



CCAFS site atlas

Haryana / Karnal India

CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS)

Site Atlas

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Titles in this series aim to disseminate interim climate change, agriculture and food security research and practices and stimulate feedback from the scientific community.

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Introduction

The CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) seeks to promote a food-secure world through the provision of science-based efforts that support sustainable agriculture and enhance livelihoods while adapting to climate change and conserving natural resources and environmental services.

Climate change is an unprecedented threat to the food security of hundreds of millions of people who depend on small-scale agriculture for their livelihoods. Climate change affects agriculture and food security, and likewise, agriculture and natural resource management affect the climate system.

CCAFS has initially focused on three regions; East Africa (EA), West Africa (WA) and South Asia (SA) to carry out its research. The 15 CCAFS sites in these areas represent areas that are becoming both drier and wetter, and are focal locations that will generate results that can be applied and adapted to other regions worldwide. In this year, 2013, CCAFS is expanding its portfolio to additional sites in Latin America and South-East Asia.

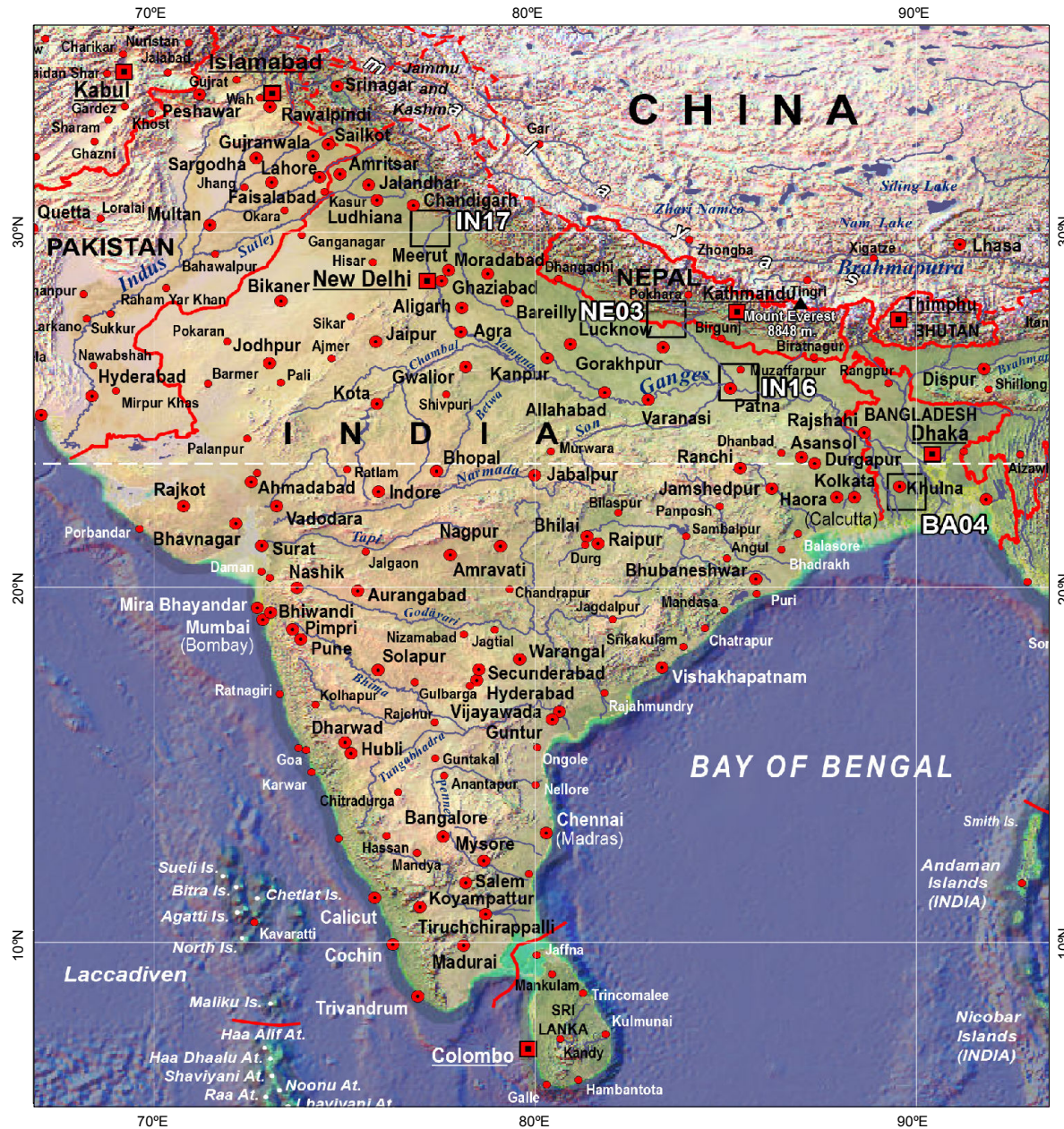
These sites serve as the initial focus of CCAFS partnership-building and long-term research activities falling within the following CCAFS Research Themes; Adaptation to Progressive Climate Change, Adaptation through Managing Climate Risk, Pro-Poor Climate Change Mitigation and Integration for Decision Making. At all 15 CCAFS sites, baseline surveys have been conducted, including three levels of data collection and analysis at household, village and organizational levels (see: <http://ccaafs.cgiar.org/resources/baseline-surveys>).

More information on CCAFS work in all the three regions can be accessed at www.ccaafs.cgiar.org

To better understand the CCAFS sites' characteristics, a list of geospatial indicators for climate variability, bio-physical characteristics and socio-economic variables have been mapped into site atlases.

This Atlas was developed for the CCAFS site at Haryana / Karnal in India, in South Asia Region.

CCAFS Sites: South Asia

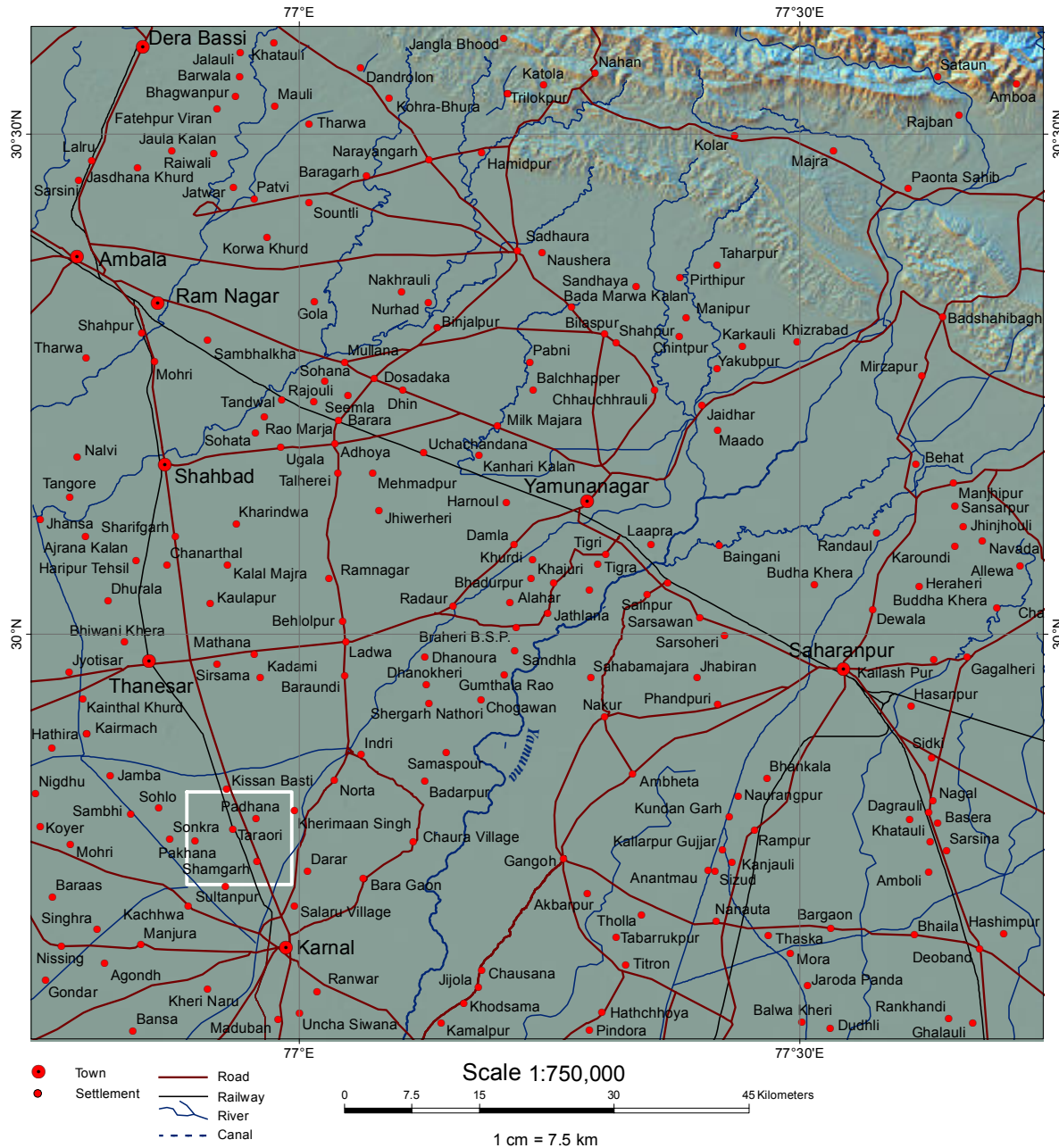


Bangladesh: Khulna (BA04)
 India: Bihar (IN16)
 India: Haryana (IN17)
 Nepal: Mid-Western Terrai (NE03)

 CCAFS Country Sites

Topography Haryana

CCAFS Site IN17, Haryana / Karnal, India



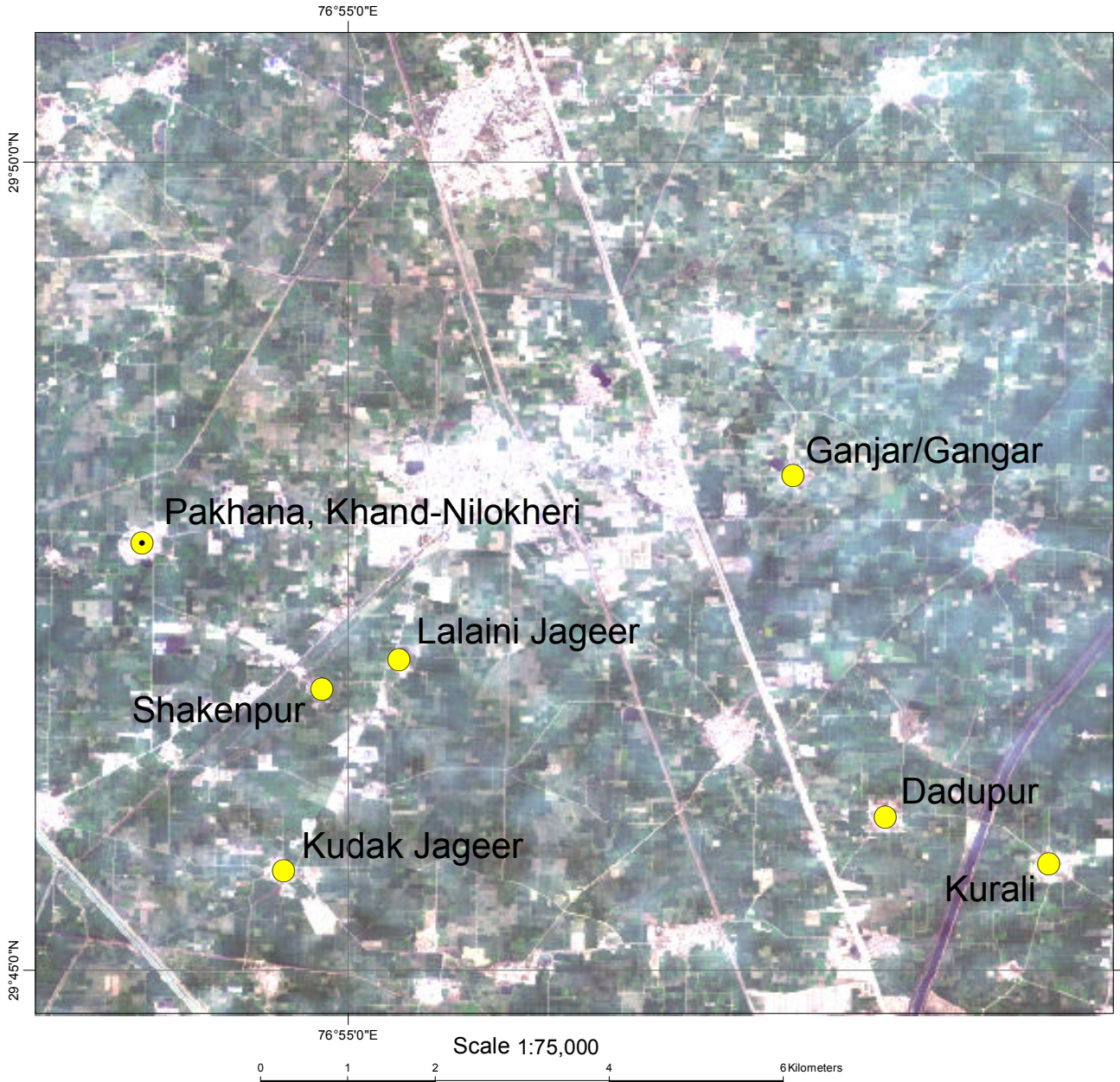
Coordinates of the CCAFS Baseline Sampling frame

76.888E	29.842N
76.993E	29.842N
76.993E	29.750N
76.888E	29.750N



Sampling frame size: 10km x 10km

Satellite Image Karnal



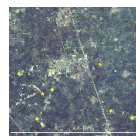
RapidEye imagery from 18-01-2011
 at 5m ground resolution

HBS= Household Baseline Survey

VBS= Village Baseline Survey

OBS= Organizational Baseline Survey

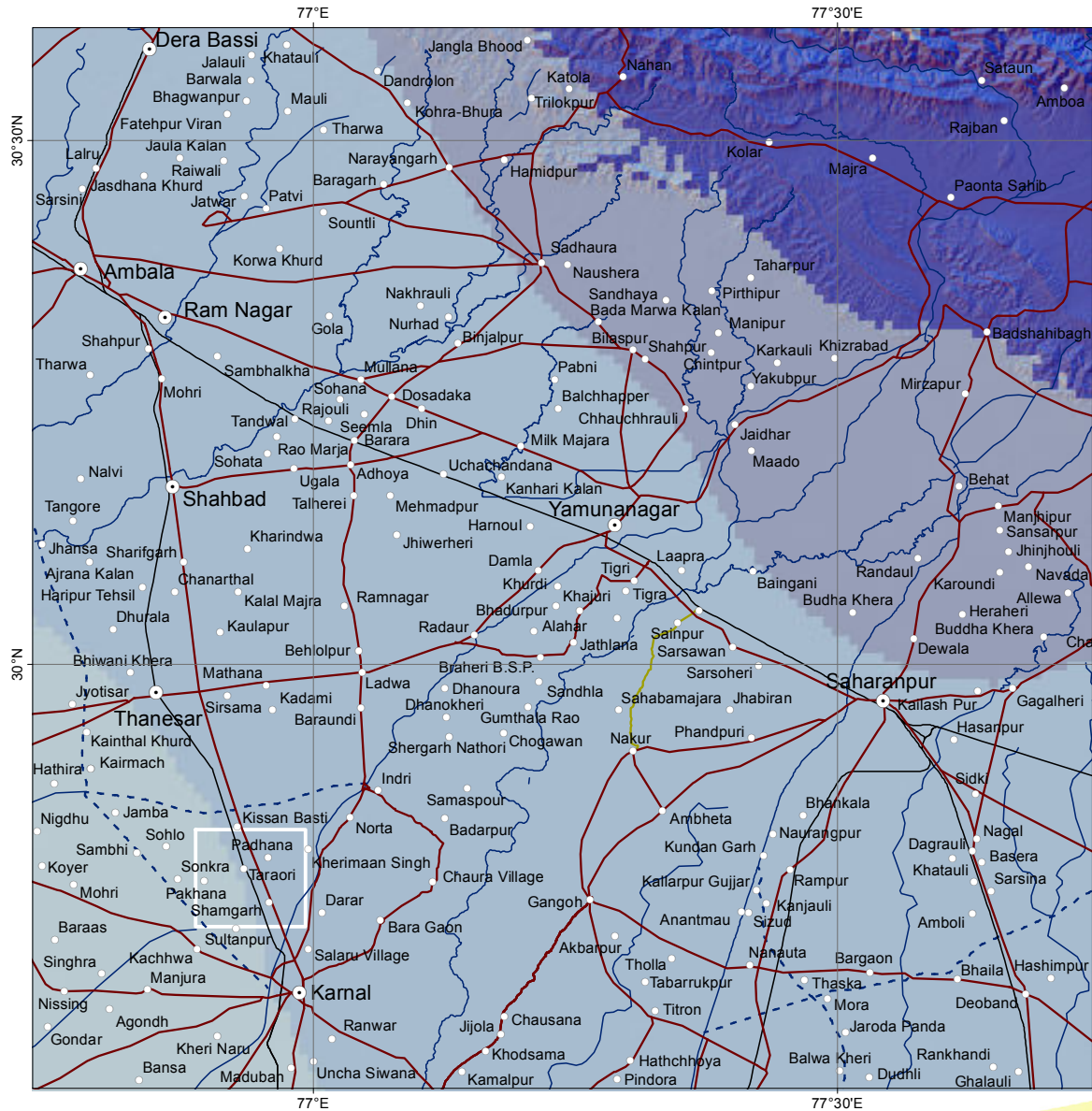
- CCAFS VBS/OBS village
- CCAFS HBS villages



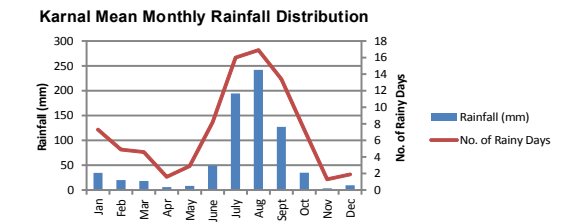
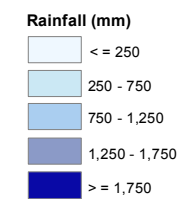
CCAFS Baseline Sampling Frame

Citation: RapidEye (2011)

Annual Rainfall



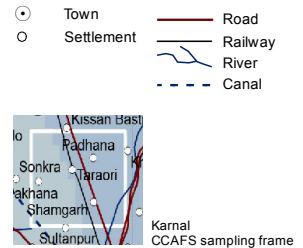
International boundary
Scale 1:10,000,000
0 125 250 500 Kilometers
Corresponds to the map on the left



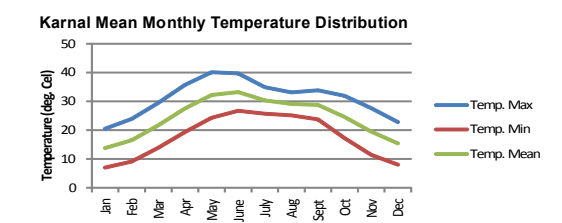
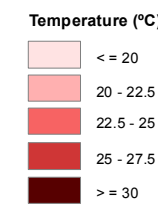
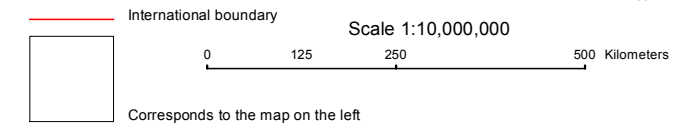
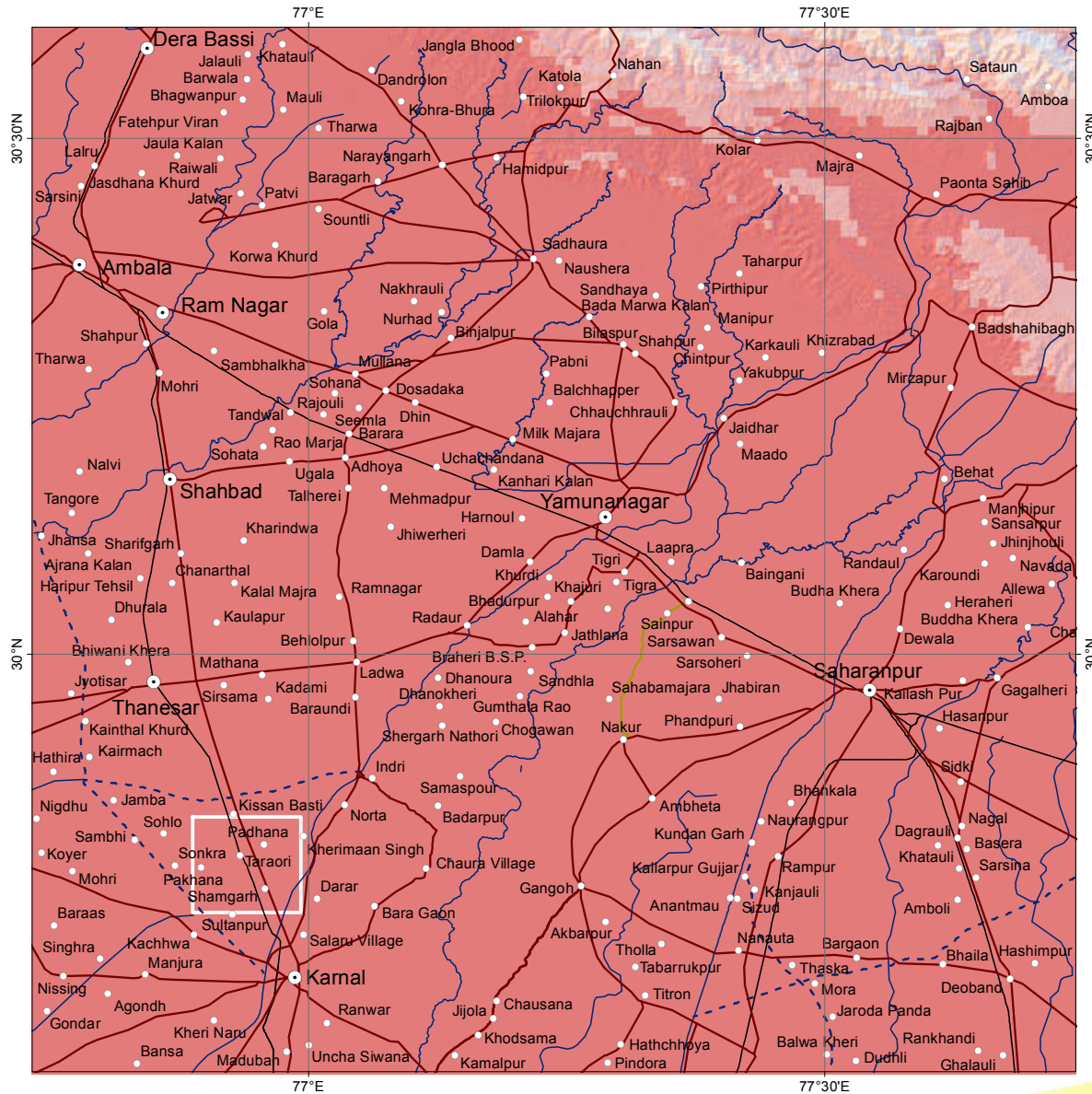
Citation: Jones et al (2002)

Annual Rainfall data of current interpolations of observed data, representative of 1950 - 2000

Citation: Hijmans et al (2005)



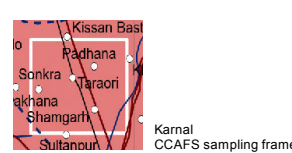
Annual Temperature



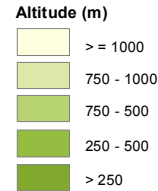
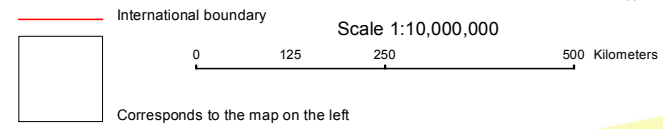
Citation: Jones et al (2002)

Annual Temperature represents annual temperature data of current interpolations of observed data, averaged for 1950 - 2000

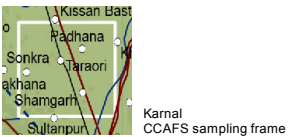
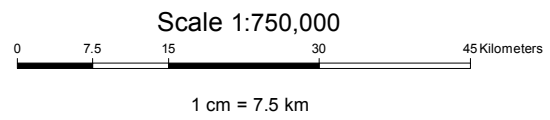
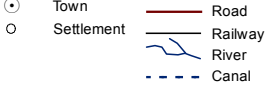
Citation: Hijmans et al (2005)



Altitude

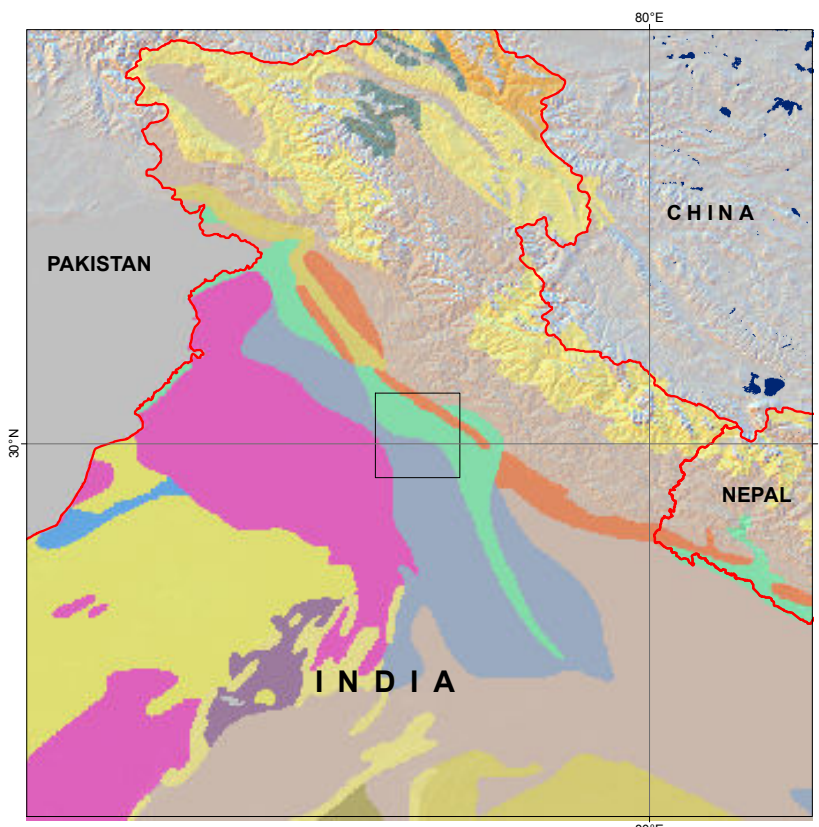
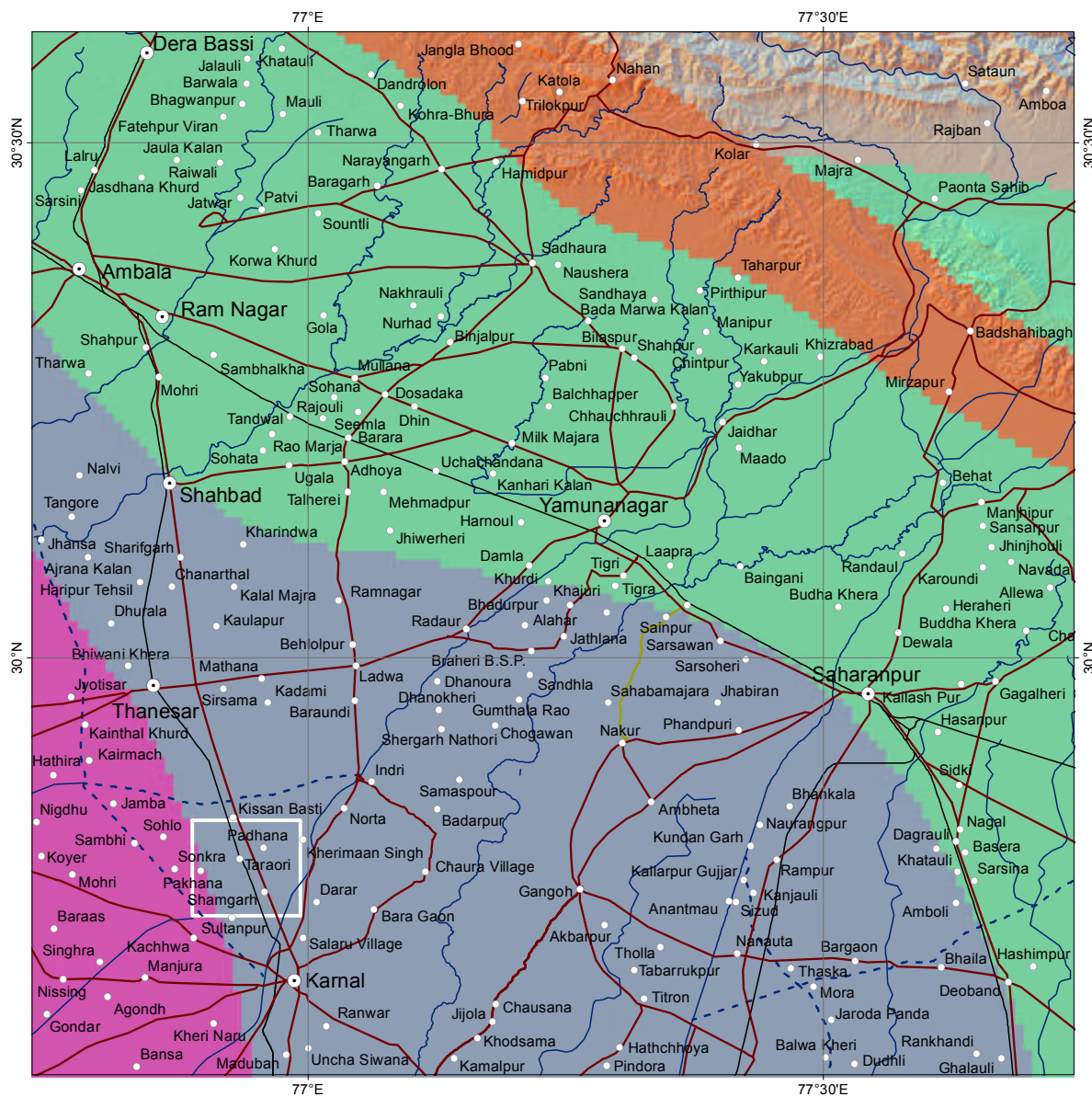


Altitude indicates the height above sea level in meters



Citation: Jarvis et al (2008)

Soil Type



International boundary

Scale 1:10,000,000

0 125 250 500 Kilometers

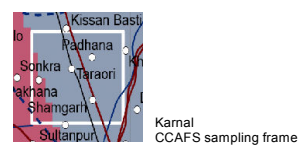
Corresponds to the map on the left

Soil Type *

- Cambisols
- Calcisols
- Fluvisols
- Lixisols
- Regosols

* Legend corresponds to left map

Soil Type refers to the soil group as per the FAO classification. Soil groups are defined by their parent material and morphogenetic characteristics in terms of structural properties and texture (sand, silt and clay content), as well as organic matter content.

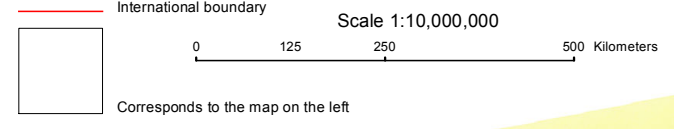
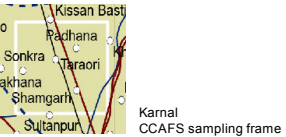
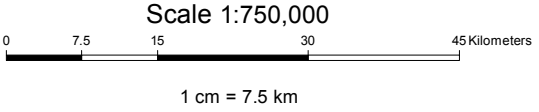


Citation: FAO et al (2009)

Agro-Ecological Zones



- Town
- Settlement
- Road
- Railway
- River
- - - Canal

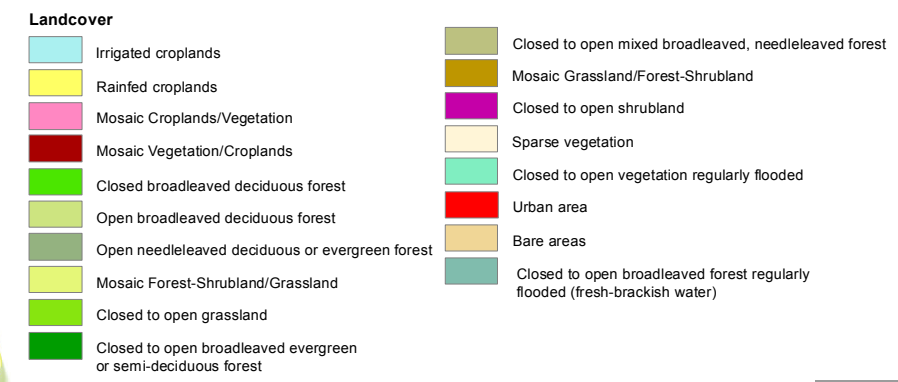
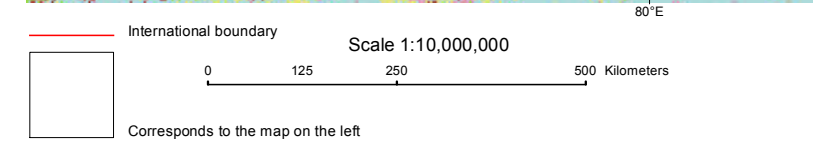
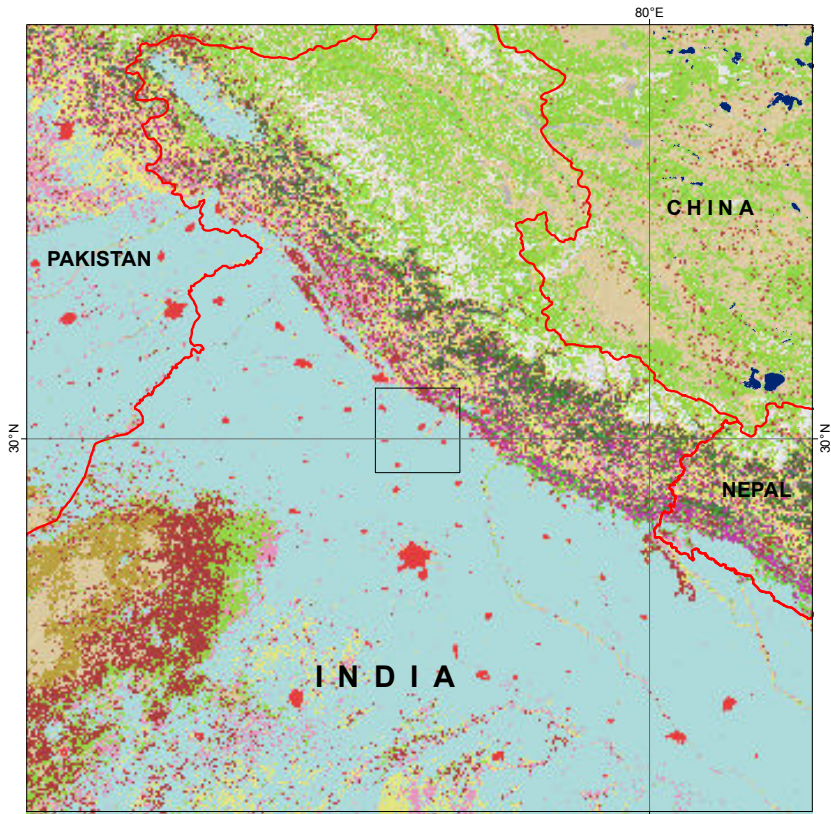
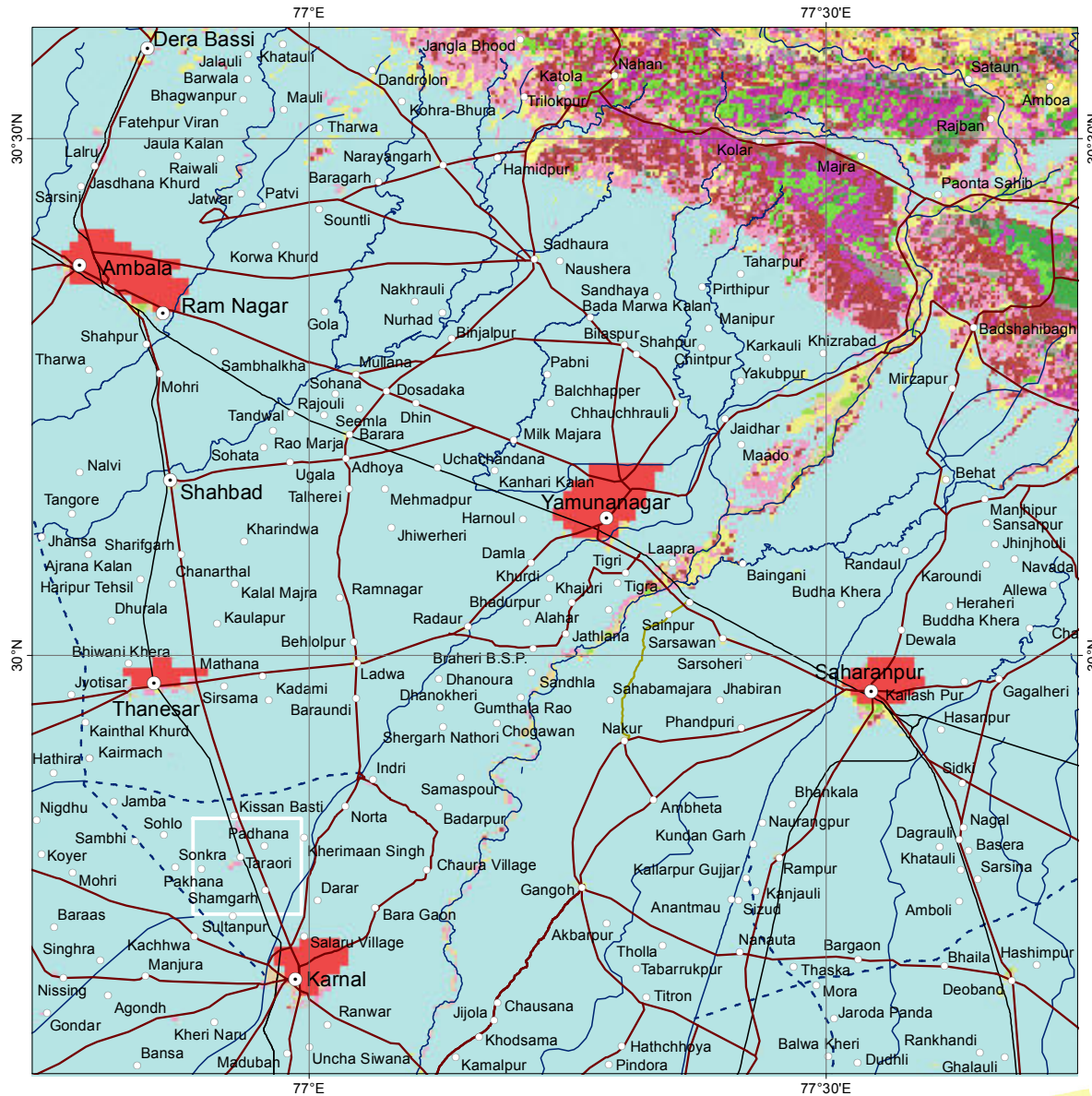


- Agro-Ecological Zones**
- Orange: Arid
 - Light Yellow: Semi-Arid
 - Light Green: Sub-Humid
 - Green: Humid
 - Dark Green: Temperate/Highlands

Agro-Ecological Zones indicate the division of land areas that have similar characteristics related to land suitability, potential agricultural production and environmental impact.

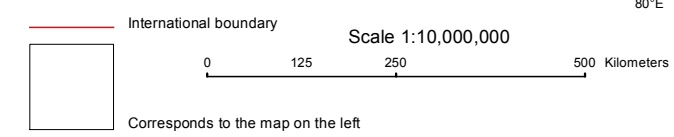
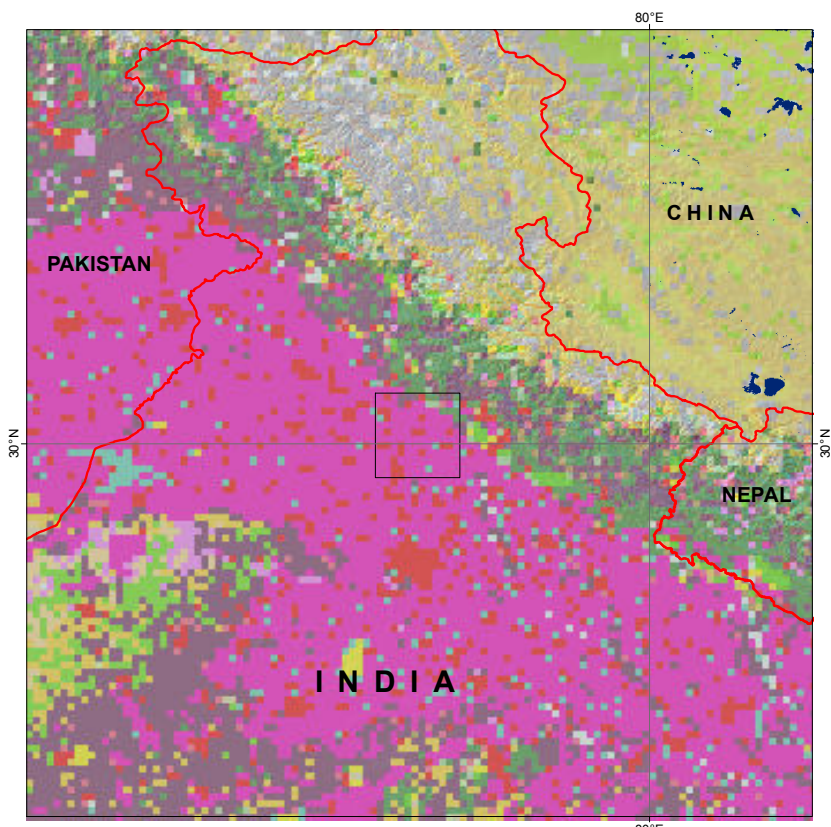
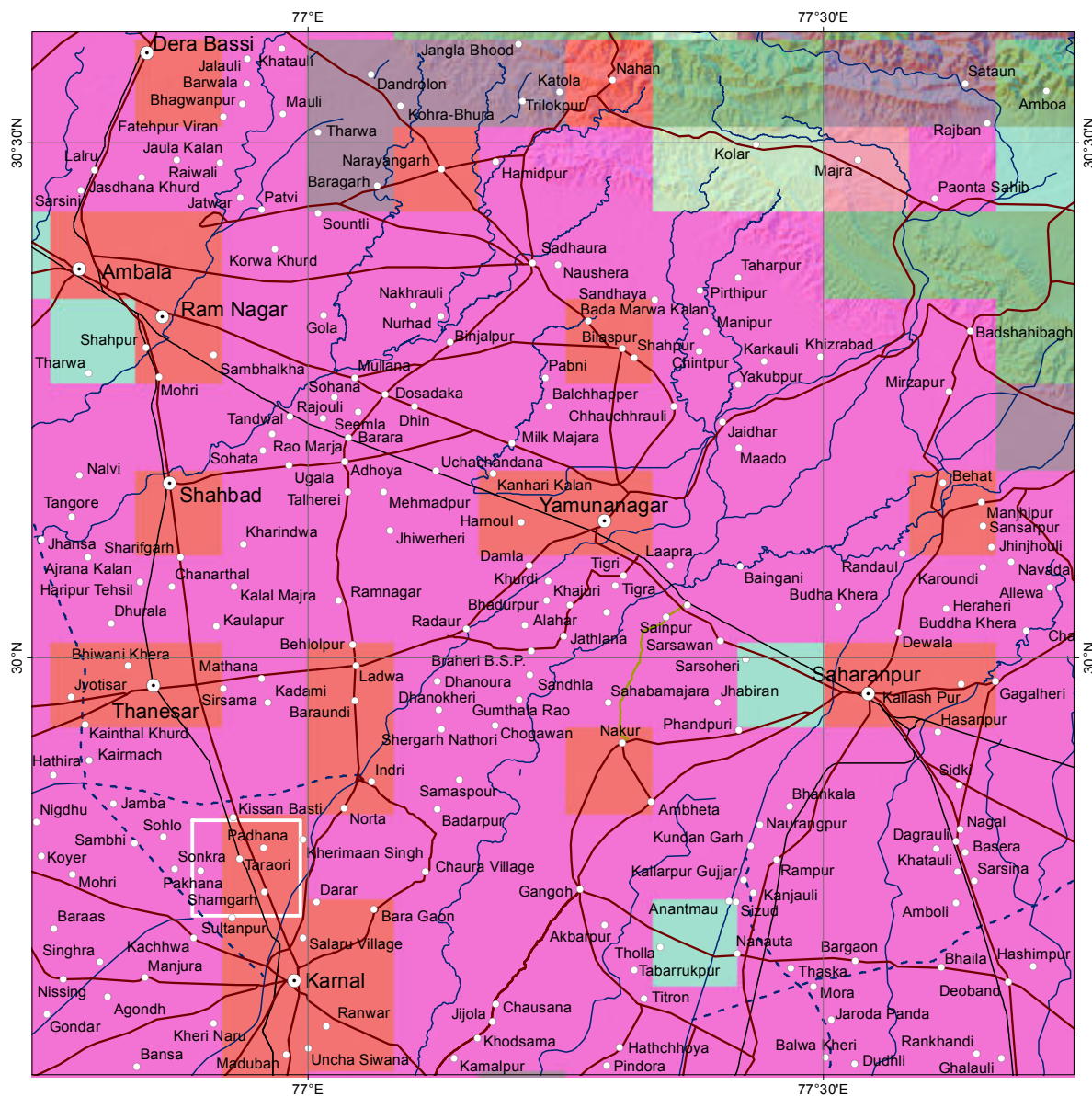
Citation: FAO (2008)

Landcover



Landcover shows the observed (bio)physical cover of the earth's surface, i.e. dominant vegetation, land use and man-made features.

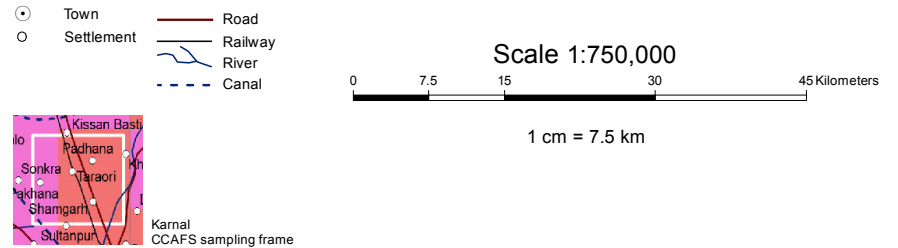
Citation: Arino et al (2009)



- Landuse ***
- Forest with agricultural activities
 - Forest with moderater higher livestock density
 - Rainfed crops (Subsistence/Commercial)
 - Crops and high livestock density
 - Crops, large-scale irrigated, moderate or higher livestock density
 - Agriculture large scale Irrigation
 - Urban area

* Legend corresponds to left map

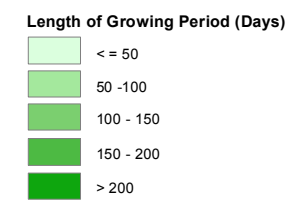
Landuse is a description of how people utilize the land. It involves socio-economic activity, i.e. the management and modification of the natural environment into built environment, such as agricultural fields and settlements. At any place, there may be multiple land uses, the dominant one is presented here.



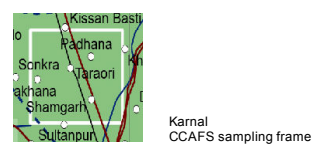
Length of Growing Period 2000



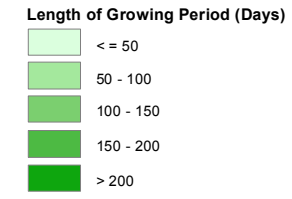
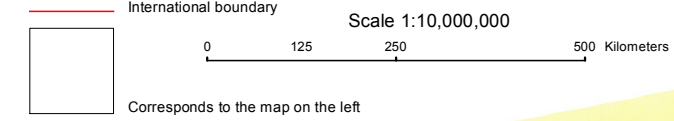
International boundary
Scale 1:10,000,000
0 125 250 500 Kilometers
Corresponds to the map on the left



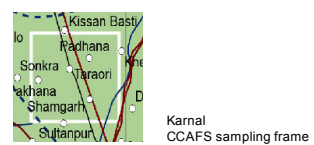
The Length of Growing Period (LGP) is defined as the number of days in a year during which there is available rainfall soil moisture supply for plant growth.



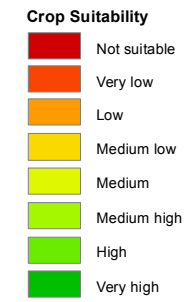
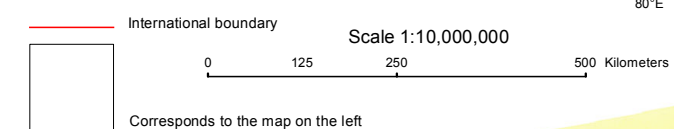
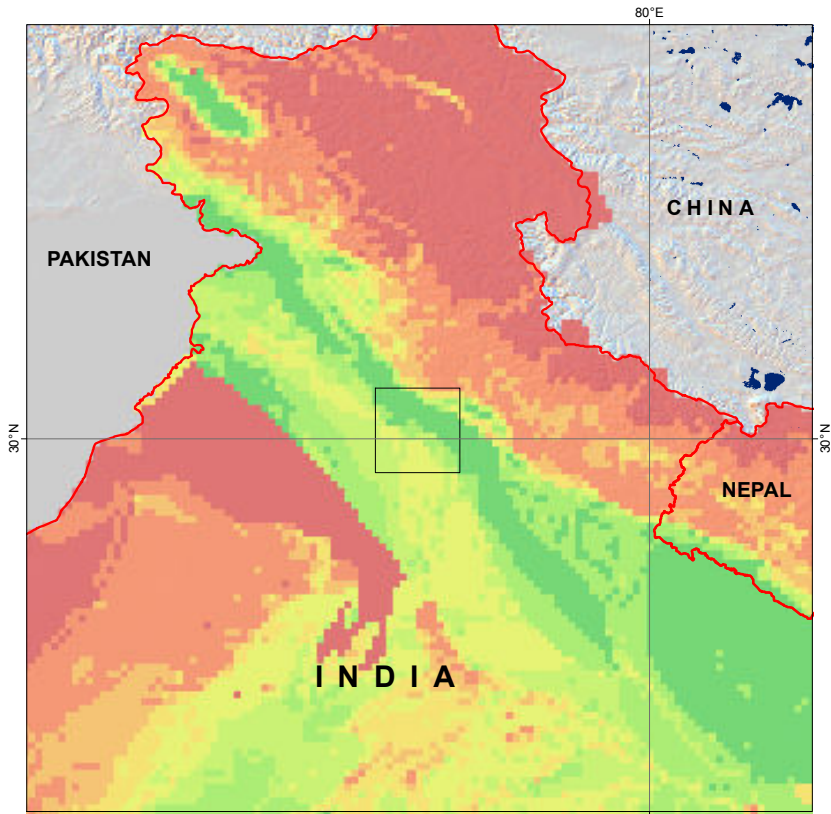
Length of Growing Period 2030



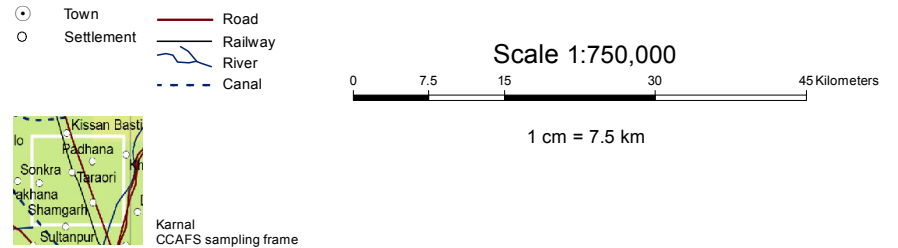
The Length of Growing Period (LGP) is defined as the number of days in a year during which there is available rainfed soil moisture supply for plant growth; here modeled for 2030.



Crop Suitability

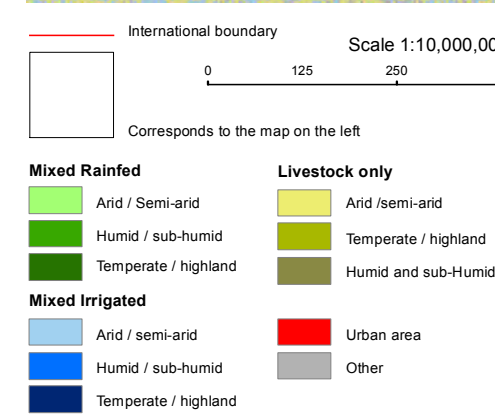
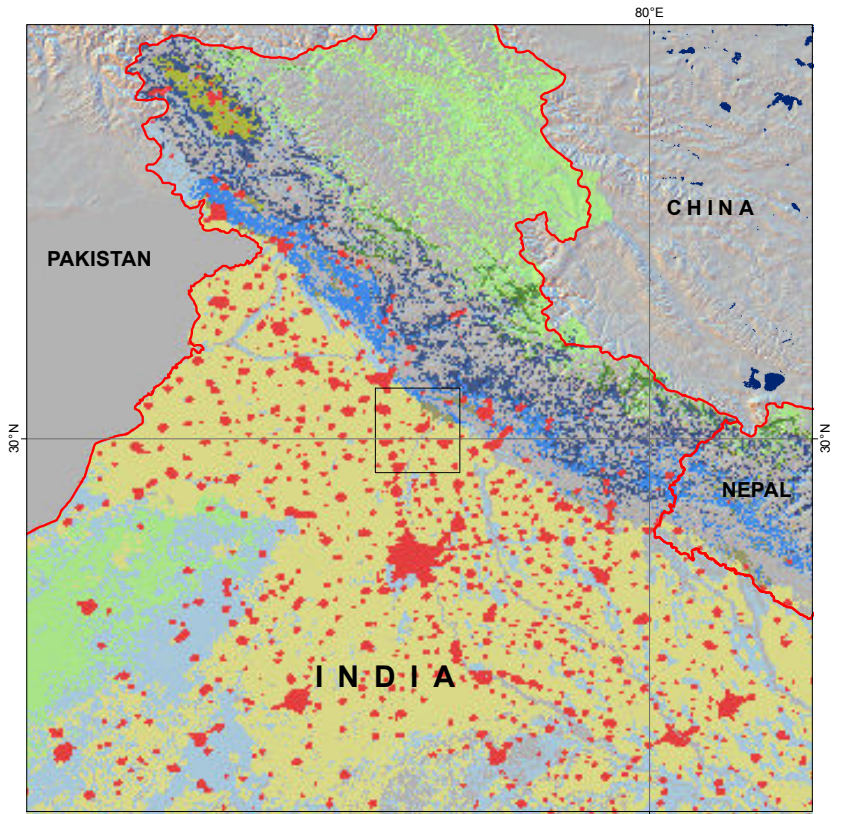
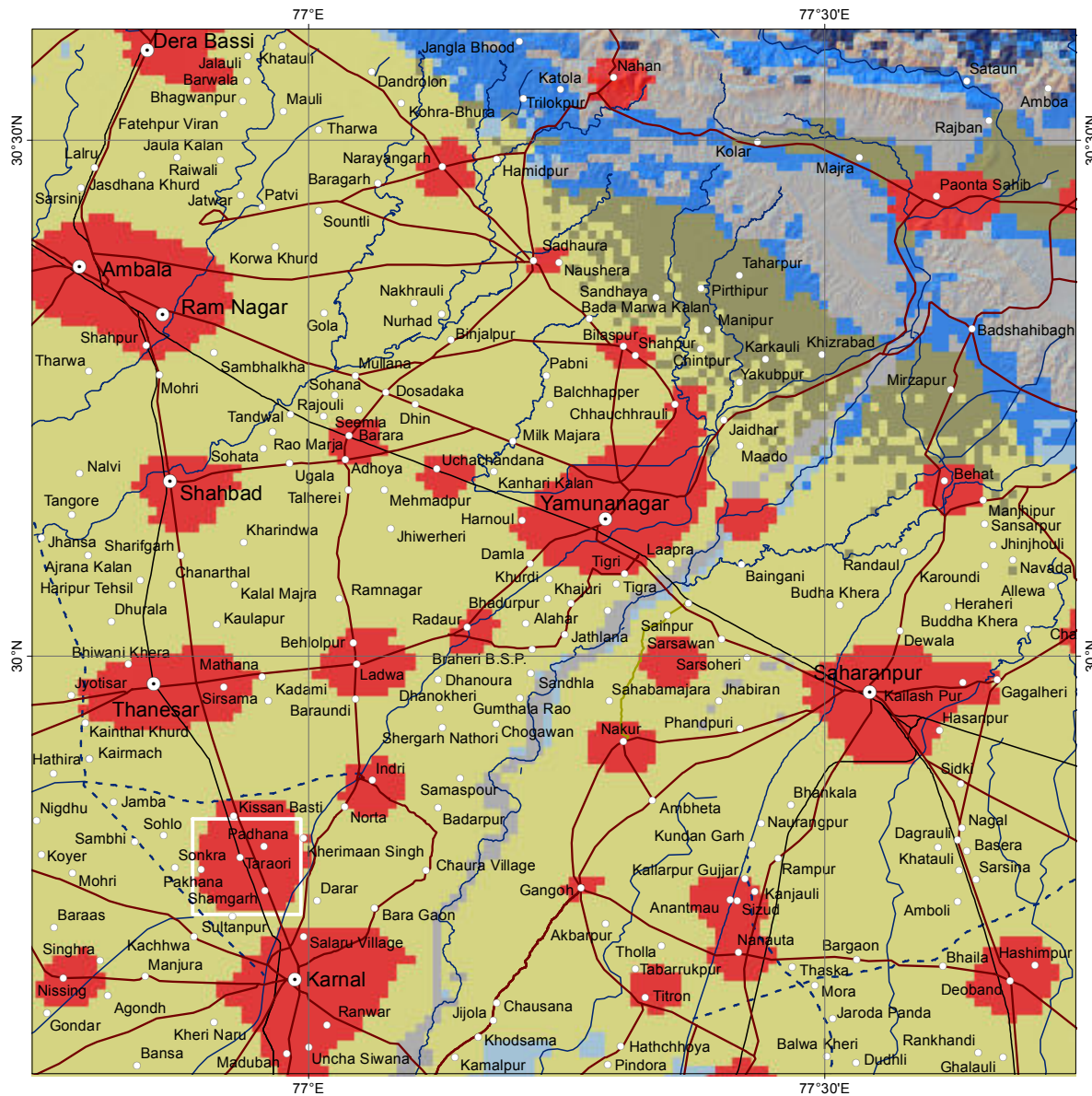


Crop Suitability refers to the land resource assessment that considers agricultural land use options with relevant agro-ecological condition to estimate expected cropping activities.



Citation: FAO and IIASA (2007)

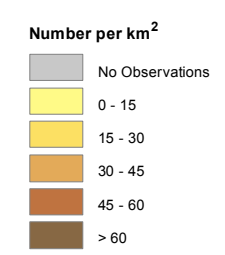
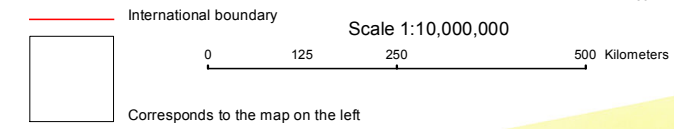
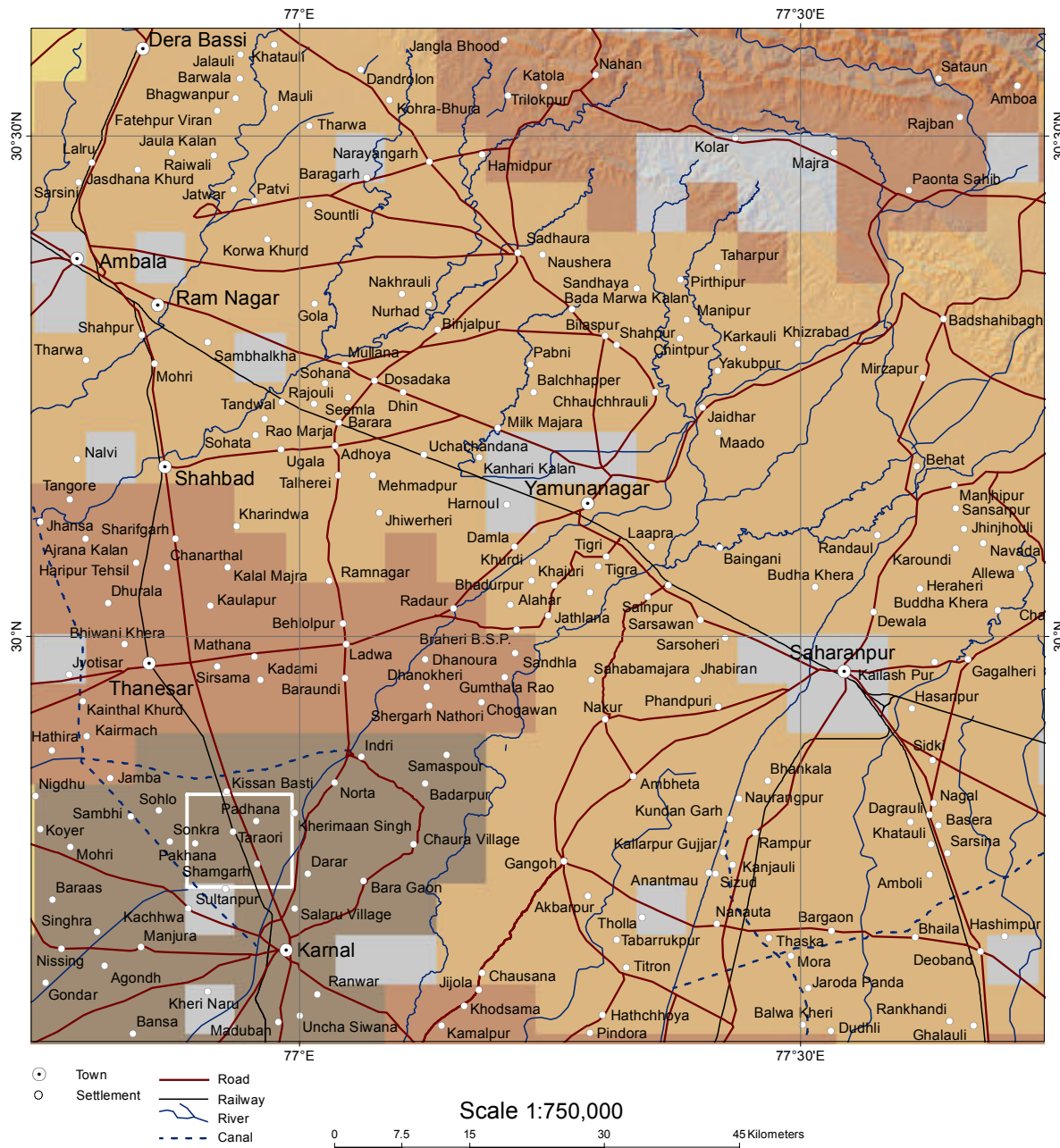
Livestock Production Systems



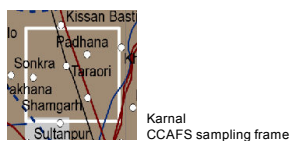
Livestock Production Systems as part of agricultural systems take agro-climatic conditions into account and are classified into terms of feed and livestock resources; livestock commodities produced; production technology; product use and livestock functions; area covered; geographic locations; and human populations supported.

Citation: FAO (2007)

Livestock Density

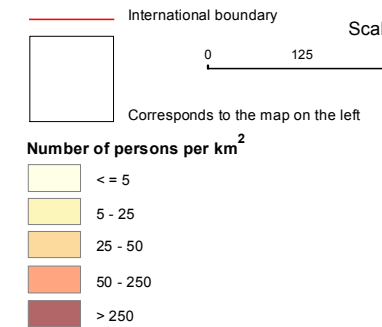
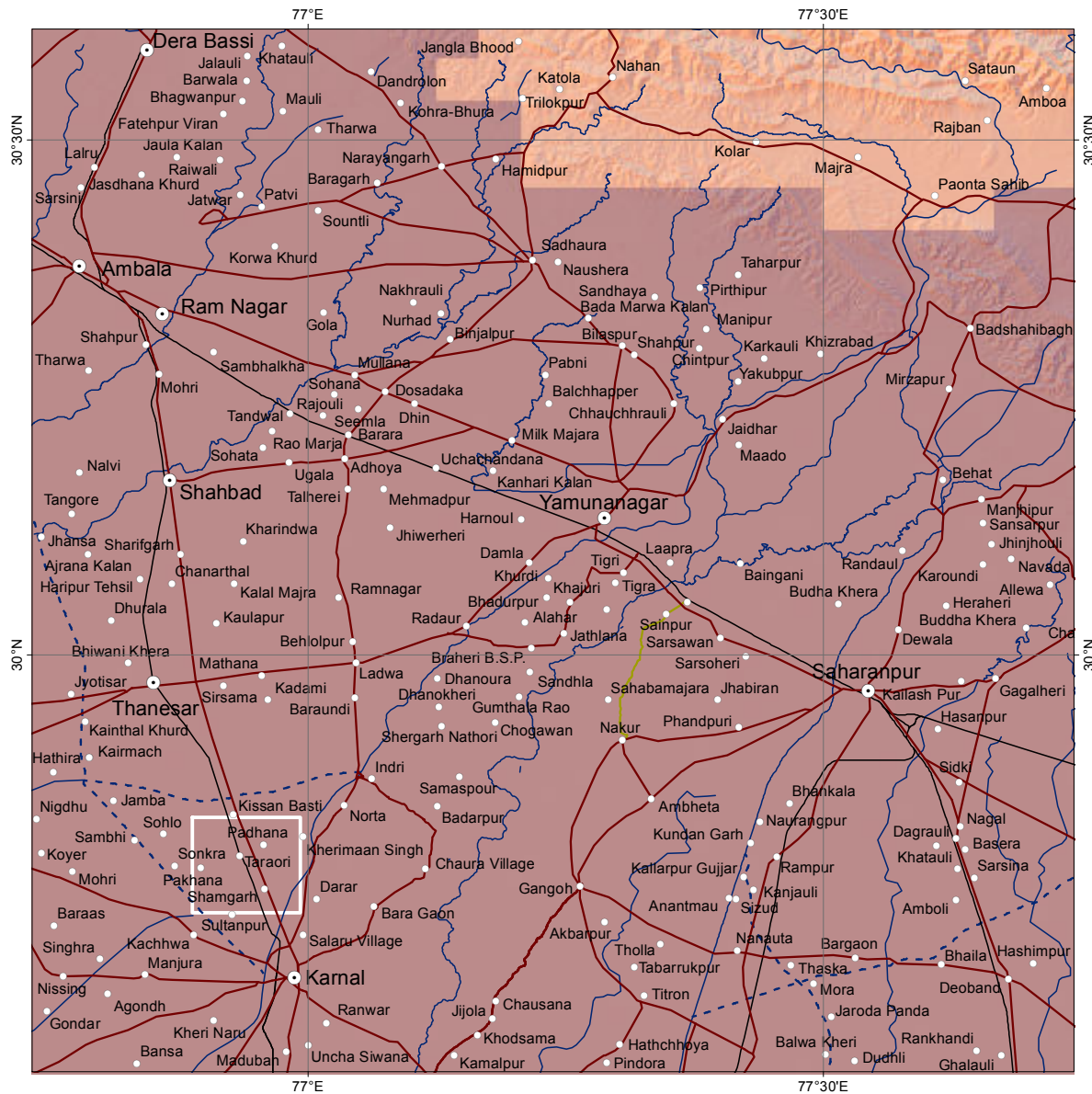


Livestock Density is measured in numbers of livestock, including cattle, goats and sheep, per km²



Citation: Wint et al (2007)

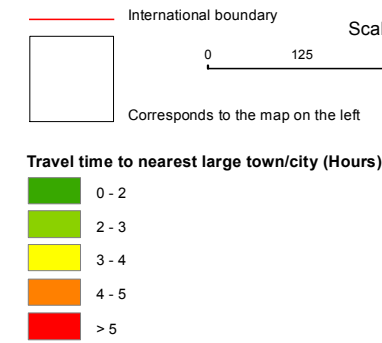
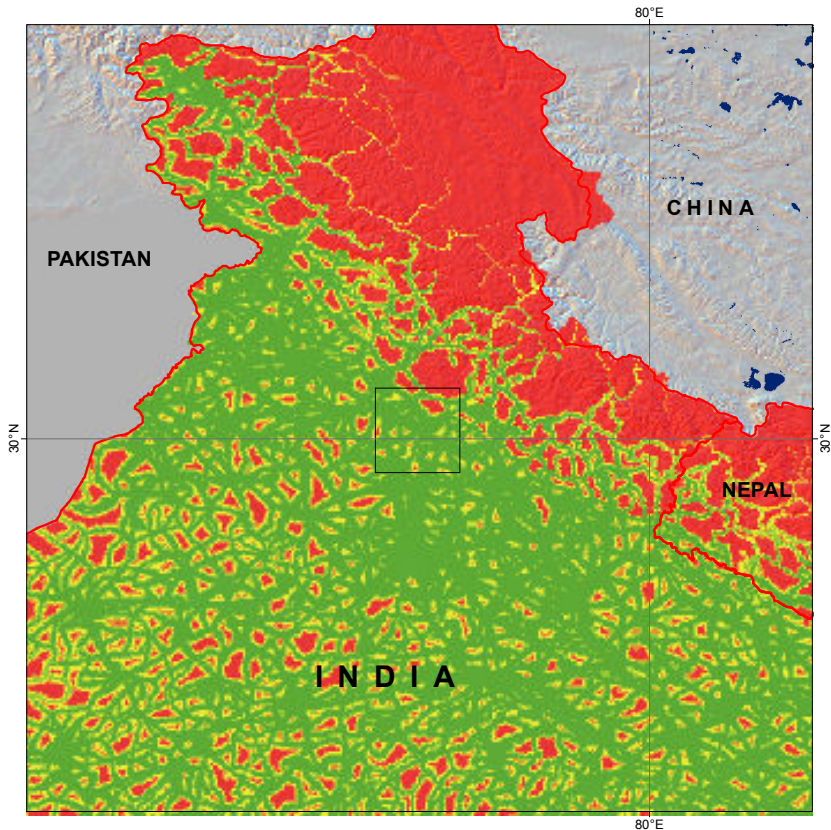
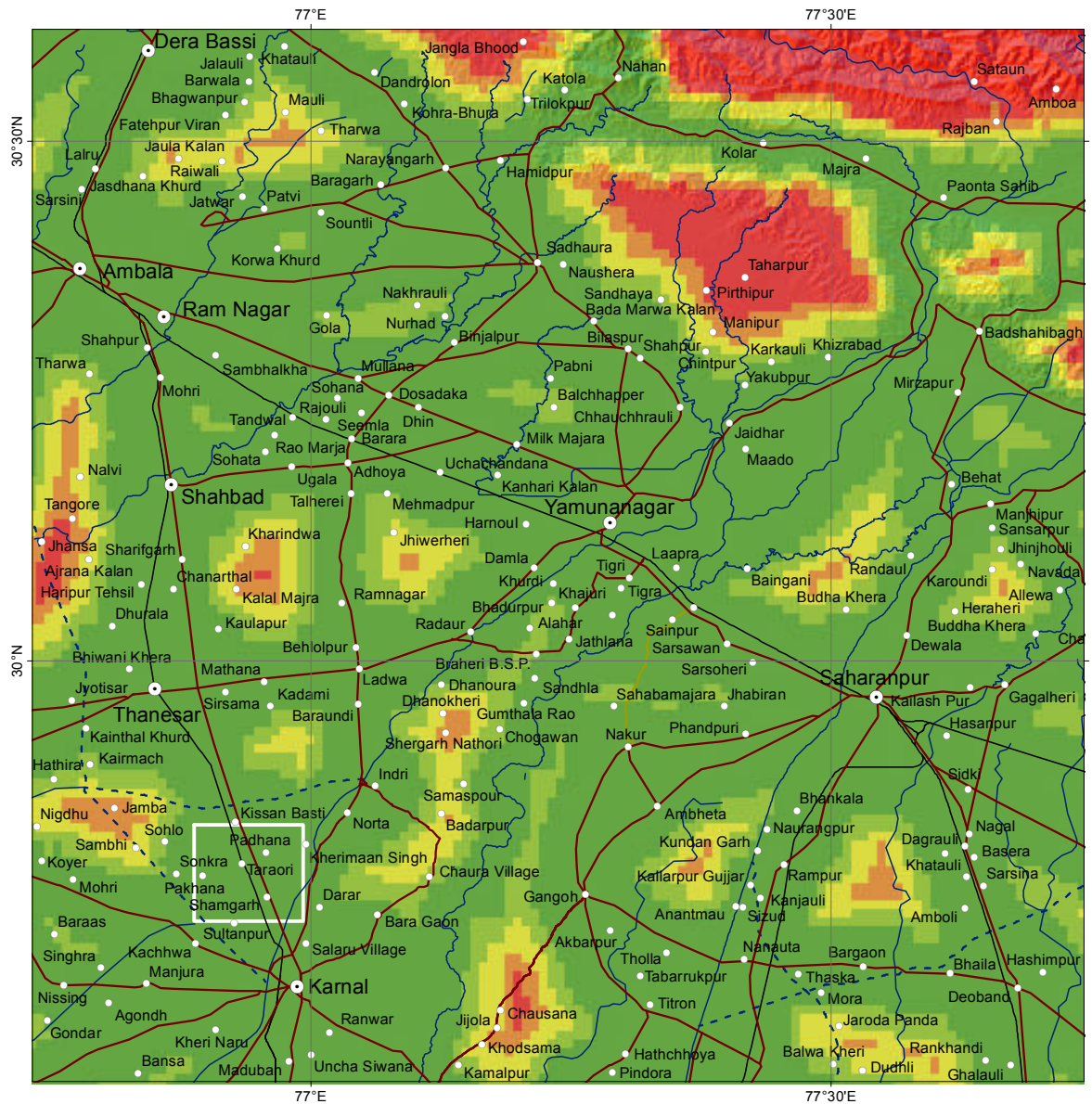
Human Population Density



Human Population Density is the gridded number of persons per km² in 2005.

Citation: CIESIN (2005)

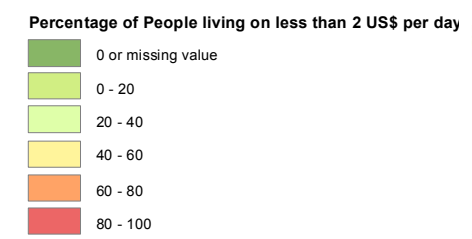
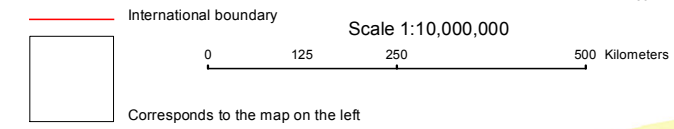
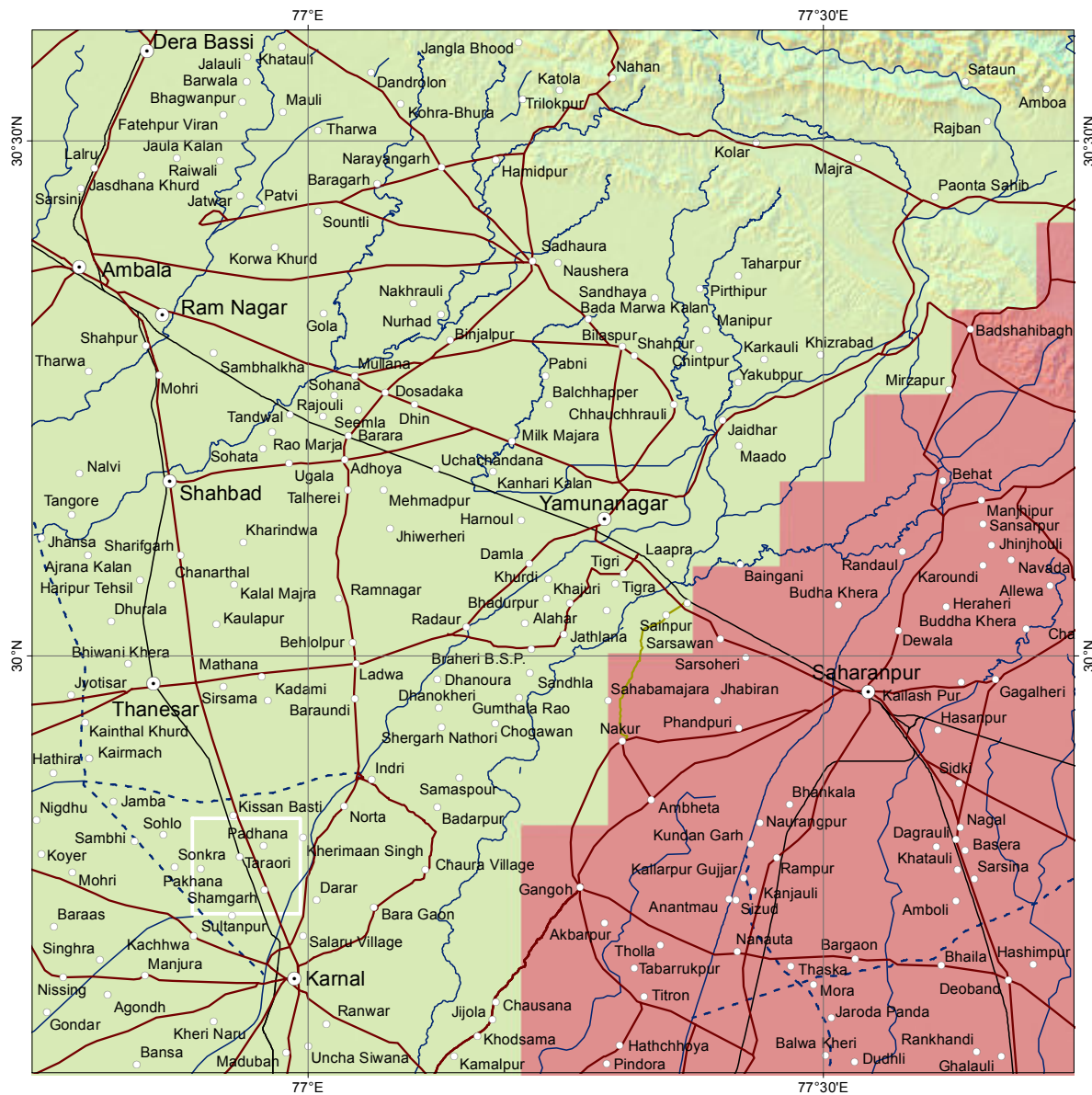
Market Access



Travel time is a measure of accessibility determined in the time (hours) taken to the nearest urban centre, of 50,000 people or more (taking different means of transportation into account)

Citation: Nelson (2008)

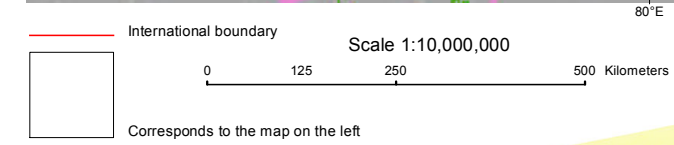
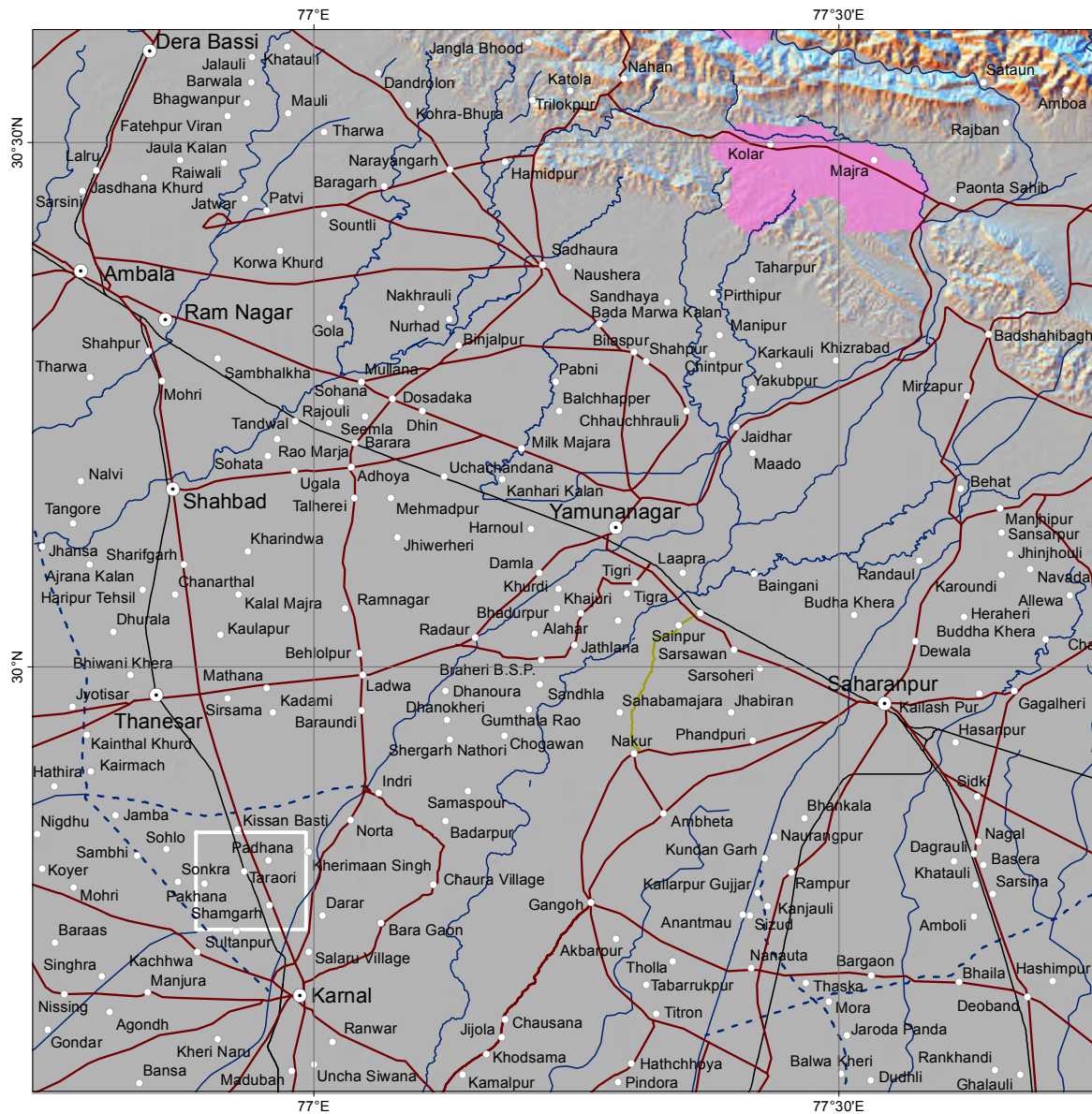
Poverty



CIESIN constructed global data sets of poverty that are based on estimates of subnational infant mortality and child malnutrition data, recognizing that both are proxies for poverty and welfare rather than direct measures.

Citation: CIESIN (2005)

Conservation Areas



- Conservation Areas**
- Sanctuary
 - National Park
 - National Park Extension
 - National Park / Buffer Zone
 - Wildlife Reserve
 - UNESCO-MAB Biosphere Reserve
 - Not Reported

Conservation Areas represent protected areas that, according to IUCN, are clearly defined geographic space, recognized through legal or other effective means, and managed through legal or other effective means, to achieve long-term conservation of nature with associated ecosystem services and cultural value.

Citation: UNEP-WCMC (2012).

References and Data Sources

Regional Map

Sijmons K. 2013a. Digital Satellite Image based on, MODIS (Moderate Resolution Imaging Spectroradiometer) NASA, 2009, Ground resolution : 1 Kilometer. GTOPO30, (DEM) Global Digital Elevation Model U.S Geological Survey, Ground resolution: 1 Kilometer. Topographic Features derived from: Global GIS, U.S. Geological Survey and Google Earth. Projection: Geographic, Lat/Long, WGS84

Topographic Map

Sijmons K. 2013b. Relief representation derived from Digital Elevation Model (DEM) of SRTM (Shuttle Radar Topographic Mission) 2000, Ground resolution 90 meter and ASTER GDEM, Ground resolution 30 meter, NASA. Topographic Features digitized from Google Earth Projection: Geographic, Lat/Long, WGS84

Satellite Image

RapidEye Satellite Image, 5 meter ground resolution, Image acquisition, 17-01-2011

Annual Rainfall

Hijmans, R.J., S.E. Cameron, J.L. Parra, P.G. Jones and A. Jarvis, 2005. Very high resolution interpolated climate surfaces for global land areas. *International Journal of Climatology* 25: 1965-1978.

Annual Rainfall Graph

Jones P G, Thornton P K, Diaz W and Wilkens P W. 2002. MarkSim, a computer tool that generates simulated weather data for crop modeling and risk assessment. Version 1, 2002. CD-ROM and Users Manual. CIAT, AA6713, Cali, Colombia, 87 pp.

Annual Temperature

Hijmans, R.J., S.E. Cameron, J.L. Parra, P.G. Jones and A. Jarvis, 2005. Very high resolution interpolated climate surfaces for global land areas. *International Journal of Climatology* 25: 1965-1978.

Annual Temperature Graph

Jones P G, Thornton P K, Diaz W and Wilkens P W. 2002. MarkSim, a computer tool that generates simulated weather data for crop modeling and risk

assessment. Version 1, 2002. CD-ROM and User's Manual. CIAT, AA6713, Cali, Colombia, 87 pp.

Aridity Index

Trabucco, A., and Zomer, R.J. 2009. Global Aridity Index (Global-Aridity) and Global Potential Evapo-Transpiration (Global-PET) Geospatial Database. CGIAR Consortium for Spatial Information. Published online, available from the CGIAR-CSI GeoPortal at: <http://www.csi.cgiar.org/>

Altitude

Jarvis, A., H.I. Reuter, A. Nelson, E. Guevara, 2008, Hole-filled SRTM for the globe Version 4, available from the CGIAR-CSI SRTM 90m Database. Available at <http://srtm.csi.cgiar.org>

Soil Type

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