expenditure statement to pollution control board in respect of the pollution control measures taken including that on plantation and its maintenance.
- Garland drains should be constructed to arrest the silt from the surface runoff in the mines.
- Persons in working areas should use dust masks.
- The mine owners should construct effluent treatment for the mine water if any.
- The mine owner should give due emphasis on reuse of the OB material to the extent possible. However, in case where such practice is not feasible, separate space should be earmarked for dumping of the OB material. Such sites should be approved in consultation with District Mining Engineer and State Pollution Control Board. Physical and biological reclamation of OB material should be the responsibility of the mine owner.
- Plantation of forestry plant species and fruit bearing trees in and around the mining complex should be considered. Such areas should be fenced from out side to protect it. Maintaining of the plant should be the responsibility of the mine owner till the crown of the tree is achieved above the browsing level.
- For the mines wherein excavation goes below the ground level, terminal land may be rendered in the shape as shown in Figure-6.9 for storage of water and to facilitate the recharge of already stressed ground water resource.
- The mining operations beyond the level at which ground water occurs may be permitted provided that the nearby villages and human settlements are not affected by it and the mine operators take appropriate measures for conservation/recharge of ground water. In such cases, consent/clearance of Ground Water Board may be obtained.

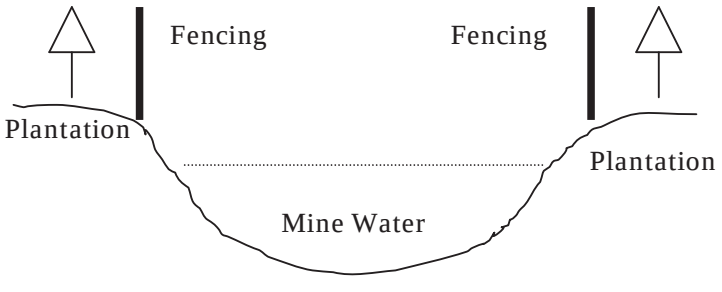

Figure-6.9: Final Land use by creating water bodies in mine pits

- **Industrial Operations**

  - The industries should preferably be located in the industrial areas developed at other places in the district. Isolate locations of the industries may be considered in case the same is not feasible in the industrial areas. However, under such cases, the units should have pollution control technology to meet the standards specified by Rajasthan State Pollution Control Board and other central agencies.
  - The high water consuming industries should not be permitted in the notified areas.

6.4.10 Tehsil Laxmangarh

A. Existing Environmental Scenario

Tehsil Laxmangarh is situated on the south-eastern part of the district having Laxmangarh as its headquarters. It is connected to Alwar Town though Malakhera by metalled road. No industrial township has been planned in this tehsil. Apart from forest blocks, the categories of lands restricted as per Aravali Notification also exist here. At present, there is one mine of soapstone operating in the tehsil. The one mining block proposed in this area is of masonary stone at Khera Mangal Singh.

There is no problem of air pollution in the tehsil. At some locations, the SPM contour is at 200 $\mu g/m^3$ that is the acceptable limit. The proposed mining block is away from Sariska Reserve Forests. The ground water status remains in a overexploited state over major portion of the tehsil. The depth to water in older alluvium varies between 5.95 metres to 19.00 metres.

B. Applicability of Recommendations

The recommendations for sustainable mining and industrial practices are applicable for the category of lands found as per Aravali Notification in the tehsil. This includes forestland, Gair Mumkin Pahar and Gair Mumkin Rada.

C. Recommendations

The mining and developmental activities in the region require considerations for ground water and minimisation of land degradation and ecological restoration efforts through plantation. Keeping in view the environmental scenario, the following management practice may be considered for opening of mines for promoting environmentally benign mining practices and establishment of industrial operations:

- **Mining operations**
  - The minimum lease area of the mines should be 1.0 ha or as decided by the Government of India under the relevant Rules, whichever is higher.
  - The boundary of the mine lease should be clearly demarcated.
  - A minimum of 25 m wide safety zone should be maintained around the forest area as per Mineral Policy of Government of Rajasthan. Plantation on this safety zone should be carried out in consultation with the State Forest Department.
  - Controlled blasting with adequate safety measures should be resorted to, for extraction of minerals.

- As far as possible, the approach road should be metalled. However, if there is any kutcha road, regular water sprinkling should be done.
- The environmental monitoring of air quality for SPM, RPM, SO_2, NO_x and CO should be carried out six monthly. If the air quality level is above the permissible level, the frequency should be increased to quarterly/monthly depending upon the pollution level.
- Adequate measures should be taken to control the noise level in the project.
- The mine owner should submit the yearly expenditure statement to pollution control board in respect of the pollution control measures taken including that on plantation and its maintenance.
- Garland drains should be constructed to arrest the silt from the surface runoff in the mines.
- Persons in working areas should use dust masks.
- The mine owners should construct effluent treatment for the mine water if any.
- The mine owner should give due emphasis on reuse of the OB material to the extent possible. However, in case where such practice is not feasible, separate space should be earmarked for dumping of the OB material. Such sites should be approved in consultation with District Mining Engineer and State Pollution Control Board. Physical and biological reclamation of OB material should be the responsibility of the mine owner.
- Plantation of forestry plant species and fruit bearing trees in and around the mining complex should be considered. Such areas should be fenced from out side to protect it. Maintaining of the plant should be the responsibility of the mine owner till the crown of the tree is achieved above the browsing level.
- For the mines wherein excavation goes below the ground level, terminal land may be rendered in the shape as shown in Figure-6.10 for storage of water and to facilitate the recharge of already stressed ground water resource.
- The mining operations beyond the level at which ground water occurs may be permitted provided that the nearby villages and human settlements are not affected by it and the mine operators take appropriate measures for conservation/recharge of ground water. In such cases, consent/clearance of Ground Water Board may be obtained.

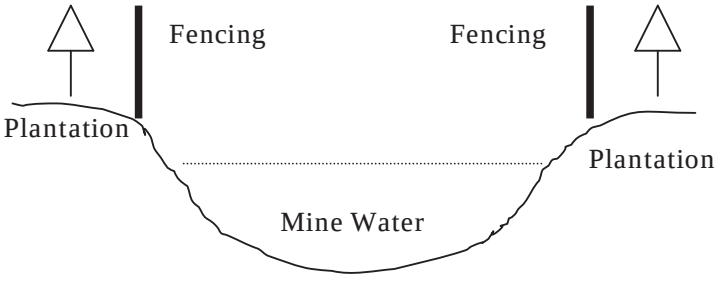

Figure-6.10: Final Land use by creating water bodies in mine pits

- **Industrial Operations**

  - The industries should preferably be located in the industrial areas developed at other places in the district. Isolate locations of the industries may be considered in case the same is not feasible in the industrial areas. However, under such cases, the units should have pollution control technology to meet the standards specified by Rajasthan State Pollution Control Board and other central agencies.
  - The high water consuming industries should not be permitted in the notified area.

6.4.11 Tehsil Kot Kasim

A. Existing Environmental Scenario

Tehsil Kot Kasim is situated in the northern part of the district having its headquarters at Kot Kasim. It is connected to district headquarter via Kishangarh Bas by metalled road. In this tehsil, one industrial site has been planned at Kot Kasim on 500 Acres of land. The land that are restricted as per Aravali Notification exist in this tehsil. At present, there are some mines of masonary stone. The mine of masonary stone has also been proposed at Khohra Thakran- Magha ka Majra.

There does not seem to be problem of air quality in the tehsil except in northern and eastern part where it is projected to be higher. Since the proposed mining location falls in hot spot zone in terms of air quality, opening of industries and mine will require effective pollution control measures. The status of ground water remains in overexploited category. The depth to water ranges from 5.20 metres to 9.95 metres.

B. Applicability of Recommendations

The recommendations for sustainable mining and industrial practices are applicable for the category of lands found as per Aravali Notification in the tehsil. This includes forestland, Gair Mumkin Pahar, Gair Mumkin Rada and Gair Mumkin Beehed.

C. Recommendations

The following management practice may be considered for opening of mines for promoting environmentally benign practices and establishment of industrial operations:

- **Mining operations**

  - The minimum lease area of the mines should be 1.0 ha or as decided by the Government of India under the relevant Rules, whichever is higher.
  - The boundary of the mine lease should be clearly demarcated.

- A minimum of 25 m wide safety zone should be maintained around the forest area as per Mineral Policy of Government of Rajasthan. Plantation on this safety zone should be carried out in consultation with the State Forest Department.
- Controlled blasting with adequate safety measures should be resorted to for extraction of minerals.
- As far as possible, the approach road should be metalled. However, if there is any kutcha road, regular water sprinkling should be done.
- The environmental monitoring of air quality for SPM, RPM, SO_2, NO_x and CO should be carried out six monthly. If the air quality level is above the permissible level, the frequency should be increased to quarterly.
- Adequate measures should be taken to control the noise level in the project.
- The mine owner should submit the yearly expenditure statement to pollution control board in respect of the pollution control measures taken.
- Garland drains should be constructed to arrest the silt from the mines.
- Persons in working areas should use dust masks.
- The mine owners should construct effluent treatment for the mine water if any.
- Plantation of forestry plant species and fruit bearing trees in and around the mining complex should be considered. Such areas should be fenced from out side to protect it. Maintaining of the plant should be the responsibility of the mine owner till the crown of the tree is achieved above the browsing level.
- If the mine is deep below the ground level and the ground water is encountered, the final shape of the land may be rendered as shown in Figure-6.11 for storage of water and to facilitate recharge of ground water.
- The mining operations beyond the level at which ground water occurs may be permitted provided that the nearby villages and human settlements are not affected by it and that the mine operators take appropriate measures for conservation/recharge of ground water. In such cases, consent/clearance of Ground Water Board may be obtained.

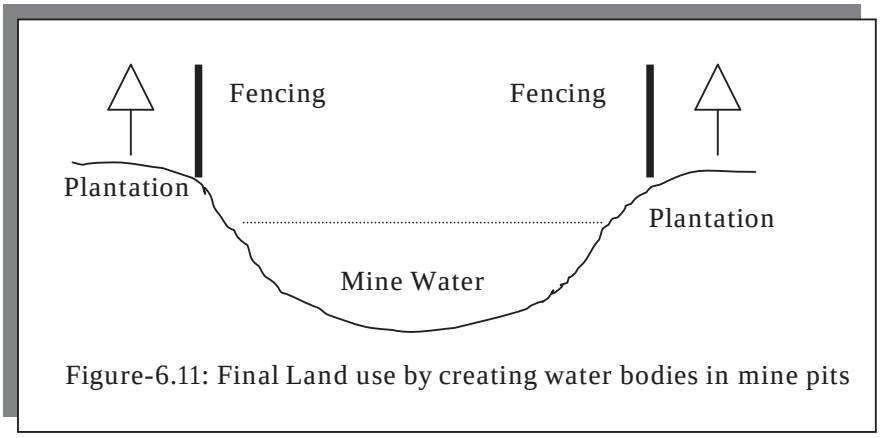

Figure-6.11: Final Land use by creating water bodies in mine pits

- **Industrial Operations**

  - Since the water is one of the critical resources in the district, the high water consuming industries should not be permitted in the notified area.
  - The industries should preferably be permitted in the proposed Kot Kasim Industrial area. Establishment of industries outside the industrial area should be permitted only if siting within the industrial area is not feasible.
  - The rainwater harvesting measuring by the industrial units should be encouraged.
  - Emphasis would be given on construction, operation and maintenance of Common Effluent Treatment Plant (CETP), ETPs and STPs wherever required in the industrial area. The treated effluent should be re-utilised to the extent possible.
  - Since the industrial area has not yet been developed, the following points may be considered by RIICO while developing the industrial estate:
    - Common effluent treatment plant/ hazardous waste treatment facilities and other associated requirements to be part of the infrastructure provided to the industries.
    - The storm water drains may be separate from the waste water/ effluent conveyance systems, depending upon the pollution potential of effluent.
    - Sufficient plantation may be undertaken in all the available spaces in the industrial area. Such areas should not be compounded later on for the establishment of industries.

6.4.12 Tehsil Kathumar

A. Existing Environmental Scenario

Tehsil Kathumar is in the south-eastern part of the district having its headquarters at Kathumar. It is connected to district headquarter by metalled road. In this tehsil, there is one industrial site *i.e.* Kherli Industrial Area. Forest blocks exist in the tehsil and other categories of restricted land as per Aravali notification do not exist.

In this tehsil, no mine is operating at present and also no mine has been planned for the near future. The air quality parameters have been found to be within acceptable limits. Here also, the status of ground water development is in safe stage. The availability of water remains the primary criteria for locating the industrial units. The depth to water in older alluvium ranges between 6.10 metres to 22.90 metres and in saline water zones it ranges between 7.60 metres to 13.75 metres.

B. Applicability of Recommendations

The recommendations for sustainable mining and industrial practices are applicable for the category of lands found as per Aravali Notification in the tehsil. This includes forestland.

C. Recommendations

Keeping in view the environmental scenario, the following good management practice may be considered for establishment of industrial units:

- **Industrial Operations**

  - Since the water is one of the critical resources in the district, the high water consuming industries should not be permitted in the notified area.
  - The industries should preferably be permitted in industrial area. Establishment of industries outside the industrial area should be permitted only if siting of the same is not feasible in the industrial area premises.
  - The rainwater harvesting measuring by the industrial units should be encouraged.
  - Emphasis would be given on construction, operation and maintenance of Common Effluent Treatment Plant (CETP), ETPs and STPs wherever required in the industrial area. The treated effluent should be re-utilised to the extent possible.
  - Sufficient plantation may be undertaken in all the available spaces in the industrial area. Such areas should not be compounded later on for the establishment of industries.

6.5 Sites for Disposal of Municipal Solid Waste

The following sites are identified for disposal of municipal solid waste in the district:

Sl No.	Name of the Town	Location of the site identified	Water Level (below ground level)
1	Alwar	Rundh Dhuninath, MIA, Khasara No. 208, 209/617	18 m-23 m
2	Behror	In the village Ganga Bishan in between Khasara No. 896-899	38 m-42 m
3	Rajgarh	In the village Machadi in Khasara No. 1074 & 1075	30 m-35 m
4	Khairthal	Village Husainpur, Khasara No. 1503 and 1511	--
5	Tijara	1 km from the village Alaka in Khasara No. 147 & 148	--
6	Kherali	Village Sonkhar, Khasra no. 4	--

For safe disposal of the municipal solid waste, the following conditions are recommended:

- Construction of protective wall around the site with gate against the flow of surface water
- An impervious layer should be laid down at the site to check the percolation of polluted water
- There should be no source of drinking water within 400 m from the site
- Industrial waste and other waste water should be properly treated before the disposal

6.6 Bio-medical Waste Management

For treatment of bio-medical waste, Government of Rajasthan has assigned the work of establishment of combined bio-medical waste treatment facility at Alwar to M/s Hoswin Incinerator, Indore at the following rates:

a. Rs. 2.95 per bed per day from the hospitals having indoor facility.
b. Rs 700.00 per month from pathological labs, diagnostic centre and blood banks.
c. Rs 550.00 per month from all other medical institutions generating bio-medical waste, OPD clinics.
d. The above rates include collection, transportation, storage and disposal of biomedical waste generated within a radius of 150 kilometres as per guidelines issued by CPCB and as per Bio-medical Waste Rules.

6.7 Hazardous Waste Management

The units generating the hazardous waste in the industrial area have provided landfill facilities within factory premises to store the waste individually. It is recommended that a centralised unit be established for collection, treatment/disposal of the hazardous waste generated by industrial units in the District. RIICO may take lead in this direction. Alternately the industry owner may form a trust/society to deal with the hazardous waste generated from various locations.

Land for disposal of hazardous waste, a Committee of GM (DIC), RIICO, RPCB & BMA was constituted under the chairmanship of SDM, Tijara. This Committee has identified land measuring 88-11 bigha of village Indora in Tijara Tehsil and the same has been sent to SDM Tijara for reserving it. Besides this site, three more sites have been identified in village Gwalda, Indora & Joria which are under consideration by RPCB/District Administration. Comparatively better site will be selected and developed if found suitable for hazardous waste management.

6.8 Guidelines for disposal of solid waste from Industrial Areas

For disposal of solid waste from industrial areas, it is suggested that site should be identified within the industrial area premises itself. In case it is not feasible, this may be linked to some external identified locations. The market for these waste materials should be explored for reuse. The following guidelines are suggested for the management of solid waste from the industrial areas:

- Characterisation of solid waste from the industrial areas including its leaching characteristics
- The inert material may be used for filling up of low-lying areas.
- Physical and biological reclamation of the heaps once they are no more active. This may be carried out after making certain amendments in the waste material.
- For solid waste under hazardous category, such waste should be dealt as per the relevant provisions of Environment (Protection) Act, 1986 and its Rules.

6.9 Plantation for Eco-restoration

For promoting eco-restoration in the district, plantation may be carried out at places to achieve 33% vegetation cover in the district. The type of plants should preferably be indigenous forestry type. However, fruit bearing tress may also be considered for this purpose. Due consideration should be given to *ethno-forestry* practices to promote ecological restoration. A tentative list of plants, which may be considered for planation purpose, is as under:

A. Shrubs

Common Name	Botanical Name
Kanghi	*Abutilon indicum*
Khair	*Acacia catechu*
Biswal	*A pennata*
Kanchan	*Bauhinia acuminate*
Bougainvillea	*Bougainvillea spectabilis*
Bottle brush	*Collistemon citrinus*
Karaunda	*Carissa spinarus*
Nebu	*Citrus limon*
Scarlet brush	*Hamelia patens*
Jasum	*Hibiscus rosa-sinansis*
Lantana	*Lantana camara*
Mehdi	*Law sonia inermis*
Sazina	*Moringa otuifera*
Kaner	*Nerium indicum*
Harsinghar	*Nyctanthus arbor-tristis*

B. Tree

Common Name	Botanical Name
Silver wattle	*Acacia dealbata*
Gandh	*Acacia jarnesiana*
Black wattle	*A. mearnsii*
Babool	*A. Nilotica*
Beal	*Aegle marmelos*
Maharuk	*Alianthus excelsa*
Siris	*Albizia lebbeck*
Subabul	*Albizia moluccana*
Kala siris	*Albizia odoratissima*
White siris	*A. Procera*
Seetaphal	*Anona squamosa*
Kadamba	*Authocephalus chinensis*
Harin	*Aphanamixis polystachya*
Kathal	*Atrocarpus heterophyllus*
Khairwal	*Bauhinia purpurea*
Astha	*Bauhinia recemosa*
Semla	*B. semla*
Kachnar	*B. varigata*
Dhak	*Butea monosperma*
Amaltas	*Cassia fistula*
Yellow pink cassia	*Cassia sp.*

Common Name	Botanical Name
Jungali saru	*Casuarina equisetifolia*
Shisham	*Dalbergia latifolia*
Gulmohar	*Delonix rogia*
Amla	*Emblica officinalis*
Rubber tree	*Ficus elastica*
Bargad	*F. Banghalensic*
Gular	*F. Glomerata*
Pipal	*F. Religiosa*
Phalsa	*Grewia subinequalis*
Mahwa	*Madhuca longifolia*
Ashok	*Saraca asoka*
Imli	*Tamarindus indica*
Arjuna	*Terminalia arguna*
Ber	*Zizyphus mauritiana*

6.10 Drainage Sytem For Bhiwadi, Khuskhera and Chopanki to prevent flow of water to Haryana

Bhiwadi: The entire topographical slope of Bhiwadi Region is towards Haryana. RIICO has constructed internal drains for a length of 80 kms for catering the industrial effluents as well as storm water and this entire water is collected at one pumping station and pumped through 4.20 kms pressure pipeline and 2.0 kms gravity pipeline to dispose off at Alwar Road in Rajasthan portion. During rainy season, the flow may increase resulting in flow towards Haryana.

Khushkhera: The prevent flow of water from Khushkhera towards Haryana, a separate disposal system upto Sabi river has been framed for which land acquisition proposal in a length of 3.54 kms has been framed. This entire land falls in Rajasthan territory.

Chopanki: For disposal of flow from Chopanki to Sabi river via Khushkhera, preparation of feasibility report has been taken up. Entire land of disposal system falls in Rajasthan territory.

6.11 Guidelines for Mine Solid Waste (Over Burden) Management

The best way of solid waste management is to use-it-up. That part of solid waste not used in quarry backfilling may be disposed of in the form of dump or reclamation of low lying areas.

The use of dump material will depends on its quality (physical & chemical characteristics). If the dump is composed of igneous or metamorphic or any very hard and compact rock, its crushing strength bearing strength etc. should be tested in the laboratory for its suitability as construction material/road metal etc. and may be used suitably. The softer ones, i.e. those coming out from sedimentary deposits should be better used for backfilling the quarries. Such materials can also be used for stabilizing slopes by forming "ripraps"

For biological reclamation of over burden dumps, preservation of the topsoil is very important. It is to be collected separately by scraping the top 10-150 cm

layer (depending upon the soil profile) and stored properly to preserve its biolife and physical properties. In Indian condition (tropical climate) such scraped soil prove to be vulnerable to erosion, and if lost, may create serious ecological damage by forming siltation on surrounding land and water and also creating loss of topsoil, a worthy natural resource; as nature takes several years to form 1 cm of topsoil.

Hence it will not be justified to loose the topsoil by getting mixed with subsoil or OB. Thus a calendar programme may be chalked out to reuse topsoil for its (most rapid use) on back-filled quarries even without requiring preservation through long time.

Dump management

Volume of solid waste, which cannot be used-up by any means, may be allowed to form "waste dumps". The following guidelines may be used management of mine dumps:

- Its topsoil should be scrapped first to use somewhere else or to store for future use. During site selection for forming such waste dumps, the important consideration could be topography, hydro-geology and land use pattern.
- The final shape of waste dump should be such that the surfaces are stable. The overall slope of the OB dump permissible in the coal sector is 28^{o}. In this case also, the overall slope may be 28% from the horizontal. Since the size of HEMM used will be smaller, the berm width may be kept 20 m.
- Long slopes allow high surface runoff and hence high erosion, so the slope surfaces should be of short length so that the vertical fall in individual terrace does not exceed 20 m. The side slopes may be kept at the angle of repose of the material i.e. 37^{o} or so.
- Drainage lines (grassed water ways) should be constructed to prevent runoff on slope and gully erosion.
- Any gully, if formed even after above care, should be plugged at different places on the slope (across the length of the gully) at a distance of 1 to 2 m such that base of upper barrier is slightly below the top of the next barrier down slope.
- The dumps should be bounded by toe-barriers around the base. These should be low height walls with sloping walls outside so that the base is wider than the top with openings at selected sites so that the water can be collected at suitable sites and allowed to flow through planned avenue and not to create any land degradation.

A typical sketch of the over burden dump is provided on next page as Figure-6.12.

6.12 Review of the Environmental Master Plan

The recommendation embodied in this report need to be reviewed after a certain period to take stock of the prevailing environmental conditions vis-à-vis the recommendations and for issual of the revised guidelines / policy options if required. It is recommended that this Report may be reviewed after a period of 10 years for the aforesaid purpose.

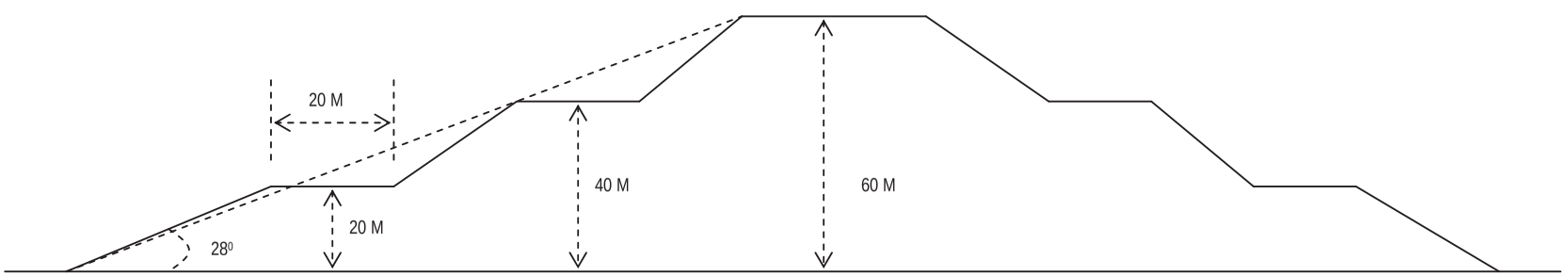

Fig – 6.12: A typical section of External OB Dump

CHAPTER - VII
SUGGESTIONS

CHAPTER-VII
SUGGESTIONS

7.0 General

- With the preparation of GIS based map showing the areas, which are restricted under Aravali Notification, 1992, it is now possible to take a holistic view of such areas and plan environmental protection measures to safeguard the environment on such areas.
- The areas under the forestland are about 1770 sq kms. (21% of the total area of the district). The vegetation cover is only on about 18.42% area. The vegetation cover could be increased by carrying out intensive plantation on forestland, industrial areas, mining areas and also diverting wasteland for plantation purposes. Variety of trees could be selected for plantation purposes to increase the vegetation cover in the district. Participation of every stakeholder is essential for increase of vegetation cover in the district.
- The district census reveals that there is population growth of over 30% during the period 1991-2001. The district since included in the NCR is likely to attract migration of population from other places. This trend will have impact on land resources, water resources etc. Since it is likely that expansion of industrial and urban complexes and other activities may reduce the extent of agricultural land. As such, there is need to protect the agricultural land in the district. The priority for locating the urban complexes and industries therefore should be on lands other than the prime agricultural land. The occurrence of salt affected land, which is about 2% of the total district area as per the NRSA data, is one of the concerns in changing land use pattern in the district. Unless proper reclamation measures to convert it into agricultural land are taken, the extent of such areas may go on increasing.
- The status of water resource in the district presents a grim picture. Due to limited surface water resources, there is increased dependence on the ground water. There is growing dependence on ground water for domestic, industrial and irrigational requirement. The ground water status in most of the blocks is under dark category. The increase in population and industrial growth may further put pressure on the ground water for domestic, irrigational and industrial purposes. The supportive capacity of the ground water is already exhausted and rainwater harvesting measures will have to be taken up at village and industry level to conserve/augment the water resource. All the urban & industrial units and housing complexes should treat the wastewater; reuse the same to the extent possible.
- Alwar district is covered under National Capital Region (NCR). There is likely to be pressure from outside for setting up of housing complexes, industries etc. A City Master Plan of Alwar has already been prepared to promote systematic growth. It is suggested that Town and Country Planning Department of Government of Rajasthan, keeping in view the suggestions made in this report, may prepare a District Master Plan.
- Considerable quantity of municipal solid waste gets generated from Alwar and other townships and this is likely to further increase in the years to

come. In addition, solid waste also gets generated from industrial areas in the district. Since land is a resource, the disposal methodologies for solid waste can not remain only sanitary landfill. Other environmentally friendly and financially viable options need to be explored in future and a detailed *solid waste management plan* (SWMP) needs to be prepared and implemented in the district.

- The sewage generation from the townships is considerable and no sewage treatment facility is available. It is suggested that schemes for sewage treatment should be taken up for townships in the district and the same should be implemented soon. Development authorities should provide sewage treatment facilities simultaneously while developing the area in phased manner. No untreated sewage/waste water should be allowed to flow in the neighbouring areas. Piecemeal approach to laying of the sewers should be avoided.
- The recommendation made in this report should be reviewed after 10 years and fresh policy guidelines may be framed based on the prevailing socio-economic and environmental conditions at that point of time.
- Inter-departmental consultation on matters of development and protection of environment is essential. Such platform may also be used for exchange of environmental data for information of other departments to help them in decision making. These may include the environmental data from pollution control boards, data from ground water and irrigation department and forest department etc.
- At least, on 2-3% of the land, water bodies may be developed to lessen dependence on ground water and recharge of the aquifers.
- Seeing the grim ground water scenario, an expert from CGWB/State Ground Water Board should be included in the Expert Committee Meetings for environmental clearance of the projects.

7.1 Industrial Areas–Actions For Environmental Management

For industrial locations, the following actions are recommended:

- The drain carrying the storm run-off should be separate from those carrying the industrial effluent in the industrial areas as far as possible and wherever required. The drains carrying the industrial effluent should discharge them in domestic effluent drains only when the effluent meets the prescribed criteria.
- Sufficient plantation should be carried out on all the available spaces in the industrial areas. The selection of plant species should be done in consultation with the Forest Department. Such areas should not be compounded later on for establishment of industries.
- The provision of combined effluent treatment facilities should form part of the infrastructure provided the industries. There is need to encourage reuse of treated water from the treatment plants to lessen the fresh water consumption.
- The practice of rainwater harvesting should be encouraged at every level to lessen dependence on ground water which is overexploited at most locations in the district. This point may form a part of conditions embodied

in *"Consent to operate"* being granted by State Pollution Control Board to industries.

- There is need to identify suitable sites within the industrial areas itself for collection, treatment and disposal of solid waste. However, in any case, if the same is not feasible, it can be linked to some external site outside the industrial area. Such areas should be identified in consultation with District authorities.
- In order to promote better environmental management at industrial sites, the industry promoting agencies should provide wastewater treatment facilities, solid waste collection, treatment and disposal facilities, and hazardous waste management sites as a part of infrastructure. Such facilities should be developed and operated by the Association/Beneficiaries/Trust of the particular industrial area. RIICO should consider to allot necessary land for this purpose. The Disposal points for the effluent from each of the industrial area should be decided in advance.

7.2 Mining Operations

- There are several clusters of small mines in the region. The consultant, engaged by the mine owners for preparing environmental management plans should take into account the factors on cluster basis for a particular mining complex and accordingly devise strategies for individual mine operators for sound environmental management practices like physical and biological reclamation of OB dumps, development of green belts etc. Due consideration should be given to the final designated land use pattern *e.g.* green belt or water pools, in the EMPs being prepared by them.
- All the eco-restoration and pollution control activities should be undertaken on cost sharing basis by the mine owners and entrepreneurs. This will lessen the burden on the part of individual mine operators for promoting eco-friendly mining operations.
- The rainwater harvesting measures should be practiced in each of the mining areas to lessen dependence on the ground water for various industrial and domestic purposes.
- There is need to organise frequent consultations between mine operators, State Pollution Control Board and other agencies for environmental awareness for promoting eco-friendly mining operations.
- The plantation in the mining areas, creation of water pools etc. near the Sariska Tiger Reserve should be planned in close co-ordination with the officials of STR. The type of plant species should be selected in close co-ordination with Forest/STR officials. The plantation of indigenous specious should be preferred. The afforestation needs to be carried out on mass scale.
- The renewal of mining lease should be effected based on the past record of the mine owner.

7.2.1 Additional Measures Required for Environmental Protection in Mining Areas

In the district, the majority of mines are of two types; the first one for the extraction of masonary stone and the second one for the marble. The marble mining is confined to Thana Ghazi and Rajgarh tehsils. The extraction of masonary stone and some other minerals are being carried out in other tehsils *viz*. Bansur, Mundawar, Kishangarh Bas, Tijara, Alwar and Ramgarh.

- For marble mining in Thana Ghazi and Rajgarh tehsils, following additional measures may be implemented to improve the environmental scenario in all the mining complexes:

  - Garland drains should be constructed to arrest silt from the surface runoff.
  - Approach road may be made pucca to prevent dust particles becoming airborne.
  - Though plantation work has been carried out by the mine operators in the mining areas, there is need to implement intensive afforestation schemes. Such scheme should also target plantation on external areas.
  - The mine operators need to construct sludge drying beds for drying and disposal of the solid materials recovered from the effluent. Market for such slurry should be explored and be reutilised.
  - The treated effluent should be reutilised for mining and other operations.
  - The air quality is being monitored at six monthly basis. If the monitoring report shows the air quality above the permissible level, the frequency of monitoring should be increased say quarterly.
  - The responsibility of mine closure and decommissioning remain with the mine operators. Upon closure of the mine, the overburden material needs to be backfilled or reutilised, the external OB dumps should be physically and biologically reclaimed, and the entire quarry should be fenced and plantation should be carried out along the periphery.

- For mining of masonary stone and other minerals in Bansur, Mundawar, Kishangarh Bas, Tijara, Alwar, Behror and Ramgarh, following additional measures are suggested to improve the environmental scenario in all the mining complexes:

  - Clearly demarcate the boundary of the mining lease area
  - Approach road may be made pucca to prevent dust particles becoming airborne.
  - Garland drains should be constructed to arrest silt from the surface runoff.
  - Though plantation work has been carried out by the mine operators in the mining areas, there is need to implement intensive afforestation schemes. Such scheme should also target plantation on external areas.
  - The mine operators need to construct effluent treatment plant in cases where ground water is being encountered.
  - The treated effluent should be reutilised for mining and other operations.

- The air quality is being monitored at six monthly basis. If the monitoring report shows the air quality above the permissible level, the frequency of monitoring should be increased say quarterly.
- The responsibility of mine closure and decommissioning remain with the mine operators. The overburden material needs to be backfilled or reutilised, the external OB dumps should be physically and biologically reclaimed, and the entire quarry should be fenced and plantation should be carried out along the periphery.

7.3 Ground Water Management Strategy

The following strategies are being suggested for management of ground water in the district:

- Augmentation of ground water resources by artificial recharge methods wherever feasible.
- To arrange mass awareness programme to educate people as regards to conservation of water and water shed management techniques.
- Industrial waste and other wastewater should be properly treated before disposal to check ground water pollution.
- Dead bodies of animals and solid wastes should be properly disposed off so that underground water may not get polluted by leaching action specially near nay drinking water source *i.e.* open well/hand pump/tube well.
- Recycling of water should be preferred in daily use.
- Recycling of industrial waste-water after proper treatment.
- Notification of critical area/blanks as regards over-exploitation of ground water.

ANNEXURE - I

LAKES & TANKS IN THE DISTRICT

Annexure-I

Lakes and Tanks in the District

Table-1 : Tanks in the District

Class: Medium

Sl No.	Project Name	Basin Name	Location (° ‘ “)		Live Storage (mm^3)	CCA (ha)
			Latitude	Longitude		
1	Jaisamand Bund	Ruparel	272900	763545	26.45	4846.50
	Total				26.45	4846.50

Table-2: Tanks in the District

Class: Minor

Sl No.	Project Name	Basin Name	Location (° ‘ “)		Live Storage (mm^3)	CCA (ha)
			Latitude	Longitude		
1	Adoli	Banganaga	271600	765300	0.23	38.00
2	Agar bund	Banganaga	271800	761030	2.88	252.90
3	Ahir Majra Bund	Sabi	274730	762530	0.23	40.60
4	Almadika Bund	Sabi	275220	764230	0.34	83.40
5	Anandpur	Shekhawati	280700	762220	0.17	75.90
6	Atal Bund	Banganaga	272230	764930	0.41	43.10
7	Ateria Bund	Ruparail	274000	764930	Diversion Dam	
8	Babriya	Sabi	274710	762230	4.02	1514.00
9	Bagar Bund	Ruparail	275320	765430	0.19	38.00
10	Bagh Singh Teliwala	Banganaga	272330	764845	1.21	228.00
11	Baghor Bund	Sabi	274640	764230	0.18	51.80
12	Bagola Bund	Ruparail	271330	763730	0.81	51.80
13	Bakathala	Sabi	275130	764530	0.30	57.00
14	Baleta Bund	Ruparail	272100	763300	2.83	75.70
15	Bara Weir	Ruparail	272500	763100	3.29	783.70
16	Behroz Bund	Sabi	274350	763240	1.35	89.00
17	Bhageri Kalan	Sabi	275410	764115	0.28	28.70
18	Bhageri Khurd	Sabi	275350	763950	3.54	316.00
19	Bhindusi Bund	Ruparail	275330	764800	0.42	69.50
20	Bhiwari	Sabi	281200	765000	0.25	57.00
21	Bichgaon	Banganaga	271645	764855	1.04	148.00
22	Bilaspur Bund	Ruparail	275345	765000	1.18	65.90
23	Birkhiri	Banganaga	270415	762015	1.07	265.50
24	Chawandi Kala Bund	Sabi	280200	765030	0.26	60.70
25	Dera Bund	Banganaga	271000	764030	0.85	45.30
26	Dewti Bund	Banganaga	271000	763000	5.88	1580.00
27	Dhamera Bund	Ruparail	271700	763400	--	612.14
28	Dhiriawas Bund	Sabi	280535	764800	0.64	91.90
29	Dugduga	Banganga	270700	764030	0.30	72.40
30	Gadwai	Banas	254600	741400	0.17	47.00

Sl No.	Project Name	Basin Name	Location (° ‘ “)		Live Storage (mm^3)	CCA (ha)
			Latitude	Longitude		
31	Gala Khera	Banganaga	271215	770015	0.30	71.50
32	Garhi Sawairam	Banganaga	271300	764800	0.10	114.90
33	Ghatbai Bund	Banganaga	272745	764800	1.75	342.00
34	Gor Pahari	Banganaga	272300	764945	0.41	76.00
35	Hamira ka Bund	Sabi	275900	765200	0.45	29.30
36	Hans Sarowar	Ruparail	273130	764500	9.23	244.00
37	Harsana	Banganga	271800	764930	0.93	163.00
38	Husepur Bund	Ruparail	274800	764700	0.19	62.70
39	Imlaki Bund	Sabi	281130	765300	0.30	30.40
40	Inchaka Bund	Sabi	274710	764150	0.90	21.40
41	Isapur Bund	Sabi	215020	764100	0.43	39.30
42	Ismailpur Bund	Sabi	274630	764030	0.93	94.30
43	Isorada bund	Sabi	275930	764725	0.42	104.80
44	Jai Sagar	Banganga	271015	761750	--	910.93
45	Jajor ka Naka	Ruparail	274235	764200	0.55	109.30
46	Jamroli	Banganaga	270930	763945	0.29	23.10
47	Jatka Bund	Sabi	275120	764255	2.08	166.70
48	Jatwara	Banganga	271530	765400	0.65	155.50
49	Jetpur	Banganga	271430	761730	2.49	518.40
50	Jhalatal	Sabi	271430	764845	0.25	48.00
51	Jhiroli Bund	Banganaga	274930	765130	2.77	425.50
52	Jhiwana	Ruparail	280900	765030	1.53	126.60
53	Kaliyaki Bund	Banganaga	275610	765350	2.16	30.90
54	Kanwara	Sabi	272245	765330	0.12	19.00
55	Karoli ka Naka	Banganaga	274100	764000	0.45	81.30
56	Karoli ki Batai	Banganaga	273830	765200	0.17	38.00
57	Karwar Bund	Ruparail	275635	764400	2.08	263.90
58	Khedarpur Bund	Sabi	280150	765330	0.96	303.40
59	Kho Bund	Banganga	271200	762200	0.14	31.50
60	Kho Ka Naka	Banas	274340	764330	0.17	38.00
61	Kirt Singhpur	Sabi	275500	762350	0.37	52.60
62	Kot Kasim Bund	Sabi	280120	764150	0.59	40.50
63	Kothi Narainpur	Ruparel	271645	763800	0.50	40.00
64	Kutina	Shekhawati	280400	762630	0.31	108.00
65	Lachmangarh Bund	Banganga	272230	765130	--	424.00
66	Lakhnaka	Banganga	271415	761400	0.44	40.90
67	Lily Bund	Banganga	272200	765310	0.43	76.00
68	Macheri	Banganga	271445	763945	0.08	49.40
69	Machroli Bund	Sabi	275300	764120	0.76	31.20
70	Man Sarowar	Banganga	271445	762315	9.08	842.90
71	Mangalsar	Banganga	271300	762530	--	964.78
72	Milakpur Bund	Ruparail	273300	765400	0.85	39.00
73	Nagla Banjir bund	Ruparail	273130	764500	2.61	809.40
74	Nakhnol Bund	Sabi	280700	765050	0.16	102.80
75	Navgaon Khas Bund	Ruparail	275300	764900	0.17	46.60
76	Navgaon Masit Bund	Sabi	280520	764910	0.34	40.60
77	Navgaon Tek Bund	Ruparail	275310	764850	0.17	39.00

Sl No.	Project Name	Basin Name	Location (° ‘ “)		Live Storage (mm^3)	CCA (ha)
			Latitude	Longitude		
78	Neemle Bund	Ruparail	275100	765400	0.62	39.00
79	Nimbola	Banganaga	270845	764415	0.33	40.00
80	Nirmala Bund	Banganga	271215	763430	0.05	3.00
81	Patwari Ka Naka	Banganga	271445	762815	0.07	16.00
82	Pinan	Banganga	271545	764500	0.85	79.70
83	Pinas Nagal	Banganga	271330	764400	0.10	12.00
84	Piproli	Banganga	273300	764730	0.90	1864.40
85	Pratap Bund	Sabi	271330	763730	0.26	23.10
86	Prem Ratnakar Bund	Sabi	272930	763700	1.10	33.20
87	Pritam Pura	Sabi	271310	770130	1.38	297.70
88	Qaziwala Bund	Sabi	275530	765130	1.50	39.00
89	Rajroli	Banganga	271445	762545	0.37	32.80
90	Ram Sagar Sumushi	Ruparail	271330	765930	0.30	71.60
91	Rambas	Banganaga	275820	764950	0.43	57.10
92	Ramlala Wala	Sabi	272130	764845	0.43	131.00
93	Rampur Bund	Banganga	272740	761730	--	1012.00
94	Rata Khurd	Banganga	274130	764100	0.20	75.60
95	Reni new	Sabi	270930	764430	0.85	148.50
96	Reni Old	Banganaga	271000	764400	0.39	63.10
97	Roop was	Ruparail	271330	764500	0.12	60.70
98	Sajjanpuri	Banganaga	272130	765050	0.09	171.00
99	Salwari	Sabi	271230	765700	0.12	29.00
100	Saran Khurd	Banganaga	280840	765610	1.55	914.00
101	Shahidpur Barka	Banganaga	275540	765000	0.45	52.20
102	Sharod Bund	Ruparail	281150	765250	0.42	49.30
103	Sileberi	Sabi	271930	763145	5.46	836.40
104	Siliserh	Banganga	273100	763200	12.14	1124.29
105	Siryani Bund	Banas	280250	762510	0.85	38.10
106	Surer Lower	Sabi	271200	763645	0.35	72.80
107	Surer Upper	Sabi	271145	763745	0.35	24.30
108	Talab Bund	Ruparel	271300	762715	0.35	36.40
109	Thekri Bund	Shekhawati	271245	763830	0.21	38.00
110	Thetra	Banganga	271200	764400	0.26	63.10
111	Thonsari	Banganga	271030	764115	0.85	202.50
112	Tijara (Kaliyaki)	Banganga	275510	765230	1.63	304.00
113	Titpuri	Banganga	272230	770000	1.22	290.20
114	Toda Bund	Sabi	272200	765530	0.85	202.50
115	Tohari Bund	Banganga	275100	764055	0.76	38.00
116	Training Bund	Banganga	273800	763530	5.21	143.20
117	Tusari	Ruparail	272100	770535	--	619.00
118	Vijai Sagar	Ruparail	273600	763500	1.64	359.80
119	Harsora Bund	Sabi	274830	762720	3.90	1985.83
120	Tasai	Banganga	272215	770500	0.40	54.60
	Class-wise Total				133.69	27062.27

Table-3: Proposed Tanks in the District

Class: Minor

Sl No.	Project Name	Basin Name	Location (° ‘ “)		Live Storage (mm^3)	CCA (ha)
			Latitude	Longitude		
1	Alwara	Ruparail	--	--	0.24	117.00
2	Amka[1]	Banganga	--	--	1.01	144.00
3	Baduk	Sabi	274530	764200	1.19	243.20
4	Bassangpura	Ruparel	272200	763430	5.09	1080.00
5	Bhagwas	Sabi	274700	762500	0.26	45.00
6	Bigota	Banganga	--	--	1.40	400.00
7	Chandi	Ruparel	--	--	0.24	105.00
8	Danpur	Banganga	--	--	0.30	85.00
9	Hamirpur	Sabi	274305	762720	0.17	36.00
10	Inderpura	Ruparail	271600	763700	2.80	759.00
11	Iswana	Banganga	--	--	0.19	50.00
12	Itoli	Banganga	--	--	4.20	1200.00
13	Kanch Khal	Ruparel	273200	763330	0.09	152.00
14	Munda	Sabi	275200	763600	0.34	67.50
15	Nanpur	Ruparail	272500	763100	0.33	81.00
16	Nathri	Ruparail	272500	764200	1.53	304.00
17	Nawalpur	Sabi	273900	761810	2.26	702.00
18	Nigari	Ruparail	272945	763130	3.06	621.00
19	Tasing	Shekhawati	275330	761240	0.12	47.00
	Class-wise Total				24.82	6238.70
	Status-wise Total				24.82	6238.70

Table-3: On-going Tank Projects in the District

Class: Minor

Sl No.	Project Name	Basin Name	Location (° ‘ “)		Live Storage (mm^3)	CCA (ha)
			Latitude	Longitude		
1	Dholan	Ruparail	271400	763145	0.35	117.00
2	Khanpur	Ruparail	274545	764745	5.26	920.00
3	Patan Milakpur	Sabi	280330	765330	1.19	243.20
	Class-wise Total				6.80	1280.20

(All the above three projects have now been completed)

Table-4: Projects Under Consideration

Sl No.	Name of the Project	Capacity (million m^3)	CCA	Remarks
1	Nimbahedi	1.40	452.00	Completed.
2	Takwasan	0.39	138.00	Completed
3	Bitoli	0.58	196.00	Completed
4	Samarsarovar	1.13	379.00	Damaged

[1] Amka under construction. Bhaduk, Chandi, Danpur and Hamirpur have been completed and handed over to Panchayat. Bigota project has also been completed.

ANNEXURE - II

LIST OF MINE LEASES IN THE DISTRICT

Annexure-II

List of Mine Leases in the Alwar District as on 31.07.2004 – Major Minerals

Sl No.	Name of Lessee	ML No.	Mineral	Near Village	Tehsil	Area (Ha)	Period
1	M/s Shriram Minerals	02/75	Barytes	Umren	Alwar	3.589	20 years from 4.4.91
2	M/s Ramnarain & Bros.	01/94	Barytes	Khohra Makroda etc	Rajgarh	9.483	10 years from 15.2.85
3	M/s Ramnarain & Bros.	27/86	Feldspar & Quartz	Tatarpur	Mundawar	4.7305	20 years from 27.12.87
4	Shri Rajiv Mohan Gupta	03/96	Silica Sand & Fireclay	Basawa Gate	Rajgarh	4.7305	20 years from 9.4.99
5	Shri Satish Mohan Gupta	04/02	Silica sand & fire clay	Nangal Dharma	Rajgarh	3.746	20 years from 28.5.83
6	M/s Balaji Minerals	01/90	Soapstone & Fireclay	Khohra, Karmali	Ramgarh	68.25	20 years from 12.8.91
7	Smt. Brahma Devi Sharma	12/84	Soapstone	Nangal Chandel	Rajgarh	62.50	20 years from 28.1.85
8	Shri Laxmi Chand Gupta	04/76	Soap stone	Seerawas	Alwar	4.9616	20 years from 29.4.77
9	Smt Suman Lata Pareek	02/81	Soapstone, iron, dolomite	Natata	Thana Ghazi	69.367	20 years from 29.4.82
10	Shri Shiv Karan Singh	5/87	Soapstone	Dhani Gujran	Thana Ghazi	72.84	10 years from 20.12.88
11	Shri Shiv Karan Singh	1/78	Soapstone	Samara	Thana Ghazi	72.84	20 years from 12.12.78
12	Shri Rajesh Sharma	12/76	Soapstone, Pyrafilates Calcite	Berala	Laxamangarh	48.75	20 years from 30.7.77
13	Shri Narain Pd. Sharma	14/79	Red & Yellow Ochre	Neemwala Guwada	Thana Ghazi	60.70	20 years from 16.1.80
14	Smt Sudha Goyal	37/84	Soapstone, Quartz	Adhismera	Bansur	57.36	20 years from 6.1.86

[Source: Office of District Mining Engineer, Alwar]

List of Mine Leases in the Alwar District as on 31.07.2004 – Minor Minerals

Sl No.	Name of Leasee	ML No.	Mineral	Near Village	Tehsil	Area	Period
1	M/s Arpit Marbles	34/96	Marble	Jhiri	Thana Ghazi	100 mx100 m	20 years from 5.8.97
2	M/s Arpit Marbles	37/96	Marble	Jhiri	Thana Ghazi	100 mx100 m	20 years from 5.8.97
3	M/s Arpit Marbles	35/96	Marble	Jhiri	Thana Ghazi	100 mx100 m	20 years from 5.8.97
4	M/s Arpit Marbles	50/96	Marble	Jhiri	Thana Ghazi	100 mx100 m	20 years from 17.10.97
5	M/s Arpit Marbles	59/96	Marble	Jhiri	Thana Ghazi	100 mx100 m	20 years from 21.7.97
6	M/s Arpit Marbles	08/97	Marble	Jhiri	Thana Ghazi	100 mx100 m	20 years from 19.1.98
7	M/s Agrwal Marble Mines	837/88	Marble	Kalsi Kala Guwada	Thana Ghazi	100 mx100 m	20 years from 25.4.89
8	Shri Anil Kumar Goyal	1010/88	Marble	Kalsi Kala Guwada	Thana Ghazi	100 mx100 m	20 years from 29.5.89
9	M/s Ambika Marbles	542/88	Marble	Kalsi Kala Guwada	Thana Ghazi	100 mx100 m	10 years from 31.5.89
10	Shri Apoorva Kr Sharma	3/95	Marble	Natata	Thana Ghazi	100 mx100 m	20 years from 3.1.96
11	Smt Anita Sharma	89/97	Marble	Natata	Thana Ghazi	100 mx100 m	20 years from 26.8.98
12	Shri Ashwini Agrawal	91/99	Marble	Kalsi Kala Guwada	Thana Ghazi	1.0032 Ha	20 years from 17.8.00
13	Shri Amrit Gaba	1009/88	Marble	Kalsi Kala Guwada	Thana Ghazi	100 mx100 m	20 years from 31.3.89
14	Smt Basanti Devi Khetan	317/87	Marble	Jhiri	Thana Ghazi	100 mx100 m	20 years from 17.10.88
15	Shri B.S. Shekhawat	872/88	Marble	Kalsi Kala Guwada	Thana Ghazi	100 mx100 m	10 years from 14.3.89
16	Shri Babu Lal Meena	1583/91	Marble	Kalsi Kala Guwada	Thana Ghazi	100 mx100 m	20 years from 28.10.99
17	Shri C.S. Gupta	9/93	Marble	Jhiri	Thana Ghazi	2.25 Ha	20 years from 28.7.93
18	M/s C.S. Mines Pvt. Ltd.	218/89	Marble	Jhiri	Thana Ghazi	4.6232 ha	20 years from 19.2.90
19	Smt Chando Devi Meena	10/98	Marble	Dhani Nijhara	Thana Ghazi	5292 sq.m.	20 years from 12.10.98
20	M/s Dixit Marble Stone	815/88	Marble	Kalsi Kala Guwada	Thana Ghazi	100 mx100 m	20 years from 7.1.89
21	M/s Dixit Marble Stone	816/88	Marble	Kalsi Kala Guwada	Thana Ghazi	100 mx100 m	10 years from 7.1.89
22	M/s Dhiraj Marbles	263/88	Marble	Kalsi Kala Guwada	Thana Ghazi	100 mx100 m	20 years from 8.3.89
23	Shri G.P. Gupta	79/88	Marble	Kalsi Kala Guwada	Thana Ghazi	100 mx100 m	10 years from 4.5.88
24	M/s Ganpati Marbles	14/87	Marble	Kalsi Kala Guwada	Thana Ghazi	100 mx100 m	10 years from 5.8.87
25	M/s Ganpati Mines Pvt Ltd	258/89	Marble	Kalsi Kala Guwada	Thana Ghazi	10.1857 Ha	20 years from 13.3.90
26	M/s Ganpati Minerals	18/96	Marble	Kalsi Kala Guwada	Thana Ghazi	100 mx100 m	20 years from 11.11.97
27	M/s Kuhu Mineral & Marble	1848/91	Marble	Dhani Nijhara	Thana Ghazi	100 mx100 m	20 years from 8.11.96
28	Shri K.L. Kumavat	101/87	Marble	Kalsi Kala Guwada	Thana Ghazi	100 mx100 m	10 years from 17.10.87

Sl No.	Name of Leasee	ML No.	Mineral	Near Village	Tehsil	Area	Period
29	Shri Kishan Singh	537/88	Marble	Kalsi Kala Guwada	Thana Ghazi	100 mx100 m	10 years from 5.6.89
30	M/s Karni Marbles	594/88	Marble	Kalsi Kala Guwada	Thana Ghazi	100 mx100 m	10 years from 2.1.89
31	Smt Kiran Kanwar	881/88	Marble	Jhiri	Thana Ghazi	100 mx100 m	20 years from 27.7.89
32	M/s Khandelwal Mines	53/88	Marble	Kalsikala Guwada	Thana Ghazi	100 mx100 m	20 years from 4.5.88
33	M/s Krishna Marbles	153/91	Marble	Kalsikala Guwada	Thana Ghazi	100 mx100 m	20 years from 4.11.99
34	Shri L.N. Sharma	544/88	Marble	Kalsikala Guwada	Thana Ghazi	100 mx100 m	10 years from 5.6.89
35	M/s Hari Singh	220/86	Marble	Jhiri	Thana Ghazi	100 mx100 m	20 years from 5.8.97
36	M/s Andhi Minerals & Marbles	30/96	Marble	Jhiri	Thana Ghazi	100 mx100 m	20 years from 14.7.97
37	M/s Moti Maharaja Marbles	152/88	Marble	Kalsi Kala Guwada	Thana Ghazi	100 mx100 m	10 years from 28.12.88
38	M/s Manohar Marbles	153/88	Marble	Kalsi Kala Guwada	Thana Ghazi	100 mx100 m	10 years from 28.12.88
39	Shri M.C. Meena	841/88	Marble	Kalsi Kala Guwada	Thana Ghazi	100 mx100 m	10 years from 3.6.89
40	Shri Mohar Singh	987/88	Marble	Kalsikala Guwada	Thana Ghazi	100 mx100 m	10 years from 2.9.89
41	Shri M.Y. Chauhan	1005/88	Marble	Kalsikala Guwada	Thana Ghazi	100 mx100 m	20 years from 29.8.89
42	Smt Manjusha Daga	224/86	Marble	Kalsi Kala Guwada	Thana Ghazi	100 mx100 m	10 years from 5.8.87
43	Shri Anil Kr jain	1347/91	Marble	Jhiri	Thana Ghazi	10,000 sq.m.	20 years from 3.12.2001
44	Shri Narpat Singh	834/88	Marble	Kalsi Kala Guwada	Thana Ghazi	100 mx100 m	20 years from 2.5.89
45	Shri Naresh Kr Bhateja	2433/91	Marble	Jhiri	Thana Ghazi	100 mx100 m	20 years from 5.11.96
46	M/s Naruka Marbles	596/88	Marble	Kalsi Kala Guwada	Thana Ghazi	100 mx100 m	20 years from 26.5.89
47	Shri Prakash Chandra Jain	222/86	Marble	Kalsi Kala Guwada	Thana Ghazi	100mx100m	10 years from 5.8.87
48	M/s Prithvi Marbles	1006/88	Marble	Kalsi Kala Guwada	Thana Ghazi	100 mx100 m	20 years from 4.10.89
49	Shri Ram Avtar Sharma	64/96	Marble	Kalsi Kala Guwada	Thana Ghazi	100 mx100 m	20 years from 7.3.98
50	Shri Rakesh Meena	1767/91	Marble	Kalsi Kala Guwada	Thana Ghazi	100 mx100 m	20 years from 15.10.97
51	Shri Rakesh Meena	1770/91	Marble	Kalsi Kala Guwada	Thana Ghazi	100 mx100 m	10 years from 15.10.97
52	Shri Ravindra Kr Sharma	83/98	Marble	Kalsi Kala Guwada	Thana Ghazi	0.6080 Ha	20 years from 14.10.99
53	M/s Ratnesh Marble	811/88	Marble	Kalsi Kala Guwada	Thana Ghazi	100 mx100 m	10 years from 17.8.91
54	M/s Sharma Marble & Mineral	327/88	Marble	Kalsi Kala Guwada	Thana Ghazi	100 mx100 m	20 years from 8.9.88
55	M/s Shiv Shakti Marble	543/88	Marble	Kalsi Kala Guwada	Thana Ghazi	100 mx100 m	10 years from 5.6.89
56	M/s Shri Shyam Marble	102/88	Marble	Kalsi Kala Guwada	Thana Ghazi	100 mx100 m	10 years from 19.7.88
57	M/s Swami Marbles	867/88	Marble	Kalsi Kala Guwada	Thana Ghazi	100 mx100 m	10 years from 2.9.89
58	Shri Kailash Chandra Gupta	39/96	Marble	Kalsi Kala Guwada	Thana Ghazi	100 mx100 m	20 years from 31.8.97
59	Shri Shiv Dayal Meena	812/88	Marble	Kalsi Kala Guwada	Thana Ghazi	100 mx100 m	20 years from 17.8.91

Sl No.	Name of Leasee	ML No.	Mineral	Near Village	Tehsil	Area	Period
60	Smt Sushila Bajaj	246/88	Marble	Dhani Neejhra	Thana Ghazi	100 mx100 m	20 years from 12.05.03
61	Shri Rajesh Garg	43/94	Marble	Dhani Neejhra	Thana Ghazi	100 mx100 m	20 years from 28.6.95
62	Smt Seema Singh	41/92	Marble	Dhani Neejhra	Thana Ghazi	10,000 sq.m.	10 years from 12.5.92
63	Smt Bhagwati Devi	81/88	Marble	Kalsikala Guwada	Thana Ghazi	100 mx100 m	20 years from 5.5.88
64	M/s Veer Bajrang Marble	53/98	Marble	Kalsikala Guwada	Thana Ghazi	100 mx100 m	20 years from 14.3.99
65	Shri Virendra Gupta	361/88	Marble	Jhiri	Thana Ghazi	100 mx100 m	20 years from 23.5.89
66	Shri Vijai Kr Bhateja	2435/91	Marble	Jhiri	Thana Ghazi	100 mx100 m	20 years from 5.11.96
67	Smt Suman Kaushik	2430/91	Marble	Jhiri	Thana Ghazi	100 mx100 m	20 years from 2.2.01
68	M/s Shri Ganpati Marble	20/2000	Marble	Kalsi Kala Guwada	Thana Ghazi	6158 sq.m.	20 years from 15.6.01
69	Shri Nagendra Meena	103/2001	Marble	Samra	Thana Ghazi	5600 sq.m.	20 years from 14.12.01
70	M/s Narayani Marbles	155/91	Marble	Kalsikala Guwada	Thana Ghazi	100 mx100 m	20 years from 21.10.99
71	Shri Ashok Kusmar	1007/88	Marble	Kalsikala Guwada	Thana Ghazi	1.0 ha	10 years from 4.10.89
72	Shri Ramawtar Kumawat	12/85	Marble	Kalsikala Guwada	Thana Ghazi	1.0 ha	10 years from 11.8.86
73	Shri Anil Mantal	65/97	Marble	Khoh	Rajgarh	1.0 Ha	20 years from 3.6.98
74	Shri Ashok Gupta	267/88	Marble	Khoh	Rajgarh	1.0 Ha	20 years from 1.4.89
75	Smt Usha Sharma	199/86	Marble	Khoh	Rajgarh	1.0 Ha	10 years from 25.4.87
76	Shri Deepak Kr Gupta	212/88	Marble	Khoh	Rajgarh	1.0 Ha	10 years from 13.4.88
77	M/s Rajasthan Mineral Traders	2/96	Marble	Khoh	Rajgarh	1.0 Ha	20 years from 10.2.97
78	M/s Granito Marmo Tiles	209/86	Marble	Khoh	Rajgarh	1.0 Ha	20 years from 14.5.87
79	M/s Jagdish Prasad Goyal	924/88	Marble	Khoh	Rajgarh	1.0 Ha	20 years from 31.5.89
80	M/s Khanij Udyog	64/97	Marble	Khoh	Rajgarh	1.0 Ha	20 years from 2.6.98
81	M/s Yash Marble	208/84	Marble	Khoh	Rajgarh	5.0 Ha	10 years from 20.2.85
82	Shri Indra Kumar Gupta	966/88	Marble	Khoh	Rajgarh	1.0 Ha	20 years from 9.11.89
83	Shri Mahesh Kumar Goyal	40/97	Marble	Khoh	Rajgarh	1.0 Ha	20 years from 2.4.98
84	Smt Maya Goyal	922/88	Marble	Khoh	Rajgarh	1.0 Ha	20 years from 31.5.89
85	Shri Pramod Kr Goyal	123/88	Marble	Khoh	Rajgarh	1.0 Ha	20 years from 2.4.88
86	Shri Rajendra Agrawal	39/99	Marble	Kalwad	Rajgarh	1.0 Ha	20 years from 16.7.99
87	M/s Ramnarain & Brothers	46/88	Marble	Khoh	Rajgarh	1.0 Ha	20 years from 12.5.88
88	M/s Ramnarain & Brothers	16/97	Marble	Khoh	Rajgarh	1.0 Ha	20 years from 28.9.97
89	M/s Ramnarain & Brothers	1158/91	Marble	Khoh	Rajgarh	1.0 Ha	20 years from 1.9.01
90	Shri Rajesh Khanna	372/88	Marble	Khoh	Rajgarh	1.0 Ha	10 years from 9.9.88

Sl No.	Name of Leasee	ML No.	Mineral	Near Village	Tehsil	Area	Period
91	Shri Sunil Goyal	17/97	Marble	Khoh	Rajgarh	1.0 Ha	20 years from 28.9.97
92	Smt Sushila Mishra	19/88	Marble	Khoh	Rajgarh	1.0 Ha	10 years from 9.8.89
93	Smt Santosh Sharma	923/88	Marble	Khoh	Rajgarh	1.0 Ha	20 years from 31.5.89
94	M/s Shreeram Minerals	246/85	Marble	Khoh	Rajgarh	1.0 Ha	20 years from 10.2.87
95	Shri Vimal Kr Goyal	205/86	Marble	Khoh	Rajgarh	1.0 Ha	10 years from 14.5.87
96	Smt Sumitra Devi	54/02	Marble	Khoh	Rajgarh	4.0 Ha	20 years from 8.1.03
97	Smt Sumitra Devi	56/02	Marble	Khoh	Rajgarh	4.0 Ha	20 years from 8.1.03
98	Shri Babulal Meena (Mallana)	34/97	Marble	Palpur	Rajgarh	1.0 Ha	20 years from 30.3.98
99	Shri Bhagirath Meena	32/96	Marble	Palpur	Rajgarh	1.0 Ha	20 years from 30.9.97
100	Shri Dwaraka Prasad Meena	35/97	Marble	Palpur	Rajgarh	1.0 Ha	20 years from 31.12.98
101	Shri Mahadeo Prasad Meena	33/96	Marble	Palpur	Rajgarh	1.1880 Ha	20 years from 30.9.97
102	Shri Hanuman Prasad Sharma	17/86	Marble	Palpur	Rajgarh	1.0 ha	20 years from 8.4.86
103	Shri Radhe Shyam Gupta	51/96	Marble	Palpur	Rajgarh	1.0 Ha	20 years from 28.10.97
104	Shri Rajkumar Agrawal	73/87	Marble	Palpur	Rajgarh	1.0 Ha	10 years from 16.4.87
105	M/s R.N.B. Marbles	18/2001	Marble	Dundpuri	Rajgarh	2.25 Ha	20 years from 16.7.01
106	M/s Shruti Marmo Pvt Ltd.	79/97	Marble	Dundpuri	Rajgarh	1.0 Ha	20 years from 6.10.97
107	M/s Shruti Marmo Pvt Ltd	80/97	Marble	Dundpuri	Rajgarh	1.0 Ha	20 years from 6.10.97
108	M/s Garg Marbles	108/2000	Marble	Mallana	Rajgarh	0.8175 Ha	20 years from 2.8.01
109	Shri Neeraj Purohit	114/2000	Marble	Mallana	Rajgarh	1.90 Ha	20 years from 16.5.01
110	Shri Subhash Chand	680/88	Marble	Mallana	Rajgarh	1.0 Ha	10 years from 24.11.90
111	M/s Triveni Marbles	859/88	Marble	Mallana	Rajgarh	1.0 Ha	10 years from 9.6.89
112	M/s K.R. Marbles	106/01	Marble	Mallana	Rajgarh	1.48 Ha	20 years from 19.12.01
113	M/s Lalit Marmo & Granites	104/01	Marble	Mallana	Rajgarh	2.24 Ha	20 years from 21.12.01
114	M/s Lalit Marmo & Granites	105/01	Marble	Mallana	Rajgarh	2.025 Ha	20 years from 21.12.01
115	Shri Suresh Kalra	728/88	Marble	Mallana	Rajgarh	1.0 Ha	10 years from 1.9.88
116	M/s Adarsh Marble	444/87	Marble	Gordhanpura	Rajgarh	1.0 Ha	10 years from 29.3.88
117	Smt Alka Singh	741/88	Marble	Gordhanpura	Rajgarh	1.0 Ha	10 years from 12.7.89
118	Shri Ajai Malpani	412/87	Marble	Gordhanpura	Rajgarh	1.0 Ha	10 years from 29.3.88
119	Shri Ashok Somani	445/87	Marble	Gordhanpura	Rajgarh	1.0 Ha	10 years from 29.3.88
120	Shri Ashok Kumar Verma	980/88	Marble	Gordhanpura	Rajgarh	1.0 Ha	20 years from 24.11.89
121	M/s Hindustan Marble	852/88	Marble	Gordhanpura	Rajgarh	1.0 Ha	10 years from 1.5.89

Sl No.	Name of Leasee	ML No.	Mineral	Near Village	Tehsil	Area	Period
122	Smt Kamla Devi	39/86	Marble	Gordhanpura	Rajgarh	1.0 Ha	10 years from 2.6.86
123	Shri ravindra Singh	639/88	Marble	Gordhanpura	Rajgarh	1.0 Ha	10 years from 5.5.89
124	Shri Kailash Chand Gupta	255/85	Marble	Gordhanpura	Rajgarh	1.0 Ha	20 years from 12.3.86
125	Smt Lalita Devi	742/88	Marble	Gordhanpura	Rajgarh	1.0 Ha	10 years from 12.7.89
126	M/s Rama Marbles	38/99	Marble	Gordhanpura	Rajgarh	1.0 Ha	20 years from 16.7.99
127	Shri Narendra Kumar Gupta	40/86	Marble	Gordhanpura	Rajgarh	1.0 Ha	10 years from 2.2.87
128	Shri Pawan Kumar Khola	6/87	Marble	Gordhanpura	Rajgarh	1.0 Ha	20 years from 25.7.87
129	Shri K.K. Marbles	4/2000	Marble	Gordhanpura	Rajgarh	2.25 Ha	20 years from 8.9.2000
130	Shri Radhe Shyam Gupta	217/86	Marble	Gordhanpura	Rajgarh	1.0 Ha	20 years from 25.9.87
131	Shri Ram Swaroop Sodhani	383/87	Marble	Gordhanpura	Rajgarh	1.0 Ha	10 years from 29.3.88
132	Shri Sampat Ram Choudhary	49/86	Marble	Gordhanpura	Rajgarh	1.0 Ha	20 years from 3.6.86
133	Shri Suresh Kr Agrawal	443/87	Marble	Gordhanpura	Rajgarh	1.0 ha	10 years from 29.3.88
134	Shri Sube Singh Choudhary	7/87	Marble	Gordhanpura	Rajgarh	1.0 Ha	10 years from 30.7.87
135	Shri Sandeep Ghai	143/87	Marble	Gordhanpura	Rajgarh	1.0 Ha	20 years from 28.12.87
136	Shri Sunil Bhadu	920/88	Marble	Gordhanpura	Rajgarh	1.0 Ha	10 years from 19.6.89
137	Smt Sareena Bhadu	921/88	Marble	Gordhanpura	Rajgarh	1.0 Ha	10 years from 19.6.89
138	Shri Ajai Sharma	262/87	Marble	Baldeogarh	Rajgarh	1.0 Ha	20 years from 30.12.87
139	Shri Ashok Ajmera	341/87	Marble	Baldeogarh	Rajgarh	1.0 Ha	20 years from 1.9.88
140	Shri Anil Sharma	376/87	Marble	Baldeogarh	Rajgarh	1.0 Ha	20 years from 27.5.88
141	M/s S.S. Marbles	167/88	Marble	Baldeogarh	Rajgarh	1. 0 Ha	20 years from 25.4.88
142	Shri Kamod Kr Sharma	158/87	Marble	Baldeogarh	Rajgarh	1.0 Ha	20 years from 23.4.88
143	Shri Kamod Kumar Sharma	159/87	Marble	Baldeogarh	Rajgarh	1.0 Ha	10 years from 23.4.88
144	Smt Nirmala Sharma	278/88	Marble	Baldeogarh	Rajgarh	1.0 Ha	20 years from 11.8.88
145	Shri Sushil Kr Sharma	160/87	Marble	Baldeogarh	Rajgarh	1.0 Ha	20 years from 23.4.88
146	Shri Umesh Gaur	169/87	Marble	Baldeogarh	Rajgarh	1.0 Ha	20 years from 23.4.88
147	Shri V.K. Ajmera	342/87	Marble	Baldeogarh	Rajgarh	1.0 Ha	20 years from 1.9.88
148	Shri Amar Chand Kumawat	160/86	Marble	Tilwad	Rajgarh	1.0 Ha	10 years from 6.2.87
149	Smt Asha Devi Khaitan	227/88	Marble	Tilwad	Rajgarh	1.0 Ha	10 years from 8.7.88
150	Shri Bhagwan Das Mangal	38/98	Marble	Tilwad	Rajgarh	1.0 Ha	20 years from 12.4.92
151	Shri Bhagwan Das Mangal	150/88	Marble	Tilwad	Rajgarh	1.0 Ha	10 years from 12.4.89
152	Shri Brij Kishor Sharma	265/88	Marble	Tilwad	Rajgarh	1.0 Ha	10 years from 10.1.89

Sl No.	Name of Leasee	ML No.	Mineral	Near Village	Tehsil	Area	Period
153	M/s CGM Mineral	260/88	Marble	Tilwad	Rajgarh	1.0 Ha	10 years from 29.6.88
154	M/s Dinesh Khaitan	289/88	Marble	Tilwad	Rajgarh	1.0 Ha	10 years from 12.4.89
155	M/s Granito Marmo Tiles	228/86	Marble	Tilwad	Rajgarh	1.0 Ha	20 years from 14.5.87
156	Smt Hemlata Saraswat	78/88	Marble	Tilwad	Rajgarh	1.0 Ha	10 years from 18.3.89
157	Smt Indira Sharma	331/87	Marble	Tilwad	Rajgarh	1.0 Ha	10 years from 11.4.88
158	M/s Kamdhenu Mining	569/88	Marble	Tilwad	Rajgarh	1.0 Ha	20 years from 28.10.89
159	Smt Koshalya Devi Khaitan	224/88	Marble	Tilwad	Rajgarh	1.0 Ha	10 years from 8.3.88
160	M/s Khaitan Minerals	309/88	Marble	Tilwad	Rajgarh	1.0 Ha	20 years from 15.9.88
161	M/s Khaitan Minerals	310/88	Marble	Tilwad	Rajgarh	1.0 ha	20 years from 15.9.88
162	Shri Murari Lal Goyal	245/88	Marble	Tilwad	Rajgarh	1.0 Ha	10 years from 6.7.88
163	Shri Om Prakash Gupta	155/86	Marble	Tilwad	Rajgarh	1.0 Ha	10 years from 9.2.87
164	Shri Paras Jain	351/88	Marble	Tilwad	Rajgarh	1.0 Ha	10 years from 5.8.88
165	Shri Pradeep Pareek	307/87	Marble	Tilwad	Rajgarh	1.0 Ha	10 years from 29.3.88
166	Shri Pradeep Pareek	148/85	Marble	Tilwad	Rajgarh	1.0 Ha	20 years from 5.5.87
167	Shri Prabhulal Purohit	141/87	Marble	Tilwad	Rajgarh	1.0 Ha	10 years from 11.9.87
168	Smt Ratan Devi Kala	174/87	Marble	Tilwad	Rajgarh	1.0 Ha	10 years from 8.3.88
169	Smt Sua Devi Khaitan	471/88	Marble	Tilwad	Rajgarh	1. 0 Ha	10 years from 15.9.88
170	Smt Sua Devi Khaitan	472/88	Marble	Tilwad	Rajgarh	1.0 Ha	10 years from 15.9.88
171	Smt Santosh Khaitan	316/87	Marble	Tilwad	Rajgarh	1.0 Ha	10 years from 29.3.88
172	M/s Tilwad Marble	233/88	Marble	Tilwad	Rajgarh	0.947 Ha	10 years from 4.5.88
173	M/s Kailash Chand Kala	177/87	Marble	Tilwad	Rajgarh	1.0 Ha	10 years from 8.3.88
174	Shri Neeraj Purohit	14/88	Marble	Tilwad	Rajgarh	1.0 Ha	10 years from 1.9.88
175	Shri Gauri Shankar Gupta	179/87	Limestone	Machadi	Rajgarh	5.1225 Ha	10 years from 7.11.87
176	Shri Prakash Chandra Gupta	533/90	Limestone	Kali Pahari	Rajgarh	2.25 Ha	10 years from 12.6.91
177	Shri R.C. Gupta	270/90	Granite	Harsaura	Bansur	1.0 Ha	10 years from 12.6.91
178	Shri Babulal Mahajan	356/90	Chirt	Poothi	Ramgarh	1.0 Ha	10 years from 1.2.91
179	Shri Baluram Meena	81/99	Chirt	Sainthali	Ramgarh	1.0 Ha	20 years from 27.10.99
180	M/s Saini Minerals	77/97	Chirt	Beeghota	Rajgarh	2.0 Ha	20 years from 24.10.97
181	Shri Indra Kumar Sharma	7/85	Patti Katla	Ulahedi	Mundawar	13.378 Ha	10 years from 14.12.88
182	The Mundawar Mines Co-op.	78/90	Patti Katla	Sagar Jadeed	Mundawar	25.46 Ha	10 years from 16.8.90
183	Shri Narain Sahay	822/88	Patti Katla	Saleta Bassi	Thana Ghazi	136.2887 Ha	10 years from 28.4.89

Sl No.	Name of Leasee	ML No.	Mineral	Near Village	Tehsil	Area	Period
184	Shri Basheer Ahmed	65/90	Mas. Stone	Dholidoob	Alwar	1.0 Ha	10 years from 11.9.90
185	Smt Radha Agrawal	54/90	Mas. Stone	Kasba Dehra	Alwar	1.0 Ha	10 years from 21.4.90
186	Smt Sharda Kanwar	24/90	Mas. Stone	Kasba Dehra	Alwar	1.0 Ha	10 years from 21.4.90
187	Shri Dashrath Singh	108/88	Mas. Stone	Naka Boda	Alwar	0.70 Ha	10 years from 24.4.88
188	M/s Shankar Industries	393/90	Mas. Stone	Mangalwas	Alwar	1.0 Ha	10 years from 10.12.90
189	M/s Shankar Industries	394/90	Mas. Stone	Mangalwas	Alwar	1.0 Ha	10 years from 10.12.90
190	Shri Sunil Agrawal	323/90	Mas. Stone	Kadooki	Alwar	1.0 ha	10 years from 13.2.91
191	Shri Suman Kr Sharma	404/87	Mas. Stone	Jatiana	Alwar	1.0 Ha	10 years from 8.3.88
192	Shri Pradeep Kr Jain	121/86	Mas. Stone	Sonawa	Alwar	0.25 Ha	10 years from 23.2.87
193	Shri Noor Hussain	218/87	Mas. Stone	Sonawa	Alwar	1.0 Ha	10 years from 13.1.88
194	Shri Dinesh Saini	110/98	Mas. Stone	Tehadpur	Alwar	1.0 Ha	20 years from 8.9.99
195	Shri Kishan Saini	111/98	Mas. Stone	Tehadpur	Alwar	1.0 Ha	20 years from 29.7.99
196	Shri Mamraj Saini	102/90	Mas. Stone	Bhoogor	Alwar	0.25 Ha	10 years from 17.9.90
197	Shri Rattiram Gupta	319/89	Mas. Stone	Bhoogor	Alwar	0.25 Ha	10 years from 6.5.90
198	Shri Sohan Lal Saini	386/90	Mas. Stone	Bhoogor	Alwar	0.25 Ha	10 years from 23.3.91
199	Shri Umrao Singh	24/90	Mas. Stone	Bhoogor	Alwar	0.35 Ha	10 years from 21.3.90
200	M/s Indu Stone Crushing Co.	113/89	Mas. Stone	Sahedi	Alwar	0.25 Ha	10 years from 8.10.88
201	Shri Mohan Lal Gupta	273/90	Mas. Stone	Balwandka	Ramgarh	1.0 Ha	10 years from 11.3.91
202	Shri Sunil Agrawal	485/90	Mas. Stone	Goleta	Ramgarh	1.0 Ha	10 years from 31.7.91
203	Shri Ramkishor Saini	183/86	Mas. Stone	Bhatesara	Ramgarh	1.0 Ha	10 years from 23.7.87
204	Shri Padam Data	1039/88	Mas. Stone	Idgaah	Kishangarh	0.50 Ha	10 years from 4.11.89
205	Shri Ramesh Chandra Agrawal	324/87	Mas. Stone	Husainpur	Kishangarh	0.50 Ha	20 years from 18.3.88
206	Shri Dulichand Gurjar	122/86	Mas. Stone	Shyopur	Mundawar	1.0 Ha	10 years from 4.10.87
207	Shri Harphool Gurjar	985/88	Mas. Stone	Shyopur	Mundawar	0.25 Ha	10 years from 2.6.89
208	Shri Mohanlal Yadav	253/85	Mas. Stone	Shyopur	Mundawar	0.50 Ha	10 years from 28.2.86
209	Shri Matadeen Yadav	76/89	Mas. Stone	Shyopur	Mundawar	1.0 Ha	10 years from 4.1.89
210	Shri Rajkumar Agrawal	62/89	Mas. Stone	Shyopur	Mundawar	1.0 Ha	10 years from 30.10.89
211	Shri Makul Khan	508/03	Mas. Stone	Bagodi	Ramgarh	1.0 ha	20 years from 2.7.04
212	Shri Roshan Khan	501/03	Mas. Stone	Bagodi	Ramgarh	1.0 ha	20 years from 2.7.04
213	Shri Kawal Singh	493/03	Mas. Stone	Bandholi	Ramgarh	1.0 ha	20 years from 26.12.03
214	Shri Jakir Khan	101/98	Mas. Stone	Bagodi	Ramgarh	1.0 ha	20 years from 11.6.99

Sl No.	Name of Leasee	ML No.	Mineral	Near Village	Tehsil	Area	Period
215	Shri Balu Ram Meena	81/99	B. Chirt	Saithali	Ramgarh	1.0 ha	20 years from 27.10.99
216	The Mundawar Mines Co-op.	109/2000	Patti Katla, Mas. Stone	Mundawar	Mundawar	2.64 Ha	20 years from 12.1.04
217	Shri Inder Kumar	7/85	Patti Katla	Ulaheri	Mundawar	4.92 Ha	10 years from 14.12.88
218	Shri Parag Balecha	481/90	Mas. Stone	Dantala	Mundawar	1.0 Ha	10 years from 30.10.91
219	Shri Pramod Kr Agrawal	167/90	Mas. Stone	Hameerpur	Bansur	1.0 Ha	10 years from 8.5.90
220	Shri Pramod Kr Agrawal	168/90	Mas. Stone	Hameerpur	Bansur	1.0 Ha	10 years from 8.5.90
221	Shri P.C. Saini	45/85	Mas. Stone	Kothal	Bansur	0.50 Ha	10 years from 28.5.85
222	Shri Ramswaroop Sharma	57/2000	Mas. Stone	Mukandpura	Bansur	1.0 Ha	20 years from 30.11.00
223	Shri Chhaganlal Modi	15/95	Mas. Stone	Kothal	Bansur	1.0 Ha	20 years from 16.6.01
224	Shri Chhaganlal Modi	16/95	Mas. Stone	Kothal	Bansur	1.0 Ha	20 years from 16.6.01
225	Shri Lalchand Saini	22/98	Mas. Stone	Kothal	Bansur	0.9952 Ha	20 years from 22.6.01
226	Shri Manoj Kumar Modi	19/95	Mas. Stone	Kothal	Bansur	1.0 Ha	20 years from 16.6.01
227	Smt Sunita Modi	15/95	Mas. Stone	Kothal	Bansur	1.0 Ha	20 years from 16.6.01
228	Shri Tinchu Khan	24/95	Mas. Stone	Kothal	Bansur	1.0 Ha	20 years from 22.6.01
229	Shri Rehmat Meo	13/99	Mas. Stone	Neemli	Tijara	0.75 Ha	20 years from 17.6.99
230	M/s Bhiwadi Grit Udyog	128/97	Mas. Stone	Chaupanki	Tijara	1.0 Ha	20 years from 15.6.99
231	M/s Bhiwadi Grit Udyog	129/97	Mas. Stone	Chaupanki	Tijara	1.0 Ha	20 years from 15.6.99
232	M/s Diva Const. Product Ind.	126/97	Mas. Stone	Chaupanki	Tijara	1.0 Ha	20 years from 17.6.99
233	M/s Diva Const. Product Ind.	127/97	Mas. Stone	Chaupanki	Tijara	1.0 Ha	20 years from 17.6.99
234	Shri Chandra Prakash Jain	934/88	Mas. Stone	Ulahedi	Alwar	1.0 Ha	10 years from 23.3.89
235	Shri Navin Jain	137/89	Mas. Stone	Ulahedi	Alwar	1.0 Ha	27.9.89-23.11.03
236	Shri Pramod Kr jain	135/89	Mas. Stone	Ulahedi	Alwar	1.0 Ha	10 years from 27.9.89
237	Shri Anshul Mehta	216/89	Mas. Stone	Ulahedi	Alwar	1.0 Ha	5.1.90-27.3.04
238	Smt Sudesh Mehta	217/89	Mas. Stone	Ulahedi	Alwar	1.0 Ha	5.1.90-27.3.04
239	Shri Vivek Tyagi	7/90	Mas. Stone	Ulahedi	Alwar	1.0 Ha	10 years from 19.4.90
240	Shri Suraj Bhan Singh	25/95	Mas. Stone	Kaunthal	Bansur	1.0 Ha	20 years from 30.4.01
241	Shri Tinchu Khan	25/95	Mas. Stone	Kaunthal	Bansur	1.0 Ha	20 years from 23.4.01
242	Shri Gopal Singh	88/90	Mas. Stone	Kasba Dehra	Alwar	1.0 Ha	10 years from 22.2.91
243	Shri Vijai Kr Harijan	276/89	Mas. Stone	Khareta Khurd	Mundawar	1.0 Ha	--
244	Smt Akhteri Begum	349/02	Mas. Stone	Khohra	Kot Kasim	1.0 Ha	20 years from 24.12.02

Sl No.	Name of Leasee	ML No.	Mineral	Near Village	Tehsil	Area	Period
245	Shri Suresh Chandra Mehta	213/89	Mas. Stone	Dhobigatta	Alwar	0.35 Ha	--
246	Shri Suresh Chandra Mehta	74/90	Mas. Stone	Dhobigatta	Alwar	0.35 Ha	--
247	Shri Ramesh Agrawal	33/97	Mas. Stone	Husainpur	Kishangarh	0.5 Ha	20 years from 18.3.98
248	Shri Devanand	93/98	Mas. Stone	Ismailpur	Kishangarh	1.0 Ha	20 years from 23.9.99
249	Shri Om Prakash	301/03	Mas. Stone	Neemali	Tijara	1.0 Ha	20 years from 23.10.03
250	M/s Bharati Grit	201/02	Mas. Stone	Neemali	Tijara	1.0 Ha	20 years from 27.12.03
251	Smt Anju Sewak	363/02	Mas. Stone	Khohra Thakran	Kot Kasim	1.0 Ha	20 years from 25.7.03
252	Shri Vinod Kumar	112/03	Mas. Stone	Sanoli	Mundawar	1.0 Ha	20 years from 29.07.04
253	Shri Prakash Chand	113/03	Mas. Stone	Sanoli	Mundawar	1.0 Ha	20 years from 29.07.04

[Source: Office of the District Mining Engineer, Alwar]

List of Mine Leases in the Alwar District (Tehsil-Behror) – Minor Minerals

Sl No.	Name of Leasee	ML No.	Mineral	Near Village	Area	Period	Status
1	Shri Balbeer Singh Yadav	362/89 & 29/99 (R)	Slate Stone	Khundroth	0.36 Ha	10 years from 12.6.90	Renewal applied
2	Shri Sunil Dutta Sharma	191/88 & 2/98 (R)	Slate Stone	Khundroth	2.25 Ha	10 years from 9.9.88	Renewal applied
3	Shri Mahendar Singh Yadav	82/90 & 32/99 (R)	Slate Stone	Khundroth	0.40 Ha	10 years from 12.8.90	Renewal applied
4	Shri Om Prakash Rajput	201/90 & 39/99 (R)	Slate Stone	Khundroth	0.36 Ha	10 years from 18.8.90	Renewal applied
5	Shri Pawan Kumar Sharma	236/88 & 98/97 (R)	Slate Stone	Khundroth	2.25 Ha	10 years from15.11.81	Renewal applied
6	Shri Surendra Kumar	119/80 & 30/99 (R)	Slate Stone	Khundroth	0.50 Ha	10 years from10.6.90	Renewal applied
7	Shri Hari Prakash Yadav	341/89 & 5/99 (R)	Slate Stone	Khundroth	2.25 Ha	10 years from23.1.90	Renewal applied
8	Shri Dharam Pal Yadav	320/89 & 31/99 (R)	Slate Stone	Khundroth	0.25 Ha	10 years from 7.5.90	Renewal applied
9	Shri Om Prakash Sharma	63/78 & 78/99 (R)	Slate Stone	Khundroth	0.36 Ha	10 years from 3.8.89	Renewal applied
10	Smt Nilima Banerji	211/88 & 32/98 (R)	Slate Stone	Khundroth	0.30 Ha	10 years from 28.2.88	Renewal applied
11	Shri Sardar Singh Rajput	55/97 (R)	Slate Stone	Khundroth	2.25 Ha	10 years from 6.9.88	Renewal applied
12	Smt Basanti Devi	138/82 & 55/95 (R)	Slate Stone	Khundroth	2.25 Ha	10 years from 22.9.86	Renewal applied
13	Shri Lekharam Harijan	232/89 & 1/99 (R)	Slate Stone	Khour	2.25 Ha	10 years from 4.1.90	Renewal applied
14	Smt Savitri Devi	1/89 & 28/99 (R)	Slate Stone	Ghiloth	2.25 Ha	10 years from 24.7.98	
15	Shri Shrichand Yadav	5/90 & 13/2000 (R)	Slate Stone	Ghiloth	2.25 Ha	10 years from 19.1.90	Renewal applied
16	Shri Mangilal Sharma	891/88 & 38/98 (R)	Slate Stone	Mandhan	0.38 Ha	10 years from 24.4.89	Renewal applied
17	Shri Ajeet Singh Yadav	33/95	Slate Stone	Mandhan	0.86 Ha	20 years from 26.6.95	
18	Shri Surender Singh Yadav	1046/88 & 79/98 (R)	Slate Stone	Jhakhrana	2.25 Ha	10 years from 16.10.89	Renewal applied
19	Shri B.N. Mathur	84/98	Slate Stone	Jhakharana	2.25 Ha	20 years from 15.7.00	
20	Shri Suraj Bhan Sharma	434/87 & 31/97 (R)	Slate Stone	Bhaisar	0.25 Ha	20 years from 13.6.98	
21	Shri Suraj Bhan Sharma	85/91 & 5/00 (R)	Slate Stone	Bhaisar	0.36 Ha	20 years from 15.4.01	
22	Shri Kasi Ram & Sones	399/80 & 2194/91	Slate Stone	Mehtawas	12.14 Ha	20 years from 1.1.92	
23	Shri Ram Chandra Yadav	63/2001	Slate Stone	Shivdansinghpura	2.25 Ha	20 years from 29.5.00	
24	Smt Krishna Devi Sharma	185/80 & 499/90 (R)	Slate Stone	Khundroth	0.48 Ha	10 years from6.3.81	Renewal applied
25	Shri Ashvani Kumar	230/89	Cheja Pathar	Neemrana	453.25 Ha	20 years from 26.2.90	
26	Shri Virendra Singh Yadav	27/97	Cheja Pathar	Rewana	1.00 Ha	20 years from 2.1.01	
27	Shri Virendra Singh Yadav	28/97	Cheja Pathar	Rewana	1.00 Ha	20 years from 2.1.01	
28	Shri Auran Kumar Gupta	63/96	Cheja Pathar	Rewana	1.00 Ha	20 years from 2.11.00	
29	Shri Ratan Lal Sharma	24/96	Cheja Pathar	Rewana	1.00 Ha	20 years from 21.2.04	
30	Shri Ratan Lal Sharma	25/96	Cheja Pathar	Rewana	1.00 Ha	20 years from 21.2.04	

[Source: Office of the Assistant Mining Engineer, Kotputali]

ANNEXURE - III

LAND AS PER ARAVALI NOTIFICATION, 1992 (EXCLUDING FOREST LAND)

ANNEXURE-III

Alwar

		Total Area	GM Pahar	GM Rada	GM Behad	Banjar Beed
1	Ahmedpur	553.27	64.26	0.00	0.00	0.00
2	Akbarpur	560.53	201.07	0.00	0.00	0.00
3	Alapur	414.71	67.49	0.00	0.00	0.00
4	Alwar No. 1	1074.10	154.06	0.00	0.00	0.00
5	Alwar No. 2	2487.20	842.39	0.00	0.00	0.00
6	Bader	935.58	208.92	0.00	0.00	0.00
7	Bahadurpur Patti Ka	219.88	0.92	0.00	0.00	0.00
8	Bahadurpur Patti Ka	917.48	101.47	0.00	0.00	0.00
9	Bahadurpur Patti Pa	420.97	8.35	0.00	0.00	0.00
10	Bakhtpura	345.61	6.98	7.75	0.00	0.00
11	Bala Dehra	499.24	199.53	0.00	0.00	0.00
12	Baleta	1666.82	117.76	0.00	0.00	0.00
13	Ballaboda	300.34	31.62	0.00	0.00	0.00
14	Ballana	338.42	11.88	0.00	0.00	0.00
15	Barh Bilandi	136.15	56.18	0.00	0.00	0.00
16	Barh Kesharpur	115.60	1.00	0.00	0.00	0.00
17	Barwara	121.82	40.99	0.00	0.00	0.00
18	Bhadkol	595.54	122.26	0.00	0.00	0.00
19	Bhakheda	2774.73	2.04	0.00	0.00	0.00
20	Bhandwara	508.91	32.73	0.00	0.00	0.00
21	Bhoogor	669.37	2.17	0.00	0.00	0.00
22	Bhurari	173.24	28.58	0.00	0.00	0.00
23	Bijopur	477.73	125.22	0.00	0.00	0.00
24	Bilandi	326.69	23.10	0.00	0.00	0.00
25	Chand Pahari	161.31	6.68	0.00	0.00	0.00
26	Chandoli	1662.92	340.52	0.00	0.00	0.00
27	Chomu	682.97	179.07	0.00	0.00	0.00
28	Dadeekar	3335.29	48.34	0.00	0.00	0.00
29	Dhahlawas	953.71	168.68	0.00	0.00	0.00
30	Dhamala	351.44	61.89	0.00	0.71	0.00
31	Dharmpura	726.52	3.27	0.00	0.00	0.00
32	Dhokri	260.75	62.49	0.00	0.00	0.00
33	Dholidoob	171.43	3.06	0.00	0.00	0.00
34	Dhoolpuri	240.38	43.03	0.00	0.00	0.00
35	Diwakari	280.80	0.31	0.00	0.00	0.00
36	Ghatala	849.22	315.44	0.00	0.00	0.00
37	Ghegholi	432.67	51.13	0.00	0.00	0.00
38	Hajipur	896.53	77.59	0.00	0.00	0.00
39	Indok	2399.20	1045.93	1.26	0.00	0.00
40	Jahar Kheda	584.01	26.85	0.00	0.00	0.00
41	Jatiyana	567.40	27.52	0.00	0.00	0.00
42	Jatoli	507.01	95.80	0.00	0.00	0.00
43	Jhadoli	344.33	101.51	0.00	0.00	0.00
44	Kadooki	217.85	3.36	0.00	0.00	0.00
45	Kaimala	278.81	32.53	0.00	0.00	0.00
46	Kairwadi	305.98	3.20	0.00	0.00	0.00
47	Kala Chhara	327.63	14.99	0.00	0.00	0.00
48	Kali Khol	264.48	62.87	1.13	0.00	0.00
49	Kali Pahari	236.30	70.13	0.00	0.00	0.00
50	Kalyanpura	43.15	9.89	0.00	0.00	0.00
51	Karoli	1455.00	495.49	0.00	0.00	0.00
52	Kasba Dehra	232.70	5.54	0.00	0.00	0.00
53	Kazakpur	127.11	14.70	0.00	0.00	0.00

		Total Area	GM Pahar	GM Rada	GM Behad	Banjar Beed
54	Kerwa Wal	542.45	59.81	0.00	0.00	0.00
55	Kesharpur	344.03	13.95	0.00	0.00	0.00
56	Kharkhara	352.90	73.01	0.00	0.00	0.00
57	Kherka	130.61	24.13	0.00	0.00	0.00
58	Kishanpur	774.07	27.34	0.00	0.00	0.00
59	Kushalgarh	1181.55	97.46	0.00	0.00	0.00
60	Kushalpura	97.39	21.42	0.00	0.00	0.00
61	Liwari	286.28	29.31	2.44	0.00	0.00
62	Machri	315.29	18.73	0.00	0.00	0.00
63	Madho Garh	3021.65	49.06	0.00	0.00	0.00
64	Maharajpura	377.80	87.88	0.00	0.00	0.00
65	Mannaka	321.23	6.61	0.00	0.00	0.00
66	Maujdika	254.08	13.41	0.00	0.00	0.00
67	Milakpur	132.90	22.77	0.00	0.00	0.00
68	Mouriya	168.07	17.64	0.00	0.00	0.00
69	Nandan Hedi	499.45	220.72	0.00	0.00	0.00
70	Nangal Ratawat	267.29	10.61	0.00	0.00	0.00
71	Nangal Todiyar	474.16	182.09	0.00	0.00	0.00
72	Nangala Sedoo	247.25	43.44	0.00	0.00	0.00
73	Naurangabad	460.29	171.87	0.00	0.00	0.00
74	Navli @Baldeopura	217.02	15.02	0.00	0.00	0.00
75	Pabroda	338.41	19.93	0.00	0.00	0.00
76	Padisal	196.22	7.10	0.00	0.00	0.00
77	Paitpur	753.24	16.00	0.00	0.00	0.00
78	Palkhari	298.97	44.91	0.00	0.00	0.00
79	Prithvipura	1808.84	811.08	0.00	0.00	0.00
80	Ramnagar	284.90	23.55	0.00	0.00	0.00
81	Rogda	480.17	84.37	0.00	0.00	0.00
82	Rundh Madar	46.51	12.41	0.00	0.00	0.00
83	Rundh Shahpur	135.32	0.10	0.00	0.00	0.00
84	Sahanpuri	164.01	65.27	0.00	0.00	0.00
85	Sahori	620.55	113.58	0.00	0.00	0.00
86	Samalat Chak	140.46	48.98	0.00	0.00	0.00
87	Sarangpura	169.17	21.69	0.00	0.00	0.00
88	Satana	243.43	71.52	0.00	0.00	0.00
89	Seerawas	6805.28	4.25	0.00	0.00	0.00
90	Shahpur	264.23	45.51	0.00	0.00	0.00
91	Sirmauli	704.64	31.86	0.00	0.00	0.00
92	Siyaka Bas	307.89	48.15	0.00	0.00	0.00
93	Sonawa	168.34	12.56	0.00	0.00	0.00
94	Tehadpur	574.18	230.50	0.00	0.00	0.00
95	Thekra	357.51	33.77	0.00	0.00	0.00
96	Ulahedi	254.21	50.30	0.00	0.00	0.00
97	Umrain	1096.43	0.00	1.70	0.00	0
		62209	8826	14	1	

Bansur

1	Banera	883.13	36.43	0.00	0.00	0.00
2	Baragaon	840.00	244.44	0.00	0.00	0.00
3	Basai Chauhan	246.62	3.74	0.00	0.00	0.00
4	Basehi	987.92	34.92	0.00	0.00	0.00
5	Behram Ka Baas	336.47	26.62	0.00	0.00	0.00
6	Belwa Ka Baas	158.74	1.27	0.00	0.00	0.00
7	Bhakhedwada	233.50	36.94	0.00	0.00	0.00
8	Bhoori Doongari	75.70	5.51	3.97	0.00	

		Total Area	GM Pahar	GM Rada	GM Behad	Banjar Beed
9	Bhupsera	665.15	9.31	0.00	0.00	0.00
10	Bilali	674.25	81.02	0.00	0.00	0.00
11	Bilath	828.57	72.54	0.00	0.00	0.00
12	Buteri	722.27	17.72	0.00	0.00	0.00
13	Chhor	1946.65	12.44	5.34	0.00	0.00
14	Choola	332.39	73.43	0.00	0.00	0.00
15	Devsan	274.00	13.50	0.00	0.00	0.00
16	Dhamala Ka Bas	702.35	0.00	2.50	0.00	0.00
17	Ghaat	582.53	186.70	0.00	0.00	0.00
18	Guwada	436.66	48.99	0.00	0.00	0.00
19	Hameerpur	2030.12	75.14	0.00	0.00	0.00
20	Harsora	889.00	213.80	0.00	0.00	0.00
21	Hazipur	1686.00	13.31	0.00	0.00	0.00
22	Jaitpur	127.80	53.44	0.00	0.00	0.00
23	Kali Pahari	349.15	97.54	0.00	0.00	0.00
24	Kalyan Nagar	282.21	4.07	0.00	0.00	0.00
25	Kalyanpura	400.17	174.34	0.00	0.00	0.00
26	Keharpura	186.59	0.50	0.00	0.00	0.00
27	Kharkhari Khurd	114.41	39.13	0.00	0.00	0.00
28	Kharwa	387.06	25.75	0.00	0.00	0.00
29	Khatoti	454.00	125.70	0.00	26.50	0.00
30	Khohri	1493.75	268.75	0.00	0.00	0.00
31	Kool	123.48	22.88	0.00	0.00	0.00
32	Kothal	517.83	70.74	0.00	0.00	0.00
33	Lekri	911.27	365.60	0.00	0.00	0.00
34	Loyati	246.25	16.58	1.53	0.00	0.00
35	Maachi	373.90	60.50	0.00	0.00	0.00
36	Maatha	287.30	178.79	0.00	0.00	0.00
37	Mangalwa	318.99	115.91	0.00	0.00	0.00
38	Meerapur	309.00	23.90	0.00	0.00	0.00
39	Mehanpur	1236.07	123.16	0.00	0.00	0.00
40	Moduka	906.15	32.40	0.00	0.00	0.00
41	Moondali	456.25	25.34	0.00	0.00	0.00
42	Morodi	1124.90	71.20	0.00	0.00	0.00
43	Mukandpura	141.79	31.54	0.00	0.00	0.00
44	Naathoosar	1432.50	288.96	0.00	0.00	0.00
45	Narol	396.70	139.20	0.00	0.00	0.00
46	Parasa Ka Baas	517.00	49.40	0.00	0.00	0.00
47	Rampur	2244.05	930.91	0.00	0.00	0.00
48	Randada	672.25	58.82	0.00	0.00	0.00
49	Ratanpura	276.00	19.10	0.00	0.00	0.00
50	Ukhalheda	792.40	24.00	0.00	0.00	0.00
		32611	4646	13	27	0

Behrod

1	Arsand Puza	0.00	79.78	0.00	0.00	0.00
2	Balani	0.00	116.28	0.00	0.00	0.00
3	Banesingpura	161.00	44.79	0.00	0.00	0.00
4	Banhad	453.87	50.89	0.00	0.00	0.00
5	Banthala	158.00	17.31	0.00	0.00	0.00
6	Bardod	2114.00	30.75	0.00	0.00	0.00
7	Basai	1066.00	157.43	0.00	0.00	0.00
8	Bat Khani	0.00	11.10	0.00	0.00	0.00
9	Batana	324.00	46.39	0.00	0.00	0.00
10	Bighana Jat	0.00	19.16	0.00	0.00	

		Total Area	GM Pahar	GM Rada	GM Behad	Banjar Beed
11	Bijorawas	270.43	14.22	0.00	0.00	0.0
12	Chawadi	601.00	43.06	0.00	0.00	0.0
13	Dabarwas	669.00	17.75	0.00	0.00	0.00
14	Dhadhakari	0.00	34.31	0.00	0.00	0.0
15	Dhikwara	0.00	14.66	0.00	0.00	0.0
16	Dudheda	489.00	45.46	0.00	0.00	0.00
17	Ghilotu	0.00	51.84	0.00	0.00	0.00
18	Giglana	969.29	54.20	0.00	0.00	0.0
19	Golawas	126.94	5.47	0.00	0.00	0.0
20	Googaria	368.00	74.80	0.00	0.00	0.00
21	Guvi	0.00	0.62	0.00	0.00	0.0
22	Isrisinghpura	185.00	7.87	0.00	0.00	0.0
23	Jakhrana Kalan	752.77	43.49	0.00	0.00	0.00
24	Janaksinghpura	221.00	33.10	0.00	0.00	0.0
25	Jonaycha Kalan	388.00	36.43	0.00	0.00	0.0
26	Kaathee Was	0.00	6.25	0.00	0.00	0.00
27	Kali Pahari	187.79	20.56	0.00	45.24	0.00
28	Kalila Jaga	0.00	8.55	0.00	104.03	0.0
29	Kalila Rabar	0.00	12.90	0.00	71.84	0.0
30	Kaysa	1403.00	160.98	0.00	0.00	0.00
31	Keertansingpura	194.00	26.49	0.00	0.00	0.0
32	Khapariya	401.86	115.32	0.00	0.00	0.0
33	Khohar	733.00	118.46	0.00	0.00	0.00
34	Khohari	423.21	26.20	0.00	0.00	0.0
35	Khund Rath	0.00	207.02	0.00	0.00	0.0
36	Kuteena	934.00	96.52	0.00	0.00	0.00
37	Laksiwas	155.80	14.23	0.00	0.00	0.00
38	Maharajawas	386.69	22.85	0.00	0.00	0.0
39	Mahmoodpur Nanga	228.41	39.22	0.00	0.00	0.0
40	Mahtawas	550.00	1.10	0.00	0.00	0.00
41	Majrakath	569.00	71.46	0.00	0.00	0.0
42	Mangalapur	159.67	11.74	0.00	0.00	0.0
43	Maudhan	930.00	30.36	0.00	0.00	0.00
44	Nagali Balai	0.00	46.94	0.00	0.00	0.00
45	Nagali Jagir	242.88	8.54	0.00	0.00	0.0
46	Nalota	406.00	28.08	0.00	0.00	0.0
47	Neemrana	725.00	295.91	0.00	0.00	0.00
48	Oontoli	855.83	101.34	0.00	0.00	0.0
49	Pahari	854.00	3.11	0.00	0.00	0.0
50	Partappur Chuck N	429.00	175.97	0.00	0.00	0.00
51	Partappur Chuck N	176.00	66.01	0.00	0.00	0.0
52	Partappur Chuck N	176.00	24.90	0.00	0.00	0.0
53	Porula	168.00	5.24	0.00	0.00	0.00
54	Raisarana	585.00	57.65	0.00	0.00	0.00
55	Raiwana	608.00	95.73	0.00	0.00	0.0
56	Salarpur	395.00	11.88	0.00	0.00	0.0
57	Sanseri	0.00	0.32	0.00	0.00	0.00
58	Santo	402.00	19.09	0.00	0.00	0.0
59	Saryani	0.00	18.18	0.00	0.00	0.0
60	Shahjahanpur	989.00	5.52	0.00	0.00	0.00
61	Shidansing	0.00	77.17	0.00	0.00	0.0
62	Talwana	529.76	26.33	0.00	0.00	0.0
63	Vijai Nagar	0.00	136.11	0.00	0.00	0
		24115	3245	0	221	

Kishangarh

		Total Area	GM Pahar	GM Rada	GM Behad	Banjar Beed
1	Alamdeeka	472.19	3.30	0.00	0.00	1.29
2	Baghoda	589.98	69.20	0.00	22.56	0.00
3	Baghor	405.27	6.27	0.00	0.00	0.00
4	Bajhor	902.52	51.68	0.28	0.26	4.27
5	Balani	565.96	49.42	0.00	0.00	0.00
6	Ballabhgram	249.88	0.75	0.00	0.00	0.30
7	Bambora	702.79	62.16	0.00	0.00	0.00
8	Basai Basan	303.29	18.08	0.00	0.00	0.51
9	Basai Jagata	671.20	30.11	0.00	6.03	0.25
10	Baskripal Nagar	566.20	6.80	0.00	0.00	0.00
11	Beda Baas	247.89	51.39	0.00	3.03	0.00
12	Bhageri Kalan	518.83	18.80	0.00	0.00	0.00
13	Bhatkol	209.56	20.82	0.00	73.69	0.00
14	Bidaraka	306.27	130.60	0.00	0.00	0.00
15	Chachaka	376.97	0.00	0.00	53.17	0.00
16	Cheelghana	252.41	95.50	0.00	0.00	0.00
17	Choduwata	125.82	13.31	0.00	0.00	0.00
18	Chor Basai	797.02	16.32	0.00	0.00	40.64
19	Dadarhera	150.39	1.30	0.00	0.00	0.00
20	Dayalpur	178.20	1.77	0.00	0.00	0.00
21	Devata	469.21	126.59	0.04	0.00	26.32
22	Dhammukad	372.18	25.32	0.00	0.00	0.00
23	Dohada	219.85	17.33	0.00	0.00	0.00
24	Dongra	496.77	10.79	0.00	0.00	0.00
25	Fatiabad	358.43	0.00	13.55	0.00	0.00
26	Ganj	120.08	4.02	0.00	0.00	0.00
27	Googalhedi	217.57	0.00	0.00	0.00	1.54
28	Gothadi	98.02	3.03	0.00	0.00	0.00
29	Husainpur	561.68	66.94	0.00	24.33	0.00
30	Husepur	280.99	0.00	0.00	41.90	0.00
31	Ismailpur	707.31	10.29	0.00	0.00	3.04
32	Jaistika	211.53	23.34	0.00	0.00	0.00
33	Jeelota	594.25	68.21	0.00	0.00	0.78
34	Jhamoowas	238.87	2.76	0.00	0.00	0.00
35	Jhar Jhila	205.05	6.02	0.00	0.00	0.00
36	Jhirndia	277.97	29.10	0.00	1.03	0.00
37	Khairthal	1525.34	60.67	0.00	0.02	0.00
38	Khanpur Mewan	627.37	31.12	0.00	0.00	0.00
39	Kherla	144.37	13.30	0.00	0.00	0.00
40	Khoa Bas	862.41	108.31	0.00	0.00	0.00
41	Khohra Peepli	257.93	63.20	0.00	0.00	0.00
42	Khudina	242.15	105.76	0.00	0.00	0.00
43	Kishangarh Bas	400.29	1.79	0.00	22.56	0.00
44	Kol Gariv	706.80	20.10	0.00	0.00	0.00
45	Koshalpur	128.33	0.78	0.00	0.00	0.00
46	Lalpuri	137.60	16.54	0.00	0.00	0.00
47	Leesana	114.54	18.81	0.00	0.00	0.00
48	Madook	89.99	22.31	0.00	0.00	3.06
49	Mancha	776.44	8.79	0.00	0.00	2.53
50	Manothadi	123.35	48.14	0.00	0.00	0.00
51	Moharrampur	126.82	16.07	0.00	0.00	0.00
52	Mothuka	533.10	88.48	0.00	0.00	0.00
53	Nagal Maujiya	220.31	0.00	0.00	0.00	0.02

		Total Area	GM Pahar	GM Rada	GM Behad	Banjar Beed
54	Nagla Doogar	411.56	1.51	0.00	0.00	0.00
55	Nagli Janardan	216.55	62.66	1.77	0.00	3.28
56	Nangali Khalil	458.90	140.89	0.00	0.00	8.07
57	Nangali Pathan	253.91	22.83	0.00	41.38	0.00
58	Nanglia	249.13	8.78	0.00	0.00	30.33
59	Nayana	379.47	17.34	0.00	0.00	13.06
60	Neemeda	238.12	30.08	0.00	0.00	3.51
61	Noornagar	380.25	0.00	0.00	0.00	1.01
62	Odra	430.33	60.21	67.42	3.54	0.00
63	Pahar Shamlat	1428.32	1428.32	0.00	0.00	0.00
64	Raipur Mewan	213.82	15.81	0.00	0.00	1.51
65	Ranoli	123.33	20.06	0.00	0.00	0.00
66	Rata Kalan	209.05	18.84	0.00	0.00	0.26
67	Rata Khurd	425.83	7.06	0.00	0.00	5.28
68	Rawaka	212.65	43.90	0.00	21.31	0.00
69	Rundh Gielawada	1089.99	400.28	0.00	687.26	0.00
70	Sarpur	186.22	0.00	0.00	10.54	0.00
71	Seewana	577.22	128.84	9.80	0.00	35.87
72	Sevkhera	147.66	0.02	0.00	0.00	0.00
73	Shekhpur	780.22	138.37	0.00	0.00	0.00
74	Shyamka	256.15	16.81	0.00	0.00	0.25
75	Tarwala	328.82	14.57	0.00	0.00	0.00
76	Tehnoli	245.15	30.62	0.00	0.00	0.00
77	Tehtara	209.05	11.80	0.00	0.00	0.00
		30491	4285	93	1013	187

Kot Kasim

1	Beraheri	157.69	9.31	0.00	0.00	0.00
2	Bhagari Khurd	588.24	14.08	0.00	0.00	0.00
3	Girwas	351.63	0.00	0.00	14.82	0.00
4	Jhariaja	103.54	7.96	0.00	0.00	0.00
5	Khohra Thakran	304.80	12.31	0.00	0.00	0.00
6	Lisani	87.76	13.05	0.00	0.00	0.00
7	Magha Ka Majra	247.39	7.81	0.00	0.00	0.00
8	Paharwas	264.51	16.95	0.00	0.00	0.00
9	Palpur	561.20	18.32	0.00	0.00	0.00
10	Pur	820.23	3.76	0.00	0.00	0.00
11	Ramnagar	135.88	20.34	0.78	0.00	0.00
12	Shajadpur	142.14	0.00	0.00	0.00	0.00
13	Thethar Basna	196.91	10.73	1	15	0
		3962	135			

Lachhmangarh

1	Antapada	179.42	0.76	0.00	0.00	0.00
2	Bheekhahedi	319.85	13.03	0.00	0.00	0.00
3	Chhilachho	302.54	6.25	0.00	0.00	0.00
4	Chimrawali Sikh	334.04	0.51	0.00	0.00	0.00
5	Ghaat & Bai	1122.55	1.25	0.00	0.00	0.00
6	Gor Pahari	335.80	13.00	0.00	0.00	0.00
7	Gujar Khoheda	235.00	80.00	0.00	0.00	0.00
8	Harsana	1434.06	53.06	0.00	0.00	0.00
9	Hasanpur	700.00	143.00	0.00	0.00	0.00
10	Jaahala Taahala	742.00	4.89	0.00	0.00	0.00
11	Jaunkhera Pahad	441.64	15.19	0.00	0.00	0.00
12	Kali Pahai	150.19	2.72	0.00	0.00	0.00
13	Kheda Mangalsingh	982.76	39.24	0.00	0.00	

		Total Area	GM Pahar	GM Rada	GM Behad	Banjar Beed
14	Khohara	1075.17	0.00	5.40	0.00	0.00
15	Moongjodi	196.87	50.16	0.00	0.00	0.00
16	Nainapur	215.53	1.28	0.00	0.00	0.00
17	Narkhohra Bhaupar	383.56	7.59	0.00	0.00	0.00
18	Narnaul Kalan	170.44	19.59	0.00	0.00	0.00
19	Raipur	191.00	18.00	0.00	0.00	0.00
20	Roneeja Pahar	145.00	33.00	0.00	0.00	0.00
21	Shehdaka	350.00	27.00	0.00	0.00	0.00
22	Thumrela	377.52	43.33	0.59	0.00	0.00
		10385	**573**	**6**	**0**	**0**

Mundawar

1	Agwani	217.00	21.00	0.00	0.00	0.00
2	Azizpur	301.00	5.00	0.00	0.00	0.00
3	Badheen	345.00	16.00	0.00	0.00	0.00
4	Bapdoli	411.00	31.00	0.00	0.00	0.00
5	Bari	461.00	4.00	0.00	0.00	0.00
6	Basni	729.00	4.00	0.00	0.00	0.00
7	Behroj	1710.00	133.00	0.00	0.00	0.00
8	Bhoongara Thethar	362.00	17.00	0.00	0.00	0.00
9	Bhoongarha Ahir	327.00	41.00	0.00	0.00	0.00
10	Birtoli	169.00	2.00	0.00	0.00	0.00
11	Dotala	200.00	4.00	0.00	0.00	0.00
12	Gandhinagar	689.00	42.00	0.00	0.00	0.00
13	Hadaheri	229.00	2.00	0.00	0.00	0.00
14	Kali Pahari	324.00	49.00	0.00	0.00	0.00
15	Khanpur Mewan	199.00	5.00	0.00	0.00	0.00
16	Khareta	492.00	27.00	0.00	0.00	0.00
17	Khohari	372.00	49.00	0.00	0.00	0.00
18	Mainpur	934.00	58.00	0.00	0.00	0.00
19	Mundawar	1878.00	117.00	0.00	0.00	0.00
20	Sabalgarh	642.00	43.00	0.00	0.00	0.00
21	Sanoli	399.00	15.00	0.00	0.00	0.00
22	Shahpur	111.00	7.00	0.00	0.00	0.00
23	Shamada	1413.00	24.00	0.00	0.00	0.00
24	Shreekrishnanagar	665.00	17.00	0.00	0.00	0.00
25	Shyopur	237.00	30.00	0.00	0.00	0.00
26	Siakhoh	639.00	12.00	0.00	0.00	0.00
27	Sihali Kalan	561.00	19.00	0.00	0.00	0.00
28	Siyakhoh	639.15	12.00	0.00	0.00	0.00
29	Sorakha Kalan	535.00	263.00	0.00	0.00	0.00
30	Sorakha Khurd	207.00	13.00	0.00	0.00	0.00
31	Suheta	488.00	77.00	0.00	0.00	0.00
32	Tunwas	524.00	15.00	0.00	0.00	0.00
33	Ulahedi	416.00	7.00	0.00	0.00	0.00
		17825	**1181**	**0**	**0**	**0**

Rajgarh

1	Adooka	124.83	20.66	0.00	0.00	0.00
2	Adwadi	388.45	76.79	0.00	0.00	0.00
3	Ahmadpur	154.19	0.60	0.00	0.00	0.00
4	Akoda	274.15	8.11	0.00	0.00	0.00
5	Alei	124.70	38.25	0.00	0.00	0.00
6	Amarpura	116.64	2.25	0.00	0.00	0.00
7	Audpur	258.94	96.57	0.00	0.00	0.00
8	Badela	207.28	0.62	0.00	0.00	0.00

		Total Area	GM Pahar	GM Rada	GM Behad	Banjar Beed
9	Bahadurpur	321.18	10.85	0.00	0.00	0.00
10	Baironda	112.82	0.66	0.00	0.00	0.00
11	Baldeogarh	1647.92	20.04	0.00	1.22	0.00
12	Barh Bileta	169.73	18.96	0.00	0.00	0.00
13	Barh Doroli	26.02	5.45	0.00	0.00	0.00
14	Barh Makroda	45.62	0.00	0.59	0.00	0.00
15	Barwa Dongari	249.34	6.00	0.00	1.63	0.00
16	Berli	88.35	51.63	0.00	0.00	0.00
17	Bhankari	120.01	7.09	0.00	0.00	0.00
18	Bhedoli	217.45	60.66	0.00	0.00	0.00
19	Bighota	2478.00	1633.87	195.32	0.00	11.17
20	Bileta	477.29	89.75	0.00	0.00	0.00
21	Binjari	596.93	250.94	0.00	0.00	0.00
22	Birpur	456.00	215.00	17.83	0.00	0.00
23	Boore Kalan	112.37	21.28	0.00	0.00	0.00
24	Chandpur	298.38	46.11	0.00	0.00	0.00
25	Chawa Ka Bas	235.92	144.57	8.24	0.00	0.00
26	Chhilodi	519.50	109.97	0.00	0.00	0.00
27	Chitop	201.24	0.00	0.00	0.27	0.00
28	Chokhari	305.40	7.60	0.00	0.00	0.00
29	Dabala Meo	201.17	0.40	0.00	0.00	0.00
30	Dabkan	302.23	0.77	0.00	0.00	0.00
31	Dagdaga	752.00	71.77	0.00	0.00	0.00
32	Dalalpura	389.23	61.72	0.00	0.00	0.00
33	Dangarwara	597.37	75.88	0.00	0.00	0.00
34	Danpur	427.96	23.22	0.00	0.00	0.00
35	Daulatpura	143.18	13.98	8.72	0.00	0.00
36	Dera	609.42	18.49	0.00	0.00	0.00
37	Devati	389.95	10.33	7.10	0.00	0.00
38	Dhamred	930.97	0.10	0.00	0.00	0.00
39	Dhaulan	487.53	1.19	0.00	0.00	0.00
40	Dheeroda	896.16	41.12	0.00	0.00	0.00
41	Dhorala	303.51	20.55	0.00	0.00	0.00
42	Dhundhpuri	222.96	6.56	0.00	0.00	0.00
43	Digawara	859.92	24.35	0.00	0.00	0.00
44	Doroli	549.54	111.72	0.00	0.00	0.00
45	Firozepur Jageer	178.03	0.43	0.00	0.00	0.00
46	Garh	964.47	35.13	5.36	0.00	0.00
47	Garhi Sawairam	1069.56	1.33	0.00	0.00	0.00
48	Gharwadi	95.39	22.54	0.00	0.00	0.00
49	Ghatoj	267.80	6.70	0.00	0.00	0.00
50	Ghatra	644.89	135.33	0.00	0.00	0.00
51	Ghewar	698.18	35.54	6.18	0.00	0.00
52	Girawali	345.81	217.59	0.84	0.00	0.00
53	Gorakhpura	102.24	1.17	0.00	0.00	0.00
54	Gordhanpura	812.70	32.43	221.24	0.00	2.87
55	Goth	635.00	371.06	0.48	0.00	0.00
56	Govindpura	208.27	3.75	0.00	0.00	0.00
57	Gugdodh	248.75	74.56	0.00	0.00	0.00
58	Guriya	257.23	5.47	0.00	0.00	0.00
59	Indrapura	185.67	0.00	4.11	0.00	0.00
60	Iswana	839.56	0.68	0.00	0.00	0.00
61	Jagmalpura	76.87	8.25	0.00	0.00	0.00
62	Jamdoli	1813.28	10.09	32.73	0.00	1.32
63	Jhankra	623.26	36.45	0.00	0.00	

		Total Area	GM Pahar	GM Rada	GM Behad	Banjar Beed
64	Jhunda	832.96	4.93	0.00	0.00	0.00
65	Joneta	233.00	44.97	0.00	0.00	0.00
66	Kakrali Rampura	635.84	31.97	0.00	0.00	0.00
67	Kali Pahari	404.93	0.07	0.00	0.00	0.00
68	Kalwar	457.98	6.55	0.00	0.00	0.00
69	Kandoli	131.00	4.58	0.00	0.00	0.00
70	Kantiyawas	146.58	1.42	0.00	0.00	0.00
71	Karoth	386.87	83.60	0.00	0.00	0.00
72	Keelpur	156.56	4.50	0.00	0.00	0.00
73	Kharagpur	201.57	9.63	0.00	0.00	0.00
74	Kharkhara	288.92	80.33	0.00	0.00	0.00
75	Kharkhara	322.39	0.33	0.00	0.00	0.00
76	Kharkhari Chawand	263.87	47.23	0.00	0.00	0.00
77	Kharkhari Rana	151.59	42.49	0.00	0.00	0.00
78	Kharyawas	338.79	27.99	0.25	0.00	0.00
79	Khera Mirzapur	378.28	17.20	0.00	0.00	0.00
80	Kherali	240.08	69.50	25.02	0.00	0.00
81	Khirani Khora	181.36	29.16	0.00	0.00	0.00
82	Khoh	1829.00	763.13	0.00	0.00	0.00
83	Khuleri	447.39	13.87	0.00	0.00	0.00
84	Khurd	140.49	22.20	0.00	0.00	0.00
85	Kooncha	322.97	68.10	0.00	0.00	0.00
86	Kotala	119.23	6.82	0.00	0.00	0.00
87	Kothi Narayanpur	234.48	79.24	0.00	0.00	0.00
88	Kundala	1140.39	108.08	8.48	0.00	0.00
89	Kundroli	287.55	26.82	0.00	0.00	0.00
90	Ladiya	439.37	112.83	0.00	0.00	0.00
91	Lalka	150.27	60.50	0.00	0.00	0.00
92	Lanki	173.00	45.48	15.15	0.00	0.00
93	Losal	814.25	34.38	54.93	0.00	0.00
94	Machari	2021.80	34.79	0.00	0.00	0.00
95	Madhogarh	211.14	11.35	0.00	0.00	0.00
96	Makroda	310.90	94.21	0.00	0.00	0.00
97	Mallana	678.36	2.49	22.11	0.00	0.00
98	Manaka	146.32	64.42	0.00	0.00	0.00
99	Mandawari	234.00	112.36	7.29	0.00	0.00
100	Manpura	104.50	13.35	0.00	0.00	0.00
101	Mitrawat	148.20	16.67	0.00	0.00	0.00
102	Morod Kalan	487.16	134.56	0.00	0.00	0.00
103	Morod Khurd	336.81	53.61	0.00	0.00	0.00
104	Motiwara	708.00	189.22	0.00	0.00	0.00
105	Mukundpura	196.34	18.33	0.00	0.00	0.00
106	Murlipura	187.52	18.93	34.31	0.00	0.00
107	Murlipura	57.62	2.68	0.00	0.00	1.60
108	Murrata	95.00	50.68	0.09	0.00	0.00
109	Nandu	1301.45	328.43	74.35	0.00	0.00
110	Nangad Ganga Gur	124.12	1.64	0.00	0.00	0.00
111	Nangal Chandel	449.53	23.25	0.00	0.00	0.00
112	Nangal Dharmoo	565.58	4.08	0.00	0.00	0.00
113	Nangal Sohan	323.64	88.25	0.00	0.00	0.00
114	Narayanpur	323.00	69.31	0.00	0.00	0.00
115	Nathalwara	756.00	448.69	0.00	0.00	0.00
116	Nayabas Haveli	114.00	41.17	0.00	0.00	0.00
117	Nayabas Machari	146.34	0.47	0.00	0.00	0.00
118	Nayagaon Bolka	239.57	0.33	0.00	0.00	

		Total Area	GM Pahar	GM Rada	GM Behad	Banjar Beed
119	Nedoli	312.88	3.65	0.00	0.00	0.00
120	Neemla	842.00	271.84	0.00	0.00	3.79
121	Padli	305.56	26.17	6.00	0.00	0.00
122	Pali	305.59	0.28	0.00	0.00	0.00
123	Pali	399.00	0.00	6.45	0.00	0.00
124	Palpur	364.96	53.54	29.30	0.00	0.00
125	Palwa	322.98	0.38	0.00	0.00	0.00
126	Pande Roopwas	408.40	175.00	2.30	0.00	0.00
127	Parvani	927.49	0.00	0.00	138.58	0.00
128	Patan	313.49	40.75	0.00	0.00	0.00
129	Pawata	249.67	34.56	0.00	0.00	0.00
130	Pinan	1714.41	6.94	0.00	0.00	0.00
131	Pragpura	273.83	1.13	0.00	0.00	0.00
132	Pratappura	255.68	0.00	23.87	0.00	0.00
133	Prempura	192.00	30.81	0.00	0.00	0.00
134	Pundraka	154.18	50.22	0.00	0.00	0.00
135	Rajor	1969.98	43.69	48.95	0.00	0.00
136	Rajpur Bada	1781.00	1055.13	5.25	0.00	0.00
137	Rajpur Chhota	396.96	47.92	0.00	0.00	0.00
138	Ramsinghpura	352.09	59.68	19.01	0.00	0.00
139	Ramsinghpura	235.28	30.34	0.00	0.00	0.00
140	Ranpur	216.98	18.97	0.00	0.00	0.00
141	Ratanpura	156.00	89.61	0.00	0.00	0.00
142	Reni	3113.66	71.84	0.00	0.00	0.00
143	Roopbas	252.92	46.96	13.75	0.00	0.00
144	Sainthal	584.38	30.63	0.00	0.00	0.00
145	Sakat	948.00	59.38	0.00	0.00	0.00
146	Saloli	452.68	63.39	0.00	0.00	0.00
147	Shreenagar	202.08	15.26	0.00	0.00	0.00
148	Sitawar	465.97	13.46	0.68	0.00	0.00
149	Surer	1235.00	714.77	0.00	0.00	0.00
150	Tahla	1269.56	94.33	6.92	0.00	0.00
151	Talab	1555.41	269.43	120.84	0.00	0.00
152	Tehtada	561.73	35.29	13.13	0.00	0.00
153	Thana (ILR Khoh)	275.27	32.00	0.00	0.00	0.00
154	Thana (ILR Rajgarh	333.68	0.39	0.00	0.00	0.00
155	Thoomara	326.84	35.89	0.00	0.00	0.00
156	Tilwar	375.60	89.76	1.50	0.00	0.00
157	Tilwari	328.14	86.61	0.00	0.00	0.00
158	Toda Gyansingh	205.09	28.44	0.00	0.00	0.00
159	Todi	178.00	55.49	0.00	0.00	0.00
160	Tora Jaisinghpura	663.96	122.45	0.00	0.00	0.00
161	Umri Deori	236.86	37.97	23.18	0.00	0.00
162	Vijainagar	129.00	19.50	0.00	0.00	0.00
		76721	**12060**	**1072**	**142**	**21**

Ramgarh

1	Aalampur	252.19	5.95	0.00	0.00	0.00
2	Adeenaka	175.81	17.69	0.00	0.00	0.06
3	Agyara	558.00	10.00	0.00	0.00	0.00
4	Audaka	133.55	22.09	0.00	0.00	0.00
5	Bagholi	53.50	21.30	0.00	0.00	0.00
6	Baghori	137.39	24.58	0.00	0.00	0.00
7	Bahala	764.00	2.00	0.00	0.00	0.00
8	Balrampur	108.40	8.09	0.00	0.00	0.00

		Total Area	GM Pahar	GM Rada	GM Behad	Banjar Beed
9	Balwandka	281.00	51.00	0.00	0.00	0.00
10	Bamanikhera	279.00	18.00	0.00	0.00	0.00
11	Bardod	234.53	40.05	0.00	0.00	0.00
12	Bera	518.27	298.00	0.00	0.00	0.00
13	Berawas	373.30	73.00	0.00	0.00	0.00
14	Bilaspur	274.00	33.00	0.00	0.00	0.00
15	Bunaka	447.71	240.69	0.00	5.00	0.00
16	Chaprada	341.00	82.00	0.00	0.00	0.00
17	Chauki	273.93	96.55	0.00	0.00	0.00
18	Choroti Pahar	451.00	46.00	0.00	0.00	0.00
19	Dabari	388.48	127.62	0.00	0.00	0.00
20	Dhaneta	372.73	92.36	0.00	0.00	0.00
21	Dohali	670.02	119.98	0.00	0.00	0.00
22	Goha	245.49	75.93	0.00	0.00	0.00
23	Goleta	306.00	41.00	0.00	0.00	0.00
24	Goojarpur Kalan	118.50	8.58	0.00	0.00	0.00
25	Goojarpur Khurd	124.06	7.83	0.00	0.00	0.00
26	Goojarwas	329.00	6.00	0.00	0.00	0.00
27	Gugdod	368.00	63.00	0.00	0.00	0.00
28	Hajipur	353.90	83.39	0.00	0.00	0.00
29	Jugarkhar	637.00	73.00	0.00	0.00	0.00
30	Kaati	300.00	36.00	0.00	0.00	0.00
31	Kala Ghata	189.87	13.59	0.00	0.00	0.00
32	Kalsawada	188.22	29.70	0.00	0.00	0.00
33	Kannat	145.00	18.00	0.00	0.00	0.00
34	Kareeriya	397.67	148.51	0.00	0.00	0.00
35	Karoli Jageer	120.98	31.35	0.00	0.00	0.00
36	Karoli Khalka	148.99	19.61	0.00	0.00	0.00
37	Khanpur Kalan	251.00	19.00	0.00	0.00	0.00
38	Kharkhara	179.88	13.15	0.00	0.00	0.00
39	Kharkhari	126.47	28.05	0.00	0.00	0.00
40	Khilora	676.18	67.50	0.00	0.00	0.00
41	Khoh	542.91	242.79	0.00	0.12	22.61
42	Khohada Karmali	690.18	301.88	0.00	0.00	0.00
43	Khohar	375.00	195.81	0.00	0.18	0.00
44	Khunteta Kalan	443.00	83.00	0.00	0.00	0.00
45	Khutela Khurd	190.00	33.00	0.00	0.00	0.00
46	Korakhurd	396.59	138.18	0.00	0.00	0.00
47	Kota Kalan	172.23	55.56	0.00	0.00	0.00
48	Kota Khurd	396.59	138.18	0.00	0.00	0.00
49	Ladpur	212.00	33.00	0.00	0.00	0.00
50	Lalawandi	620.00	80.00	0.00	0.00	0.00
51	Loharwari	315.00	15.00	0.00	0.00	0.00
52	Mandla Kalan	210.00	39.00	0.00	0.00	0.00
53	Mandla Khurd	288.00	61.00	0.00	0.00	0.00
54	Manki	510.83	56.51	0.00	10.46	0.00
55	Mastabad	342.00	16.00	0.00	0.00	0.00
56	Meo Khera	284.00	24.00	0.00	0.00	0.00
57	Mubarikpur	1363.00	117.87	0.00	0.00	0.00
58	Mukundwas	320.23	58.55	0.00	40.79	0.00
59	Munpur Karmala	650.25	179.57	0.00	0.00	0.00
60	Naadka	373.17	22.23	0.00	0.00	0.74
61	Naaliwal	236.27	96.61	0.00	0.00	0.00
62	Nakachpur	225.27	28.95	0.00	0.00	0.00
63	Nakhnol	329.64	132.24	0.00	0.00	0.00

		Total Area	GM Pahar	GM Rada	GM Behad	Banjar Beed
64	Nangad Rajput	671.00	7.00	3.00	0.00	0.00
65	Nangadmeo	524.00	21.00	0.00	0.00	0.00
66	Nangal Alaf	145.00	14.00	0.00	0.00	0.00
67	Nangal Balaiya	159.00	35.60	0.00	0.00	0.00
68	Nangal Kali	196.11	14.59	0.00	0.00	0.00
69	Nangal Vaziraka	697.36	51.09	0.00	165.38	9.59
70	Nangala Chirawand	909.53	226.81	0.00	141.04	0.00
71	Natesar	171.00	37.00	0.00	7.00	0.00
72	Naugawan	1605.53	26.34	0.00	0.00	0.00
73	Nayabaas	542.00	125.00	0.00	0.00	0.00
74	Neekach	627.76	146.89	0.00	0.00	0.00
75	Newada	224.33	12.88	5.50	0.00	0.00
76	Oontwas	578.90	14.78	0.00	0.00	0.00
77	Ozala	297.76	37.09	0.00	0.00	0.00
78	Padawada	172.53	16.12	0.00	0.00	0.00
79	Pali	301.00	52.00	0.00	0.00	0.00
80	Pata	734.29	39.07	0.00	0.00	13.70
81	Patanbhan	192.47	13.98	0.00	0.00	0.00
82	Peeproli	600.50	106.25	0.00	16.80	0.00
83	Podipur	134.75	0.00	0.00	0.00	0.00
84	Poothi	629.00	68.00	0.00	0.00	177.11
85	Raghunathgarh	1291.82	600.51	0.00	0.00	0.00
86	Rasgan	1238.28	228.69	0.00	0.00	0.00
87	Rasoolpur	91.72	62.46	0.00	0.00	0.00
88	Raswada	217.28	22.75	0.00	0.00	0.00
89	Roopbas	143.16	12.53	0.00	15.82	0.00
90	Sadan Ka Baas	342.22	9.26	0.00	0.00	0.00
91	Sammanpur	93.45	8.31	0.00	0.00	0.00
92	Sarheta	199.22	48.00	0.00	0.00	0.00
93	Shahdoli	429.88	99.75	0.00	0.00	0.00
94	Tismar	131.14	34.38	0.00	107.10	0.00
95	Todli	320.18	0.00	0.00	0.00	0.00
96	Warispur	81.32	16.10	0.00	0.00	0.00
		36474	**6570**	**9**	**510**	**224**

Thana Ghazi

1	Aamka	430.00	948.11	237.09	0.00	0.00
2	Agar	6723.10	3388.17	363.50	0.00	47.11
3	Ajabgarh	515.98	0.00	13.29	0.00	0.00
4	Amra Ka Bas	294.69	0.50	4.79	0.00	0.00
5	Angari	1176.86	117.01	284.00	0.00	0.00
6	Bakhatpura	85.00	0.00	1.14	0.00	0.00
7	Balloowas	495.00	139.69	0.00	0.00	0.04
8	Bamanwas Chauga	484.23	1.25	5.05	0.00	0.00
9	Bandrol	925.67	431.24	0.18	0.00	0.00
10	Barh Goojran	311.42	4.00	5.35	0.00	0.00
11	Basadi	608.40	94.15	0.00	0.00	0.00
12	Basai Jogiyan	652.15	0.00	0.36	0.00	0.00
13	Beera Garhi	7762.00	742.50	2.11	82.04	0.00
14	Bhadaj	2368.05	1303.12	89.01	0.00	0.00
15	Bhangdoli	455.25	30.21	52.53	0.00	0.00
16	Bhaota	873.70	13.30	1.60	0.00	56.54
17	Bhoodiyawas	643.65	0.00	0.00	0.00	0.00
18	Bhooriyawas	2770.19	920.16	68.40	0.00	0.00
19	Biharisar	264.87	3.09	0.53	0.00	

		Total Area	GM Pahar	GM Rada	GM Behad	Banjar Beed
20	Chaha Ka Bas	1683.17	1121.90	9.50	0.00	0.00
21	Chandpura	1092.02	483.02	42.14	0.00	0.00
22	Chosla	1634.05	787.09	38.03	0.00	0.00
23	Churani	560.32	320.80	0.00	0.00	0.00
24	Daulatpura	260.45	67.88	0.00	0.00	0.00
25	Dehra	450.57	98.32	0.00	0.00	0.00
26	Dera	212.70	18.82	0.00	0.00	0.00
27	Dhaital	220.83	66.21	0.32	0.00	0.00
28	Doomeda	256.76	37.10	32.28	0.00	0.00
29	Duhar Chaugan	776.14	6.83	0.66	40.54	0.50
30	Duharmala	2218.77	88.85	19.63	0.00	0.00
31	Ganeshpura	40.46	0.00	1.26	0.00	0.00
32	Garh Basai	542.85	256.95	42.50	0.00	0.00
33	Gopalpura	358.99	80.49	114.20	0.00	0.00
34	Govari	532.24	6.92	46.16	0.00	0.00
35	Govindpura	256.06	0.00	80.35	0.00	4.12
36	Guada	133.48	29.26	13.44	0.00	0.00
37	Gujaron Ka Guwada	1970.70	232.12	49.10	0.00	0.17
38	Guwada Bhagwan	55.17	17.09	2.10	0.00	0.00
39	Guwada Bhopala	340.74	22.76	0.00	0.00	0.00
40	Guwada Bhuriawali	255.92	144.03	0.00	0.00	0.31
41	Guwada Ghasi	134.86	58.89	0.00	0.00	0.00
42	Guwada Gugli	266.74	73.96	60.21	0.00	0.00
43	Guwada Haar	112.80	6.56	0.00	0.00	0.00
44	Guwada Kaloth	54.01	7.56	0.00	0.00	0.00
45	Guwada Kalyan	218.94	80.74	20.83	0.00	0.00
46	Guwada Kishordas	344.17	0.00	15.17	0.00	0.00
47	Guwada Kundal	248.13	0.00	30.80	0.00	0.00
48	Guwada Nirma	54.22	7.94	0.00	0.00	0.00
49	Guwada Radi	118.96	7.72	0.00	0.00	0.30
50	Guwada Ramji	168.42	72.27	0.00	0.00	0.00
51	Guwada Seera	118.24	8.29	0.00	0.00	0.00
52	Guwada Soti	41.62	0.00	0.87	0.00	0.00
53	Guwada Virkadi	225.51	45.43	10.63	0.00	0.58
54	Hameerpur	5877.80	1222.50	1752.18	0.00	37.13
55	Hamer	133.76	5.82	0.00	0.00	0.00
56	Heedaili	613.16	4.15	23.00	0.00	0.00
57	Heensala	544.03	148.69	0.00	0.00	0.00
58	Jagannathpura	590.45	13.07	35.81	0.00	0.00
59	Jaisinghpura	188.35	43.13	23.17	0.00	0.00
60	Jaitpur Goojran	1368.12	478.16	494.90	0.00	2.40
61	Jhankri	501.60	197.01	10.36	0.00	0.00
62	Jhiri	1600.78	338.39	153.42	0.00	0.78
63	Jodhawas	572.09	43.54	253.04	0.00	0.13
64	Kabligarh	910.83	408.61	54.42	0.00	0.00
65	Kala Lanka	369.67	87.75	0.00	0.00	0.00
66	Kaler	5429.90	1428.16	413.70	0.00	0.00
67	Kanpura Loj	3750.11	0.00	0.00	43.12	0.00
68	Kiara	654.25	248.45	42.15	0.00	0.84
69	Kishori	3533.15	380.17	349.14	0.00	0.00
70	Kundalka	643.89	0.00	0.00	0.00	10.18
71	Kundla	396.48	119.16	95.20	0.00	1.30
72	Laka Ka Bas	255.05	32.89	10.61	0.00	0.00
73	Lalpura	1980.00	881.12	5.12	0.00	34.12
74	Lila Marha	270.92	0.00	0.00	0.00	5.69

		Total Area	GM Pahar	GM Rada	GM Behad	Banjar Beed
75	Lothawas	300.00	66.16	286.12	0.00	9.12
76	Madhogarh	2288.14	438.11	0.00	391.10	3.50
77	Malootana	1042.13	222.34	0.32	3.54	0.00
78	Manawas	1881.15	0.00	0.00	157.10	0.00
79	Mejod	579.32	0.00	416.79	0.00	0.00
80	Mundawara	9025.12	708.11	86.05	0.00	1882.10
81	Mundiyawas	614.26	167.14	28.60	0.00	0.00
82	Naathusar	231.12	0.00	0.09	0.00	0.00
83	Nangal Bani	1062.88	608.35	0.00	0.00	2.88
84	Nangalai	1566.14	1421.10	0.50	0.00	0.00
85	Narayanpur A	1584.39	124.56	6.00	0.00	0.00
86	Narhat	3365.03	1525.15	287.19	0.00	0.00
87	Nedali	237.36	0.00	22.09	0.00	0.40
88	Neetota	3841.19	920.16	68.40	0.00	0.00
89	Padak Chhapli	1811.18	705.07	27.09	0.00	0.00
90	Panchpadi	195.13	151.50	0.00	41.40	0.00
91	Pipla	1532.10	381.11	128.47	0.00	2.49
92	Pratapgarh	2710.10	1011.50	228.17	0.00	15.20
93	Raipura	1224.30	0.00	83.60	0.00	0.00
94	Roopu Ka Bas	103.45	13.52	1.44	0.00	0.00
95	Saddharam	271.21	42.42	68.38	0.00	0.40
96	Saleta	322.69	87.78	5.67	0.00	0.00
97	Samra	8133.10	3295.00	2184.18	0.00	5.17
98	Sanwatsar	405.93	265.44	35.11	0.00	0.79
99	Seeli Baori	382.13	82.09	3.79	0.00	0.23
100	Shyampura	451.90	382.15	3.75	0.00	0.00
101	Suratgarh	590.51	260.62	136.54	0.00	0.00
102	Thana Ghazi	1667.88	191.76	111.79	0.00	0.00
103	Toda	1471.40	274.14	9.16	0.00	11.12
104	Todi Luharan	459.88	177.72	88.83	0.00	0.00
105	Turkiyawas	159.89	0.00	0.00	0.00	5.69
106	Vijaipura	462.76	3.76	22.86	6.51	0.70
		123957	32000	9816	765	2142

Tijara

1	Aamirnagar	267.34	16.67	0.00	67.13	0.00
2	Aandhaka	344.67	0.00	0.00	243.92	0.00
3	Adeepur	490.64	33.77	0.00	180.20	0.00
4	Alapur Jatt	131.00	0.00	0.00	6.02	0.00
5	Alapur Meo	543.87	0.00	0.00	221.49	0.00
6	Amanpur	248.70	0.00	0.00	35.25	0.00
7	Baiganhedi	462.17	1.44	0.00	0.00	0.00
8	Baloj	444.00	61.00	0.00	0.00	0.00
9	Barnara	134.00	0.00	0.00	87.63	0.00
10	Bandapur	156.24	0.00	0.00	16.20	0.00
11	Barhera	232.18	0.00	0.00	28.53	0.00
12	Berla	657.46	7.04	0.00	89.92	0.00
13	Bhalesar	376.00	17.96	0.00	169.42	0.00
14	Bhatkol	205.91	3.19	0.00	0.00	0.00
15	Chaupanaki	449.45	7.37	0.00	26.05	0.00
16	Chooharpur	411.00	0.00	0.00	3.06	0.00
17	Damdama	163.75	11.50	0.00	0.49	0.00
18	Dhakpuri	122.00	0.00	0.00	8.78	0.00
19	Dhaus	445.00	42.87	0.00	0.00	0.00
20	Dotana	257.00	14.72	0.00	0.00	

		Total Area	GM Pahar	GM Rada	GM Behad	Banjar Beed
21	Gandhola	268.00	0.41	0.00	0.00	0.00
22	Gandwa	173.00	0.00	0.00	9.32	0.00
23	Gothra	388.00	13.18	0.00	0.00	0.00
24	Gotoli	956.98	2.99	0.00	309.91	0.00
25	Guwalda	1387.00	11.53	0.00	205.47	0.00
26	Hameeraka	720.35	0.00	0.00	229.84	0.00
27	Hasanpur Mafi	604.00	26.00	0.00	0.00	0.00
28	Husaipur	206.00	29.00	0.00	0.00	0.00
29	Jairoli	1996.11	3.38	0.00	963.96	0.00
30	Jaudia	188.90	0.80	0.00	0.00	0.00
31	Jojaka	165.00	0.00	0.00	3.00	0.00
32	Karenda	202.00	0.00	0.00	0.25	0.00
33	Kharkhara	194.39	0.00	0.85	5.64	0.00
34	Kharkhari	202.00	2.26	0.00	10.30	0.00
35	Khatiwas	97.00	0.00	0.00	1.14	0.00
36	Khidarpur	829.84	22.73	0.00	8.63	0.00
37	Khohri Kalan	448.00	9.31	0.00	0.00	0.00
38	Khohri Khurd	238.00	1.03	0.00	11.14	0.00
39	Kulawat	186.00	57.73	0.00	23.71	0.00
40	Laadpuri	171.00	0.00	0.00	13.65	0.00
41	Lakhnor	532.00	0.00	0.00	36.26	0.00
42	Lapala	505.00	2.00	0.00	0.00	0.00
43	Maliyar Jatt	875.00	47.74	0.00	302.07	0.00
44	Mayapur	152.00	5.44	0.00	0.00	0.00
45	Mehandika	97.00	0.00	0.00	1.21	0.00
46	Milakpur Turk	1304.00	0.88	0.00	383.96	0.00
47	Muradwas	160.00	0.00	0.00	3.00	0.00
48	Nabinagar	256.00	0.00	0.00	98.00	0.00
49	Nangal	49.46	1.39	0.00	0.00	0.00
50	Nazalka	194.17	0.00	0.00	1.84	0.00
51	Neemli	1139.00	45.00	0.00	9.00	0.00
52	Nibaheri	676.00	0.00	0.00	88.90	0.00
53	Patan Kalan	312.17	0.00	0.00	21.06	0.00
54	Patan Khurd	281.00	5.03	0.00	22.71	0.00
55	Peeplana	534.00	0.00	0.00	12.00	0.00
56	Phullabas	414.81	0.00	0.00	207.91	0.00
57	Raipur	1342.00	25.18	0.00	0.00	0.00
58	Rehmatnagar	330.00	14.00	0.00	0.00	0.00
59	Roopbas	313.41	8.60	0.00	0.00	0.00
60	Saare Kalan	376.00	0.00	0.00	2.07	0.00
61	Saare Khurd	329.00	0.00	0.00	13.39	0.00
62	Sarheta	338.00	15.00	0.00	0.00	0.00
63	Shadipur	419.22	84.78	0.00	53.96	0.00
64	Shekhpur Jatt	131.00	0.00	0.00	2.58	0.00
65	Siroli Kalan	695.00	17.00	0.00	70.00	0.00
66	Siroli Khurd	185.44	0.00	0.00	54.31	0.00
67	Ubaraka	193.00	0.00	0.00	45.90	0.00
68	Udhanwas	95.00	0.22	0.00	5.70	0.00
		28393	670	1	4416	0

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