The Millennium Earth Project:

A Visual Framework for Sustainable Development

(Concept Paper)

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Our Mission:

Visualize, analyze, explain, and disseminate data to make sustainable development plans universally accessible

Our Vision:

Fundamentally Change the Way Humanity Lives and Creates Its Environment

Our Goal:

To build A Visual Framework to meet the Millennium Development Goals

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The Millennium Earth Project Initiative

Millennium Earth Project:

A Visual Framework for Sustainable Development

Six Pillars

1. **Research-(Millennium Development Goals- MDGs)**
2. **Geographic Information System (GIS)**
3. **Education**
4. **Infrastructure Development**
5. **Web Interface and Network Communication**
6. **Quality Assurance**

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1. Overview

The Millennium Earth Project (MEP), formerly Virtual Global Earth Project, is the primary activity of The Institute for Conscious Global Change and was developed to support the United Nations in fulfilling its mission as laid out in its Charter.

In 2007, The Institute for Conscious Global Change (ICGC) was founded, with the objective of providing a comprehensive response to end poverty and all of its effects with a special focus on the world's Least Developed Countries (LDCs) as categorized by the United Nations. ICGC is a 501(c)(3) non-profit organization. ICGC was granted Special Consultative Status in 2012 by the Economic and Social Council (ECOSOC) in the United Nations. The focus of our work is to provide virtual but tangible visual development solutions to support the Millennium Development Goals. In the course of our work, however, we have identified that the MDGs cannot achieve long-term and sustainable effects without an additional goal that we have termed Millennium Development Goal 9: Infrastructure. On this basis, we will address the original goals as listed below, and further demonstrate how our 9th goal, Infrastructure, is **key** to moving the LDCs to developed status to achieve sustainable viability:

1. Eradicate extreme poverty and hunger
2. Achieve universal primary education
3. Promote gender equality and empower women
4. Reduce child mortality
5. Improve maternal health
6. Combat HIV/AIDS, malaria and other diseases
7. Ensure environmental sustainability
8. Develop a Global Partnership for Development
9. ***Infrastructure:*** *Telecommunications; Energy; Transportation; Water and Waste Treatment; Architecture and Urban Planning; Industry*

Many within the international development community agree that peace is also a missing goal and we recognize that over 50% of the 49 LDCs are actively involved in armed conflict which serves as a hindrance to successfully achieving the MDGs and the post-2015 Sustainable Development Goals (SDGs).

The Millennium Earth Project Framework consists of six pillars, which will be explained more fully herein:

- **Research:** Both qualitative and quantitative research is needed to produce primary and secondary data to meet the MDGs and SDGs. The data from our research is then mapped by the GIS Team and will be displayed through a web interface.

- **Geographic Information System (GIS) and Web Interface:** GIS provides interested parties with the ability to interact with and visualize data. The system reveals relationships, patterns, and trends through the use of maps, reports, and charts. This allows stakeholders and interested citizens to develop better decision-making strategies. The results of the GIS data will be shared through a web-based interface where users can view and download the information developed by the Millennium Earth Project. Users will be able to query the database by country, MDG goal or other pre-defined filters. The data will be displayed visually using images of the countries, national and state boundaries, cities and townships to provide the current 'Is' structure and, using GIS, demonstrate a viable 'To Be' state.

- **Education**: The Education pillar lays out the plan to inform all stakeholders and educational institutions on the methodology of the Millennium Earth Project to achieve sustainable development. This pillar will also provide guidance on how local citizens can become more active participants in the transformation of their local communities. One facet of educating citizens will be providing local training on how GIS technology can play a role in international development efforts and community building initiatives.

- **Infrastructure Development**: Infrastructure Development provides the framework for how national and local institutions including but not limited to, governments, businesses, education and health systems, agriculture, roads, water supplies, sanitation, and transportation need to work together and support one another to achieve well-functioning municipalities that will drive broader economic and sustainable growth for the affected country.

- **Web Design-Interface-Communications:** The internet is a vital tool that will support us in disseminating information about the Millennium Earth Project. Stakeholders can learn how they can contribute to the development of the LDCs. The Millennium Earth Project is also intended to be a resource for citizens in particular, to show them how they can become involved in development efforts and, thus provide them with hope for a better day.

- **Quality Assurance:** Quality assurance includes the business requirements, processes, and performance indicators for each key stakeholder such as:

    - Institute for Conscious Global Change
    - Funding Organizations
    - International and national beneficiary organizations
    - Suppliers, contractors, sub-contractors and other partners

An innovative and integral aspect of the Millennium Earth Project framework is its virtual nature. Using GIS technology, also used in Google Earth Mapping, we determined that the technology could be used to identify the issues related to the eight Millennium Goals (MDGs) and then display them both quantitatively and qualitatively using visual imagery. By offering a "visual solution" for meeting the MDGs, the Millennium Earth Project will allow citizens in affected countries as well as the international development community to see that local conditions can be achieved for the betterment of the local populace. In this way, the development of underdeveloped and developing countries can be more unified and deliberate so that governments and other stakeholders such as the UN, World Bank, IMF, USAID and NGOs can provide assistance that will be permanent and sustainable.

We will display the needs of each country – infrastructural, agricultural, medical, educational, economic, environmental, and developmental – so the solutions can be more easily sought and served.

Upon the completion of Phase 1, which began in June 2011, we will provide virtual, though implementable solutions to the issues facing three selected countries. We have chosen one country for each of the three regions where the 49 LDCs exist: Asia, Africa and the Caribbean.

The three countries selected for Phase 1 are: Afghanistan in Asia with a population of 26 million; The Democratic Republic of the Congo in Africa with a population of approximately 68 million and, lastly, Haiti in the Caribbean with a population of approximately 13 million. In total, at the end of Phase 1, the Millennium Earth Project will provide visual solutions with the potential to tangibly affect the lives of over 100 million people.

The Millennium Earth Project's virtual development plan is designed to serve as a call to action by providing comprehensive and detailed information about each country. The ultimate goal of moving all LDCs to Developed Country status by 2030, if all stakeholders become fully engaged, is the challenge we make to all.

It is our intent to have all three country prototypes completed by July 31st, 2013 and the Haitian prototype is on track for completion by the end of May 2013.

The Institute is dedicated to significantly helping eradicate the economic and educational deficiencies existing in countries, which often serve as the cause for poverty and conflict. Members of the global community must equally serve the task of ending global poverty - but, to change this reality we must first be able to “see” it. Making these issues and their solution visible through the MEP is a significant step toward achieving this goal.

Working in concert with and in support of the United Nations, NGOS and other national and international stakeholders, ICGC will use the guidelines of the Millennium Development Goals as supported by the United Nations Secretariat of Economic and Social Affairs groupings of: Developed region; Countries of the Commonwealth of Independent States; Northern Africa; Sub-Saharan Africa; South-Eastern Asian; Oceania; Eastern Asia; Southern Asia; Western Asia; Latin America and the Caribbean to make our findings and work available on the Millennium Earth website.

2. Six Pillars of the Millennium Earth Project Framework

Each pillar of the MEP framework supports and is connected to the work of all other pillars and, taken together we will be able to attain our goal of creating a visual solution to address world poverty.

- Research
- Geographic Information System (GIS) Model and Web Interface
- Education Programs and Initiatives
- Infrastructure in Developing Countries
- Web/Online Presence
- Quality Assurance

2a. Research

Research Orientation
Before beginning research on the LDCs, it is important that all ICGC researchers are well versed in the Millennium Development Goals and the goals of the organization. The resources below provide history about the MDGs and ICGC:

1. Millennium Declaration
   - http://www.un.org/millennium/declaration/ares552e.htm
   - www.un.org/documents/ga/docs/56/a56326.pdf

2. Millennium Development Goals (MDG)
   - http://www.un.org/millenniumgoals/bkgd.shtml

3. Initiatives and Organizations involved with MDGs
   - Millennium Challenge Corporation - http://www.mcc.gov
   - Columbia Earth Institute - http://www.earth.columbia.edu
   - Global Pulse - http://www.unglobalpulse.org
   - The Institute for Liberty and Democracy - http://www.ild.org.pe

4. MDG Progress Reports
   - http://www.un.org/millenniumgoals/reports.shtml

5. Department of Economic and Social Affairs: MDG Indicators and Data
   - http://mdgs.un.org/unsd/mdg/Default.aspx

6. Institute for Conscious Global Change Research Handbook
   - Millennium Development Goals as guides
   - ESRI GIS technology- www.esri.org
   - Information Layers… see Millennium Earth's Information www.millenniumearth.org

Research Framework
The research that is collected on each of the 49 least developed countries is used to develop our maps. For each LDC, our method of gathering information follows a comprehensive framework allowing ICGC to gather the most relevant information about each country. Research is broken into three sections:

1. Historical Data Collection
3. Primary Data Collection
2. Secondary Data Collection

Historical Data Collection

Research must begin with a proper historical analysis of a given country, including the major events of the past 100 years that have influenced development within the country. The background research work must answer the following questions:

- Why is the country categorized as a Least Developed Country?
- What caused the lack of development? (conflict, natural disaster, colonization...)
- Is it a Landlocked Developing Country or a Small Island Developing State?
- What is the political structure of each country? (states, departments, regions…)
- What is the political history of each country?

Having a historical understanding of the country will make data collection of the country's current state far more comprehensive, thus creating greater understanding about the current problems and needs of the country.

Primary Data Collection
Primary data collection is the most crucial aspect of research for MEP. Primary data enables ICGC to interact with the citizens and governments of the LDC to learn their unique perspectives about the current state of their country and their plans and hopes for the future. ICGC is able to use the MDGs along with the goals of each individual country to establish a development framework for each country. The goals of individual countries can be ascertained from the following sources for each country we are mapping:

- Government Personnel
- UN Representatives
- Non-Government Organizations
- Religious Leaders
- Community Members
- Academics

Secondary Data Collection

Once there is a clear understanding of the history of a country, ICGC will then be prepared to gather secondary information, historical data as it relates to the specific Millennium Development Goals from 1990 to the present. This information can be gathered from a variety of sources including but not limited to international development databases, online searches, institutional publications, and periodicals. With this secondary data we are able to see how the major historical events have affected the country in terms of a given MDG.

Research Collection and Display

1. Submit data/information in an Excel spreadsheet.
2. Display country's information in the following format:

I. http://www.conservationalmanac.org/secure/alamanac/

3. All data and information should be communicated in a way that is comprehensible to the citizens, the legislature and all stakeholders.
4. Develop personal list of indicators based on knowledge gained in research

All researched information will be displayed through the MEP using GIS maps created by the GIS specialist and interns, allowing the people and governments of each country as well as international stakeholders such as the UN, World Bank, and IMF to bring about a fundamental change in the future of these countries.

Research Assignments and Meetings

The Research Director sets the research goals for the MEP. All researchers are required to check in with the Research Director weekly, either with completed assignments or with updated research. It is essential that the research team maintain strong communication in order to complete the first phase of the Millennium Earth project. All data is to be summarized with appropriate citations. Charts and graphs can be submitted as is. It is also essential for each researcher to maintain a bibliography of the books, articles, reports, websites, blogs or interviews he or she reads or conducts and researchers must use the MLA (Modern Language Association) style for referencing.

All researchers will have periodic meetings with the Research Director to ensure that all questions are answered and everyone is supported. Researchers will post their questions, comments and concerns to the established online project workspace so that all members of the research team can stay up to date on the progress of their collective research. In addition, creating a forum to answer questions in our organization's blogs will foster consistent communication and ensure that everyone stays informed.

Accountability and evaluation

All researchers must update the central excel spreadsheet once assignments have been completed. An assignment is considered complete once the Research Director has signed off on all assignments. This spreadsheet is a working document that will document all assignments that must be completed by the team. It will also allow for increased accountability for members of the research team.

Assignments will be evaluated using a variety of criterions by the GIS team to ensure that the information the research team gathers is useful and relevant to their work.

NGOS

There are many NGOs who are working in various ways to alleviate the suffering of the people in LDCs. However, more often than not, their work is uncoordinated and fails to be integrated into the countries' own policies and plans for their citizens. Although a great deal of good work is done, that work is isolated and lacks collaboration with the country's government or citizens.

The Institute for Conscious Global Change would like to serve as a clearinghouse for NGOs operating in these countries. Our goal is to help coordinate the work of NGOs with the country's government, as well as with stakeholders in international development. This means that each ICGC researcher will identify the NGOs that are operating in each region of the country, and specify what kind of aid these organizations are providing. The work of the NGO is then categorized within the framework of the MDGs. The ICGC researcher responsible for each goal will work closely with those NGOs striving to satisfy that particular MDG. For example, the ICGC researcher responsible for MDG 2, "Achieve Universal Primary Education", will be researching the NGOs that are providing educational services. We will collect the relevant data about the NGO's operations and, through collaboration with the country's government and other NGOs providing similar assistance, suggest a more effective delivery of services for the people of the country.

A current researcher's assignment is to create a comprehensive database of the NGOs that are active within the country, determine which MDG they would be categorized into, and detail their major projects and achievements. Researchers will also create a list of international aid organizations, particularly those based within the United States.

Researchers are also required to identify funding resources of such NGOs and aid organizations.

End-users and Stakeholders

The goal of ICGC is to use the MEP as a tool for change. By visually mapping the potential of LDCs, stakeholders can begin to actualize this vision. Additionally, ICGC aims to use the Millennium Earth Project as an educational tool, educating people across the globe about different countries. The following will be potential end-users of the Millennium Earth Project;

- International Governments
- International Universities (Higher Education)
- K-12 Educational Institutions
- IBO Schools
- International Organizations e.g. OECD, World Bank, IMF
- International Development Agencies in Developed Countries
- US State Department with a recommendation to develop educational programs to advance their diplomatic agendas in country and deter conflict in developing countries
- Consulates and Embassies
- NGOs
- Religious Organizations
- Cultural Exchange Organizations i.e. Franco-American and German- American Institutes
- Libraries

The data gathered by the research team is the foundation on which the Millennium Earth Project will be built.

2b. Geographic Information System (GIS) Model

Geographic Information System (GIS) integrates hardware, software, and statistical data for identifying and computing, managing, analyzing, and displaying graphically all forms of geographically referenced information.

It allows us to view, understand, question, interpret, and visualize data revealing relationships, comparisons, patterns, and trends in the form of maps, globes, reports, and charts.

The GIS interface equips us to answer questions and solve problems by looking at the data in a way that is quickly understood and easily shared.

GIS technology can be integrated into many enterprise information system frameworks.

Utility of GIS

- **Map Locations:** Mapping locations helps you find places of importance and get directions.

- **Map Quantities and Query Statistics**: Researchers can map information within a specific geographical area, easily analyze the data and find computational results for a particular variable or feature. For example, public health officials could map the numbers of physicians per 1,000 people in each census tract to identify which areas are adequately served, and which are not. In market research a company might want to find zip codes with many young families with relatively high income to market children's products in the area.

- **Map Densities within a Geographical Area**: A density map lets you measure a number of features using a uniform areal unit so you can clearly see the distribution. This is especially useful when mapping areas, such as census tracts or counties, which vary greatly in size. A county map showing the number of people per census tract may reveal that some smaller tracts might have more people per square mile compared to some larger tracts.

- **Monitor a Geographical Area**: GIS can be used to monitor what is happening inside a specific area and to take action by mapping what is inside that area. For example, a district attorney would monitor drug-related arrests to find out if an arrest is within 1,000 feet of a school and if so apply stiffer penalties.

- **Community Development**: GIS can help you determine what is occurring within a set distance of a feature by mapping what is nearby. Developers are able to build a community map projection by mapping the infrastructure in the neighborhood to make it more desirable to live in.

- **Track Change by Mapping**: Using GIS maps one can track changes in an area to anticipate future conditions, decide on a course of action, or to evaluate the results

of an action or policy. By mapping where and how things move over a period of time, one can gain insight into how they behave. For example, a meteorologist might study the paths of hurricanes to predict where and when they might occur in the future.

MEP Description

The objective of this work is to construct visual representations or maps of the LDCs from three areas: Asia, Africa and the Caribbean. The first country under construction is Haiti.

The following is a tentative design of the application we intend to create. This prototype uses ESRI's (www.esri.org) ArcGIS online mapping software to create a user-friendly application with maps and charts. The application will be web accessible through an interface designed for target audiences such as: The UN, Haitian Government, the citizens of Haiti, NGO's, foreign investors and anyone interested in the development and progress of LDC's.

Plan

- Identify areas of research to be visually represented in GIS
- Identify and analyze the data to be mapped
- Convert data in Excel format and populate the attribute data tables for mapping
- Create common symbols for representing each variable to be represented (e.g. population will have one symbol, color, icon that will be consistent in all maps)
- Create area maps for the identified data. Combine symbols, icons and information on the map.
- Export map to .pdf, .png and interactive ArcGIS online server
- Create GIS web application and web interface
- Embed the web application in the web interface

Components of Creating the Maps and the GIS Web Application

1. Geocoding areas

The maps will have levels of administrative boundaries with scales as detailed as possible. These will include:

1. Country boundaries
2. State boundaries
3. District, city, and towns boundaries
4. Area boundaries
    a) Street details
    b) Neighborhood details
    c) Infrastructure details in the area

2. Converting statistical data into geospatial maps

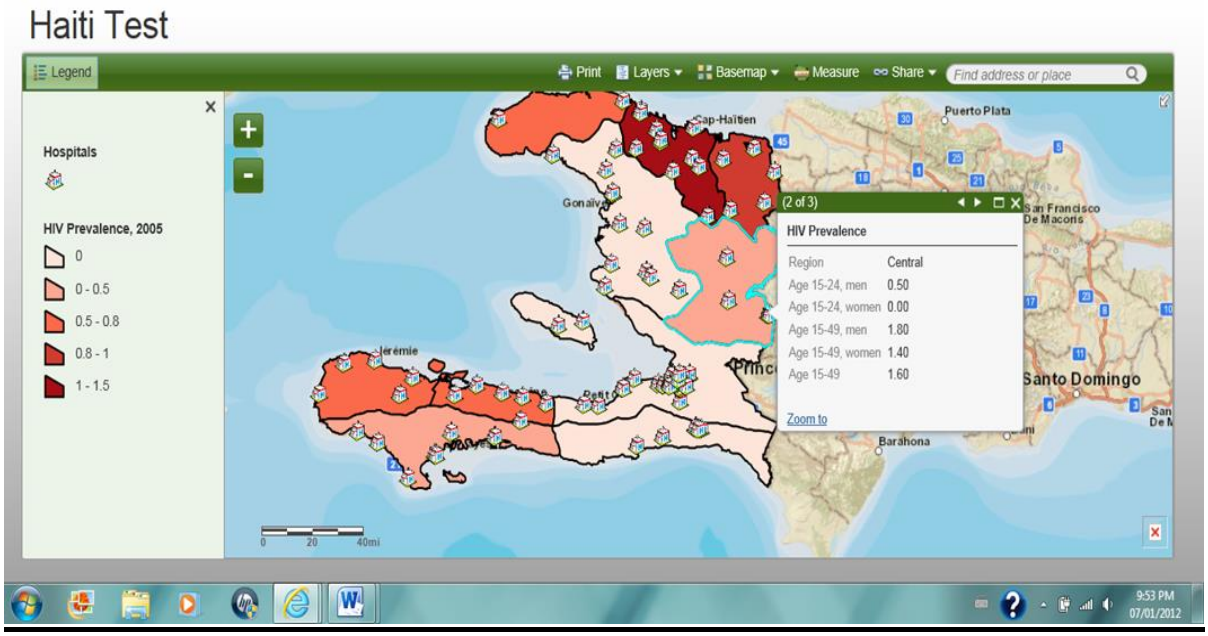
Statistical data received from the researchers of ICGC will be geocoded, geospatially referenced and visually mapped to monitor progress and development in the country relating to the MDG's. The charts and query features will allow for the analytical understanding through visual representation. The data will be presented in terms of past development, current development and a future plan for a particular department, city, or neighborhood.

3. Interpreting data and graphically supporting the data
Analytical description, photos and videos will help the viewer to understand the situations in the area being viewed. These graphical elements will be integrated in the web application along with the maps for more detailed information and documentation.

4. Documenting information in one integrated web application through a web interface.
A web interface will be created to integrate the research data other than millennium goals with the web application. This will contain the visual representations in terms of maps, charts and statistical queries. The web interface will be a one-stop clearinghouse of information documenting the country's development progress.

5. Customization according to user needs
Web application users will be able to access data, create maps and print the maps as needed by customizing the maps by selecting different feature layers, timelines and the 8 MDG's that will be available for selection within the application.

Figure 1: Visual of the GIS Web Application



To view the prototype application, please visit the following link:
http://www.millenniumearth.org/

2c. Education Programs and Initiatives

Premise and Context

During the last two decades, an increase of non-profit, non-governmental organizations (NGOs), foundations, social enterprise entities, and private/public partnerships were created to stimulate productivity toward improving family and societal economic development in several of the least developed countries (LDCs). Consequently, there is evidence of improved productivity, efficiency, and conservation, primarily in the health, agriculture, and energy sectors using design and technology that have proved advantageous for some populations.

Now, shifts in global demographics demand that young people in or from these countries become leaders and decision-makers not only to gain expertise to lead existing entities in business and society today, but also to be ready to master and replicate the complex networks and entities that renewed societies require. However, investment and access to training and development opportunities that operate on the international, regional, and local levels are lacking. Collaborative partnerships across cultures and generations can serve as critical pipelines for societal renewal but they must be built now.

Young people who advocate cultural literacy and cross cultural engagement for productive action will be attracted to ICGC's education programs which are designed to prepare them to tackle the challenges represented in the MDGs and post- 2015 Sustainable Development Goals (SDGs).

Introduction

ICGC is focused on creating technological tools to advance sustainable planning, innovation, and problem-solving across local and international realms that can produce actively shared networks and collaborations between and among LDCs and their support partner countries. ICGC's Millennium Earth Project will provide the visual mapping portal through which the process of re-visioning the world's societies can be achieved.

Education Mission

ICGC Education programs aim to grow leaders and practitioners in every target nation who can motivate, lead, and inspire citizen action to renew societies and build intercultural understanding and trust throughout the world. By providing leadership training and education, role model mentorship, and access to advanced technological innovations and applications the ICGC Education Unit commits to the following goals:

- To develop and connect emerging leaders in government, private/public sectors, NGOs, and CBOs (Community Based Organizations) to advance study and achievement in all areas of the MDGs;

- To advance the social, economic, and professional/career status of youth, especially women and girls, and gain influential support from a broad public;
- To foster strategic alliances and partnerships, promote global networking and support lasting pipelines of candidates for leadership development;
- To employ media, communications, and cultural resources in program development and distribution for use by all participants and partners;
- To coordinate critical research and assist the creation of knowledge resources on trends and activities regarding leadership, populations and economic development.

Education objectives

1. Increase awareness of the goals and methodology of the Millennium Earth project.
2. Encourage use of the Millennium Earth Project as an educational tool to promote learning about countries across the globe.
3. Increase in-country capabilities to fill knowledge gaps that are hindering the country's development.
4. Coordinate the work of NGO's and other stakeholders, fostering strategic alliances and partnerships.
5. Grow leaders who can motivate, lead and inspire citizen action to renew their societies.
6. Get citizens involved to change their local communities.
7. Provide solution-specific training on delivering sustainable transportation infrastructures, increasing access to basic water and sanitation services, creating reliable energy services, supporting information and communication technologies and supporting urban infrastructure planning and development.

Targeted audience

Education Deliverables

- User Guide for non-experts in GIS
- Toolkit for schools in educating specific content around the ME & MDGs
- Develop GIS-based games—specific content around MDGs
- Develop online workbook & tools around ME & MDGs

2d. Infrastructure in Developing Countries

1. Definition

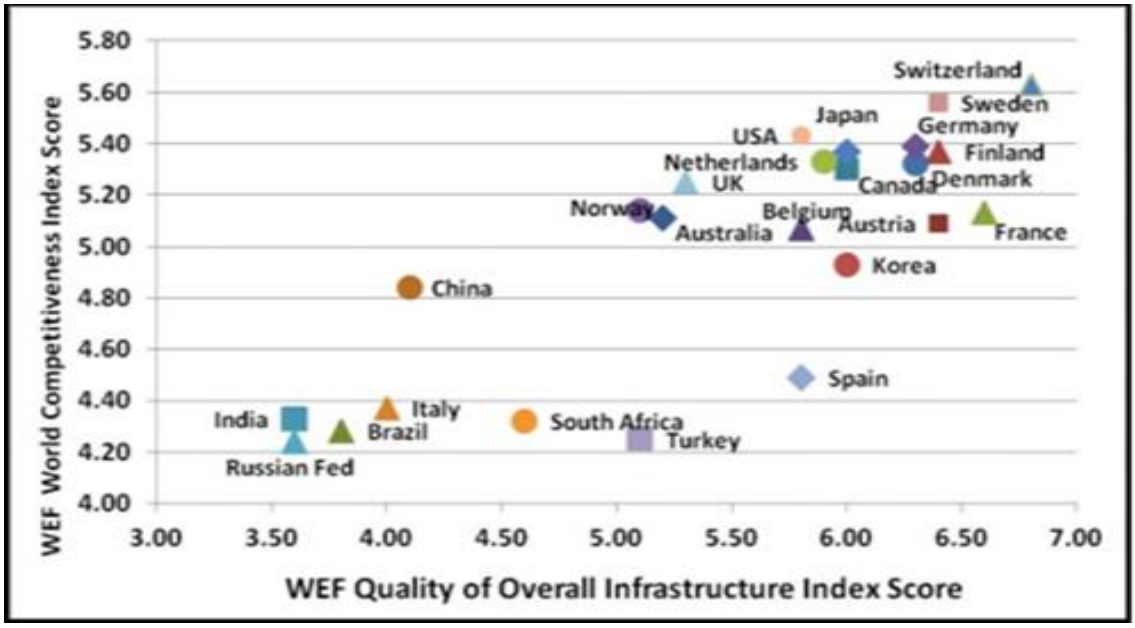
Infrastructure refers to the basic physical and organizational structures needed for the operation of a society. It refers to the commodities, services and facilities necessary to enable, sustain, or enhance societal living conditions. Infrastructure is the set of interconnected structural elements that provide a framework supporting an entire structure of development.

The word is most often used to describe large structures made of concrete and steel, such as power plants, roads, water supply systems, and, increasingly, information and communications systems. These parts of the built environment underpin a country's economic potential—in today's world, no country can expect to succeed without a solid infrastructure foundation.

Good quality infrastructure is a key ingredient for sustainable development. All countries need efficient transport, sanitation, energy and communications systems if they are to prosper and provide a decent standard of living for their populations.

Infrastructure networks reduce the effect of distance, help integrate national markets, and provide the necessary connections to international markets. Quality infrastructure is trade enhancing – especially for exports – and has positive impacts on economic growth. Not surprisingly, therefore, most of those countries with high-quality infrastructure also rank high in the world index for overall competitiveness.

Figure One: WEF Quality of Overall Infrastructure Index Score



Unfortunately, many developing countries possess poor infrastructure, which hampers their growth and ability to trade in the global economy.

Infrastructure is the vehicle for transforming low and middle-income countries. The developmental challenges that these countries face are numerous, ranging from rapid urbanization to the threat of a changing climate, and catastrophic natural disasters. To address these challenges, the infrastructure sectors - water, transport, energy and information and communications technology - have emerged as real agents of change.

2. Main Infrastructure Sectors

The main sectors of infrastructure in developing countries are:

- Transport
- Water and sanitation
- Energy
- Information and Communication Technologies
- Urban Development

Transport

Good quality roads, railways, ports and airports are essential for the smooth running of many key economic sectors in the developing world including agriculture, industry, mining and tourism. Efficient transport infrastructures can also improve the delivery of and access to vital social services, such as health and education.

Improved transport can also be used as a means of achieving the broader goals of reducing poverty, sustaining economic growth and stimulating social development. There is no doubt that an improved transport infrastructure will also help developing countries to integrate into the global economy.

The goal is to make improvements that meet local needs in a safe, affordable and efficient way, and that has a minimal impact on the environment.

Water and Sanitation

The water management infrastructure includes all the water systems that make a country function in terms of providing drinking water (collection, treatment and distribution), sewage collection, disposal of waste water, drainage systems, irrigation systems and flood control, in both urban and rural areas.

Drinking water supply is formed by a system of pipes, storage reservoirs, pumps, valves, buildings and structures to house the treatment equipment and meters that are used to provide drinking water to a population in a community or on a larger scale, to a country.

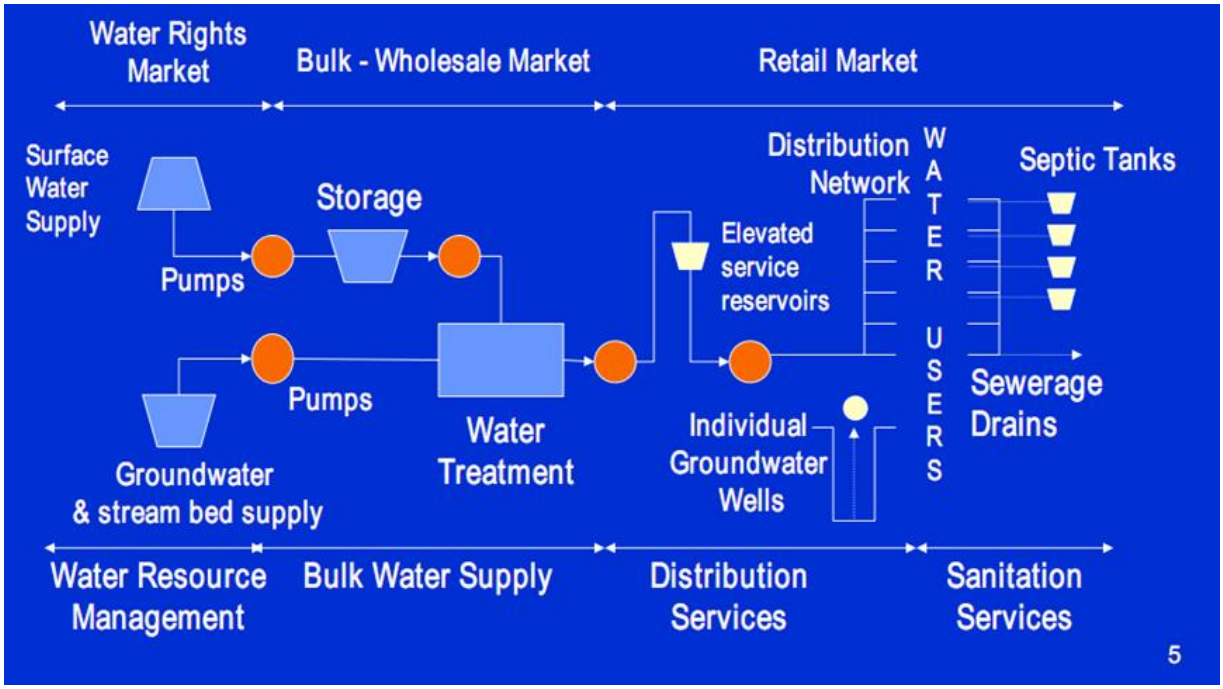
Water security is essential for economic growth. Adequate infrastructure and good policy including better water management around the linkages between water, food and energy is critical.

Sanitation generally refers to the provision of facilities and services for the safe disposal of human urine and feces. Inadequate sanitation is a major cause of disease worldwide and improving sanitation is known to have a significant beneficial impact on health both in households and across communities. The word 'sanitation' also refers to the maintenance of hygienic conditions, through services such as garbage collection and wastewater disposal.

Disposal of solid waste is most commonly conducted in landfills, but incineration, recycling, composting and conversion to biofuels are also viable avenues.

Water Cycle

Figure Two: Water Cycle



To expand access to safe drinking water, provide proper waste management system in rural areas and maintain the sustainability of the water cycle is a goal to reach in order to save millions of lives in least developed countries.

Energy

Energy infrastructure refers to all the resources that exist on the planet to generate power, in order to make people´s life more comfortable. These resources are hydropower, wind energy, solar panels, oil, gas, nuclear and mining.

Energy is not an end in and of itself, but it is integral to the wider system contributing to quality of life and facilitating economic development. Industrial and commercial enterprises need a reliable and affordable supply of electricity to deliver the products and services upon which economies depend.

At the community level, access to energy can also act as a catalyst for economic activity because it links people to markets through transport and communications. It can increase the income of poverty stricken communities by modernizing agricultural processes and small enterprises. It can also reduce time spent on domestic tasks such as collecting firewood and water, which fall disproportionately on women and children, and provide access to cleaner cooking fuels.

The electric power industry provides the production and delivery of electric energy, in sufficient quantities to areas that need electricity through a grid connection. The grid

distributes electrical energy to customers. Electric power is generated by central power stations or by distributed generation. Demand for electricity is derived from the requirement for electricity in order to operate domestic appliances, office equipment, industrial machinery and provide sufficient energy for both domestic and commercial lighting, heating, cooking and industrial processes.

Information and Communication Technologies (ICTs)
ICTs are playing an increasingly influential role in reshaping trade, growth, employment and production in large parts of the world. They present unprecedented opportunities to combat poverty by increasing income and opening markets, thereby contributing to the attainment of wider development goals. ICTs can also help improve access to health, education, information, communication and more.

Essential tools for this to occur are the proper functioning of the vectors of communication, without market distortion and border restrictions. This means that attention needs to be paid to the ICT institutional and regulatory framework in order to liberalize telecommunication facilities, promote investment in the sector, develop harmonized incentives and foster regional integration. This will also help lead to the development of technical and regulatory standards, the promotion of transparency, and the emergence of regional centers of excellence for training.

Technological advances offer major opportunities for countries to leapfrog in their development. New mobile technologies, fiber optics and satellite systems are making a significant difference in efficiency and improved demand management in infrastructure. They are used for the control of electricity networks, remote metering of water use, road capacity utilization and better public transport logistics. Other technologies with significant potential include biotechnology in water treatment, fuel technology in land transport and carbon sequestration in power generation.

Research into multi-fuelled vehicles, fuel cells, bio-fuels, hydrogen-based fuels and electric batteries will surely prove valuable due to shortages in more traditional fuels, and may also result in drastic reductions in the environmental impact of road transport. Technological advances now allow small-scale renewable-based generation and other forms of distributed generation, such as small-scale fossil-fuel-based co-generation plants and fuel cells.

Urban Development
Urban planning (urban, city, and town planning) is a technical and political process concerned with controlling how land is used and the design of the urban environment, including transportation networks, to guide and ensure the orderly development of settlements and communities. It concerns itself with research and analysis, strategic

thinking, urban design, public consultation, policy recommendations, implementation and management.

There is an increasing need to address rapid urbanization in many developing countries and the significant financing constraints they face. It is essential to support the development of strong planning, management and financing capacity needed to address the high density and diversity of urban residents, companies and institutions. The inadequacy of urban infrastructure limits economic efficiency and the supply of urban land and housing, especially hurting poor people.

Urban planning practices directly affect the health of individual citizens both positively and negatively. It is necessary to refocus urban planners on the implications of their work on human health and the wellbeing of the population. Healthy urban planning is a core element for sustainable development and must focus on the positive aspects, in particular, to make health objectives central to the decision-making process to improve both the quality of the built environment and the quality of life for the individuals and communities in cities. It supports the creation of a healthy economy, a healthy environment and a healthy society.

3. Infrastructure's contribution to achieving the MDG

Investment in infrastructure can contribute to achieving the Millennium Development Goals, as it leads to improved access to services like health and education, generates employment and enhances a country's ability to trade while reducing the costs of its goods and services. Good infrastructure also makes it easier for economic actors to do business and helps to improve environmental conditions.

Health, education, and efficient water and sanitation services help lay the groundwork for a more productive, healthy population capable of contributing to sustained economic growth. Likewise transport infrastructure improves access to services and markets in rural areas.

Infrastructure plays a significant role in promoting gender equality and empowering women since women and girls tend to be disproportionately affected by distance to health and education services, and to markets. Improved access to water supply, sanitation, and electricity, also reduces women's burden of work in the home and frees up their time for paid work, and enables girls as well as boys to spend more time at school and studying.

Progress in sanitation and water supply underpins many of the other MDGs, particularly relating to child and maternal health, nutrition, education, agriculture and general economic productivity.

Inadequate sanitation and water supplies result in diarrheal and other infectious diseases and compounds the effects of malnutrition. Access to safe drinking water and basic sanitation helps prevent water-related diseases, and improve nutrient uptake.

The availability of clean water and hand washing with soap by mothers and birth attendants result in lower mortality rates among neonates and improves the survival rate of mothers.

When adequate sanitation facilities are unavailable, the surrounding environments (be they terrestrial or marine) are used for either direct defecation or for septic tank dumping thereby badly polluting these ecosystems. Adequate treatment and disposal of excreta and wastewater contribute to less pressure on freshwater resources.

The availability of energy has a direct impact on poverty, employment opportunities, education, demographic transition, indoor pollution and health, and has gender- and age-related implications. In rich countries, energy for lighting, heating and cooking is available at the flip of a switch. The energy is clean, safe, reliable and affordable. In least developed countries, up to six hours a day is required to collect wood and dung for cooking and heating, and this task is usually done by women, who could be otherwise engaged in more paid activities. In areas where coal, charcoal and/or paraffin are commercially available, these fuels take up a large portion of the monthly household income. Inadequate equipment and ventilation means that these fuels, burned inside the house, cause a high risk of disease and death through air pollution and fires.

The development of renewable energy, which means the use of renewable sources like solar power, wind turbines, hydroelectric plants and biomass, promotes sustainable energy and reduces the negative impact of the non-renewable resources onto the environment.

4. Infrastructure for sustainable development

Sustainable infrastructure development contributes to poverty reduction by spurring economic growth, stimulating enterprise opportunities, generating employment and providing communities with access to basic needs, improving the quality of life and protecting the environment.

It is not simply the short-term provision of infrastructure that is of prime importance, but planning and designing infrastructure which takes full account of its own impact and its operational needs and use. Infrastructure must be sustainable if it is to benefit coming generations and make a positive contribution to the future. Providing such infrastructure now is an investment that will pay off many times over later.

An approach to sustainable infrastructure should focus on four pillars:

1. Delivering sustainable transport infrastructure.
2. Facilitating increased access to basic water and sanitation infrastructure services
3. Creating reliable energy services and supporting information and communication technologies
4. Supporting urban infrastructure planning and development

Investments in infrastructure need to ensure longevity, both in physical assets and the operating environment, including private sector and civil society engagement. To be sustainable, infrastructure investments must address crosscutting issues such as governance, inclusiveness, corruption, social disruption, gender equality, safety, climate change and the environment.

Addressing energy security is one of the major objectives in the sustainable development criteria of many countries. Interruptions of energy supply can cause serious financial and economic losses. To support the goals of sustainable development, energy must be available at all times, in sufficient quantities and at affordable prices. Secure energy supplies are essential to maintaining economic activity and to providing reliable energy services to society. The monitoring of trends of net energy imports and the availability of appropriate stocks of critical fuels are important for assessing energy security.

5. Infrastructure Indicators

Access to infrastructure services is strongly correlated with a country's average income. In the developing world, upper-middle income countries have the highest access rates and are very close to meeting the infrastructure needs of 90% of their population. The low-income countries are very far from meeting infrastructure needs, particularly for electricity.

The access gap is unevenly distributed across income groups, at various stages of development. The gaps between the poorest and the richest 20% of the population in terms of access to infrastructure services are systematically largest in the poorest countries. This means that affordability issues are the harshest, and infrastructure access gaps are also the largest in the poorer regions.

2e. **Web Design/Interface-Communication**

A web presence for ICGC and the Millennium Earth Project is a top priority. Today every organization needs to have a web presence and the Internet is clearly becoming the future of communication. It is also a Millennium Development Goal to increase Internet connectivity and accessibility in every nation as a means towards increasing collaboration, share knowledge, educate and increase communication between countries.

ICGC understands that its online presence is crucial for reaching its target audience as it supports the organization in building its market, building a community and identifying relevant donors. The organisations website will provide a focal point for building our community and then engaging the community in the activities of the organization. In today's digital world visitors and interested parties will use the organisations website to learn more about what the organization is doing, its on the ground activities in country and learn how they could contribute or become engaged.

ICGC will use its web presence to not only communicate the work it is doing but, a key objective is to engage interested parties in exchanging information and ideas from one person to another, from one organization to another from one media to an individual or a group as we do our work.

Methodology for Online Web Presence for ICGC

1. Through the ICGC website, the organisations facebook page, twitter and online blog we intend to create a knowledge base for the international development community including the UN, NGOs, local governments bodies, citizens and expatriates of LDC countries to become aware and exchange best practice experiences as it relates to the ongoing work in each of the LDCs.

2. ICGCs online presence will include information on the 8 UN MDGs and, to the extent possible, the development plans and objectives of national and local governments to inform the population of each LDC on the development plans for their country. Using our social media platforms we intend to engage our visitors in a dialogue on the development needs in LDCs. This ongoing dialogue is expected to further support government officials and policy makers in understanding the expectations and needs of their constituents both locally and abroad. Additionally, field experts working on specific MDGs will use the ICGC website as a repository of real-time up-to-date information to all interested parties on the mission of ICGC through their research whitepapers, articles, blogs or other published materials that will be published on the website.

3. The Millennium Earth web application is an innovative tool that will visually represent not only the current state in each LDC for which the prototype has been developed but its predictive element will also map, based on research and expert analysis, how the country could develop based on various factors and

under various scenarios. ICGC will then use its social media and YouTube channels to share videos and images on each countries progress..

4. To support the work of the Infrastructure pillar, we will continuously provide whitepapers, case studies and relevant workshop materials on the "what", "where" and "how to" of developing a sustainable infrastructure for each LDC.

5. In addition to the face-to-face learning modules providing through the Education pillar, the ICGC website will provide an online resource for all participants in the program to work together on each course module as well as exchange information and knowledge in their field of expertise. Open pathways for communication and the exchange of knowledge, information, ideas and tools is vital in building sustainable communities irrespective of whether it is in a learning situation such as mentor to mentoree or accurate information for the prevention or treatment of disease.

ICGC online web presence criteria

- Provide a website and social media pages that are engaging, well-trafficked and optimized for search engine recognition to achieve a returning visitor rate of 65% and an industry standard web bounce rate of <40%
- Engaging social media platforms that support and encourage online dialogue around the work of ICGC and the MDGs
- Increase web traffic by 30% year over year for the first 3 years.
- Increase ICGCs current fan base on facebook and twitter followers by 50% by Q4 2012
- Implement communication campaigns on each country and/or LDC country regularly and, at minimum, 1 per quarter.

2f. Quality Assurance

The work of the Millennium Earth Project's Quality Assurance system comprising its business requirements, business processes and performance measures is targeted to provide ongoing information to the following key stakeholders:

- Institute for Conscious Global Change
- Country Governments & Citizens, United Nations and it's agencies
- World Bank
- International Monetary Fund
- Non-Governmental Organizational (NGOs) & (INGOs)
- Various Customer Groups
- Various Contracting Agencies
- Various Funder Groups

Quality Assurance is responsible for systematic monitoring, evaluating and implementing continuous improvements to the MEP that ensures all contractual standards of quality are being met.

Institute for Conscious Global Change Quality Assurance System

ICGC will use a variety of best practices to define and create all the written procedures and processes that monitor and evaluate all quality standard contractual requirements based upon the following interactions and collected information:

1) Define the various products (maps, data, information databases, screens, educational models, etc.) that make up MEP
2) Define how we will deliver those products that make up MEP.
3) Define the various business processes that acquire the data/information, that create the various products and that deliver those to our customers/stakeholders.
4) Define specific performance measures that need to be implemented to ensure information and data quality.

Customer/Stakeholder Groups

1) Define the specific customer/stakeholders of MEP.
2) Identify their requirements—what they expect from us—relevant data, accurate data, timeliness, etc.
3) Define and implement specific performance measures that ensure that customer/stakeholder's requirements are continuously met.

Contracting Agencies

1) Identify the specific contracting agencies.
2) Define the specific requirements ICGC expects from each contracting agency.
3) Identify the specific requirements each contracting agency has of ICGC.
4) Identify and implement specific performance measures that ensure the contracting agencies continuously meet the specific requirements as defined by ICGC.

Funding Organizations

1) Identify the funding organizations
2) What specific requirements does each funder have of ICGC
3) What performance measures need to be identified and integrated to ensure that ICGC continuously meets those measures

Quality Assurance Glossary of Terms

Contracting Agencies

Those people, functions or organizations who supply materials, equipment, information, people, and funding so ICGC can create MEP.

Customers

Those who receive and use the products, services and/or actions created for MEP.

Inputs

The materials, equipment, information, people, money or environmental conditions that are needed to create and maintain MEP.

Measures

Information that indicates the efficiency and effectiveness of the work accomplished by or through the ICGC to maintain MEP.

Outputs

The products and services produced by or through the MEP for their customers and key stakeholders.

Processes

Work structures that contain linked activities with the purpose of producing a product or service.

Quality Assurance

The systematic monitoring, evaluating and implementing continuous improvements of MEP to ensure that contractual standards of quality are being met by all stakeholders

Requirements

What customer's need, want and expect of MEP outputs.

Stakeholders

Those who have an interest in the MEP and stands to gain or lose based on its output.

Appendices

APPENDIX 1

UNITED NATIONS MILLENNIUM DEVELOPMENT GOALS AND TARGETS

Goal 1: Eradicate extreme poverty and hunger
- Target1. A: Halve, between 1990 and 2015, the proportion of people whose income is less that $1 a day
- Target1. B: Achieve full and productive employment and decent work for all, including women and young people
- Target1. C: Halve, between 1990 and 2015, the proportion who suffer from hunger

Goal 2: Achieve universal primary education
- Target 2. A: Ensure that, by 2015, children everywhere, boys and girls alike will be able to complete a full course of primary schooling

Goal 3: Promote gender equality and empowerment of women
- Target 3. A: Eliminate gender disparity in primary and secondary education, preferably by 2005, and in all levels of education no later than 2015

Goal 4: Reduce child mortality
- Target 4. A: Reduce by two-thirds, between 1990 and 2015, the under-five mortality rate

Goal 5: Improve maternal health
- Target 5.A: Reduce by three-quarters, between 1990 and 2015, the maternal mortality ratio
- Target 5.B: Achieve by 2015 universal access to reproductive health

Goal 6: Combat HIV/AIDS, Malaria, and other diseases
- Target 6.A: Have halted by 2015 and begun to reverse the spread of HIV/AIDS
- Target 6.B: Achieve by 2010 universal access to treatment for HIV/AIDS for all those who need it
- Target 6.C: Have halted by 2015 and begun to reverse the incident of malaria and other major diseases

Goal 7: Ensure environmental sustainability
- Target 7.A: Integrate the principles of sustainable development into country policies and programs and reverse the loss of environment resources

Target 7.B: Reduce biodiversity loss, achieving by 2010 a significant reduction in the rate of loss
Target 7.C: Halve by 2015 the proportion of people without sustainable access to safe drinking water and basic sanitation
Target 7.D: Have achieved a significant improvement by 2020 in the lives of at least 100 million slum dwellers

Goal 8: Develop a global partnership for development
Target 8.A: Develop further an open, rule-based, predictable, non-discriminatory trading and financial system (includes a commitment to good governance, development, and poverty reduction both nationally and internationally
Target 8.B: Address the special needs of the least-developed countries (including tariff-and quota-free access for exports of the least-developed countries; enhanced debt relief for heavily indebted poor countries and cancellation of official bilateral debt; and more generous official develop assistance for countries committed to reducing poverty)
Target 8.C: Address the special needs of land-locked and small island developing states (through the Programme of Action for the Sustainable Development of Small Island Developing States and the outcome of the 22nd special session of the General Assembly)
Target 8.D: Deal comprehensively with the debt problems of developing countries through national and internal measures to make debt sustainable in the long term
Target 8.E: In cooperation with pharmaceutical companies, provide access to affordable, essential drugs in developing countries
Target 8.F: In cooperation with the private sector, make available the benefits of new technologies, especially information and communications

APPENDIX 2

Baseline Research Information

Historical Data:

1. Geographic location of country
2. Comprehensive history of Country-settlers
3. Type of Government
4. Political History
5. Population (make-up of pop. Demographics)
6. Country's natural resources

Secondary and Primary Data:

1. Investments-foreign, regional and local (detail assessment and recommendations)
2. Economic health of country
3. Agriculture
4. Water (availability and access)
5. Education (schools-elementary, secondary and tertiary education, libraries, adult education, academic resources present and needed)
6. Infrastructure (transportation, water and sanitation energy, information and communication and urban development)
7. Medical issues (AIDS, malaria, tuberculosis, waterborne illnesses)
8. NGOs operating in country and the work of each with a view for how they could work cooperatively and more effectively
9. Describe how the country is currently addressing and accomplishing the following Millennium Development Goals and, the targets that have been established in support of the goals.
10. Develop and/or identify recommendations as to how the country can address and achieve the Millennium Development Goals, and the targets that have been established in support of the goals.

APPENDIX 3
Infrastructure

This annex provides an overview of the indicators that should be checked in each country in order to determine their economic infrastructure. It should contain information for selected years on, access, affordability, efficiency, the state of reform, and financial performance of the energy, water supply and sanitation (WSS), telecom, and transport sectors.

Indicators of Transport

Access

Vehicle ownership

Motorized vehicles:	% households
Rural:	% households
Non-motorized vehicles:	% households
Rural:	% households

Road density in terms of

Population:	Road km/1000 people
Land:	Road km/1000 sq km

Rail density in terms of

Population:	Rail km/1000 people
Land:	Rail km/100 sq Km

Affordability

Average pump price for super/ leaded/unleaded):	US$/liter
Average pump price for diesel:	US$/liter
Spending on transport:	%hh expenditure

Average Rail Tariff

Freight:	US$/tn-km
Passenger:	US$/Passenger-km

Ports handling costs US$

Ports handling costs Freight t/km (US$)

Quality

Travel time to work in main cities:	Min/one-way work trip
Paved roads:	% of total roads
National:	% of total paved roads
Secondary/regional:	% of total paved roads
Roads in good/fair condition:	Km
National roads in good condition:	% of national roads
Annual fatalities in car accidents:	Fatalities/10,000 vehicles
Railway traffic density:	Traffic units/railway km
Railway employee productivity:	Annual output/employee
Road length:	Thousands of kms
Motorways:	Thousands of kms
Highways:	Thousands of kms
Secondary/regional:	Thousands of kms
Other roads:	Thousands of kms
Information on seaport traffic:	Thousands of freight tons
Urban transport modes – modal structure:	% work trips per mode
(a) private car:	% work trips per mode
(b) train/tram:	% work trips per mode
(c) bus or minibus:	% work trips per mode
(d) motorcycle:	% work trips per mode
(e) bicycle, foot and other modes:	% work trips per mode

Fiscal costs

Annual central gov spending on transportation:	Millions US$
Annual central gov spending on roads:	Millions US$

New construction:	Millions US$
Maintenance/rehabilitation:	Millions US$
Others:	Millions US$
Administration:	Millions US$
Annual local gov spending on transportation:	Millions US$
Annual local gov investment on roads:	Millions US$
Road Fund:	Millions US$
Provincial spending:	Millions US$
Road recurrent and capital expenditure:	Millions US$

Financial autonomy

Annual expenditure by private sector in owning/operating vehicles:	US$

Institutional development

National roads boards exist and reports annually:	Y/N
National road safety action plan:	Y/N
Social assessment of road projects mainstreamed:	Y/N
Environmental assessment of road projects mainstreamed:	Y/N

Economic regulation

Transport formal economic regulatory framework:	
For road:	Y/N
For airport:	Y/N
For port:	Y/N
For railway:	Y/N
Transport regulatory agency with some degree of independence:	
For road:	Y/N
For airport:	Y/N

For port:	Y/N
For railway:	Y/N

Geographical scope of regulation:	
For road:	National/Subnational
For airport:	National/Subnational
For port:	National/Subnational
For railway:	National/Subnational

Environmental regulation

Specific environmental regulation for transportation projects:	Y/N
Environmental assessment of transportation projects mainstreamed:	Y/N
Engineering design specifications related to environmental factors:	Y/N
Regulations requiring population resettlement in transport projects:	Y/N
Relevant internat. environmental agreements affecting transportation projects:	Y/N

Indicators of Water and Sanitation

Access

Access to improved water sources:	% population
Rural:	% population
Urban:	% population

Urban access to improved sanitation:	% population
Sewerage:	% population
On-site sanitation:	% population

Rural access to improved sanitation:	% population
Sewerage:	% population
On-site sanitation:	% population

Affordability

Spending on water services:	% of HH expenditure
Rural:	% of HH expenditure
Urban:	% of HH expenditure

Spending on water and sewerage services:	% of HH expenditure
Water average tariff:	US$/m3-year
Sanitation average tariff:	US$/m3-year
Average water bill:	US$/month
Average water connections charge:	US$
Average sanitation connections charge:	US$

Quality

Water supply time:	Hours/day
Rural:	Hours/day
Urban:	Hours/day
Source of drinking water in rural areas:	
Piped water:	% of rural households
Well water:	% of rural households
Surface water:	% of rural households
Rainwater:	% of rural households
Tanker truck:	% of rural households
Bottled water:	% of rural households
Others (rainwater, bottled water,(already mentioned above) others):	% of rural households
Source of drinking water in urban areas:	
Piped water:	% of urban households
Well water:	% of urban households
Surface water:	% of urban households
Rainwater:	% of urban households
Tanker truck:	% of urban households
Bottled water:	% of urban households
Others (rainwater, bottled water, others):	% of urban households
Source of drinking water:	
Piped water:	% of households
Well water:	% of households
Surface water:	% of households
Rainwater:	% of households
Tanker truck:	% of households
Time to water source from HH with in-	

dwelling hand washing material:	
Less than 2 minutes:	% of households
2-5 minutes:	% of households
5-9 minutes:	% of households
10 or more minutes:	% of households
Disinfected water/produced water:	%
% urban population with disinfected water:	% urban population
% urban systems with disinfection:	% urban systems
% urban treated residual water before discharge:	%
% collected volume which is treated:	%
Public distribution of water-total	

Technical dimensions

Unaccounted for water:	%
Water supplies that are functioning in rural areas:	% of total
Water utility labor productivity:	Employees/100 connections

Fiscal costs

Total national spending on water & sanitation:	US$ million
Total subnational spending on water & sanitation:	US$ million
Operating subsidies:	US$ million
Rural:	US$ million
Urban:	US$ million
Last ten years mean investment in water & sanitation:	US$
Urban:	US$
Rural:	US$
Capital investment:	US$ million
Rural:	US$ million
Urban:	US$ million
Water supplies recurrent and capital expenditure:	US$ million
Total public spending on water & sanitation	US$ million

of the central administration:	

Financial autonomy

Water utilities working ratio:	Operating costs/operating revenues

Institutional development

Existence of policy requiring tariff to cover operation and maintenance costs:	Y/N

Economic Regulation

Formal economic regulatory framework:	
For tariff:	Y/N
Coverage:	Y/N
Service quality:	Y/N
Sanitary quality:	Y/N
Regulatory agency with some degree of independence:	Y/N
Geographical score of regulation:	National/subnational

Environmental regulation

Environmental assessment of water and sanitation projects mainstreamed:	Y/N
Standards and regulations of environmental quality:	
- water quality standards:	Y/N
- contamination of water resources:	Y/N
- disposal of hazardous or toxic wastes:	Y/N
- disposal of liquid wastes:	Y/N
- disposal of solid wastes:	Y/N

Indicators of Energy

Access

Access to electricity network:	% of population
Households reporting access to electricity:	% HH
Rural:	% HH
Urban:	% HH
Households using as main cooking fuel:	
Modern fuels:	% total HH
Urban:	% total HH
Rural:	% total HH
Solid fuels:	% total HH
Urban:	% total HH
Rural:	% total HH

Affordabiity

Average electricity end-user prices:	
Residential:	US$/MWh
Commercial:	US$/MWh
Industrial:	US$/MWh
Spending on electricity:	% of HH expenditure
Spending on alternative sources of energy:	% of HH expenditure
Electric power consumption:	Kwh per capita
Expenditure in electricity per capita:	US$
Percentage of GDP per capita spent on electricity:	%

Quality

Electricity supply time:	Hours/day
Frequency of interruptions:	Number per consumer/year
Duration of interruptions:	Hours per customer/year

Technical dimensions

Energy production:	MWh
Electricity production:	MWh
Total net electricity generation:	Billion KWh
Net production by fuel type:	
Hydropower:	% of total production
Coal:	% of total production
Oil:	% of total production
Gas:	% of total production
Nuclear:	% of total production
Net electricity generation by type:	
Hydroelectric:	% of total generation
Conventional thermal:	% of total generation
Nuclear:	% of total generation
Geothermal, solar, wind and wood and waste:	% of total generation
Main energy source for households:	
Piped gas:	% of households
Gas in containers:	% of households
Coal:	% of households
Electricity:	% of households
Oil/kerosene:	% of households
Other/not stated:	% of households
Natural gas:	% of households
Firewood:	% of households
Liquified petroleum gas:	% of households
Kerosene:	% of households
Gasworks gas:	% of households
Electricity:	% of households
Charcoal:	% of households
Energy consumption per unit of GDP:	Kg of oil equivalent/1000 PPP GDP
Electricity transmissions and distribution losses:	% of total output

Fiscal costs

Public expenditure on energy, fuel and mines:	US$ millions
Total federal (is this word federal okay for international usage?) budget spending on energy:	US$ millions
Total federal budget spending on energy/GDP:	%
Private investment in energy:	US$ millions
Private investment in energy/GDP:	%

Financial autonomy

Return on equity:	%

Institutional development

Oil industry

Supply corporatized:	Y/N
Board of Directors autonomous from executive branch:	Y/N
Legislation requiring transparent and arm's length:	Y/N
Is this legislation implemented:	Y/N
Seasonality of supply quality:	Y/N
Seasonality of demand:	Y/N

Gas industry

Supply corporatized:	Y/N
Board of Directors autonomous from executive branch:	Y/N
Legislation requiring transparent and arm's length:	Y/N
Is this legislation implemented:	Y/N
Seasonality of supply quality:	Y/N
Seasonality of demand:	Y/N

Power industry

Supply corporatized:	Y/N
Board of Directors autonomous from executive branch:	Y/N
Legislation requiring transparent and arm's length (?):	Y/N
Is this legislation implemented:	Y/N
Seasonality of supply quality:	Y/N
Seasonality of demand:	Y/N

Market structure

Independent system operator:	Y/N
Single buyer:	Y/N
Bilateral contracting:	Y/N
Power pool:	Y/N

Industry structure

Vertical unbundling:	Y/N
Horizontal unbundling in generation:	Y/N
Horizontal unbundling in distribution:	Y/N

Economic regulation

Formal economic regulatory framework	
- For power:	Y/N
- For gas:	Y/N
- For oil:	Y/N
Regulatory agency with some degree of independence:	
- For power:	Y/N
- For gas:	Y/N
- For oil:	Y/N
Geographical scope of regulation:	
-Power and gas distribution:	National/subnational
- Power gas transportation:	National/subnational
- Power and gas production:	National/subnational
- For oil:	National/subnational

Environmental regulation

Environmental regulation for hydroelectric power generation:	Y/N
Environmental regulation for fuel power generation:	Y/N
- SO2 Control:	Y/N
- NOx Control:	Y/N
- Other:	Y/N
Environmental regulation for power transmission:	Y/N
Environmental regulation for gas pipeline:	Y/N
Environmental assessment of energy projects mainstreamed:	Y/N
Worker health and safety laws and regulations in gas manipulation:	Y/N

Indicators of Telecommunications

Access

Telephone subscribers per 100 inhabitants	
Main telephone lines per 100 inhabitants	
Cellular subscribers per 100 inhabitants	
Mainlines per 100 inhab. outside largest city	
International voice traffic:	Million minutes
Personal computers per 1000 inhabitants	
Internet users per 100 inhabitants	
Internet hosts per 100 inhabitants	
Number of Internet service providers	
Number of mail items posted per inhab.	
Total postal savings account deposits:	% of GDP
Radios per 1000 inhabitants	
Ownership in rural areas:	
- TV:	% of rural HH
- Radio:	% of rural HH
- Telephone:	% of rural HH
Ownership in urban areas:	
- TV:	% of urban HH
- Radio:	% of urban HH
- Telephone:	% of urban HH
Ownership:	

- TV:	% of HH
- Radio:	% of HH
- Telephone:	% of HH

Affordability

Cost of local phone call:	US$ per 3 mins
3 minute local call (peak rate)	
Cost of phone call to the US:	US$ per 3 mins
Cost of cellular local call:	US$ per 3 off-peak min.
Internet service provider access charges:	$ per 30 off-peak hours
Internet service provider access charges:	Monthly fee US$

Quality

Phone faults per 100 mainlines	
Unmet demand	

Fiscal costs

Total national spending on telecommunications:	US$ millions
ICT sector revenue:	US$ millions
Total telecommunication service revenue:	US$ millions
Postal net revenue:	SDR
ICT sector return on equity:	%

Institutional development

Independence of telecom regulator:	Y/N
Private ownership of telecom incumbent op.:	% of total capital
Local PSTN service competition:	Full, Partial, Monopoly
Mobile competition:	Full, Partial, Monopoly
International long distance competition:	Full, Partial, Monopoly
Leased phone lines competition:	Full, Partial, Monopoly
ISP competition:	Full, Partial, Monopoly
Monopoly threshold of item to be mailed:	grams

Environmental regulation

Environmental regulation for telecommunication projects:	Y/N
Environmental assessment of telecommunication projects mainstreamed:	Y/N
Engineering design specifications related to environmental factors:	Y/N

Urban Plan indicators

People

Total city population

Population density:	Per square km
Percentage of country's population	
Percentage of population that are children (0-14):	% of total
Percentage of population that are youth (15-24):	% of total
Percentage of population that are adult (25-64):	% of total
Percentage of population that are senior citizens (65+):	% of total
Male to female ratio:	# of males per 100 females
Population growth:	Annual %
Population Dependency Ratio (Employment Adjusted)	
Percentage of population that are new immigrants:	% of total
Percentage of population that are migrating from elsewhere in the country	

Housing

Total number of households	
Total number of occupied dwelling units	
Owned:	% of total
Rented:	% of total

Persons per unit:	Number per unit
Dwelling density:	Square km
Jobs/housing ratio	
Areal size of informal settlements as a percent of city area	
Green area (hectares) per 100,000 populations	
Mechanisms for enforcement; regulation, planning standards (building codes, zoning by-laws, informal):	Y/N
Percentage of land parcels with a registered title	
Population in rural areas:	% of total population
Population in urban areas:	% of total population
Population with durable structures:	% of total population
Population living in slums:	% of total population
Households that exist without registered legal titles:	% HH
Number of homeless:	People per 100,00 populations

Health

Total number of hospitals:	Number
Public:	% of total
Private:	% of total
All hospitals per 100,000	Number
Number of in-patient hospital beds per 100,000 population	
Health expenditure per capita:	US$
Government:	US$
Private sector:	US$
Sanitation facilities access:	% population
Rural:	% population
Urban:	% population

Education

Total number of schools:	Number
Public:	% of total
Private:	% of total
Primary schools:	Number
Public:	% of total
Private:	% of total
Secondary schools:	Number
Public:	% of total
Private:	% of total
Total spending on education:	US$
Government:	US$
Private sector:	US$
Educational facilities access:	% population
Rural:	% population
Urban:	% population

6 Common Phases of Infrastructure Programmes (Programs?)

1. Planning
   - Identify and address basic human needs
   - Analyse options based in experience, legal/regulatory framework, operational capacity and resources of the country and its partners:
   - Technical expertise
   - Material resources
   - Financial resources (capital and recurrent costs)
   - Political, social and environmental factors
   - Institutional environment (public and private utility, agency or firm
   - Legal or regulatory requirements
   - Sustainability
   - Make decisions involving all key actors (stakeholders, beneficiaries, government, regional and local partners)

2. Engineering
   - Apply standards
   - Conceptualize
   - Make judgments
   - Describe and specify

3. Construction
   - Administer contracts.
   - Use timelines, schedules and budgets to manage labour and materials.
   - Monitoring the implementation for its success.

Success factors for infrastructure projects implementation

- Projects should be demand driven and based on sound planning
- Sustainability depends on a proper legal/regulatory framework and effective institutions
- Procure competent partners and develop team attitude
- Keep a “project focus”- we are all in this together
- Trust is two-fold: competence and ethics