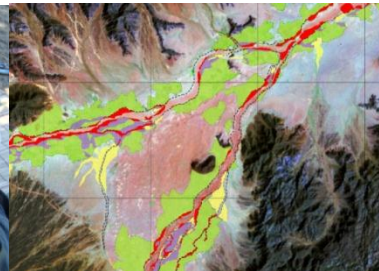
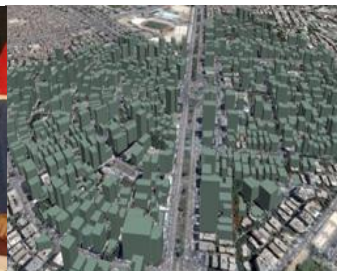




GeoVillage

Community Information Infrastructure

Putting Information and Communications
Technologies to Work for Local Community
Development





What is **GeoVillage** - Community Information Infrastructure?

GeoVillage is a conceptual framework for the planning, development, operation and sustainment of a locally-based information infrastructure to support sustainable and resilient community development. The infrastructure comprises several technical and organizational parts that fit together to put information and communications technology and GIS for development to work for local communities.

Linked together, a network of distributed GeoVillage nodes provides a scalable framework for shared information, best practices, and coordinated actions at the community, town, region and national levels that can be linked to other eGovernment, Spatial Data Infrastructure (SDI) and equivalent information sharing federations.

Many Issues, Many Information Communities, One Earth.....

100's of Environmental Information Networks

100's of Spatial Data Infrastructures

1000's of Data Federations

100's of National Mapping Organizations

100's of National Statistical Bureaus

100's of International Finance Institutions

Dozens of foundations

Dozens of Standards Organizations

**Need for national, regional and global information
infrastructure and coordinated efforts well
recognized**



Food & water
security

Economic
development

Poverty
elimination

Natural resource
management

Biodiversity
Conservation

Sustainable
Development

Climate change
Disaster planning &
response

Civil stability

Peace

Prosperity

Global Investment in Geospatial and Related Data is Immense...

Several billion dollars invested in the creation of geospatial data each year

~80% common objectives, principles and outcomes are almost the same

Many excellent efforts

No existing forum yet ties all these communities together

Need for more coordinated development efforts and information management and utilization well recognized



**Most formal information sharing initiatives
are focused at national and regional levels...**

**Many Spatial Data Initiatives (SDI) and data
federations in place in many countries**

**Focused on large regional policy
issues**

**Community development efforts
are local by definition**

**How to make SDI and ICT4D
relevant at the local level??**

**Need for locally relevant information
infrastructure ??**



Issue Statement

- Development projects often lack sufficient environmental, infrastructure and socioeconomic contextual and place-specific information to properly condition, design, and monitor local projects effectively
- Much information that is needed in common is collected by different government and non-government entities in the development community for individual projects and programs and at different levels (village to region), but few mechanisms in place to share information across the community, or to even to repatriate information to beneficiaries for future use
- Informal economies in many countries in transition are as important, if not more important than the formal economy, but few policy or infrastructure responses in place to leverage this latent resource base
- Keeping communities proactively engaged in defining local needs and informed in regards to development initiatives in their communities is fundamental to transformative change

Issue Statement

- Focused and coordinated development approaches needed to take maximum advantage of the limited resources available
- Many enabling technologies becoming more accessible, affordable, and familiar
- Many innovative applications of information and communications technology arising all over the developing world
- Lessons learned from Spatial Data Infrastructure (SDI), Information and Communications Technology for Development (ICT4D), and crowd-sourcing programs and initiatives around the world provide important foundations for a new kind of infrastructure –

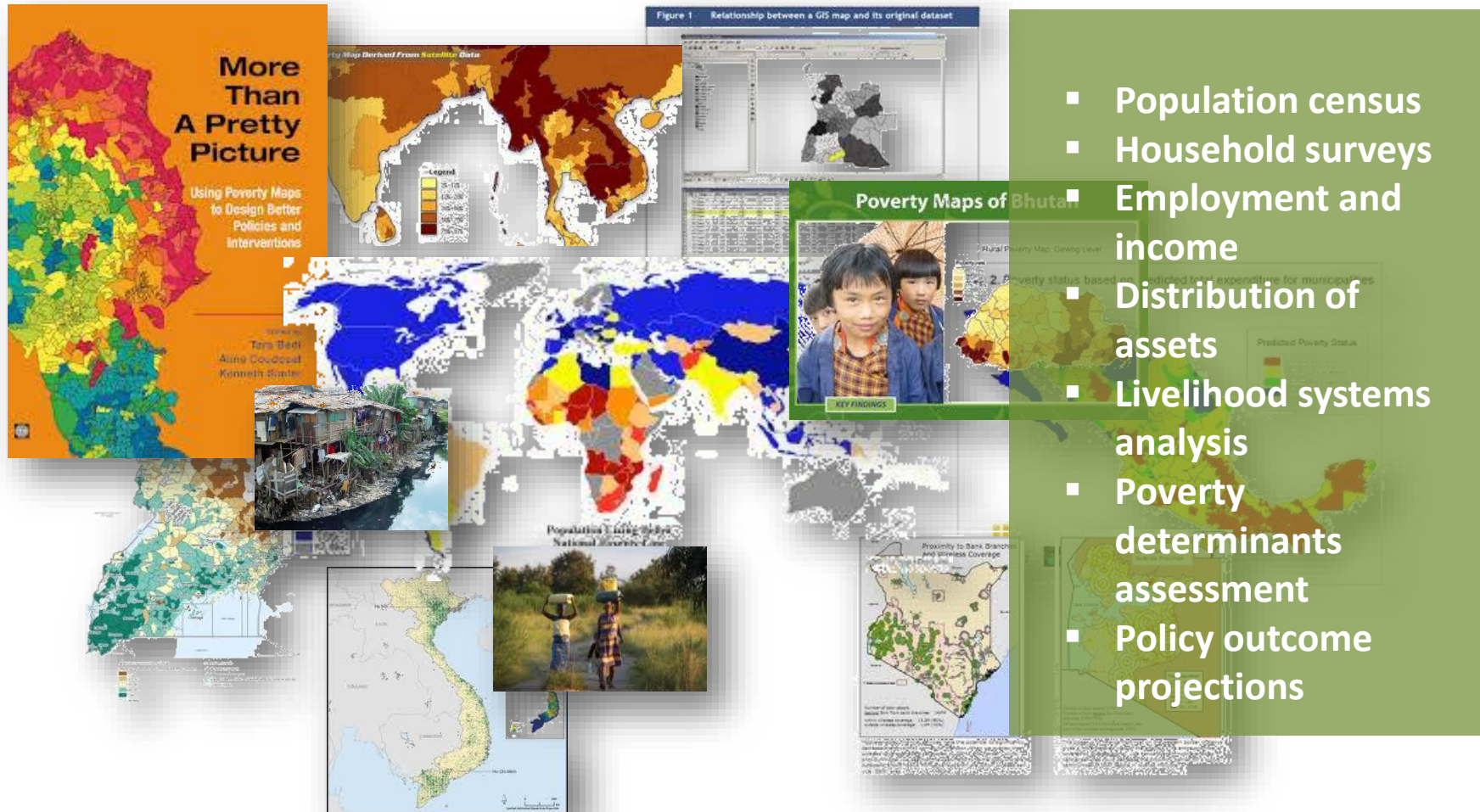
GeoVillage - community information infrastructure



How is **GIS** and **ICT** technology being used in the International Development field today?

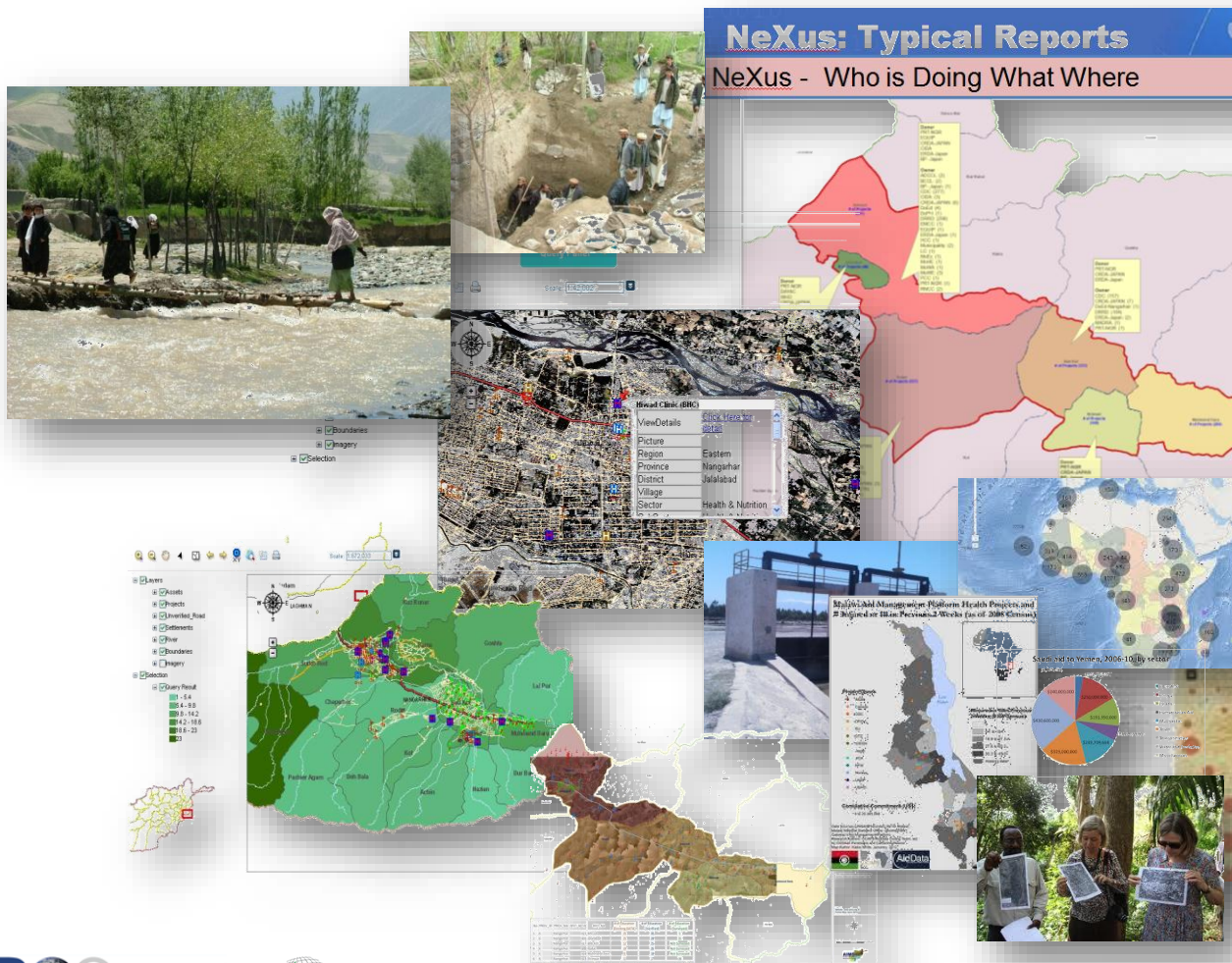
Poverty Mapping

Poverty mapping and related socioeconomic geostatistics are being used extensively to develop better targeted poverty alleviation interventions



Project Monitoring and Evaluation

GIS provides a critical capability for tracking development projects, monitoring and assessing their impacts, individually and cumulatively.



- 
- Project location and meta-information
 - Feasibility studies
 - Project planning and design
 - Project monitoring and reporting
 - Environmental impact assessment
 - Social safeguards compliance
 - Post project operations and maintenance

How is GIS technology being used in the International Development field today?

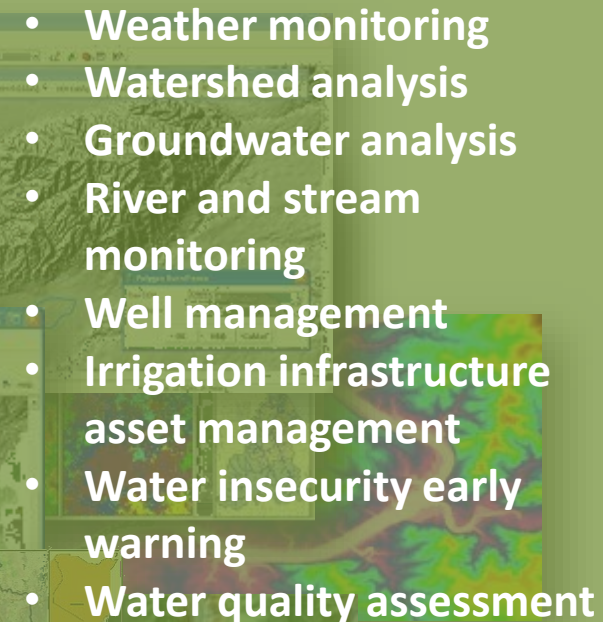
Agriculture and Food Security

GIS can be used to help optimize arable land and agricultural resources and infrastructure for sustainable and resilient food production and security



- Agricultural suitability assessment
- Food insecurity assessment
- Farm planning and design
- Precision agriculture
- Crop monitoring and assessment
- Early warning assessment
- Coop asset management
- Farm extension management

Water Security

- 
- Weather monitoring
 - Watershed analysis
 - Groundwater analysis
 - River and stream monitoring
 - Well management
 - Irrigation infrastructure asset management
 - Water insecurity early warning
 - Water quality assessment

How is GIS technology being used in the International Development field today?

Humanitarian Assistance

Natural disasters, military conflicts, political upheaval have a disproportionately greater impact on the poorest people in any country. GIS provides tools for identifying, conducting and tracking humanitarian assistance.



- Humanitarian assistance asset management and tracking
- Management of Internally Displaced People (IDP's)
- Supply chain tracking
- Relief effort planning and operations
- Security assessment and operations
- Inter-agency coordination

How is GIS technology being used in the International Development field today?

Cadastral Survey and Land Registration

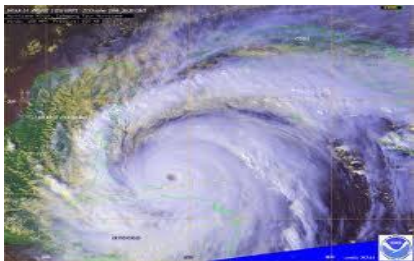
Secure property rights support economic growth, social stability, encourage investment in infrastructure and land improvements and other societal benefits. GIS provides tools to establish and manage property boundaries and titles.



- Property boundary survey and mapping
- Land title preparation
- Informal land use mapping
- Computer assisted tax appraisal
- Land use regulation and monitoring
- Land suitability assessment
- Property management
- Land allocation and reapportionment

How is GIS technology being used in the International Development field today?

Disaster Management

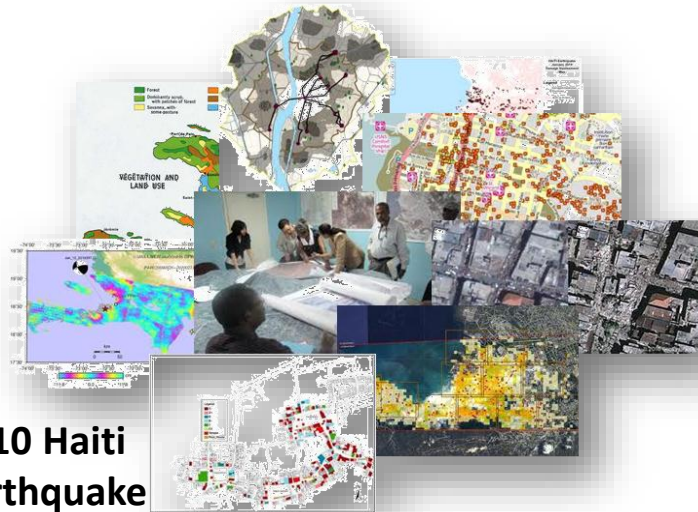


- Natural hazard assessment
- Resources at risk assessment
- Contingency plan preparation and drills
- Disaster response support
- Post-disaster recovery
- Disaster resistant community planning and design



How is GIS technology being used in the International Development field today?

Disaster Management

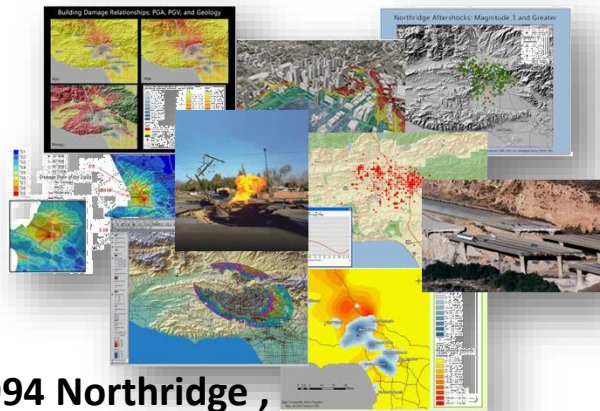


2010 Haiti Earthquake



2004 Banda Aceh Tsunami

GIS has been used extensively to aid in responses to nearly every major natural disaster since the early 1990's



**1994 Northridge ,
USA Earthquake**



2011 Horn of Africa Famine

How is GIS technology being used in the International Development field today?

Demining

GIS provides a critical capability for the inventory, prioritization and tracking of mine removal and maintaining community safety.



- Mined area mapping
- Mine removal prioritization and tracking
- Field data collection
- Field crew tracking and reporting
- Security management
- Public awareness and safety

Total number of land-mines
110 million in 64 countries

Human cost of land-mines
800 deaths a month, mostly innocent civilians, with thousands more maimed for life

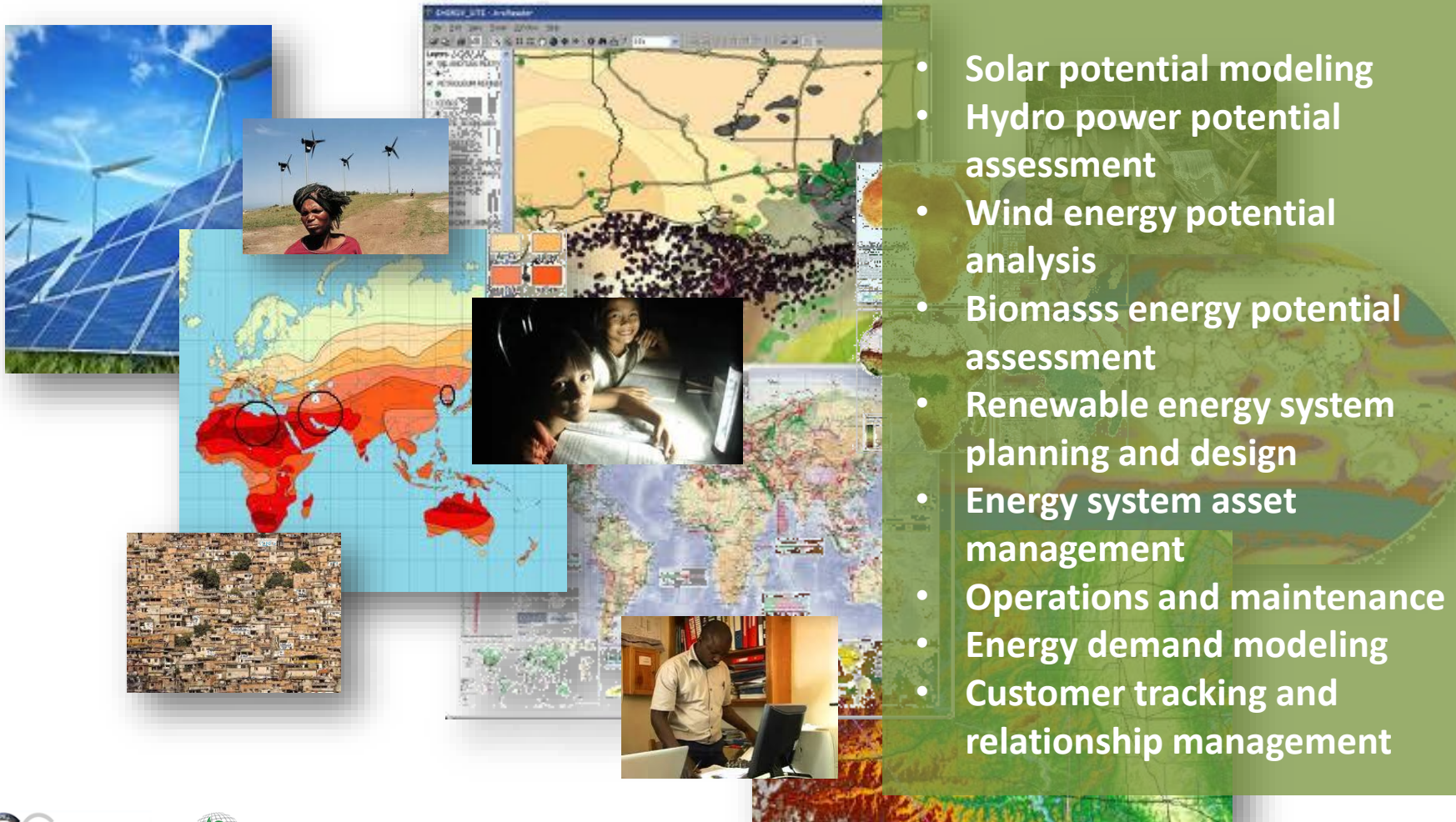
Dollar cost of land-mines
To buy one: \$3-\$10
To remove one: \$300-\$1,000

COUNTRY	TOTAL MINES
Afghanistan	10,000,000
Angola	15,000,000
Austria	-
Azerbaijan	100,000
Belarus	-
Belgium	-
Bosnia and Herzegovina	3,000,000
Burundi	-
Cambodia	6,000,000
Chad	70,000
China	10,000,000
Costa Rica	-
Croatia	8,000,000
Cyprus	16,942
Czech Republic	-
Democratic Republic of the Congo	-
Denmark	6,900
Egypt	-
Ecuador	60,000
El Salvador	23,000,000
France	10,000
Germany	1,000,000
Ghana	500,000
Greece	25,000
Honduras	150,000
Hungary	1,500
India	35,000
Indonesia	16,000,000
Israel	10,000,000
Italy	204,193
Japan	-
Jordan	17,000
Kazakhstan	8,785
Korea	18,210
Kuwait	-
Laos	-
Latvia	-
Lithuania	-
Madagascar	-
Malaysia	-
Maldives	-
Mali	-
Mexico	-
Moldova	-
Mongolia	-
Montenegro	-
Myanmar	-
Namibia	-
Netherlands	-
Nicaragua	-
Norway	-
Oman	-
Pakistan	-
Panama	-
Paraguay	-
Peru	-
Romania	-
Russian Federation	-
Rwanda	250,000
Senegal	-
Slovenia	-
Somalia	1,000,000
Sri Lanka	-
Sudan	1,000,000
Syrian Arab Republic	-
Tajikistan	-
Thailand	-
Tunisia	-
Turkey	-
Uganda	-
Ukraine	1,000,000
Viet Nam	3,500,000
Yemen	100,000

How is GIS technology being used in the International Development field today?

Renewable Energy

GIS is being used widely to identify and assess renewable energy resources all over the world, from global to local analysis



- Solar potential modeling
- Hydro power potential assessment
- Wind energy potential analysis
- Biomass energy potential assessment
- Renewable energy system planning and design
- Energy system asset management
- Operations and maintenance
- Energy demand modeling
- Customer tracking and relationship management

How is GIS technology being used in the International Development field today?

Post Conflict Reconstruction

Redevelopment and security are critical to sustainable post-conflict reconstruction and stabilization. GIS provides effective tools for prioritizing and managing reconstruction efforts

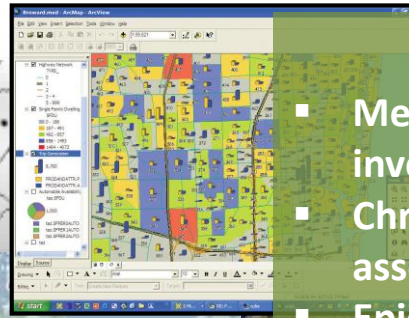


- Internally displaced person (IDP) camp siting and management
- Food and shelter distribution
- Security management
- Demolition and clearing management
- Property and housing rights
- Reparations calculation
- Reconstruction project tracking and evaluation

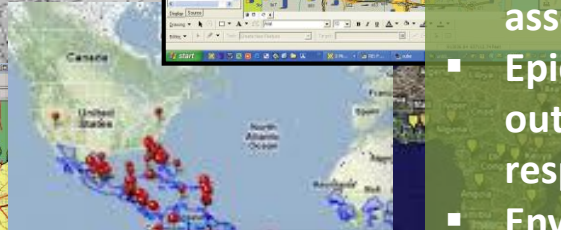
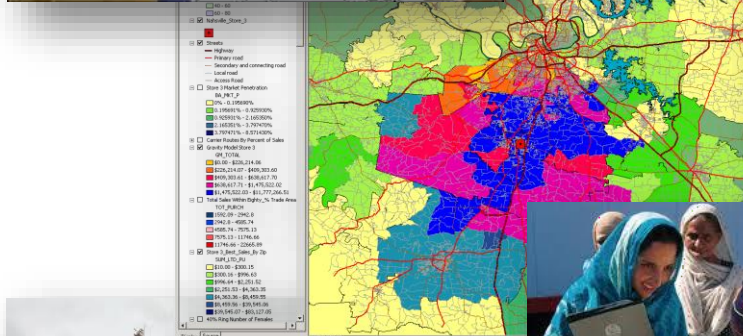
How is GIS technology being used in the International Development field today?

Health and Human Services

GIS provides powerful tools for health management, including the tracking and response to chronic and communicable diseases, among other matters.



- Medical facility inventory
- Chronic disease assessment
- Epidemiology and outbreak tracking and response
- Environmental health
- Field health worker tracking
- Mobile clinic mgmt
- Remote diagnosis
- Ambulance routing and tracking



How is GIS technology being used in the International Development field today?

Education

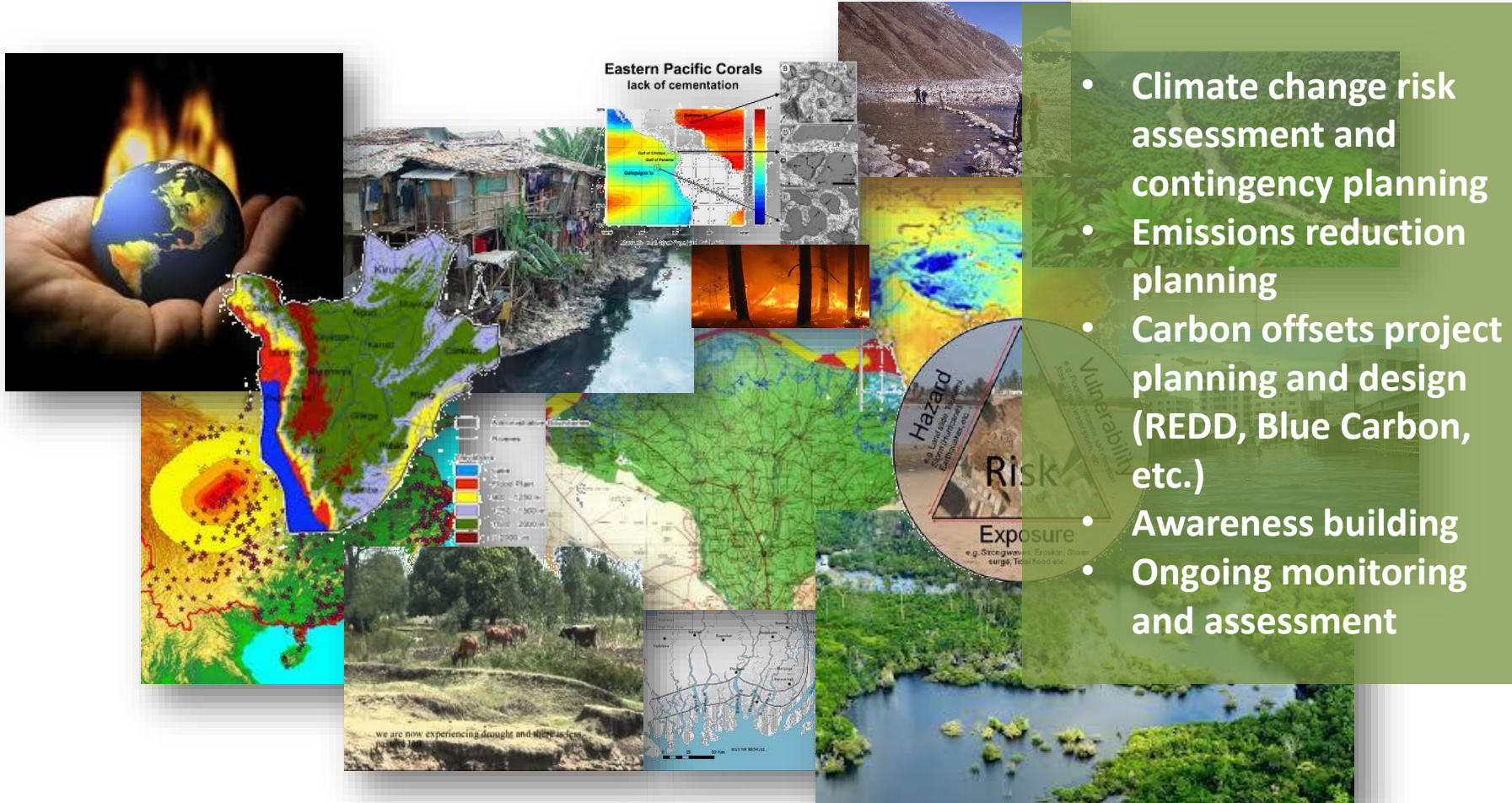
GIS can be incorporated to nearly every field and level of education, thus providing important problem solving skills and employment opportunities



- Technical training
- K-12 geographic science
- On the job GIS training
- Higher education and spatial thinking and problem solving
- Applied research in all sectors
- Citizen engagement and awareness building
- Career development for continuing education
- International engagement in education at all levels

Climate Change

GIS provides a critical capability for the inventory, prioritization and tracking of mine removal and maintaining community safety.



Environmental Conservation

GIS has been used for many years all over the world for protection of natural and cultural heritage and community-based conservation



- Habitat mapping and analysis
- Community-based conservation
- Protected areas management
- Endangered species monitoring
- Environmental monitoring
- Environmental Impact Assessment

How is GIS technology being used in the International Development field today?

Governance and Democracy

GIS supports effective governance and promotion of democratic principles, especially when open data policies are adopted



- Election monitoring
- Public polling and opinion measurement
- Public awareness building
- Social networking
- Multi-dimension public information exchange
- Opinion trend monitoring
- Stakeholder information management

How **can** GIS technology be used in the International Development field today **and tomorrow**? **Green Economy**

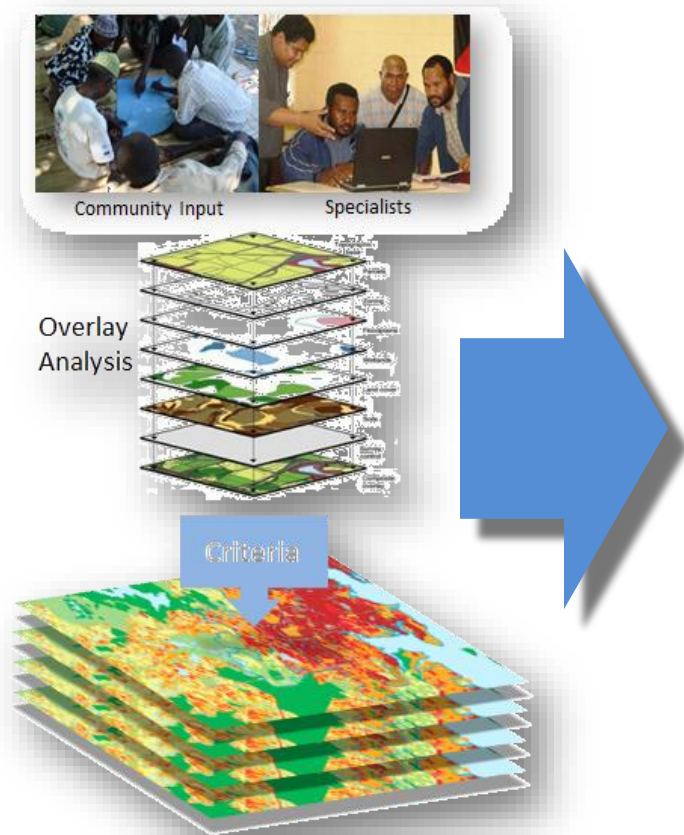
GIS provides the tools to understand and assess the intersection of local and regional natural and socioeconomic systems, and to plan and develop communities and economies that can evolve in ways that are sustainable, resilient and adaptable to disruptive change, and supportive of human and ecological well-being and social equity.



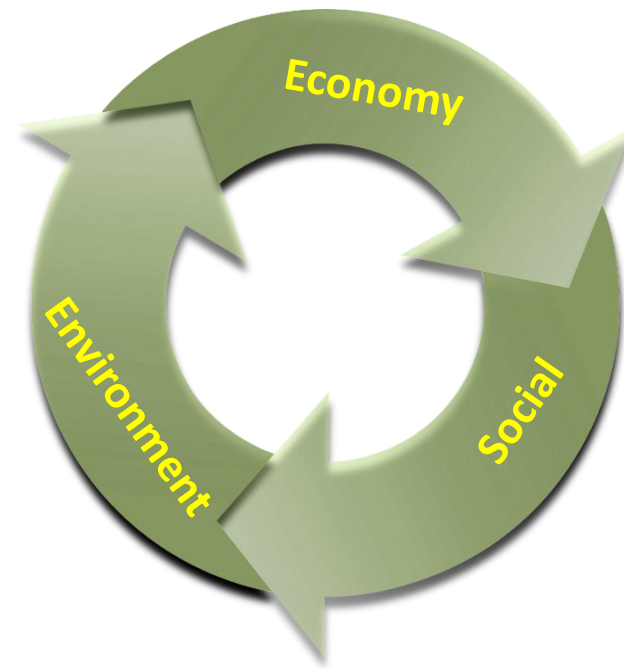
- Optimize utilization of local natural resources and ecosystem services
- Provide opportunities for sustainable economic development and growth
- Minimize impacts to local ecosystems
- Support social equity
- Minimize and mitigate risks, while maximizing opportunities
- Provide evidence based monitoring and evaluation as basis for ongoing adaptive management

How **can** GIS technology be used in the International Development field today **and tomorrow**?

GIS provides the tools to understand and assess the intersection of local and regional natural and socioeconomic systems, and to plan and develop communities and economies that can evolve in ways that are sustainable, resilient and adaptable to disruptive change, and supportive of human and ecological well-being and social equity.



Is increased ICT for development at village scale feasible??



What challenges??

GeoVillage

Community Information Infrastructure

Perception #1 - *“There is no local information available....”*

Experience suggests that in most cases there is vastly more information existing than most people realize because it is scattered across many agencies and in many different forms.

Fundamental Data Uncovered Through Data Inventory and Assessment Activity

Program	# Document Sets	# Entities
Libya	1800	17
Afghanistan	800	7
Lebanon	450	13
Abu Dhabi	500	10

- Wide variety of data often available in different government and commercial sources
- Sector-specific data from local government sources
- International organizations
- NGO's and charitable organizations
- Private companies (international and local)
- Declassified information from security and military sources
- Crowd-sourced information (e.g. USHAIDI, Open Street Map, etc.)

GeoVillage

Community Information Infrastructure

Perception #2 - "The people are not ready for technology....."

Enabling Technologies



Global Positioning Satellites (GPS)

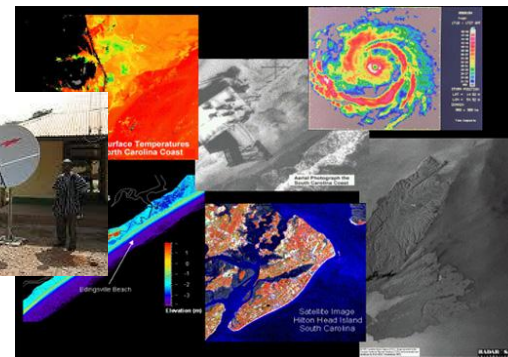


Cloud Computing

- Cell phones outpacing electrification in many parts of the world
- Mobile devices increasingly able to connect to Internet and are location-aware
- Mixed media can provide access for semi-literate
- Communications infrastructure seen as development priority in most countries
- Cloud computing reducing need for heavy local computing resources
- Distributed options for local renewable energy sources becoming more feasible

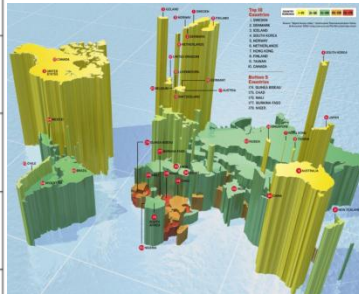
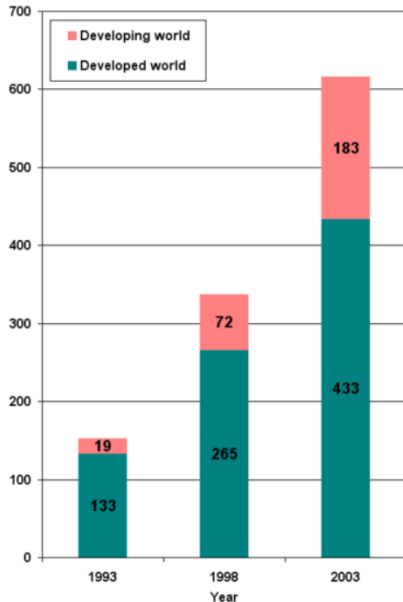


Global Telecommunications



Community Information Infrastructure

Perception #3 - “Technology is expensive……”



- Price of basic computers has declined drastically while capabilities have soared
- ICT4D bringing lots of low cost, appropriate tech solutions in response to real world needs
- Education systems at all levels in most parts of the world incorporating computing at some level

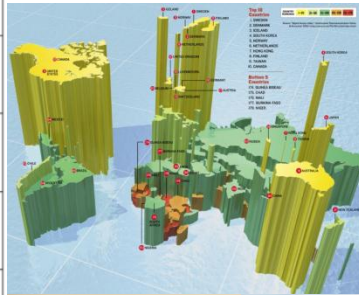
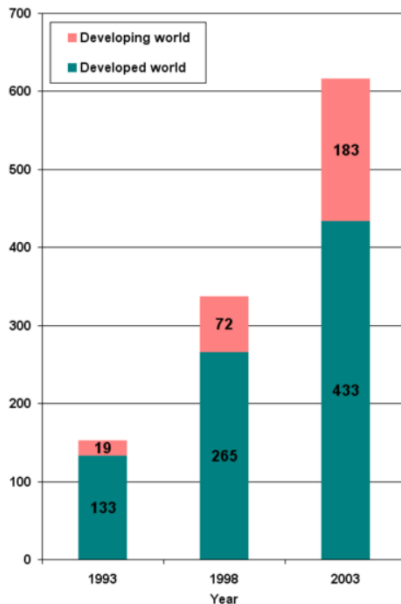


GeoVillage

Community Information Infrastructure

Perception #4 - "Change is difficult....."

Personal computers (million), source: ITU



- Cell phone adoption faster than any other technology adoption in history;
- Mobile telephony and basic computing in wide usage in the developing world and growing rapidly;
- Basic technology only requires basic literacy, but encourages increased literacy and technology familiarity through usage for practical purposes.

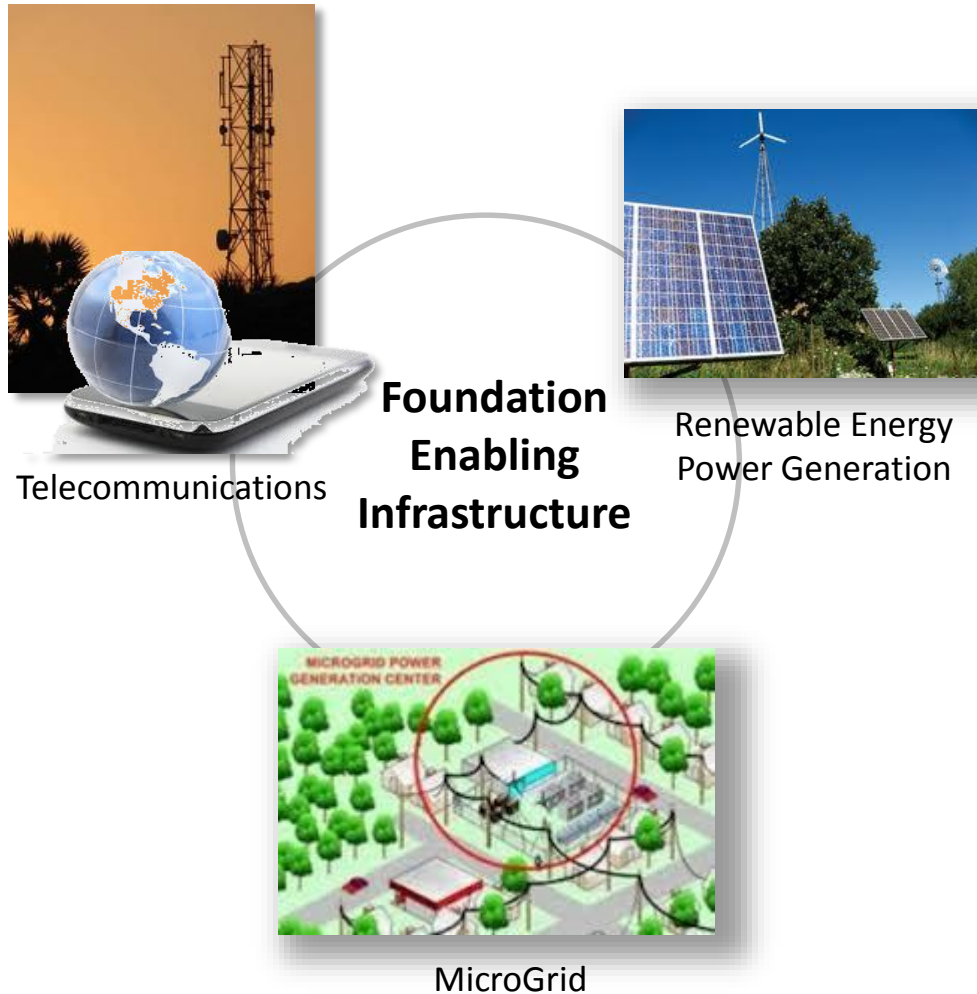


GeoVillage Services

- gvVIEW - Geographic Information System (GIS)
- gvPROJECT - Project management and monitoring system
- gvNET – Mobile Phone, Internet, Email, and VoIP
- gvCOMMUNITY – Local community website
- gvSUCCEED - Best practices and success stories Wiki
- gvFINANCE - Access to microfinance networks
- gvPAY – Electronic payment services
- gvTRADE – Market prices, barter, exchange, local and export sales
- gvJOBS – Employment opportunities
- gvHEALTH – Remote health network services
- gvLEARN – Remote learning network services
- gvGROW – Remote agriculture extension services

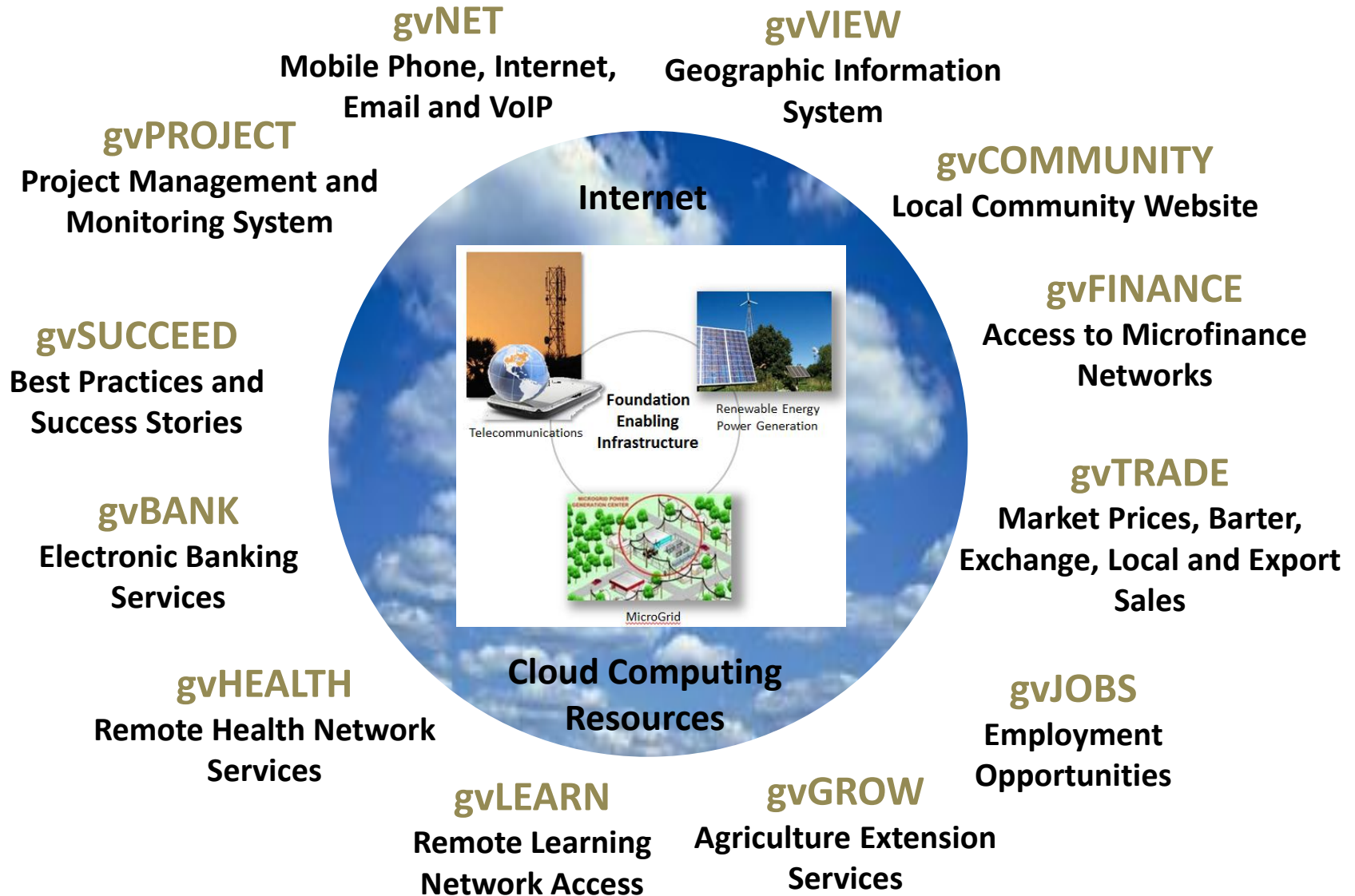
GeoVillage

Community Information Infrastructure



GeoVillage

Community Information Infrastructure

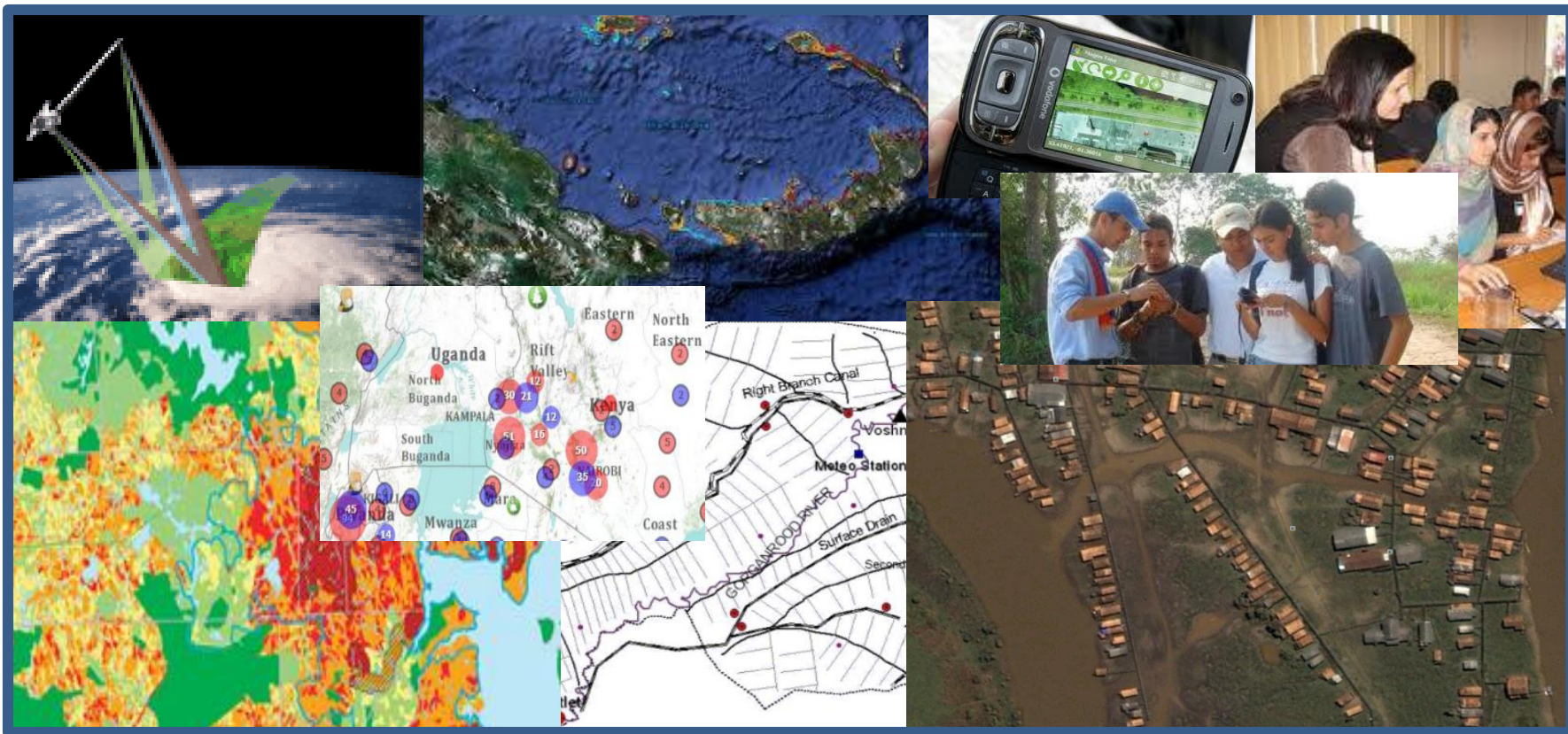


GeoVillage

Community Information Infrastructure

gvVIEW

Geographic Information System



**Better information for better
development decisions**

Regional and Local Assessment

Data Collection, Compilation, Integration

Existing Government Sources

- NMO - National mapping for general context
- CSO - Population and socioeconomic
- FAO - Land use and land cover
- MoM - Infrastructure
- EPA - Surface hydrology (rivers, streams, etc.)
- EPA - Soils and surficial geology
- Landform (may be derived from digital topo)
- WMO - Climate and weather (temp., precip., etc.)
- Others, including data from other governments

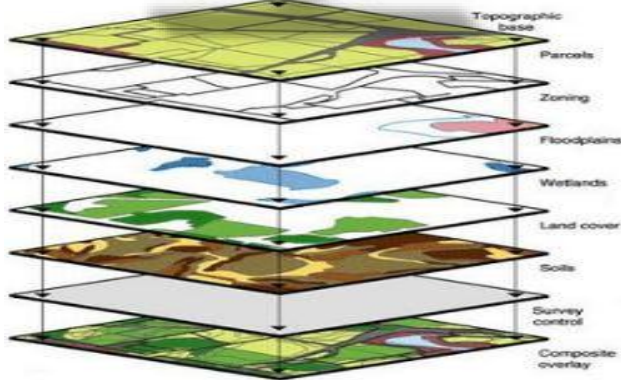
Non-Government Sources

- Humanitarian Information Centres (HIC's);
- NGO's
- Multilateral Development Banks
- Bilateral AID Agencies

Original

- High resolution Imagery from various sources
- Field data collection
- Crowd Sourced (e.g. USHAIDI)

Conversion



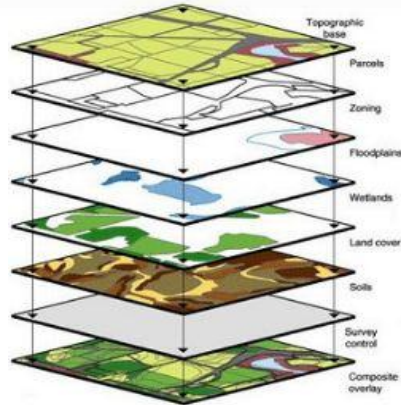
*Wide variety of data can often be mined from a
variety of sources*



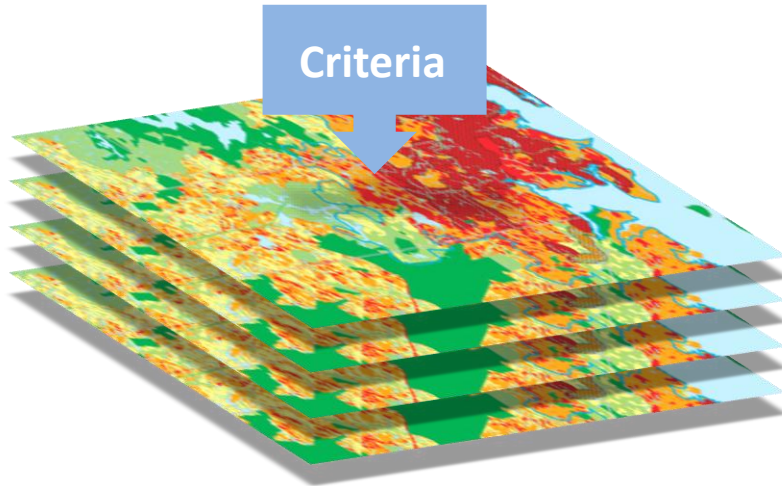
Community Input

Specialists

Overlay
Analysis



Criteria



Better information for better
development decisions

Regional and Local Assessment

Development Constraints and Opportunities

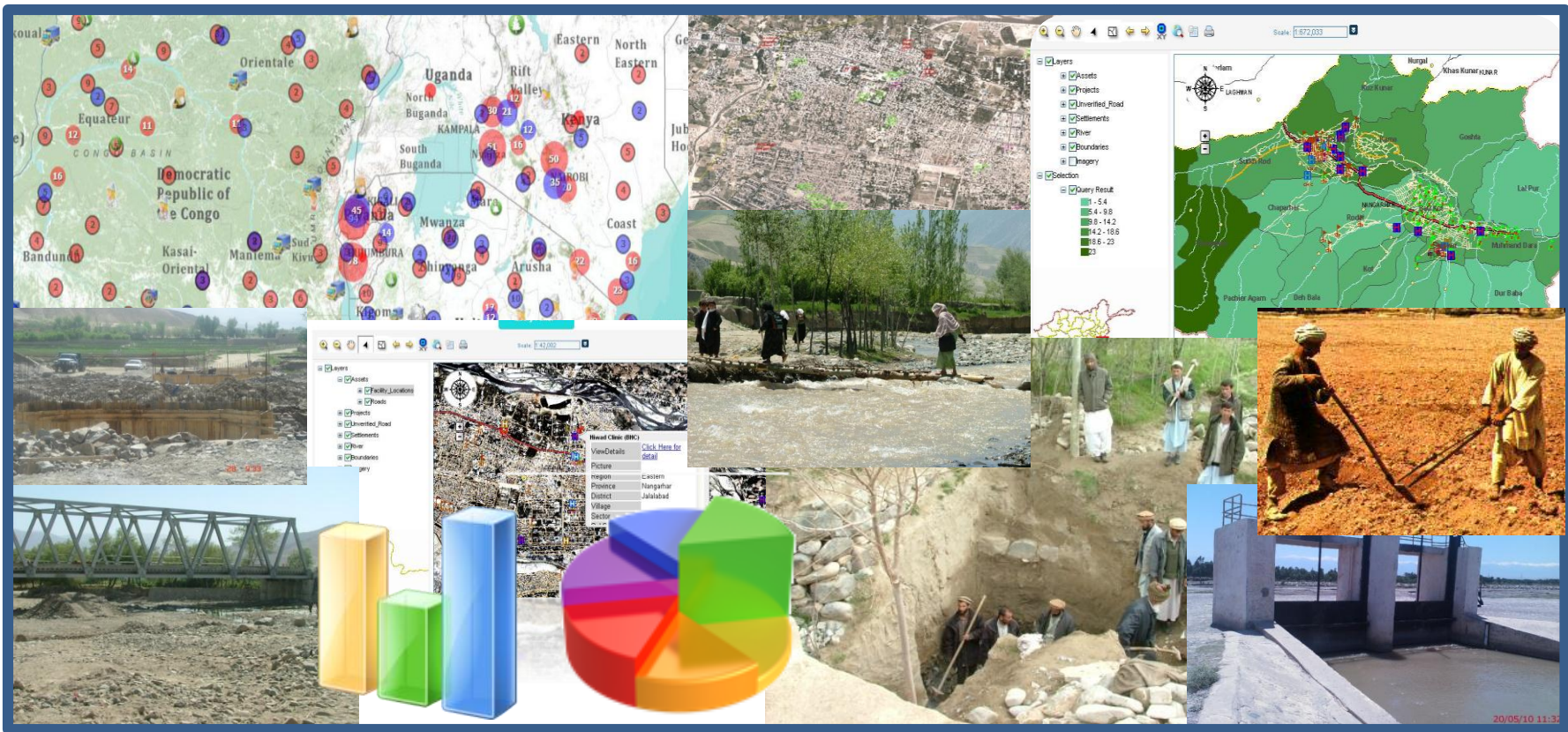
- Deforestation and Land Degradation
- Land Use Change (urban and rural)
- Erosion and Sedimentation
- Proximity to existing infrastructure (roads, electricity, telephone, etc.)
- Proximity to existing community facilities
- Proximity to existing protected areas
- Agroecological zones
- Climate change risk assessment
- Ecological value (biodiversity and ecosystem services)
- Urban development suitability
- Security conditions (mines, insurgents, etc.)

GeoVillage

Community Information Infrastructure

gvPROJECT

Project Management and Monitoring System



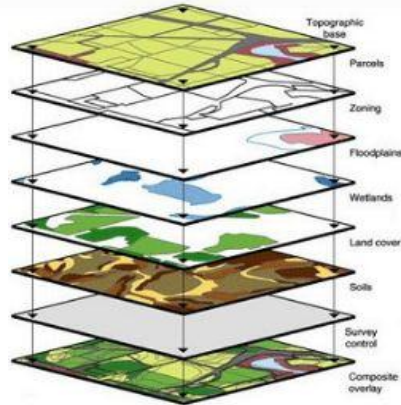
**Better information for better
development decisions**



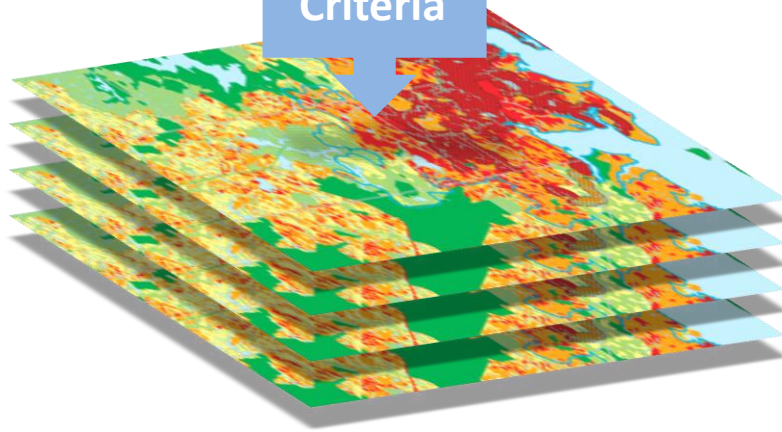
Community Input

Specialists

Overlay
Analysis



Criteria



Project Formulation

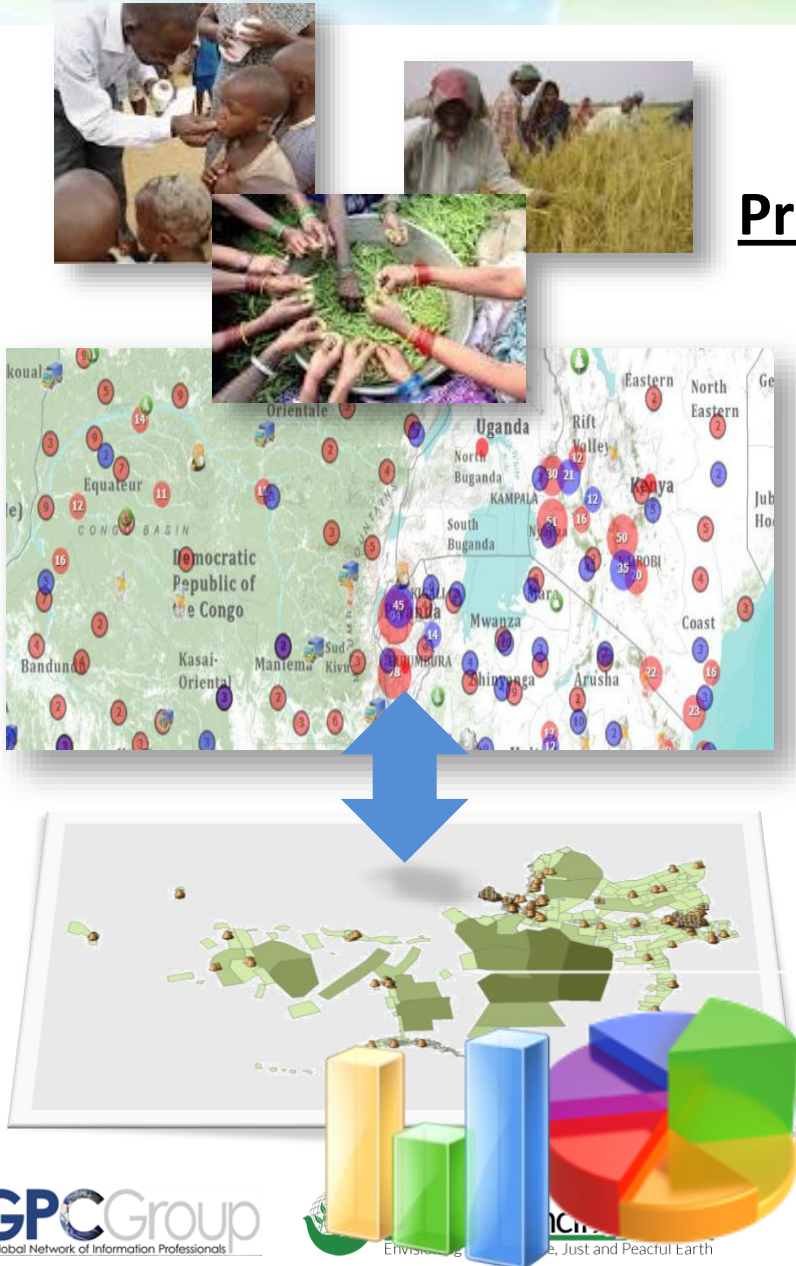
- Community Driven Development engagement
- What and where are the most critical needs?
- What projects to be implemented, where, and what outcomes expected?
- What related projects already active in this or related area?
- What environmental and social safeguards must be addressed?
- What risks and how best mitigate?
- What is the type and geographic extent of the intended outcomes of the project?

**Better information for better
development decisions**

Regional and Local Assessment

Project Management

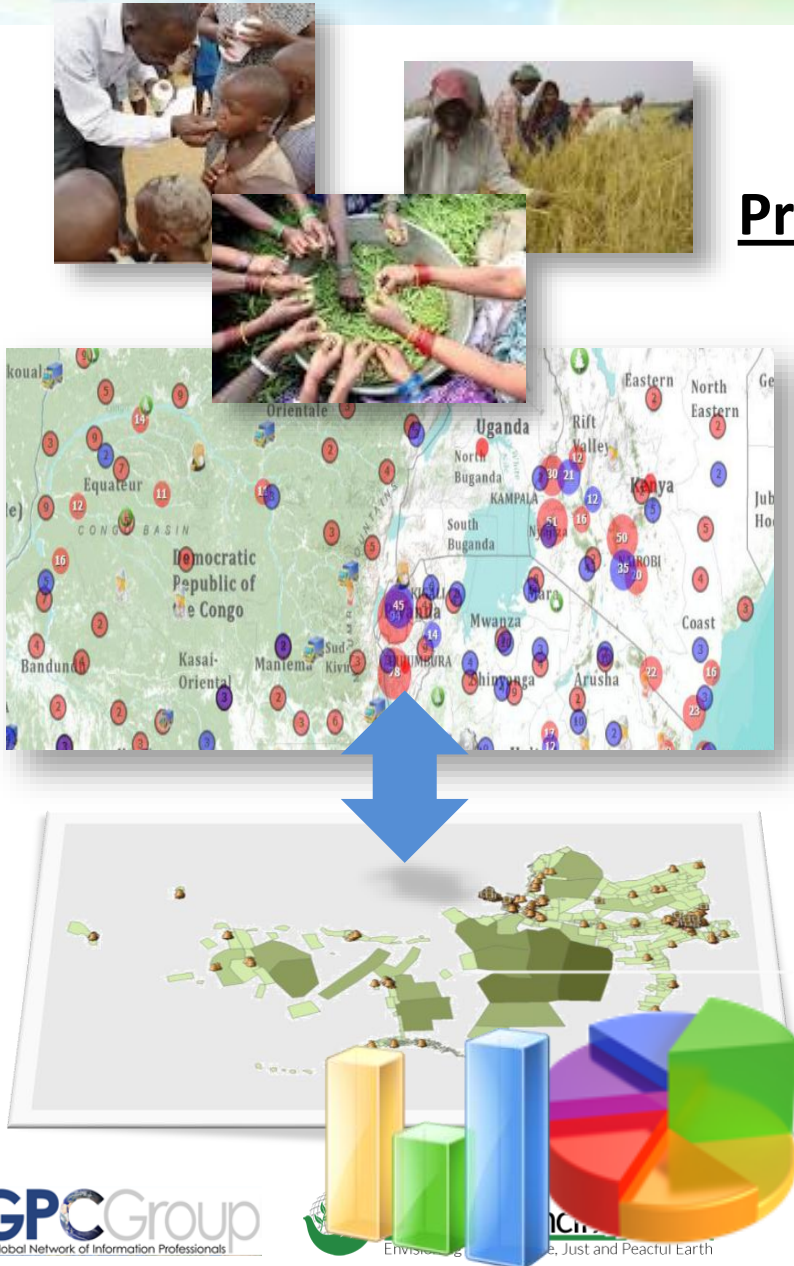
- What project status?
- What project resources are distributed where, and when?
- Streamlining of periodic project progress reporting.
- What opinion of local communities about projects?
- What project outcomes achieved?



Better information for better
development decisions

Regional and Local Assessment

Project Monitoring and Assessment



- What projects active, by whom, and what status?
- What opinion of local communities about projects?
- What historical projects in the area?
- What proposed projects pending for the area?
- What project outcomes achieved?
- What cumulative outcomes of multiple projects?

Community Information Infrastructure

Community Information Infrastructure

gvNET

Mobile Phone, Internet, Email and VoIP



gvNET

Internet, Email and VoIP

- Mobile phone service with SMS
- Internet connectivity
- Email account provision
- VoIP access for international calls

Arrangement would need to be made with appropriate Telco provider, who is either already providing such services, or that would be incorporated to the Telco/Electrical service provider partnership as described elsewhere

Community Information Infrastructure

Local Community Website



gvCOMMUNITY

Local Community Website

- Represent local issues and provide community information that is internally significant, as well as other information that may be useful and interesting to others in the region or internationally for touristic or other purposes
- Website could act as a “portal” to other gv services

GV Service providers provided with templates and showcase example local community websites as a starting point.

GeoVillage

Community Information Infrastructure

gvSUCCEED

Best Practices and Success Stories



gvSUCCEED

Best Practices and Success Stories

- Provide a Wiki-based framework for compiling, searching and accessing relevant success stories, best practices and the like
- Focus on subject areas, issues and technologies that are relevant to community development

International framework, with capability for localization, addition and refinement by gv service provider. Selected local extensions could then also be folded into the international archive where these have the potential to be of more general interest to others in other communities and regions.

GeoVillage

Community Information Infrastructure

gvFINANCE

Access to Microfinance Networks



gvFINANCE

Access to Microfinance Networks

- Many channels for microfinance now available across the world
- Provide an online application to identify which microfinance institutions may be appropriate for a given need, as well as tutorials, help guides and models for how to prepare and submit funding requests

Establish a working relationship with selected microfinance institutions to gain special acknowledgement for gv subscribers

GeoVillage

Community Information Infrastructure

gvPAY

Electronic Payment Services



gvBANK

Electronic Payment Services

- SMS or online transactions, with secure authentication
- Reduce transaction costs to financial institutions
- Reduce transaction costs to remote customers (avoid half-day travel to physical bank, reduce security risks)

Establish a working relationship with selected online payment institutions to gain special acknowledgement and account rates for gv subscribers.

Community Information Infrastructure

Community Information Infrastructure

gvTRADE

Market Prices, Barter, Exchange, Local and Export Sales



gvTRADE

Market Prices, Barter, Exchange, Local and Export Sales

- Establish mechanism for tracking and publishing market prices for common products. Local in this case would refer to logical economic market areas for local subsistence use
- Provide an online market that in addition to cash sales can also accommodate barter and exchange transitions
- For selected products, provide a framework for connecting local primary producers with consolidators or regional and international export sellers. Focus on fair trade channels and other avenues that protect the interests of primary producers

Tap into existing local, regional and international sales networks, access to transportation and supporting consolidation and storage infrastructure, wholesaler networks, and fair trade promotion enterprises.

Community Information Infrastructure

Employment Opportunities



gvJOBS

Employment Opportunities

- Local and regional employment boards (long term, temporary and seasonal)
- Job training opportunities
- Online job opportunities

Community Information Infrastructure

Remote Health Network Services



gvHEALTH

Remote Health Network Services

- Access to health information networks and resources
- Remote consultation and diagnosis
- Epidemiological reporting
- Environmental health and chronic disease reporting
- Access to clinics and mobile facilities
- Access to medical supply material
- Emergency response support

gvLEARN

Remote Learning Network Access

- Connect to education networks at various levels
- Access to online teaching and learning resources
- Trade school and certificate programs
- Connecting schools and teachers for professional and cultural exchange
- Home school options
- ADD

gvGROW

Remote Agriculture Extension Services

- Support existing field extension services
- Connectivity across agricultural communities and professional extension officers
- Forum for sharing issues, ideas and best practices
- Access to infrastructure, markets, finance, and banking
- ADD

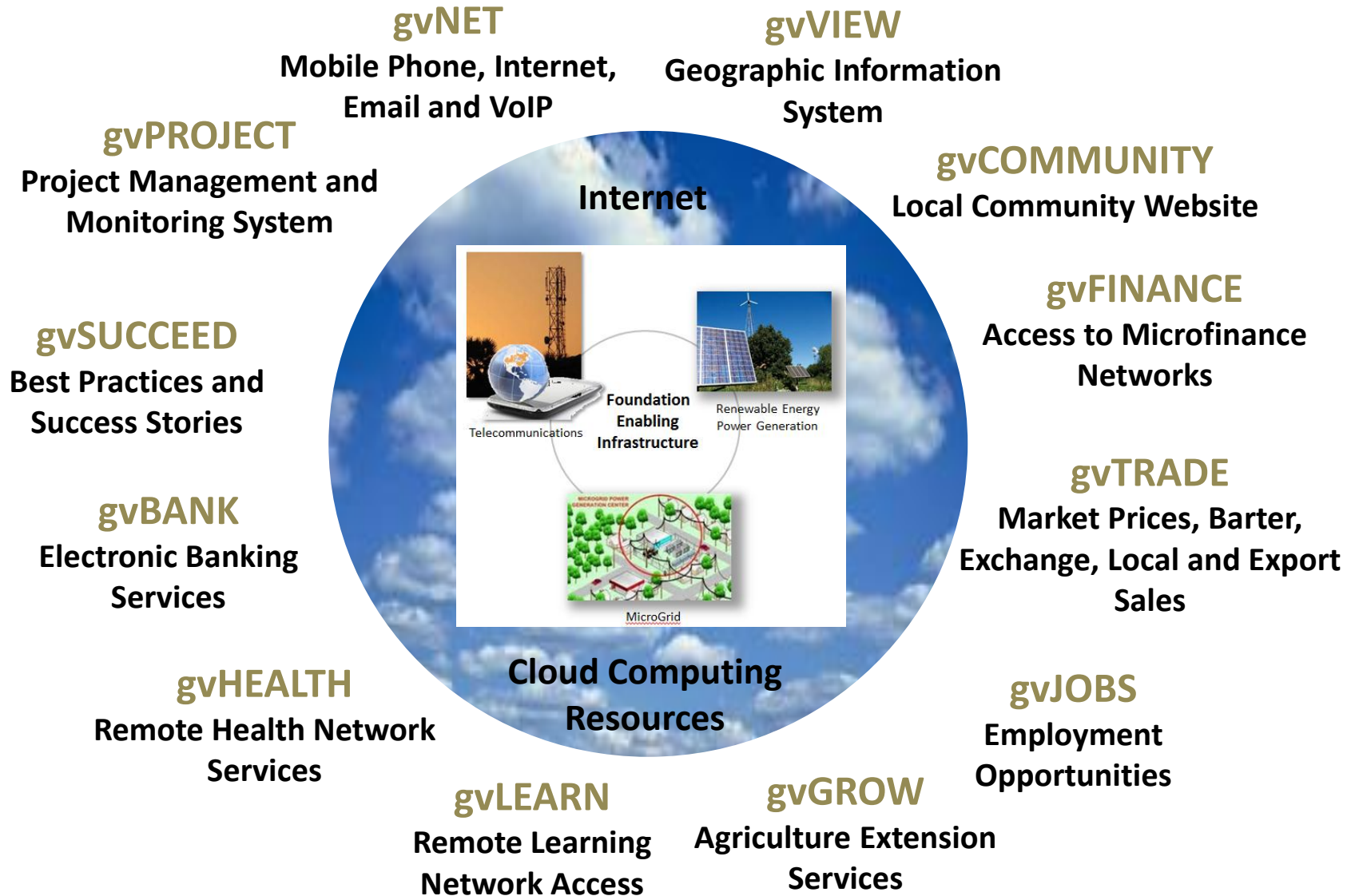
GeoVillage

Community Information Infrastructure



GeoVillage

Community Information Infrastructure



GeoVillage

Community Information Infrastructure



GeoVillage

Community Information Infrastructure

Infrastructure Components

Mobile Telephony
and Internet
Infrastructure

GeoVillage
Community Nodes

Renewable Energy
Power Plant

Content

Electrical Distribution
System

Business model and
governance

Cloud Server

GeoVillage

Community Information Infrastructure

GeoVillage Service Entity Options

NGO

PPP

Government

Company

GeoVillage

Community Information Infrastructure

Who Benefits?

Local Communities

Donor agencies

- Multilateral lenders
- Bilateral aid agencies
- Foundations

Government

- Governance from local to national
- Commercial sector
- Education sector
- Environmental sector
- Health sector

Investors

- Sovereign funds
- Private and institutional investors
- Banks
- Microfinance institutions and investors

Private sector

- Formal
- Informal

CII Implementation

Community Driven Development engagement process

Incremental, and focused on foundation capacity and highest priority needs

Choose logical area of interest – confluence of:

- Social area of influence
- Economic area of influence
- Ecological area of influence
- Scope extent (geographic area, resource limitations, time limitations, political limitations, local support limitations)

Inventory and assess existing conditions

Identify and assess development issues, opportunities and constraints

CII Implementation

Track 1 – GeoVillage/CII Program Planning

- Situation Assessment and Requirements Analysis
- Data Inventory and Assessment
- Program Design and Implementation Plan

Track 2 – Regional Level Assessment

- Prepare Basic GIS Database
- Conduct Regional Level Issues, Opportunities and Constraints Assessment
- Program Design and Implementation Plan

Track 3 – Community Level Analysis

- Conduct Orientation Seminar
- Conduct Community Level Interviews
- Develop Community Level CII Database
- Establish Local Node Infrastructure
- Monitor Funded Projects

Track 4 – Capacity Building, Education and Public Outreach

- Train the Trainers Program
- Develop eCommunity Website
- Develop Best Practices and Success Stories Wiki