CHAPTER - VI

WESTERN SALINE WASTELAND

GENERAL

The Western Saline Wasteland (WSW) is the distinct physiographic contrast marked between the dunal topography of CAP and the Rann of Kachchh which is clearly visible in the satellite imagery (Plate 6.1). As the name indicates it is characterised by inherent salinity of its land (Plate 6.2) and water pointing to strong marine influence of a Quaternary high sea level. Thus this unit represents a transitional zone between the permanent saltwaste of the two Ranns of Kachchh in the west and the fertile alluvial plain of CAP in the east. The taluka headquarters towns of Tharad and Deodar lie on the boundary between the two units (Fig 6.1). Thus, the unit, has rather well-defined boundaries with the Central Alluvial Plain (CAP) on one side and the Ranns of Kachchh (ROK) on the other side. The western boundary is a rather sharp line separating the barren salt-encrusted marshy lowland of the ROK. The WSW forms a slightly elevated plain comprising scrub-land made up of fluvio-marine sediments (Plate 6.3). The line separating the WSW from ROK infact, marks the strandline of the last high sea-level of Quaternary. The rocky island of Chorar, north of Santalpur appears to represent a land protrusion of the unit within the Rann, and is in structural continuity with the Bela-Khadir-Pachham islands of the Great Rann and indicate a eastern terminal part of horst. The strandline boundary, within the study area maintains a N-S trend leaving the Chorar island to its west(Merh, 1995). It is interesting to observe that the eastern and the western boundaries of the WSW are marked by the last high strandline (Flandrian) of the Holocene sea (Patel et. al.,1979,1988).

The northern part of the unit has a veneer of aeolian sand, which gradually increases in thickness northward across the state boundary. The area further north across the Luni river in Jalor district, merges into the Thar desert sand dunes (Plate 3.2). While

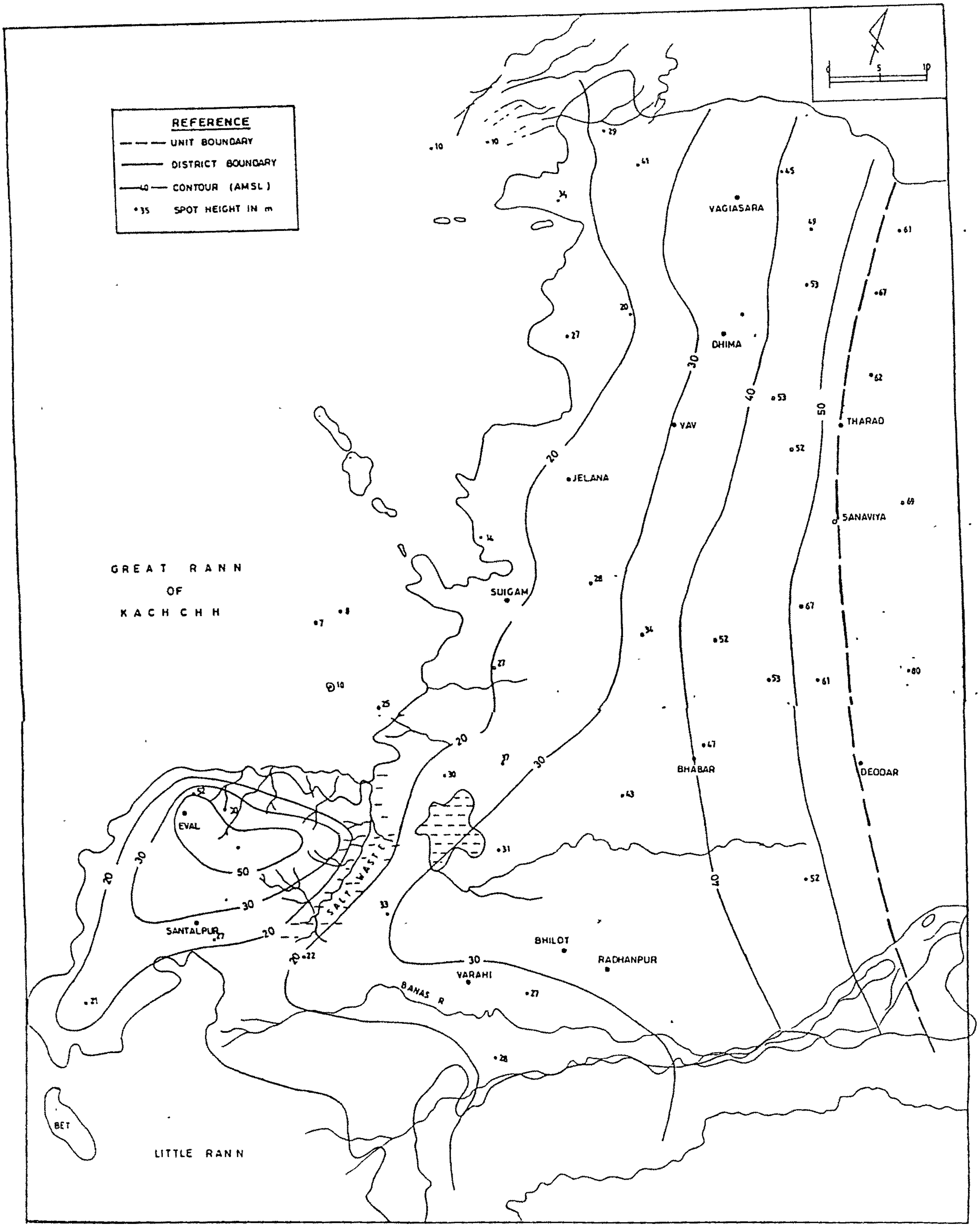
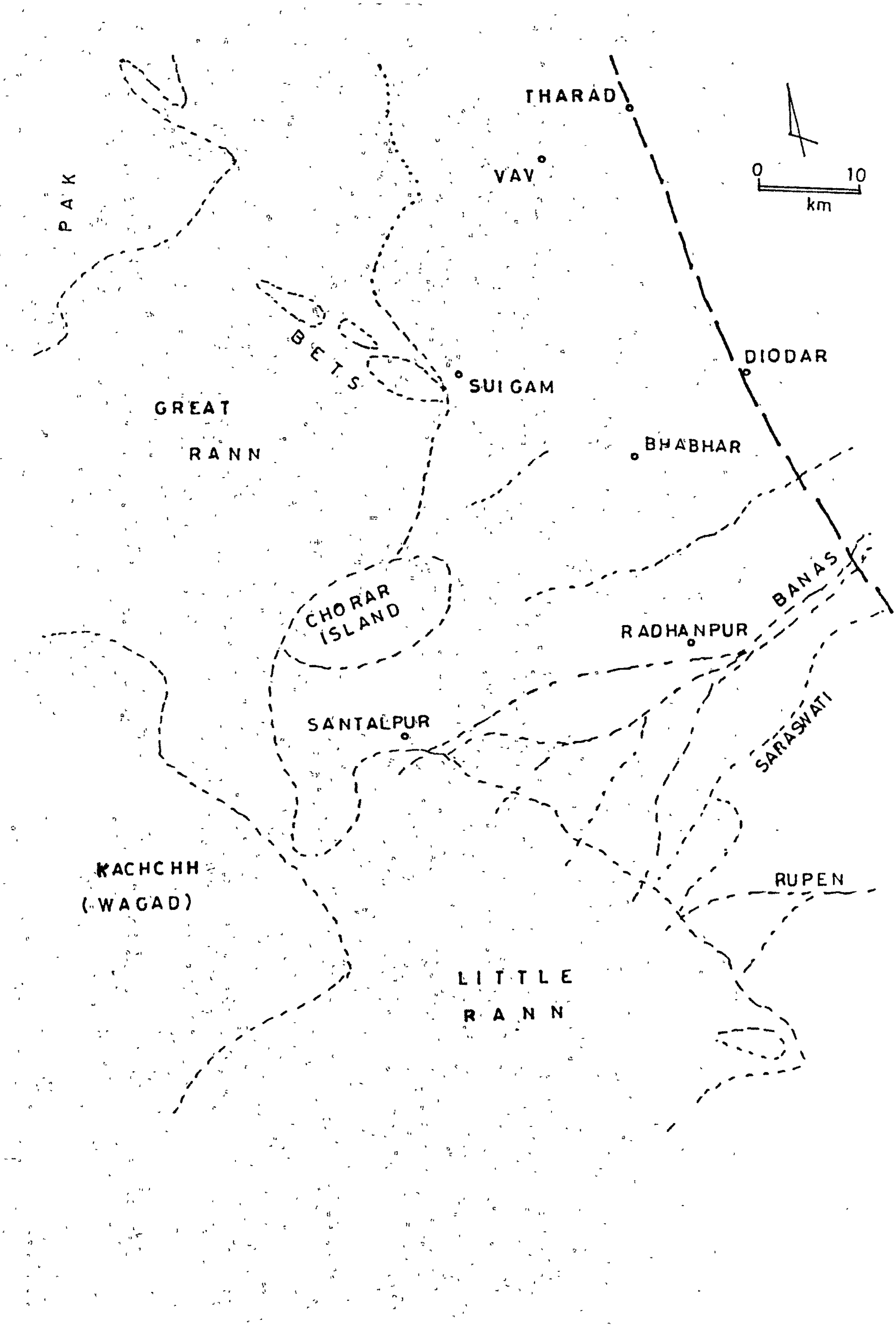


FIG-6·1 PHYSIOGRAPHIC MAP OF WSW UNIT


THARAD
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BANAS
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RADHANPUR
SANTALPUR
SARASWATI
KACHCHH
(WAGAD)
RUPEN
LITTLE
RANN

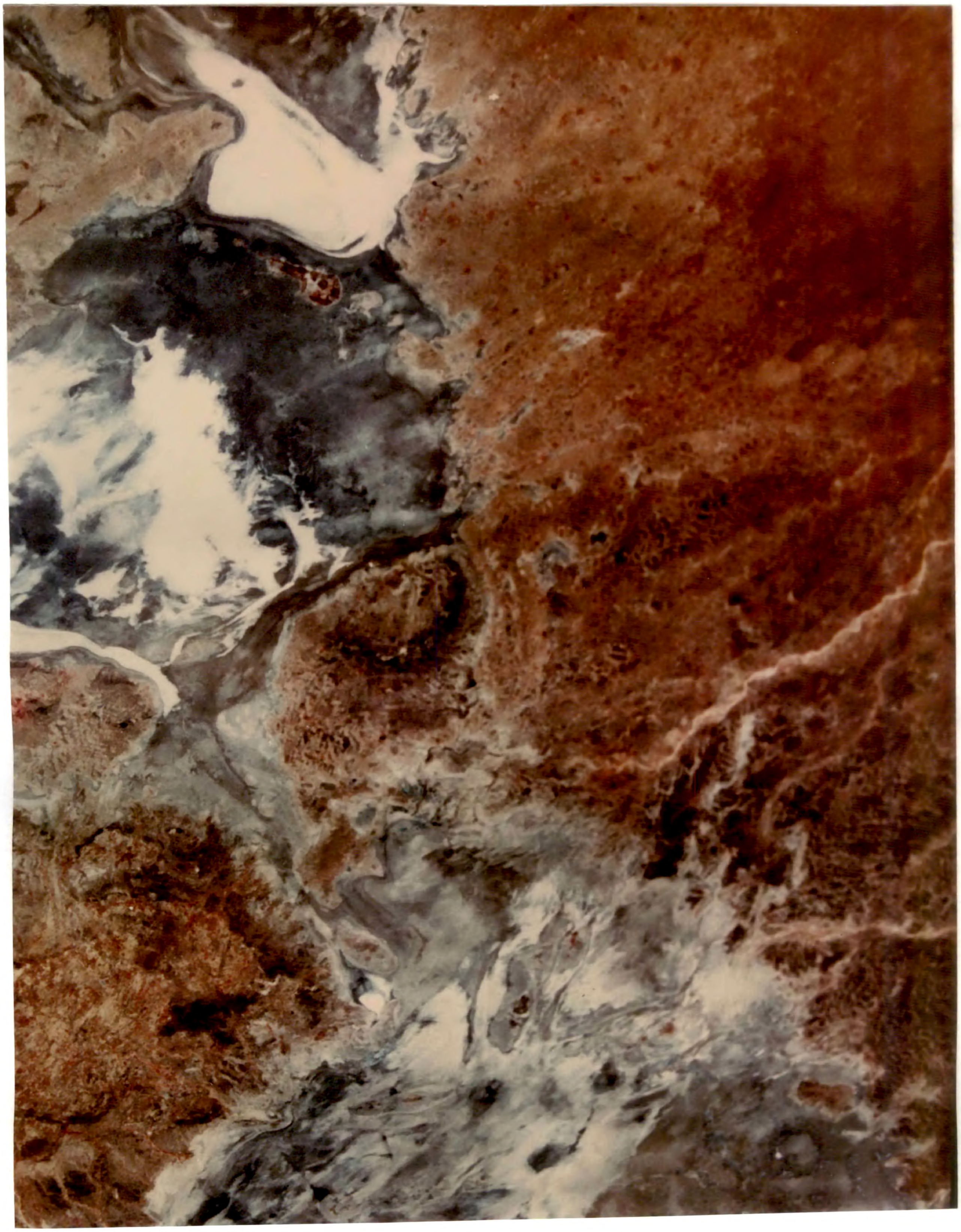

PLATE 6.1 SATELLITE VIEW OF WESTERN SALINE WASTELAND (WSW)

Plate 6.2 A view of dry saltwaste of WSW near Dhudhva village

Plate 6.3 Panoramic view of the WSW as seen from overhead tank of Shergunj the southern limit is marked in the lower reaches of the Banas river It also forms the district boundary with Mehsana district. However, the river does not form any geoenvironmental boundary for the unit, as the identical environmental features continue southwards across into the western parts of Mehsana, following the border of the Little Rann Further south it gradually merges into the saline wasteland of the Nal lake depression and Bhal

The unit covers an area of 4100 sq km forming about 32% of the geographical area of the district Its E-W width is about 40 km and extends N-S for about 100 km. Administratively, it covers talukas of Radhanpur, Santalpur, Vav and parts of Tharad, Deodar and Kankrej, supporting a population of 5 lacs(1991 Census). It shows a density of 130 per sq km which is remarkably low as compared to the other two units. The sparseness of population is indication of the harsh climatic conditions and poor life supporting base of its land and water resources. About 48% of land is an uncultivable waste (ORG, 1994). The terrain is subjected to hostile environments of the Ranns of Kachchh from west and Thar desert from the northwest. Even the soil cover and hydrogeological regime are subjected to the salinity hazards.

TERRAIN ATTRIBUTES

The major terrain attributes of landscape and geology have been evolved under the strong influence of as sea level changes, climatic variations, tectonic activity and environments of deposition of the late Quaternary The land surface is characterised by a topography showing an almost flat and barren landscape (Plate 6 4 a and b) Its streams show mixed features of ancient and recent drainages The soils in general are clayey loam with high salinity and sodicity

Plate 6.4 a An aerial view of the barren saline wasteland near Shergadh

Plate 6.4 b A view of WSW unit with thin sand covered sparse xerophytic vegetation (Loc. village Kotarwada)

LANDSCAPE

The landscape of the unit represents a typical transition between alluvial plain on one sid eand salt-waste of Ranns on other. Though it is a monotonously flat salty ground at very low elevation, it shows a significant diversity in its landform types, drainage characters and poor quality soils.

TOPOGRAPHY, SLOPE AND LANDFORMS

Landscape of area is characterised by a flat plain with the average ground elevation of around 40 m AMSL, but the ground has a gentle slope from east to west. Along the eastern border, general elevation is around 60 m which fall to about 20 m at the western border; imparting a very gentle gradient of 1:1000 to 1.5000.

The monotony of the flatness of the terrain is broken by an isolated but prominent hill of Chorar, located in the extreme southwest corner of the area just north of Santalpur. The abrupt cropping up of the rocky hill in an otherwise flat extensive alluvial terrain is a rather conspicuous and striking topographic feature. The hill covers about 200 sq km area; it is elongated along E-W direction stretching for about 20 km and its N-S width is about 10 km It has a maximum elevation of 86 m; the northern slope is steeper having gradient of about 1:40 while the southern slope is gentler and has a gradient of about 1:250. The hill made up of Jurassic rocks forms the eastern extension of the island outcrops of the Ranns.

The unit in general, is marked by a flat landscape consisting of raised mudflats and older alluvial surface. The flatness, when examined in detail reveal numerous discrete low dunes of sand and local shallow depressions, dotting the plains When traced northwards, the dune density gradually increases and the veneer of sand cover also becomes thicker. The main bulk of the aeolian deposits appear to be reworked earlier sediments of fluvial and aeolian processes. The extreme corners of the unit in the northwest and southeast form the present day delta systems of Luni and Banas rivers respectively. The delta regions are characterised by networks of shallow distributary channels. The Luni delta proper falls outside the limit of the area in the north. Features of Banas delta are also developed and the extension of the Banas delta within Little Rann is clearly visible on the satellite imagery (Plate 6.1). The study also ideally reveals the extended palaeochannels throwing light on the nature of the morphology of the ancient deltic system in this part between Luni and Banas (Ghosh, 1979, 1982).

The broad and wide river bed of the Banas between Sudrasan to Najupura Mota for a distance of about 25 km is a channel filled sand feature. The river course has been filled with enormous quantity of sand. The sandy bed of the river on an average 1 km width and at places is more than 2 km. The thickness of sand filling is more than 5 m (Plate 6.5 a). A section across the river excavated near Badarpura village for construction of an underground check dam revealed more than 6 m thickness of sand above the clayey substratum of paleo mudflat (Plate 6.5 b). The river has bank height hardly a meter or so, and during monsoon the river water, overflows the bank and the flood water spreads in considerable areas on both the sides. This phenomena has given rise to development of a conspicuous landforms of the channel filled sand bed associated with levees along the river banks (De, 1995).

In the southwestern part there is extensive formation of barren saline wasteland. identical to that of the Rann patches. The low-lying land of salt rich clay beds, gets covered under stagnant rainwater in the monsoon. The water pools thus formed slowly turn saline and after evaporation, leave salt-encrusted surfaces,

Plate 6.5 a Thick sands in Banas bed as seen in foundation excavation for.underground checkdam near Badarpura village

Plate 6.5 b Section of Banas river showing sand thickness above clayey substratum near Badarpura

which for the most part of the year (non-monsoon) period remain as pockets of dry salt waste barren surface. Between Radhanpur and Santalpur there are several such pockets (Plate 6.6). Some of them are quite large and cover 25 sq km in area. A strip of such a Rann surface stretches for 30 km in length and 3 km width from Dudasan in the north to Amarnes in the south. It forms a striking and conspicuous landform in this part of the area. In fact, it separates the Chorar island from the mainland and marks the N-S continuity of the Great Rann with the Little Rann within area (Plate 6.1).

DRAINAGE

The area has a very peculiar drainage system, representing an interesting interference of two generations of streams, an ancient system manifesting remnants of an estuarine deltaic system characterised by a close network and profuse discharge of water and sediments; and the younger system of sparse drainage characteristic of the present arid climate.

The area beyond the northern and northwestern limits of the unit ideally represents a mix drainage of two generations related to the Luni delta system. Similarly, the present network of the braided channels of the Banas river in the southern half, which forms the major drainage of the unit also represents the drainage pattern of the two generations related with the Banas delta system of the present and the past.

The present drainage pattern divides the area into two almost equal parts along an E-W line. The northern half is totally devoid of any well-defined drainage and the existing drainage in the adjoining upslope area of the CAP gets lost in the sand dunes in the junction zone of the two units. A sand cover and poor monsoon precipitation, create unfavourable conditions for producing adequate runoff well-defined drains or streams, and thus there is only a sporadic localized development of interdunal drain courses running for a short length, couple of kilometers or so. Detailed study of satellite imagery, however has revealed presence of relicts of an ancient drainage system which today lies covered beneath the sands. On a careful scrutiny, these pre-dunal stream courses can be traced eastward intermittently through CAP, extending further to join the present day rivers of Baragoan, Sukal, Peplu, Ven and Khari in ERH unit (Plate 6.1).

The present drainage pattern in the southern half of the unit is rather well defined. Streams flow within fine fluvial sediments and palaeo-mudflat, and are devoid of sand cover. As these sediments are almost impervious, the monsoon precipitation even though quite low, produces sufficient runoff to flow into the local drains. Also the surplus runoff from the adjoining higher level land (CAP) provides some discharge to augment to the flows in the local drains of the unit. The Banas, the major stream further south, brings large volume of water from the upstream, but here it gets braided and forms a close network of deltaic distributaries, covering about 500 sq km in the southwestern part of the area.

The river in this part of the area, shows a braiding pattern that very clearly marks an ancient deltaic estuary of a late Pleistocene high sea. It is most obvious that with the falling sea level, Banas and the distributory system further extended westward. Reconstruction of the palaeo-drainage system of the area upstream right upto Sihori clearly reveals more or less a continuous delta system consisting of all the distributories of Banas including the present streams of Vo and Khari.

The Palaeo-delta region formed by the Banas downstream of Sihori covers about 2000 sq km area. During heavy monsoon, large scale spillover from the upper Banas create flooding and inundation over the most part of this delta region. As outflow conditions to the Little Rann are not favourable, the inundation persists for quite some time, almost more than a month which have proved a blessing in disguise to the area. The nutrient rich silt laden flood waters temporarily supress the salinity of the land and this helps in producing rich Kharif crops.

The rivers to the south of the Banas, viz., Saraswati, Khari and Rupen also have almost the similar mechanism of flooding and inundation in the adjoining areas of the western part Mehsana district.

Besides Banas, Vo and Khari are the major streams that drain the area to the north of Banas. These also maintain the general southwest to west-southwest flow trend marked by meandering with a very high winding ratio of about 1:1.6. Several abandoned loops today forms local ponds; the entire region is closely dotted with such ponds. The curved shapes and alignments of the ponds clearly indicate the palaeo-channels related to the migratory pattern of the streams. These streams give an apparent impression of their originating from the dune hills located a few kilometers to the east in the adjoining unit of CAP, but on a detailed examination of the toposheets and satellite imagery and field observations, it becomes obvious that they in fact belong to the older drainage system.

The area of Chorar island has an independent drainage pattern of its own, different from the mainland plains. The rocky outcrop has locally developed a characteristic radial drainage. The short length streams discharge in the saline wasteland in all directions, including the eastern side lowland depression that connects it to the mainland.

SOILS

The soils are mainly clayey loam to fine sandy loam. The major constraints for the soil formation are aridity, wind erosion, monsoon inundation, salinity and sodicity. As per the recent soils resource mapping by the Sharma et. al., (1994) the soils of the unit fall under 3 orders, 4 suborders and 4 greatgroups and 7 sub-groups (Table 6.1)

Table :6.1 Taxonomic soil classification of the Western Saline Wasteland.

Order	Suborder	Greatgroup	Subgroup	Description
Aridsols	Orthids	Camborthids	Ustochreptic Camborthids	Deep Calcareous fine loamy soils with strong salinity.
			Lithic Camborthids	Shallow calcareous soils with strong salinity.
Entisols	Psamments	Torripsamments	Typic Torripsamments	Very deep calcareous soils with strong salinity.
	Fluvents	Ustifluvents	Typic Ustifluvents	Very deep calcareous coarse loamy soils with sodicity and salinity.
Inceptisols	Ocrepts	Ustocrepts	Typic Ustocrepts	Moderately shallow to deep calcareous clayey soils with moderate a strong sodicity and salinity
			Aridic Ustocrepts	Coarse loamy soils with moderate salinity.

The Ocrepts represented by Typic and Aridic Ustocrepts predominantly cover major part of the unit, characterised by moderate to strong sodicity and salinity. They show a general clayey texture, calcareous nature and are moderately shallow to deep. The Fluvents are represented by Typic Ustifluvents; these mainly occur along the river banks and flood plains. They are generally very deep calcareous in nature showing general sodic and saline character with coarse loamy texture. The Psamments are represented by Typic Torripsamments showing strong sodicity. Their occurrence is restricted to a limited area in the extreme northern parts of the unit. The Orthids comprising Ustocreptic and Lithic Camborthids are characterised by strong salinity, and their occurrence is restricted to the Chorar island hill and neighbouring area; these soils are calcareous showing a fine clayey loamy texture and generally are shallow to moderately deep (Fig 6.2).

GEOLOGY

Geologically, the unit mainly consists of Quaternary deposits of marine, fluvial and aeolian origins. The sediments covering the area however exhibit a monotony. The most striking geological feature of the unit, is that within it lies the sub-surface tectonic junction of Kachchh and Cambay grabens. The striking outcrops of the Jurrasic and Tertiary rocks occurring as an inlier within the Quaternary plains are also of considerable interest. In fact, the Chorar hill exposures represent the easternmost member of the Kachchh Island Belt (Pachham-Khadir-Bela-Chorar); representing a structural horst formed of E-W trending parallel faults (Biswas and Despande, 1970).

The area has been investigated by the officers of the GSI, ONGC and researchers of the various Universities. Taking into account the works of the Biswas (1921), Ghosh (1988), Gupta (1977), Merh and Patel (1988), Patel and Desai (1988), Merh and Chamyal (1993), Roychoudhary et.al;(1972), Mehrotra et.al;(1980) and De(1995) following

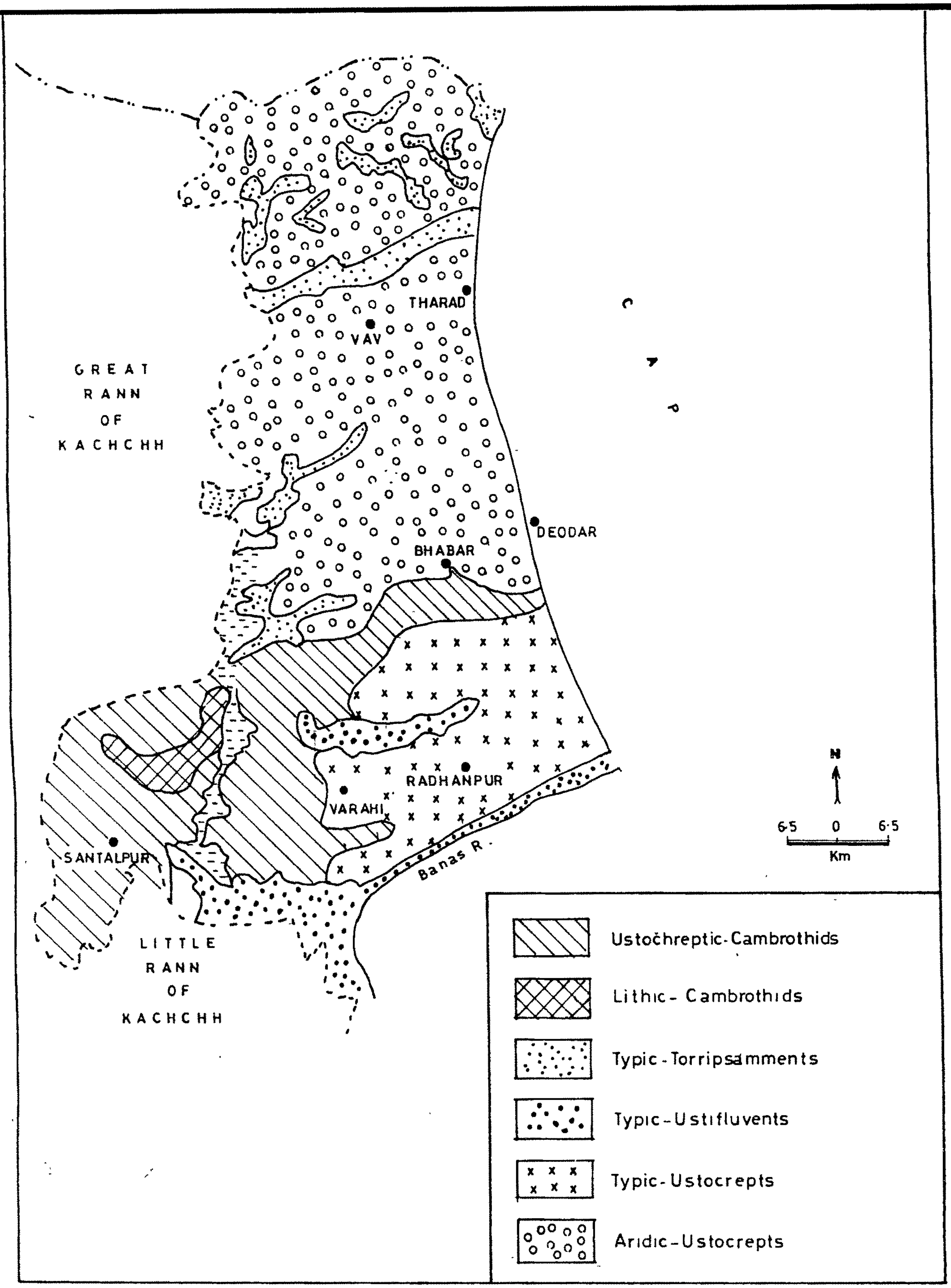

FIG. 6.2 SOIL MAP OF WESTERN SALINE WASTELAND

stratigraphic succession for the unit has been constructed (Table 6.2), most of which is however subsurface.

Table :6.2 Succession of Geological Formations in the Western Saline Wasteland.

Era/Period	Age	Group /Formation Thickness (m) (Environment)	Lithology
Quaternary	Late Holocene	Varahi (13) (Fluvial)	Channel gravel, floodplain clays , levee sands, dune sands.
	Sub-Recent	Radhanpur (30) (Fluvial)	Channel sands, flood plain clays, levee sands dune sands.
	Upper Pleistocene	Vend (10) (Marine)	Calcareous clay with sand, silt and pebbles.
	Upper to Middle Pleistocene	Miliolitic Lst (25) (Marine)	Oolitic calcareous sandstones with intebedded gravels, clays, grapestone and marl.
Tertiary	Pliocene and Miocene	Kankawati and Khari	Gypsiferous clay and shale.
	Cretaceo-Eocene	Deccan Trap	Basaltic dykes and sills.
Mesozoic	Jurassic	Wagad sandstone	Brown red felspathic sandstone with shale beds

Occurrence of the outcropping geological formations in the unit is shown in the geological map (Fig 2.4).

The oldest rocks of Jurassic age representing Wagad Sandstone formation are exposed around Eval in the form of the 'island hill of Chorar, located north of Santalpur. The rocks comprise brown, red feldspatic sandstone (Plate 6.7) with shale beds and hard, purple and black ironstone bands. At places these are intruded by the dykes and sills of Deccan Trap. The Jurassic rocks are overlain by Tertiaries and represented by gypsifereous shales and clays of Eocene age. These occur on the gentle slopes on the southern side of the Chorar hill and further extend upto Piprala for a distance of about 15 km.

Plate 6.6 Low lying land of salty bed covered under stagnant rainwater near Varahi village

Plate 6.7 A section of Wagad Sandstone in Chorar hill near Charnka village

km. Westward beyond Piprala, they are extensively exposed in the Wagad area of Kachchh.

These exposures of Mesozoic and Tertiary rocks form the eastern limit of the Kachchh basin which extends in Banaskantha and marks the site of the merger of the Kachchh basin and the Cambay Basin. The WSW in fact, forms a part of the Serau-Tharad block (Mehrotra et.al.,1981) of the Cambay basin.

The Quaternaries forming a part of the Gujarat Alluvium have been mapped in detailed by De(1995) who has classified it into four formations, viz. Varahi, Radhanpur, Vend and Miliolitic limestone with aggregate thickness of about 80 m. The lower two formations were deposited under shallow marine conditions while the upper two show sedimentation under fluvial conditions. The aeolian phase of the Terminal Pleistocene to Early Holocene is represented by the deposition of sand dunes in the eastern parts of the unit. A thin veneer of blown sand and shifting dunes in the extreme northern parts represent the recent aeolian deposition.

CLIMATE

In the climate of the unit, strong influences of Ranns from the west and desert from the north are reflected. It shows more or less arid characters, and its aridity index varies between 30 to 40% indicating a high deficiency of moisture. The climate becomes almost dry supporting an increasing scrub grass growth and more xerophytic desert type vegetation. In the absence of any observation centre within the unit, the data of nearest IMD observatory located at Bhuj in Kachchh has been taken as representative for characteristing the various climatic parameters for the unit (Table 5.3).

The observed maximum and minimum rainfall at Radhanpur are 1177 mm (1926) and 21 mm (1899) respectively. Heaviest observed rainfall in 24 hrs has been 468 mm

(1959). The average rainfall data for the four taluka headquarters stations falling within the unit, as obtained from the State Agriculture Department are given in Table 6.3. It indicates average rainfall for the unit as 436 mm and average number of rainy days are 20.

Table :6.3 Talukawise rainfall characters in Western Saline Wasteland unit.

Talukas	Average Annual rainfall (mm)	Average Rainy days (Number)
Radhanpur	440	19
Santalpur	451	19
Tharad	487	20
Vav	479	21
Average for the unit	436	20

The mean annual **temperature** is 32.6 °C, with the The mean monthly maximum and minimum temperatures are 33° C and 20.1 °C; mean daily maximum and minimum temperatures have been 42.8°C and 5.4 °C. The extreme highest and lowest temperatures observed are 47.8 °C (26-5-1929). The mean **relative humidity** is 49% and mean **wind** speed is 12.1 km/hr. Dust-storms are quite common. The climate of the unit thus, shows extreme conditions of rainfall erraticity, high inter-annual fluctuations of temperature, very low humidity, strong winds and a very high atmospheric moisture deficiency. The unit is subjected to frequent droughts and occasional occurrences of flood. Almost 70% of the drought prone area and 20% of the flood prone area of the district is shared by this unit (ORG, 1994).

WATER REGIME

The water resource potential is characterised by poor water availability, both surface as well as underground. The low average annual rainfall with erratic character in combination with the dry climatic conditions, high aridity index inhibit generation of surface runoff. Of course, Banas river does bring surface flow from the upper catchment, augmenting to the surface water potential is significant. Further, the sediments of the unit being predominantly clayey do not provide good aquifer conditions. So the groundwater, availability is also meagre. Since, the sediments are being impregnated with inherent salts, the quality of the groundwater, if and where available, is generally brackish.

SURFACE WATER

The surface water potential in the unit is governed by an unusual combination of unfavourable hydrometeorology but favourable topographic conditions ie. low average and erratic rainfall and a very high rate of evapotranspiration, but almost flat topography is with poor outflow condition which helps *'in situ'* retention of the surface runoff. Recently, TEC (1995) has computed yearly surface runoff flow for Banas and according to them the flow below Khakhal (i.e. flowing within this unit having a catchment of 726 sq km) has 44 MCM yield at average rainfall, which is equivalent to 60.6 mm (about 13% of the average rainfall) depth of water. Considering this value, the total surface water potential for the unit works out to be 248 MCM. At higher rainfall dependabilites of 60% and 70% it is computed to produce the annual potential of 178 MCM and 134 MCM. Obviously, the potential of WSW unit is relatively low in comparison to the other two units (CAP and ERH). Of this potential as very little flows into the Rann by way of stream discharge, most of it gets stored in the form of surface water bodies as ponds and river channel pools. There are a large number of ponds scattered all over the area storing the rain water. These ponds provide freshwater recharge to the dugwells on the periphery of ponds. As many as 391 (48%) of total number of ponds with a total capacity of about 20.6 MCM recorded in this unit. The stream channels of Vo, Khari and large number of braided distributaries of Banas have also a large potential of storage, is almost evenly distributed within the unit forms an important source of fresh water supply for domestic needs. The open surface pond-storages are subjected to high rate evaporation losses (average annual 2253 mm, TEC,1995). The ponds with depth less than 2.25 m are ephemeral but there is a large number ponds with depths more than 4 m form important water pools which retain water round the year, but due to inherent salts, most of the pond storages slowly turn saline in due coarse.

There is no feasibility for large scale storage schemes in the area, and the surface water irrigation has not developed. However, the village pond storages are many a times utilised locally for protective irrigation in the source vicinity by direct lift. Further this unit would get benefited by Narmada waters in future.

GROUNDWATER

Hydrogeologically, the unit presents a complex and rather depressing picture. The alluvial deposits extending to a maximum depth of about 300 m, and comprising a sequence of clays, silts and sands with clay-silt proportion being predominant, do not provide good aquifer conditions (Phadtare, 1989). Thus, the open wells located in the area have generally very low yield. Water quality immediately after the monsoon period is good, but progressively gets contaminated due to salt leaching from the sediments and the water turns brackish, for the most part of the post-monsoon period. However, the wells located in the vicinity or within the surface water bodies like village ponds and tanks, generally hold potable water round the year; the yield being rather low is adequate enough for domestic needs only, with no capacity to meet any irrigation needs.

Interestingly, the main river course of Banas and some of its major distributaries have very thick sand fillings. The river bed sands generally hold good quantities of fresh water. These are localised sources of copious supply in an otherwise region of low yield groundwater and that too saline. Such river bed sand aquifers are extensively exploited by installation of hundreds of small diesel pumpsets within the river sand and groundwater is lifted for irrigating Kharif and Rabi crops.

The Tertiary sequence below the Quaternaries, forms confined aquifer system, and provides groundwater of variable quality. The sand members of Miocene formations form a series of good aquifers. CGWB under its exploratory programme has drilled more than 12 tubewells reaching to a maximum depth of about 400 m. More than 10 successive aquifers have free flows. The yield varies form 100 lpm to 1500 lpm (UNDP, 1976, Phadtare,1989). The quality is quite variable showing values ranges from 1500 ppm to more than 2600 ppm. Due to poor quality, this groundwater source has so far remained under developed. However, more recently tubewells tapping selective aquifers of lower salinity within depths of 250 m to 300 m are being under developed for irrigation and domestic use. The recharge and development of groundwater as estimated by the GWRDC (1991) for the talukas covered in the unit are given in Table 6.4.

Table 6.4 Groundwater recharge and development in WSW.

Taluka	Total recharge (MCM/Yr)	Level of Development (%)	Utilisable recharge (MCM/Yr)
Vav	44.97	31.86	38.22
Tharad	56.24	150.08	47.80
Santalpur	16.45	44.77	13.98
Radhanpur	20.5	63.03	17.42
Average for the unit	**34.54**	**72.84**	**29.35**

ANTHROPOGENIC ASPECTS

The inhospitable terrain and harsh environment of the unit have inhibited anthoropogenic activities and limited use of the land. The main use is pastures and grasslands (Table 6.5), supporting large populations, of cattle. Hence cattle rearing is the main occupation of the people.

Table: 6.5 Landuse pattern of the WSW unit.

Features	Santalpur	Radhanpur	Vav	Tharad	Total
Forest area (ha)	34231	1690	8077	2	44000 (30)
Barren Uncultured area (ha)	5669	1513	9360	543	17O85 (48)
Non-agricultural land (ha)	11512	5136	8486	3876	29010 (42)
Permanent Pastures (ha)	1887	3254	7923	102190	23283 (33)
Culturable Waste (ha)	7286	35	6213	-	13534 (57)

On a limited scale, light Kharif agriculture forms a seasonal occupation. The area in fact, earlier had a sizable Kharif cropping based on Banas river inundation, but after construction of the Dantiwada dam, the river has lost its flow and there is no inundation. The people have now turned into marginal farmers, farm labours or have migrated elsewhere. During hot months of the year, most families migrate with their cattle in search of fodder and water. There is no industrial development has taken place in the area.

Of late some enterprising farmers from the neighboring areas of Kachchh and Mehsana have introduced irrigated agriculture by developing tubewells in the local pockets. The major transport link connecting Kandala port to Delhi through National highway No. 15 and the metergauge Railway section joining Gandhidham with Palanpur passsing through the unit have added some transport related activities (Fig 1.6).

The northern part of the unit being very close to Pakisthan, there are regular movements of BSF and Defence personnels. The good communication linkage therefore have developed in the unit mainly from the point of view of defence related activities due to its proximity to the international port of Kandla.