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URBAN MIS-GIS DATABASE SYSTEM FRAMEWORK

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URBAN MIS-GIS DATABASE SYSTEM FRAMEWORK

1.0 INTRODUCTION

The Urban MIS-GIS Database Framework System shall be oriented towards the requirements for urban planning and its subsequent monitoring and evaluation. It provides a platform from which more detailed, extended and sophisticated systems could be built on which may be done in incremental steps and in reaction to evolving needs of each city.

Geodatabase design is based on a common set of fundamental GIS design steps, so it is important to have a basic understanding of these GIS design goals and methods. GIS design involves organising geographic information into a series of data themes layers that can be integrated using geographic location. So it makes sense that geodatabase design begins by identifying the data themes to be used, then specifying the contents and representations of each thematic layer. This involves defining the following:

- How the geographic features are to be represented for each theme (for example, as points, lines, polygons, or rasters) along with their tabular attributes
- How the data will be organised into datasets such as feature classes, attributes, raster datasets, and so forth
- What additional spatial and database elements will be needed for integrity rules, for implementing rich GIS behaviour (such as topologies, networks, and raster catalogues), and for defining spatial and attribute relationships between datasets .

2.0 START-UP SYSTEM REQUIREMENTS

The requirements to start-up the Urban MIS-GIS Database System include the following:

- Data

This is considered as the most important component of the system. It comprises geographic and related attribute data which could be generated from primary and secondary sources. Standards will be developed for:

- Data acquisition and data entry
- Data maintenance and storage
- Data analysis and processing
- Data display and reporting

- Computer software

Software requirements include:

- ArcView (ArcGIS)
- MS Office

- Computer hardware

- Desktop computer
- A4 scanner
- A3 size colour printer

- GPS hand held device
- Digital camera
- UPS
- Skilled personnel
 - Formal training on GIS (Basic/ Beginners)
 - On-the-job training

3.0 DATA BUILD-UP

Data could be built-up in line with the preparation of Master Plans (or Local Economic Development Plans) of each city. Most of the data will be generated at Step 2 Spatial Assessment, Step 3 Master Plan Strategy Preparation and Step 4 Master Plan Implementation (refer to Master Planning Guidelines).

Stage 2 Spatial Assessment Information Products

Table 1 Basic Information

Data Classification	Urban MIS-GIS Database System Information Products	
	Attribute (Descriptive)	Spatial
1. Base Map		
	Administrative boundaries, major natural and man-made features and reference names	
2. Demography		
2.1 Composition	Total population by age group and sex	
	Total population by employment status and economic activity	
	Average family income	
	Poverty incidence	
2.2 Distribution	Total population and number of households by Union Council	
	Population density by Union Council	
	Gross population density	
	Built-up area density	
	Urban-rural population	
2.3 Change	Migration	
	Historical growth rate and total population per census year	
	Projected annual city population by Union Council, i.e, 25 years	
	Doubling time	
	Projected population by age group and sex	

Table 2 Economic Sector

Data Classification	Urban MIS-GIS Database System Information Products	
	Attribute (Descriptive)	Spatial
1. Commerce		
• Profile and trends	Inventory of commercial areas	
	Growth of commercial areas	

	Number of business permits Issued by type of activity, employment size and market linkages	
• Support facilities and infrastructure	Type of present support facilities and infrastructure	
• Affecting policies	Inventory of national, provincial and local policies that directly and will directly affect sub-sector activities	
2. Industry		
• Profile and trends	Inventory of industrial areas	
	Growth of industrial areas	
	Number of business permits Issued by type of activity, employment size and market linkages	
	Existing hazardous and/or pollutive industries	
	Natural resources with potential for industrial development (mining, manufacturing, logging, etc.)	
• Support facilities and infrastructure	Type of present support facilities and infrastructure	
• Affecting policies	Inventory of national, provincial and local policies that directly and will directly affect sub-sector activities	
3. Tourism		
• Profile and trends	Inventory of tourism establishments and attractions	
	Number of business permits Issued and employment size by type of activity	
	Facilities in existing tourism establishments and markets catered	
	Accessibility of existing tourism establishments and tourist attractions	
	Tourism activities and events	
	Visitor arrivals	
	Potential tourist attractions	
• Support facilities and infrastructure	Type of present support facilities and infrastructure	
• Affecting policies	Inventory of national, provincial and local policies that directly and will directly affect sub-sector activities	
4. Agriculture		
• Profile and trends	Location and area of lands devoted to agricultural production	
	Comparative agricultural crop areas	
	Employment	
	Environmental issues/concerns that need to be addressed	
• Support facilities and infrastructure	Type of present support facilities and infrastructure	
• Affecting policies	Inventory of national, provincial and local policies that directly and will directly affect sub-sector activities	
5. Livestock and Fisheries		
• Profile and trends	Location and area of lands devoted to livestock and fisheries production	
	Comparative livestock and fisheries areas	

	Comparative production data	
	Employment	
	Environmental issues/concerns that need to be addressed	
• Support facilities and infrastructure	Type of present support facilities and infrastructure	
• Affecting policies	Inventory of national, provincial and local policies that directly and will directly affect sub-sector activities	
6. Forestry		
• Profile and trends	Location and area forest lands by type	
	Comparative production data	
	Employment	
	Environmental issues/concerns that need to be addressed	
• Support facilities and infrastructure	Type of present support facilities and infrastructure	
• Affecting policies	Inventory of national, provincial and local policies that directly and will directly affect sub-sector activities	
7. Informal Sector		
• Profile and trends	Inventory of areas occupied by informal settlements	
	Population and number of households	
	Socio-economic characteristics	
• Support facilities and infrastructure	Type of present support facilities and infrastructure	
• Affecting policies	Inventory of national, provincial and local policies that directly and will directly affect sub-sector activities	

Table 3 Socio-economic Sector

Data Classification	Urban MIS-GIS Database System Information Products	
	Attribute (Descriptive)	Spatial
1. Health		
• Profile and trends	General health situation	
	Leading causes of morbidity	
	Leading causes of mortality	
	Rate of malnutrition	
• Facilities and services	Government and private medical health facilities and personnel	
	Traditional <i>unani</i> and <i>ayurvedic</i> facilities and services	
	Informal structures	
	Number of households with sanitary toilet facilities	
• Accessibility of facilities and services	Mapped location of health facilities	
• Affecting policies	Inventory of national, provincial and local policies that directly and will directly affect sub-sector activities	
2. Education and literacy		
• Profile and trends	General education and literacy situation	
	Enrolment participation rates	
	Drop-out rate	

	Projected school-going age population over the planning period	
• Facilities and services	Government and privately-owned schools and universities	
	Student - teacher and student - classroom ratio by level	
• Accessibility of educational facilities	Mapped location of educational facilities	
• Affecting policies	Inventory of national, provincial and local policies that directly and will directly affect sub-sector activities	
3. Social and population welfare		
• Profile and trends	Poverty incidence	
	Profile of disadvantaged groups	
• Facilities and services	Social and population welfare facilities and personnel	
• Accessibility of educational facilities	Mapped location of facilities	
• Affecting policies	Inventory of national, provincial and local policies that directly and will directly affect sub-sector activities	
4. Culture		
• Facilities and services	Cultural facilities and services	
	Events held	
	Visitor arrivals	
• Accessibility of facilities and services	Mapped location of health facilities	
• Affecting policies	Inventory of national, provincial and local policies that directly and will directly affect sub-sector activities	
5. Sports and Recreation		
• Facilities and services	Existing sports and recreation facilities and services and their status	
	Events held and visitor arrivals	
• Accessibility of facilities and services	Mapped location of health facilities	
• Affecting policies	Inventory of national, provincial and local policies that directly and will directly affect sub-sector activities	
6. Public Safety		
• Profile and trends	Crime incidence	
	Crime solution efficiency	
	Fire incidence for the last 5 years	
	Occurrence of natural and man-made disasters	
	Level of assistance to victims of natural and man-made disasters	
	Mortality rates	
• Facilities and services	Civil defence services	
	Fire fighting services by facility, personnel and equipment	

	Emergency rescue (flood, famine and other disasters) services by facility, personnel and equipment	
	Number and capacity of existing burial and burning places	
• Accessibility of facilities and services	Mapped location of Public Safety facilities	
• Affecting policies	Inventory of national, provincial and local policies that directly and will directly affect sub-sector activities	

Table 4 Housing Sector

Data Classification	Urban MIS-GIS Database System Information Products	
	Attribute (Descriptive)	Spatial
• Profile and trends	Housing Situation	
	Inventory of existing government and privately-developed housing areas	
	Inventory of Katchi Abadis	
	Inventory of resettlement areas	
	Inventory of government- and privately-owned land banks for housing	
	Inventory of potential lands for housing	
	Mapped location of existing housing areas (formal and informal), land banks and potential lands for housing	
• Housing services	Housing institutions	
• Affecting policies	Inventory of national, provincial and local policies that directly and will directly affect sector activities	

Table 5 Environment Sector

Data Classification	Urban MIS-GIS Database System Information Products	
	Attribute (Descriptive)	Spatial
1. Characterisation	Topography and slope	
	Soil map	
	Land cover	
	Hydrogeological conditions	
	Mineral resources	
	Freshwater bodies	
	Coastal and marine areas	
	Climatological conditions	
	Air quality	
	Urban areas (environmental quality)	
2. Environmentally constrained areas	Protected areas	
	Risk and hazard-prone areas	
3. Areas suitable for urban development	Areas suitable for urban development	
4. Affecting policies	Inventory of national, provincial and local policies that directly and will directly affect sector activities	

Table 6 Infrastructure Sector

Data Classification	Urban MIS-GIS Database System Information Products	
	Attribute (Descriptive)	Spatial
1. Water Supply and Distribution		
• Supply and distribution	Ownership and Management	
	Existing potable water supply sources	
	Potential potable water supply sources	
	Potable water distribution system	
	Water rates	
• Affecting policies	Inventory of national, provincial and local policies that directly and will directly affect sub-sector activities	
2. Drainage and Flood Control		
• Service Coverage	Ownership and Management	
	Existing drainage and flood control system	
• Affecting policies	Inventory of national, provincial and local policies that directly and will directly affect sub-sector activities	
3. Irrigation		
• Supply and Distribution	Ownership and Management	
	Existing irrigation system	
	Potential sources of irrigation water	
• Affecting policies	Inventory of national, provincial and local policies that directly and will directly affect sub-sector activities	
4. Power Generation and Distribution		
• Supply and distribution	Ownership and Management	
	Existing power supply sources	
	Potential power supply sources	
	Power generation distribution system	
	Power rates	
• Affecting policies	Inventory of national, provincial and local policies that directly and will directly affect sub-sector activities	
5. Information and Communications Technology		
• Services and facilities	Ownership and Management	
	Services and facilities	
	Landline based telephone system	
	Internet services	
	Mobile phone services	
• Affecting policies	Inventory of national, provincial and local policies that directly and will directly affect sub-sector activities	
6. Sewage Collection and Disposal		
• Service Coverage	Ownership and Management	

	Existing sewage collection and system	
	Service rates	
• Affecting policies	Inventory of national, provincial and local policies that directly and will directly affect sub-sector activities	
7. Solid Waste Management		
• Service Coverage	Ownership and Management	
	Type and volume of waste generated	
	Existing solid waste management system	
	Service rates	
• Affecting policies	Inventory of national, provincial and local policies that directly and will directly affect sub-sector activities	
8. Toxic and Hazardous Waste Management		
• Service Coverage	Ownership and Management	
	Type and volume of waste generated	
	Existing toxic and hazardous management system	
	Service rates	
• Affecting policies	Inventory of national, provincial and local policies that directly and will directly affect sub-sector activities	

Table 7 Governance Sector

Data Classification	Urban MIS-GIS Database System Information Products	
	Attribute (Descriptive)	Spatial
1. Planning and implementation capability		
	Inventory of master plan-oriented legislation passed by the local council	
2. Financial resources	Income statement	
	Capital improvement plans	
	Fund transfers	
3. Affecting policies	Inventory of national, provincial and local policies that directly and will directly affect sector activities	

Table 8 Land Use and Transportation Sector

Data Classification	Urban MIS-GIS Database System Information Products	
	Attribute (Descriptive)	Spatial
1. Characterisation	Land classification	
	Historical spatial growth pattern	
	Existing land use	
	Prevailing land use plan/ zoning map	
	Land values	
	Urban environment (quality)	
	Modes of transportation	
	Road network	
	Road capacity	
	Ancillary road facilities	
	Transportation terminals	

	Anticipated spatial growth pattern	
2. Affecting policies	Inventory of national, provincial and local policies that directly and will directly affect sector activities	

Stage 3 Master Plan Strategy and Implementation Information Products

Table 9 Master Plan Strategy and Implementation

Data Classification	Urban MIS-GIS Database System Information Products	
	Attribute (Descriptive)	Spatial
1. Land Management		
	Land Use Plan	
	Zoning Map	
2. Proposed Programs and Projects		
	Programs and Projects	