International Journal of Engineering Research & Management Technology
ISSN: 2348-4039
July-August-2019 Volume 6, Issue-4
Email: editor@ijermt.org www.ijermt.org

LAND DEGRADATION AND CONTROL MEASURES- A CASE STUDY OF RAJASTHAN STATE.

Dr. Deepak Maheshwari

Associate Professor Department of Geography

Government Meera Girls College Udaipur Rajasthan.

ABSTRACT

Land degradation is caused by wind and water erosion, loss of soil humus, depletion of soil nutrients, secondary salinization, plant cover loss, and biodiversity loss. Food production systems utilize land and water. Even now, soil produces 90% of food and inland water and seas 10%. Overexploitation of natural resources is harming land production, environment maintenance, and life system activity. Land degradation reduces livelihoods, causing poverty, migration, and food insecurity. Rajasthan, in the northwest, is India's biggest state. It covers 10.41% of the country with 34.22 million hectares. State's population is 68.62 million, 5.67 percent of India's. Rajasthan ranks second with 56.66 million cattle. Rajasthan has two unique land resources. First, it has more desert than other states. Second, the desolate Aravali hills separate the state into two sections, west and east of the range. Half (17038 thousand acre) of the state's land is net planted. It is crucial to agricultural sustainability. Net planted area grew somewhat over time. Too much or too little net sown area to geographical area hurts state/regional agricultural growth. The state's and agricultural sector's sustainable growth would be threatened if we don't protect our natural resources. Wind erosion (44.2%), water (11.2%), vegetal degradation (6.25%), and salinization (1.07%) are the main causes of desertification and land degradation in Rajasthan, which covers 67% of the state. Thus, soil degradation threatens agricultural production and future food security. Degradation of the ecosystem, especially land, and the loss of productivity of this finite resource would adversely impact most humans and cattle. Degradation causes significant unemployment, migration, regional and intergenerational inequities, natural resource loss, and ecological imbalance.

Introduction

Food security and agricultural production are both put in jeopardy by land degradation, which is a major global environmental problem. There are a few different ways to look at land degradation, which affects the amount of biological production. The quality and quantity of the soil, which is essential for agricultural production, are predominantly impacted by land degradation. The function of the watershed is lost off-site. When the quality of the land and the way it is used are mismatched, productivity suffers. Land degradation consists of water and wind erosion, chemical degradation (acidification, salinization, fertility depletion, and a decrease in cation retention capacity), physical degradation (crusting, compaction, hard-setting, etc.), and biological degradation (reduction in total and biomass carbon and land bio-diversity). Physical degradation includes things like crusting and compaction, while chemical degradation includes things like acidification and salinization. It is common practice in semi-arid regions to make changes to the land's cover, which can alter the character of the land without influencing how it is classified. The dynamics of land use and cover and the factors that influence them can be improved using remote sensing in conjunction with socioeconomic surveys, censuses, and other means of acquiring biophysical information. The dynamics of land cover can be better understood with the addition of

data collected from households at the village level. The dynamics of a village may be verified by using remote sensing, and village profiles can be related to landscape features. Data from homes is helpful in explaining the land-use practices of each village since the majority of land-use decisions are made by people and households. This may quantify the sustainability of land use and community vulnerability (or resilience), as it is based on models of the interaction between humans and their environments. The examination of structural changes associated to economic aspects that were difficult to examine using cross-sectional analysis, whether household, village, or geographic, was made possible using time series remote sensing data as well as village-aggregated household data. These types of data were collected from villages.

LAND USE STATISTICS

Land Use Statistics are built up as a part of The Land record maintained by the revenue agencies (Board of Revenue, Rajasthan). Land Use Statistics collected on complete enumeration. The Land Use pattern during 2017-18 and 2018-19 presented in following table Only through the practice of intensive agriculture will farmers be able to satisfy the ever-increasing demand for food. It has a negative impact on the quality of the land and decreases the amount of food that can be produced. Rajasthan has distinct land resources. To begin, it encompasses a vast desert.

Table 1. Land Utilization in Rajasthan

CATEGORY		Area (In Hectare) 2017-18	%	Area (In Hectare) 2018-19	%
	REPORTING AREA (1 to 5)	34287067	100	34287053	100
1	FOREST	2755703	8.04	2760127	8.05
2	AREA NOT AVAILABLE FOR CULTIVATION (a + b)	4365999	12.73	4375272	12.76
	(a) LAND PUT TO NON - AGRICULTURAL USES	1983002	5.78	1992710	5.81
	(b) BARREN & UN-CULTURABLE LAND	2382997	6.95	2382562	6.95
3	OTHER UNCULTIVATED LAND EXCLUDINGFALLOW LAND (a+ b + c)	5528090	16.12	5478146	15.98
	(a) PERMANENT PASTURES & OTHER GRAZING LANDS	1672781	4.88	1667795	4.86
	(b) LAND UNDER MISC. TREE CROPS & GROVES NOT INCLUDED IN NET AREA SOWN	24413	0.07	26020	0.08
	(c) CULTURABLE WASTE LAND	3830896	11.17	3784331	11.04
4	FALLOW LAND (a + b)	3734161	10.89	3895421	11.36
	(a) FALLOW LAND OTHER THAN CURRENT FALLOW	1992294	5.81	2106378	6.14

	(b) CURRENT FALLOWS	1741867	5.08	1789043	5.22
5	NET AREA SOWN (6-7)	17903114	52.22	17778087	51.85
6	GROSS CROPPED AREA	25069010	73.12	25313351	73.83
7	AREA SOWN MORE THAN ONCE	7165896	20.90	7535264	21.98
8	NET IRRIGATED AREA	7984937	23.29	8282956	24.16
9	GROSS IRRIGATED AREA	10603502	30.93	11021395	32.14

Note: Figures in parentheses are percentage of Total Geographical Area (TGA)

in contrast to the policies of the other states in the country. The Aravali mountain range, which also helps to divide the state into two distinct regions, is responsible for making a sizeable percentage of the land in this nation unusable. To the west of the Aravali Range, the climate tends to be dry or semi-dry, but to the east of the Aravali Range, the climate tends to be humid or sub-humid. It is estimated that the existing landmass of the state encompasses a total area of 34,25 million hectares. It's possible that the overall patterns of land usage in different districts and areas will vary greatly from one another. Table 1 presents the particulars of the land use classification for the years 2005-2006 through 2009-2010, as well as the overall average for this time period. The data presented in this table covers the period from 2005-2006 through 2009-2010. At least one third of the land area has to be covered by forest cover for there to be an acceptable degree of ecological balance throughout the region. The amount of land in the state that is occupied by trees accounts for 7.92 percent of the total land area. Only 5.52 percent of the landmass is utilized for non-geographical reasons such as buildings, roads, rail, canals, and other permanent constructions. These non-geographical objectives take the form of man-made infrastructure. This just accounts for a very little part of the total land. The topography of the state often causes a significant portion of the land to be classified as unproductive and infertile land owing to characteristics like as hills, mountains, rocks, and the like. This is because these topographical factors prevent the land from being cultivated. This proportion represents 6.93 percent of the total land area of the state. With the application of the appropriate sort of planning, this piece of land has the potential to be put to use in a beneficial way. The bulk of the state's permanent pastures and grazing grounds are utilized for the purpose of providing grazing for livestock, which accounts for the majority of the state's total grazing lands and pastures, which make up around five percent of the state. The nearly nonexistent area is covered with forest and tree crops. According to official estimates, 13.18 percent of the land in the state of Rajasthan is uncultivable waste land. This is due to a combination of causes, including problems with the soil and water quality, extreme desert cover, and conditions of persistent waterlogging. The implementation of a scientific strategy for the reclamation of cultivable waste land and the planning of land use is a problem of the highest relevance in geographic regions that have a high concentration of such land. It is vital, due to the perishable condition of the soil as well as for other social and economic reasons, to keep a portion of the culturable land fallow for a whole year. This is true both in terms of the social and economic reasons as well as the social reasons. The percentage of lands that are now fallow across the state is 5.37 percent, and this figure has been steadily decreasing over the course of the past several years. In a similar vein, the percentage of arable land that has been kept fallow for a period of time ranging from two to five years in order to improve the quality of the soil is somewhere in the vicinity of 6.34 percent. Out of the nine distinct types of land use, "net sown" is considered to be the most significant use of the land and accounts for around 17038 thousand hectares (49.73%) of the total land area. In point of fact, the success of agriculture in a way that is both long-term and sustainable is significantly dependent on this specific area of the land. This success may be measured in terms of both economic and environmental benefits. Over the course of these many years, there was also a marginal increase in the total net sown area. This rise occurred in the latter part of the

period. It is harmful to the environmentally responsible agricultural growth of a state or region if the proportion of net sown land is either too great or too little in comparison to the entire geographical area of the state or region. If we do not conserve the natural resources that we have in their entirety, the state as a whole and the agricultural sector in particular will face considerable challenges in the years to come in terms of their ability to expand sustainably. If we do not protect the natural resources that we possess. The inadequacy of the state's irrigation systems is demonstrated by the fact that only 15% of the land has been planted more than once. The whole land area of the state has been farmed and developed to the extent of 21991.4 thousand hectares, which accounts for 64.19 percent of the total land area.

Causes of Land Degradation for Agricultural land:

The conversion of agricultural land with medium to low yield for use in other uses, such as industries, brick kilns, roadways, and so on, is the one that is considered to be the most important factor. Another element that contributes to the degradation of land is the use of land for intensive agricultural techniques. The following is a list of additional factors that contribute to the decline in the quality of land:

1. The climate is characterized by a greater rate of evaporation than the rate at which it precipitates, drought, strong rainfall for a short period of time, high-speed winds, cyclones, storms, and other such phenomena.
2. Aspects of the ground itself, such as slope, coarse texture, layers that are impermeable and compacted, tectonic and volcanic activity, and so on.
3. Factors that are connected to management include irresponsible land use, improper cropping systems with no conversion measures, excessive use of pesticides, exploitation of ground water, indiscriminate deforestation, shifting agriculture, and so on.
4. Socioeconomic and policy causes, including population pressure, poverty, the slow adoption of new technologies, a diminishing land:man ratio, the land tenure system, ineffective land regulations and cultural norms, and so on and so forth.

Especially in the western section of the state, sand dunes and other sandy formations found in the Thar desert are extremely vulnerable to wind erosion. This is the key factor that contributes to the degradation of land and the development of deserts. Additional factors that can contribute to localized wind erosion or soil reactivation include high pressures from humans and animals, as well as a temperature history that has been predominantly dry. A couple of the reasons that are contributing to the quickening of the aeolian processes are the use of mechanical deep ploughing and an expansion in the net sown area. Other factors, such as water erosion, excess irrigation, and poor drainage planning, and water logging and salinity, are also contributing to the acceleration of these processes. Water erosion is occurring in parts of the Aravali hill ranges and along the eastern margin of the Thar desert. Other contributing factors include: (i) water logging and salinity; (ii) water logging and salinity; and (iii) water erosion. According to a study that was conducted by NBSS &LUP, Udaipur, 11.61 million hectares (ha), which is equal to 33.2% of the overall geographical area in Rajasthan, is affected by a variety of soil degradation issues, the majority of which are caused by human intervention. This represents 33.2% of the state's total land area. Wind erosion is the most significant problem, since it can lead to the loss of top soil and/or the transformation of the landscape. Because to this issue, 19.4 percent of the entire land area has been impacted, which is equivalent to 6.6 million acres of damage. There is evidence of water erosion on 3 million hectares, which is 7.1% of the total area. This accounts for the percentage.

Table 2. Statistics on Rajasthan's Degraded and Desertified Lands

(Area in ' 000 ha)

District	Degraded and Wastelands classes						
	Exclusively Water Erosion (>10 tonnes /ha/yr)	Water erosion under open forest	Exclusively wind erosion	Saline and Sodic Soils	Total of Classes	Other*	Total
Ajmer	275	0	1	10	286	559	845
Alwar	358	102	0	18	478	356	834
Banswara	387	78	0	0	465	37	502
Baran	480	84	0	0	564	133	697
Barmer	0	0	1908	14	1922	930	2852
Bharatpur	297	3	0	1	301	205	506
Bhilwara	552	19	0	6	577	466	1043
Bikaner	1	0	2119	0	2120	626	2746
Bundi	448	91	0	0	539	15	554
Chittorgarh	466	167	0	12	645	435	1080
Churu	0	0	1346	35	1381	314	1695
Dausa	134	3	0	6	143	199	342
Dholpur	253	10	0	0	263	41	304
Dungarpur	357	0	0	2	359	19	378
Hanumangarh	0	0	320	80	400	860	1260
Jaipur	215	41	0	14	270	836	1106
Jaisalmer	0	0	2753	19	2772	1091	3863
Jalore	4	0	244	10	258	801	1059
Jhalawar	501	70	0	0	571	50	621
Jhunjhnu	0	0	149	0	149	442	591
Jodhpur	0	0	1235	6	1241	1042	2283
Karauli	353	78	0	0	431	120	551
Kota	417	9	0	0	426	119	545
Nagaur	7	0	735	31	773	995	1768
Pali	21	3	1	2	27	1202	1229
Rajsamand	275	13	0	0	288	98	386
Sawai Madhopur	263	12	0	1	276	173	449
Sikar	0	0	414	0	414	361	775
Siroi	303	105	0	1	409	102	511
Sri Ganganagar	0	1	194	77	272	529	801
Tonk	390	0	0	0	390	327	717
Udaipur	679	307	0	28	1014	317	1331
Total	7436	1196	11419	373	20424	13800	34224

*Normal Agricultural land, water bodies, lakes & habitants etc.

Source : NBSS & LUP, Udaipur, (Rajasthan)

area of the world geographically. It has been determined that salinity impacts 1.4 million hectares, which is comparable to four percent of the total area, both on its own and in connection with other variables such as water/wind erosion and floods. This is true whether salinity is considered an independent component or if it is considered in conjunction with other factors. Rock outcrops, Ranns (also known as salt flats), and active sand dunes are some examples of the many sorts of terrain that are not appropriate for agricultural usage. These features take up a combined total of 5.2 million hectares, which is equivalent to 15.2 percent of the total land area. As indicated in Table 2, the state of Rajasthan has a land area that is either desertified or degraded to the extent of 67 percent. The most major contributor to this condition is wind erosion, which accounts for 44.2% of the state's land area, followed by water (11.2%), vegetation degradation (6.25%), and salinization (1.07%). The state has a total of 20,424 thousand hectares of degraded land, which is equivalent to 54 percent of TGA. The region that has suffered the greatest damage is Jaisalmer, which has 2,772 thousand ha of degraded land,

followed by Bikaner, which contains 2,120 thousand ha, Barmer, which contains 1,922 thousand ha, Churu, which contains 1,381 thousand ha, Jodhpur, which contains 1,241 thousand ha, and Udaipur, which contains 1,014 thousand ha. The land area that is the most deteriorated in Jaisalmer compared to those of the other districts. There are 11,419 thousand acres in the state that are severely influenced by wind erosion, which is a crucial component in the degradation of land. This number represents the amount of land that is negatively damaged by wind erosion. The districts of Jaisalmer (2,753 thousand ha), Bikaner (2,119 thousand ha), Barmer (1,908 thousand ha), Churu (1,346 thousand ha), and Jodhpur (1,235 thousand ha) have been hit the most by wind erosion. The water erosion problem is very severe in the districts of Udaipur (986 thousand ha), Chittorgarh (633 thousand ha), Bhilwara (571 thousand ha), Baran (564 thousand ha), and Bundi (539 thousand ha). With a combined area of 263,000 hectares (ha), the areas of Bhilwara, Bharatpur, Alwar, Ajmer, Tonk, Jaipur, Chittorgarh, Dungarpur, Udaipur, and Sri Ganganagar have the largest concentration of saline and sodic soils in India.

CONCLUSIONS

The problem of soil degradation is thus presenting a grave threat to the sustained productivity of agricultural land, which in turn puts at risk not only the food security of the current generation but also the food security of generations to come. Deterioration of the ecosystem, in particular of the land component, and the associated loss of productivity of this scarce resource would have a considerable effect on the means of sustenance for the great majority of the population, including both humans and animals. This would be the case whether or not the land component was degraded. The deterioration of the natural environment has resulted in a multitude of unfavorable outcomes, such as widespread unemployment, the emigration of employees, inequality on a regional and intergenerational scale, the depletion of natural resource bases, and ecological imbalance.

REFERENCES

[1] UNCCD (1994) United Nations Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa. A/AC.241/27, Paris.

[2] Reynolds, J.F. and Stafford-Smith, M. (2002) Global Desertification: Do Humans Create Deserts? In: Stafford-Smith, M. and Reynolds, J.F., Eds., Do Humans Create Deserts? Dahlem University Press, Berlin, 1-22.

[3] Coxhead, I. and Oygard, R. (2008) Land Degradation. Copenhagen Consensus.

[4] Beinroth, F.H., Eswaran, H., Reich, P.F. and Van Den Berg, E. (1994) Land Related Stresses. In: Virmani, S.M., Katyal, J.C., Eswaran, H. and Abrol, I.P., Eds., Stressed Eco-Systems and Sustainable Agriculture, Oxford and IBH, New Delhi.

[5] Diouf, A. and Lambin, E.F. (2001) Monitoring Land-Cover Changes in Semi-arid Regions: Remote Sensing Data and Field Observations in the Ferlo, Senegal. Journal of Arid Environments, 48, 129-148. http://dx.doi.org/10.1006/jare.2000.0744

[6] Quattrochi, D.A. and Goodchild, M.F. (1997) Scale in Remote Sensing and GIS. Lewis Publishers, New York.

[7] Walsh, S.J. and Welsh, W.F. (2003) Approaches for Linking People, Place and Environment for Human Dimensions Research. Geocarto International, 18, 51-61. http://dx.doi.org/10.1080/10106040308542281

[8] Walsh, S.J., Entwisle, B., Rindfuss, R.R., Shao, Y., Weiss, D.J., McDaniel, P.M. and Pullen, R.E. (2003) Characterizing Land Use/Land Cover Change in Northeast Thailand and Analyzing the Causes

and Consequences of Landscape Dynamics. Proceedings of 30th International Symposium on Remote Sensing of Environment, Honolulu, Hawaii.

[9] Moran, E. and Brondizio, E. (1998) Land-Use Change after Deforestation in Amazonia. In: Liverman, D., Moran, E., Rindfuss, R. and Stern, P., Eds., People and Pixels, National Academy Press, Washington DC, 45-67.

[10] Kobayashi, T., Nakayama, S., Wang, L.M., Li, G.Q. and Yang, J. (2005) Socio-Ecological Analysis of Desertification in the Mu-Us Sandy Land with Satellite Remote Sensing. Landscape and Ecological Engineering, 1, 17-24. http://dx.doi.org/10.1007/s11355-005-0003-3

[11] Annonymous. 2010, Status report. NBSS &LUP, Udaipur, Rajasthan.

[12] Govt. of Rajasthan, 2010. Rajasthan State Environment Policy. Department of Environment Govt. of Rajasthan.

[13] Govt. of Rajasthan, 2011. Basic Statistics Rajasthan 2011. Directorate of Economics and Statistics Rajasthan, Jaipur.

[14] Gajja, B.L. and Purohit, M.L. 1998. Sustainable management of land resources in arid zone of Rajasthan. Proceeding of National Seminar on Management of Natural Resources in Rajasthan. 298 -305.

[15] ICAR, 2010. Report on Degraded and Wastelands of India Status and Spatial Distribution. ICAR, New Delhi.

[16] Joshi, B.R., Patel, N.K. and Kumar, Sandeep, 2009. Depletion of common property resources in aris areas of Rajasthan : An economic analysis. Rajasthan Economic Journal. 33 (1 & 2) : 15 -27.

[17] Sharma, P.M., Chaturvedi, P. and Varghese, K.A. 1998. Temporal changes and spatial diverities in the use of land resource endowments in Rajasthan. Proceeding of National Seminar on Management of Natural Resources in Rajasthan. 15-22.