UN-Water Country Briefs Project
Description of the method used

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BACKGROUND

The UN-Water Country Briefs (WCB) project was implemented by the AQUASTAT Programme of the Food and Agriculture Organization of the United Nations (FAO) (http://www.fao.org/nr/aquastat) on behalf of UN-Water with financial support from United States Department of State (USDS). The project's dedicated webpage can be accessed at http://www.unwater.org/WaterCountryBriefs.html.

The WCBs intend to frame water issues within the larger development equation within a country as a way to stimulate further political attention and investments in water. The intention is to produce an impactful brief to foster increased political momentum for stronger interventions on water-related issues by policy makers. An ultimate goal is to mobilize increased financial and institutional investments directed to water-related interventions, to serve as a tool for advocacy on water issues in more general terms and as a decision support tool in policy processes. The primary target groups are national governments, but also major civil society organizations and private sector actors and the media are targeted.

The method, indicator definitions and data sources adopted throughout the WCBs are detailed below.

PAGE BY PAGE DESCRIPTION

Variables and Indicators on page 1 of the WCB

Following are the definitions of the variable and indicators in the table on top of page 1 of the WCBs.

Total population
Usually refers to the present-in-area (de facto) population, which includes all persons physically present within the present geographical boundaries of countries at the mid-point of the reference period. The 2012 data was obtained from "World Urbanization Prospects: The 2011 Revision".
Source: United Nations Population Division, Department of Economic and Social Affairs (DESA) of the United Nations Secretariat
Website: http://esa.un.org/unpd/wup/index.htm

Total area

The area of the country including area under inland water bodies, but excluding offshore territorial waters. Possible variations in the data may be due to updating and revisions of the country data and not necessarily to any change of area. Data in FAOSTAT are expressed in 1 000 hectares and have been converted to km^2 for the WCB.

Source: FAOSTAT, FAO Statistics Division

Website: http://faostat3.fao.org/home/
http://faostat3.fao.org/home/index.html#metadata_glossary

Population density

Equal to: [Total population]/[Total area]

Unit: inhabitants/km^2.

Human Development Index (HDI)

The HDI is a summary measure of human development. It measures the average achievements in a country in three basic dimensions of human development: (1) a long and healthy life, as measured by life expectancy at birth; (2) knowledge, as measured by the adult literacy rate (with two-thirds weight) and the combined primary, secondary and tertiary gross enrolment ratio (with one-third weight); (3) a decent standard of living, as measured by GDP per capita (Purchasing Power Parity or PPP US$). The HDI ranges from 0, which is lowest, to 1, which is highest,

Source: United Nations Development Programme

Website: http://hdr.undp.org/en/statistics/hdi/

Gender Inequality Index (GII)

The GII reflects women's disadvantage in three dimensions: reproductive health, empowerment and the labour market. The index shows the loss in human development due to inequality between female and male achievements in these dimensions. It ranges from 0, which indicates that women and men fare equally, to 1, which indicates that women fare as poorly as possible in all measured dimensions. The health dimension is measured by two indicators: maternal mortality ratio and the adolescent fertility rate. The empowerment dimension is also measured by two indicators: the share of parliamentary seats held by each sex and by secondary and higher education attainment levels. The labour dimension is measured by women's participation in the work force. The Gender Inequality Index is designed to reveal the extent to which national achievements in these aspects of human development are eroded by gender inequality, and to provide empirical foundations for policy analysis and advocacy efforts.

Source: United Nations Development Programme

Website: http://hdr.undp.org/en/statistics/gii/

Water, sanitation & hygiene-related deaths as % of total deaths

Estimated deaths attributable to water, sanitation and hygiene ('000), by disease and World Health Organization (WHO) Member State, 2004 - published August 2010.

The annex (of the report cited below) contains a first estimate of country-by-country data of disease burden attributable to unsafe water, inadequate sanitation, insufficient hygiene and inadequate management of water resources. Data are based on a combination of results from the Comparative Risk Assessment study, a review of the literature and an expert survey and country guidance for estimating water, sanitation- and hygiene-related burden of disease. Such preliminary estimates can be used as an input to more refined estimates of a country's health impacts.

These estimates address the attributable burden of disease—i.e. the reduction of disease burden that could be achieved if the three main groups of risks within the area of water, sanitation and hygiene were reduced. It should be noted that, in principle, the preventable disease burdens from various intervention areas cannot necessarily be summed up, as there may be interactions between exposures and outcomes or joint effects. For the purpose of this estimate, to avoid an overestimate,

the outcomes with a direct water, sanitation and hygiene component are excluded from the estimation of the burden from malnutrition and its consequences. Additional information on methods used can be found in the report cited below. It is possible that the estimates of health impacts from this rather comprehensive risk factor are likely to underestimate the burden, as not all the diseases or risks could be quantified (see last paragraph in the section "Estimating the disease burden related to water, sanitation and hygiene" in the report cited below).

Source: Prüss-Üstün A, Bos R, Gore F, Bartram J. *Safer water, better health: costs, benefits and sustainability of interventions to protect and promote health*. World Health Organization, Geneva, 2008.

Website: http://www.who.int/quantifying_ehimpacts/publications/saferwater/en/index.html

Long-term average precipitation

Long-term average (over space and time) of annual endogenous precipitation (ie. produced in the country) in depth.

Unit: mm/year

Source: CRU CL 2.0 dataset (through FAO AQUASTAT)

Website: http://www.cru.uea.ac.uk/~timm/grid/CRU_CL_2_0.html
http://www.fao.org/nr/water/aquastat/gis/index3.stm
http://www.fao.org/nr/water/aquastat/data/query/index.html?lang=en

Long-term average actual renewable water resources (TARWR)

TARWR: The sum of internal renewable water resources (IRWR) and external actual renewable water resources (ERWR). It corresponds to the maximum theoretical yearly amount of water actually available for a country at a given moment.

IRWR: Long-term average annual flow of rivers and recharge of aquifers generated from endogenous precipitation. Double counting of surface water and groundwater resources is avoided by deducting the overlap from the sum of the surface water and groundwater resources.

ERWR: That part of the country's annual renewable water resources that are not generated in the country. It includes inflows from upstream countries (groundwater and surface water), and part of the water of border lakes and/or rivers. It takes into account the quantity of flow reserved by upstream (incoming flow) and/or downstream (outflow) countries through formal or informal agreements or treaties.

Unit: km^3/year, converted to million m^3/year in the WCB (1 km^3 = 1000 million m^3)

Source: FAO AQUASTAT

Website: http://www.fao.org/nr/water/aquastat/water_res/index.stm
http://www.fao.org/nr/water/aquastat/data/query/index.html?lang=en
http://www.fao.org/nr/water/aquastat/data/glossary/search.html?lang=en

Actual renewable water resources per capita

Equal to: [Total annual actual renewable water resources]/[Total population]

Unit: m^3/year per inhabitant

% of total actual renewable freshwater resources withdrawn (MDG Water Indicator)

Total freshwater withdrawn (by irrigated crops, livestock, aquaculture, municipalities and industries), expressed in percentage of the total actual renewable water resources (TARWR), in a given year. This parameter is an indication of the pressure on the renewable water resources.

Source: FAO AQUASTAT
http://www.fao.org/nr/water/aquastat/maps/index.stm
http://www.fao.org/nr/water/aquastat/data/query/index.html?lang=en

Groundwater withdrawal as % of total freshwater withdrawal

The part of the total freshwater withdrawal that is groundwater, expressed in percentage.

Total freshwater withdrawal: The sum of surface water withdrawal and groundwater withdrawal.

Surface water withdrawal: Annual gross amount of water extracted from rivers, lakes and reservoirs. It includes withdrawal of primary renewable surface water resources and secondary freshwater sources (water previously withdrawn and returned).

Groundwater withdrawal: Annual gross amount of water extracted from aquifers. It includes withdrawal of renewable groundwater (primary and secondary), water extracted from deep fossil aquifers (non-renewable water) and potential over-abstraction of renewable groundwater.

Equal to: 100 x [Groundwater withdrawal]/[Total freshwater withdrawal]

Source: FAO AQUASTAT

Website : http://www.fao.org/nr/water/aquastat/water_use/index.stm
http://www.fao.org/nr/water/aquastat/data/query/index.html?lang=en

Total area equipped for irrigation

The area equipped to provide water (via irrigation) to crops. It includes areas equipped for full/partial control irrigation, equipped lowland areas, and areas equipped for spate irrigation.

Area equipped for full control irrigation: the sum of surface irrigation, sprinkler irrigation and localized irrigation.

Equipped lowland areas: the land equipped for irrigation in lowland areas includes: (i) Cultivated wetland and inland valley bottoms (IVB) that have been equipped with water control structures for irrigation and drainage (intake, canals, etc.); (ii) Areas along rivers where cultivation occurs making use of structures built to retain receding flood water; (iii) Developed mangroves and equipped delta areas.

Spate irrigation (sometimes referred to as floodwater harvesting): an irrigation practice that uses the floodwaters of ephemeral streams (wadi) and channels it through short steep canals to bunded basins where cropping takes place.

Source: FAO FAOSTAT, FAO AQUASTAT, Government

Website: http://faostat.fao.org/site/377/default.aspx#ancor
http://www.fao.org/nr/water/aquastat/data/query/index.html?lang=en
http://www.fao.org/nr/water/aquastat/data/glossary/search.html?lang=en

% of the cultivated area equipped for irrigation

Part of cultivated land that is equipped for irrigation, expressed in percentage. This indicator is not valid for the few countries that irrigate pastures.

Cultivated land: The sum of arable land and permanent crops.

Arable land: Land under temporary crops (double-cropped areas are counted only once), temporary meadows for mowing or pasture, land under market and kitchen gardens and land temporarily fallow (less than five years). The abandoned land resulting from shifting cultivation is not included. Data for arable land is not meant to indicate the amount of land that is potentially cultivable.

Permanent crops: Crops are divided into temporary and permanent crops. Permanent crops are sown or planted once, and then occupy the land for some years and need not be replanted after each annual harvest, such as cocoa, coffee and rubber. This category includes flowering shrubs, fruit trees, nut trees and vines, but excludes trees grown for wood or timber, and permanent meadows and pastures.

Equal to: 100 x [Total area equipped for irrigation]/[Cultivated area]

Source: FAO FAOSTAT and FAO AQUASTAT

Website: http://faostat.fao.org/site/377/default.aspx#ancor
http://www.fao.org/nr/water/aquastat/data/query/index.html?lang=en

% of irrigation potential equipped for irrigation

Part of the total area of potentially irrigable land (irrigation potential) that is equipped for irrigation, expressed in percentage.

Irrigation potential: Area of land which is potentially irrigable. Country/regional studies assess this value according to different methods. For example, some consider only land resources, others consider land resources plus water availability, others include economical aspects in their assessments (such as distance and/or difference in elevation between the suitable land and the available water) or environmental aspects, etc. If available, this information is given in the individual country profiles. The figure includes the area already under agricultural water management.

Equal to: 100 x [Area equipped for irrigation: total]/[Irrigation potential]

Source: FAO AQUASTAT and FAO FAOSTAT

Website: http://www.fao.org/nr/water/aquastat/data/query/index.html?lang=en
http://www.fao.org/nr/water/aquastat/data/glossary/search.html?lang=en
http://faostat.fao.org/site/377/default.aspx#ancor

% of irrigation equipped for irrigation actually irrigated

The part of the area equipped for irrigation that was actually irrigated in a given year, expressed in percentage.

Area actually irrigated: Portion of the area equipped for irrigation that is actually irrigated, in a given year. It refers to physical areas. Irrigated land that is cultivated and irrigated more than once a year is counted only once.

Equal to: 100 x [Area actually irrigated]/[Total area equipped for irrigation].

Source: FAO AQUASTAT and FAO FAOSTAT

Website: http://www.fao.org/nr/water/aquastat/data/query/index.html?lang=en
http://www.fao.org/nr/water/aquastat/data/glossary/search.html?lang=en
http://faostat.fao.org/site/377/default.aspx#ancor

Ramsar sites

Ramsar sites are wetlands that acquire a new status at the national level and are recognized by the international community as being of significant value not only for the country, or the countries, in which they are located, but for humanity as a whole.

Source: Ramsar

Website: http://www.ramsar.org/cda/en/ramsar-documents-list/main/ramsar/1-31-218_4000_0__
http://www.ramsar.org/pdf/sitelist.pdf

Investment data on page 1 and 2 of the WCB

The investment data was collected according to the categories established by the Creditor Reporting System (CRS) of the Development Assistance Committee (DAC) of the Organization for Economic Cooperation and Development (OECD). Nine OECD DAC categories were deemed to be water relevant (see explanation of these OECD DAC categories below) and data was collected for Government Budget and Government Expenditures as well as Official Development Assistance (ODA) gross disbursement. Following are the definitions used.

Water-related government budget

The amount that has been budgeted (was forecasted) by the national government when the budget was drawn up - so it refers to the planning of the water-related government budget. National consultants were tasked to gather this information from official government sources. The budget was calculated according to the nine OECD DAC categories in a questionnaire. Government budget excludes any ODA, it only include funds from government revenues without ODA.

Water-related government expenditure
The amount that was actually spent by the national government, at the end of the budgeting cycle (again according to the nine OECD DAC categories). Government actual expenditure also excludes any ODA, it only include funds from government revenues without ODA. National consultants were tasked to gather this information from official government sources.

Both "Government Budget" and "Government Expenditure" data was obtained to analyze the implementation of what is planned, how realistic the planning is and get a more complete picture of the investment cycle. It was expected that "Actual Expenditure" for 2012 was not yet available at the time of filling this questionnaire. For the investment data displayed on page 1 and 2 of the brief actual expenditure data has been used where available. For the years for which actual expenditure was not available, the government budget has been used and refers to the amount that the government reportedly budgeted for the given year.

National consultants consulted relevant ministries and calculated both the water-related government budget and water-related government actual expenditures according to the nine OECD DAC categories. The project aimed to obtain official government budget and expenditure data only. In some countries the government entity dealing with water or with agriculture, industry, energy, etc. has its accounting process, which is not reflected in the detail needed for the project in the Ministry of Finance. Hence, it was important to also capture data at the different line ministries and at the same time to ensure that there is no double counting of expenditures. Particularly careful attention was paid that there is no double counting of donor investment, i.e. that donor investments were not included in the government budget and government expenditure data. It was intended to gather data as far back as possible.

ODA gross disbursement
Data was accessed from the OECD database (http://stats.oecd.org/index.aspx?DataSetCode=CRS1) and provided for the same years as the government expenditure and government budget was available. In this OECD database the following selections were made to obtain the data:

- Recipient: The WCB country investigated
- Sector: The OECD DAC category analyzed for the WCB
- Flow: Left as default "Official Development Assistance"
- Channel: Left as default "100: ALL Channels"
- Amount type: Select "Constant prices (2010 USD millions)"
- Flow type: Gross Disbursements
- Type of Aid: Left as default "100: All Types, Total"
- Year: Select all years for which Expenditure or Government Budget data could be collected.

It is important to note that each government uses different categories to classify its spending in different areas of water, particularly because water is a cross-cutting topic that affects various issues, a point this project aims to highlight. Using these established categories allowed the project to integrate existing OECD data from donors. For added transparency national consultants were asked to show the categories the government uses and illustrate clearly in which OECD DAC category each of the items retrieved from the government's budget and expenditure items were placed.

Definitions of the nine OECD DAC categories

14010 "Water resources policy and administrative management": Water sector policy, planning and programmes; water legislation and management; institution capacity building and advice; water supply assessments and studies; groundwater, water quality and watershed studies; hydrogeology; excluding agricultural water resources (31140).

14015 “Water resources protection”: Inland surface waters (rivers, lakes, etc.); conservation and rehabilitation of ground water; prevention of water contamination from agro-chemicals, industrial effluents.

14020 “Water supply and sanitation in large systems”: Water desalination plants; intakes, storage, treatment, pumping stations, conveyance and distribution systems; sewerage; domestic and industrial wastewater treatment plants.

14030 “Basic drinking water supply and basic sanitation”: Water supply and sanitation through low-cost technologies such as hand-pumps, spring catchment, gravity-fed systems, rainwater collection, storage tanks, small distribution systems; latrines, small-bore sewers, on-site disposal (septic tanks).

14040 “River development”: Integrated river basin projects; river flow control; dams and reservoirs; excluding dams primarily for irrigation (31140) and hydropower (23065) and activities related to river transport.

23065 “Hydroelectric power plants”: Hydroelectric power plants, including power-generating river barrages.

31140 “Agricultural water resources”: Irrigation, reservoirs, hydraulic structures, groundwater exploitation for agricultural use.

41050 “Flood prevention/control”: Floods from rivers or the sea; including sea water intrusion control and sea level rise related activities.

74010 “Disaster prevention and preparedness”: Disaster risk reduction activities, such as developing knowledge, natural risks cartography, legal norms for construction; early warning systems; emergency contingency stocks and contingency planning including preparations for forced displacement.

Currency conversion

The Gross Domestic Product (GDP) Deflator or, if not available, the Consumer Price Index from the country, available in the World Bank World Development Indicators (WB WDI) has been used to convert the data that is in the current local currency unit (LCU) to constant 2010 LCU.

To convert from current LCU to current United States dollar (US$) the "Official exchange rate (LCU per US$, period average)" from the WB WDI has been used.

An index was created by dividing each year of the constant LCU data series by its 2010 value (thus, 2010 will equal 1).

Each year's index result was multiplied by the corresponding 2010 current US$ price value.

Gross Domestic Product (GDP): The market value of all officially recognized final goods and services produced within a country in a given period of time.

Consumer Price Index: A measure that examines the weighted average of prices of a basket of consumer goods and services, such as transportation, food and medical care.

Status and trends on page 3 and 4 of the WCB

Water-related disasters

All available data on water-related hazards, disasters and their impacts was collected from government sources. Some countries, however, do not have an up-to-date disaster database.

Water-related hazards: The definition varies throughout the literature. The hazards induced by unusual flow characteristics of surface water or mixture of water and sediment can be defined as water-related hazards. However, a tsunami, usually triggered by earthquake, is considered as geological or geophysical hazard, while water-borne diseases by polluted water are considered as epidemic and therefore both are not included in the WCBs. Drought of different types (meteorological, hydrological, agriculture, socioeconomic) is a significant hazard and often results in catastrophic disasters. However, drought impact is broad and data are scarce, which due to the considerable time needed to collect and interpret for reporting has been omitted from the present WCBs. The water-related hazards included in this report are: landslides, flashfloods including debris flow, riverine flood, pluvial flood (drainage congestion), tropical storms.

Disaster: As defined by the United Nations Office for Disaster Risk Reduction (UNISDR), it is a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources.

Economic damage data is expressed in US$ (current price).

Water intensity in industry

The FAO AQUASTAT variable "Industrial water withdrawal (km^3/year)" has been divided by the World Bank World Development Indicator (WDI) "Industry, value added (constant 2000 US$)" and the unit changed to constant 2000 US$/$m^3$.

Irrigated agriculture

Rainfall variability and agricultural GDP

The line for "Variability in agricultural GDP (percentage of deviation from trend of agricultural goods produced per square kilometer of agricultural land)" was calculated as follow:

(1) Division of the indicator "Agriculture, value added (constant 2000 US$)" (World Bank WDI) by "Agricultural land (km^2)" (FAO FAOSTAT)
(2) Calculation of the "trend" (using least square regression analysis) over the years for which data is available
(3) Calculation of how much agricultural GDP per km^2 of agricultural land deviates from the point on the "trend" for each year (expressed in percent).

The line for "National rainfall index variability (percentage of deviation from average national rainfall index)" was calculated as follows:

(1) Calculation of average national rainfall index (NRI)
(2) Calculation of average deviation of each year's NRI from the average NRI, expressed in percent.

Benefit-cost analysis

While every new irrigation development has different climate, hydrology, agronomic, economic and social characteristics, this section tries to provide insight into the economics of expanding irrigation.

Structure

The basic benefit cost structure is as follows:

- A standard benefit cost analysis framework was used (a very simplified version of what would normally be done for a specific irrigation development project). It should be noted that the data provided was a fraction of that normally used for specific irrigation projects.
- A 25-year time period was taken, reflecting the long economic life of irrigation schemes.
- In the modeling framework, benefits are the marginal increases in the value of production attributable to the irrigation development and costs include capital costs and annual operating costs (including annual water costs, additional labour costs, and any other variable costs identified).
- All benefits and costs have been discounted to present values using a WCB country-specific discount rate.
- Because most data provided has been based on an area (e.g. US$/km^2), the model was run based on a 10km^2 development.
- The model calculated the net present value and the benefit cost ratio of potential developments. These are the standard economic decision rules used in benefit costs analysis. To be viable, the benefit cost ratio must be >1.
- The benefit cost ratio is presented in the WCBs as this is more meaningful when comparing potential projects.
- Due to variability and uncertainty in the data, three scenarios have been modeled to provide WCB readers an idea of the range of potential outcomes.

Process

The process for undertaking the benefit costs analysis is as follows:

1. A benefit cost analysis framework was developed in Excel. This model has been the same for each WCB.
2. The framework was essentially repeated for the three scenarios: pessimistic, mid-point, and optimistic.
3. The discount rate used was calculated based on the 10-year average lending rate for the WCB country (data accessed from the World Bank).
4. Benefits were calculated and included for every year within the model. For most WCBs this was based on the marginal increase in the value of production from moving from dryland farming to irrigated farming. In some cases, where data was available, further increases from other agronomic practices were also included. These additional productivity gains should be included as it is very common for new irrigation developments to be established in conjunction with capacity development, other related infrastructure, and other agronomic efficiency initiatives.
5. Capital costs, generally provided by the national consultant, were included in year one. Additional data was also used where available.
6. Other costs, generally provided by the national consultant, were then included for each year. Additional data was also used where available.

7. Three scenarios for assessment were established. Because the national consultants only provided a single value for each variable in the economic model (e.g. labour costs per km^2), additional research was undertaken to seek data and insight into the variability of benefits and costs to be included into the economic modeling. This informed the data inputs for developing the range of scenarios (pessimistic, mid-point, and optimistic). Where additional country-specific data was obtained, this was used in conjunction with data provided by the national consultant as the range for input variables for the benefit cost analysis. Where unable to obtain any additional relevant data, the pessimistic and optimistic scenarios were based on sensitivity analysis around the data provided by the national consultant. Specifically, for the optimistic scenario, benefits were valued 20 percent higher, while costs were 20 percent lower. For the pessimistic scenario, benefits were 20 percent lower, while costs were 20 percent higher.
8. The results have been documented. Analysis of contextual information and statistics from the review of literature and the notes provided by the national consultant was also documented.

Data and information

The key data and information included are:

- Data provided by the national consultant.
- Text provided by the national consultant.
- Additional data from the World Bank and other relevant sources (all referenced in the footnotes).
- Information from a literature review of specific issues relating to the benefits and costs of irrigation in the WCB country (referenced in the footnotes).

As a general note, for most WCBs significant additional data to underpin the assessment of the benefits and costs of new irrigation developments have been researched and included.
Given the quality of the information and data used and the simple approach used for the benefit cost analysis, the results presented should be treated with caution. While they provide some broad conclusions, they should not be used to underpin investment. For example, one benefit costs analysis done for an irrigation scheme involved 60 days of technical analysis and modeling. While the framework was essentially the same as that used for the WCBs, the detail was significantly greater.

<u>Crop production index (from World Bank WDI)</u>

The crop production index (CPI) provides a broad indicator of the overall long-term trend in the volume of crops produced in the country. The CPI is the agricultural production for each period relative to the base period 1999–2001. It includes all crops except fodder crops. It is a key indicator of a developing nation's progress towards food security objectives.

Analysis undertaken for the CPI sections has been:

1. CPI data has been obtained from the World Bank country data sets and plotted in a time series graph.
2. Narrative from the national consultant has been assessed and additional information that could explain trends and variability in data has been reviewed.
3. Results are written up, paying particular attention to any trends in the index.
4. Notes and comments on particular issues (e.g. data quality, inconsistencies etc.) are provided.

Energy for water, water for energy

Data for the indicators has been obtained from the World Energy Council (2010) *Survey of energy resources*. The World Energy Council has defined the indicators as follows:

Installed capacity or Capacity in operation: The total of the rated capacities of the electric generating units that are installed at all sites which are generating, or are capable of generating, hydro-electricity.

Technically exploitable capability: The amount of the gross theoretical capability that can be exploited within the limits of current technology.

Actual generation: The net output (excluding pumped-storage output) in the specified year.

Environment and ecosystem health

The 2010 Water Quality Index (WQI) was submitted by the GEMS/Water Programme of the United Nations Environment Programme (UNEP). This index was prepared for the CIESIN/Yale Environmental Performance Index. For certain countries this value was not available and in those cases, the 2012 Environmental Performance Index (EPI) (Yale/CIESIN) relevant values on water were reported. And for those countries where there is no 2012 EPI value, the 2010 EPI WQI was reported.

Definition and methods are available at:
http://www.unep.org/gemswater/AssessmentsandIndicators/WaterQualityIndexandIndicators/tabid/101094/Default.aspx

The 2010 EPI WQI: A proximity-to-target composite of water quality, adjusted for monitoring station density in each country, with the maximum score of 100. Data were available to compute indicator values for 85 countries: 74 countries had recent data, and 11 had data from pre-1990 for which a regression model was used to impute post-1990 scores. A multiple imputation model based on statistical relationships between countries with data and a number of covariates (variables that can predict WQI scores) was used to compute WQIs for an additional 110 countries that had more than 10 km^2 of surface water bodies. Countries with surface water less than 10 km^2 were averaged around.
Website: http://www.epi2010.yale.edu/

Drinking water supply and sanitation

The provision of reliable water and sanitation services is a cornerstone of economic and social development. To the extent possible, it is important to note the contribution of Water, Sanitation and Hygiene (WASH) investments to development outcomes. Because expenditure on water supply and sanitation is covered in the money stream section, the WASH section focuses on analysis of the outputs of the expenditure (% of relevant population with access to services). The data on the Under 5 child mortality rate is from the United Nations Inter-agency Group for Child Mortality Estimation (IGME) and the data on improved drinking water source and sanitation facilities WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation (JMP). A simple analysis of the correlation between changes in the percentage of people using improved water and sanitation services and changes in under-5 mortality outcomes has been carried out.

The right to water is implicit within the right to an adequate standard of living and inextricably related to the right to the highest attainable standard of health outlined in the International

Covenant on Economic, Social and Cultural Rights (ICESCR). Therefore the date of the ratification/accession of the ICESCR and where applicable the optional protocol has been included.

Tracking water governance

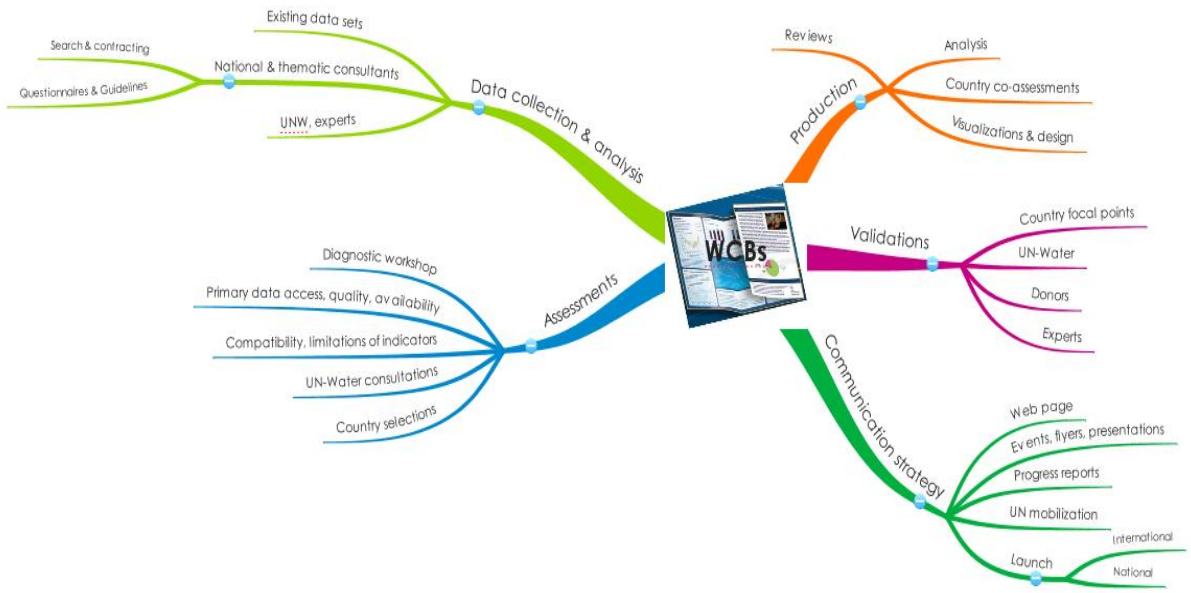
Data from the 2012 UN-Water survey on the application of integrated approaches to water resources management, prepared for Rio+20, has been displayed in two spider diagrams. In addition the answer of government officials to the questions 4d and 5e/f posed for the UN-Water 2012 Global Analysis and Assessment of Sanitation and Drinking-Water (GLAAS) report have been included.

Rapid assessment on page 5 of the WCB

The rapid assessment method presented in the WCB is an advocacy tool designed to generate debate and attention to the issues, and has been developed in conjunction with national government focal points.

WCBs PRODUCTION PROCESS

The WCBs were developed through a diverse set of activities, schematically represented below:



METHOD AND DATA ISSUES

Data is a vital input to water management and investment in water-related infrastructure and projects. The lack of quality and reliability of physical data in a country makes water-related investment decisions inherently more complex and investments more risky for investors.

The WCBs, based on the FAO AQUASTAT model, were built on quantitative data with the aim of contributing a comprehensive (i.e.: across sectors) national evidence-base, both in terms of new data collected (on investments) and updated data (on water-related indicators).

The project team regularly confirmed throughout the project's consultations that readily available national quantitative datasets on water were largely lacking for national level assessments and analysis. So, while there is information collected through various questionnaires and surveys, it is not

quantitative water-related information. Hence, it does not give information about the water situation in a country from a quantitative point of view, competition between sectors, etc.

Data accessibility and availability

The data collection submissions received from the national consultants show that there is a varying degree of data availability in the WCB countries. For instance, some countries have a good record of their investments in water, both in terms of the tracking back in time as well as in the range of categories. Other countries have scant data on investments, whether in terms of the number of years for which data is available or the number of water-related categories.

The purpose of the WCB project is "*to better visualize the critical importance of 'investments in water' for human and economic development*". In order to be able to *visualize* this relationship between *investments in water* and *human and economic development* data on investments as well as sound economic studies on the link of such an investment is needed. A literature review and various consultations with experts have shown that this type of information is lacking on both ends, i.e. on the investment side and on the existing economic studies. Where economic studies on related or other issues have been carried out, it has been done with either a far greater budget and a much more narrowly defined topic (for example studies focusing only sanitation) or on a much smaller scale (sub-basin level and not the national level the WCB project is looking at). Hence, the degree of econometric analysis and complexity of data to be presented in the WCBs was constrained by the availability of suitable data and time to assess and access additional data.

In certain instances, it was difficult to draw any concrete conclusions from the available data, particularly due to a lack of more recent data for some datasets. Also, the initial project foresaw mainly a visualization of existing data sources held in the UN system with minimal gathering of additional data at the country level. However, since the data and studies available would clearly not respond to the project's objective, the project adapted to these realities, focusing increased efforts on gathering investment data and contracting additional support to investigate what economic relationship could be made between the gathered water-related investment data and human and economic development (all within the allotted budget).

In most countries, national accounting for water is quite recent, and investment data on water is not consolidated going back further than 2006. In some countries, prior to 2006 there was no secondary reporting as there were no national development plans. Primary data collected in the country would thus need to be analyzed for individual agency activity budgets, an extensive exercise, which is beyond the scope of this project. The same applies to 2011 and 2012 where either data still needed to be collected or were available in "raw" form and required extensive analysis by all activities in the government budget to group them into the OECD DAC categories, which were chosen after expert consultation to group investment data in a coherent way.

Similarly, as the global datasets on water-related disasters are limited, a thematic consultant was recruited specifically to collect more comprehensive national data on water-related disasters.

It is to be noted that it is virtually impossible to find national-level gender-disaggregated data for almost all themes contained in the WCBs.

Data manipulation

The WCBs adopted the OECD DAC Creditor Reporting System (CRS) for investment reporting. However, these are not the categories employed at the national level and vary from country to

country, hence national consultants have had to manipulate the data to provide it according to the OECD DAC classification.

As an example, the national public expenditure reports for the water sector present budgets consolidated at the agency level. In more detail, the agency investment report for small dams for instance analyzes expenditure for “dams”, and contains investments relating to various activities relating to dams ie: irrigation, boreholes, restocking, etc. making it difficult to align data into OECD DAC categories.

There are also differences observed in the donor investment reported in the national reports with those on the OECD DAC database. In sum, consultants have had to manipulate the data in order to align it within the OECD DAC categories, which inevitably leads to approximations, assumptions, etc. In some countries it also became obvious that the investment data gathered only represents a portion of the government budget, since some data could not be accessed.

Country co-assessments and validations

The WCB team developed a method to provide WCB countries, through national focal points referred by the project’s national consultants, to both assess the sub-sectors covered in the WCBs as well as to validate the data and analysis presented.

DISCLAIMERS

- The most recent and updated information can be found in the original databases cited throughout the WCBs.

- The rapid assessment method presented here is an advocacy tool designed to generate debate and attention to the issues, and is developed in conjunction with national government focal points.

- Data presented herein stems either from existing databases or was collected from national reports, experts and institutions, and in some cases raw data underwent various manipulations to categorize the information for this presentation.

- Due to data limitations, the investment-related estimates may not include water-related investments that are counted under other categories of investments, and some investment categories (i.e. disaster prevention and preparedness) may include some investments that are not directly water-related. Moreover, water being a crosscutting issue, investments in other parts of the government (not calculated here) may also benefit water management.

- The words investments/invested/funded for ODA refer to gross disbursements of ODA according to the OECD definitions. The words investments/invested/funded for government refer to government expenditure or/and budget for the years reported (depending on each country). In addition, investment data and analysis do not include any other forms of investment (such as, private sector investments).