Stevie Mann/ILRI

CCAFS site atlas

Kollo / Fakara
Niger

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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Contents

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://ccafs.cgiar.org/resources/baseline-surveys).

More information on CCAFS work in all the three regions can be accessed at www.ccafs.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 Kollo / Fakara in Niger, in West Africa Region.

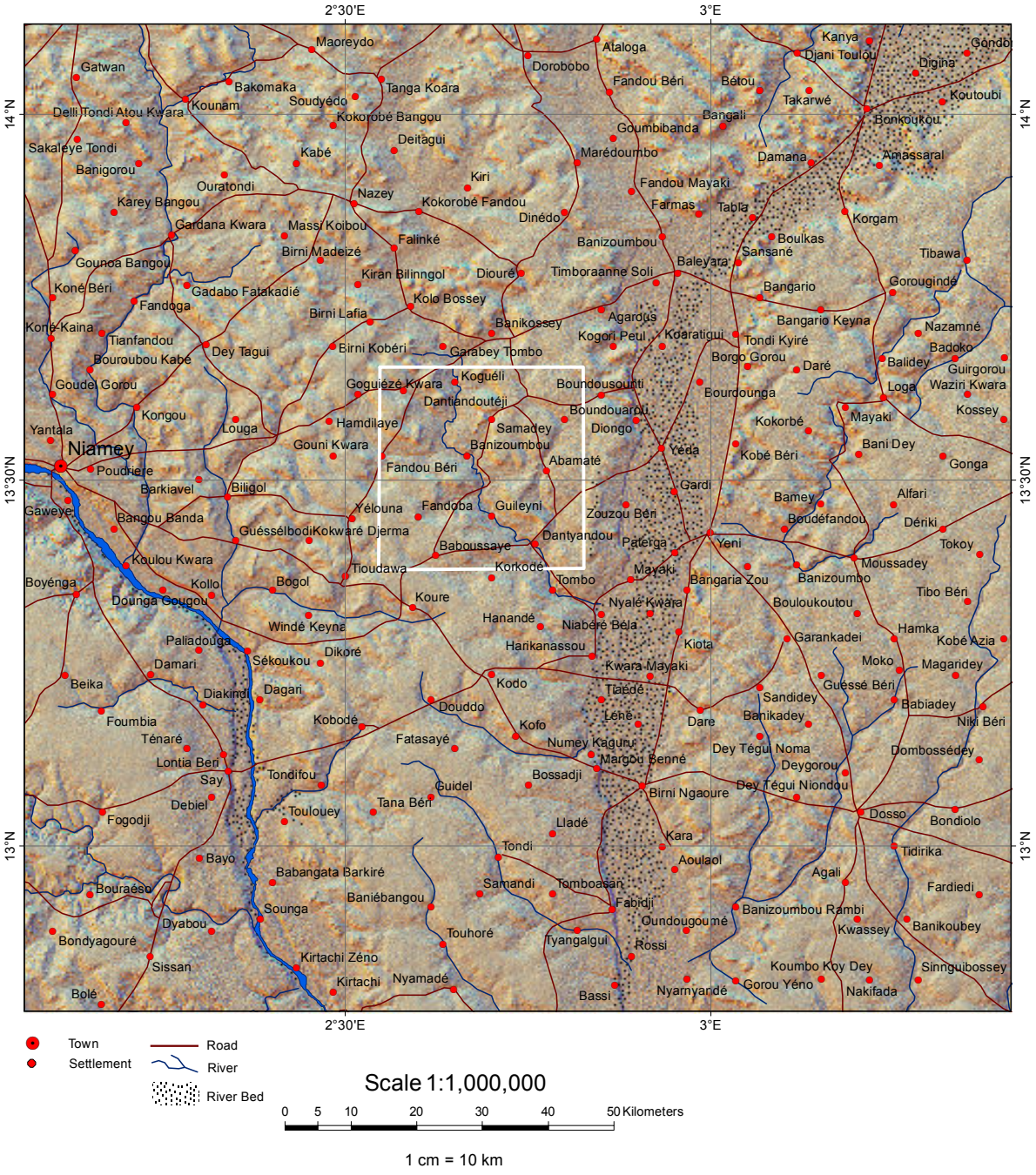
CCAFS Sites: West Africa

Burkina Faso: Yatenga (BF01)
Ghana: Lawra-Jirapa (GH01)
Mali: Segou (MA01)
Niger: Kollo (NI01)
Senegal: Kaffrine (SE01)

CCAFS Country Sites

Citation: GeoMapa (2013a)

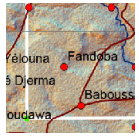
Topography Kollo



CCAFS Site NI01, Kollo / Fakara, Niger

Coordinates of the CCAFS Baseline Sampling frame

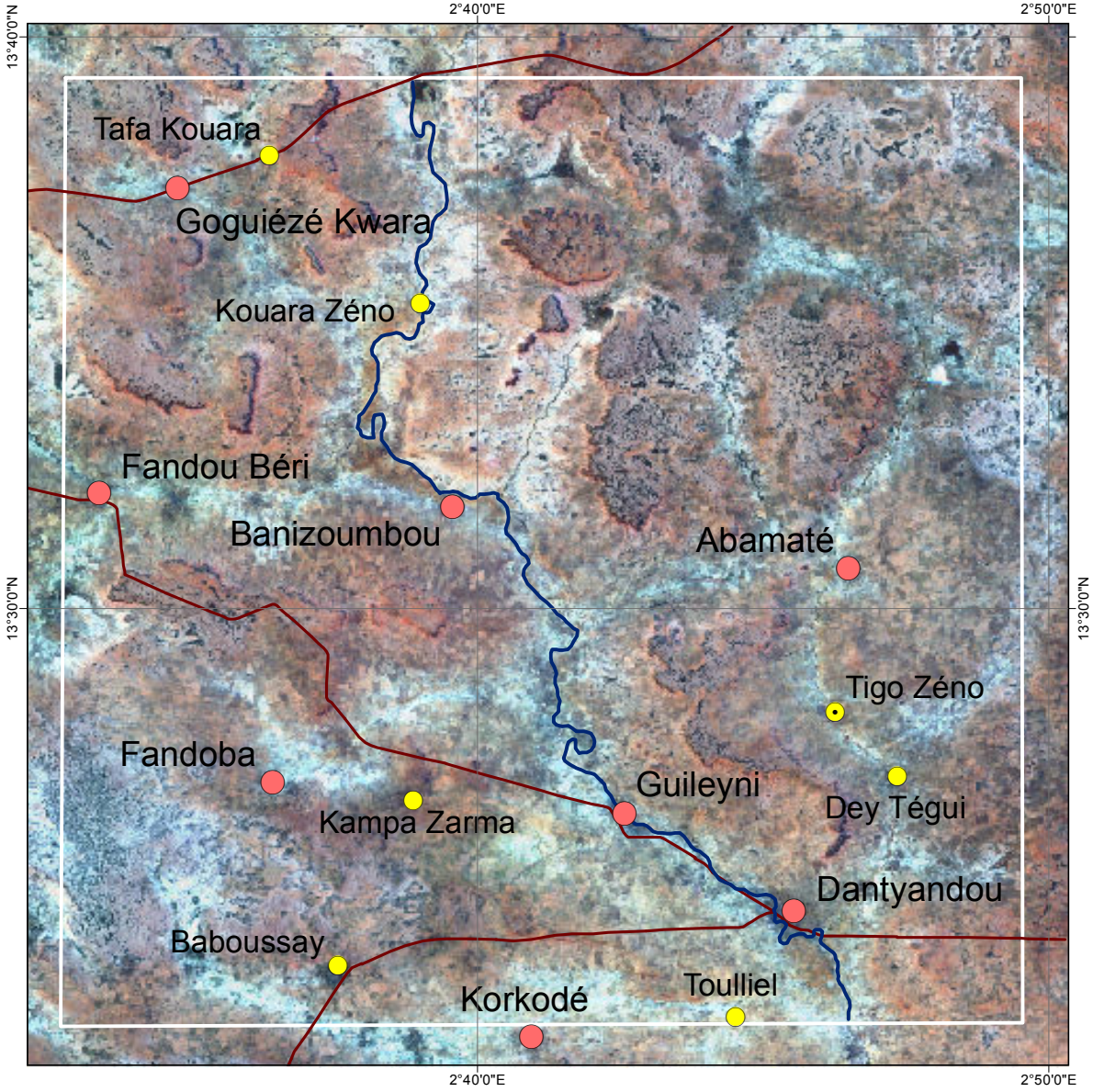
2.826E 13.379N
2.826E 13.654N
2.547E 13.654N
2.547E 13.379N



Sampling frame size: 30km x 30km

Citation: GeoMapa (2013b)

Satellite Image Fakara



Scale 1:225,000

0 2.5 5 10 15 Kilometers

RapidEye imagery from 23-10-2010 at 5m ground resolution

HBS= Household Baseline Survey

VBS= Village Baseline Survey

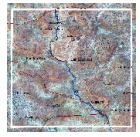
OBS= Organizational Baseline Survey

Road

Settlement

CCAFS VBS/OBS village

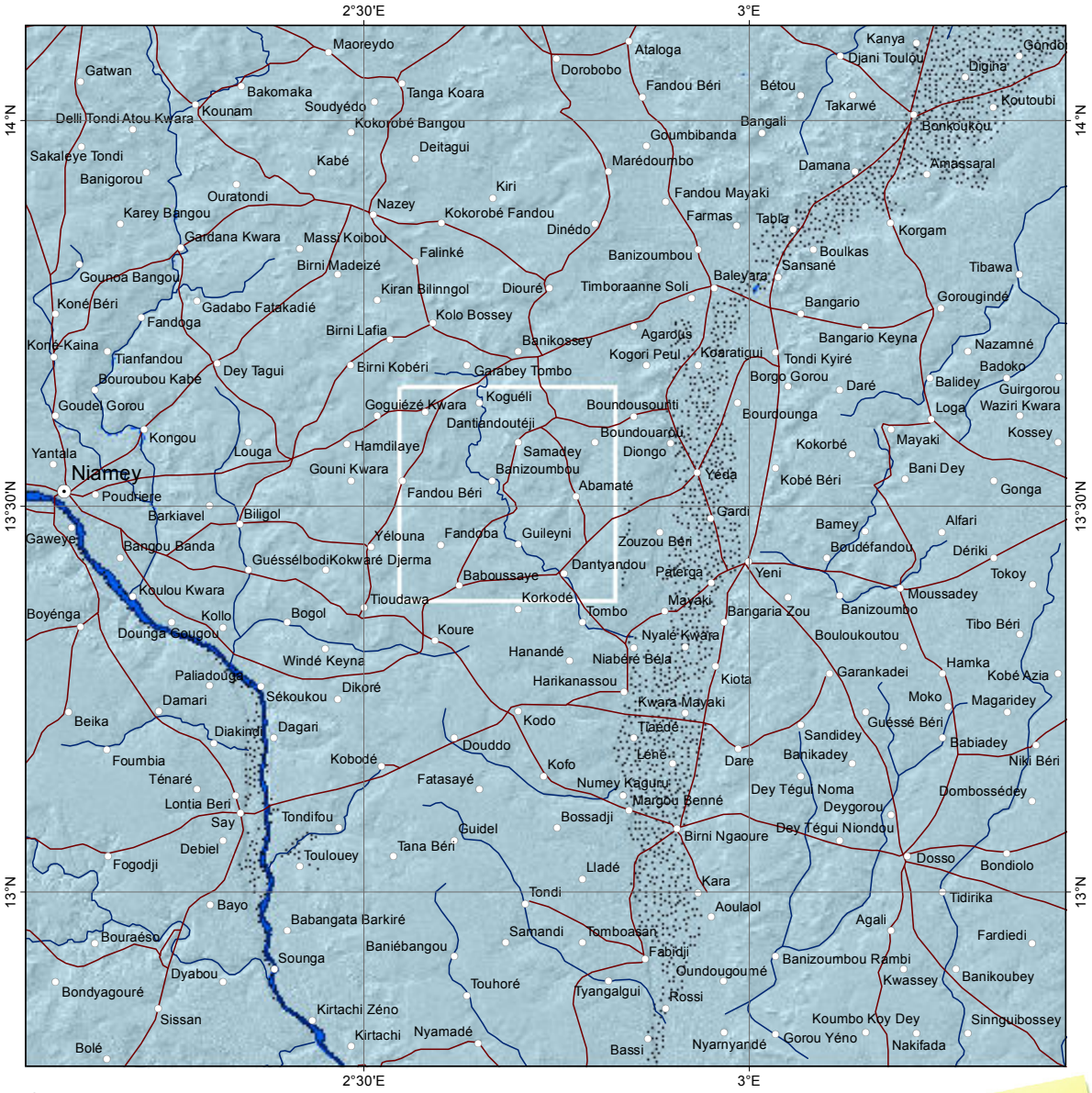
CCAFS HBS villages



CCAFS Baseline Sampling Frame

Citation: RapidEye (2010)

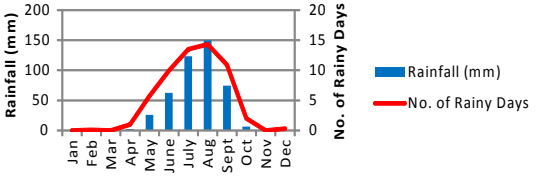
Annual Rainfall



Rainfall (mm)

- < = 250
- 250 - 750
- 750 - 1,250
- 1,250 - 1,750
- > = 1,750

Fakara Mean Monthly Rainfall Distribution



Citation: Jones et al (2002)

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

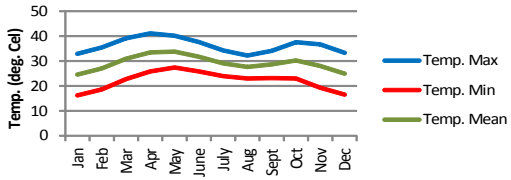
Citation: Hijmans et al (2005)

Annual Temperature

Temperature (°C)

- < = 15
- 15 - 20
- 20 - 25
- 25 - 30
- > = 30

Fakara Mean Monthly Temperature Distribution



Citation: Jones et al (2002)

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

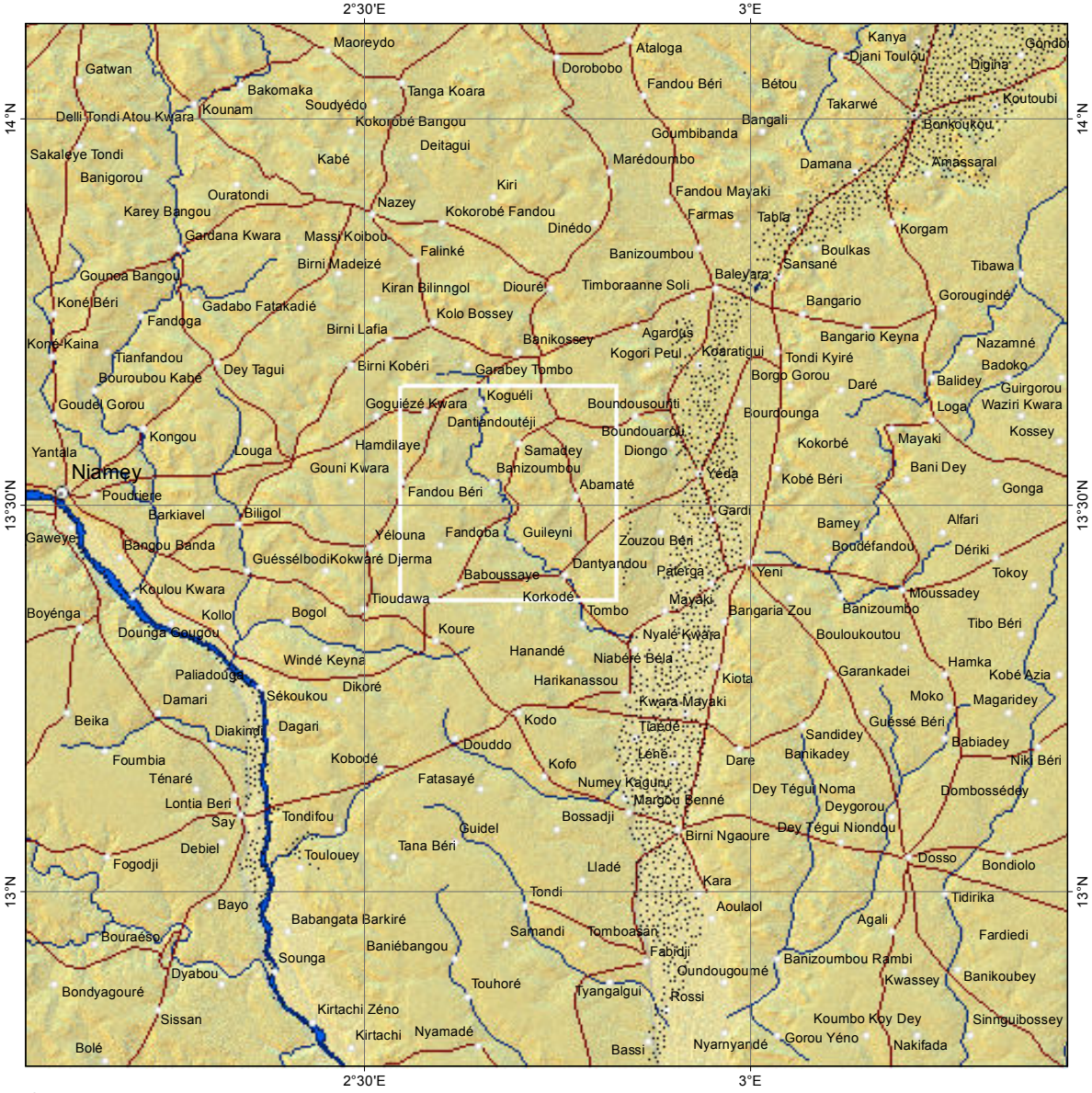
Citation: Hijmans et al (2005)

Aridity Index

Aridity Index indicates the level of dryness, taking evapotranspiration into account, at a given location of known rainfall

Citation: Trabucco et al (2009)

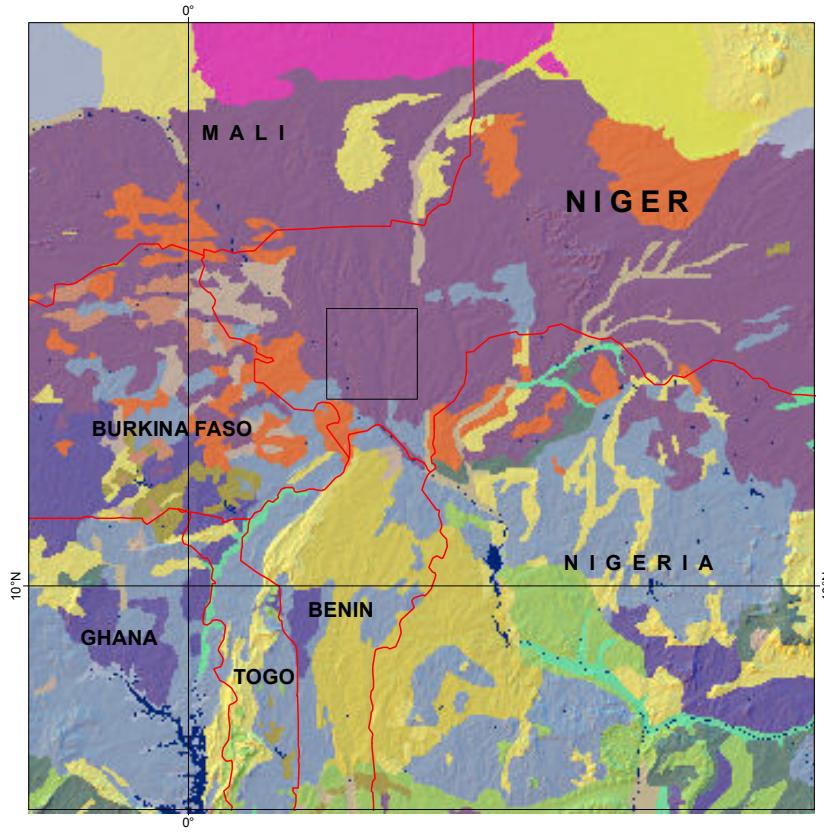
Altitude



Altitude indicates the height above sea level in meters

Citation: Jarvis et al (2008)

Soil Type



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.

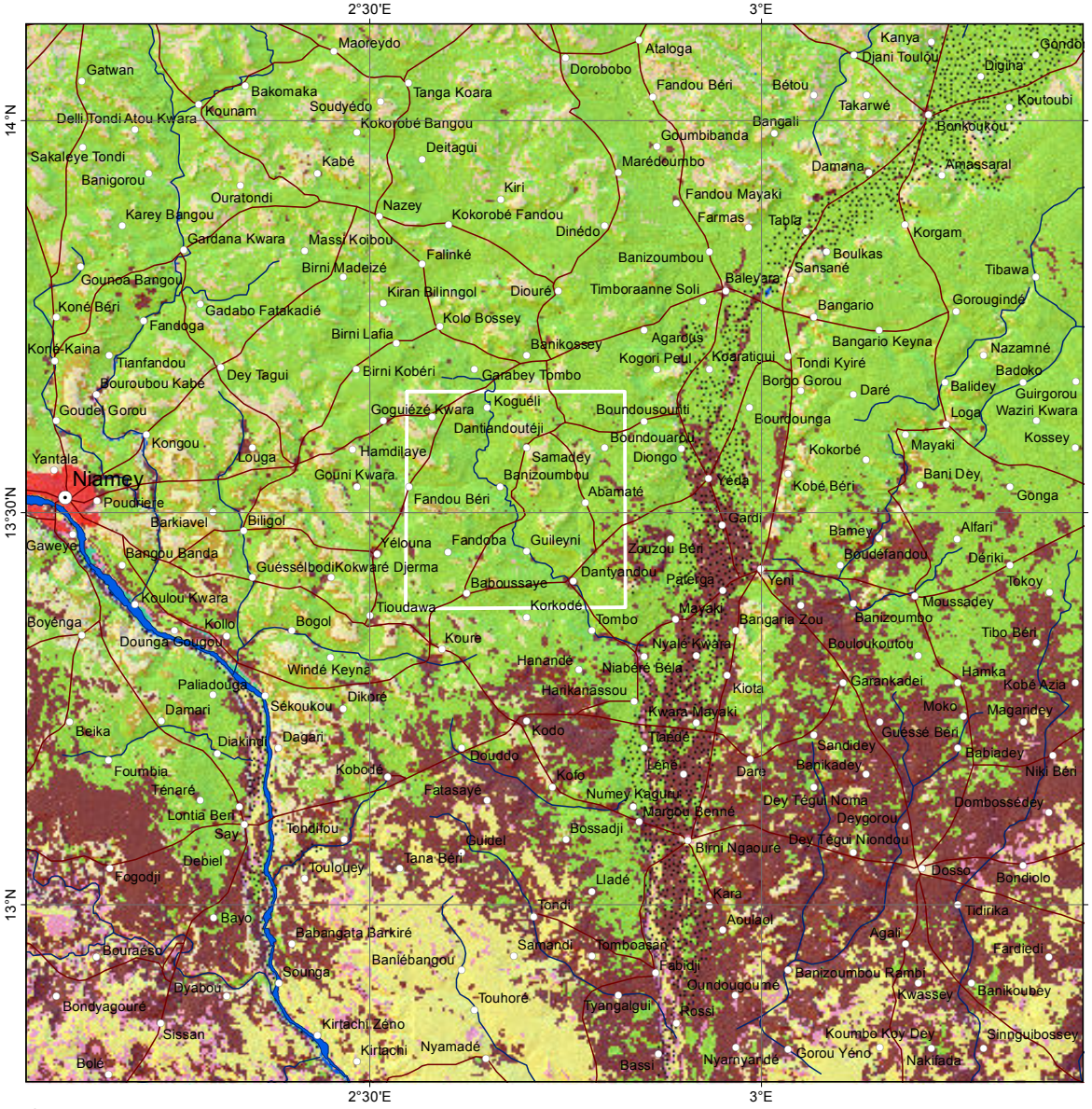
Citation: FAO et al (2009)

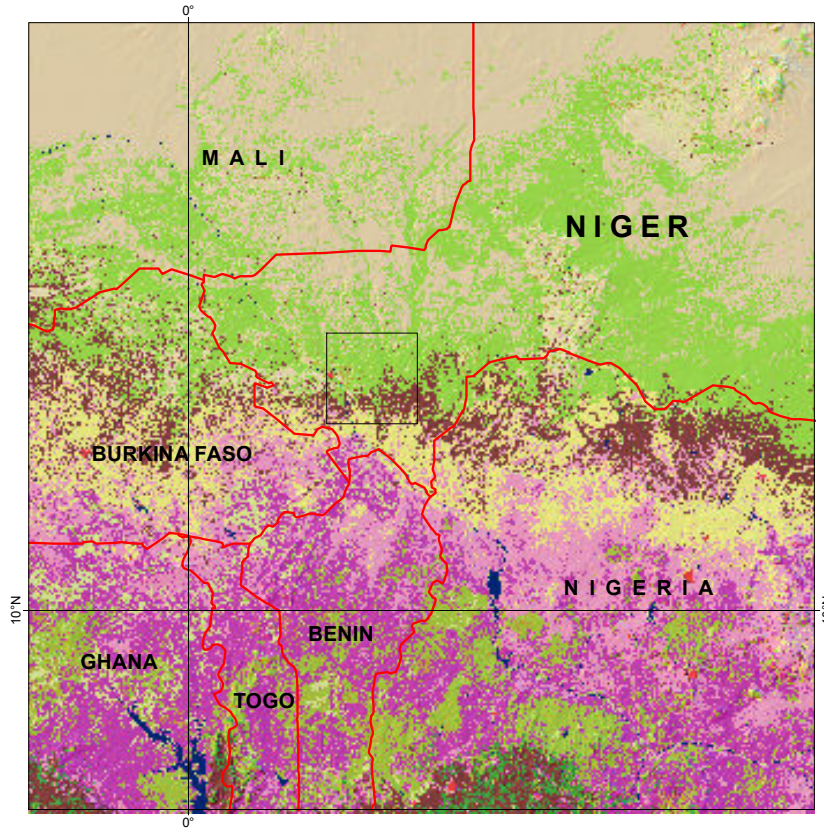
Agro-Ecological Zones

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 *

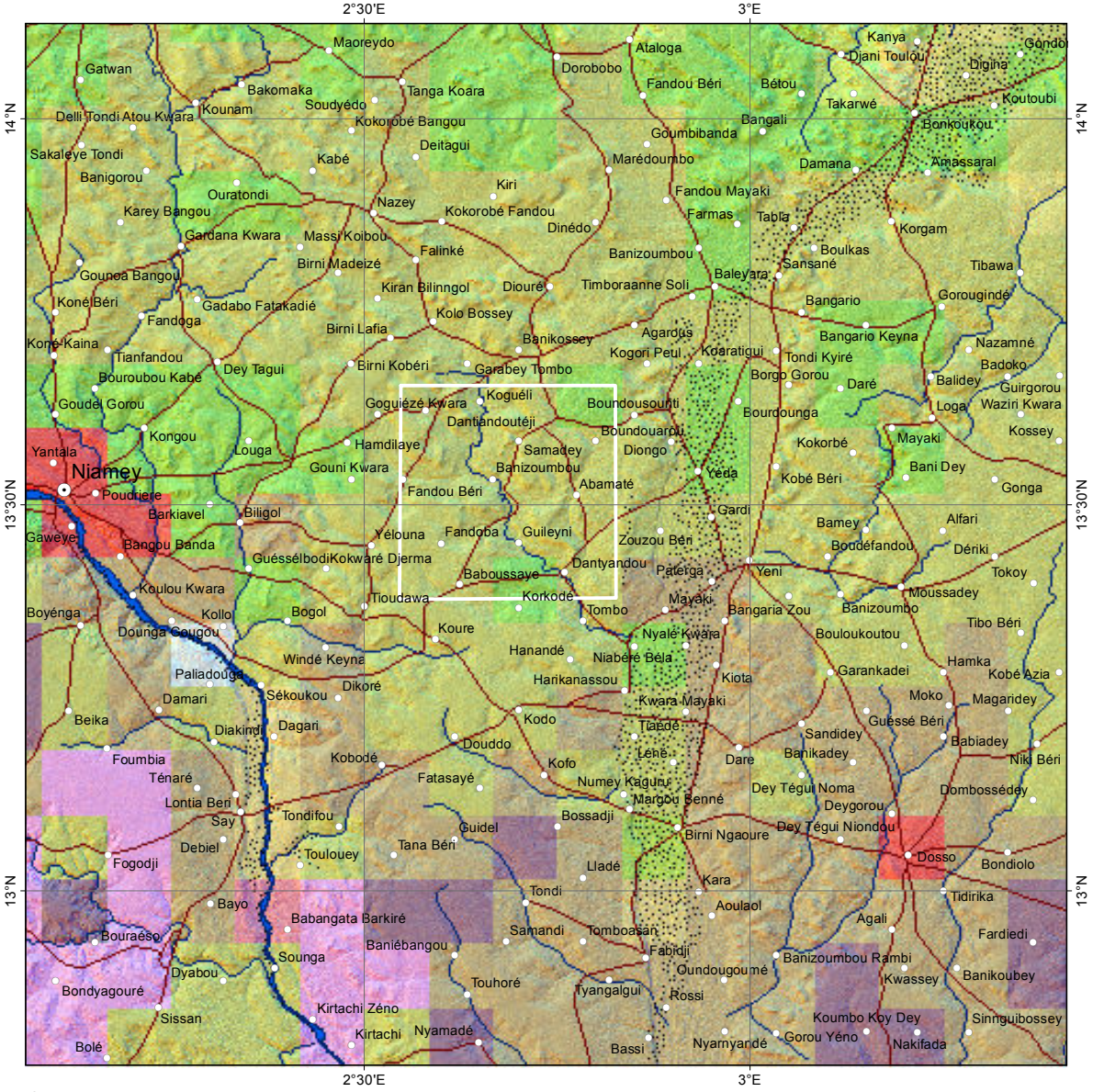
- Rainfed croplands
- Mosaic Croplands/Vegetation
- Mosaic Vegetation/Croplands
- Open broadleaved deciduous forest
- Mosaic Forest-Shrubland/Grassland
- Closed to open shrubland
- Mosaic Grassland/Forest-Shrubland
- Closed to open grassland
- Sparse vegetation
- Bare areas
- Urban area

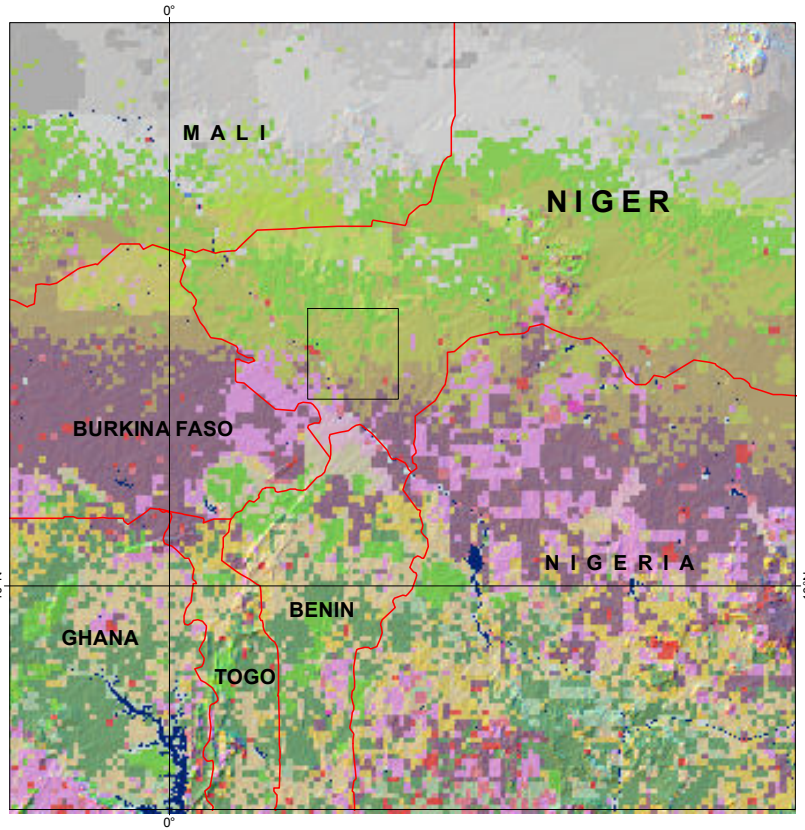
* Legend corresponds to left map

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





Landuse *

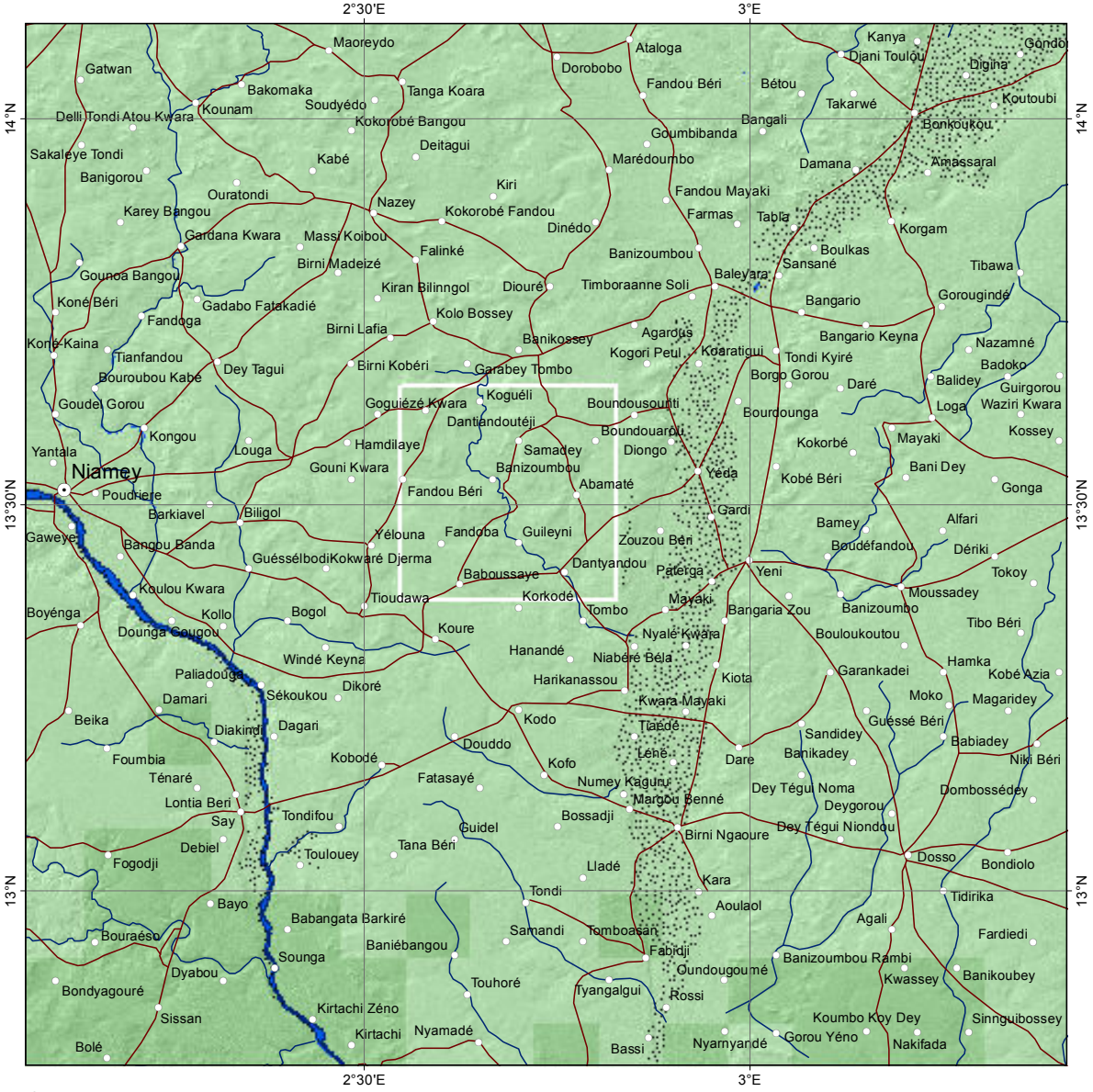
- Grasslands unmaganed
- Grasslands low livestock density
- Grasslands moderate livestock density
- Grasslands high livestock density
- Crops and moderate intensive livestock density
- Crops and high livestock density
- Sparsely vegetated areas unmanaged
- Sparcely vegetated areas with low livestock density
- Sparcely vegetated areas moderate or high livestoc
- Urban area
- Open water inland Fisheries

* 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, theremay be multiple land uses, the dominant one is presented here.

Citation: Natchtergaele et al (2010)

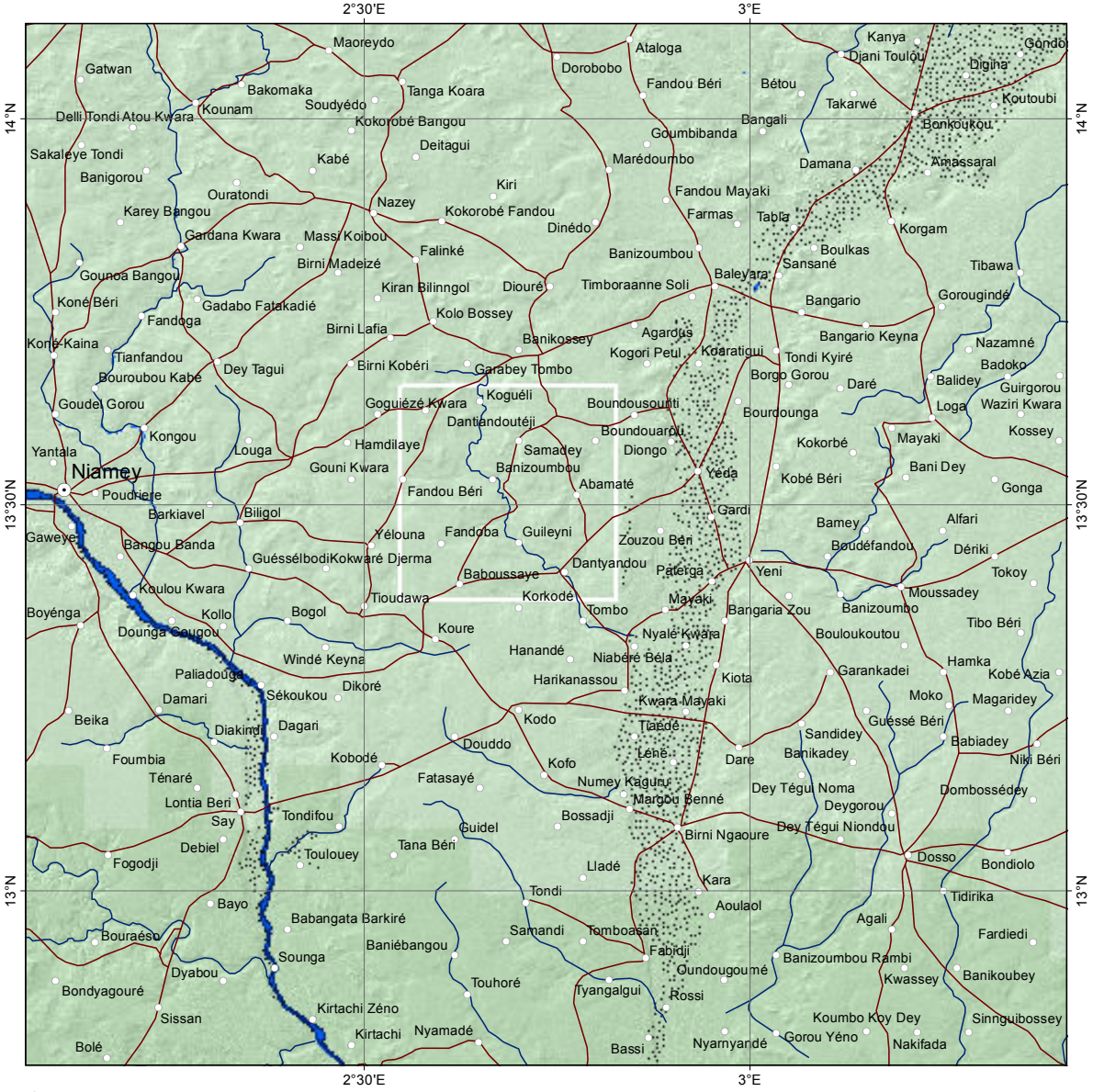
Length of Growing Period 2000



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.

Citation: Thornton et al (2006)

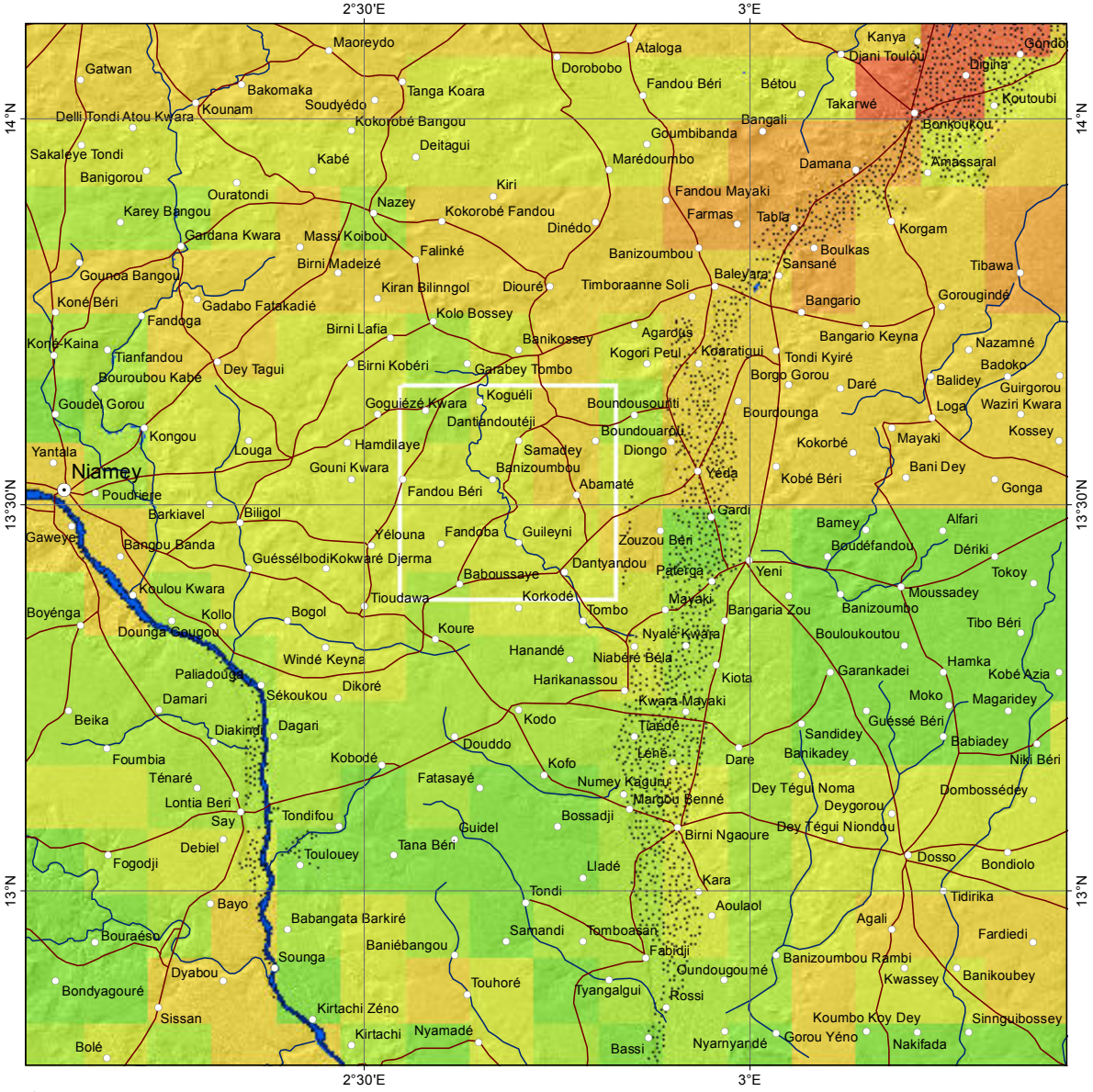
Length of Growing Period 2030

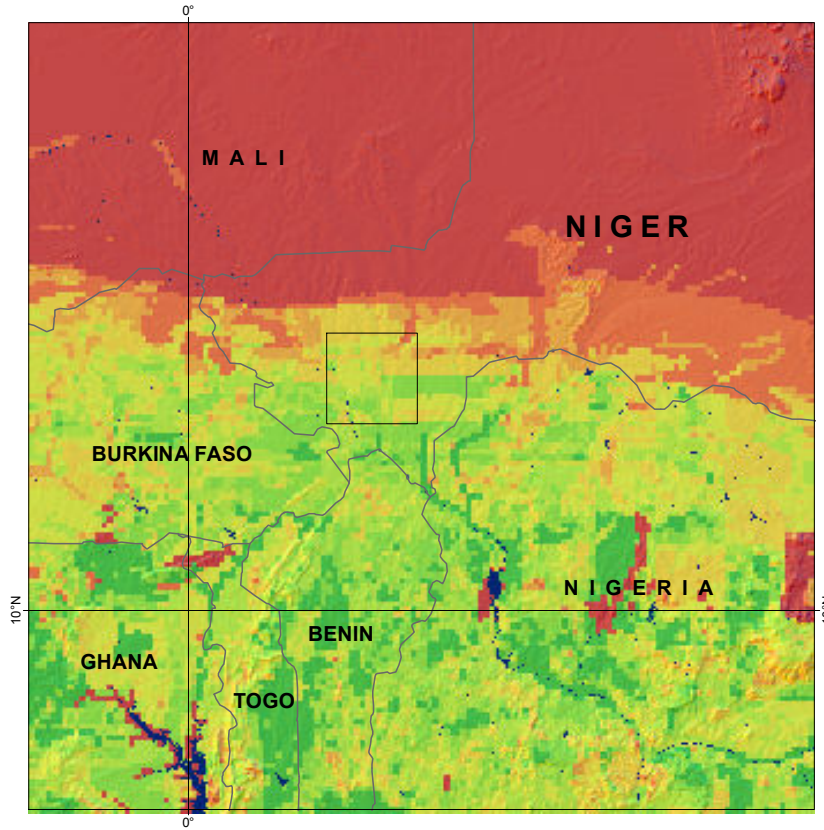


The Length of Growing Period (LGP) is defined as the number of days in a year during which there is available rainfed soil moisture supply for plant growth; here modeled for 2030.

Citation: Thornton et al (2006)

Crop Suitability





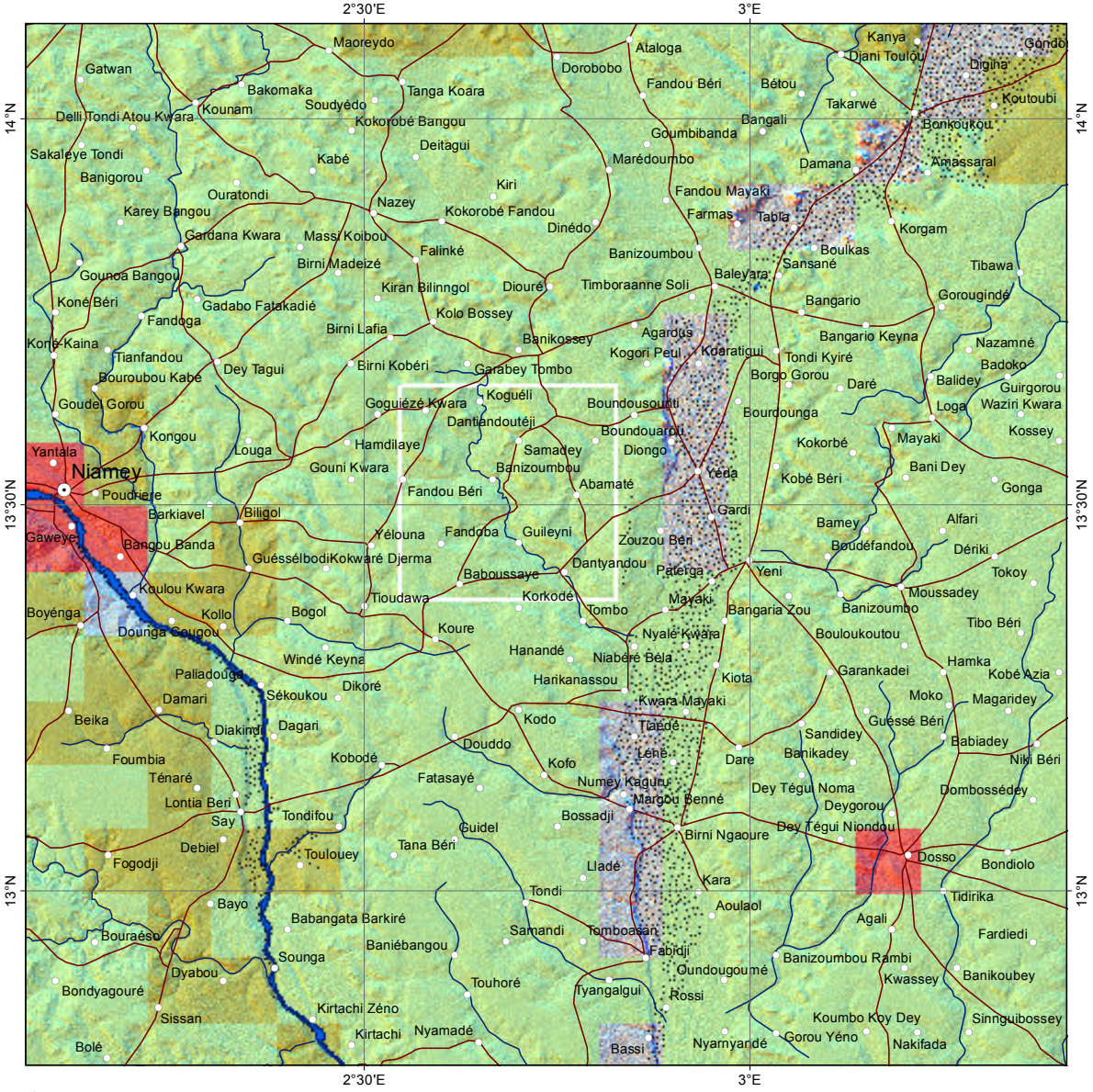
Crop Suitability

- Not suitable
- Very low
- Low
- Medium low
- Medium
- Medium high
- High

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



Mixed Rainfed
- Arid / Semi-arid
- Humid / sub-humid
- Temperate / highland

Mixed Irrigated
- Arid / semi-arid
- Humid / sub-humid
- Temperate / highland

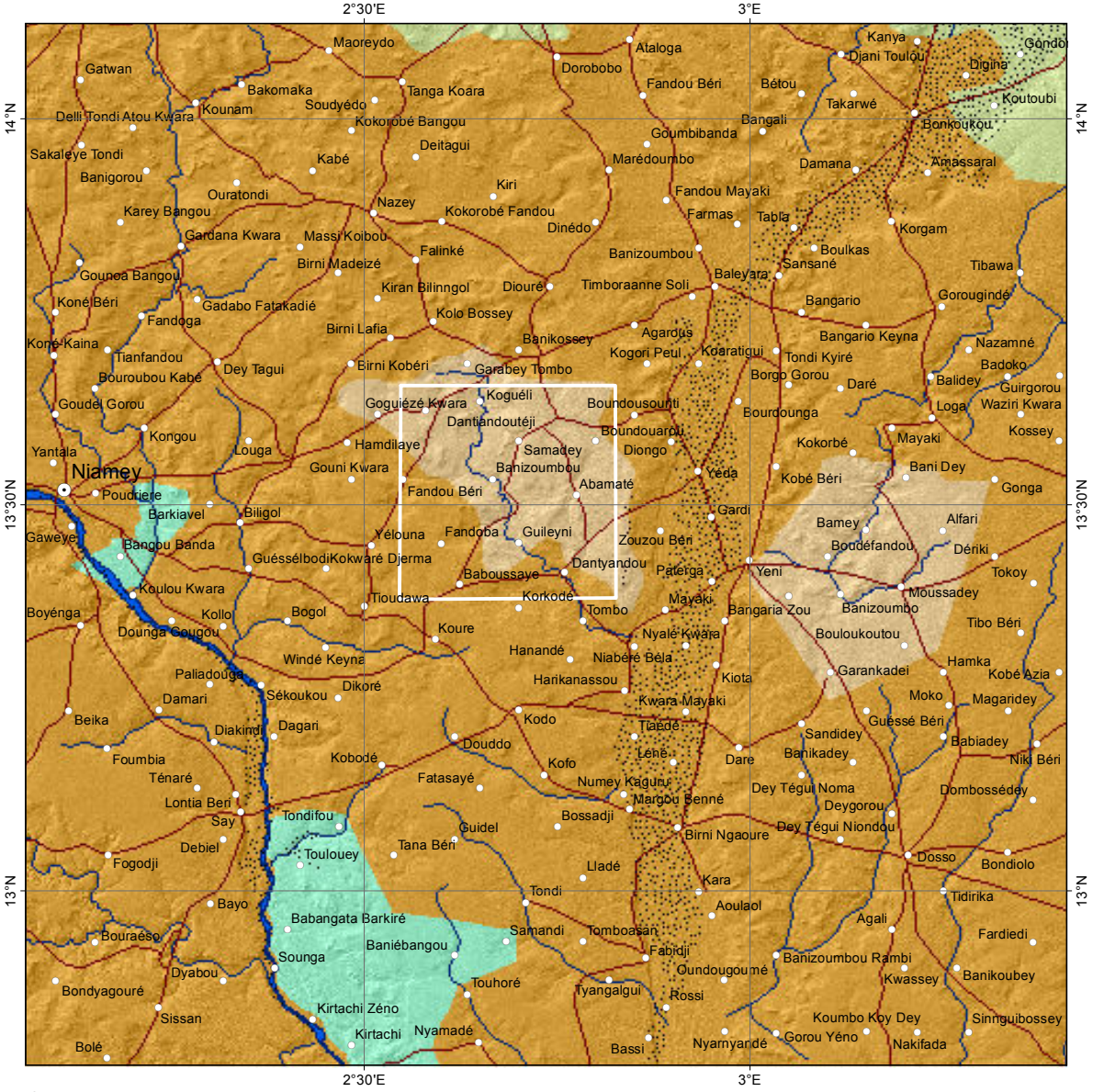
Livestock only
- Arid /semi-arid
- Temperate / highland
- Closed to open shrubland

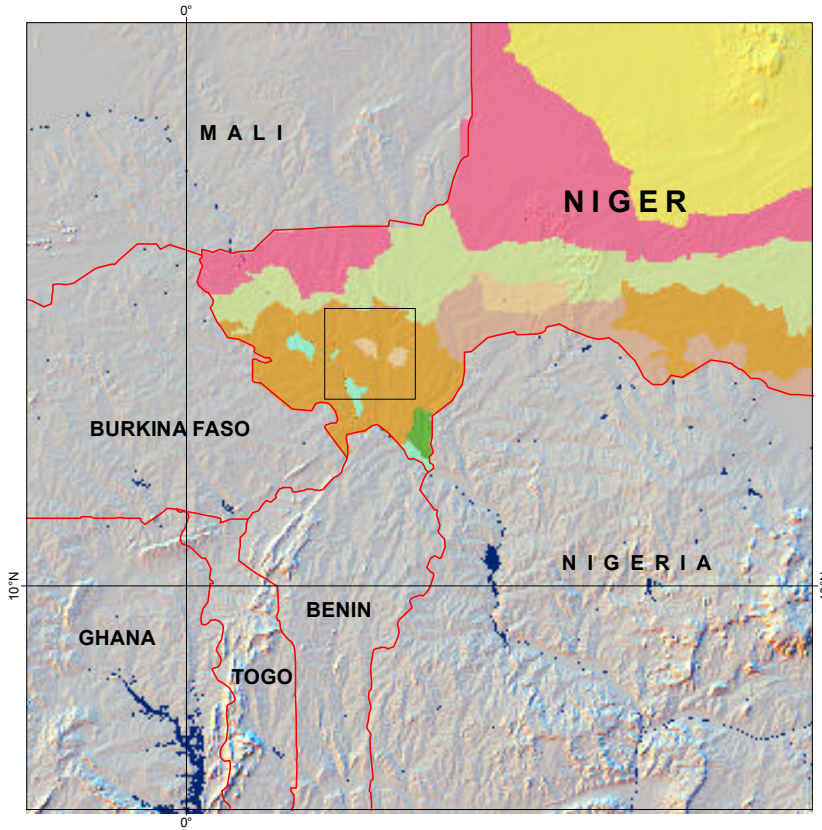
- Urban area
- Other

Livestock Production Systems as part of agricultural systems take agro-climatic conditions into account and are classified in 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)

Livelihood Zones

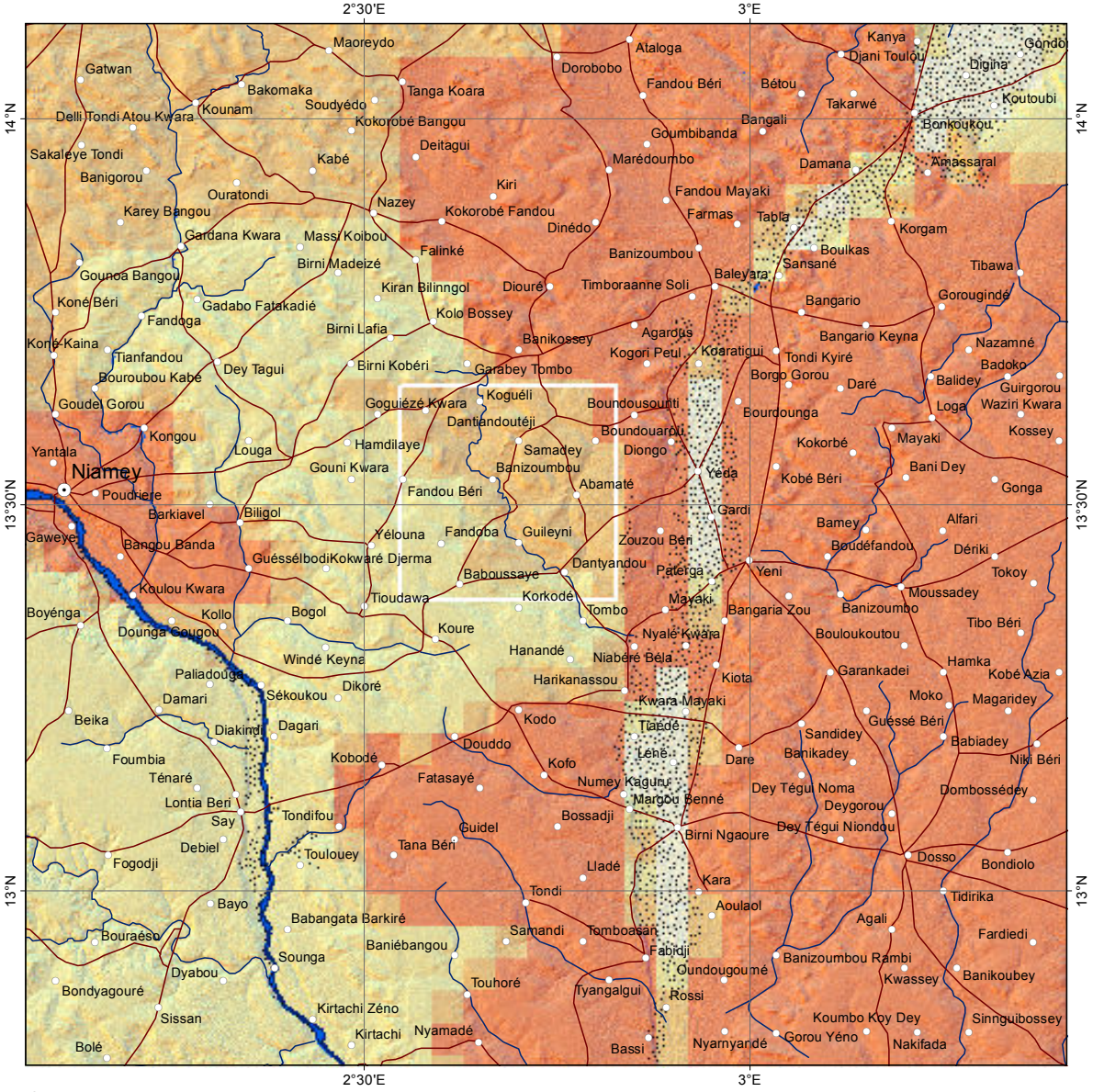




Livelihoods are complex and shaped by a variety of factors. These livelihood zone maps delineate geographic areas within which people broadly share the same livelihood patterns including access to food, income, and markets.

Citation: USAID (2011)

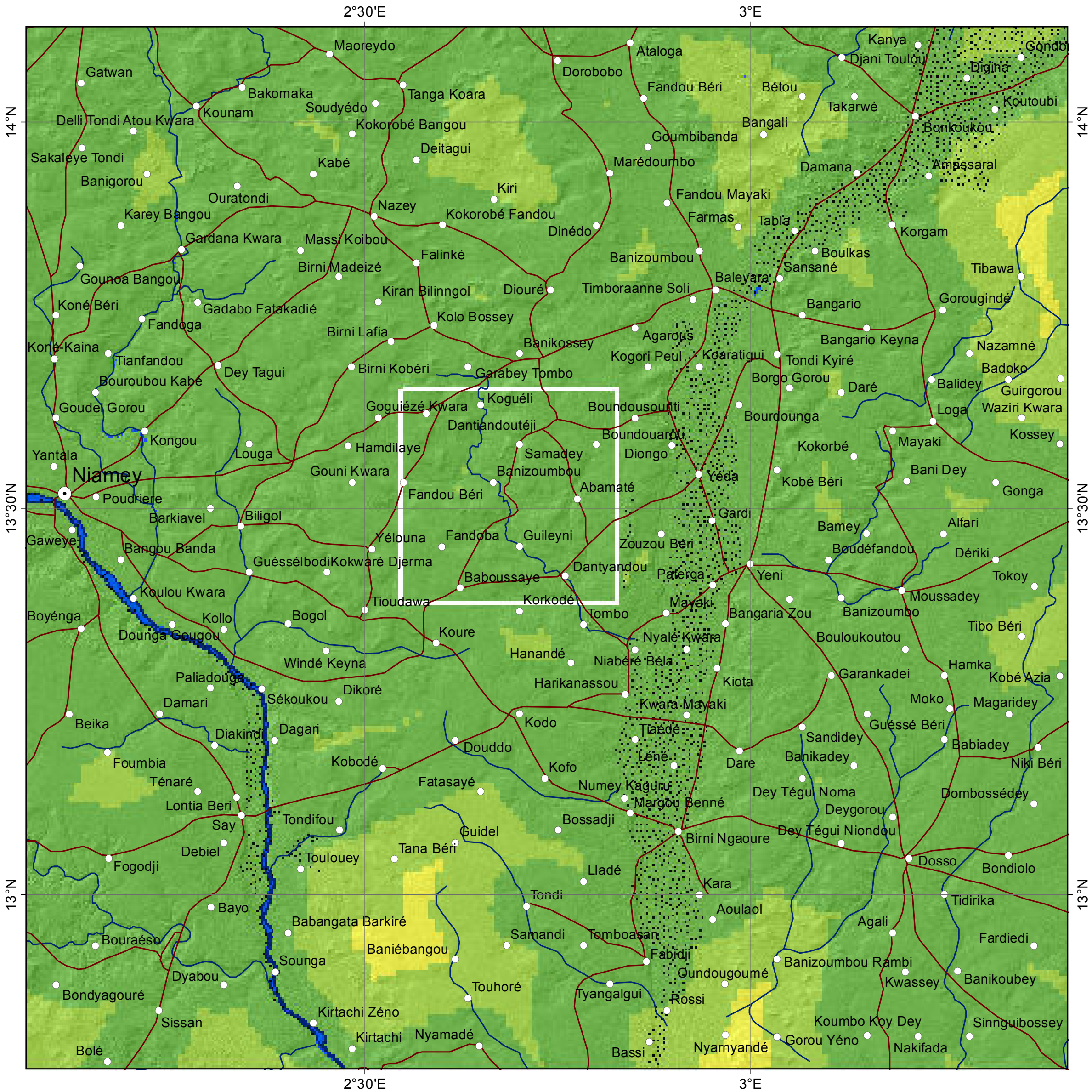
Human Population Density



Human Population Density is the gridded number of persons per km 2 in 2005.

Citation: CIESIN (2005)

Market Access



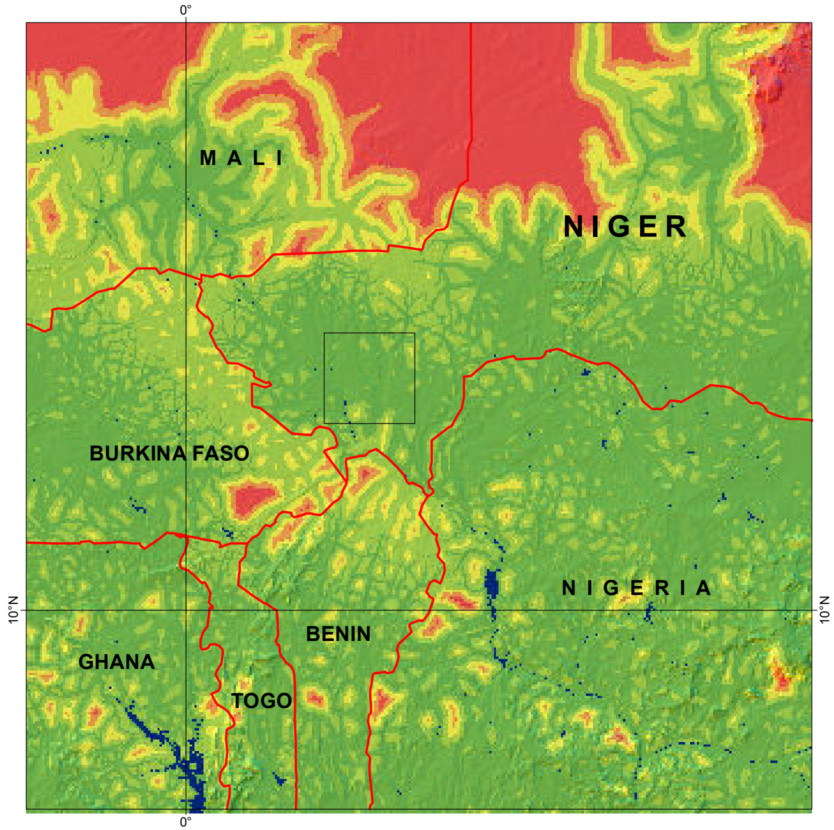
Town
Settlement
Road
River
River Bed

Scale 1:1,000,000

0 5 10 20 30 40 50 Kilometers

1 cm = 10 km

Fakara
CCAFS sampling frame



International boundary

Corresponds to the map on the left

Scale 1:12,500,000

0 125 250 500 Kilometers

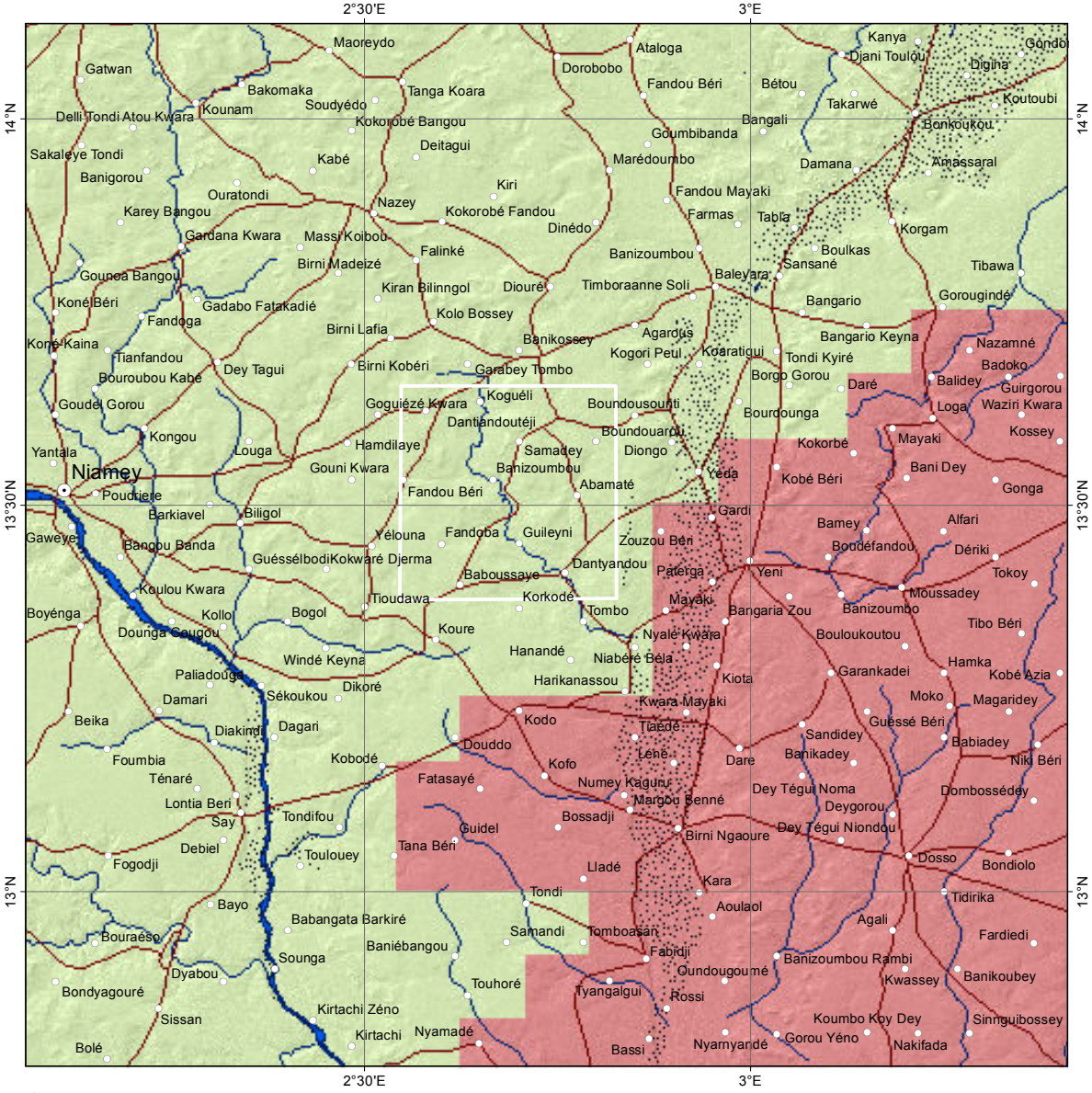
Travel time to nearest large town/city (Hours)

- < = 5
- 5 - 10
- 10 - 15
- 15 - 20
- > =20

Travel time is a measure of accessibility determined in the time (hours) taken to the nearest urban centre, town or city of a population 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 represent protected areas that,according to IUCN, are clearly defined geographic spaces, recognized, dedicated 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 represenation 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
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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
FAO/IIASA/ISRIC/ISS-CAS/JRC. 2009. Harmonized World Soil Database (version 1.1). FAO, Rome, Italy and IIASA, Laxenburg, Austria.

Agro-Ecological Zones
Fischer, G., F. Nachtergaele, S. Prieler, H.T. van Velthuizen, L. Verelst, D. Wiberg, 2008. Global Agro-ecological Zones Assessment for Agriculture (GAEZ 2008). IIASA, Laxenburg, Austria and FAO, Rome, Italy

Landcover
Arino, O., Perez J. R., Kalgirou V., Defourny P., Achard F. 2009. GlobCover. Version 2.3 Global. Accessed at http://ionia1.esrin.esa.int/

Landuse
Natchtergaele F., Petri M., 2010. Mapping Land Use at global and Regional Scales for Land Degradation Assessment Analysis (LADA).Version 1.1.
LADA Project FAO/UNEP GEF/.
http://www.fao.org/geonetwork/srv/en/metadata.show?id=37139&currTab=simple

Length of Growing Period 2000
Thornton P K, Jones P G, Owiyo T, Kruska R L, Herrero M, Kristjanson P, Notenbaert A, Bekele N and Omolo A, with contributions from Orindi V, Adwerah A, Otiende B, Bhadwal S, Anantram K, Nair S and Kumar V. 2006. Mapping climate vulnerability and poverty in Africa. Report to the Department for International Development, International Livestock Research Institute, Nairobi, Kenya, 200 p.

Length of Growing Period 2030
Thornton P K, Jones P G, Owiyo T, Kruska R L, Herrero M, Kristjanson P, Notenbaert A, Bekele N and Omolo and Kumar V. 2006. Mapping climate vulnerability and poverty in Africa. Report to the

Department for International Development, International Livestock Research Institute, Nairobi, Kenya, 200 p.

Crop Suitability
FAO-IIASA 2007. Mapping biophysical factors that influence agricultural production and rural vulnerability. Food and Agriculture Organization and International Institute for Applied Systems Analysis, Rome 2007.

Livestock Production Systems
FAO. 2007. Gridded livestock of the world 2007, by G.R.W. Wint and T.P. Robinson.Rome, pp 131.

Livestock Density
Wint W, Robinson T, 2007. Gridded Livestock of the World.
FAO, 131 pp.

Livelihood Zones
Livelihood Zone Products. Famine Early Warning Systems Network (FEWS NET). Accessed at http://www.fews.net/pages/livelihoods.aspx?loc=6&l=en.

Human Population Density
Center for International Earth Science Information Network (CIESIN)/Columbia University, and Centro Internacional de Agricultura Tropical (CIAT, 2005. Gridded Population of the World, Version 3 (GPWv3): Population Density Grid, Future Estimates, Edition: 3.0. NASA Socioeconomic Data and Applications Center (SEDAC. Online_Linkage: http://sedac.ciesin.columbia.edu/data/set/gpw-v3-population-density-future-estimates

Market Access
Nelson, A. (2008) Estimated travel time to the nearest city of 50,000 or more people in year 2000. Global Environment Monitoring Unit - Joint Research Centre of the European Commission, Ispra Italy. Available at http://www-tem.jrc.it/accessibility (accessed 06/03/2004)

Poverty
Center for International Earth Science Information Network (CIESIN), Columbia University, 2005. Small Area Estimates of Poverty and Inequality (SAEPI) database. Palisades, NY: CIESIN, Columbia University. Available at http://www.ciesin.columbia.edu/povmap. (Version 1.0) Available at http://sedac.ciesin.columbia.edu/theme/poverty

Conservation Areas
UNEP-WCMC (2012). Data Standards for the World Database on Protected Areas. UNEP-WCMC: Cambridge, UK.

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The CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) brings together the world's best researchers in agricultural science, development research, climate science and Earth System science, to identify and address the most important interactions, synergies and tradeoffs between climate change, agriculture and food security. CCAFS is a strategic partnership of CGIAR and Future Earth, led by the International Center for Tropical Agriculture (CIAT).

For more information, visit *www.ccafs.cgiar.org* and *www.geomapa.nl*

CGIAR RESEARCH PROGRAM ON Climate Change, Agriculture and Food Security CCAFS

GeoMapa GIS/Cartography

Stevie Mann/ILRI