

JNU ENVIS RP ON GEODIVERSITY &
IMPACT ON ENVIRONMENT

Repository of
Environmental Knowledge
**TOPOLOGY, SOIL &
LAND USE PATTERN**



सत्यमेव जयते



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Abstract

Repository of Environmental knowledge on Topology, Soil & Land Use Pattern contains latest information and knowledge base for research and policy issues. This report contains information about International Protocols, Conventions and Agreements. It also includes national rules, regulations, and legislations applicable in India. Current research papers on Topology, Soil & Land Use Pattern from 2016 – 18 has been included. Important case studies and success stories also finds place in this report. Some important and basic free e-books, Mobile Apps, Videos, Photograph have been included. Directory containing important contact number and e-mails has been included in this report.

International Protocols, Convention, Agreements, & Key Institutions

- 1. UNITED NATIONS CONVENTION TO COMBAT DESERTIFICATION**
https://www.unccd.int/sites/default/files/relevant-links/2017-01/UNCCD_Convention_ENG_0.pdf
- 2. Land Use, Land-Use Change and Forestry (LULUCF), UNFCCC**
Source: UNFCCC, <https://unfccc.int/topics/land-use/workstreams/land-use--land-use-change-and-forestry-lulucf>
- 3. Intergovernmental Technical Panel on Soils (ITPS), FAO**
<http://www.fao.org/global-soil-partnership/intergovernmental-technical-panel-soils/en/>
- 4. IUCN WCEL Soil, Desertification, and Sustainable Agriculture Specialist Group.**
<https://www.iucn.org/commissions/world-commission-environmental-law/our-work/specialist-groups/soil-desertification-and-sustainable-agriculture>
- 5. Convention on Biological Diversity (Soil & Land Biodiversity)**
<https://www.cbd.int/>
- 6. Intergovernmental Technical Panel on Soils (ITPS)**
<http://www.fao.org/global-soil-partnership/intergovernmental-technical-panel-soils/en/>
- 7. Revised World Soil Charter**
<http://www.fao.org/3/a-i4965e.pdf>

Key international Institutions:

1. Food and Agriculture Organization of the United Nations (FAO)
2. Land Resources, Management, Planning and Use (FAO)
3. Commission on Genetic Resources for Food and Agriculture
4. Bioversity International
5. World Agroforestry Centre
6. Ecoagriculture Partners
7. The Global Crop Diversity Trust
8. International Center for Agricultural Research in the Dry Areas (ICARDA)
9. International Federation of Organic Agriculture Movements (IFOAM)

National Rules, Regulation, Legislation and Guidelines

- 1. THE RIGHT TO FAIR COMPENSATION AND TRANSPARENCY IN LAND ACQUISITION, REHABILITATION AND RESETTLEMENT (Removal of Difficulties) Order, (The Gazette of India, 2015)**
<http://dolr.gov.in/sites/default/files/RFCTLARR%20%28Removal%20of%20Difficulties%29%20Order%2C%202015.pdf>
- 2. Compensation, Rehabilitation and Resettlement and Development Plan Rules, 2015 (The Gazette of India, 2015)**
http://dolr.gov.in/sites/default/files/THE-GAZETTE-OF-INDIA-EXTRAORDINARY%20_0.pdf
- 3. RFCTLARR (Social Impact Assessment and Consent) Rules 2014**
http://dolr.gov.in/sites/default/files/RFCTLARR%20%28SIA%20and%20Consent%29%20Rules%202014_1.pdf
- 4. THE RIGHT TO FAIR COMPENSATION AND TRANSPARENCY IN LAND ACQUISITION, REHABILITATION AND RESETTLEMENT ACT, 2013 No. 30 or 2013 (The Gazette of India, 2013)**
<http://dolr.gov.in/sites/default/files/Right%20to%20Fair%20Compensation%20and%20Transparency%20in%20Land%20Acquisition%2C%20Rehabilitation%20and%20Resettlement%20Act%2C%202013.pdf>
- 5. National Rehabilitation & Resettlement Policy, 2007**
<http://dolr.gov.in/sites/default/files/National%20Rehabilitation%20%26%20Resettlement%20Policy%2C%202007.pdf>
- 6. INDIA NATION ACTION PROGRAMME TO COMBAT DESERTIFICATION (2001)**
<http://www.moef.nic.in/sites/default/files/national-action-programme-to-combat-desertification.pdf>
- 7. Land Acquisition (Companies) Rules, 1963**
<http://dolr.gov.in/sites/default/files/LAND%20ACQUISITION%20RULES.pdf>
- 8. The Registration Act, 1908**
<http://dolr.gov.in/registration-act-1908>
- 9. Land Acquisition Act, 1894**
<http://dolr.gov.in/sites/default/files/THE%20LAND%20ACQUISITION%20ACT.pdf>

Research Papers / Publications

1. **2030 Agenda for Sustainable Development: implications for the United Nations Convention to Combat Desertification,**
https://www.unccd.int/sites/default/files/inlinefiles/ICCD_COP%2813%29_L.18-1716078E_0.pdf
2. **Quantifying the contribution of land use land cover changes (LULC) and climate change on hydrological processes over India (2018)**
By: Nikhil Ghodichore et al.,
<https://adsabs.harvard.edu/abs/2018EGUGA..20.8487G>
3. **Plant cover and management practices as drivers of soil quality (2018)**
S.C.Panico et al.,
<https://www.sciencedirect.com/science/article/pii/S092913931830266X>
4. **Land Matters for Climate Reducing the Gap and Approaching the Target, Flyer, UNCCD, 2017.**
https://www.unccd.int/sites/default/files/relevant-links/2017-01/2015Nov_Land_matters_for_climate_FLYER_ENG_0.pdf
5. **Climate change and desertification, UNCCD thematic fact sheet series No. 1. (2017)**
https://www.unccd.int/sites/default/files/relevant-links/2017-01/Desertificationandclimatechange_0.pdf
6. **The scientific conceptual framework for land degradation neutrality Synthesis report by the Science-Policy Interface, CoP 13, Committee on Science and Technology (2017)**
https://www.unccd.int/sites/default/files/sessions/documents/2017-07/ICCD_COP%2813%29_CST_2-1710707E.pdf
7. **Voluntary Guidelines for Sustainable Soil Management (2017)**
<http://www.fao.org/documents/card/en/c/5544358d-f11f-4e9f-90ef-a37c3bf52db7/>
8. **Assessment, Restoration and Reclamation of mining Influenced Soils(2017)**
Edited by: Jaume Bech et al.,
<https://www.sciencedirect.com/book/9780128095881/assessment-restoration-and-reclamation-of-mining-influenced-soils#book-description>
9. **Historical carbon dioxide emissions caused by land-use changes are possibly larger than assumed (2017),**
By: A. Arneth et al.,
<https://www.nature.com/articles/ngeo2882>
10. **Dynamics and determinants of land change in India: integrating satellite data with village socioeconomics (2017)**
By: Prasanth Meiyappan
<https://link.springer.com/article/10.1007/s10113-016-1068-2>

- 11. An assessment of the global impact of 21st century land use change on soil erosion (2017), By: Pasquale Borrelli**

<https://www.nature.com/articles/s41467-017-02142-7>

- 12. Achieving Land Degradation Neutrality at the country level Building blocks for LDN target setting, UNCDD, 2016.**

https://www.unccd.int/sites/default/files/documents/18102016_LDN%20country%20level_ENG.pdf

- 13. Desertification & Land Degradation Atlas of India (2016)**

http://www.moef.gov.in/sites/default/files/Desertification_Atlas_2016_SAC_ISRO.pdf

Success Stories

- 1. Global Soil Partnership for Food Security & Climate Change Mitigation and Adaptation**

Source: Food & Agriculture Organisation

<http://www.fao.org/docrep/016/ap404e/ap404e.pdf>

- 2. Unlocking The potential of Soil Organic Carbon (2017)**

<http://www.fao.org/3/i7268en/I7268EN.pdf>

- 3. Be the solution to soil pollution (2018)**

<http://www.fao.org/documents/card/en/c/CA0362EN>

- 4. Wastelands Atlas of India, Change Analysis Based on Temporal Satellite Data of 2005-06 and 2008-09 (2011)**

http://dolr.gov.in/sites/default/files/Wastelands_Atlas_2011.pdf

- 5. Changing Rural Lives through watershed Development –Integrated Watershed Management Programme (2015)**

<http://dolr.gov.in/sites/default/files/Changing%20Rural%20Life%20through%20Watershed%20Development%20-%20IWMP%20-%20Compressed.pdf>

Case Studies

1. **Status of the World's Soil Resources: Main Report (2015)**
<http://www.fao.org/documents/card/en/c/c6814873-efc3-41db-b7d3-2081a10ede50/>
2. **Valuing the Biodiversity of Dry and Sub-Humid Lands(2013)**
Source: Convention on Biological Diversity
<https://www.cbd.int/doc/publications/cbd-ts-071-en.pdf>
3. **CAN CARBON (SOC) offset the Climate Change (2015)**
<http://www.fao.org/3/a-bl100e.pdf>
4. **LAND USE PLANNING AND MANAGEMENT PROJECT ,Tamil Nadu (2016)**
http://lupm.urban-industrial.in/live/hrdpmp/hrdpmaster/igep/content/e65513/e65664/e65685/e66012/TN_Demonstration_Area_Proposal_Report.pdf
5. **LAND USE PLANNING AND MANAGEMENT PROJECT ,Odisa (2016)**
http://lupm.urban-industrial.in/live/hrdpmp/hrdpmaster/igep/content/e65513/e65664/e65685/e66013/17.01.24_ODDemonstrationProjectAProposal_SC.pdf
6. **IMPACT AND EFFECTIVENESS OF “WATERSHED DEVELOPMENT PROGRAMMES” IN INDIA**
<http://dolr.gov.in/sites/default/files/Impact%20and%20Effectiveness%20of%20WDP%20by%20LBSNAA.pdf>

E-Books

1. **A Better World, Actions and commitments to the Sustainable Development Goals, Vol4, (2018)**
http://catalogue.unccd.int/992_Better_World_Tudor_Rose_publication.pdf
2. **The Global Soil Biodiversity Atlas**
Source: Global Soil Biodiversity Initiative & European Commission Joint Research Center
<http://atlas.globalsoilbiodiversity.org/>
3. **Land Degradation and Desertification (2017)**
<https://www.intechopen.com/books/land-degradation-and-desertification-a-global-crisis>
4. **Land Use, Land Cover and Soil Sciences**
Source: UNESCO-EOLSS
<https://www.eolss.net/Land-Use-Land-Cover-Soil-Sciences.aspx>

5. **Principles and Practice of Soil Science The Soil as a Natural Resource**
By: Robert E. White
<https://www.pdfdrive.com/principles-and-practice-of-soil-science-the-soil-as-a-natural-resource-e34478756.html>
6. **Fundamentals of Soil Sciences**
By: Henry Foth
<https://www.pdfdrive.com/fundamentals-of-soil-sciencepdf-e33410601.html>
7. **IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry(2004)**
Source: IPCC
<https://www.pdfdrive.com/ipcc-good-practice-guidance-for-land-use-land-use-change-and-e5941925.html>
8. **Land Use Planning**
GIZ (2012)
<https://www.pdfdrive.com/land-use-planning-giz-e8369403.html>

Important Mobile App

1. **Soilinfo App – Android compatible app**
<https://play.google.com/store/apps/details?id=org.isric.soilinfo>
2. **Soil Sample Collector- Android compatible app**
<https://play.google.com/store/apps/details?id=com.krsac.localtilearc>
3. **Soil Sampler - Android compatible app**
<https://play.google.com/store/apps/details?id=com.noframe.farmissoilsamples>
4. **Soil Classification- Android compatible app**
<https://play.google.com/store/apps/details?id=summer14.manparvesh.soil12>
5. **Digital Soil Health Card- Android compatible app**
<https://play.google.com/store/apps/details?id=org.kvksambalpur.myapplication>
6. **Soil Structure Assessment- Android compatible app**
<https://play.google.com/store/apps/details?id=com.lvdigital.fga>

Videos

1. "Drought resilience – instant responses and long-term solutions"

Source: United Nations Convention to Combat Desertification (2017)

<https://www.unccd.int/issues/land-and-drought>

2. Intergovernmental Technical Panel on Soils -- boosting sustainable soil management

<https://www.youtube.com/watch?v=aunmD28Vlgw&feature=youtu.be>

3. Soil Solutions to Climate Problems

Source: Center for Food safety

<https://www.youtube.com/watch?v=BxiXJnZraxk>

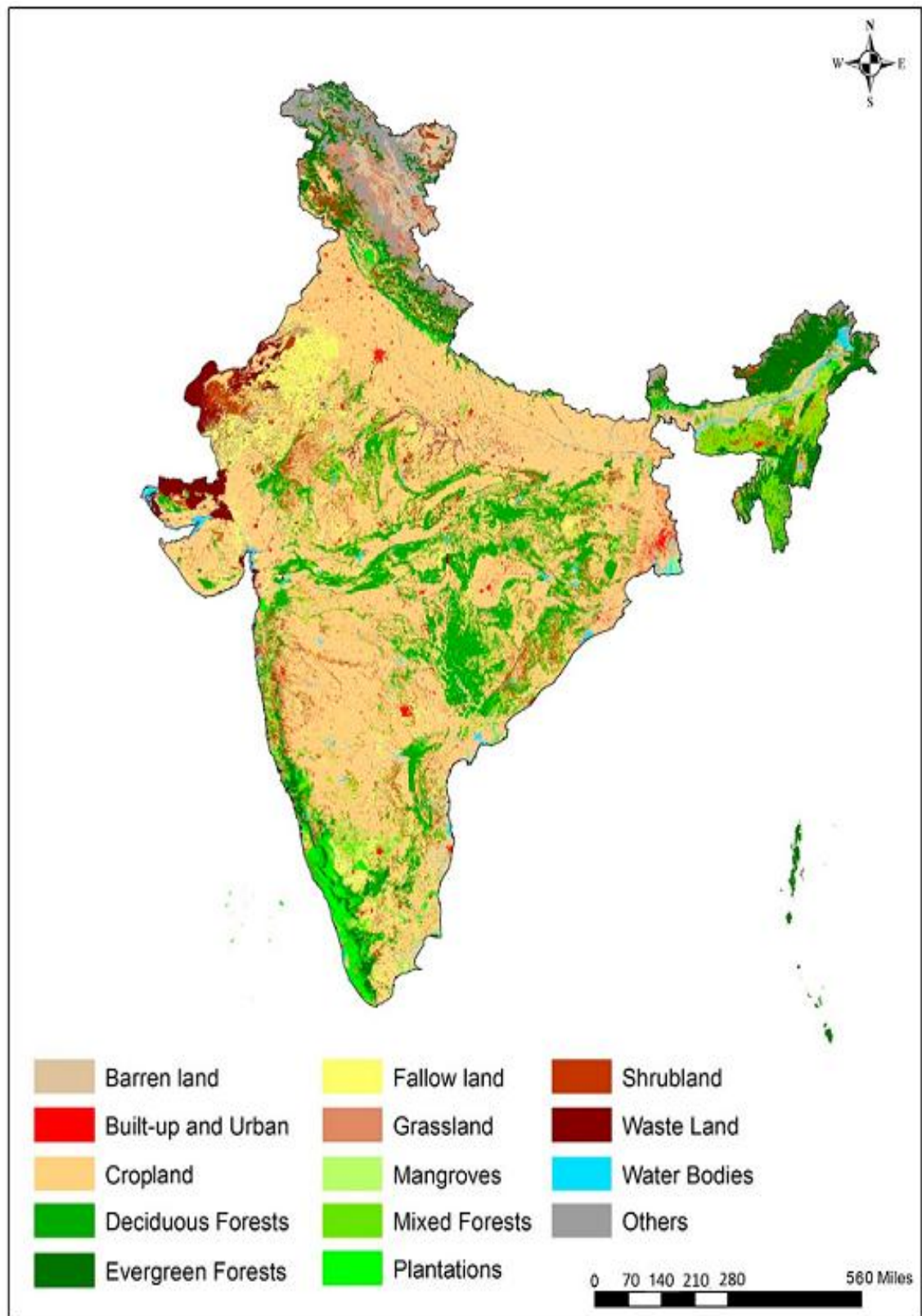
4. Soil Pollution a Hidden reality

https://www.youtube.com/watch?time_continue=13&v=wHcY-iFSYZM

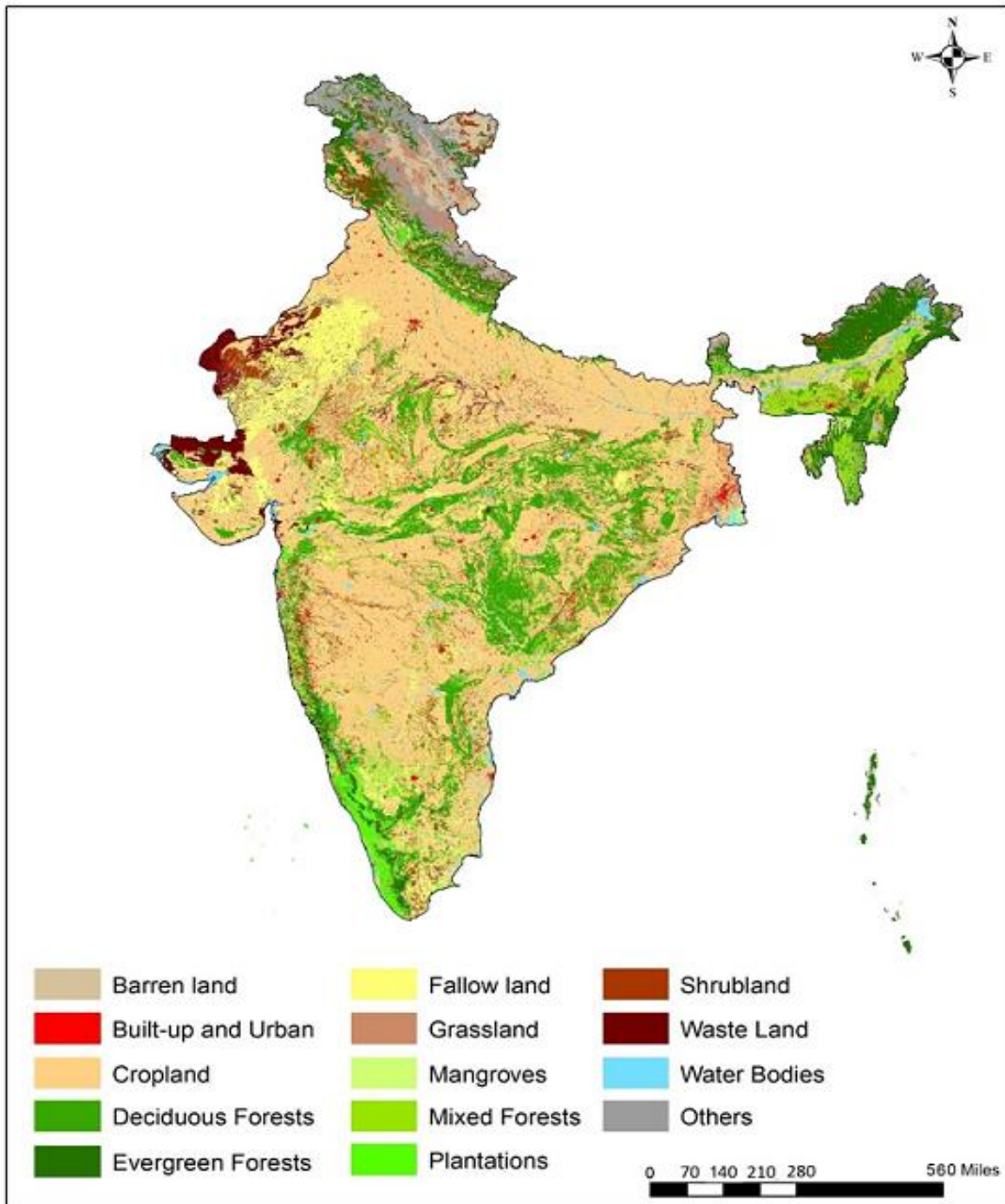
5. Sustainable soil management: A major step in achieving the Sustainable Development Goals

https://www.youtube.com/watch?time_continue=14&v=7cJdyL78JsM

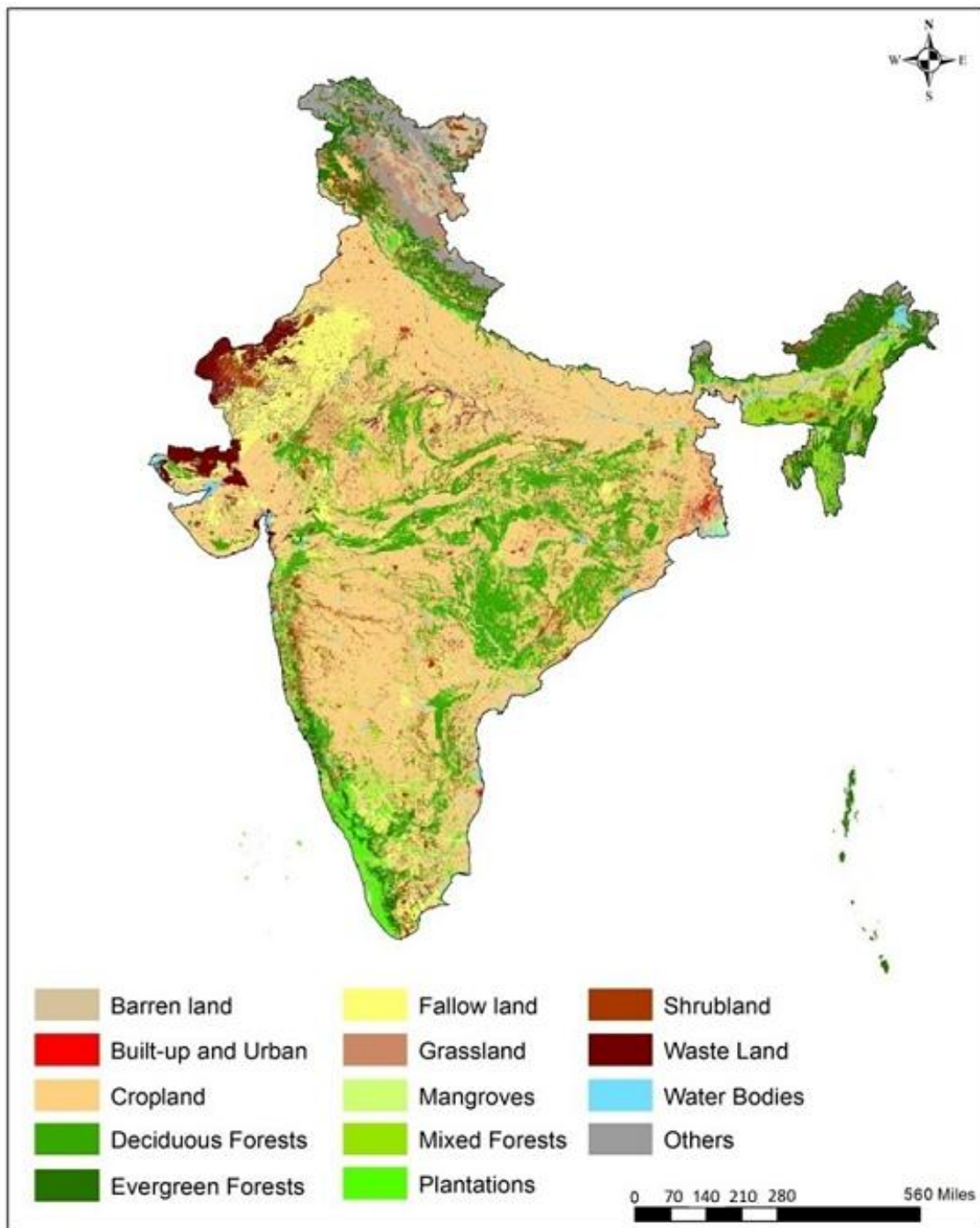
Photographs & Maps



Source: Land use and land cover map of India for 2005 (Roy et al., 2015)



Source: Land use and land cover map of India for 1995 (Roy et al., 2015)



Source: Land use and land cover map for 1985 (Roy et al., 2015).

Upcoming Conferences

1. **9th Working session of the International Technical Panel on Soils (ITPS)**
09-12 October 2018 | Rome, Italy
2. **Fourth workshop of the International Network of Soil Information Institutions Meeting**
23-25 October 2018, FAO Headquarters, Rome, Italy
3. **International Conference on Recent Trends in Agriculture, Environment & Life Sciences**
2nd November 2018, Mysore, India
4. **2nd International Conference on Sustainable Development**
21st November 2018, Meghalaya, India
5. **World Soil Day 2018: Be the Solution to Soil Pollution!**
5 December 2018, FAO Headquarters, Rome, Italy
6. **4th Open Science Meeting : Transforming Land Systems for People and Nature**
24th -26th April 2019, Bern, Switzerland

Skill Development Programmes

1. **Skill development programme on soil health, Indian Agriculture Research Institute**
<https://icar.org.in/content/skill-development-programme-soil-health-0>
2. **Plantation Techniques and Utilization of Renewable Energy in Arid Zone**
ICAR-CAZRI, Jodhpur
3. **Pollution Monitors :Soil, NBRI, Lucknow**

Directory of Resource Persons

| S. No. | Name & Designation | Organization | Disciplines | Details |
|--------|---|--|--|---|
| 1. | Dr. V. M. Arora Director DDP | Government of Uttar Pradesh | Watershed, Management, Combatting desertification, Drought Proofing, Rural Livelihoods | Vm.arora@nic.in Current: vasumitra1958@gmail.com Phone: 24364602, 24102770,24364602 Fax:0522-2206053 |
| 2. | Dr.V.P. Tewari | Institute of Wood Science And Technology, Banglore | Natural Resources Management, Physical Sciences , Ecology, Other | vptewari@icfre.org vptewari@yahoo.com Phone: 080-22190199 / 0949022769 Fax: +91-80-23340529 |
| 3. | Dr. P K Das | Indian Council of Forestry Research and Education, Ministry of Environment and Forests, Dehradun | Soil Sciences, Natural Resources Management, Education, Agriculture Science | daspk@icfre.org pradyot2008@gmail.com Phone: 09401386511 / 0376 2305521 Fax: 0376 2350274 |
| 4. | Dr. R.P. Pandey | National Institute of Hydrology, Ministry of Water Resources, Roorkee | Hydrology, Agriculture Engineering, Meteorology, Land use Planning, Conservation | rpp@nih.ernet.in rppanndey@gmail.com Phone: 09412160391, 01332-249216/276220 Fax: +911-332-272123 |
| 5. | Mr. B.M.S Rathore | Joint Secretary, Ministry of Environment and Forests, New Delhi | Ecology, Natural Resources Management, Information Systems, Other | bms.rathore@nic.in Phone: 011-24361774 Fax: 011-24367009 |
| 6. | Mr. Vivek Saxena | DIG, Ministry of Environment and Forests, New Delhi | Natural Resources Management, Agricultural Science, Political Science, Education | viveksax1@gmail.com Phone: 011- 24362065 Fax: 011-24362065 |
| 7. | Dr. T P Singh ADG(Forest & Climate Change) | Assistant Director General (Forest & Climate Change) | Natural Resources Management, Economics, Education, Information Systems | tpsingh@icfre.org , tpsingh_ifs@yahoo.com |

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|-----|------------------------------------|---|---|--|
| | | Indian Council of Forestry Research and Education, Ministry of Environment and Forests, Dehradun | | adg_fcc@icfre.org 0135-2224823/2755399 Fax: +91-135-2750296 |
| 8. | Dr Saibal Dasgupta DDG(EXTN) | Deputy Director General (Extn.) Indian Council of Forestry Research and Education, Ministry of Environment and Forests, Dehradun | Natural Resources Management, Participatory Approaches to Development in Forestry, Human Resources Development, Use of Remote Sensing and GIS in Forestry | ddg_extn@icfre.org saibaldasgupta@hotmail.com Phone: 0135-2750693/2224830 Fax: +91-135 2750693 |
| 9. | Dr. Ventakeswarlu Bandi | Director, Central Research Institute for Dryland Agriculture (CRIDA) | Natural Resources Management, Agriculture Sciences, Soil Sciences, Atmosphere Sciences | vbandi_1953@yahoo.com director@crida.in Phone: 04024530177/ 09652988265 |
| 10. | Dr. V.N.S. Prasad Jasti | Principal Scientist, Central Research Institute for Dryland Agriculture (CRIDA) | Agriculture Science, Natural Resources Management, Soil Science, Ecology | jasti@crida.in jasti2008@gmail.com Phone: 040-24530177 Fax: 040-24531802 |
| 11. | Dr. Venkatasamy Venkatasubramanian | ADG (Agriculture Extension) ICAR, Ministry of Agriculture | Education, Animal Science, Anthropology, Natural Resources Management | vsmn@yahoo.com Phone: 011-25843279, 09999605152 Fax: +91-11-25843279 |
| 12. | Dr. Arunacham Ayyandar | Principal Scientist ICAR, Ministry of Agriculture | Natural Resources Management, Ecology, Agriculture Sciences, Plant Sciences | arun70@gmail.com arun.icar@nic.in Phone: 9212441230/011-23385065/23386711 Fax: +91-11-23384773 |
| 13. | Dr. Naveen Kumar Bohra | ARID Forest Research Institute | Climate Change and its effect, Biodiversity Conservation, Nursery Technology, Medicinal Plant and Propagation | bohrank@rediffmail.com Phone: 0291-2785657 |

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|-----|--------------------|---|---|--|
| 14. | Dr. Ramesh Kumar | Soil and Land Use Survey of India, Deptt. of Agriculture & Cooperation, Ministry of Agriculture | Soil Science, Natural Resource Management , Other | rkumar.sharma@nic.in csso-slusi@nic.in Phone: 011 25841263 Fax: 011 25843811 |
| 15. | Dr. T.N. Manohara | Rain Forest Research Institute | Plant Science, Natural Resource Management, Ecology, Soil Science | manohara_tn@yahoo.com manoharatn@icfre.org Phone: +91-94353 51304(M), +91 376 2305168(O) Fax |
| 16. | Dr. Nalam Sudhakar | Zonal Project Director (Zone V), ICAR, Central Research Institute for Dryland Agriculture (CRIDA) | Agronomy (crop production, water management, weed control and arid agriculture) | zcu5hyd@gmail.com zcu5hyd@yahoo.com nalamsudhakar@yahoo.com Phone:9104024530300 & 9849694940 Fax: 9104024533543 |
| 17. | Dr.Gaya Prasad | Indian Veterinary Research Institute | Veterinary Science, Veterinary Microbiology, Animal Biotechnology, Infectious Diseases of Animals | directorivri@gmail.com Phone: 0581-2300096 Fax: 0581-2303284 |

Source: MoEF&CC

Reference

Roy, Parth S.; Roy, Arijit; Joshi, Pawan K.; Kale, Manish P.; Srivastava, Vijay K.; Srivastava, Sushil K.; Dwevidi, Ravi S.; Joshi, Chitiz; Behera, Mukunda D.; Meiyappan, Prasanth; Sharma, Yeshu; Jain, Atul K.; Singh, Jamuna S.; Palchowdhuri, Yajnaseni; Ramachandran, Reshma M.; Pinjarla, Bhavani; Chakravarthi, V.; Babu, Nani; Gowsalya, Mahalakshmi S.; Thiruvengadam, Praveen. Development of Decadal (1985–1995–2005) Land Use and Land Cover Database for India. *Remote Sens.* 2015, 7, 2401-2430; doi:10.3390/rs70302401