Confidential Information, Geospatial Variables

To maintain the confidentiality of our respondents, certain parts of the ECVMA database have not been made publicly available. The confidential variables pertain to (i) names of the respondents to the household and community questionnaires, (ii) village and constituency names, (iii) descriptions of household dwelling and agricultural plot locations, (iv) phone numbers of household members and their reference contacts, (v) GPS-based household and agricultural plot locations, (vi) names of individuals listed in the network roster, and (vii) names of field staff.

To increase the use of the ECVMA data, a set of geospatial variables has been provided by using the georeferenced plot and household locations in conjunction with various spatial databases that were available to the survey team. These include measures of distance, climatology, soil and terrain and other environmental factors. Time-series on rainfall and vegetation have also been used to describe the survey agricultural season relative to normal conditions. These variables are intended to provide some understanding of how geophysical characteristics vary at the landscape level. The tables below provide the name, type, source, reference period, resolution, description, and source of each variable.

The geovariables are stored in two data files, one at the household-plot-level, and the other at the household-level. The plot-level file, named **NER_PlotGeovariables_Y1**, contains four geospatial variables measuring plot distance to household, slope, elevation and potential wetness index for plot locations. The observations are uniquely identified by the combination of **grappe, ménage, order, parcel and field**. The observations included in this file are plots that are owned and/or cultivated by the household and that have been visited for GPS-based land area measurement.

The rest of the geovariables are stored in **NER_HouseholdGeovariables_Y1** and the observations are uniquely identified by **hid.** To partially satisfy the demand for georeferenced household and community locations while preserving the confidentiality of sample household and communities, we have computed the average of household GPS coordinates in each EA, applied a random offset within a specified range to the average EA value (following the MeasureDHS methodology) and provided the offset EA latitudes and longitudes as part of **NER_EA_Offsets.**

More specifically, the coordinate modification strategy relies on random offset of cluster center-point coordinates (or average of household GPS locations by EA in ECVMA) within a specified range determined by an urban/rural classification. For urban areas a range of 0-2 km is used. In rural areas, where communities are more dispersed and risk of disclosure may be higher, a range of 0-5 km offset is used. An additional 0-10 km offset for 1% of rural clusters effectively increases the known range for all rural points to 10 km while introducing only a small amount of noise. Offset points are constrained at the zone level, so that they still fall within the correct zone for spatial joins, or point-in-polygon overlays. The result is a set of coordinates, representative at the EA level, that fall within known limits of accuracy. Users should take into account the offset range when considering different types of spatial analysis or queries with the data. Analysis of the spatial relationships between locations in close proximity would not be reliable. However, spatial queries using medium or low resolution datasets should be minimally affected by the offsets.

Finally, all geospatial variables have been produced using the unmodified GPS data. Efforts have been made to correct obvious data entry errors, but this is not always possible. A variable of qa_type and plot_qa_type is included in the household and plot-level geovariable files as an indicator of coordinate reliability, with a value of "5" indicating that the location falls outside expected range of values (more than 10 km from the EA centerpoint for households and more than 10 km from household for plots).

Table 1 NER_PlotGeovariables_Y1

Theme	Source	Dataset Title	Variable Name	Variable Type	Reference Period	Resolution	Description	Web
Distance	LSMS-ISA	Plot Distance to Household	dist_household	Continuous	N/A	N/A	Plot distance to household	
Soil & Terrain	NASA	SRTM 90m	plot_srtm	Continuous	N/A	0.000833 dd	Elevation (m)	ftp://xftp.jrc.it/pub/srtmV4/arcasci/
	USGS	Slope (percent)	plot_srtmslp	Continuous	N/A	0.000833 dd	Derived from unprojected 90m SRTM using DEM Surface Tools	
	AfSIS	Topographic Wetness Index	plot_twi	Continuous	N/A	0.000833 dd	Downloaded from AfSIS website. Derived from modified 90m SRTM. Local upslope contributing area and slope are combined to determine the potential wetness index: WI = ln (A s / tan(b)) where A s is flow accumulation or effective drainage area and b is slope gradient.	http://www.ciesin.columbia.edu/afsis/bafsis_fullmap.htm#

Table 2 NER_HouseholdGeovariables_Y1

Theme	Source	Dataset Title	Variable Name	Variable Type	Reference Period	Resolution	Description	Web
	ISCGM & World Bank	Household Distance to Main Road	dist_road	Continuous	2007	N/A	Household distance to nearest major road (class 'Routes Nationales')	www.iscgm.org
	World Gazetteer	Household Distance to Towns	dist_popcenter	Continuous	2001	N/A	Household distance to nearest town of >20,000 based on 2007 Census	world-gazetteer.com
	USAID FEWSNET	Household Distance to Key Market Centers	dist_market	Continuous	N/A	N/A	Household distance to nearest major market (FEWSNET key market centers)	
	Tracks4Africa, IGN map series	Household Distance to Border Posts	dist_borderpost	Continuous	N/A	N/A	Border control posts from PADKOS database, plus other border crossings on major road	
	INS & World Gazetteer	Household Distance to Regional Capital	dist_adm1ctr	Continuous	N/A	N/A	Household distance to to the capital of the region of residence	world-gazetteer.com
	INS & World Gazetteer	Household Distance to Department Capital	dist_adm2ctr	Continuous	N/A	N/A	Household distance to to the capital of the region of residence	world-gazetteer.com
Climatology	UC Berkeley	WorldClim Bioclimatic Variables	af_bio_1	Continuous	1960-1990	0.008333 dd	Average annual temperature calculated from monthly climatology, multiplied by 10 (°C)	http://www.worldclim.org/bioclim
	UC Berkeley	WorldClim Bioclimatic Variables	af_bio_8	Continuous	1960-1990	0.008333 dd	Average temperature of the wettest quarter, from monthly climatology, multiplied by 10. (°C)	http://www.worldclim.org/bioclim
	UC Berkeley	WorldClim Bioclimatic Variables	af_bio_12	Continuous	1960-1990	0.008333 dd	Total annual precipitation, from monthly climatology (mm)	http://www.worldclim.org/bioclim
	UC Berkeley	WorldClim Bioclimatic Variables	af_bio_13	Continuous	1960-1990	0.008333 dd	Precipitation of wettest month, from monthly climatology (mm)	http://www.worldclim.org/bioclim
	UC Berkeley	WorldClim Bioclimatic	af_bio_16	Continuous	1960-1990	0.008333 dd	Precipitation of wettest quarter, from monthly	http://www.worldclim.org/bioclim

Theme	Source	Dataset Title	Variable Name	Variable Type	Reference Period	Resolution	Description	Web
		Variables					climatology (mm)	
Landscape Typology	ESA and UC Louvain	GlobCover v 2.3	fsrad3_lcmaj	Categorical	2009	0.002778 dd	Majority landcover class within approximately 1km buffer	http://ionia1.esrin.esa.int/
	ESA and UC Louvain	GlobCover v 2.3	fsrad3_agpct	Continuous	2009	0.002778 dd	Percent under agriculture within approx 1 km buffer	http://ionia1.esrin.esa.int/
	IFPRI	IFPRI standardized AEZ based on elevation, climatology	ssa_aez09	Categorical		0.008333 dd	Agro-ecological zones created using WorldClim climate data and 0.0833dd resolution LGP data from IIASA.	http://harvestchoice.org/production/biophysical/agroecology
Soil & Terrain	NASA	SRTM 90m	srtm	Continuous		0.000833 dd	Elevation (m)	ftp://xftp.jrc.it/pub/srtmV4/arcasci/
	AfSIS	Topographic Wetness Index	twi	Continuous		0.000833 dd	Downloaded from AfSIS website. Derived from modified 90m SRTM. Local upslope contributing area and slope are combined to determine the potential wetness index: WI = ln (A s / tan(b)) where A s is flow accumulation or effective drainage area and b is slope gradient.	http://www.ciesin.columbia.edu/afsis/bafsis_fullmap.htm#
	LSMS-ISA	Terrain Roughness	srtm_5_15	Categorical		0.000833 dd	Derived from 90m SRTM using 15 Meybeck relief classes and 5x5 pixel neighborhood	
	FAO	Harmonized World Soil Database	SQ1	Categorical		0.083333 dd	Nutrient availability	http://www.iiasa.ac.at/Research/LUC/External-World-soil-database/HTML/
	FAO	Harmonized World Soil Database	SQ2	Categorical		0.083333 dd	Nutrient retention capacity	http://www.iiasa.ac.at/Research/LUC/External-World-soil-database/HTML/
	FAO	Harmonized World Soil Database	SQ3	Categorical		0.083333 dd	Rooting conditions	http://www.iiasa.ac.at/Research/LUC/External-World-soil-database/HTML/
	FAO	Harmonized World Soil	SQ4	Categorical		0.083333 dd	Oxygen availability to roots	http://www.iiasa.ac.at/Research/LUC/External-World-

Theme	Source	Dataset Title	Variable Name	Variable Type	Reference Period	Resolution	Description	Web
		Database						soil-database/HTML/
	FAO	Harmonized World Soil Database	SQ5	Categorical		0.083333 dd	Excess salts	http://www.iiasa.ac.at/Research/LUC/External-World-soil-database/HTML/
	FAO	Harmonized World Soil Database	SQ6	Categorical		0.083333 dd	Toxicity	http://www.iiasa.ac.at/Research/LUC/External-World-soil-database/HTML/
	FAO	Harmonized World Soil Database	SQ7	Categorical		0.083333 dd	Workability (constraining field management)	http://www.iiasa.ac.at/Research/LUC/External-World-soil-database/HTML/
Crop Season Parameters	NOAA CPC	Rainfall Estimates (RFE)	anntot_avg	Continuous	2001-2011	0.1 dd	Average 12-month total rainfall (mm) for Jan-Dec	ftp://ftp.cpc.ncep.noaa.gov/fews/newalgo_est_dekad/
	NOAA CPC	Rainfall Estimates (RFE)	wetQ_avg	Continuous	2001-2011	0.1 dd	Average total rainfall in wettest quarter (mm) within 12-month periods from Jan-Dec	ftp://ftp.cpc.ncep.noaa.gov/fews/newalgo_est_dekad/
	NOAA CPC	Rainfall Estimates (RFE)	wetQ_avgstart	Continuous	2001-2011	0.1 dd	Average start of wettest quarter in dekads 1-36, where first dekad of Jan =1	ftp://ftp.cpc.ncep.noaa.gov/fews/newalgo_est_dekad/
	NOAA CPC	Rainfall Estimates (RFE)	h2011_tot	Continuous	2011	0.1 dd	12-month total rainfall (mm) in Jan-Dec, starting January 2011	ftp://ftp.cpc.ncep.noaa.gov/fews/newalgo_est_dekad/
	NOAA CPC	Rainfall Estimates (RFE)	h2011_wetQ	Continuous	2011	0.1 dd	Total rainfall in wettest quarter (mm) within 12-month periods starting January 2011	ftp://ftp.cpc.ncep.noaa.gov/fews/newalgo_est_dekad/
	NOAA CPC	Rainfall Estimates (RFE)	h2011_wetQstart	Continuous	2011	0.1 dd	Start of wettest quarter in dekads 1-36, where first dekad of January 2011 =1	ftp://ftp.cpc.ncep.noaa.gov/fews/newalgo_est_dekad/
	BU	MOD12Q2 Land Cover Dynamics (PHENOLOGY)	eviarea_avg	Continuous	2001-2011	0.004176 dd	Average total change in greenness (integral of daily EVI values) within main growing season, averaged by Department	ftp://e4ftl01.cr.usgs.gov/MOTA/MCD12Q2.005
	BU	MOD12Q2 Land Cover Dynamics (PHENOLOGY)	evimax_avg	Continuous	2001-2011	0.004176 dd	Average EVI value at peak of greenness, averaged by Department	ftp://e4ftl01.cr.usgs.gov/MOTA/MCD12Q2.005

Theme	Source	Dataset Title	Variable Name	Variable Type	Reference Period	Resolution	Description	Web
	BU	MOD12Q2 Land Cover Dynamics (PHENOLOGY)	grn_avg	Continuous	2001-2011	0.004176 dd	Average timing of onset of greenness increase in day of year 1-356, within main growing season, averaged by Department	ftp://e4ftl01.cr.usgs.gov/MOTA/MCD12Q2.005
	BU	MOD12Q2 Land Cover Dynamics (PHENOLOGY)	sen_avg	Continuous	2001-2011	0.004176 dd	Average timing of onset of greenness decrease in day of year 1-356, within main growing season, averaged by Department	ftp://e4ftl01.cr.usgs.gov/MOTA/MCD12Q2.005
	BU	MOD12Q2 Land Cover Dynamics (PHENOLOGY)	h2011_eviarea	Continuous	2011	0.004176 dd	Total change in greenness (integral of daily EVI values) within main growing season of 2011, averaged by Department	ftp://e4ftl01.cr.usgs.gov/MOTA/MCD12Q2.005
		MOD12Q2 Land Cover Dynamics (PHENOLOGY)	h2011_evimax	Continuous	2011	0.004176 dd	EVI value at peak of greenness within main growing season of 2011, averaged by Department	ftp://e4ftl01.cr.usgs.gov/MOTA/MCD12Q2.005
	BU	MOD12Q2 Land Cover Dynamics (PHENOLOGY)	h2011_grn	Continuous	2011	0.004176 dd	Onset of greenness increase in day of year 1-356, within main growing season of 2011, averaged by Department	ftp://e4ftl01.cr.usgs.gov/MOTA/MCD12Q2.005
	BU	MOD12Q2 Land Cover Dynamics (PHENOLOGY)	h2011_sen	Continuous	2011	0.004176 dd	Onset of greenness decrease in day of year 1-356, within main growing season of 2011, averaged by Department	ftp://e4ftl01.cr.usgs.gov/MOTA/MCD12Q2.005