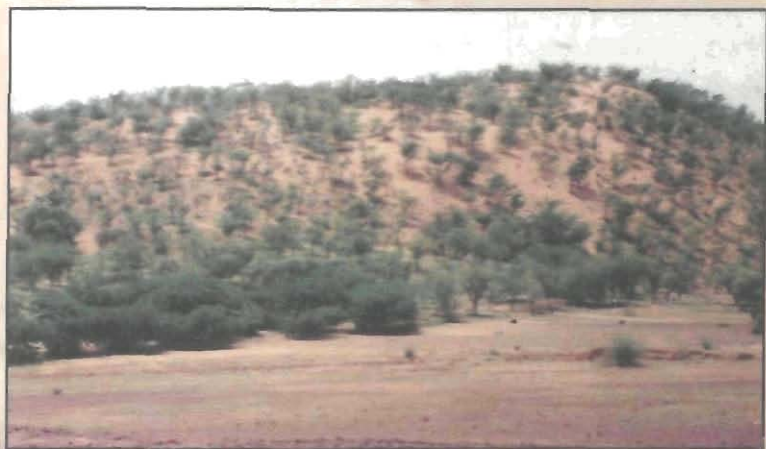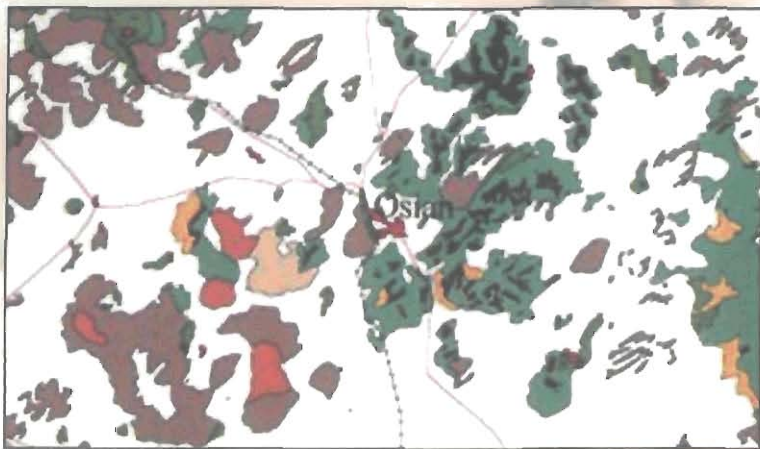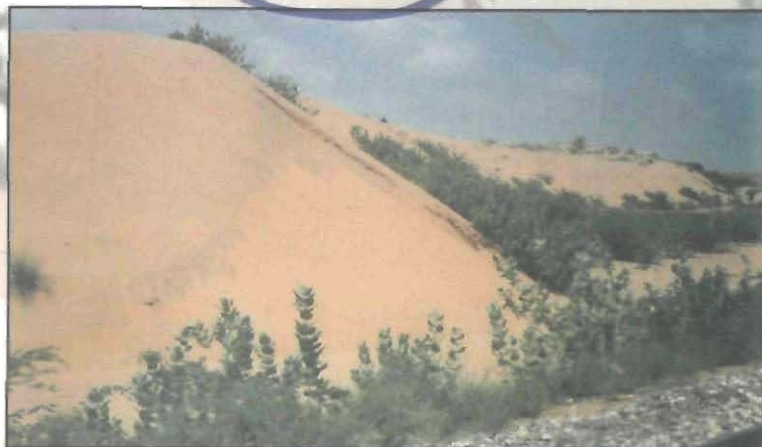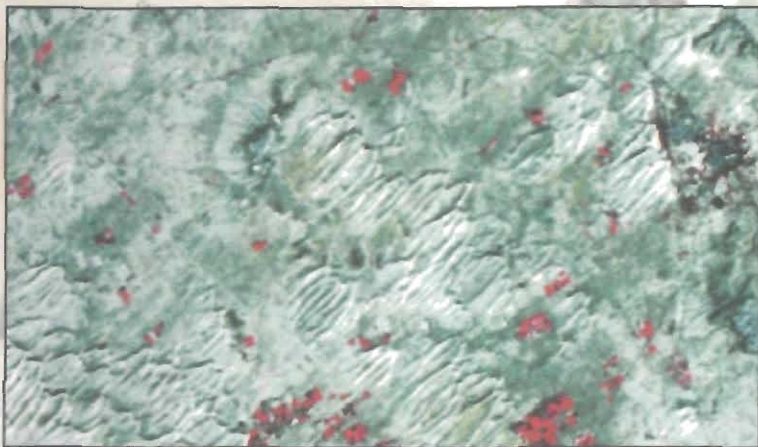# Wastelands Management in Arid Western Rajasthan

157

CENTRAL ARID ZONE RESEARCH INSTITUTE
JODHPUR

ICAR

REGIONAL REMOTE SENSING SERVICE CENTRE
JODHPUR

इसरो isro

NATIONAL REMOTE SENSING AGENCY
HYDERABAD

nrsa

Environmental Scenario
24° 37' 00" to 30° 10' 48" N
69° 29' 00" to 76° 05' 33" E
Geographical Area: 2,08,751 Km²
Population: 22.5 million human (13-323 person/Km²) &
livestock: 23.62 million

Climate:
Hot arid: Low erratic rainfall (< 400 mm), CV 40-70%, Extremes of temperatures (-5.7° to 50° C), Frequent droughts once in 2.5 years, Crop growing period: 8-15 weeks .

Surface water: Weak drainage except the ephemeral Luni river system. 550 reservoir/tanks with 1169.28 mcm storage. IGNP brings 4567 mcm water annually with 1.393 mha irrigation potential

Landforms: Sand dunes (upto 120 meters high), interdunal plains, flat older alluvial plains, sandy undulating older alluvial plains, rocky/gravelly pediments, saline depressions

Ground water: Deep, scares and over exploited. About 45% area has saline to very saline and 40% moderately brackish ground water.

Soils: Dominantly Typic Torripsamments in Entisols and Haplocambids in Aridisols orders. Soils highly erodable, low in moisture retention, organic matter and fertility

Land Use: Net sown area 49.1%, fallow lands 16.8%, net irrigated area 10.8% and wastelands 30% (Sands-desertic 59%, lands with/without scrub 20% and pastures 10%). Perceptible shift in land use in recent past

Vegetation: Psammophytic desert vegetation in the west and Xeromorphic thorn forest in the east entail 682 plant species belonging to 352 genera and 87 families

WASTELANDS

Degraded lands on account of natural causes, wind and water erosion and lack of soil and water management, which can be brought under vegetative cover and turn productive with reasonable efforts

Rationale : Burgeoning human and livestock populations, over exploitation of natural resources and ever increasing demands of society for land based products

➢ **Leads to land degradation and desertification**

Needs : Assessment, characterization, mapping and management for sustainable productivity

➢ **Rehabilitation and reversal of land degradation**

Approaches for mapping wasteland :
District level wasteland mapping of country accomplished at 1:50,000 scale by DLR, MRD, GOI, with NRSA

- Phase I to Phase V (1986 to 1999) and Updation in 2003
- Low spatial resolution data of 80 meters in Landsat to 36 meters in IRS LISS III
- Refinement of methodology and classification system from 13 to 28 categories
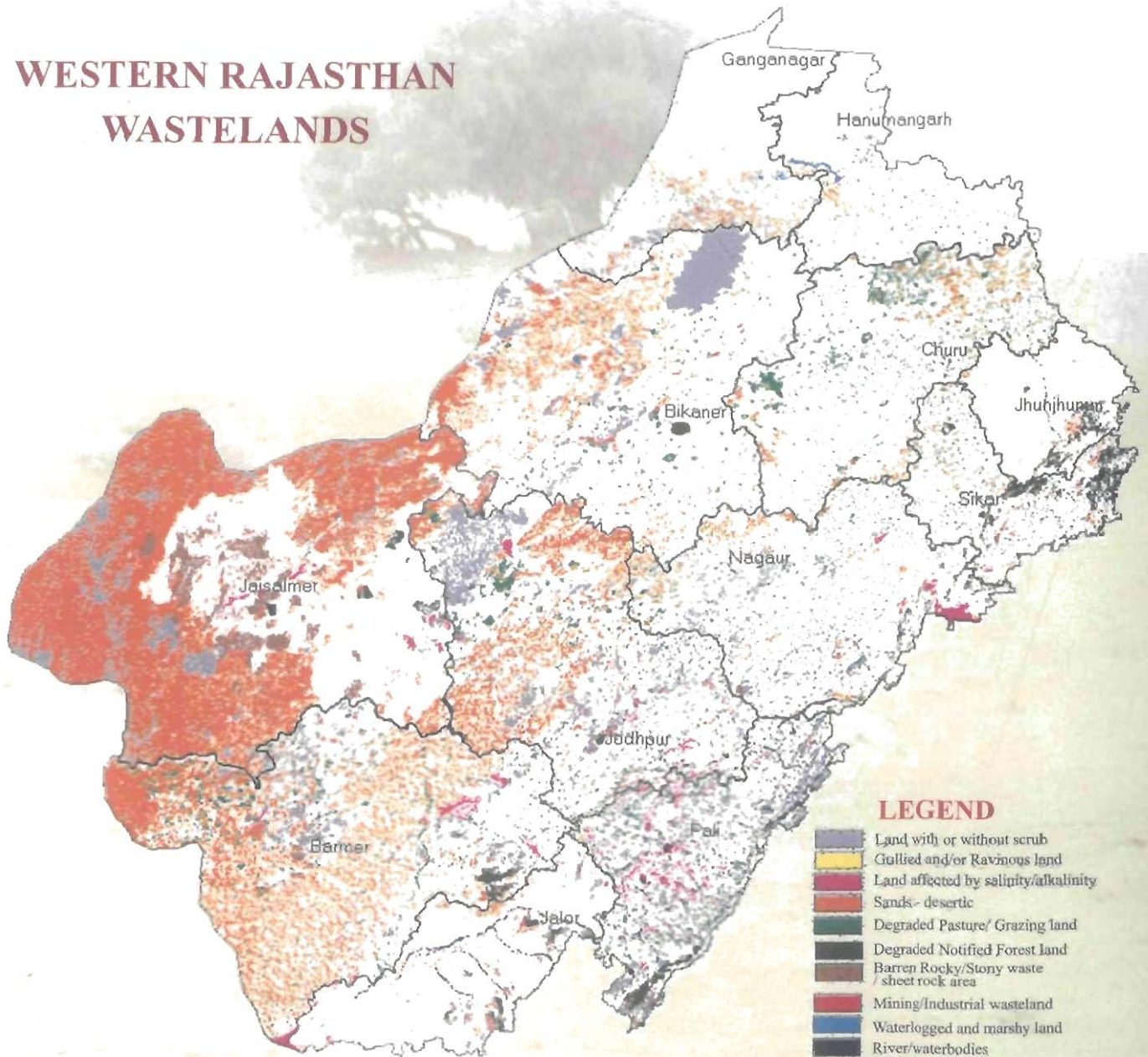
DISTRIBUTION OF WASTELANDS
(6.36 million ha)

Wasteland Mapping of 12 districts of Arid Western Rajasthan (20.87 mha) using IRS LISS-III data shows that different kind of wastelands occupy 30.46% area

Area in ha

Wasteland Categories	Barmer	Bikaner	Churu	Hanuman-garh	Jaisalmer	Jalor	Jhun-jhunun	Jodhpur	Nagaur	Pali	Sikar	Ganga-nagar	Total
Gullied and/or ravinous land (Deep)	---	---	---	---	---	---	---	---	429	---	---	---	429
(Medium)	---	3098	---	---	---	239	3506	340	341	---	4622	---	12146
(Shallow)	---	4846	---	---	---	562	1815	7776	137	791	10672	---	26599
Land with scrub	97438	164792	24464	1644	1056592	34449	16941	202859	45109	91534	27987	---	1763809
Land without scrub	21428	10470	28024	4	425213	2865	1429	12334	1227	6769	1266	---	511029
Waterlogged and marshy land (Permanently)	---	2493	---	1945	---	---	---	---	---	---	---	2163	6601
(Seasonal)	---	1966	---	6463	3535	---	---	---	---	---	---	2366	14330
Land affected by salinity/alkalinity (Strong)	12596	230	382	---	---	18707	---	5781	10203	---	---	---	47899
(Moderate)	12925	---	573	794	---	8816	---	9008	8350	---	---	---	40466
(Slight)	1630	---	753	40	---	1552	---	---	958	33806	---	---	38739
Under utilized/degraded notified forest land (Scrub dominated)	12658	7224	3367	2937	14376	17459	4862	3538	12281	31242	2214	---	112158
Degraded notified forest (Agri. land)	---	---	197	---	734	---	283	---	---	442	---	---	1656
Degraded pastures/grazing land	138280	68086	32882	5800	---	46226	1757	109306	91629	59883	54495	---	608344
Degraded land under plantation crops	---	---	---	---	---	---	---	---	963	3395	387	---	4745
Sands Desertic / Riverine (Flood Plain)	---	---	---	---	---	---	---	---	---	---	9297	---	9297
Semi-stabilized to stabilized high (>40 m) Sand dunes and major obstacle dunes	76407	7906	---	---	173613	2414	---	6202	746	---	---	---	267288
Semi-stabilized to stabilized moderately high (15-40 m) dunes and minor obstacle dunes	502730	173778	39006	5466	567731	14107	1078	221151	29052	---	---	83971	1638070
Semi-stabilized to stabilized low (<15 m) dunes High hummocky and shrub-coppice dunes	38201	145272	41230	4577	402525	6420	1558	73255	29223	---	---	86562	828823
Closely spaced inter-dune area	---	10574	---	---	154110	---	---	460	---	---	8413	---	173557
Mining Wasteland	365	2850	17	261	2138	---	147	3356	---	54	2040	---	11228
Industrial Wasteland	---	---	---	---	---	---	---	---	1437	---	56	---	1493
Barren Rocky/Stony waste/Sheet rock area	28450	---	461	---	118103	15686	33650	8872	11771	22171	---	---	239164
Total Wastelands	943108	603585	171356	29931	2918670	169502	67026	664238	243856	250087	121449	175062	6357870
Total district area	2838700	2724400	1683000	970300	3840100	1064000	592800	2285000	1771800	1238700	773200	1093100	20875100
Percentage to total district area	33.22	22.15	10.18	3.08	76.00	15.93	11.31	29.07	16.01	20.19	15.71	16.01	30.46

WESTERN RAJASTHAN WASTELANDS

Ganganagar
Hanumangarh
Churu
Jhunjhunu
Bikaner
Sikar
Nagaur
Jaisalmer
Jodhpur
Pali
Barmer
Jalor

LEGEND

- Land with or without scrub
- Gullied and/or Ravinous land
- Land affected by salinity/alkalinity
- Sands - desertic
- Degraded Pasture/ Grazing land
- Degraded Notified Forest land
- Barren Rocky/Stony waste / sheet rock area
- Mining/Industrial wasteland
- Waterlogged and marshy land
- River/waterbodies

Status of
Integrated Natural Resources Appraisal by CAZRI

Ferozpur Lodhiana
Abohar
Sangpur
Bhatinda
Jind
Ganganagar
Sirsa
Hisar
Hanumangarh
Bhiwani
Mahendragarh
Bikaner
Churu
Sikar
Jaisalmer
Nagaur
Jodhpur
Barmer
Pali
Jalor
Sirohi
Banaskantha
Palanpur
Rann of Kachchh
Mehsana
Bhuj
Ahmedabad
Surendranagar
Jamnagar
Junagarh
Amreli
Bhavnagar

- Reconnaissance
- Semi-detailed
- Detailed
- Arid Zone Boundary
- Semi-detailed (In Progress)

82% area surveyed

Western Rajasthan
Recommended Land Use
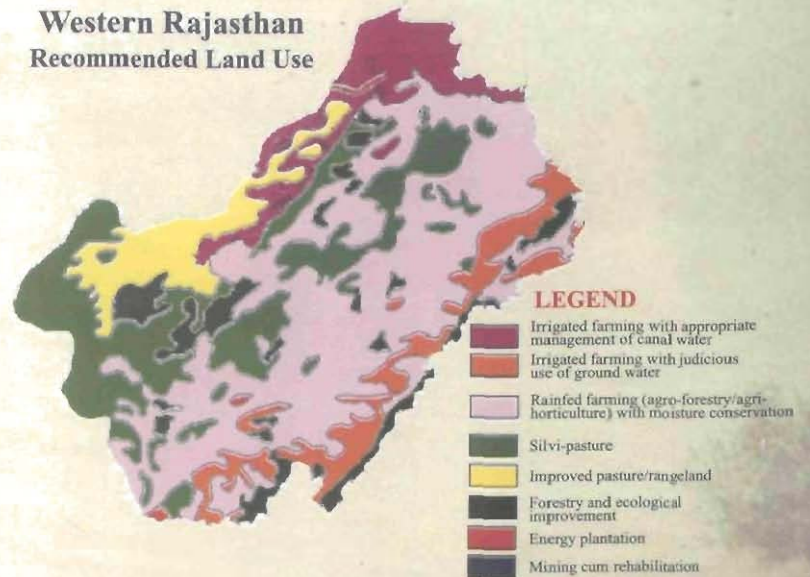
LEGEND

- Irrigated farming with appropriate management of canal water
- Irrigated farming with judicious use of ground water
- Rainfed farming (agro-forestry/agri-horticulture) with moisture conservation
- Silvi-pasture
- Improved pasture/rangeland
- Forestry and ecological improvement
- Energy plantation
- Mining cum rehabilitation

Image and Ground Characteristics of Wastelands

Moderately high semi-stabilized longitudinal dunes
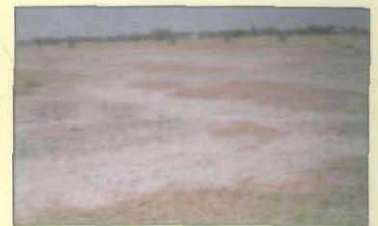
Moderately salt affected lands

Semi-stabilized high parabolic dunes

Pachpadra salt basin(Barmer)
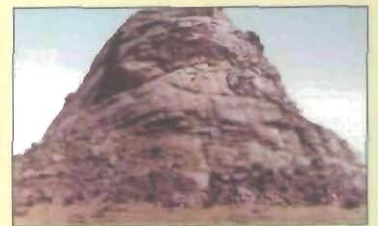
Low and shrub coppice dunes

Land with scrub

Land without scrub

Permanent waterlogged land along IGNP canal

Gullied land

Barren rocky / stony waste

Under utilized / degraded notified forest

Degraded pasture/grazing land

Gypsum mine spoil area

Sandstone mine spoil area