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From the Editor's desk

Land degradation generally signifies the temporary or permanent decline in the productive capacity of the land (UN/FAO).

It is caused by multiple forces, including extreme weather conditions, particularly drought. It is also caused by human activities that pollute or degrade the quality of soils and land utility. It negatively affects food production, livelihoods, and the production and provision of other ecosystem goods and services. Desertification is a form of land degradation by which fertile land becomes desert. (WHO).

It can be defined as a negative trend in land condition, caused by direct or indirect human-induced processes including anthropogenic climate change, expressed as long-term reduction or loss of at least one of the following: **biological productivity, ecological integrity, or value to humans.** Forest degradation is land degradation that occurs in forest land. Deforestation is the conversion of forest to non-forest land and can result in land degradation. (IPCC AR5)

The land man ratio in India is low , hence reclamation of degraded land is of vital significance and India has committed for land degradation neutrality at UNCCD 2019.

The current newsletter puts forth the types of degraded lands, their regeneration approaches and its role in guiding urbanization.

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SPA ENVIS MoEFCC

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ENVIS RESOURCE PARTNER ON HUMAN SETTLEMENTS AND THEIR IMPACT ON ENVIRONMENT

Centre For Environmental Studies School Of Planning And Architecture, New Delhi

Land Degradation and Its Management

Sponsored by:

Ministry of Environment, Forest and Climate Change, Government of India

Definition of Land Degradation:

Land is global environmental part that holds natural assets (aquatic portion, flora and topsoil) the natural geography, anthropological and progressions substructure and disbursements that function inside the ecosystem. However, Land degradation can be defined as long-term injury to ecosystem productivity and functioning initiated due to disturbances from which land and its components cannot recover . Land degradation is defined as a negative trend in land condition, caused by direct or indirect human-induced processes including anthropogenic climate change, expressed as long-term reduction or loss of at least one of the following: biological productivity, ecological integrity, or value to humans. Forest degradation is land degradation that occurs in forest land. Deforestation is the conversion of forest to non-forest land and can result in land degradation.

Fig 1: Land Degradation
Source: https://www.thenewsminute.com/

Land degradation affects people and ecosystems throughout the planet and is both affected by climate change and contributes to it. Currently, degradation of the Earth's land surface through human activities is negatively impacting the well-being of at least 3.2 billion people, pushing the planet towards a sixth mass species extinction, and costing more than 10 per cent of the annual global gross product in loss of biodiversity and ecosystem services. Land degradation is a multi-faceted and complex socio-environmental phenomenon wherein a land area loses some combination of biological productivity, economic productivity, and/or ecosystem functions and services. This loss is the result of interactions between biophysical and socio-economic determinants and factors operating at different spatial and temporal scales. The extent of global land degradation is uncertain. Projections range between 10-35 million km2 of land that has experienced some extent of degradation, which means that a conservative projection would indicate that 20 percent of all global land in use has been degraded.

Causes of Land Degradation:

The causes of land degradation can be classified into two major categories: proximate and underlying drivers . Proximate causes of land degradation are those drivers that directly affect the terrestrial ecosystem; these can be further subdivided into naturally occurring (biophysical) drivers and human-induced (anthropogenic) drivers. Underlying drivers are those which have indirect effects on proximate causes.

Biophysical drivers which result in land degradation include natural disasters (e.g., floods, landslides, etc.), severe and adverse climatic conditions (e.g. heavy rainfall), and non anthropogenic climate change (e.g. soil degradation as a result of a rise in air temperature).

Land degradation has been linked to biodiversity loss and climate change, both as a cause and an effect, while land degradation and climate change can form an ecologically disastrous feedback loop. Climate change aggravates land degradation by changing the spatio-temporal patterns of earth temperature, rainfall, solar radiation, and wind. One example of the results of this effect are the extended droughts which occur as a direct result of climate change, which in turn exacerbate land degradation in certain areas of the world. Moreover, CO2-induced climate change and land degradation are inextricably linked due to the mutual effects of precipitation and land degradation.

Anthropogenic drivers – such as unsustainable land use in general, overgrazing, over-cultivation and cultivation on steep slopes, mining, deforestation, ineffective management of water resources, pervasive use of certain agrochemicals, and population-related factors – are increasingly changing environments and causing unprecedented land degradation and depletion of natural resources.

Soil sealing – the loss of the ecological, permeable functions of soil due to covering land surface for housing, roads, or other construction – is a proximate and anthropogenic driver of land degradation that is highly linked to urbanization. It has become increasingly problematic due to the rapid expansion of the built environment, and is also linked to urban heat island effect and increased potential severity of extreme weather events such as flooding.

Global population growth – and in particular the growing global urban population – also places additional pressure on land resources for food production. This leads to soil erosion and the loss of arable lands for housing. Underlying drivers of land degradation with a direct link to urban lifestyles and governance include poverty, land tenure insecurity, population growth and density, market access, failing institutions, and a weak policy and regulatory environment in the environmental and agriculture sectors.

Types of Land Degradation

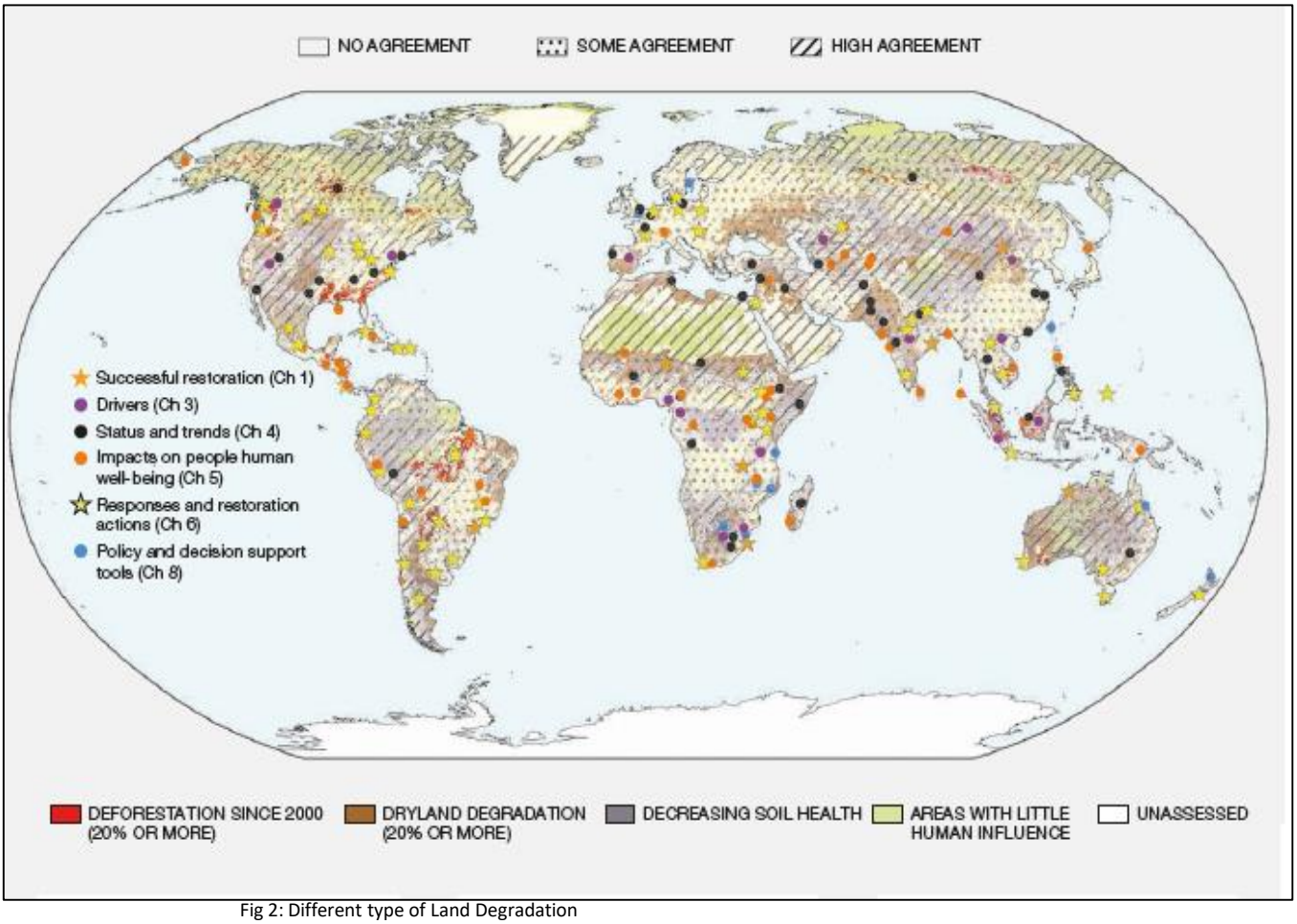

Fig 2: Different type of Land Degradation
Source: The Assessment Report on Land Degradation and Restoration

Land degradation may be caused by erosion, loss in soil organic matter, soil acidity, deforestation, desertification, salinization, soil compaction and such more phenomena that make agricultural land unfavourable for crop production .

Land degradation is a pervasive, systemic phenomenon: it occurs in all parts of the terrestrial world and can take many forms.

LAND ABANDONMENT can be caused by changes in economic conditions, policies or political circumstances, or by changes in the soil making it unsuitable for cropping.

BIODIVERSITY DEGRADATION results mainly from loss, deterioration or fragmentation of habitat (often underlain by other processes of land degradation, such as deforestation, rangeland degradation or freshwater degradation), and from overharvesting. Climate change and competition with alien invasive species are growing threats.

SOIL DEGRADATION includes loss of soil through erosion at a rate faster than it is formed; nutrient removal in harvest greater than it is replaced; depletion of soil organic matter, surface sealing, compaction, increasing salinity, acidity, metal or organic toxicity to the point where it cannot support former uses.

FOREST DEGRADATION is a reduction in the biomass, productivity or benefits from the forest.

DEFORESTATION is the direct human-induced conversion of forested land to non-forested land.

RANGELAND DEGRADATION involves persistent loss of vegetation productivity or cover, especially of those plants which support herbivores. It can be caused by climate change or by mismanagement.

FRESHWATER DEGRADATION includes reduction in the quantity or quality of water in rivers, lakes or aquifers, the loss of wetland habitats, and the loss of beneficial hydrological functions such as flood attenuation.

Land Degradation and its Effects:

Globally, about 60 percent of area is degraded. Furthermore, land degradation alters biogeochemical and hydrological cycles in earth . Land degradation is an ecological sensation that disturbing arid lands and effect the economic and natural excellence of an agronomic land . Other hand land degradation is a continuing deterioration of environment and production

Globally, degraded lands are approximately 18.1 million km2 in which 92 percent is due to mismanagement and 38 percent is due to overgrazing of animals . Overall, 20 percent of arable land, 30 percent forests and 10 percent grasslands are affected due to land degradation, affecting 1.5 billion people and it may be due to the result of different factors or combination of anthropogenic activities like climatic variations and unsustainable management of land . It occurs in the form of total loss in vegetative covers and loss of its economic productivity or biophysical by exposure of soil surface to water and wind erosion, and by water logging, soil and salinization, leading to decline in biological, chemical and physical soil properties. The continued vegetation loss due to human activities and salinization also depletes the biodiversity, and it decreases the capability of natural ecosystem for CO^2 sequestration with long-term influence of climate and global warming.

Continent	Total area	Degraded Area	Degraded (%)
Africa	14.33	10.46	73
Asia	18.81	13.42	71
Australia and the Pacific	7.01	3.76	54
Europe	1.46	0.94	65
North America	5.78	4.29	74
South America	4.21	3.06	70
Total	51.60	35.92	70

Fig3: Estimates of all degraded lands (in million km2) in dry areas
Source: Land Degradation: Its Control, Management and Environmental Benefits of Management in Reference to Agriculture and Aquaculture

The estimates of global extend of land degradation shows that Asia has highly affected and followed by Africa, Where as the Europe is the least effected. United Nations Development Program (UNDP) estimates $42 billion in income and 6 million hectares of productive land are lost every year. As per UNDP the conditions in Africa are worsening with dust storms, damaged water sheds, lost of forests and lower agriculture productivity, which is linked to human poverty, migration and instability .

It is estimated that 2.6 billion people are affected by land degradation and desertification in more than a hundred countries, influencing over 33% of the earth's land surface. The detailed degraded lands in dry areas as per the continents have been given in the below Table .

Global region	Period	Net loss hectare/year
South America	2000-2005	10.46
Africa	2000-2005	13.42
Oceania	2000-2005	3.76
North & Central America	2000-2005	0.94
Asia	1990s	4.29
Europe	1990s	3.06

Fig 4: An overview of deforestation figures around the globe
Source:Land Degradation: Its Control, Management and Environmental Benefits of Management in Reference to Agriculture and Aquaculture

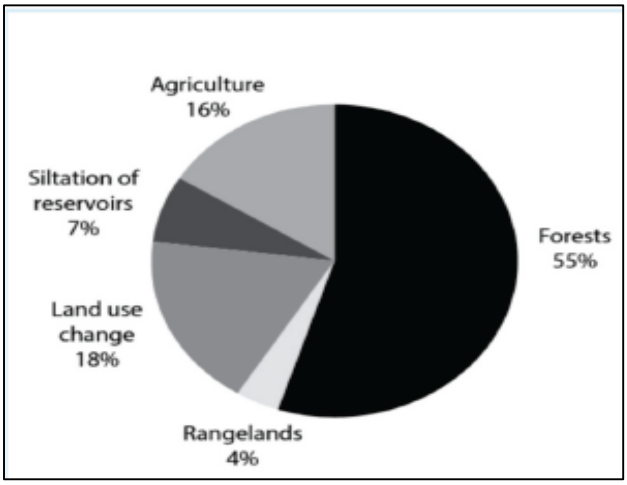

Fig 5: Distribution of the total costs of land degraded in India
Source: TERI 2018

The Energy and Resource Institute (TERI) in its recent study on economics of desertification and land degradation found that the cost of land degradation through various processes in India cost around 2.5 per cent of the country's GDP in 2014- 15. It also found that almost 82 per cent of the estimated cost is on account of land degradation, which indicates that it has severe adverse impact on food security and livelihood security of millions of people.

The study of TERI in 2018 estimated total investment required for reclamation of land degraded by five major processes namely water erosion, wind erosion, forest degradation, water logging and salinity. The study found that India requires Rs. 2948 billion (2014-15 price) to reclaim 94.53 mha degraded land as per newest survey of by SAC, Ahmadabad. This estimate analyses land degradation pattern between two surveys conducted in 2003 and 2011. In another estimate, the study analysed land degradation pattern based on three surveys conducted in 1995, 2003 and 2011 and calculated that India will require Rs. 3175 billion to reclaim 106.15mha degraded land by 2030.

Effect of land degradation on agriculture :

Land degradation is basically a huge worldwide issue due to its antagonistic influence on agriculture efficiency. It also has bad impact on ecological circumstance and nutritional safety. Globally above 20% of agricultural zones, 30% of plantations and 10% of savannas are effected by land degradation, this degradation caused by human actions like unmaintainable land managing and environmental deviations . About 50 percent of agricultural land are going to be degraded from moderately to severely. Land degradation effects about 1.5 billion humans globally, 15 billion tons' soil disappears every year, about 12 million ha- lost every year due to desertification and drought, about six million km2 dry lands leads towards desertification.

Effect of land degradation on Soil:

The effect of land degradation includes accelerated soil erosion by wind and water, soil acidification, soil alkalinisation, soil salination, soil water logging, destruction of the structure of soil. Soil erosion is the process of take up, transportation and deposited of soil from one place to another. The transportation media can be wind, water or ice. The main causes of increased erosion are industrial agriculture, deforestation and urban sprawl. Usage of tillage in industrial agriculture will remove the top vegetation and leads to erosion. Soil acidification is the effect of reducing the pH of soil. This can commonly by acids such as sulfuric acid, nitric acid, or compounds like aluminium sulfate or compounds from fertilizer nitrogen like ammonia. The major reason for soil acidity are from nitrogen leaching process, addition of excess nitrogenous fertilizers and build up of organic matter. If the water containing high amount sodium bicarbonate will increases the pH of the soil. Soil salination is a natural phenomenon, the soil with high level of salt, climate favourable accumulation and can be by human activities like aquaculture activities, land clearing or salting the road. Soil water logging, saturation of soil with water is another effect of land degradation. Irrigation can change the soil structure. The porosity can be blocked by clay during irrigation. High level of sodium content also can cause change soil aggregation.

Climate Change:

Loss of soil organic carbon is one of the principal signs of land degradation, and land degradation is one of the leading challenges for sustainable development, biodiversity conservation, and mitigating and adapting to climate change. When land is degraded, soil carbon can be released into the atmosphere, along with nitrous oxide, making land degradation one of the biggest contributors to climate change. An estimated two-thirds of all terrestrial carbon stores from soils and vegetation have been lost since the 19th century through land degradation. Agriculture, forest and other land-use sectors generate roughly a quarter of all anthropogenic greenhouse gas emissions.

Reduced productivity:

As the land quality reduced as effect of land degradation the productivity also reduces. Impacts of change in soil quality like erosion are leads to less productive land. Water erosion is most common phenomenon which is leading to low productivity of the land. As result of soil erosion the soil fertility gradually decreases.

Migration:

Land degradation will leads to migration of the people from are to another, especially the dry area to near place either for short term of long term. It can lead to suboptimal land-use and further degradation of land. It can also create social, economic and environmental imbalance.

Damage to basic resources and ecosystems:

Land is a non renewable resource, by degrading it creating damage to the basic resource and ecosystem by changing the quality of the land, temporarily or permanently, creating an imbalance to the eco system. The leached nitrogen can contaminate the water sources can make it as non drinkable as high level of nitrate or it can leads to development of phytoplankton on excess level, and then reduces the dissolved oxygen level.

Food insecurity:

Land degradation will leads to reduction in productivity or turn the land in to non productive land. As the problem is more common in developing countries, increasing population along with reduced productivity will leads to food insecurity.

Loss of biodiversity:

In dry lands, land degradation is known as desertification. The process like deforestation and desertification process will leads to loss of flora and fauna. Most of the species cannot adapt in to new modified environment. Change in pH of the soil can leads to destruction of the microbes in the soil really needed for the fertilization process of the soil. Recent estimates of the global loss of ecosystem services due to land degradation and desertification are between US$ 6.3 and 10.6 trillion annually.

Adaptation:

The person needs to adapt in to the new environment as consequence of land degradation. The availability of resources such as water, land will be reduced as result of degradation process.

Process of Degradation	Area under Desertification (mha)							
	2011-13				2003-05			
	Arid	Semi-Arid	Sub-Humid	Total	Arid	Semi-Arid	Sub-Humid	Total
Vegetation Degradation	2.86	13.48	6.65	22.99	2.81	13.39	6.34	22.54
Water Erosion	3.03	17.51	8.97	29.51	3.12	17.07	8.91	29.1
Wind Erosion	17.63	0.56	0	18.19	17.72	0.57	0	18.29
Salinity/Alkalinity	2.52	0.86	0.09	3.47	2.52	1.07	0.21	3.8
Water Logging	0.02	0.08	0.31	0.41	0.02	0.08	0.25	0.35
Mass Movement	0.84	0.11	0	0.95	0.76	0.11	0	0.87
Forest Shattering	2.94	0.46	0.01	3.41	2.74	0.43	0.01	3.18
Man Made	0.04	0.14	0.16	0.34	0.04	0.14	0.14	0.32
Barren	0.25	0.28	0.05	0.58	0.25	0.28	0.05	0.58
Rocky	0.3	0.97	0.02	1.29	0.29	0.97	0.02	1.28
Settlement	0.11	0.93	0.44	1.48	0.07	0.75	0.33	1.15
Grand Total	**30.54**	**35.38**	**16.7**	**82.62**	**30.34**	**34.86**	**16.26**	**81.46**

Fig 6 : Land Degradation in India
Source: Regeneration of Degraded Land in India: Challenges and Possibilities

Land Degradation in India:

According to a latest publication of ISRO, about 29.32 per cent of total 328.72 mha geographical area of India is affected by land degradation. It accounts for 96.4 mha of forest, non-forest and agriculture land spread across the country. Disturbingly, the total degraded land has increased to this level in 2011-13 from 94.53mha in 2003-05. In these eight years, 1.87 mha more land degraded or deserted due to various reasons.

The 'Desertification and Land Degradation Atlas of India' published by the Space Application Centre (ISRO) published in 2016 reveals that about 24 per cent of desertification/land degradation with respect to total geographical area is contributed by nine states namely Rajasthan, Maharashtra, Gujarat, Jammu and Kashmir, Karnataka, Jharkhand, Odisha, Madhya Pradesh and Telangana. State specific analysis shows that more than 50 per cent land of states like Jharkhand, Rajasthan, Delhi, Gujarat and Goa is under desertification/land degradation. Kerala, Assam, Mizoram, Haryana, Bihar, Uttar Pradesh, Punjab and Arunachal Pradesh have shown less land as compared to their total geographical area under desertification/land degradation in the Atlas. Total land degradation in India is given in the table.

Land Regeneration Initiatives in India:

❑ **Soil and Water Conservation under DPAP and DDP since the 1970s :**

The Drought Prone Area Development (DPAP) was one of the first development programmes launched to address the problems of a specific area such as dry lands. Launched in 1973-74, the programme was set up to reduce the effects of drought on fragile ecosystems and vulnerable populations. The Desert Development Plan (DDP) was set up to combat desertification and restore ecological balance in the desert areas of the country like Rajasthan, Gujarat and Himachal Pradesh.

❑ **The National Wasteland Development Board, 1985 :**

The National Wastelands Development Board (NWDB) was set up under the Ministry of Forests and Environment in 1985 in order to address land degradation, restoration of ecology and meet the increasing demand of fuel wood and fodder at the national level. As per the NWDB, wastelands were divided into 2 categories-culturable and unculturable. The board was implemented for bringing to health degraded forests and non-forest (culturable) wastelands specifically. The mission was to restore 5mha of wastelands annually by planting trees.

❑ **National Watershed Development Program since 1990s :**

The National Watershed Development Program for Rain fed Areas was launched in 1990-91 under the Ministry of Agriculture. The scheme was set up to address conservation, development and sustainable management of natural resources. Increasing agriculture production in a sustainable manner was also part of the scheme as well as greening and restoring the ecological balance in degraded rainfed eco-systems.

❑ **Social Forestry and Joint Forest Management Programs since 1990s :**

While the idea of social forestry had been around since pre-independence time in India, it originated formally in 1976 with a report by the National Commission of Agriculture. The forest policy saw a radical change with the new forest policy in 1988, when joint forest management and integrated forestry came into the purview.

The area covered by JFM in 2010 was approximately 24.6 million ha, which is about 30% of the forest cover of the country with around 99 lakh beneficiaries participating. In several states, almost 3/4th of the forest cover was under JFM such as Jharkhand (72.94%), Bihar (71.42%) and Madhya Pradesh (70.62%)56.

❑ **Green India Mission, 2014 :**

The Green India Mission (GIM) is one the eight missions outlined under the National Action Plan on Climate Change (NAPCC). It the newest mission included in the Action Plan in 2014. This scheme was proposed for 10 years. It aims at protecting; restoring and enhancing India's diminishing forest cover and responding to climate change by a combination of adaptation and mitigation measures. The Green India mission seeks to converge with other sub missions of NAPCC and related national schemes, programs and missions.

❑ **Compensatory Afforestation Fund Management and Planning Authority (CAMPA) :**

The CAMPA authority created in 2001 by the Supreme Court to manage fund collected towards compensatory afforestation. For last two decades, the collected CAMPA fund remains largely un-utilized and in some case it was diverted for other purposes. The NDC committed by the country aspire to create more forest in order to sink 2.5 to 3 billion tons of carbon dioxide by the year 2030. According to some expert, to achieve this target, India needs to create nearly 30 mha forest over and above the existing forest land mass of 75 mha. However, the green India mission targets to generate only 5 mha new forest.

❑ **Mahatma Gandhi National Employment Guarantee Scheme (MG-NREGA)**

The Mahatma Gandhi National Rural Employment Guarantee Scheme has evolved as a major program for regeneration of natural resources in the rural part of India. While this program guarantees 100 days of unskilled job per year for every rural household, it also has played crucial role in creating individual and community level rural assets. These assets are largely constructed to re-generate local natural resources.

❑ **Digital India Land Record Modernization Program and State Land Reforms :**

The Digital India Land Records Modernization Program (DILRMP) was initiated in 2006- 2007 with the aim of introducing "conclusive titling" in India and is under implementation since 2008 following the merger of two earlier schemes, namely, 'Computerization of Land Records (CLR)' and 'Strengthening of Revenue Administration and Updating of Land Records (SRA & ULR).' The main aims of DILRMP are to usher in a modern and updated system of land records which leads to a minimum scope of land/property disputes, enhance transparency in the land records maintenance system, and facilitate moving eventually towards guaranteed conclusive titles to immovable properties in the country. The district has been taken as the unit of implementation, where all program activities are to converge.

Urbanization and Land Degradation:

One of the biggest challenges facing sustainable development is found in preparing for the doubling in size of the urban population during the period between 2010-2050; cities around the world will incorporate 2.4 billion additional urban inhabitants by 2050. Currently, it is estimated that about 200,000 people migrate from rural areas to cities in all around the world every day. the relationship between urban areas and land degradation is highly complex, as urban areas represent both a cause and an effect. Urbanization and urban lifestyles are directly impacting some proximate causes of land degradation (e.g. increasing GHG emissions), and are also highly linked to several underlying drivers of land degradation; drivers such as migration, poverty, market access and failing institutions and regulatory frameworks are all occurring to varying degrees within cities.

Global concern around the requirements for sustaining 'life on land' has been signaled by the inclusion of SDG 15 in the 2030 Agenda for Sustainable Development. Achieving this global goal requires a paradigm shift which recognize the increasing rights and responsibilities of cities in the 21st century. This new paradigm must acknowledge urban activities as a "meta-underlying driver" of land degradation and consider local and regional governments as key allies in minimizing land degradation and restoring affected land areas.

Role of Local and Regional Institutions :

Land is not a renewable resource, and the preservation of land resources is closely linked to governance patterns and management practices at all levels of government. In order for land degradation to be halted and reversed, active engagement of all stakeholders is required. Local and regional governments can play a pivotal role by utilizing a number of cross-cutting policy levers and planning strategies. Integrating sustainable land management (SLM) principles into planning can effectively contribute to a reduction in land degradation. For example, local governments can promote urban agriculture to produce food within cities, and as such, reduce the pressure on farmlands in rural areas, therein resulting in less land degradation.

1.Compensatory Afforestation Fund Management and Planning Authority (CAMPA)

Guidelines for compact city planning and smart growth can be mainstreamed into urban and regional planning. These principles can prevent and decrease the transformation of arable lands in peri-urban areas, can reduce the extent of soil sealing which occurs as a result of the expansion of the built environment, and can revitalize previously degraded brownfield areas.

2. **A landscape-level approach** is an integrated planning and decision making method which is increasingly understood as a set of principles and approaches toward expanding food production and security, conserving ecosystems and environment, alleviating poverty, and coping with natural disasters caused by climate change.

Landscape-level approaches are aimed at proper allocation and management of land in areas where productive land uses (e.g. agriculture, mining, etc.) compete with environmental and biodiversity goals. This allows for achievement of socio-economic objectives without compromising ecological integrity . In that regard, local and regional governments can utilize the approach to balance the provision of land-based goods and services with the conservation of natural ecosystems and land that are pivotal to halting land degradation.

3. A number of additional strategies, such as **sustainable urban transport** and increasing the energy derived from renewable sources, have the added benefit of reduced GHG emissions. This can mitigate climate change and reduce the frequency and severity of proximate natural causes of land degradation.

4. **Urban and rural areas are highly interdependent** and increasingly integrated. They form a complex set of linkages, such as labour market flows and environmental services, and represent an important strategy for tackling land degradation.

5. A rural-urban partnership – defined by the OECD (2013) as mechanisms of cooperation that manage urban-rural linkages to achieve common goals and more desirable and sustainable regional development – can help fight poverty and prevent forced rural out migration. These have been successfully practiced in a number of countries, including Japan, Australia and Germany.

Rural-Urban partnerships can lead to a range of benefits at various scales of government, including: increased government capacity for executing policy; the creation of a development and land use policy that supports landscape preservation; sustainable management of natural resources; and larger and more integrated markets . More integrated markets can increase employment in rural areas, which in turn can reduce forced migration by safeguarding the capability to earn a livelihood. This can lead to less pressure on urban lands and reduced urban expansion and informal settlement, all of which contribute to land degradation.

Compact City Planning & Smart Growth: Nagpur

Nagpur, India, is a 2.4 million inhabitant urban agglomeration. A recent study indicated that approximately 36 percent of Nagpur's population resides in informal settlements, often in-and-around Nagpur's peri-urban agricultural and forest lands. In order to promote greater inclusivity, as well as safeguard its natural assets, Nagpur has developed a smart growth strategy that emphasizes compact, mixed-use planning on all publicly owned land and advances sustainable urban transport in the form of two metro-line corridors. These initiatives deter future land degradation by encouraging the redevelopment of core city areas, promoting mixed-use development along the transportation corridors, and providing affordable movement options for those living in informal settlements.

Rural-Urban Partnerships: Nuremberg Metropolitan Region

The Nuremberg Metropolitan Region (NMR) in Germany encompasses a set of contiguous administrative districts, 11 urban and 22 rural, and is seen as a leading example of a successful rural-urban partnership. In the NMR partnership, the links between rural and urban areas in common economic activities focus on agriculture and food production. The partnership produces observed benefits including: enhanced local productive linkages; better management of natural resources; economies of scale; increased political significance, financial resources and better dialogue with other government levels; improved quality, access or economic viability of services' provision; improved local government capacity to carry out tasks; and aligned priorities for economic development.

Land degradation is driven by multi-scalar and temporally dynamic processes, and as such, the scale and level at which strategies to halt land degradation are planned and executed are extremely important. Land degradation processes operating at larger spatial scales interact with those operating at smaller scales; accordingly, in order to deal with land degradation at the global level, need to encourage conscientious actions at the local level.

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