Geospatial Variables
To maintain the confidentiality of our respondents, certain parts of the EAC-I 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 the children of the head/spouse living elsewhere, (vii) names of the deceased household members, (viii) names of individuals listed in the network roster, and (ix) names of field staff.

To facilitate the integration of other spatial data 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 (the MeasureDHS methodology, with some modifications) and provided the offset EA latitudes and longitudes as part of the file **EACI_Geovariables.**

More specifically, the coordinate modification strategy relies on random offset of EA center-points (or average of household GPS locations by EA in EAC-I) within a specified range determined by an urban/rural classification. In rural areas, where communities are more dispersed and risk of disclosure may be higher, a range of 0-5 km offset is used for 90% of EAs. A range of 0-10 km is applied in 10% of rural clusters, which effectively increases the known range for all rural points to 10 km while introducing a small amount of additional noise. For urban areas, the commune center is used. Urban area communes correspond to arrondissements, and are much smaller in extent than rural communes, resulting in a lower average offset from true location. The commune center (mean center of populated places) is also used in a small number of rural EAs where the 10 km range does not provide sufficient anonymization.

Offset points are constrained at the arrondissement level, so that they fall within the correct area 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.

To increase the usefulness and research potential of the EAC-I data, a set of geospatial variables has also been provided in the file **EACI_Geovariables**. To create the geospatial variables the modified locations are merged with various spatial databases that were available to the survey team and are standardized across LSMS-ISA program countries. 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, reference period, resolution, description, and source of each variable.

Table 1 EACI_Geovariables

Theme	Source	Dataset Title	Variable Name	Variable Type	Reference Period	Resolution	Description	Web
	DNR & World Bank	Distance to Main Road	dist_road	Continuous	2007	N/A	Distance to nearest major road (class 'Routes Nationales')	
	T. Brinkhoff: CityPopulation	Distance to Towns	dist_popcenter	Continuous	2009	N/A	Distance to nearest town of >20,000 based on 2009 Census	http://www.citypopulation.de
	UNOCHA/ WFP	Distance to Border Posts	dist_border	Continuous	N/A	N/A	Distance to nearest border control post	
	INSTAT	Distance to Regional Capital	dist_admctr	Continuous	N/A	N/A	Distance to the capital of the region of residence	
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 (℃)	http://www.worldclim.org/bioclim
Climatology	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. (℃)	http://www.worldclim.org/bioclim
Climatology	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
Climatology	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
Climatology	UC Berkeley	WorldClim Bioclimatic Variables	af_bio_16	Continuous	1960-1990	0.008333 dd	Precipitation of wettest quarter, from monthly climatology (mm)	http://www.worldclim.org/bioclim
Landscape Typology	IIASA-IFPRI	Cropland Map v8	hybrid_V8	Continuous	2009	0.008333 dd	Percentage cropland ranging from 0 to 100	http://ionia1.esrin.esa.int/
Landscape Typology	IFPRI	IFPRI standardized AEZ based on elevation, climatology	ssa_aez09	Categorical		0.00833 dd	Agro-ecological zones created using WorldClim climate data and 0.0833dd resolution LGP data from IIASA.	http://harvestchoice.org/production/biophysical/agroecology

Theme	Source	Dataset Title	Variable Name	Variable Type	Reference Period	Resolution	Description	Web
	WorldPop	Mali 2009 Population Density v 2b	popdensity	Categorical		0.00833 dd	Population per square kilometer, aggregated from source.	https://www.worldpop.org/
Soil & Terrain	NASA	SRTM	srtm1k	Continuous		0.00833 dd	Elevation (m), aggregated to 1km block	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#
	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 Database	sq4	Categorical		0.083333 dd	Oxygen availability to roots	http://www.iiasa.ac.at/Research/LUC/External-World-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/

Theme	Source	Dataset Title	Variable Name	Variable Type	Reference Period	Resolution	Description	Web
Crop Season Parameters	NOAA CPC	ARC 2	anntot_avg	Continuous	1983-2012	0.1 dd	Long-term average annual total rainfall (mm)	ftp://ftp.cpc.ncep.noaa.gov/fews/fewsdata/africa/arc2
	NOAA CPC	ARC 2	wetQ_avg	Continuous	1983-2012	0.1 dd	Long-term average total rainfall in wettest quarter (mm) within 12-month period	ftp://ftp.cpc.ncep.noaa.gov/fews/fewsdata/africa/arc2
	NOAA CPC	ARC 2	wetQ_avgstart	Continuous	1983-2012	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/fewsdata/africa/arc2
	NOAA CPC	ARC 2	h2014_tot	Continuous	2014	0.1 dd	12-month total rainfall (mm), starting January 2014	ftp://ftp.cpc.ncep.noaa.gov/fews/fewsdata/africa/arc2
	NOAA CPC	ARC 2	h2014_wetQ	Continuous	2014	0.1 dd	Total rainfall in wettest quarter (mm) within 12-month periods starting January 2014	ftp://ftp.cpc.ncep.noaa.gov/fews/fewsdata/africa/arc2
	NOAA CPC	ARC 2	h2014_wetQstart	Continuous	2014	0.1 dd	Start of wettest quarter in dekads 1-36, where first dekad of January 2014 =1	ftp://ftp.cpc.ncep.noaa.gov/fews/fewsdata/africa/arc2
	NOAA CPC	ARC 2	h2017_tot	Continuous	2017	0.1 dd	12-month total rainfall (mm), starting January 2017	ftp://ftp.cpc.ncep.noaa.gov/fews/fewsdata/africa/arc2
	NOAA CPC	ARC 2	h2017_wetQ	Continuous	2017	0.1 dd	Total rainfall in wettest quarter (mm) within 12-month periods starting January 2017	ftp://ftp.cpc.ncep.noaa.gov/fews/fewsdata/africa/arc2
	NOAA CPC	ARC 2	h2017_wetQstart	Continuous	2017	0.1 dd	Start of wettest quarter in dekads 1-36, where first dekad of January 2017 =1	ftp://ftp.cpc.ncep.noaa.gov/fews/fewsdata/africa/arc2
	NOAA CDR	NDVI version 4	ndvi_avg	Continuous	1983-2012	0.05 dd	Long-term average NDVI value in primary growing season (highest quarter)	Google Earth Engine, accessed Jan 2019

Theme	Source	Dataset Title	Variable Name	Variable Type	Reference Period	Resolution	Description	Web
	NOAA CDR	NDVI version 4	ndvi_max	Continuous	1983-2012	0.05 dd	Long-term maximum dekadal NDVI value in primary growing season (highest quarter)	Google Earth Engine, accessed Jan 2019
	NOAA CDR	NDVI version 4	h2014_avg	Continuous	2014	0.05 dd	Average NDVI value in primary growing season (highest quarter) in 2014	Google Earth Engine, accessed Jan 2019
	NOAA CDR	NDVI version 4	h2014_max	Continuous	2014	0.05 dd	Maximum dekadal NDVI value in primary growing season (highest quarter) in 2014	Google Earth Engine, accessed Jan 2019
	NOAA CDR	NDVI version 4	h2017_avg	Continuous	2017	0.05 dd	Average NDVI value in primary growing season (highest quarter) in 2017	Google Earth Engine, accessed Jan 2019
	NOAA CDR	NDVI version 4	h2017_max	Continuous	2017	0.05 dd	Maximum dekadal NDVI value in primary growing season (highest quarter) in 2017	Google Earth Engine, accessed Jan 2019