

A case study of wasteland development plan in Jind district (Haryana)

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Abstract

The ever – increasing population needs food fiber, shelter fuel and fodder for mating its various demands. Management of natural resources particularly land and water are very essential for sustainable development of living being on the earth. The challenge to provide food security to our country’s increasing population is a big task. The stretches of land lying waste, which can be brought under use with reasonable efforts merit urgent attention in the state. It has been rightly pointed out that these lands are not “waste” lands but “wasted” lands.

In the present study an attempt has been made to analyses the wasteland development plan in Jind district (Haryana). The data was provided by National Remote Sensing Agency (NRSA). Survey of India topographical maps were used for indentifying villages “location” major transport network, culture feature and annotation of major towns and cities. A standardized and widely accepted classification system of wasteland amenable to delineation using remote sensing prepared by NRSC, Department of space and Government of India. Land with open scrub found in Northern part of the district where water availability is very less. Degraded pasture / grazing land is the major category of wasteland in the district is 90.53 percentages of the total 22369.32 acres.

Keywords: population, wasteland, NRSC, location

Introduction

Management of natural resources particularly land and water are very essential for sustainable development of living being on the earth. The increasing population pressure, urbanization and industrialization have put a great stress on natural resources resulting in the decrease in agriculture area. According to UNEP/ISRIC (1991) ^[4] estimate 1965 million hectares of land are subject to some kind of degradation all over the world. In India, wasteland statistics indicate that about 63.85 million hectares of land, which account for 20.17 % of the total geographical area (328.72 million hectares), exist as wasteland (NRSA, 2000). If this wasteland will be under cultivation and other purposes like a forestation and horticulture can help in development of the socio-economic status of the people and increase the overall economic growth of the country.

Meaning of the wasteland

The term wasteland means low-quality land from agriculture point of view, often referred to as degraded land. Local village revenue maps as well as the agriculture statistics define wasteland as uncultivated, non-forested land which is further divided into cultivable and uncultivable wasteland, whereas the categories used for interpreting remote sensing image are based on vegetation cover, soil characteristics, and spatial pattern (e.g. gully formation). In this present study the wasteland is alienated into many parts:

1. Scrubland.
2. Land with Dense Scrub.
3. Land with Open Scrub.
4. Waterlogged Area.

5. Land Affected by Salinity.
6. Degraded Pastures/Grazing Land.
7. Sand Dunes.
8. Mining Dumps.
9. Industrial Wasteland.

Wasteland Scenario in India

The very high percentage of area under wasteland in Jammu and Kashmir (64.55%), Himachal Pradesh (56.87%) is due to snow cover and degraded forest, in Nagaland (50.69%), Assam (25.22%), Manipur (58.00%), Meghalaya (44.16%) and Mizoram (19.31%) is due to shifting cultivation, in Sikkim (50.30%) due to degraded forest and in Rajasthan (30.87%) due to Sandy area. Among all the states, Punjab has a minimum 3.73 percent and Jammu and Kashmir has a maximum 64.55 percent of area under wastelands. The category-wise distribution of wastelands shows that highest percentage (6.31%) belongs to the category ‘land with scrub’ followed by ‘underutilized forestland’ (4.44%). The former is mainly distributed in the southern states of India whereas the later is distributed throughout the country. The total geographic area of the country is covered in 584 districts, out of which 109 districts will be extracted when the digitization of 241 districts is completed. In view of this 475 districts are considered for analysis for which the statistics of wastelands are generated. (Wasteland Atlas of India-2010)

Wasteland scenario in Haryana

The total area under wastelands in Haryana is 3,257.72 sq. km. which constitutes 7.38% of the total geographical area of the state (Wastelands Atlas of Haryana, 2010). This indicates

a slight reduction in the wasteland compared to previous study conducted during 1998 showing 8.45% of area under wastelands in the state. The wastelands status during 2002 indicates that the maximum area of 1097.19 sq. km. occurs under scrublands followed by 923.63 sq. km. under Degraded Grazing/Pasture land. Scrublands constitutes almost one third of the total wastelands in the state. Other main categories are degraded land under Plantation crops (206.74 sq. km.), Sand dune area (141.61 sq. km.), Barren Rocky/Stony Waste/Sheet Rock area (112.10 sq. km.) and land affected by Salinity (123.01 sq. km.). Maximum area of wastelands i.e. 395.99 sq. km. is observed in Panchkula district which constitute 12% of the total wastelands of Haryana. Thus 44.1% area of the district is under wasteland. This is because the area is covered by degraded hills with steep slopes and very undulating piedmont zone. Faridabad, Gurgaon, Mahendergarh and Mewat are the four other districts in the state having more than 10% of area under wastelands. In some district like Gurgaon, Faridabad, Panchkula, Mahendergarh and Rewari where hills are present, gullied ravenous land is also prominent. Salt affected land exists mainly in Kaithal, Gurgaon, Sonapat, Mewat and Panipat district. South western district Bhiwani, Mahendergarh, Rewari, Hisar, Fatehabad and Sirsa are situated at the fringe of the Thar Desert so sand dunes are the main wasteland feature here (Wasteland atlas of Haryana, 2010).

Study Area

The district lies in the north- central part of Haryana between 29°03' and 29° 51' north latitudes and 75°53' and 76°47' east longitudes. It is bounded by Kaithal district in the north, by Hisar and Fatehabad districts in the west, on the south by Rohtak and Sonapat districts and on the east by Panipat district. The north- western boundary of the district separates it from Punjab state. The district covers a total area of 2702 sq.km.

Objective of the study

- To study the Wasteland development plan of Jind districts in Haryana.

Methodology

Information on wasteland could be derived from multi-temporal data either by digital analysis or visual interpretation. Visual interpretation could be carried out either using analogy image through monoscopic interpretation or the digital data could be displayed on the colour monitor and wasteland categories could be delineated through on screen interpretation of multi season IRS-IC/ID LISS-III digital data, for the year 2012 for interpretation of various wasteland categories. The data was provided by National Remote Sensing Agency (NRSA), now a day; know as National Remote Sensing Centre (NRSC), Department of Space, Government of India, as per the Path and Row of the satellite.

Survey of India topographical maps were maps used for identifying villages' locations, major transport network, culture feature and annotation of major towns and cities. Digital data loaded and geo- referenced with the help of ground control points by using image processing software, and visually interpreted various wasteland categories on the image

through on screen digitization in the computer.

A standardized and widely accepted classification system of wasteland amenable to delineation using remote sensing prepared by NRSC, Department of Space, and Government of India. Due to variability of Wasteland and terrain characteristics, ground truth in the district was collected. Interpretation "key" were developed for various Wasteland categories by modified as per the ground truth information and final maps on 1: 50,000 scales were prepared.

Result and Discussion

Land with open scrub

This is the land, which is generally prone to deterioration and have scanty vegetation cover. Such land occupies relatively high topographic location. It is intensively cultivated district, and therefore, the area under this class is very less. It is found scattered in northern part of the district where water availability is very less. The prominent patch is observed near Jind in the western and Belrakha in the north of the district. The total area in this class is 2.39% out of 592.21 acres.

Degraded land under plantation crops

These are the degraded lands that have been brought under plantation crops after reclamation. These do not come under notified forest area. Mainly the area under this category lies in central part of the district near Baroli village. The area covers is 0.41% of total 103.44 acres.

Degraded Pasture / Grazing Land

These are spread mainly on village panchayat lands associated with village surroundings. The pasture and grazing land with natural plantation have become degraded due to neglected land management (lack of proper soil conservation and drainage measures). These overgrazed lands are covered by bushes, scrubs or with scattered trees. The prominent patches are observed around Kharal, Sulhara villages in the north, Mangalpur, Baroda, Narwana village in the west, Chattar, Alewah and Nagaura village in the east, Karsola, Dhigana and Deorar villages in the south part of the district. This is the major category of wasteland in the district is 90.53% of total 22369.32 acres.

Salt affected land

The salt affected land is found either nears the canals due to canals seepage or in the low lying areas where water table has come up. Mainly moderately affected land is found near Morkhi and Gataoli in the south eastern side of the district. This class is again divided into moderately affected and strongly salt affected classes. The area under moderately salt affected class lies in the western part is 0.075% of the total geographical area. Strongly salt affected land is 2.20% of the total 545.99 acres.

Sand Dunes

Majority of the area is sandy that depends on rainfall and in some parts sprinkler system is also used for irrigation purposes. The sandy areas mainly lie in the southern part of the district near Karsola village and Makhand village in the eastern part of the district. The area is 3.39% of the total 839.72 acres.

Waterlogged Area

Mostly the waterlogged area in the district is either in the local depressions or along the canals. During rainy seasons, the water accumulates in the depressions and creates water logging. Water logging is also caused due to canal leak along the banks. Seasonal waterlogged areas were identified in the district. The areas which were waterlogged only in Kharif season were classified as seasonal waterlogged areas. Some patches of seasonal waterlogged area are observed in the east and southern part of the district. The area under seasonal waterlogged is 0.26% of total 66.52 acres.

Mining Dumps

This class occupies a very small area scattered all over the district. This class is observed mostly on the uplands. Therefore, farmers lease out this area for lifting 2 to 3 feet of surface or sub-surface soil for making bricks. This class is 0.30% of the total 74.76 acres.

Industrial Wasteland

These are areas of stockpile of storage dump of industrial raw material or slag/effluents or waste material or quarried/mixed debris from earth’s surface. This class is 0.47% of the total 116.96 acres.

Table 1: Distribution of various wasteland categories of jind district in Haryana.

Sr. No	Category	Area (Acres)	Percentage
1	Land with Open Scrub	592.21	2.39
2	Waterlogged area (seasonal)	66.52	0.26
3	Land Affected by Salinity	545.99	2.20
4	Degraded land under Plantation	103.44	0.41
5	Stabilized Sand Dunes	839.72	3.39
6	Degraded Pasture/Grazing land	22369.32	90.53
7	Mining Dumps	74.76	0.30
8	Industrial Wasteland	116.96	0.47
	Total	24708.92	100

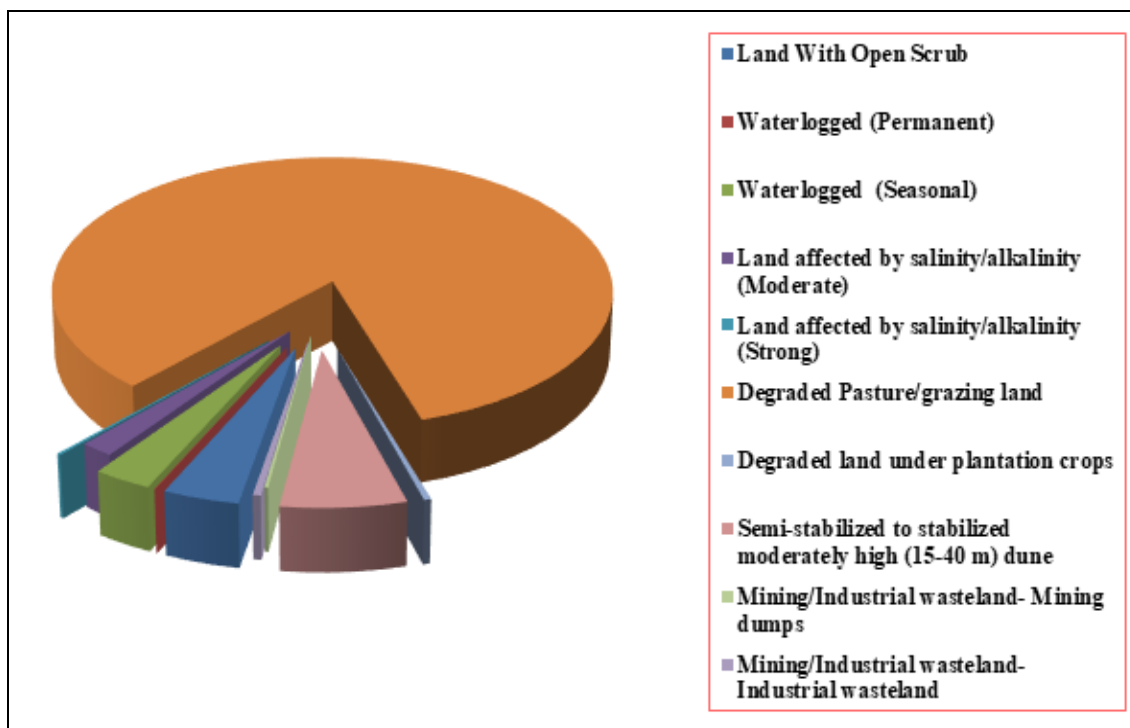


Fig 1: Distribution of various wasteland categories.

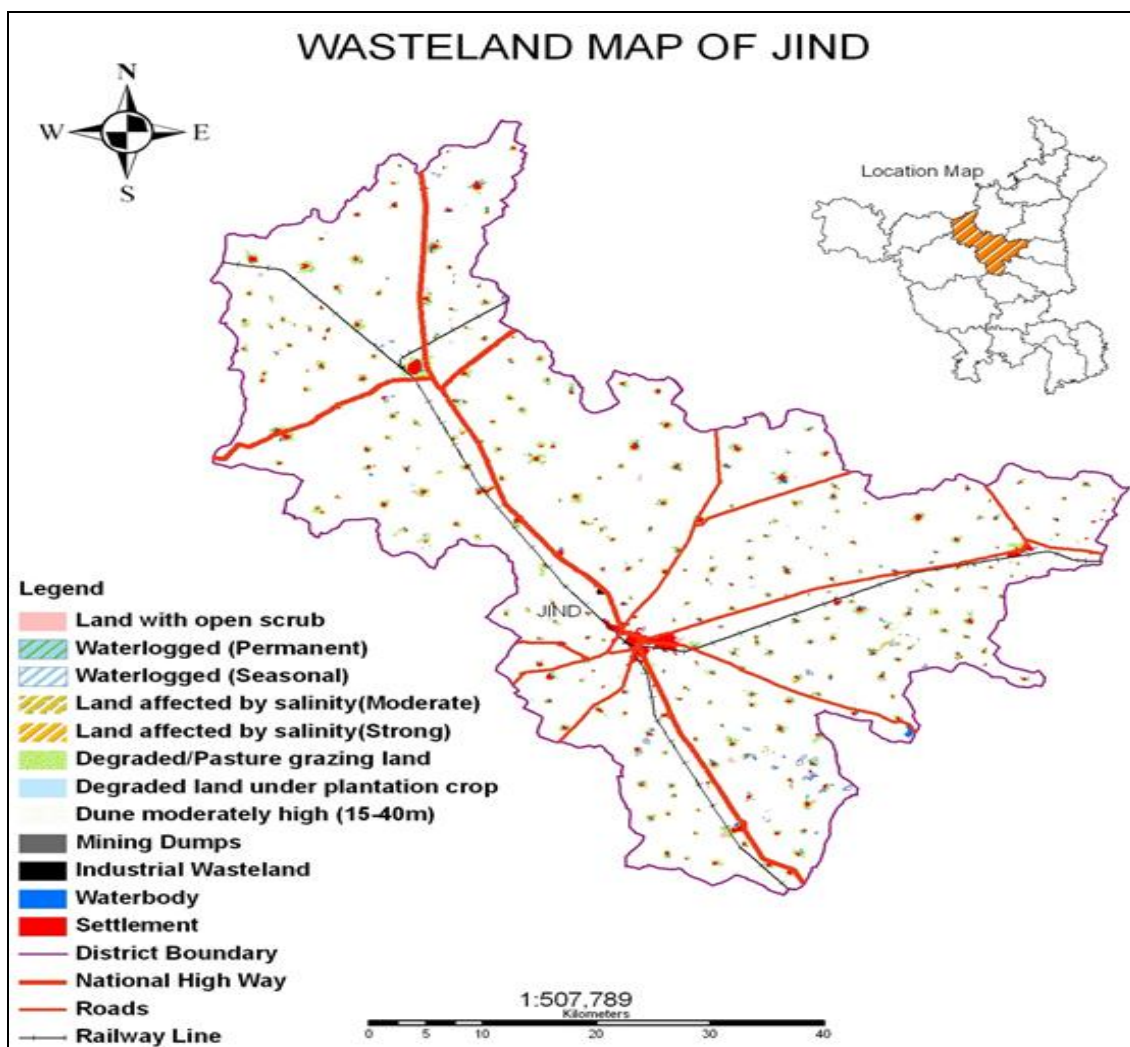


Fig 2: Wasteland Map of Jind

Reclamation of wasteland classes

Salt-affected lands have been grouped into two main categories: saline soils-containing excess neutral soluble salts and alkali soils having excess exchangeable sodium. The reclamation of soils involves leaching of soluble salts and providing adequate surface and sub-surface drainage. On the other hand, alkali soils could be reclaimed by replacing by exchangeable sodium with calcium and its subsequent leaching beyond the root zone. The details of reclamation measure for both type of soils is discussed hereunder.

Leaching and drainage are the two essential component of any permanent solution of salinity problem. Leaching can be best accomplished by flooding the field with 5-7 cm of standing water. In some cases only one heavy irrigate on may be adequate for bringing down the salts to safe limit of some plants. The water use for leaching should be of good quality, canal water is the best for the purpose. However, in the absence of canal water, good quality of irrigation water may be used. The efficiency of leaching for operation could be improved by either going in for sprinkler irrigation for alternate pouding or drying the field. To prevent the rise of salts the soil should be kept under continuous cropping to the

extent possible. The application of mulches considerably checks upward movement of water and improves the efficiency of leaching.

Reclamation of alkali soil involves replacement of exchangeable sodium with calcium and the leaching of sodium, thus replaced, beyond the root zone. Though many compounds, namely, lime, sulphuric acid, iron sulphate, aluminum sulphate, molasses and presumed are available, being cheapest and abundantly required for alkali soil reclamation depends upon the amount of exchangeable sodium and the depth to which soil improvement is intended. The optimum time for applying amendment appears to be the last week of many in areas where good quality ground water is available. The field should be leveled after harrowing. Gypsum powdered to pass through a 2 mm sieves should be broadcast evenly on filed and mixed with the soil. The field should be divided into smaller plots irrigated heavily to maintain 5-7 cm of standing water for a period of about 30 days. This would be followed by transplanting of paddy in July. Paddy being highly tolerant of exchangeable sodium because its need for excess water throughout the growing seasons and its requirement for low permeability which

normally exists in alkali soils: is most commonly taken immediately after reclamation.

Drainage by fast growing tree species is known as bio-drainage. This technology is economic as well as eco-friendly. Trees like Eucalyptus can grow well under high water table condition as compared to other forest species. Some Eucalyptus tree species transpire higher than pan evaporation. Pan evaporation in arid climate is more than 2 m per year. Assuming a specific yield of 0.2 and evaporation of water from forest plantation area equivalent to pan evaporation, it work out that plantation in 10 ha area will lower the water table area by 1 m in 1000 ha annually. Proper drainage removes excess water from crop root zone and excess nutrient salts. A suitable soil environment is created for growth of plant root which result in higher crop production on sustainable basis.

If we talk about degraded pasture land it is the area mainly around village which is of no use. This land could be reclaimed by plugging it many time during seasons when the soil becomes soft and under grass can be planted and used for cattle grazing and could be put purely pasture land. Land with stabilized sand dunes could be loved and further used for growing dry crops likes' gram, bajra etc. If irrigation by canal or tubewell is possible it could further used for growing other crops which required more irrigation than dry crops. This land could be made fertile by putting one or two cm thick layer of bio-compost and then mixing that with soil by plugging.

Degraded land under plantation and land with open scrub with the interest of village could be reclaimed by planting fuel wood tree species that later serve the fuel wood requirement of the villagers. Under the haryali scheme of Govt. of India a Vanrakshak could be appointed by the village panchyant that will take care of these plants. Industrial wasteland is mainly the area which was recently an industry but due to some reasons that was closed. This could be reclaimed by establishing another industry whose product is demanded by the area surrounding.

Conclusion

1. Degraded Pasture / grazing land are spread all over the sandy area around the village on the panchyant land. It was found mostly around the villages' abadi area. The pasture and grazing land with natural plantation have become degraded due to neglected land management. It covers 90.53% of the study area. This category covers the 22369.32 acres of the study area. This area is mainly around villages which are of no use. This land could be reclaimed by plugging it many times during rainy seasons.
2. Sand dunes is second dominant wasteland class in the study area. This class constitutes 839.72 acres area which is 3.39% of the total geographical area. The sand dunes in the southern part of jind near deshkhara and Khimachkhara village. This land could be made fertile by putting one or two cm thick layer of bio-compost and then mixing that with soil by plugging.
3. Land with open scrub is the dominant wasteland class

throughout the study area. This class constitutes 592.21 acres area which is 2.39% of the total geographical area. The scrub land area occupied by this class is found in the spread in whole district. The scrub found like Lantina, Bushes and Jungles grass. This land could be reclaimed by planting fuel wood tree species that later serve the fuel wood requirement of the villagers. Under the haryali scheme of Govt. of India a Vanrakshak could be appointed by the village panchyant that will take care of these plants.

4. Degraded land under plantation is another wasteland class found in the study area. This category covers 103.44 acres which is 0.41% of the total geographical area. This land could be reclaimed by planting fuel wood tree species that later serve the fuel wood requirement of the villagers. Under the haryali scheme of Govt. of India a Vanrakshak could be appointed by the village panchyant that will take care of these plants.
5. Salt Affected land mostly in the southern-east part in jind district. This class covers 2.20% of the study area. The salt affected lands are found small patches in the jind district. The reclamation of soils involves leaching of soluble salts and providing adequate surface and sub-surface drainage. One the other hand, alkali soils could be reclaimed by replacing by exchangeable sodium with calcium and its subsequent leaching beyond the root zone.
6. Mining Dump is another wasteland class of the jind district. This class includes brick kiln areas, mine dump etc. It covers an area of 0.30% of the total geographical area. This category covers the 74.76 acres of the study area. The mining and processing of materials to reclaim capacity for the disposal of additional solid waste. This type of activity must include upgrading the existing liner system to meet current regulatory standards. Reclamation is subject to the entire section of the regulations relating to landfill mining.
7. Water logged areas are found due to accumulation of water in the depressions during monsoon and also due to seepage along the canal. This class constitutes 65.52 acres area which is 0.26% of the total geographical area. This land could be reclaimed Evapotranspiration by Eucalyptus tree. Evapotranspiration from forest tree species is 2 to 2.5 times higher than agriculture crops. Some Eucalyptus tree species transpire higher than pan evaporation. Pan evaporation in arid climate is more than 2 m per year.
8. Wasteland being an important aspect in land use planning and developmental activities of any area, so all the database on wasteland was put in Geographical Information System (GIS) format. The spatial information generated on wasteland on 1: 50,000 scales can be utilized for various reclamation measures and other uses for the district level planning.

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