

## REFERENCES

### Dashboard

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The GIS layers available for display on the main base map come from a variety of sources

- Populated Places – created by DeLorme Publishing Company, Inc and published by [ESRI](#)
- Major Rivers – created by USGS and published by [ESRI](#)
- Water bodies – created by USGS and published by [ESRI](#)
- Dams – created by ESRI, and available for download at [FAO's GeoNetwork](#)
- Roads – created by ESRI published by [ESRI](#)
- Railroads – created by ESRI published by [ESRI](#)

### Climate Baseline

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The climate baseline, trends, and predictions are derived from the World Bank's Climate Change Knowledge Portal and UNDP's Climate Change Country Profiles.

The data displayed in the provincial climate chart was calculated using GIS climate grids from WorldClim. These set of global climate layers have a spatial resolution of 1 square kilometer and have been interpolated using several major climate databases with records from 1950-1990. To learn more about the methodology or to download the layers click [here](#).

All maps showing climate baseline trends (such as annual precipitation, maximum temperature of hottest month, and minimum temperature of coldest month etc) were also created using layers from WorldClim.

\*Any additional climate information was taken from either the UNFCCC's National Communications which can be downloaded [here](#) or UNFCCC's National Adaptation Programmes of Action (NAPAs) which can be downloaded [here](#)

### Natural Hazards

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Statistics regarding hazard frequency and impacts have been extracted from the Centre for Research on the Epidemiology of Disasters' (CRED) Emergency Events Database EM-DAT. The database "contains essential core data on the occurrence and effects of over 18,000 mass disasters in the world from 1900 to present." To learn more about this global database click [here](#).

GIS layers available visualize have been created by several institutions, but are all available for download through UNEP's Global Risk Data Platform GRID. Click to view the metadata for each layer

- [Flood Frequency](#)
- [Fire Density](#)
- [Earthquake Intensity footprint](#)

- [Hurricane Tracks](#)
- [Cyclone Mortality Risks and Distribution](#)
- [Multi-Hazard Risk and Distribution](#) (depicts the accumulated risk of cyclones, earthquakes, floods and landslides)

## **Climate Future**

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Statistics presented here were extracted and analyzed from

- [The World Bank's Climate Change Knowledge Portal](#) - The Portal is a web-based service to assist WBG and partner country staff to take better account of risks to development planning and implementation that arise from climate variability and climate change. The Portal provides a central hub of software and access to information that other users can efficiently draw upon and tailor to their specific needs regarding the use of climate related information.

A wide range of impact, vulnerability and climate information is available on the portal, to learn more, click [here](#).

- UNDP's Climate Change Country Profiles. Each profile, provides "analyses of recent climate observations and the multi-model projections made available through the WCRP CMIP3". To learn more about the methodology used to generate the profiles click [here](#).

A number of global climate models were used to populate this predictive line graph. Future information is derived from 16 of the 23 available global circulation models (GCMs), the most comprehensive physically-based models of climate change available and used by the [Intergovernmental Panel on Climate Change \(IPCC\) 4th Assessment Report](#). The models are useful to illustrate the changing nature of large scale climate dynamics on continental to global scales and form the basis for understanding the human induced changes in climate. Because the resolution of these GCMs varies, they were re-gridded to a common 2° grid.

## **Vulnerability and Impact**

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The vulnerability indicators available to graph have been selected from over 400 of the World Development Indicators (WDI). To find a more in-depth description of these variables click [here](#) and to download the data visit the World Databank [here](#).

The map of Sub-Saharan Africa displays a 2008 population density grid created by [Oak Ridge National Laboratory](#) and depicts the number of people estimated to be residing in each 1 square kilometer.

## **Adaptation**

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The information presented on this page has been compiled using several key documents.

- UNFCCC's [National Adaptation Programmes of Action \(NAPAs\)](#)
- UNFCCC's [National Communications](#)

- [Country Assistance Strategy Document](#)
- GFDRR's [Country Programs for Disaster Risk Management & Climate Adaptation](#)
- [Poverty Reduction Strategy Paper](#)
- [Adaption Learning Mechanism \(ALM\) Country Profile](#)

Please note that for each country profile a slightly different combination of these core documents were used based upon availability.

## DATA SOURCES

Disasters		
Source	Link	Comments
EM-Dat	<a href="http://www.cedat.be/node/144">http://www.cedat.be/node/144</a>	In process of obtaining data through the World Bank.
Desinventar	<a href="http://online.desinventar.org/">http://online.desinventar.org/</a>	Difficult to navigate, no tables generated.
UNEP DEWA	<a href="http://www.grid.unep.ch/data/gnv199.php">http://www.grid.unep.ch/data/gnv199.php</a>	Pulled all cyclone tracks and merged into one file. Each cyclone has data on year and damage. Ascii grids for burned areas have also been downloaded.
Glide	<a href="http://www.glidenummer.net/glide/public/search/search.jsp?">http://www.glidenummer.net/glide/public/search/search.jsp?</a>	Over 4700 records going back to 1998. Location information is clustered in one field and needs to be pulled apart. The records are spread across 24 pages and can be cut/pasted into Excel. (location information grouped into single line and needs to be geo-referenced <sup>1*</sup> )
GRIP	<a href="http://www.gripweb.org/grip.php?ido=2222&amp;idMat=31321481">http://www.gripweb.org/grip.php?ido=2222&amp;idMat=31321481</a>	Provides links to data sources already explored and utilized.
SocioEconomic and Vulnerability		
Source	Link	Comments
UN HDI	<a href="http://hdr.undp.org/en/statistics/">http://hdr.undp.org/en/statistics/</a>	All national level data tables, perhaps useful for general comparisons with other countries outside of the 31 country scope.
World Bank	<a href="http://data.worldbank.org/data-catalog">http://data.worldbank.org/data-catalog</a>	Appears to be largely national level with some regional data.
WRI CAIT	WRI <sup>2</sup>	Downloaded by MFZ (needs incorporation by Mike/Sara into existing geodatabases)
Biophysical		
Source	Link	Comments
Map of Irrigated Areas	<a href="http://www.fao.org/nr/water/aquastat/irrigationmap/index10.stm">http://www.fao.org/nr/water/aquastat/irrigationmap/index10.stm</a>	Grid and Shapefile provided at global scale.
Water Resources by Country	<a href="http://www.fao.org/nr/water/aquastat/water_res/index.stm">http://www.fao.org/nr/water/aquastat/water_res/index.stm</a>	Pulled national level data for all 31 countries from the <a href="#">AQUASTAT main country database</a> .
Agricultural Water Use	<a href="http://www.fao.org/nr/water/aquastat/water_use/index.stm">http://www.fao.org/nr/water/aquastat/water_use/index.stm</a>	National level only.
Other Maps of Interest	<a href="http://www.fao.org/nr/water/aquastat/maps/index.stm">http://www.fao.org/nr/water/aquastat/maps/index.stm</a> (there is a whole list here that would be	Some dead links and PDF maps, but most of this has been, or can be found through other sources.

<sup>1</sup> Will need to work out details of georeferencing locations if the data are needed.

<sup>2</sup> Items highlighted should not be the initial focus as Fernanda will get you the datasets which have already been explored.

	useful)	
Crop Yields		EPIC simulated crop yields - administration level 2 (maize, millet, sorghum, cowpea, groundnut and cotton)
<b>Livelihoods</b>		
<b>Source</b>	<b>Link</b>	<b>Comments</b>
Fews.net (look for shapefiles)	<a href="http://fews.net">http://fews.net</a>	Some spatial data tables locate here. Need further investigation. <a href="http://earlywarning.usgs.gov/?l=en">http://earlywarning.usgs.gov/?l=en</a>
WFP (Vam methodology)	<a href="http://www.wfp.org">http://www.wfp.org</a> (you will need to search through this one)	Haiti GIS data available here: <a href="http://epmaps.wfp.org/cu/default.aspx">http://epmaps.wfp.org/cu/default.aspx</a> Nothing else found, but will continue to investigate.
<b>Other and Portals of data</b>		
<b>Source</b>	<b>Link</b>	<b>Comments</b>
Governance	<a href="http://info.worldbank.org/governance/wgi/pdf_country.asp">http://info.worldbank.org/governance/wgi/pdf_country.asp</a>	<a href="http://info.worldbank.org/governance/wgi/mc_chart.asp">http://info.worldbank.org/governance/wgi/mc_chart.asp</a> Link provides data on governance indicators by country. No subnational data.
Geoportal (most of UN data)	<a href="http://geodata.grid.unep.ch/">http://geodata.grid.unep.ch/</a>	Wealth of data, including forest fire extent and people killed.
<b>Climate</b>		
<b>Source</b>	<b>Link</b>	<b>Comments</b>
Global climate related to agri	<a href="http://www.fao.org/nr/climpag/data_3_en.asp">http://www.fao.org/nr/climpag/data_3_en.asp</a> and <a href="http://www.fao.org/nr/climpag/data_1_en.asp">http://www.fao.org/nr/climpag/data_1_en.asp</a>	<a href="http://www.fao.org/nr/climpag/climate/index_en.asp">http://www.fao.org/nr/climpag/climate/index_en.asp</a> -- ClimData.zip <a href="http://www.fao.org/nr/climpag/globgrids/KC_commondata_en.asp">http://www.fao.org/nr/climpag/globgrids/KC_commondata_en.asp</a> -- A number of tables, I need to investigate further.
<b>Vulnerability</b>		
<b>Source</b>	<b>Link</b>	<b>Comments</b>
WFP VAIM	<a href="http://ivm5.ivm.vu.nl/sat/chapdb.php?id=20">http://ivm5.ivm.vu.nl/sat/chapdb.php?id=20</a>	Dead Link?
Preview	<a href="http://www.grid.unep.ch/activities/earlywarning/preview/">http://www.grid.unep.ch/activities/earlywarning/preview/</a>	Natural hazard risk data from here: <a href="http://preview.grid.unep.ch/index3.php?preview=map">http://preview.grid.unep.ch/index3.php?preview=map</a> Some of this data is duplicated from other sources above, however with metadata.
Listing of various sites	<a href="http://ergodd.zoo.ox.ac.uk/eden/index.php?pe=57">http://ergodd.zoo.ox.ac.uk/eden/index.php?pe=57</a>	Lots to go through, I need time with much of this.
Poverty	<a href="http://sedac.ciesin.columbia.edu/povmap/ds_info.jsp">http://sedac.ciesin.columbia.edu/povmap/ds_info.jsp</a>	Infant mortality and malnutrition as indicators of poverty are stored in excel work books. Appears to be national level data.
<b>Baseline</b>		
<b>Source</b>	<b>Link</b>	<b>Comments</b>
Elevation		From DIVA
Climate	LTN file from diva below	Downloaded the Climdata zip from FAO, not sure if it is the same thing, also from DIVA, bioclim
Soils		Nutrients, type, carbon storage – from databasin (unless no data there to clip out.
General but maybe useful	<a href="http://www.Databasin.org">http://www.Databasin.org</a>	Good data at global and national levels, some sub-national. All data I have reviewed has metadata completed. (Soils carbon, irrigated crop lands, rainfed crop lands, soils with excess salt, forested land as of 2000, urbanized land as of 2000, land suitable for cultivation, soil crop rooting conditions, soil O2 availability, no vegetation for 2000, soil nutrient availability)
Other useful	<a href="http://www.diva-gis.org/Data">http://www.diva-gis.org/Data</a>	I have the base data downloaded for all relevant

resources	countries. The WorldClim LTN data has been compiled for the 31 countries.
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## Data Layers currently available in all Priority Country GeoDatabases

Under this work, final reports will be produced based on a number of a supporting documentation (reports and data collected) and knowledge products. This supporting documentation will be in the form of three types: Background Reports, Guidance Notes, Interactive knowledge products, and data products. The table below presents a summary of the current status of these supporting documents, many of which should in and of themselves be excellent sources of help to both Bank Staff and Clients.

<b>Vulnerability</b>	
Infant Mortality	CIESIN
Children under 5	CIESIN
Population Under wieght, under 5 years of age	CIESIN
Global Volcano locations	NOAA
Global Flood event Regions	Dartmouth
Global Significant Earthquakes	NOAA
Global Tsunami Events	NOAA
Global Tsunami Runups	NOAA
Global Vlocanic eruptions	NOAA
Global Historic Huricane Tracts	UNEP
<b>Biophysical</b>	
Elevation	WorldClim
Crop Lands	BASIN
Irigated croplands	BASIN
Rainfed croplands	BASIN
soils with excess salt	BASIN
Forested land, 2000	BASIN
Vegetaion, 2000	BASIN
Soil Nutrient Availability	BASIN
No vegetaion, 2000	BASIN
Soil O2 Availability	BASIN
Soild crop rooting conditons	BASIN
Soil Carbon	BASIN
Land suitable for cultivation	BASIN
<b>Demographic</b>	
Gridded urban population for the year 2000	CIESIN
Gridded urban population for the year 2001	CIESIN
Gridded urban population for the year 2002	CIESIN
Urbanized land, 2000	BASIN

## Impacts

Global IPCC Observed Climate Change Impacts

IPCC

## Climate

Layer Description	Source	Layer Description	Source
Annual Mean Temperature	WorldClim	LTN Maximum Temp for December	WorldClim
Mean Temperature of Warmest Quarter	WorldClim	LTN Maximum Temp for February	WorldClim
Mean Temperature of Coldest Quarter	WorldClim	LTN Maximum Temp for March	WorldClim
Annual Precipitation	WorldClim	LTN Maximum Temp for April	WorldClim
Precipitation of Wettest Period	WorldClim	LTN Maximum Temp for May	WorldClim
Precipitation of Driest Period	WorldClim	LTN Maximum Temp for June	WorldClim
Precipitation Seasonality(Coefficient of Variation)	WorldClim	LTN Maximum Temp for July	WorldClim
Precipitation of Wettest Quarter	WorldClim	LTN Maximum Temp for August	WorldClim
Precipitation of Driest Quarter	WorldClim	LTN Maximum Temp for September	WorldClim
Precipitation of Warmest Quarter	WorldClim	LTN Mean Temp for January	WorldClim
Precipitation of Coldest Quarter	WorldClim	LTN Mean Temp for October	WorldClim
Mean Diurnal Range(Mean(period max-min))	WorldClim	LTN Mean Temp for November	WorldClim
Isothermality (P2/P7)	WorldClim	LTN Mean Temp for December	WorldClim
Temperature Seasonality (Coefficient of Variation)	WorldClim	LTN Mean Temp for February	WorldClim
Max Temperature of Warmest Period	WorldClim	LTN Mean Temp for March	WorldClim
Min Temperature of Coldest Period	WorldClim	LTN Mean Temp for April	WorldClim
Temperature Annual Range (P5-P6)	WorldClim	LTN Mean Temp for May	WorldClim
Mean Temperature of Wettest Quarter	WorldClim	LTN Mean Temp for June	WorldClim
Mean Temperature of Driest Quarter	WorldClim	LTN Mean Temp for July	WorldClim
LTN Precipitation for January	WorldClim	LTN Mean Temp for August	WorldClim
LTN Precipitation for October	WorldClim	LTN Mean Temp for September	WorldClim
LTN Precipitation for November	WorldClim	LTN Minimum Temp for January	WorldClim
LTN Precipitation for December	WorldClim	LTN Minimum Temp for October	WorldClim
LTN Precipitation for February	WorldClim	LTN Minimum Temp for November	WorldClim
LTN Precipitation for March	WorldClim	LTN Minimum Temp for December	WorldClim
LTN Precipitation for April	WorldClim	LTN Minimum Temp for February	WorldClim
LTN Precipitation for May	WorldClim	LTN Minimum Temp for March	WorldClim
LTN Precipitation for June	WorldClim	LTN Minimum Temp for April	WorldClim
LTN Precipitation for July	WorldClim	LTN Minimum Temp for May	WorldClim
LTN Precipitation for August	WorldClim	LTN Minimum Temp for June	WorldClim
LTN Precipitation for September	WorldClim	LTN Minimum Temp for July	WorldClim
LTN Maximum Temp for January	WorldClim	LTN Minimum Temp for August	WorldClim
LTN Maximum Temp for October	WorldClim	LTN Minimum Temp for September	WorldClim
LTN Maximum Temp for November	WorldClim		

### Socio-economic Information also available

These indicator data are currently in Excell and MSAccess format and will be used in pivot table analyses. In addition to several MDG indicators and HDI indicators from the World Bank, we have several National level datasets for the following:

#### Variable

Children orphaned by HIV/AIDS

#### Variable

Birth Attd by Skilled Staff

Health expenditure per capita (current US\$)	Cereal Yields per Hect
Control of Corruption	Co2 Emmisions kt
Political Stability	Co2 Per Capita
Government Effectiveness	Contraceptive Prev 15 to 39
Percent of Land Area in Forest	Crop production Index
Access to Improved Sanitation	Death Rate pre 1000
GDP per person employed (constant 1990 PPP \$)	Econ Active Labor % age 7 to 14
Urban Population	Econ Active pop in Ag
Urban Pop Percent	Energy Methane
Regulatory Quality	Engry Nitrous Oxide
Rule of law	kg oil use percapita
Voice and Accountability	kt of oil equiv
Pop living in Slums	Export Value Index
Population Total	Export Volumn Index
Poverty Gap 2dday	Births per woman
HIV Prevalence, age 15 to 49	Fert use per H of Arable Land
Terrestrial protected areas	Refinance Investment in firms
Income Distribution	Fish Species Threatened
Income Per Capita	Food production Index
Poverty	Forsted Land sqkm
Settlement and Infrastructure: Access to Electricity (percent)	Public Health Expend % of tot H
Settlement and Infrastructure: Access to Improved Water (percent)	Immunization % children 1to2 yr
Settlement and Infrastructure: Digital Access (Percent)	Import Value Index
Settlement and Infrastructure: Flood Events (rank)	Import Volumn Index
Settlement and Infrastructure: Land below 5m (percent)	ImprovedSanitation%Access
Settlement and Infrastructure: Pop below 5m (percent)	ImprovedWater%access
Settlement and Infrastructure: Urban Growth Rate (percent)	Fish Species Threatened
Settlement and Infrastructure: Population Living in Slums (percent)	Income Share 2nd 20%
WRI HIC: Age Dependency Ratio	Income Share 3rd 20%
WRI HIC: Civil Liberties Index	Income share 4th 20%
WRI HIC: Control of Corruption	Income share highest 10%
WRI HIC: Development Assisstance	Income Share lowest 10%
WRI HIC: Gender Development Index	Income Share highest 20%
WRI HIC: Literacy	Income Share lowest 20%
WRI HIC: Political Rights	Private Energy Investment USD
WRI HIC: Political Stability	Private Telecom Investment USD
WRI HIC: Voice and Accountability	Private Transport Investmnt USD
WRI Ag: Cereal production Yields	ISO Cert % of firms
WRI Ag: Drought Events (Ranked)	Male Labor rate %
WRI Ag: Food and Cereal Deliveries (1000s metric tonnes)	Arable Land Hct per
WRI Ag: Workforce in Agriculture (percent)	Arable Land H Per Capita
WRI Ag: Pop 100km from coast (percent)	Time Spent meeting with tax off
Environment: Extreme Temp Events	Crude Birth Rat per 1000
Environment: Fertilizer Use (Cases)	
Environment: Fresh Water Resources (cubic meters per person, per year)	
Adolescent fertility rate per 1000 age 15 to 39	
Agricultural irrigated land (percent)	
Agricultural land (percent)	
Tractors per 100 sqkm	
Agricultural Methane percent of total	
Agricultural Nitrous Oxide percent of total	
Ag Value Adδες per GDP	
Val Added per Worker USD	

## Priority Documents Review

A desktop review of priority documents is underway using the resources listed in Table 1 below. This has outlined country vulnerabilities, climate change context, trends in climate parameters, impacts, Institutions, ongoing projects, policies, studies and adaptation-relevant information is being conducted for each priority country. These are available in Spreadsheet format at the country-level, including the worksheets defined in Table 2.

Table 1: Sources of Country Priority Information

Main Sources	Pakistan	Haiti	Mozambique	Ghana	Malawi	Senegal	Burkina Faso	Ethiopia	Marshall Islands
National Communications (NC)	x	x	x	x	x	x	x	x	x
Poverty Reduction Strategy Paper (PRSP)	x	x	x	x	x	x	x	x	x
National Adaptation (NAPA)	x	x	x	x	x	x	x	x	x
Country Assistance Strategy (CAS)	x	x	x	x	x	x	x	x	x
Strategic Country Environmental Assessment	x	x	x	x	x	x	x	x	x
UNDP Climate Change Country Profile	x	x	x	x	x	x	x	x	x
GFDRR Programming	x	x	x	x	x	x	x	x	x
<i>Optional</i>	x	x	x	x	x	x	x	x	x
<a href="#">Preventionweb.net</a>	x	x	x	x	x	x	x	x	x
<a href="#">UN-ISDR</a>	x	x	x	x	x	x	x	x	x
<a href="#">Country Profiles (ELDIS)</a>	x	x	x	x	x	x	x	x	x
<a href="#">Livelihoods Papers (search by country)</a>	x	x	x	x	x	x	x	x	x
<a href="#">GEF Profiles</a>	x	x	x	x	x	x	x	x	x
<a href="#">SciDev Policy Briefs</a>	x	x	x	x	x	x	x	x	x
<a href="#">FAO Country Profiles</a>	x	x	x	x	x	x	x	x	x
<a href="#">IPCC Summaries/Regions</a>	x	x	x	x	x	x	x	x	x

Format:

Each priority document review is available in spreadsheet form, including the following worksheets:

table 2: Spreadsheet design of Collected Country Priority Information<sup>3</sup>

Name of Worksheet	Description
Vulnerabilities	Key Vulnerabilities and evidence of those vulnerabilities

<sup>3</sup> These are currently stored in the Project Management Site on Deskaway.



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<b>Priorites</b>	Key priorities listed in the document
<b>CC Overview</b>	Any relevant text that discusses/summarizes climate change
<b>Trends</b>	observed trends in rainfall, temperature, and extreme events
<b>Impacts</b>	Impacts (observed impacts noted in the document)
<b>Projects</b>	On going Projects (list any adaptation projects)
<b>Institutions</b>	Institutions Involved in Climate change adaptation efforts
<b>Policies</b>	Major Initiatives or Policies that address climate change and/or the environment
<b>Studies</b>	Current and past climate change studies
<b>Adaptation</b>	Adaptation measures suggested for the future, or already adopted
<b>Graphs/Maps/Figure</b>	A list relevant Graphs, Maps, or figures extracted from documents and placed into power point