Metadata for the Limpopo Basin - Botswana

Contents

List of abbreviations

AFSIS	Africa Soil Information Service
ALCOM	Aquatic Resource Management for Local Community Development Programme
AVG	Average
BFP	Basin Focal Project
BGS	British Geological Survey
CBO	Community Based Organisation
CGIAR	Consultative Group on International Agricultural Research
CPWF	CGIAR Challenge Program on Water and Food
CSO	Central Statistics Office
DAFF	Department of Agriculture, Forestry and Fisheries
DFID	Department for International Development (UK)
DHI	Drought Hazard Index
DWAF-SA	Department of Water Affairs and Forestry, South Africa
EISA	Electoral Institute for Sustainable Democracy in Africa
FAO	Food and Agricultural Organisation of the United Nations
GIS	Geographical Information Systems
HIV	Human Immunodeficiency Virus
IEC	Independent Electoral Commission
IFPRI	International Food Policy Research Institute
INE	Instituto Nacional de Estatística (National Institute of Statistics, Mozambique)
IP	Intellectual Property
IRD	International Relief and Development
ISRIC	International Soil Reference and Information Centre
JRC	Joint Research Centre
LimRAK	Limpopo River Awareness Kit
MAR	Mean Annual Rainfall
MFI	Micro-Finance Institution
MISAU	Ministerio da Saude - Ministry of Health Mozambique
NPO	Non-Profit Organisation
SADC	The Southern African Development Community
SOC	Soil Organic Carbon
StatsSA	Statistics South Africa
SWB	Surface Water Body
TAGMI	Targeting AGwater Management Interventions
TB	Tuberculosis
UK	United Kingdom
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNICEF	The United Nations Children's Fund
USGS	United States Geological Services
WGHTD	Weighted
WRD	The original SADC Water Resource Database produced by ALCOM
ZNSA	Zimbabwe National Statistics Agency

Spatial definition of study/focus area

Choice of districts to include in each country – using latest boundary demarcations, and including all districts that fall wholly or mostly in the Limpopo River Basin according to GIS overlay of the river basin over district boundaries.

<table>
<tr><th>Botswana (quasi-Provinces)</th><th>Mozambique</th><th>South Africa (new boundaries set in 2005)</th><th>Zimbabwe</th></tr>
<tr><td>Urban districts:
Gaborone
Francistown
Lobatse
Selibe Phikwe</td><td>Gaza Province:
Bilene-Macia
Chibuto
Chicualacuala
Chigubo
Chokwe
Guija
Mabalane
Manjacaze
Massangena
Massingir
Xai-Xai
Xai-Xai(town)</td><td>Limpopo Province:
Capricorn
Greater Sekhukhune
Mopani
Vhembe
Waterberg</td><td>Matabeleland South Province:
Beitbridge
Bulilimamangwe
Gwanda
Insiza
Matobo
Umzingwane</td></tr>
<tr><td rowspan="3">Rural Districts:
Southern (sub-districts Barolong, Ngwaketse, Ngwaketse West)
South East
Kweneng (sub-districts Kweneng East, Kweneng West)
Kgatleng
Central (sub-districts Mahalapye, Serowe-Palapye, Bobonong, Boteti, Tutume)
North East</td><td rowspan="3">Inhambane Province:
Funhalouro
Mabote
Massinga
Panda</td><td>Mpumalanga Province:
Nkangala
Ehlanzeni
Gert Sibande</td><td>Matabeleland North Province:
Bubi
Umguza</td></tr>
<tr><td>North West Province:
Bojanala
Central (now Ngaka Modiri Molema)</td><td>Masvingo Province:
Chiredzi
Mwenezi</td></tr>
<tr><td>Gauteng:
Mestweding
Sedibeng
West Rand
Ekhuruleni
City of Johannesburg
City of Tshwane</td><td>Midlands Province:
Mberengwa</td></tr>
</table>

Note on data processing

Methodology

There are two parts to processing the data before entering it into the TAGMI database :

1) Extracting data from publicly available sources, and processing it into relevant indicators for the tool. This methodology is described for each indicator in the following document.
2) Transforming the numerical data into the format required by the TAGMI tool. This is the same methodology for all indicators, except Mean Annual Rainfall and Food Security.
    a. All indicators : data values were classified into three categories (low/med/high) such that a roughly equal number of districts fall into each category (using Hierarchical-Equal Count discretisation function in GeNIe for 3 classes)
    b. Mean Annual Rainfall: for **Conservation Agriculture**, rainfall range classes were set for the whole basin, not according to the range of values within each country (based on Rusinamhodzi et al 2011, who show that conservation agriculture performs very well within the **Med** rainfall class as below, averagely with **High** rainfall, and poorly with **Low** rainfall):
        i. **Low** rainfall: < 350mm average per district
        ii. **Med** rainfall: 350mm - 700mm average per district
        iii. **High** rainfall: >700mm average per district
    c. Mean Annual Rainfall: for **Small scale irrigation** and **Small Reservoirs**, the data was treated as for All indicators
    d. Food Security: this data was compiled by Magombeyi et al (2013) to be comparable between countries, and therefore it has been similarly categorised in the tool:
        i. **Low** food security: < ± 80%
        ii. **Med** food security: ± 80 - 90%
        iii. **High** food security: > ± 90%

Hydrological and administrative boundaries

The project is targeted at the river basin (hydrological area). Yet, for many users, the administrative boundaries of the districts and provinces are more relevant. Therefore, the data is compiled for the tool according to administrative boundaries.

However, spatial data such as distances to rivers and roads has been calculated within the hydrological area of the river basin only, and thus for districts which fall only partially in the river basin, the data only relates to those parts within the river basin (e.g. 'proximity to roads' refers only to the roads and district area within the hydrological limit of the basin).

Secondary data extracted directly from publications refers to the administrative boundary area.

Water resources

Characteristics of water resources that describe availability, access and quality of the water.

Water availability

D_MAR

Indicator name	Mean annual rainfall (mm)
Variable(s)	D_MARmin D_MARavg
Definition	Longterm average annual rainfall (mm) (1901-2005). (aggregation type: AVG) - minimum and average MAR per district
Data Source	Harvest Choice, available at: http://harvestchoice.org/data/longterm-average-annual-rainfall-mm (Accessed June 2013) Sourced from: University of East Anglia Climatic Research Unit (CRU). [Phil Jones, Ian Harris]. CRU Time Series (TS) high resolution gridded datasets. NCAS British Atmospheric Data Centre. Available from http://badc.nerc.ac.uk/data/cru (Accessed on 1 May 2011).
Sample size	West Africa, East & Central Africa, Southern Africa (Hydrological boundaries)
Spatial scale	1 km grid cells, recalculated to district level (average value)
Year of data	1901 - 2005
Year of publication	2011
Methodology	*same procedure as for D_cattle_dens*: • Ensure raster is projected correctly - check that it lines up with a correctly projected layer • Run "Zonal statistics as table" (Spatial Analyst Tools\Zonal) • Set All Districts_Hydro as input raster or feature zone data • Set "District" as zone field • Set MAR layer as input raster or feature data class • Set "Value" as class field • Export table of attributes as a .dbf file – Open in Excel • Extract from data table MINIMUM and MEAN values **__Note:__ for Conservation Agriculture, rainfall range classes were set for the whole basin, not according to the range of values within each country: **Low** rainfall: < 350mm average per district **Med** rainfall: 350mm - 700mm average per district **High** rainfall: >700mm average per district (based on Rusinamhodzi et al 2011)
Copyright	
Additional Information	

Access to water

D_prox_riv

Indicator name	Proximity to a river
Variable(s)	D_prox_riv
Definition	% of district area lying within 1 km of a perennial river
Data Source	CPWF Phase 1 data collection - Perennial and ephemeral river networks
Sample size	n/a
Spatial scale	Volta basin, Limpopo Basin (Hydrological boundaries)
Year of data	
Year of publication	
Methodology	Ensure layer is projected correctly Remove non-perennial and ephemeral rivers Create 1km buffer around remaining rivers Calculate area within buffer, divide by total district area, multiply by 100
Copyright	CPWF 2008-2011
Additional Information	

D_water_infr

Indicator name	Access to storage water infrastructure (e.g. rainwater harvesting tanks, shallow wells, boreholes, small ponds etc.)
Variable(s)	D_water_infr
Definition	Proportion (%) of traditional holdings that have access to a reliable source of water for livestock from a borehole, well or small reservoir
Data Source	Central Statistics Office. 2010. *2006 Annual Agricultural Survey Report*. Central Statistics Office, Gaborone. Available at: http://www.cso.gov.bw/templates/cso/file/File/2006agricannual_report.pdf Accessed December 2012 (Table 3.16A: Number of holdings by source of income, district and region)
Sample size	3263 farmers
Spatial scale	Sub - District (summed to tool District) (Administrative boundaries)
Year of data	2006
Year of publication	2010
Methodology	Sum of holdings with borehole, well and dam, divide by the total number of holdings in district and multiply by 100
Copyright	CSO Botswana, Ministry of Agriculture
Additional Information	

D_watertable

Indicator name	Depth of water table
Variable(s)	D_watertable
Definition	Estimated depth to groundwater (mbgl - metres below ground level)

Data Source	'BGS Quantitative maps of groundwater resources in Africa' Available at: http://www.bgs.ac.uk/gwresilience/
Sample size	Africa
Spatial scale	5 km grid
Year of data	
Year of publication	2012
Methodology	Import text file with point locations into ArcGIS, Display X-Y data and convert to shapefile Convert point shapefile to raster, project to same as the district boundaries Run Spatial Analysis-Zonal-Zonal statistics as table - Note: values are discrete categories:- 0 = SM = 25 - 50 1 = VS = 0 - 7 2 = VD = >250 3 = M = 50 - 100 4 = S = 7 - 25 5 = D = 100 - 250 Use MAJORITY column for D_watertable, which reflects the most common water table depth class in the district
Copyright	Based upon mapping provided by British Geological Survey © NERC 2012. All rights reserved
Additional Information	Terms of use: Following extensive review, the British Geological Survey (BGS), a component institute of the Natural Environment Research Council (NERC), asserts ownership of all intellectual property and associated legal rights in the following mapping â€˜the Mappingâ€™: ▪ Groundwater Storage Map of Africa ▪ Map of Depth To Groundwater Across Africa ▪ Groundwater Productivity Map of Africa; The Mapping is made available to download and to be viewed for any purpose. Extracts of materials derived from the Mapping may be reproduced in analogue or secure electronic format (e.g. appropriately secured .PDF format from which it is not possible to: (i) reverse-engineer back to, or to decompile, the Data; and/or (ii) print or download the reproduced extracts independently from the document), for any purpose. The following acknowledgement must accompany material derived from the Mapping: â€œBased upon mapping provided by British Geological Survey Â© NERC 2012. All rights reservedâ€?. No part of any of the Mapping may be traded, sold, licensed or sub-licensed or in any other way supplied/made available on a commercial basis to any other person or organisation. Neither NERC nor its employees gives any warranty as to the quality or accuracy of the Mapping, or its suitability for any use. All implied conditions relating to the quality or suitability of the Mapping, and all liabilities arising from the supply of the Mapping (including any liability arising in negligence) and for any reliance on results arising out of use of Mapping, are excluded to the fullest extent permitted by law. BGS has made reasonable attempts to identify/confirm ownership of any data used in connection with the creation of the Mapping, but will take down the

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D_surf_water

Indicator name	Surface water nearby
Variable(s)	D_surf_water
Definition	Number of surface water bodies per km^2 per district (includes pans, pools, wells, springs, lakes, reservoirs and others)
Data Source	African Water Resource Database - Surface Water Body Features from GEOnet Gazetteer (gns_swb dataset) Downloaded from: FAO Geonetwork, http://www.fao.org/geonetwork/srv/en/main.home , accessed September 2013
Sample size	46591 derivative point gazetteer features derived based on 1:250 000 data originally from GEOnet
Spatial scale	Africa
Year of data	1997?
Year of publication	2006
Methodology	In ArcGIS intersect gns_swb with Limpopo countries district boundaries Export attribute table to Excel and extract the number of Surface Water Bodies per district Calculate the density of Surface Water Bodies per area of the district
Copyright	FAO
Additional Information	GNS_SWB: Surface Water Bodies based on named locations GNS/GeoNet Gazetteer. The GNS_SWB shapefile data layer is comprised of 46591 derivative point gazetteer features derived based on 1:250 000 data originally from GEOnet. The layer provides nominal analytical/mapping at 1:250 000. Data processing is complete globally, this is an African subset. Acronyms and Abbreviations: GNS/GeoNet Gazetteer - NIMA's Geographic Names Server Gazetteer of Named Locations; SWB - Surface Water Body.

D_wpermit*

Indicator name	Have water permits
Variable(s)	D_wpermit
Definition	
Data Source	
Sample size	
Spatial scale	
Year of data	
Year of publication	
Methodology	

Copyright	
Additional Information	

Water quality

D_salinity*

Indicator name	Salinity
Variable(s)	D_salinity
Definition	
Data Source	
Sample size	
Spatial scale	
Year of data	
Year of publication	
Methodology	
Copyright	
Additional Information	

Social capital

"the social resources upon which people draw in pursuit of their livelihood objectives" (DFID, 1999), typically described in terms of **networks and connectedness, membership of more formalised groups** and **relationships of trust, reciprocity and exchanges.**

Organisational capacity

The organisational and leadership/management capacity that allow for effective networks and connectedness, running of community activities and providing a means of conflict management.

D_numCBOs

Indicator name	Number of community organisations
Variable(s)	D_numCBOs
Definition	The number of community-based organisations (CBOs), non-profit organisations and/or religious organisations present in the district, per 1000 population. **Botswana**: number of registered co-operatives per 1000 households (includes classes Marketing, Multi-purpose, Consumers, Producers and Savings & Credit co-operatives)
Data Source	Ministry of Trade and Industry. 2013. *Below is a list of REGISTERED co-operatives.* [website] Available at: http://www.mti.gov.bw/content/societies, accessed August 2013
Sample size	All registered co-operatives in Botswana
Spatial scale	District
Year of data	2010
Year of publication	2010
Methodology	Addresses given for each co-operative assigned to a district, number of co-operatives per district summed and divided by the number of households per districts, multiplied by 1000
Copyright	Copyright 2010 Ministry of Trade & Industry, Gaborone, Botswana
Additional Information	

D_voting

Indicator name	Voting turnout
Variable(s)	D_voting
Definition	Proportion of the voting population (%) who voted in the last government elections (Botswana: 2004 National Assembly election)
Data Source	Electoral Institute for Sustainable Democracy in Africa (EISA) 2004. *Botswana 2004 National Assembly election voter turnout* [Website] Available at: http://www.eisa.org.za/WEP/bots2004presultsa.htm Accessed: 20 Aug 2013 data from: INDEPENDENT ELECTORAL COMMISSION 2004 *Report to the Minister of Presidential Affairs and Public Administration on the 2004 General Elections*, [www] http://www.iec.gov.bw/elections/report.php [opens new window] (accessed 8 Mar 2010).
Sample size	Registered voters
Spatial scale	Constituency
Year of data	2004
Year of	2004

publication	
Methodology	Re-calculated to district as the sum of voters in all constituencies in a district divided by sum of registered voters in all constituencies in a district, multiplied by 100.
Copyright	IEC Botswana 2004
Additional Information	

D_interests*

Indicator name	# different interest groups
Variable(s)	D_interests
Definition	
Data Source	
Sample size	
Spatial scale	
Year of data	
Year of publication	
Methodology	
Copyright	
Additional Information	

D_disputes*

Indicator name	# conflicts managed
Variable(s)	D_disputes
Definition	
Data Source	
Sample size	
Spatial scale	
Year of data	
Year of publication	
Methodology	
Copyright	
Additional Information	

Support networks

D_information

Indicator name	Access to information (from radio)
Variable(s)	D_information
Definition	Percentage of households (%) with access to a working radio
Data Source	Statistics Botswana and Ministry of Transport and Communications. 2012. *Botswana Transport and Communications Statistics - 2010*. Statistics Botswana, Gaborone. Available at:

	http://www.cso.gov.bw/templates/cso/file/File/Botswana%20Transport%20And%20Communications%20Statistics%202010%20Report..pdf , Accessed December 2012 (Table 3.4c: Percentage Distribution of Households by Access to Media by District, 2008)
Sample size	Whole country
Spatial scale	District
Year of data	2008
Year of publication	2012
Methodology	Data taken directly from source
Copyright	CSO Botswana
Additional Information	

D_remittances

Indicator name	Receiving remittances
Variable(s)	D_remittances
Definition	Proportion (%) of agricultural holdings who receive income from remittances
Data Source	Central Statistics Office. 2010. *2006 Annual Agricultural Survey Report*. Central Statistics Office, Gaborone. Available at: http://www.cso.gov.bw/templates/cso/file/File/2006agricannual_report.pdf Accessed December 2012 (Table 3.16A: Number of holdings by source of income, district and region)
Sample size	3263 farmers
Spatial scale	Sub - District (summed to tool District)
Year of data	2006
Year of publication	2010
Methodology	Sum of all holdings in district, divide by the total number of holdings in district
Copyright	CSO Botswana, Ministry of Agriculture
Additional Information	

Access to land

D_own_land

Indicator name	Farmers owning land
Variable(s)	D_own_land
Definition	Proportion (%) of holdings which have land
Data Source	Central Statistics Office. 2010. *2006 Annual Agricultural Survey Report*. Central Statistics Office, Gaborone. Available at: http://www.cso.gov.bw/templates/cso/file/File/2006agricannual_report.pdf Accessed December 2012 (Table 3.16A: Number of holdings by source of income, district and region)
Sample size	3263 farmers
Spatial scale	Sub - District (summed to tool District)
Year of data	2006
Year of	2010

publication	
Methodology	Sum of holdings with land, divide by the total number of holdings in district and multiply by 100
Copyright	CSO Botswana, Ministry of Agriculture
Additional Information	

D_avg_plot

Indicator name	Average plot size per household
Variable(s)	D_avg_plot
Definition	Average size in hectares of crop land holdings (excludes agricultural land for livestock), per district
Data Source	CSO, 2010. *2006 Annual Agricultural Survey Report*, Central Statistics Office, Gaborone. Available at: http://www.cso.gov.bw/templates/cso/file/File/2006agricannual_report.pdf, Accessed August 2012 (Table 7.11A, p111)
Sample size	3265 traditional agricultural holders
Spatial scale	District
Year of data	2006
Year of publication	2010
Methodology	Total crop land area (ha) divided by Total number of Crop land holdings
Copyright	CSO, Botswana. 2010
Additional Information	'_9999' - no data (because only rural districts were surveyed) Statistics for commercial operations published in the document are not included in our data

Conflict

D_unemploy

Indicator name	Unemployment rate
Variable(s)	D_unemploy
Definition	Rate of unemployment (%)
Data Source	Statistics Botswana. 2011. *Botswana Core Welfare Indicators (Poverty) Survey 2009/10: Preliminary results*. Report No. 2011/15, Statistics Botswana: Gaborone
Sample size	7,771 households nationally
Spatial scale	District
Year of data	2009/10
Year of publication	2011
Methodology	Data taken directly from source; sub-districts of Central, Kweneng and Southern districts re-calculated the sum of number of people unemployed divided by total number economically per district multiplied by 100, following method used in the report.
Copyright	Statistics Botswana. 2011
Additional Information	

Gender

D_femHH

Indicator name	Female headed households (%)
Variable(s)	D_femHH
Definition	The number of households in each district who acknowledge a single female as the head of the household, as a percentage of all households in each district.
Data Source	CSO, Botswana. 2009. *Botswana Demographic Survey 2006*. Central Statistics Office: Gaborone, Available at: http://www.cso.gov.bw/templates/cso/file/File/2006_bdsrprt.pdf , Accessed August 2012 (Table 3.2.1, p96)
Sample size	11760 households
Spatial scale	District
Year of data	2006
Year of publication	2009
Methodology	The number of female-headed households divided by the total number of households in each district and multiplied by 100
Copyright	Central Statistics Office, Botswana
Additional Information	

D_g_credit *

Indicator name	Gender ratio - credit access
Variable(s)	D_g_credit
Definition	
Data Source	
Sample size	
Spatial scale	
Year of data	
Year of publication	
Methodology	
Copyright	
Additional Information	

D_gratio

Indicator name	Gender ratio - population
Variable(s)	D_gratio
Definition	Ratio of women to men in the population
Data Source	CSO, Botswana. 2009. *Botswana Demographic Survey 2006*. Central Statistics Office: Gaborone, Available at: http://www.cso.gov.bw/templates/cso/file/File/2006_bdsrprt.pdf , Accessed

	August 2012 (Table 3.2.1, p96)
Sample size	11760 households
Spatial scale	District
Year of data	2006
Year of publication	2009
Methodology	The number of women divided by the number of men in each district
Copyright	Central Statistics Office, Botswana
Additional Information	'_9999' – data is available but not known at this spatial level, due to problems with recalculating

D_gemployment

Indicator name	Gender ratio - employment
Variable(s)	D_gemployment
Definition	Ratio of women to men who are employed
Data Source	Statistics Botswana. 2011. *Botswana Core Welfare Indicators (Poverty) Survey 2009/10: Preliminary results*. Report No. 2011/15, Statistics Botswana: Gaborone
Sample size	7,771 households nationally
Spatial scale	District
Year of data	2009/10
Year of publication	2011
Methodology	Data taken directly from source; sub-districts of Central, Kweneng and Southern districts re-calculated the sum of number of people unemployed divided by total number economically per district multiplied by 100, following method used in the report.
Copyright	Statistics Botswana. 2011
Additional Information	

D_fem_ass *

Indicator name	Women's access to assets
Variable(s)	D_fem_ass
Definition	
Data Source	
Sample size	
Spatial scale	
Year of data	
Year of publication	
Methodology	
Copyright	
Additional Information	

Financial capital

"the financial resources that people use to achieve their livelihood objectives" (DFID 1999)

Access to credit

D_avail_MFI *

Indicator name	Availability of Microfinance Institutions (MFIs)
Variable(s)	D_avail_MFI
Definition	
Data Source	
Sample size	
Spatial scale	
Year of data	
Year of publication	
Methodology	
Copyright	
Additional Information	

Wealth

D_poverty

Indicator name	Poverty level
Variable(s)	D_poverty
Definition	Rural poverty level (%) (2009/2010)
Data Source	Magombeyi, M. S., Taigbenu, A. E. and Barron, J., 2013. *Rural poverty and Food insecurity mapping at district level for improved agricultural water management in the Limpopo River Basin.* Colombo, Sri Lanka: CGIAR Challenge Program on Water and Food (CPWF). 54pp. (CPWF Research for Development (R4D) Series 6)
Sample size	
Spatial scale	District
Year of data	2009/2010
Year of publication	2013
Methodology	Data taken directly from source.
Copyright	Copyright c 2013, CGIAR Challenge Program on Water and Food
Additional Information	

Human capital

"the skills, knowledge, ability to labour and good health that together enable people to pursue different livelihood strategies and achieve their livelihood objectives" (DFID 1999)

Health Status

Statistics providing indicators of the state of health of individuals in each district, which affect their ability to contribute to the labour-force, as well as affecting the time spent caring for them by other members of the household and the expenditure of income within the household.

D_wsafe

Indicator name	Clean water
Variable(s)	D_wsafe
Definition	Proportion (%) of households with access to piped, point or improved (protected) sources of water. **Botswana:** Proportion (%) of child population where the water source used in the household is piped or a well or a borehole.
Data Source	UNICEF, 2004. *Analysis of Botswana Child Focused Indicators, Based on 2001 Population and Housing Census*. UNICEF: Gaborone. Available at: http://www.cso.gov.bw/templates/cso/file/File/botswana_2001_censuschildrenindicators_final.pdf, accessed August 2012 (Table 15, p63)
Sample size	Census population
Spatial scale	District
Year of data	2001
Year of publication	2004
Methodology	Data taken directly from source
Copyright	UNICEF
Additional Information	

D_food_sec

Indicator name	Food security
Variable(s)	D_food_sec
Definition	Proportion of households (%) that are food secure (2009)
Data Source	Magombeyi, M. S., Taigbenu, A. E. and Barron, J., 2013. *Rural poverty and Food insecurity mapping at district level for improved agricultural water management in the Limpopo River Basin.* Colombo, Sri Lanka: CGIAR Challenge Program on Water and Food (CPWF). 54pp. (CPWF Research for Development (R4D) Series 6)
Sample size	
Spatial scale	District
Year of data	2009
Year of publication	2013
Methodology	Inverse of the source data (% food *insecure* households) - 100 minus source data. ****Note:** this data was compiled by Magombeyi et al (2013) to be comparable between countries, and therefore it has been similarly categorised in the tool (unlike most of the data which is categorised so that there are almost equal

	numbers of districts in each category): **Low** food security: < ± 80% **Med** food security: ± 80 - 90% **High** food security: > ± 90%
Copyright	Copyright c 2013, CGIAR Challenge Program on Water and Food
Additional Information	

D_clinics*

Indicator name	# clinics per 1000 households
Variable(s)	D_clinics
Definition	Total number of clinics present in each district per 1000 households.
Data Source	
Sample size	
Spatial scale	
Year of data	
Year of publication	
Methodology	
Copyright	
Additional Information	

Labour availability

D_work_pop

Indicator name	Working age population
Variable(s)	D_work_pop
Definition	Proportion (%) of total population aged between 15 and 64 **Botswana**: Total economically active population as a proportion (%) of total overall population
Data Source	Statistics Botswana. 2011. *Botswana Core Welfare Indicators (Poverty) Survey 2009/10: Preliminary results*. Report No. 2011/15, Statistics Botswana: Gaborone
Sample size	7,771 households nationally
Spatial scale	District
Year of data	2009/10
Year of publication	2011
Methodology	Data taken directly from source; sub-districts of Central, Kweneng and Southern districts re-calculated the sum of number of people unemployed divided by total number economically per district multiplied by 100, following method used in the report.
Copyright	Statistics Botswana
Additional Information	

D_g_ratio

Indicator name	Gender ratio
Variable(s)	D_g_ratio
Definition	Ratio of women to men in the population
Data Source	CSO, Botswana. 2009. *Botswana Demographic Survey 2006*. Central Statistics Office: Gaborone, Available at: http://www.cso.gov.bw/templates/cso/file/File/2006_bdsrprt.pdf , Accessed August 2012 (Table 3.2.1, p96)
Sample size	11760 households
Spatial scale	District
Year of data	2006
Year of publication	2009
Methodology	The number of women divided by the number of men in each district
Copyright	Central Statistics Office, Botswana
Additional Information	'_9999' – data is available but not known at this spatial level, due to problems with recalculating

D_HIV

Indicator name	HIV prevalence
Variable(s)	D_HIV
Definition	Estimated HIV Prevalence rates in Botswana population aged 18 months and over
Data Source	CSO. 2009. *2008 Botswana AIDS Impact Survey III: Statistical Report*, Central Statistics Office: Gaborone, Available at: http://www.cso.gov.bw/templates/cso/file/File/aids%20impact%20survey.pdf, accessed August 2012 (Table 69a, p136)
Sample size	8 275 households
Spatial scale	District
Year of data	2008
Year of publication	2009
Methodology	Data taken directly from source; sub-districts of Central, Kweneng and Southern districts re-calculated the sum of number of persons testing positive divided by total estimated population tested per district multiplied by 100, following method used in the report
Copyright	CSO, Botswana. 2009.
Additional Information	

Skills (education and experience)

D_literacy

Indicator name	Literacy rate
Variable(s)	D_literacy
Definition	According to UNESCO's definition of 'functional literacy': 'A person is functionally literate who can engage in all those activities in which literacy is required for effective functioning of his group and community and also for enabling him to

	continue to use reading, writing and calculation for his own and the community's development' (cited in UNESCO 2005, p30). A simpler version of this is 'the ability to read and write, with understanding, a short, simple sentence about one's everyday life' (cited in UNESCO 2005, p29) **Botswana:** the proportion (%) of adults (aged 15-70) who have completed 5 years of schooling or passed a literacy test
Data Source	CSO. 2005. *Botswana Literacy Survey 2003*, Central Statistics Office: Gaborone. Available at: http://www.cso.gov.bw/templates/cso/file/File/literacy_report2003.pdf, accessed August 2012 (Table 7, p81)
Sample size	7280 households selected, 6860 successfully interviewed; of these 2886 eligible individuals, of which 2613 successfully interviewed
Spatial scale	District
Year of data	2003
Year of publication	2005
Methodology	Data taken directly from source
Copyright	CSO, Botswana. 2005.
Additional Information	Unsure which their literacy rate is – conflicting information in Tables 7 and 8… data taken from Table 7

D_ag_ext

Indicator name	Agricultural extension
Variable(s)	D_ag_ext
Definition	# extension agents per 1000 rural households
Data Source	BCA Consult (Pty) Ltd. 2012. *Poverty and Social Impact Analysis of the Integrated Support Programme for Arable Agriculture Development (ISPAAD)*. Final Report for the UNDP and Republic of Botswana. Available from: http://www.unpei.org/sites/default/files/e_library_documents/POVERTY%20AND%20SOCIAL%20IMPACT%20ANALYSIS.pdf accessed September 2013
Sample size	Botswana
Spatial scale	District
Year of data	2012?
Year of publication	2012
Methodology	Count number of extension areas per district, from map in Figure 2.2 (best estimate count, due to poor image quality) - there is one extension officer assigned per extension area. Divide the number of extension officers by the number of households per district, and multiply by 1000
Copyright	UNDP
Additional Information	

D_soil_mgmnt *

Indicator name	Soil management used
Variable(s)	D_soil_mgmnt
Definition	

Data Source	
Sample size	
Spatial scale	
Year of data	
Year of publication	
Methodology	
Copyright	
Additional Information	

D_employment

Indicator name	Employment rate
Variable(s)	D_employment
Definition	The proportion of the economically active population (%) who are employed
Data Source	Statistics Botswana. 2011. *Botswana Core Welfare Indicators (Poverty) Survey 2009/10: Preliminary results*. Report No. 2011/15, Statistics Botswana: Gaborone
Sample size	7,771 households nationally
Spatial scale	District
Year of data	2009/10
Year of publication	2011
Methodology	Data taken directly from source; sub-districts of Central, Kweneng and Southern districts re-calculated the sum of number of people unemployed divided by total number economically per district multiplied by 100, following method used in the report.
Copyright	Statistics Botswana. 2011
Additional Information	

Physical capital

"the basic infrastructure and producer goods needed to support livelihoods" (DFID 1999)

Infrastructure

D_prox_rd

Indicator name	Proximity to road network
Variable(s)	D_prox_rd
Definition	Proportion of district area (%) lying within 5 km of a road
Data Source	CPWF Phase 1 data collection - road networks
Sample size	n/a
Spatial scale	Country-wide
Year of data	
Year of publication	
Methodology	Ensure layer is projected correctly Create 5km buffer around roads Calculate area within buffer, divide by total district area, multiply by 100
Copyright	CPWF 2008-2011
Additional Information	

D_equipment

Indicator name	Having agricultural equipment
Variable(s)	D_equipment
Definition	Proportion of households (%) who possess agricultural equipment **Botswana:** Proportion of households (%) using a double-plough
Data Source	CSO. 2010. *2006 Annual Agricultural Survey Report*, Central Statistics Office: Gaborone, Available at: http://www.cso.gov.bw/templates/cso/file/File/2006agricannual_report.pdf, accessed August 2013 (Table 7.17, p134)
Sample size	3265 traditional agricultural holders
Spatial scale	District
Year of data	2006
Year of publication	2010
Methodology	Total number of holdings using a double-plough divided by Total number of Crop land holdings overall multiplied by 100
Copyright	CSO, Botswana. 2010
Additional Information	'_9999' - no data (because only rural districts were surveyed) Statistics for commercial operations published in the document are not included in our data

D_postharv_infr *

Indicator name	Postharvest infrastructure available
Variable(s)	D_postharv_infr
Definition	

Data Source	
Sample size	
Spatial scale	
Year of data	
Year of publication	
Methodology	
Copyright	
Additional Information	

Market access

D_prox_rd

Indicator name	Proximity to road network
Variable(s)	D_prox_rd
Definition	Proportion of district area (%) lying within 5 km of a road
Data Source	CPWF Phase 1 data collection - road networks
Sample size	n/a
Spatial scale	Country-wide
Year of data	
Year of publication	
Methodology	Ensure layer is projected correctly Create 5km buffer around roads Calculate area within buffer, divide by total district area, multiply by 100
Copyright	CPWF 2008-2011
Additional Information	

D_market

Indicator name	Distance from the nearest market
Variable(s)	D_market
Definition	Median travel time to human settlement of 20,000 or greater population. (aggregation type: AVG)
Data Source	HarvestChoice, available from: http://harvestchoice.org/data/average-travel-time-nearest-town-over-20k-hours-2000 Sourced from: HarvestChoice/IFPRI 2009
Sample size	West Africa, East & Central Africa, Southern Africa
Spatial scale	1 km grid cells, recalculated to district level (average value)
Year of data	2000
Year of publication	2011
Methodology	*same procedure as for D_cattle_dens*: • Ensure raster is projected correctly - check that it lines up with a correctly projected layer • Run “Zonal statistics as table” (Spatial Analyst Tools\Zonal)

	• Set District boundaries as input raster or feature zone data • Set "District" as zone field • Set Market access layer as input raster or feature data class • Set "Value" as class field • Export table of attributes as a .dbf file – Open in Excel • Extract from data table MEAN values
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Additional Information	

D_transport *

Indicator name	Having transportation
Variable(s)	D_transport
Definition	
Data Source	
Sample size	
Spatial scale	
Year of data	
Year of publication	
Methodology	
Copyright	
Additional Information	

D_cell_net

Indicator name	Having cellphone (for market information)
Variable(s)	D_cell_net
Definition	Proportion of households (%) possessing a mobile telephone
Data Source	Statistics Botswana and Ministry of Transport and Communications. 2012. *Botswana Transport and Communications Statistics - 2010*. Statistics Botswana, Gaborone. Available at: http://www.cso.gov.bw/templates/cso/file/File/Botswana%20Transport%20And%20Communications%20Statistics%202010%20Report..pdf , Accessed December 2012 (Table 3.4c: Percentage Distribution of Households by Access to Media by District, 2008)
Sample size	Whole country
Spatial scale	District
Year of data	2008
Year of	2012

publication	
Methodology	Taken directly from source
Copyright	CSO Botswana
Additional Information	

D_input_market

Indicator name	Input markets present
Variable(s)	D_input_market
Definition	Proportion (%) of traditional holders obtaining their seed from Botswana Agricultural Marketing Board (BAMB) or cooperatives or a trader
Data Source	Central Statistics Office. 2010. *2006 Annual Agricultural Survey Report*. Central Statistics Office, Gaborone. Available at: http://www.cso.gov.bw/templates/cso/file/File/2006agricannual_report.pdf Accessed December 2012 (Table 3.16A: Number of holdings by source of income, district and region)
Sample size	3263 farmers
Spatial scale	Sub - District (summed to tool District)
Year of data	2006
Year of publication	2010
Methodology	Sum of holdings getting seed from BAMB, cooperatives and trader, divide by the total number of holdings in district and multiply by 100
Copyright	CSO Botswana, Ministry of Agriculture
Additional Information	

D_output_market

Indicator name	Output markets present
Variable(s)	D_output_market
Definition	Density of populated places (villages, towns, cities) per district
Data Source	de Condappa, D, I. Terrasson and J. Lemoalle. 2008. [CD] *BFP VOLTA Data Volume*, IRD & CGIAR-CPWF - Populated_places.shp from BFP VOLTA Data Volume Disc Originally from: FAO Geonetwork. *Populated places in the world.* Available from: http://www.fao.org/geonetwork/srv/en/metadata.show?id=12690,
Sample size	Global
Spatial scale	District
Year of data	2003
Year of publication	2008
Methodology	In ArcGIS, using Botswana Districts polygon layers, use Hawth's Tools - Analysis tools - Count points in polygon -> gives the number of populated places per district Calculate the number of populated places divided by district area
Copyright	CPWF/ FAO **Copyright**: Exclusive right to the publication, production, or sale of the rights to a literary, dramatic, musical, or artistic work, or to the use of a commercial print or

	label, granted by law for a specified period of time to an author, composer, artist, distributor
Additional Information	The geonames were extracted in 2003 from the National Geospatial-Intelligence Agency's (NGA) and the U.S. Board on Geographic Names' (US BGN) database of foreign geographic feature names through the GEOnet Names Server (GNS). The layer contains information on cities, towns, villages, or other agglomerations of buildings where people live and work. For the bigger areas a name is enclosed. Please note: All related fields are described in the attached DCW.pdf document.

Natural resources

"the natural resource stocks from which resource flows and services (e.g. nutrient cycling, erosion protection) useful for livelihoods are derived"

Soil suitability

Characteristics of soil that describe its suitability for a technology.

D_SOC

Indicator name	Soil organic matter content
Variable(s)	D_SOC
Definition	Soil organic carbon (g/kg) in topsoil (0-5cm deep) - % area of district with high or very high soil organic carbon on the scale: 0-1 g/kg = low; 1-2 g/kg = medium; 2-5 g/kg = high; above 5 g/kg = very high **Botswana**: area of district with 2-5g/kg SOC (high)
Data Source	Published by AFSIS http://www.isric.org/data/soil-property-maps-africa-1-km - Reference ISRIC – World Soil Information, 2013. Africa soil property maps at 1 km. Available for download at www.isric.org.
Sample size	Africa
Spatial scale	1km resolution raster of Africa, clipped to Limpopo basin, tabulated to district
Year of data	1950 - 2005 (temporal coverage approximate)
Year of publication	2013
Methodology	• Ensure layer is projected correctly • Reclassify (Spatial Analyst tools\Reclass\reclassify) raster according to decision that organic content is measures in terms of g/kg – 0 -1, 1-2, 2-5, 5-15 and 15+, according to Henry et al., 2009 – Soil carbon ion ecoregions of Africa. Biogeosciences discuss. Vol. 6, Pgs 797 – 823 • Tabulate by district area (Spatial Analyst Tools\Zonal\Tabulate by area) • Divide results by 1000000
Copyright	© Copyright ISRIC 2013
Additional Information	Downloaded: 5th June 2013 Data license (IP policy): Attribution-ShareAlike CC BY-SA Online repository of R scripts: https://code.google.com/p/gsif/source/browse/trunk/AFRICA/1km/

D_clay

Indicator name	Clay content
Variable(s)	D_clay
Definition	% area of district with on average >30% clay in top 200cm of soil **Botswana**: area of district with 20-30% clay (very few districts with >30% clay)
Data Source	Published by AFSIS http://www.isric.org/data/soil-property-maps-africa-1-km - Reference ISRIC – World Soil Information, 2013. Africa soil property maps at 1 km. Available for download at www.isric.org.
Sample size	Africa
Spatial scale	1km resolution raster of Africa, clipped to Limpopo basin, tabulated to district
Year of data	1950 - 2005 (temporal coverage approximate)

Year of publication	2013
Methodology	• Ensure layer is projected correctly • Reclassify (Spatial Analyst tools\Reclass\reclassify) raster according to decision that Clay: < 20%, 20 – 30%, > 30% in accordance with Soil textural triangle http://age-web.age.uiuc.edu/classes/age357/ABE459_08/html/Soil%20Properties.pdf. • Tabulate by district area (Spatial Analyst Tools\Zonal\Tabulate by area) • Divide results by 1000000
Copyright	© Copyright ISRIC 2013
Additional Information	Downloaded: 5th June 2013 Data license (IP policy): Attribution-ShareAlike CC BY-SA Online repository of R scripts: https://code.google.com/p/gsif/source/browse/trunk/AFRICA/1km/

Land availability

D_cropland

Indicator name	Total cropland area
Variable(s)	D_cropland; Cropland (for Fields to display)
Definition	Total cropland area (including irrigated) (ha) (2000). (aggregation type: SUM)
Data Source	HarvestChoice, available at: http://harvestchoice.org/data/cropland-area-ha Sourced from: Ramankutty et al. (2008), "Farming the planet: 1. Geographic distribution of global agricultural lands in the year 2000", Global Biogeochemical Cycles, Vol. 22, GB1003, doi:10.1029/2007GB002952.
Sample size	West Africa, East & Central Africa, Southern Africa
Spatial scale	1 km grid cells, recalculated to district level (average value)
Year of data	2000
Year of publication	2008
Methodology	*same procedure as for D_cattle_dens*: • Ensure raster is projected correctly - check that it lines up with a correctly projected layer • Run “Zonal statistics as table” (Spatial Analyst Tools\Zonal) • Set District boundaries as input raster or feature zone data • Set “District” as zone field • Set Cropland layer as input raster or feature data class • Set “Value” as class field • Export table of attributes as a .dbf file – Open in Excel • Extract from data table MEAN values
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Additional Information	

D_slope

Indicator name	Average surface slope
Variable(s)	D_slope
Definition	Proportion (%) of the district by area that is classed as flat (i.e. with < 8% slope, or a gradient <4.57°, according to FAO's Geonetwork slope classification - http://www.fao.org/geonetwork/srv/en/main.home#soils)
Data Source	Surface slope courtesy of the U.S. Geological Survey – according to http://www.usgs.gov/visual-id/credit_usgs.html; Available for download from: USGS - https://lta.cr.usgs.gov/HYDRO1K, downloaded May 2013
Sample size	Global
Spatial scale	Calculated to district
Year of data	Various
Year of publication	1996
Methodology	(See Extended Methodology and GTOPO30 README found at https://lta.cr.usgs.gov/gtopo30 for greater detail) • Download the .tar file for the Limpopo tile • Convert into a raster using IMAGEGRID • Define the co-ordinate system and projection to match the other data layers • Note that the documentation comments that the raster values have been multiplied by 100 in order to allow for the inclusion of the maximum amount of data., therefore modify raster by two orders of magnitude to correct for this • Re-classify raster according to FAO's Geonetwork classification of slope classes (http://www.fao.org/geonetwork/srv/en/main.home#soils): a. Level to undulating - < 8% slope (< 4.57°) b. Rolling to hilly – 8 – 30% slope (4.57° - 16.7°) c. Steeply bisected to mountainous - > 30% slope) (> 16.7°). • Calculate area per class per district • Calculate % area per class of total district area
Copyright	USGS 2012
Additional Information	

D_pop_dens

Indicator name	Population density
Variable(s)	D_pop_dens
Definition	Average population density (people/km^2)
Data Source	CSO, Botswana. 2009. *Botswana Demographic Survey 2006*. Central Statistics Office: Gaborone, Available at: http://www.cso.gov.bw/templates/cso/file/File/2006_bdsrprt.pdf , Accessed August 2012 (Surface area: CSO, Botswana. 2001. *Census 2001: Main Results, Table 1.2*

	Households and Population by Administrative Districts, Central Statistics Office: Gaborone, Available at: http://www.cso.gov.bw/templates/cso/file/File/Table_1.2_Households_and_Population_by_Administrative_Districts.pdf, accessed August 2012)
Sample size	11760 households
Spatial scale	District
Year of data	2006
Year of publication	2009
Methodology	The total district population divided by the surface area of the district
Copyright	Central Statistics Office, Botswana
Additional Information	

Biomass availability

The total amount of biomass available to farmers to use in agriculture (e.g. for mulch or feed).

D_bio_prod

Indicator name	Potential Biomass production
Variable(s)	D_bio_prod
Definition	Index of biomass production that is not crops, based on landcover types, with value range: 0 - 3 (100% city/cropland/bare - 100% forest)
Data Source	JRC. 2003. *Global Land Cover 2000 database*. European Commission, Joint Research Centre, [website] Available at: http://bioval.jrc.ec.europa.eu/products/glc2000/products.php, accessed July 2013
Sample size	All of Africa
Spatial scale	1 km resolution, calculated to % of district area
Year of data	1994 - 2000
Year of publication	2003
Methodology	Calculate area of each landcover class in each district, then % of total area covered by each class. To create index, assign landcover classes to categories: Forest, shrubland, grassland, other (includes cropland, cities, water); and rank categories according to the amount of biomass produced and available by farmers to use as mulch or feed: Forest = 3, shrubland = 2, grassland = 1, other = 0

Landcover class	Category	Rank
Closed evergreen lowland forest	Forest	3
Degraded evergreen lowland forest	Forest	3
Closed deciduous forest	Forest	3
Deciduous woodland	Forest	3
Deciduous shrubland with sparse trees	Shrubland	2
Open deciduous shrubland	Shrubland	2
Closed grassland	Grassland	1

	Open grassland with sparse shrubs	Grassland	1
	Open grassland	Grassland	1
	Sparse grassland	Grassland	1
	Croplands (>50%)	Other	0
	Salt hardpans	Other	0
	Waterbodies	Other	0
	Cities	Other	0

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Additional Information:

http://bioval.jrc.ec.europa.eu/products/glc2000/metadata.php?product=Africa

DATASET DESCRIPTION

Title of Dataset	Vegetation Map of Africa
Abstract	The Land Cover map of Africa is one regional component of the GLC2000 exercise, conceived and coordinated by the European Commissionâ€™s Joint Research Centre. The GLC2000 maps are based on daily observations made from 1st November 1999 to 31st December 2000 by the VEGETATION sensor on the SPOT 4 satellite. The Africa mapâ€™s legend pays special attention to the forest and savannah biomes. The map shows specific land-cover features as the irrigated agriculture, the ribbons of secondary forest of the swamp forests at a spatial detail never achieved before.
Keywords	Global Land Cover 2000, Africa, Vegetation
Language	English
Version / Edition	3.0
Production Date	20/02/2003
Status	Complete

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	Web Link :	http://bioval.jrc.ec.europa.eu/products/glc2000/glc2000.php
	Institution :	Joint Research Centre
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METHODOLOGY

Lineage of the Data		
Data Source(s)		
Temporal Coverage of the Data	Start :	1994-1996 for radar data
	End :	2000 for optical data
Legend	Name :	Land-cover legend
	Description :	
	Online Resources :	http://www-gvm.jrc.it/glc2000/Products/africa/GLC2000_africa3.pdf
Data Quality Assessment	Qualitative :	
	% Assessed by Regional Experts :	ongoing

SPATIAL REPRESENTATION INFORMATION

Geographical Location	ULX : -28.837057 LRX : 57.921857 ULY : 46.002137 LRY : -36.024635
Spatial Resolution	1km at Equator (0.00892857dd)
Map Projection	Geographic (Lat/Lon)
Spheroid	WGS84
File Size (Mb)	3.40 / 3.43

D_cattle_dens

Indicator name	Cattle density
Variable(s)	D_cattle_dens
Definition	Average cattle density per district (head/ km^2), from Cattle density per grid cell (in

	2005). (aggregation type: WGHTD)
Data Source	Harvest Choice, available at: http://harvestchoice.org/data/cattle-density-headsq-km-2005 Sourced from: FAO. 2007. Gridded livestock of the world 2007, by G.R.W. Wint and T.P. Robinson. Rome, pp 131.
Sample size	West Africa, East & Central Africa, Southern Africa
Spatial scale	1 km grid cells, recalculated to district level (average value)
Year of data	2005
Year of publication	2011
Methodology	• Ensure raster is projected correctly - check that it lines up with a correctly projected layer • Run "Zonal statistics as table" (Spatial Analyst Tools\Zonal) • Set District boundaries as input raster or feature zone data • Set "District" as zone field • Set Cattle density layer as input raster or feature data class • Set "Value" as class field • Export table of attributes as a .dbf file – Open in Excel • Extract from data table MEAN values
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Additional Information	

Weather variability

D_dryspell

Indicator name	Drought hazard index
Variable(s)	D_dryspells
Definition	Drought Hazard Index (DHI), which focuses on the probability of crop failure combined with the degree of rainfall variability. Low DHI indicates a relatively low chance of crop failure, and High indicates an increased probability of crop failure, due mainly to rainfall variability
Data Source	Limpopo River Awareness Kit, http://www.limpoporak.com , data originally from: Leira, E.M., Rafael, J., Bata, M.O., Mechisso, M., McNabb, M., Engelbrecht, R. Maló, S. 2002. Atlas for Disaster Preparedness and Response in the Limpopo Basin. Available online at: http://edmc1.dwaf.gov.za/library/limpopo/index.htm Accessed on February 1, 2010 (by LimRAK)
Sample size	Sub-Saharan Africa and Madagascar
Spatial scale	Not known
Year of data	

Year of publication	2002
Methodology	Create a raster of sub-catchments, then use 'Spatial Analyst/Zonal/Zonal Statistics as Table' to extract the **Mean** Drought hazard per district per district in the basin.
Copyright	Limpopo River Awareness Kit, DWAF-SA
Additional Information	

Pests and disease

D_loss_prod

Indicator name	Loss of harvest to pests/ disease/ weeds
Variable(s)	D_loss_prod
Definition	Proportion (%) of agricultural holdings not harvested due to crops being destroyed by pests or disease or weeds
Data Source	Central Statistics Office. 2010. *2006 Annual Agricultural Survey Report*. Central Statistics Office, Gaborone. Available at: http://www.cso.gov.bw/templates/cso/file/File/2006agricannual_report.pdf Accessed December 2012 (Table 7.24 Holdings harvested by reasons for not harvesting, District and Region)
Sample size	3263 farmers
Spatial scale	Sub - District (summed to tool District)
Year of data	2006
Year of publication	2010
Methodology	Sum of all holdings in district destroyed by pests + disease + weeds, divide by the total number of holdings in district
Copyright	CSO Botswana, Ministry of Agriculture
Additional Information	

Fields to display

Total population

Indicator name	Total population
Variable(s)	population
Definition	Total population per district (2006)
Data Source	CSO, Botswana. 2009. *Botswana Demographic Survey 2006*. Central Statistics Office: Gaborone, Available at: http://www.cso.gov.bw/templates/cso/file/File/2006_bdsrprt.pdf , Accessed August 2012
Sample size	11760 households
Spatial scale	District
Year of data	2006
Year of publication	2009
Methodology	Data taken directly from source; sub-districts of Central, Kweneng and Southern districts re-calculated the sum of number of people per district
Copyright	Central Statistics Office, Botswana
Additional Information	

Mean annual rainfall (mm)

See D_MAR

Total cropland area (ha)

See D_cropland

Poverty level (%)

See D_poverty

Food security (%)

See D_food_sec

Glossary of variables for Botswana:-

D_MARavg	Longterm average annual rainfall (mm) (1901-2005). (aggregation type: AVG) - minimum and average MAR per district
D_MARmin	Longterm average annual rainfall (mm) (1901-2005). (aggregation type: AVG) - minimum and average MAR per district
D_prox_riv	% of district area lying within 1 km of a perennial river
D_water_infr	Proportion (%) of traditional holdings that have access to a reliable source of water for livestock from a borehole, well or small reservoir
D_watertable	Estimated depth to groundwater (mbgl - metres below ground level)
D_surfwater	Number of surface water bodies per km^2 per district (includes pans, pools, wells, springs, lakes, reservoirs and others)
D_wpermit	
D_salinity	
D_numCBOs	number of registered co-operatives per 1000 households (includes classes Marketing, Multi-purpose, Consumers, Producers and Savings & Credit co-operatives)
D_voting	Proportion of the voting population (%) who voted in the last government elections (Botswana: 2004 National Assembly election)
D_interests	
D_disputes	
D_information	Percentage of households (%) with access to a working radio
D_remittances	Proportion (%) of agricultural holdings who receive income from remittances
D_own_land	Proportion (%) of holdings which have land
D_avg_plot	Average size in hectares of crop land holdings (excludes agricultural land for livestock), per district
D_unemploy	Rate of unemployment (%)
D_femHH	The number of households in each district who acknowledge a single female as the head of the household, as a percentage of all households in each district.
D_g_credit	
D_gratio	Ratio of women to men in the population
D_gemployment	Ratio of women to men who are employed
D_fem_assets	
D_avail_MFI	
D_poverty	Rural poverty level (%) (2009/2010)
D_wsafe	Proportion (%) of child population where the water source used in the household is piped or a well or a borehole.
D_food_sec	Proportion of households (%) that are food secure (2009)
D_clinics	
D_work_pop	Total economically active population as a proportion (%) of total overall population
D_g_ratio	Ratio of women to men in the population
D_HIV	Estimated HIV Prevalence rates in Botswana population aged 18 months and over
D_literacy	the proportion (%) of adults (aged 15-70) who have completed 5 years of schooling or passed a literacy test
D_ag_ext	# extension agents per 1000 rural households
D_soil_mgmnt	
D_employment	The proportion of the economically active population (%) who are employed
D_prox_rd	Proportion of district area (%) lying within 5 km of a road

D_equipment	Proportion of households (%) using a double-plough
D_postharv_infr	
D_market	Median travel time to human settlement of 20,000 or greater population. (aggregation type: AVG)
D_transport	
D_cell_net	Proportion of households (%) possessing a mobile telephone
D_input_market	Proportion (%) of traditional holders obtaining their seed from Botswana Agricultural Marketing Board (BAMB) or cooperatives or a trader
D_output_market	Density of populated places (villages, towns, cities) per district
D_SOC	Soil organic carbon (g/kg) in topsoil (0-5cm deep) - % area of district with high or very high soil organic carbon on the scale: 0-1 g/kg = low; 1-2 g/kg = medium; 2-5 g/kg = high; above 5 g/kg = very high **Botswana**: area of district with 2-5g/kg SOC (high)
D_clay	% area of district with on average 20 - 30% clay in top 200cm of soil
D_cropland	Total cropland area (including irrigated) (ha) (2000). (aggregation type: SUM)
D_slope	Proportion (%) of the district by area that is classed as flat (i.e. with < 8% slope, or a gradient <4.57°, according to FAO's Geonetwork slope classification - http://www.fao.org/geonetwork/srv/en/main.home#soils)
D_pop_dens	Average population density (people/km^2)
D_bio_prod	Index of biomass production that is not crops, based on landcover types, with value range: 0 - 3 (100% city/cropland/bare - 100% forest)
D_cattle_dens	Average cattle density per district (head/ km^2), from Cattle density per grid cell (in 2005). (aggregation type: WGHTD)
D_dryspell	Drought Hazard Index (DHI), which focuses on the probability of crop failure combined with the degree of rainfall variability. Low DHI indicates a relatively low chance of crop failure, and High indicates an increased probability of crop failure, due mainly to rainfall variability
D_loss_prod	Proportion (%) of agricultural holdings not harvested due to crops being destroyed by pests or disease or weeds