K4D | Knowledge, evidence and learning for development

Counting people and making people count: Key sources of population projections

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Question

What are the key sources of information on population dynamics globally and for the countries and regions where DFID works?

Contents

1. Key sources of information on Population Dynamics

Centrally generated population projections

Three sources of centrally generated projections exist: The Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, the World Bank and the Wittgenstein Centre. As the World Bank relies heavily on the UN its role will not be considered. The premier source of population projections is the UN Population Division. This data is easily accessible and updated every two years. Five global datasets are produced by the Division (i) World Population Prospects, (ii) World Urbanisation Prospects, (iii) World Population Policies, (iv) Estimates of family planning indicators and (v) Estimates of the number of international migrants.

United Nations, Department of Economic and Social Affairs, Population Division (2015). World Population Prospects: The 2015 Revision

https://esa.un.org/unpd/wpp/

The 2015 Revision of World Population Prospects is the twenty-fourth round of official UN's population estimates and projections. Key demographic indicators can be accessed for selected periods or dates from 1950 to 2100, for the world, development groups, major areas, regions, and countries or areas with more than 90,000 inhabitants in 2015. For countries or areas with fewer than 90,000 inhabitants in 2015, only figures related to population size and growth are provided. Data tables and figures for 1950-2015 are estimates and those thereafter are projections. Population projections are essential in the assessment of future need. A projection is a prediction made by extrapolating from past observations and shows what may happen if a set of assumptions holds true. The assumptions can be varied to see how much difference they make, thus producing a set of variant projections. These could include 'best-case' and 'worst-case' scenarios.

The projections are presented for medium, high, low and constant-fertility variants. The main results are presented in a series of Excel data files, maps, graphs and publications. Data can be displayed for both sexes combined, male or female. At a regional level and over a period of a few decades, the UN projections have a good track record of predictive validity (1). Figures for specific countries though will be subject to greater error. The mean absolute error of the UN 1994 projections for the size of national populations in the year 2000 was 5%. The predictive accuracy of national projections depends on: (1) accuracy of baseline data (typically a census), ability to detect and adjust for errors; (2) correct mortality assumptions, usually not an important source of error; (3) correct fertility assumptions, a more important source of error; and (4) migration assumptions, which are intrinsically more difficult to forecast than mortality and fertility, but are less problematic for large populations than small ones. Broadly, it is fair to claim that UN projections are of sufficient quality for many planning purposes over a horizon of 10 to 20 years.

The following is a list of the indicators can be found on the World Population Prospects 2015 Revision. Examples of what cannot be obtained from this source include: future nature/size of inequality, vulnerability, displaced people, occupational structure, educational level, number of school leavers seeking work, sub-national populations etc.

Population indicators: total population by sex (thousands), average annual rate of population change (percentage), rate of natural increase (per 1,000 population), population density, population by age and sex, percentage of total population by broad age group, both sexes, percentage of female population by broad age group, percentage of male population by broad age group, median age of total population, sex ratio of total population.

Fertility indicators: crude birth rate, total fertility, age-specific fertility rates, mean age of childbearing (years), net reproduction rate (surviving daughters per woman), number of births, both sexes (thousands), number of birth by age of mother (thousands), sex ratio at birth (male births per female births)

Mortality indicators: Crude death rate, life expectancy, infant mortality rate, under-five mortality, adult mortality, number of deaths by age and sex

Migration indicators: net migration rate (per 1000 population), net numbers of migrants, both sexes combined (thousands)

Dependency ratios: child dependency ratio, old-age dependency ratio, potential support ratio, total dependency ratio

United Nations, Department of Economic and Social Affairs, Population Division (2014). World Urbanisation Prospects: The 2014 Revision

https://esa.un.org/Unpd/Wup/

Every two years since 1988, the Population Division has been issuing revised estimates and projections of the urban and rural populations of all countries and of their major urban agglomerations growth and size. The proportion of urban (and rural) population is estimated from the most recently available census or official population estimate of each country. If this estimate is only available for some time in the past, the proportion urban is extrapolated to the base year, which in this case is 2014.

The Population Division does not use its own definition of "urban" but instead follows the definition that is used in each country. The definitions are generally those used by national statistical offices in carrying out the latest available census.

Wittgenstein Centre

http://www.wittgensteincentre.org/en/index.htm

The Wittgenstein Centre is a collaboration of three institutions: World Population Program of the International Institute for Applied Systems Analysis (IIASA), the Vienna Institute of Demography of the Austrian Academy of Sciences (VID/ÖAW) and the Demography Group and the Research Institute on Human Capital and Development of the Vienna University of Economics and Business (WU). In 2014 this Centre published projections for 195 countries, based on a blend of expert judgment and advanced modelling (2). The major innovation was to include education in addition to age and sex as a third demographic dimension in projection outputs, under the rationale that education is a key determinant of fertility and mortality. Including educational differentials in projections permitted the production of alternative projections under different assumptions. For example, in most societies, particularly during the process of demographic transition, women with more education have fewer children, both because they want fewer and because they find better ways to pursue their goals. Another example is that better educated men and women in most societies have lower mortality rates and their children have a better chance of survival.

In a recent extension to this work, Abel et al. show how achievement of the Sustainable Development Goals (SDGs), and in particular advances in female education and reproductive health, can lower future population growth (3). The goals are translated into SDG population scenarios, resulting in population sizes between 8.2 and 8.7 billion in 2100. Although this analysis uses several assumptions about the implementation of the SDGs and the persistence of educational, fertility, and mortality differentials, it quantitatively shows that 'demography is not destiny' and that policies can make a decisive difference. The Centre continues to try and understand challenges future societies will face. For example in a recently published paper, The Centre uses a 'demographic metabolism model' to forecast important aspects of societal change that affect adaptive capacity and specifically how the changing educational composition of future populations can influence societies' adaptive capacity to climate change (4).

It seems unlikely that the Wittgenstein Centre will have the resources to update projections every two years, as the UN does.

Projections generated by countries

National censuses are ideally undertaken every 10 years. They are an essential tool for policymakers to plan for resource scarcity and service provision. However, censuses are complex and costly, requiring huge amounts of time and man power. Thus, many countries have outdated or inaccurate information, especially regarding their most vulnerable populations, such as women and girls and internally displaced persons. Details on census taking are available from the UN Statistics Division. Most countries participated in the 2010 census round (report E/CN.3/2015/6) and a list of censuses by country and date are also available (https://unstats.un.org/unsd/demographic/sources/census/censusdates.htm).

At the end of the 2010 census, 22 out of the 32 DFID priority countries had conducted a population and housing census for this round. Ten DFID priority countries did not participate in the round, which resulted in an estimated 31 per cent of the population of DFID priority countries not being enumerated (table). Six DFID priority countries have no population and housing census planned for the next round (Afghanistan, Iraq, Lebanon, Somalia, Syria and Yemen) and these six countries did not conduct a 2010 census either.

Table. Date of last census for DFID priority countries

DFID priority country	2010 round of censuses 2005-2014	2020 round of censuses 2015-2024
Afghanistan	- (16)	-
Bangladesh	15 March 2011	(2021)
Burma	30 Mar-10 Apr 2014	(2024)
Democratic Republic of Congo	-	(2016)
Ethiopia	29 May-7 Jun 2007	(November 2017)
Ghana	26 Sep-10 Oct 2010	(22 March 2020)
India	9-28 February 2011	(9-28 February 2021)
Iraq	-	-
Jordan	-	30 Nov-10 Dec 2015
Kenya	24-31 August 2009	(24 August 2019)
Kyrgyzstan	24 Mar-3 Apr 2009	(2019)
Lebanon	-	-
Liberia	21 Mar-30 Mar 2008	(2018)
Malawi	8-28 June 2008	(2018)

Mozambique	1-15 August 2007	(2017)
Nepal	22 June 2011	(2021)
Nigeria	21-27 March 2006	(2017)
Occupied Palestinian Territories	1-16 December 2007	(2017)
Pakistan	-	(2016)
Rwanda	16-30 August 2012	(2022)
Sierra Leone	-	5-18 December 2015
Somalia	-	
South Africa	10 Oct-7 Nov 2011	(2021)
Sudan	21 Apr-6 May 2008	(April 2018)
South Sudan	21 Apr-5 Jun 2008	(2017)
Syria	-	
Tajikistan	21-30 September 2010	(2020)
United Republic of Tanzania	26 August 2012	(2022)
Uganda	27 Aug-6 Sep 2014	(2024)
Yemen	-	
Zambia	16 Oct-5 Nov 2010	(October 2020)
Zimbabwe	18-27 August 2012	(August 2022)

Symbols

(Date) It is expected that a census will be held on the date indicated

- No census taken or planned in the period indicated

Locally generated population projections complement UN projections mainly by generating regional and district projections. Most countries with a national statistical office produce in one form or another post-censal population projections either on their own or with some assistance from some external consultant owing to a need for subnational focus on a shorter time horizon for functional application. Spectrum or US census bureau international program software applications are among the most popular among LMIC.

Spatial projections can be made in several ways, ranging from the very crude to the extremely complex. Among the crude approaches are: (1) to assume that distribution of total population by locality will remain constant; (2) to assume that the past relative growth of localities will remain constant. A better approach is to make use of net migration rates between localities, along with estimates of fertility and mortality for each locality. This was the approach used in Myanmar based on the 2014 census. In addition to a national projection, projections were made for 15

regions. Net migration rates between regions for the year before the census were available from the census along with region-specific birth and death data. The results of this exercise showed implausibly high growth for one region and results were modified. Projections for each region were finally adjusted to enforce consistency with the national projection.

Projections based on the 2007 Ethiopian census included forecasts for 11 regions. As census data on inter-regional migration were not collected in the census, survey estimates were used. The 2013 projection report notes that "the assumptions on migration used here are not based on any detailed studies on the subject and are very subjective". It may also be noted that the UN estimates for Ethiopia's total population are about 10 million higher than the figures used by Ethiopia's Central Statistical Office. The reason is unclear but may stem from a UN judgment that the 2007 census suffered from under-enumeration. Such divergences between UN and locally generated projections and estimates may be problematic for agencies such as DFID.

The gold standard method of making sub-national projections requires age-sex specific flows in both directions of internal migrants between all regions but the number of computations required to implement this ideal is excessive. The Myanmar and Ethiopian examples illustrate that sub-national projections are a major and complex operation requiring skills that are often unavailable within countries.

The utility of population projections can be vastly increased when linked to sector-specific data, such as school enrolments, skilled attendance at childbirth, proportion of adults who are wage earners etc. In these types of application, population projections by age and sex are combined with forecasts of participation or demand to yield, for instance, the number of future schools/teachers needed, the number of obstetricians/midwives required, and the likely tax revenue from wage earners. Typically, the sector-specific data will come from specialist surveys, such as the Demographic and Health Surveys, or from administrative records. However, censuses themselves may contain relevant information. For example, in Myanmar, it is evident that disability is closely related to age (Figure 1) (http://www.dop.gov.mm/moip/index.php?route=product/product&path=54_52&product_id=95). The prevalence of disability is 10 percent between the ages of 55 and 59 and starts to increase rapidly, reaching over 50 percent at age 90. Under the assumption that disability prevalence remains constant, then population projections by age can be used to forecast the future size of the disabled population.

Figure 1: Proportion of the Population with Disability (prevalence rates) by Age and Sex
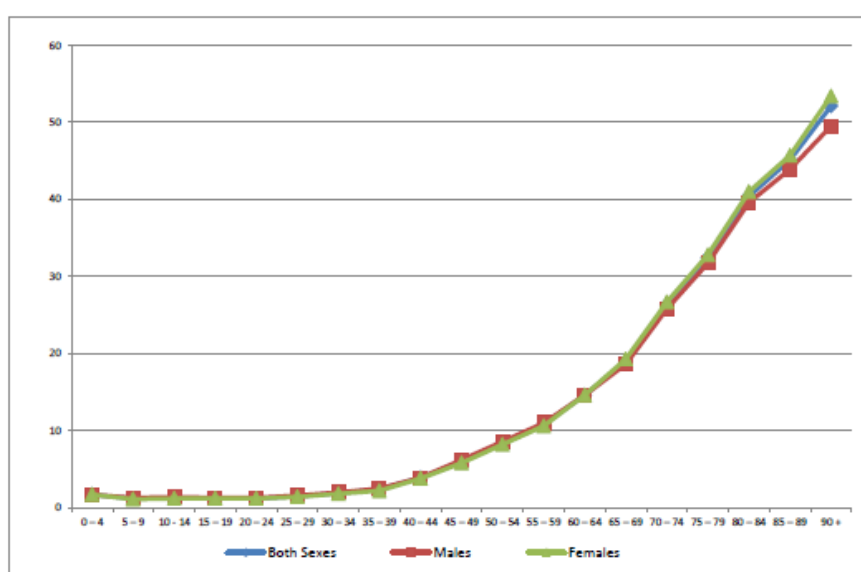
Source: 2014 Myanmar Population and Housing Census Report Volume 2

While it was beyond the scope of this report, it seems essential to find out the extent to which Ministries in DFID priority countries make use of population projections in their planning.

The UN Population Division surveyed the national institutional capacity in 2008 to produce population estimates and projections (5). The inquiry was carried out among National Statistical Offices because in most countries they are the government unit in charge not only of collecting and disseminating population statistics but also of carrying out population analysis and producing population estimates and projections. The inquiry was carried out during 2008 of which 79 out of 192 National Statistical Offices responded. The analysis focusses on four issues: (a) the quantity and quality of the human resources available in National Statistical Offices to carry out population analysis; (b) the interest of National Statistical Offices in participating in capacity-building activities at the regional or international levels; (c) the capacity of National Statistical Offices to produce population projections, and (d) the capacity of National Statistical Offices to produce reliable estimates of key demographic indicators. The analysis reveals that National Statistical Offices in developing countries are not yet universally able to produce reliable demographic indicators or detailed population projections, mainly because many of them have very few professional staff with specialized training in demography. Deficits in trained personnel also affect several countries with economies in transition and reduce their capacity to produce timely

population estimates and projections. Almost all National Statistical Offices were interested in participating in capacity-building activities to either acquire or upgrade skills.

In recent years, the Population Division has organized training workshops including 'Capacity Development in Population Estimates and Projections in sub-Saharan Africa' and 'Capacity Development on the use and Production of Migration Data' (http://www.un.org/en/development/desa/population/theme/cooperation/index.shtml). The Division seeks to expand its work in national capacity development to improve demographic data and increase knowledge and understanding of population trends (http://www.un.org/en/development/desa/population/pdf/commission/2017/documents/OpeningStatement_JohnWilmoth.pdf).

Changes in the availability and quality of demographic data due to new technologies

Accurate, up-to-date data of human population distributions, their characteristics and changes over time on a national and subnational scale are needed to determine the impacts of population growth, for monitoring changes and for planning interventions. In this Comment from Andrew Tatem, WorldPop (www.worldpop.org) is described which aims to provide detailed and open access spatial demographic datasets built using transparent data for low and middle-income countries, as well as collaborating with and running training for many national statistical offices and ministries of health around the world (6). Initiated in 2011 and growing from the AfriPop and AsiaPop projects started in 2005, WorldPop develops methods for data integration and disaggregation of traditional data sources such as census and surveys with satellite and cell phone data, amongst others to produce gridded outputs. These methods undergo peer review and the output datasets are made open access. Collection of timely, consistent, comparable and spatially-detailed demographic data in low and middle income countries can be a challenge, despite growing capacity to obtain these data. An up-to-date understanding of not only how many people live in a country, but where people are, who they are and how things change is needed to achieve the SDGs and ensure that 'no-one is left behind'. Also, the broad focus of the SDGs across climate change, disaster response and access to services is also driving a need to move beyond administrative unit based analyses to enable flexible integration with datasets on land use, flooding and service locations for example. The following provides examples of WorldPop work.

Currently WorldPop work includes integrating UN projections (urban/rural, age, sex, births) with mapping to construct disaggregated high-resolution versions of these projections. A recent example of this work can be found in the UNFPA/WHO State of the World's Midwifery Report (7).

To better understand urban growth dynamics in Africa and better predict the spatial pattern of rural-urban conversion, Linard et al. developed a modelling approach at an intermediate scale, between city and global level (5-10 km resolution), to identify factors that influence spatial patterns of urban expansion in Africa (8). The most influential variables were the urban land cover in a 1 km neighbourhood and the accessibility (measured through travel time) to the city centre. The spatial pattern of small, compact and fast growing cities was easier to simulate than cities with lower population densities and a lower growth rate. The simulation method described in this paper is now being developed further and used to produce spatially detailed urban expansion forecasts for 2020 to 2030 for Africa through the MAUPP project (http://maupp.ulb.ac.be/), and globally 2000-2030 for WorldPop global mapping work with the Bill and Melinda Gates Foundation (current research, personal communication from Andrew Tatem).

Sorichetta et al. describe the construction of internal migration estimates using models built on census microdata, demographic features and geospatial covariates across all low and middle income countries (Figure 2)(9). The estimates will be used to map connectivity for disease elimination planning, but have value beyond this in for example trade, transportation and urban planning.

Figure 2. Estimated internal human migration flows between subnational administrative units for every malaria endemic country in Africa.
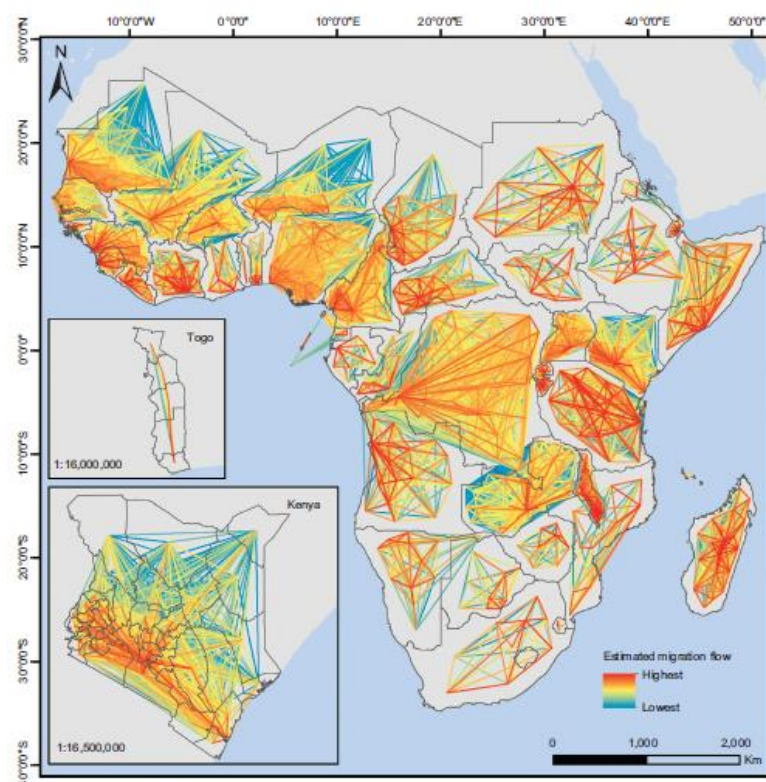
Source: Sorichetta, A. et al. Mapping internal connectivity through human migration in malaria endemic countries. Sci Data 3, 160066 (2016).

The Flowminder Foundation (www.flowminder.org), a partner organization of WorldPop and a non-profit organization based in Stockholm, Sweden, works with governments, inter-governmental organizations and NGOs to also collect, aggregate, integrate and analyze anonymous mobile operator data, satellite and household survey data to improve public health

outcomes. Analyses enable the mapping of the distributions and characteristics of vulnerable populations in low- and middle-income countries. The following publications are examples of the work both WorldPop and Flowminder are involved with.

Steele et al demonstrate (in Bangladesh) how public and private data sources that are commonly available for LMICs can be used to provide novel insights into the spatial distribution of poverty (10). The aim being to complement and update estimates between censuses. Each time a subscriber makes a phone call with his or her mobile phone, a call detail record (CDR) is generated in the system of the telecom operator. A CDR includes a timestamp of the call, the mobile phone number and the mobile tower used to route the call. This data can be used to analyse how phones move between towers between calls. The authors found that models using mobile data only yielded comparable results to models using mobile phone data and available geospatial data. Stratifying models into urban and rural areas highlighted the advantage of using mobile data in urban areas and the need to use different data sources in different contexts.

An obstacle to developing effective national malaria control programs is a lack of understanding of human movements, which are an important component of disease transmission. As mobile phones have become increasingly ubiquitous, it is now possible to collect individual-level, longitudinal data on human movements on a massive scale. Wesolowski *et al.* analyzed mobile phone call data records representing the travel patterns of 15 million mobile phone owners in Kenya over the course of a year (11). This was combined with a detailed malaria risk map, to estimate malaria parasite movements across the country that could be caused by human movement. This information enabled detailed analysis of parasite sources and sinks between hundreds of local settlements. Estimates were compared with hospital data from Nairobi to show that local pockets of transmission likely occur around the periphery of Nairobi, accounting for locally acquired cases, contrary to the accepted idea that there is no transmission in the capital. Similar analyses have been conducted by WorldPop/Flowminder in Namibia, Haiti, Tanzania and Senegal.

The mapping of populations remains constrained by the complexity, cost and frequency of censuses and surveys. Consequently, spatially detailed changes across scales of days, weeks, months or even years are difficult to assess and limit the application of human population maps in situations in which timely information is required, such as disasters, conflicts or epidemics. Deville et al. demonstrate how data collected in Portugal and France by mobile phone network operators can cost-effectively provide accurate and detailed maps of population distribution over national scales and any period, while preserving the anonymity of mobile phone users (12). WorldPop and Flowminder are working to extend the mobile data methods to many low and middle income settings, along with assessments of alternative and complimentary datasources, such as dynamic satellite data.

2. How do organisations use population projections?

DFID

A stocktake of how DFID is currently accessing and using information on population dynamics has been explored through an e-survey and focus group discussions. Please refer to the separate document on the findings.

UK Government Ministry of Defence

Strategic Trends Programme. Global Strategic Trends – Out to 2045. Fifth Edition. Ministry of Defence.

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/348164/20140821_DCDC_GST_5_Web_Secured.pdf

Global Strategic Trends (GST) describes a strategic context for those involved in developing long-term plans, policies and capabilities. It describes those phenomena that could have a significant impact on the future and combines these differing perspectives to produce a multifaceted picture of possible outcomes. The GST identifies trends, for example growth in world population, projects those trends, and analyses their potential consequences. These components are combined to produce a strategic context against which policies, capabilities and plans can be tested and refined. Key scenarios illustrate how these trends could interact and shocks provide the reader with examples of how the strategic context could be radically altered by unexpected events. In addition, alternative outcomes emphasise that there are several possible ways trends could impact on the future.

The report details their methodology which includes a review of previous data, identifying gaps, identifying research topics, breakdown, analysis and mapping to identify drivers, factors and trends, consultation of drafts across Government, industry, think-tanks and academia and finally consolidation of this work. The following graph illustrates the increasing uncertainty the further the projection into the future.
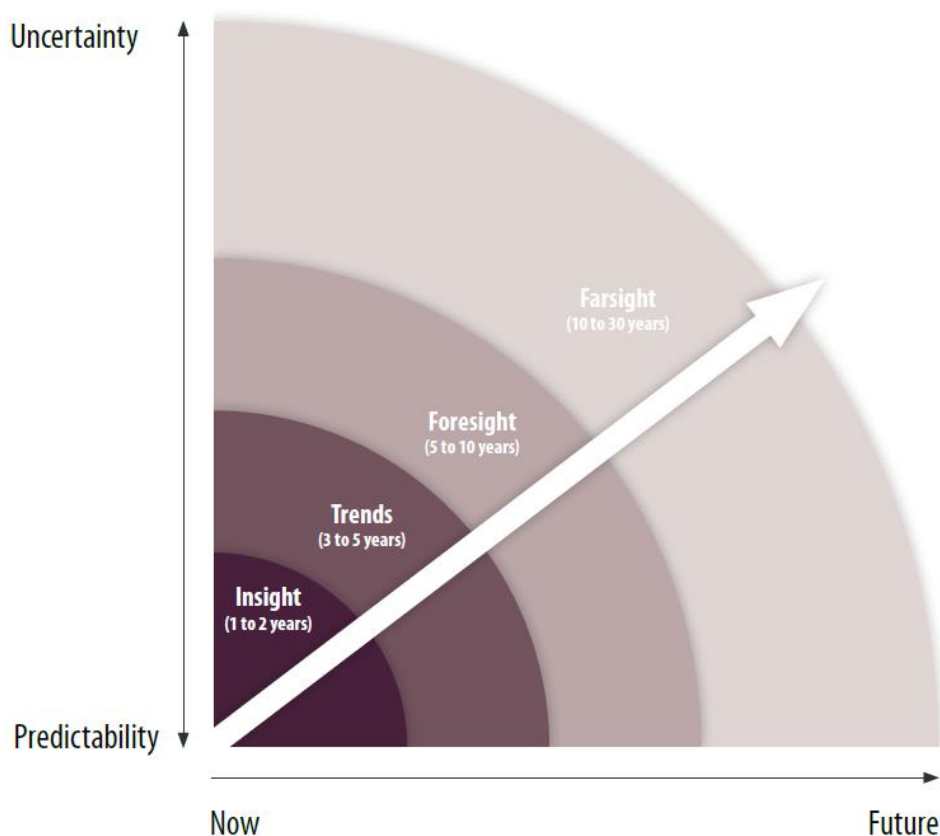
One of the thirteen overarching themes is demography and alternatively trends by region e.g. Sub-Saharan Africa are also presented. The following text is a summary of demographic trends.

The global population is likely to grow to between 8.3 and 10.4 billion by 2045, largely because of increasing life-expectancy, declining levels of child mortality and continuing high birth rates in many developing countries. Growth is not likely to be evenly distributed and will probably be slower in developed countries. Some, including Japan and several European countries, are likely to experience a decline in population. In developing countries, rapid population increase and urbanisation will probably challenge stability. Age and gender imbalances may exacerbate existing political and social tensions while a growing youth population, especially in the Middle East, Central Asia and sub-Saharan Africa, could provide a reservoir of disaffected young people. Conversely, if harnessed, they could provide a boost to their economies. Migration is likely to increase, with people moving within, and outside, their country of origin to seek work or to escape the effects of climate change.

U.S. Agency for International Development

USAID has been the most active of development agencies in the development of projection methods and software, particularly for advocacy purposes. USAID has supported the development of Spectrum, a suite of easy to use policy models which provide policymakers with an analytical tool to support the decision-making process (http://www.avenirhealth.org/software-spectrum). The socioeconomic impacts model in Spectrum, known as RAPID, is a computer model for making projections of social and economic indicators for countries or regions. The programme requires information on various social and economic indicators, such as the labour force participation rate, the number of nurses per capita, combined with population projections (created in the DemProj model of Spectrum) to project future requirements of the indicators, up to 50 years ahead. These projections can be used as a basis for policy presentation to stimulate policy dialogue about the importance of population factors to social and economic development. The Rapid programme was designed in part to show the benefits of investing in family planning.

Moreland and Talbird showed how meeting unmet need for family planning can help countries achieve the MDGs by reducing the size of the target population groups for the MDGs and therefore lowering the cost of meeting the MDGs (13). A benefit-cost analysis was applied to 16 sub-Saharan African countries for selected targets and indicators of the MDGs: achieve universal primary education, reduce child mortality, improve maternal health, ensure environmental sustainability and combat HIV/AIDS, malaria and other disease. Population estimates were made using the Demproj and FAMPLAN population projection programmes, that are part of the Spectrum software package, for two population scenarios: one when current unmet need for family planning is met and one when unmet need is not met. The cost of family planning and of meeting selected targets of each of the five MDGs were estimated under both scenarios for each country and the difference in costs between the two scenarios was calculated over the 10-year period from 2005 to 2015. The additional cost of family planning was then compared with the savings that family planning will generate in each of the selected MDG sectors to calculate benefit-cost-ratios for each sector and for the country overall. This reports shows that while increasing family planning use was not one of the MDGs, it can be a valuable role to complement goals by freeing up resources.

Bill and Melinda Gates Foundation

One of the key principles that will underpin the effort to end malaria by 2040 is to 'make surveillance the backbone of elimination' (http://endmalaria2040.org/). This reports uses WorldPop and Flowminder's analyses of combined malaria parasite prevalence data with modelling of human movement patterns based on census data and mobile call data records (CDRs) to produce high-resolution maps of parasite mobility within and between borders. Applied to regional blocks like Southern Africa (shown below), this enables key decision-makers to co-ordinate malaria policy for maximum impact and efficiency. This demonstrates how valuable CDR research is to the fight against malaria.
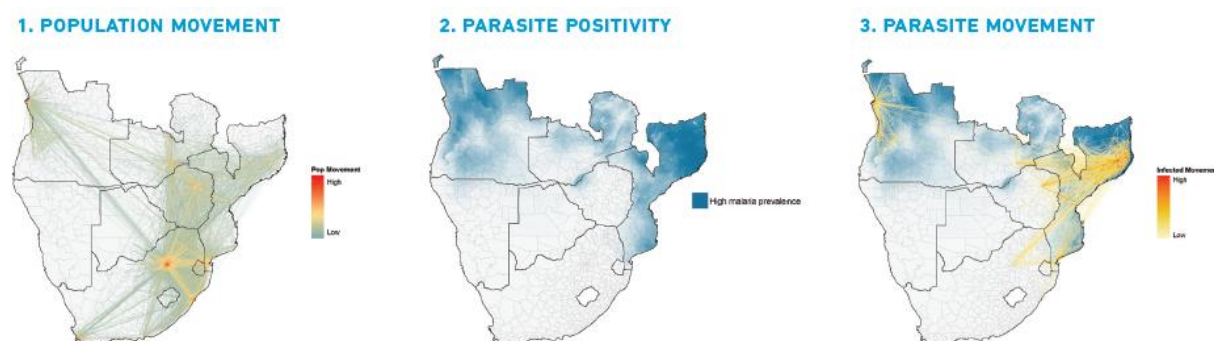
3. Other sources of information

Global population projections

Publications available on the Population Divisions' website are as follows.

United Nations, Department of Economic and Social Affairs, Population Division (2015). World Population Prospects: The 2015 Revision, Methodology of the United Nations Population Estimates and Projections. ESA/P/WP.242.

https://esa.un.org/unpd/wpp/Publications/Files/WPP2015_Methodology.pdf

Methodology of the United Nations Population Estimates and Projections

United Nations, Department of Economic and Social Affairs. Population Division (2015). World Population Prospects: Key findings & Advance Tables 2015. Working Paper No. ESA/P/WP.241.

https://esa.un.org/unpd/wpp/Publications/Files/Key_Findings_WPP_2015.pdf

Key findings and advance tables.

United Nations, Department of Economic and Social Affairs, Population Division (2015). World Population Prospects: The 2015 Revision, World Population 2015 Wallchart. ST/ESA/SER.A/378.

https://esa.un.org/unpd/wpp/Publications/Files/World_Population_2015_Wallchart.pdf

United Nations, Department of Economic and Social Affairs, Population Division (2015). World Population Prospects: The 2015 Revision, Volume I: Comprehensive Tables. ST/ESA/SER.A/379.

https://esa.un.org/unpd/wpp/Publications/Files/WPP2015_Volume-I_Comprehensive-Tables.pdf

United Nations, Department of Economic and Social Affairs, Population Division (2015). *World*

Population Prospects: The 2015 Revision, **Volume II: Demographic Profiles (ST/ESA/SER.A/380)**

https://esa.un.org/unpd/wpp/Publications/Files/WPP2015_Volume-II-Demographic-Profiles.pdf

United Nations, Department of Economic and Social Affairs, Population Division (2015). World Population Prospects: The 2015 Revision, Data Booklet. ST/ESA/SER.A/377.

https://esa.un.org/unpd/wpp/Publications/Files/WPP2015_DataBooklet.pdf

Population themes

http://www.un.org/en/development/desa/population/theme/

This webpage provides overviews of the Population Division's work in main thematic areas (see list below), as well as links to key publications, data and events.

Adolescents and Youth, ageing, environment, family planning, fertility, HIV/AIDS, international migration, marriage and unions, mortality, MDGs, population policies, population trends, SDGs, urbanization

World Bank

http://databank.worldbank.org/data/reports.aspx?source=health-nutrition-and-population-statistics:-population-estimates-and-projections

The World Bank makes population projection data available on their HealthStats portal and DataBank . The population projection database provides estimates and projections for total population and other demographic indicators from 1960 to 2050. They are disaggregated by age-group and sex and cover approximately 200 economies. The input data used for the projections include a base year population estimate by age and sex, and assumptions of mortality, fertility, and migration through 2050, mainly based on the UN Population Division's World Population Prospects database of medium variant. The projections estimates are produced by the World Bank's Development Data Group and are updated annually. Last update was 4 October 2016.

Alexandratos, N. and J. Bruinsma. 2012. World agriculture towards 2030/2050: the 2012 revision. ESA Working paper No. 12-03. Rome, FAO.

http://www.fao.org/docrep/016/ap106e/ap106e.pdf

Fertility

UN Estimates and Projections of Family Planning Indicators 2016

http://www.un.org/en/development/desa/population/theme/family-planning/cp_model.shtml

The World Health Organization has produced two interactive maps illustrating maternal mortality (deaths per 100,000 live births) and infant mortality (probability of dying between birth and age 1 per 1000 live births) rates around the world.

UN World Contraceptive Use 2016

http://www.un.org/en/development/desa/population/publications/dataset/contraception/wcu2016.shtml

Age dynamics

UN Populations Facts 2015: Youth population trends and sustainable development

http://www.un.org/en/development/desa/population/publications/pdf/popfacts/PopFacts_2015-1.pdf

UNICEF Division of Data, Research and Policy. August 2014. Generation 2030 Africa

https://www.unicef.org/publications/files/Generation_2030_Africa.pdf

Urbanisation

United Nations, Department of Economic and Social Affairs, Population Division (2014). World Urbanisation Prospects: The 2014 Revision

https://esa.un.org/Unpd/Wup/

The Population Division of the Department of Economic and Social Affairs of the United Nations has been issuing, since 1988, every two years revised estimates and projections of the urban and rural populations of all countries in the world and of their major urban agglomerations. This web site presents the main findings of the 2014 Revision of World Urbanization Prospects which are consistent with the size of the total population of each country as estimated or projected in the *2012 Revision* of *World Population Prospects* (United Nations, 2013). The *World Urbanization Prospects* are used widely throughout the United Nations and by many international organizations, research centers, academic researchers and the media.

United Nations, Department of Economic and Social Affairs, Population Division (2014). World Urbanization Prospects: The 2014 Revision, Highlights (ST/ESA/SER.A/352)

https://esa.un.org/unpd/wup/Publications/Files/WUP2014-Highlights.pdf

Migration

United Nations, Department of Economic and Social Affairs, Population Division (2016). International Migration Report 2015: Highlights.

http://www.un.org/en/development/desa/population/migration/publications/migrationreport/docs/MigrationReport2015_Highlights.pdf

Accurate, consistent and timely data on international migration are required to assess current and future needs and for setting policy priorities to promote inclusive and equitable development for all. The UN Population Division tracks systematically the levels and trends in international migration and provides estimates of the number of international migrant stocks disaggregated by age, sex and place of origin for all countries and areas of the world. This report, however, does

not provide projections of international migration. The UN Population Division has though identified a necessity for migration forecasts.

Azose, J.J. & Raftery, A.E. Bayesian Probabilistic Projection of International Migration. Demography (2015) 52: 1627. doi:10.1007/s13524-015-0415-0

https://link.springer.com/article/10.1007/s13524-015-0415-0

This paper develops a model to produce probabilistic projections of future net migration for all countries, disaggregated by age and sex.

Abel, G. J, and Sander N. Quantifying Global International Migration Flows. 2014. Science. 343: 1520

http://science.sciencemag.org/content/sci/343/6178/1520.full.pdf

Existing data on global bilateral migration flows are incomplete and incomparable because national statistical agencies do not measure migration or variation in the way migration flows are defined. Measurements of the number of people living in a country other than the one in which they were born, are more widely available, but do not capture trends and patterns of global migration flows. This paper presents data on bilateral flows between 196 countries from 1990 through 2010 providing an overview of international migration flows. The data suggests a stable intensity of global 5-year migration flows at approximately 0.6 percent of world population since 1995. The authors estimate the largest movements to occur between South and West Asia, from Latin to North America and within Africa.

Education

Lutz W, Butz WP & KC Samir (2014). World population & Human Capital in the Twenty-first Century.

http://www.oeaw.ac.at/fileadmin/subsites/Institute/VID/dataexplorer/index.html

Data of the global population projections by age, sex and education can be explored on the Wittgenstein Centre Data Explorer. Data indicators of human capital include educational attainment distribution, mean years of schooling, gender gap in mean years schooling and gender gap in educational attainment.

UNESCO (2016) The effect of varying population estimates on the calculation of enrolment rates and out-of-school rates

http://uis.unesco.org/sites/default/files/documents/the-effect-of-varying-population-estimates-on-the-calculation-of-enrolment-rates-and-out-of-school-rates-2016-en_0.pdf

Burden of Disease

Mathers C.D. and Loncar D. Projections of Global Mortality and Burden of Disease from 2002 to 2030. PLoS Medicine 2006. 3(11):e442

http://journals.plos.org/plosmedicine/article/file?id=10.1371/journal.pmed.0030442&type=printable

This paper provides updated projections on the 1990 Global Burden of Diseases study of mortality and burden of disease, up to 2030 starting from the 2002 WHO global estimates of mortality and burden of disease. In the baseline and pessimistic scenarios, the researchers predict that by 2030, the three leading causes of illness will be HIV/AIDS, depression and ischaemic heart disease. In the optimistic scenario, road-traffic accidents will replace heart disease as the third leading cause. The results depend strongly on the assumption that future mortality trends in poor countries will have a relationship to economic and social development like those that have occurred in the higher-income countries.

WHO and World Bank Group World Report on Disability. 2011

http://www.who.int/disabilities/world_report/2011/report.pdf

The first World report on disability highlights the different barriers that people with disabilities face – attitudinal, physical and financial. The prevalence of disability is increasing due to ageing populations and the higher risk of disability in older people as well as the global increase in chronic health conditions such as diabetes, cardiovascular disease, cancer and mental health disorders. Across the world, people with disabilities have poorer health outcomes, lower education achievements, less economic participation and higher rates of poverty than people without disabilities. This is partly because people with disabilities experience barriers in accessing services that many of us have long taken for granted, including health, education, employment, and transport as well as information. These difficulties are exacerbated in less advantaged communities.

It is projected that there will continue to be large increases in non-communicable disease-related Years Lost due to Disability (YLDs) in rapidly developing countries. This will be due to population ageing, reduction in infectious conditions, lower fertility and changing lifestyles related to tobacco, alcohol, diet and physical activity.

Food security

The key source on providing early warning and analysis on acute food insecurity is the Famine Early Warning System (www.fews.net). Created in 1985 by USAID, FEWS NET provides objective evidence-based analysis on more than 36 of the world's most food-insecure countries to help government decision-makers and relief agencies plan for and respond to humanitarian crises.

Economics

Labour force surveys are the main source of statistics for monitoring labour market, labour under-utilization including unemployment, and the quality of jobs and working condition of persons in employment

International Labour Organization ILOSTAT

http://www.ilo.org/ilostat

Estimates and projections of the employed populations by the ILO.

CSA Ethiopia. National Labour Force Survey 2013

http://www.csa.gov.et/index.php/survey-report/category/34-nlfs-2013

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Lutz W, Muttarak R. Forecasting societies' adaptive capacities through a demographic metabolism model. Nature Climate Change. 2017;7:177-84.

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Steele JE, Sundsoy PR, Pezzulo C, Alegana VA, Bird TJ, Blumenstock J, et al. Mapping poverty using mobile phone and satellite data. J R Soc Interface. 2017;14(127).

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