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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://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 Makueni / Wote in Kenya, in East Africa Region.
CCAFS Sites: East Africa

Ethiopia: Borana (ET01)
Kenya: Nyando (KE01)
Kenya: Makueni (KE02)
Uganda: Albertine Rift (UG01)
Uganda: Kagera Basin (UG02)
Tanzania: Usambara (TZ01)

Citation: GeoMapa (2013a)
Topography Makueni

CCAFS Site KE02, Makueni / Wote, Kenya

Coordinates of the CCAFS Baseline Sampling Frame
37.724E 1.809S
37.724E 1.900S
37.630E 1.900S
37.630E 1.809S

Sampling frame size: 10km x 10km

Citation: GeoMapa (2013b)
Satellite Image Wote

RapidEye imagery from 24-12-2010 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

Scale 1:100,000

Kathonzweni
Kithoni
Soweto
Sinai
Kwa Mboo
Itunguni
Corner Baridi
Kikeneani

Citation: RapidEye (2010)
Annual Temperature

Citation: Hijmans et al (2005)

Citation: Jones et al (2002)
Aridity Index indicates the level of dryness, taking evapotranspiration into account, at a given location of known rainfall.

Citation: Trabucco et al (2009)
Altitude indicates the height above sea level in meters.
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.

* Legend corresponds to left map

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.
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 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.

Legend corresponds to left map

Citation: Natchtergaele et al (2010)
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)
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 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 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)
Livestock Density is measured in numbers of livestock, including cattle, goats and sheep, per km².
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 km² in 2005.

Citation: CIESIN (2005)
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).
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.
Conservation Areas

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

Citation: UNEP and WCMC (2012)
References and Data Sources

Regional Map

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

Annual Rainfall Graph

Annual Temperature

Annual Temperature Graph

Aridity Index

Altitude

Landforms

Soil Type

Agro-Ecological Zones

Landcover

Landuse

Length of Growing Period 2000
Length of Growing Period 2030

Crop Suitability

Livestock Production Systems

Livestock Density
FAO, 131 pp.

Livelihood Zones

Human Population Density

Market Access

Poverty


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