Government of Kuwait

Kuwait Institute for Scientific Research

UNDP
KUWAIT
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United Nations Development Programme
Country: Kuwait
Project Document

Kuwait Integrated Environmental Information Network Phase-IV (KIEIN-IV)

Expected CP Outcome:
4.3 Kuwait Integrated Environmental Information Network (KIEIN) expanded and enhanced.

Expected CPAP Output:

Output 4.3.1 Continuing to provide technical assistance, expertise and best practices to:
1. Produce a study on relevant environmental indicators for Kuwait
2. Expand and enhance the KIEIN GIS website as an environmental data dissemination tool
3. Promote awareness and usage of the KIEIN GIS website toward protecting Kuwaiti habitats

Implementing Partner:
Kuwait Institute for Scientific Research (KISR)

Responsible Party:
United Nations Development Program (UNDP)

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Brief Description

The Kuwait Integrated Environmental Information Network-Phase IV (KIEIN-IV) is an integrated GIS –based solution to unify, enhance, document, and disseminate essential environmental indicator data and spatial decision support system tools (SDSS) and services via the internet using Web GIS technology. The environmental geographic and attribute database developed in the previous phases of KIEIN (I- III) are currently accessible within KISR and serve as the foundation for the upcoming and final phase. This final phase of KIEIN is planned within the Environmental Sustainability focus area in the Country Programme Action Plan (CPAP 2010-2014) and will result a study to document environmental indicators and SDSS tools that are essential to protecting Kuwaiti habitats. This will make that data and tools available in a GIS form that is useful and easily to accessible interested researchers in Kuwait and around the world.

Programme Period: 2009-2014	Total Budget: $1,200,000.00
Atlas Award ID: **00078085**	UNDP allocated resources (2012): $210,200.00
Start Date: **April, 2012** End Date: **December 2014**	General Management Fee 3%: $6,306.00
PAC Meeting Date:_____	Remaining budget for the following years: $983,494.00

14/5/2012

_____

Agreed Implementing Partner, (Kuwait Institute for Scientific Research):   Date:
Dr. Naji Al Mutairi, KISR General Director

9/4/2012

_____

Agreed by Responsible Party (UNDP) Resident Representative: Date:
Dr. Adam Abdelmoula, UNDP Resident Representative

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List of Abbreviations and Acronyms

APM	Assistant Project Manager
AWP	Annual Work Plan
CPAP	Country Programme Action Plan
GIS	Geographic Information System
GSSCPD	General Secretariat for the Supreme Council for Planning and Development
KIEIN	Kuwait Integrated Environmental Information Network
KISR	Kuwait Institute for Scientific Research
PM	Project Manager
SDSS	Spatial Decision Support System
TOR	Terms of Reference
UNDP	United Nations Development Program
URISA	Urban and Regional Information Systems Association

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I. ANNUAL WORK-PLAN 2012

EXPECTED OUTPUTS	PLANNED ACTIVITIES	TIMEFRAME				RESPONSIBLE PARTY	PLANNED BUDGET	
		Q1	Q2	Q3	Q4		Funding Source	Budget Description
Output 4.3.1 Continuing to provide technical assistance, expertise and best practices to produce a study on relevant environmental indicators for Kuwait **Baseline:** Lack of review and availability of Kuwait's environmental indicators **Indicators:** 1. # of Literature data gathered and evaluated for Marine, Terrestrial, and Atmospheric environments 2. # of seminars &	**Activity 4.3.1.1.** **Kuwait environmental indicators study conducted** .Conduct literature review of environmental indicators for Kuwait .Collaborate with stakeholders to document input .Select key indicators to model .Identify and document required data types and sources for developing indicator models .Draft, review and publish environmental indicators study .Conduct literature review of environmental indicators for Kuwait .Collaborate with stakeholders, to document input			√	√	PM , Assistant Project Manager (APM), GIS Systems Analyst, Design and Documentation GIS Consultant	UNDP	
				√	√	APM GIS Systems Analyst, Design and Documentation GIS Consultant	UNDP	Contracts for local and international consultants

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Activities			Responsible	Party	Budget
3. workshops conducted # stakeholder roster and participation compared to KIEIN III 4. # of metadata and data dictionary templates developed 5. # of data and sources compiled and contacted 6. # of hits to social media sites 7. # of media coverage (interviews, press releases..etc) **AWP 2012 Targets:** 1. A study on the local environment for relevant and pressing environmental issues in Kuwait conducted. 2. Environmental indicators based modeled KIEIN1-3 and results of new study. 3. GIS tools to model and produce environmental indicators for Kuwait habitat utilized. 4. the Web GIS applications (tools) to include environmental spatial decision support systems (SDSS) enhanced and	.Identify and document required data types and sources for developing indicator models .Support APM to draft, review and publish environmental indicators study .Support APM to prepare quarterly and annual technical reports .Conduct literature review of environmental indicators for Kuwait .Collaborate with stakeholders to document input .Select key indicators to model .Draft, review and publish environmental indicators study .Coordinate with PM/APM/Analyst and Communication Specialist on progress and results of study				
	4.3.1.2: GIS environmental indicators developed	√		PM, GIS Analyst, Design and Documentation GIS Specialist-Indicators	UNDP
	.Commence the ongoing design and documentation of working geodatabase in cooperation with KISR GIS Professionals .Prepare and publish conceptual data model based on study results .Design data layer schemas, subtypes and domains .Commence metadata and data dictionary documentation	√	√	GIS Analyst, Design and Documentation GIS Specialist-Indicators	UNDP	Contracts for local/international consultants

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Activities / Outputs			Responsible		
upgraded **5.** Web GIS capabilities to increase the accessibility and utilization of KIEIN expanded, enhanced, and disseminated **6.** Public awareness level of the relevant stakeholders increased **7.** Conceptual geodatabase model published **Related CP outcome: 4.3** Kuwait Integrated Environmental Information Network (KIEIN) expanded and enhanced.	.Acquire data from best available sources for conversion and compilation into GIS .Record sources for capture in metadata and data dictionary .Commence the data conversions and attribution of working geodatabase .Record processes for capture in metadata and project reporting, and technical documentation .Commence programming for environmental indicators in GIS format based on study results .Evaluate existing KIEIN programming and tools for improvement .Commence programming to prepare for SDSS and Web GIS services		GIS Developer- Indicators		
	4.3.1.3: *Project publicity and awareness level increased*	√	PM / Communication Specialist	UNDP	
	.Prepare and participate in project kick off seminar, presentations and media .Promote and maintain social network sites for project on Facebook and Twitter .Prepare team/stakeholder roster to enable communication amongst participants .Media awareness, including press releases, interviews, for newspapers, TV, professional publications	√	Communication Specialist	UNDP	Contracts for local/international consultants

Monitoring & Evaluation Activities & Final Review	√	PM	

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Project Staffing Costs 2012	Assistant Project Manager (8,500 x 6 months) = $51,000.00 GIS System Analyst, Design and Documentation (8,500 x 6 months) = $51,000.00 GIS Consultant (9,000 x 3 months) = $27,000.00 GIS Developer-Indicators (7,000 x 6 months) = $ 42,000.00 GIS specialist –Indicator (5,000 x 6 months) = $ 30,000.00 Communication Specialist (4,600 x 2 months) = $9,200.00	**$210,200.00**
Total		210,200.00
General Management Support (GMS) 3%		6306.00

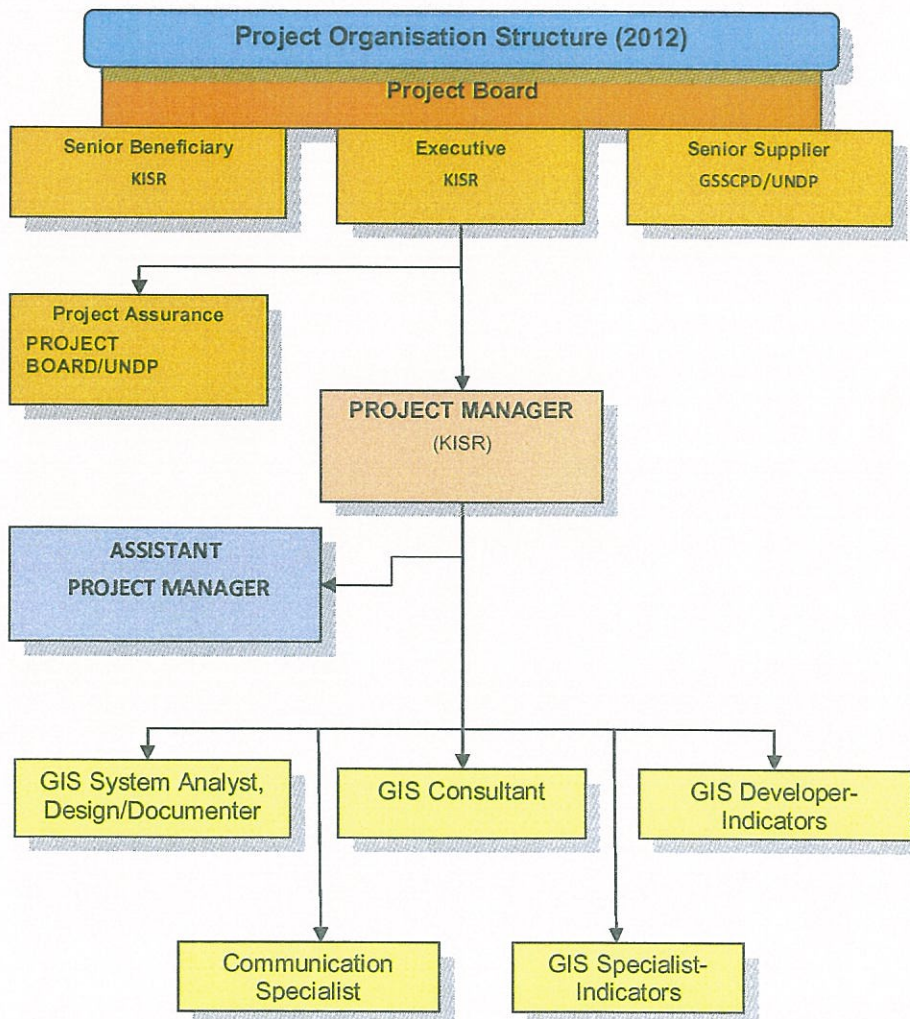H-gamily

II. MANAGEMENT ARRANGEMENTS

The project will be implemented and managed by the Kuwait Institute for Scientific Research (KISR) with operational support provided by UNDP. KISR has agreed to delegate support services to UNDP, which will act in its capacity as a responsible party.

The procurement of goods and services and the recruitment of project personnel by the UNDP country office shall be in accordance with the UNDP regulations, rules, policies and procedures. KISR will enter into a Letter of Agreement with UNDP to authorize it to conduct recruitment and procurement, and is annexed to this project document as Annex F.

All financial payments processed under this project will be pursuant to UNDP's Financial Regulations and Rules as approved by UNDP's Executive Board on 28 January 2005.

The following is the project organizational structure to illustrate the institutional framework and relationships of the key stakeholders.

A. The Project Organizational Structure

Project Organisation Structure (2012)

Project Board

Senior Beneficiary	Executive	Senior Supplier
KISR	KISR	GSSCPD/UNDP

Project Assurance
PROJECT BOARD/UNDP

PROJECT MANAGER
(KISR)

ASSISTANT PROJECT MANAGER

GIS System Analyst, Design/Documenter

GIS Consultant

GIS Developer-Indicators

Communication Specialist

GIS Specialist-Indicators

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<u>The Project Board:</u> A Project Board will be established to take executive management decisions and to provide guidance to the Project Manager, including approval of project revisions and of the project's annual work plan. Project assurance reviews by this group are made at designated decision points during the running of the project, or as necessary when raised by the Project Manager. The Board contains three (3) roles: an Executive to chair the group, a Senior Supplier to provide guidance regarding the technical feasibility of the project, and a Senior Beneficiary to ensure realization of project benefits from the perspective of project beneficiaries. A Project Board TOR will be defined and authorized by the project executive for this project.

The group will meet on a necessary basis and will be composed of:
- o The Executive Role: KISR
- o Senior Supplier: GSSCPD/UNDP
- o Senior Beneficiaries: KISR

Ex officio: The Project Manager (KISR)

The Project Manager will act as secretariat for the group (organization structure), being responsible for convening the meetings, preparing the agenda, overseeing preparation of materials for presentation to the meeting and for preparing and distributing minutes of the meetings.

<u>Project Assurance:</u> This role is held by UNDP and supports the Project Board by carrying out objective and independent project oversight and monitoring functions. This role ensures appropriate management milestones are managed and completed.

<u>The Project Manager</u> is responsible for the day-to-day implementation of the project in coordination with different stakeholders and the project's team. This includes ensuring the quality and timeliness of all project activities and outputs and supervising the work of consultants; requesting the advancement of project funds; preparing Quarterly and Annual Progress Reports; liaising with the Project Assurance role, and requesting ad-hoc directions from the Project Board when required. The draft terms of reference are attached.

<u>Project Support Unit:</u>

The Project Support will provide project administration and management support to the Project Manager as required by the needs of the project or Project Manager.

B. ***UNDP Support to Implementation:*** As implementation proceeds, UNDP will provide specific services to the implementing partner in support of delivering the expected outputs. The costs of these support services will be charged directly to the project budget.

C. ***Facilities and Administration (F & A):*** The budget includes 3% Facilities and Administration to UNDP defined as General Management Support (GMS).

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Monitoring Framework and Evaluation

In accordance with the programming policies and procedures outlined in the UNDP User Guide, the project will be monitored through the following:

Within the annual cycle

- On a quarterly basis, a Quality Assessment report will record progress towards the completion of key results, based on quality criteria and methods captured in the Quality Management table below.

- An Issue Log will be activated in Atlas and updated by the Project Manager to facilitate tracking and resolution of potential problems or requests for change.

- Based on the Initial Risk Analysis submitted (see annex D), a risk log will be activated in Atlas and regularly updated by reviewing the external environment that may affect the project implementation.

- Based on the above information recorded in Atlas, Quarterly Progress Reports (QPR) will be submitted by the Project Manager to the Project Board through Project Assurance, using the standard report format available in the Executive Snapshot.

- A project Lesson-Learned Log shall be activated and regularly updated to ensure on-going learning and adaptation within the organization, and to facilitate the preparation of the Lessons-learned Report at the end of the project.

- A Monitoring Schedule Plan will be activated in Atlas and updated to track key management actions/events.

Annually

Annual Review Report.

> An Annual Review Report will be prepared by the Project Manager and shared with the Project Board and the Outcome Board. As minimum requirement, the Annual Review Report shall consist of the Atlas standard format for the QPR covering the whole year with updated information for each above element of the QPR as well as a summary of results achieved against pre-defined annual targets at the output level.

Annual Project Review.

> Based on the above report, an Annual Project Review shall be conducted during the fourth quarter of the year or soon after, to assess the performance of the project and appraise the Annual Work Plan (AWP) for the following year. In the last year, this review will be a final assessment. This review is driven by the Project Board and may involve other stakeholders as required. It shall focus on the extent to which progress is being made towards outputs, and that these remain aligned to appropriate outcomes.

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III.   QUALITY MANAGEMENT FOR PROJECT ACTIVITY RESULTS

OUTPUT 4.3.1: Continuing to provide technical assistance, expertise and best practices to produce a study on relevant environmental indicators for Kuwait		
Activity Result 4.3.1.1. (Atlas Activity ID)	**Conduct Kuwait Environmental Indicators Study**	Start Date: 7/1/2012 End Date:12/30/2012
Purpose	To identify of specific environmental indicators for monitoring and measurement	
Description	Conduct literature review of environmental indicators for Kuwait Select key indicators to model Identify required data types and sources for developing indicator models Identify and documents required data types and sources for developing indicator models Draft, review and publish environmental indicators study	
Quality Criteria	**Quality Method**	**Date of Assessment**
# of key Kuwaiti environmental indicators studied and documented for Kuwait habitat conditions # of data types and sources compiled and contacted	• Literature review • Key indicators monitor and review • Checklist of data and sources • Progress reports on quarterly and annual basis	December 2012

1. OUTPUT 4.3.1: Continuing to provide technical assistance, expertise and best practices to Expand and enhance the KIEIN GIS website as an environmental data dissemination tool		
Activity Result 4.3.1.2 (Atlas Activity ID)	**Commence the design and development of the environmental indicators in GIS format based on study**	Start Date: 7/1/2012 End Date:12/31/2012
Purpose	To enhance the KIEIN Web portal for efficient use on a local and international level	
Description	Commence the ongoing design and documentation of working geodatabase Prepare and publish conceptual data model based on study results Design data schema, including layers, subtypes and domains Acquire data from best available sources for conversion and compilation into GIS Commence the data conversions and attribution of working geodatabase Commence metadata and data dictionary documentation Commence programming for environmental indicators in GIS format Team, stakeholder training and mentoring	
Quality Criteria	**Quality Method**	**Date of Assessment**
Conceptual geodatabase model published Metadata and data dictionary templates developed # of data sets	• Literature review • Checklist of data and sources Progress reports on quarterly and annual basis	December 2012

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acquired for GIS conversion		
Amount of data converted to GIS format		

1. OUTPUT 4.3.1: Continuing to provide technical assistance, expertise and best practices to Promote awareness and usage of the KIEIN GIS website toward protecting Kuwaiti habitats	

Activity Result 4.3.1.3 (Atlas Activity ID)	*Project Awareness*	Start Date: 7/1/2012 End Date:12/31/2012
Purpose	To increase the number of KIEIN users locally and internationally	
Description	Prepare and participate in project kick off seminar, presentations and media Promote and maintain social network sites for project on Facebook and Twitter Prepare team/stakeholder roster to enable communication amongst participants Media awareness, including press releases, interviews, for newspapers, TV, professional publications	
Quality Criteria	**Quality Method**	**Date of Assessment**
Increased number of hits to social media sites # of media coverage (interviews, press releases, etc)	Progress reports including: • Documentation of publicity • Documentation of social networking • Documentation of presentations	December 2012

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IV. LEGAL CONTEXT

This document together with the CPAP signed by the Government and UNDP, which is incorporated by reference, constitute together a Project Document as referred to in the SBAA and all CPAP provisions apply to this document.

Consistent with the Article III of the Standard Basic Assistance Agreement, the responsibility for the safety and security of the implementing partner and its personnel and property, and of UNDP's property in the implementing partner's custody, rests with the implementing partner.

The implementing partner shall:

- Put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried

- Assume all risks and liabilities related to the implementing partner's security, and the full implementation of the security plan.

UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of this agreement.

The implementing partner agrees to undertake all reasonable efforts to ensure that none of the UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267 (1999). The list can be accessed via http://www.un.org/Docs/sc/committees/1267/1267ListEng.htm. This provision must be included in all sub-contracts or sub-agreements entered into under this Project Document.

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V. ANNEXES

Contents:

A: Overall Project Schedule and Employee Wages Budget Tables

B: Required Features of Environmental Indicators for GIS Modelling

C: Required Features of Environmental Spatial Decision Support System for Web GIS

D: Risk Analysis Matrix

E: Terms of References (TOR) for Team Members

F: KISR Letter of Agreement to Authorize UNDP to Conduct Recruitment

G: The GIS Code of Ethics

ANNEX B: Required Features of Environmental Indicators

Environmental Indicators

Environmental indicators are simple measures that tell what is happening in the environment. Since the environment is very complex, indicators provide a more practical and economical way to track the state of the environment than if we attempted to record every possible variable in the environment.

The Environmental Indicators of this project have been defined as the numerical values that help provide insights into the state of the environment and its impact on human beings, ecosystems and materials, as well as on the pressures on the environment of Kuwait. These indicators are developed based on quantitative measurements or statistics of environmental conditions that are tracked over time. They can be developed and used in a wide variety of geographic scales, from local to regional to national levels. In turn, the Environmental Indicators defined in this project should also be considered a subset of Sustainable Development Indicators which are meant to track the overall sustainability of a society with respect to its environmental, social and economic integrity and health. Thus, the analysis based on these indicators is used as a reference for proposing Kuwait's environmental policies and for supporting further decision making.

Conceptual Model for Environmental Indicators

Most environmental indicator systems are built around the "pressure-state-response" (PSR) model developed by OECD, or a variation thereof, such as the "pressure-state-effects-response" (PSER) model developed by the U.S. EPA's Office of Policy, Planning and Evaluation (U.S. EPA, 1995). The PSER model is based on a concept of causality (Figure 1). Human activities (as well as natural phenomena) exert pressures on the environment.
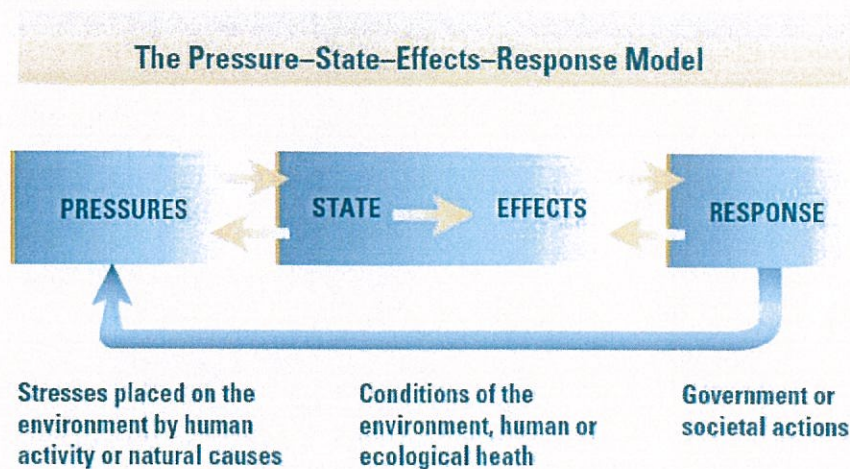

The Pressure–State–Effects–Response Model

PRESSURES	STATE → EFFECTS	RESPONSE
Stresses placed on the environment by human activity or natural causes	Conditions of the environment, human or ecological heath	Government or societal actions

Figure1: The PSER model
(Source: Organization for Economic Cooperation and Development, 1993)

Methodology:

The Kuwait Environmental Indicators (KEI) proposed in this project will be based on the 2010 Environmental Performance Index (EPI) that was developed by the following institutes as a foundation:

- Yale Centre for Environmental Law and Policy, Yale University.
- Centre for International Earth Science Information Network, Columbia University.
- The World Economic Forum.
- The Joint Research Centre of the European Commission.

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The 2010 EPI was built upon the work of a range of data providers, including their own prior data development work for the Pilot 2006 EPI, 2008 EPI, and the 2005 Environmental Sustainability Index. The 2010 EPI ranks 163 countries on 25 performance indicators tracked across ten well-established policy categories covering both environmental public health and ecosystem vitality that are shown in Figure 2.
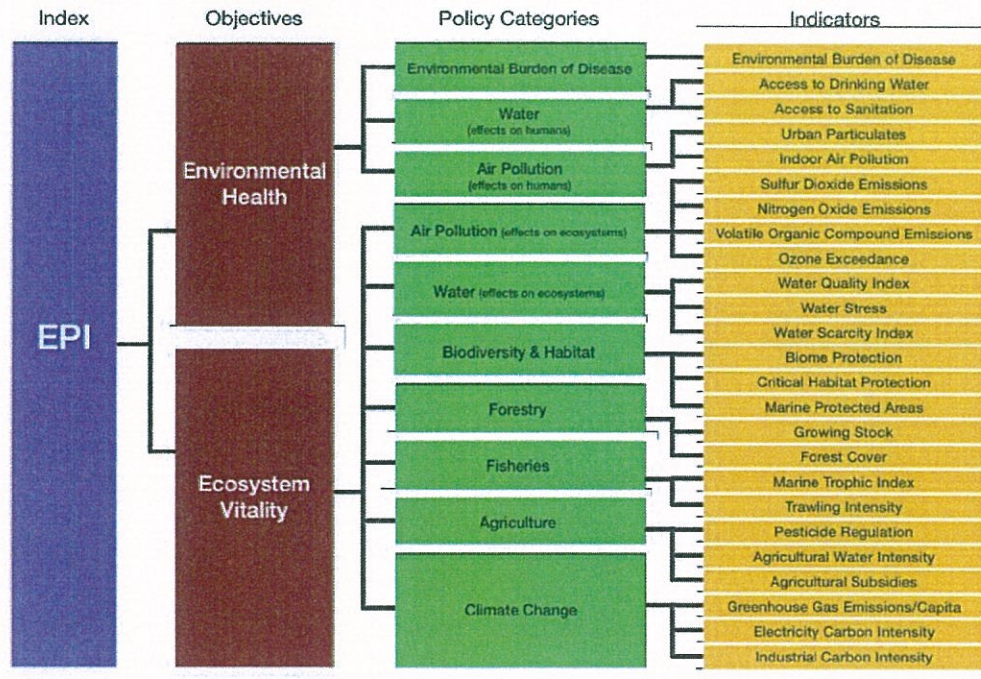

Figure2. Construction of the Environmental Performance Index (EPI).
(Source: 2010 Environmental Performance Index)

These selected Indicators rely on primary criteria designed to ensure that the Indicator is based on data collected using scientifically acceptable methods. They also closely represent the issue, and are sufficiently sensitive to distinguish change, and provide a meaningful basis for policy decisions. A set of "secondary criteria" highlight additional desirable attributes of an environmental indicator: the ability to provide early warning, comparability to indicators in other systems, cost-effectiveness, and the availability as a point of reference or a benchmark value. Therefore, the classification rules will be followed from the Environmental Protection Indicators for California (EPIC) 2002. Each indicator is classified based on the availability of data, as follows:

- Type I: Adequate data are available for presenting a status or trend.
- Type II: Further data collection/analysis/management is needed before a status or trend can be presented.
- Type III: Conceptual indicators for which systematic data collection is not in place.
- Type I and Type II indicators are supported by ongoing, systematic monitoring or data collection. Type III indicators are conceptual (sometimes based on a one-time study), and reveal areas lacking systematic data collection.

Open discussions and special interest group meetings will be held for reviewing the proposed and defined Kuwait environmental indicators to reach a consensus for further implementation.

Expected Results

The KEI defined in this project will be used for further analysis that assist in refining policy choices, understanding the determinants of environmental progress, and maximizing the return on governmental investments.

The multi-issue environmental performance measurement system proposed here can be used to achieve two core functions: (1) specifying an architecture that identifies high-priority issues; and (2) calculating metrics on a common scale. Thus, the KEI provides a powerful tool for steering Kuwait to achieve a better performance in the EPI world rankings.
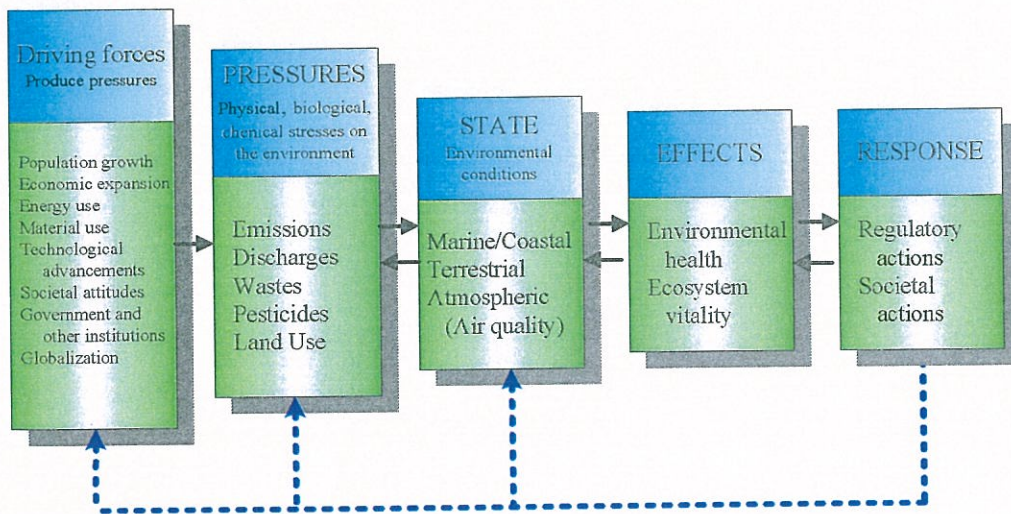

Figure 3. The PSER model for Kuwait

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Table 1. A Sample of the Kuwait Environmental Indicators.

Theme	Objectives	Policy Categories	Indicators	Policy Category Weight (% of EI)	Definition	Data Variables (parameters)	Units used	Target
Atmospheric environment	Environmental health	Air pollution (effects on humans)	Indoor air pollution*		Population using solid fuels (Type I)			0%
					Household exposure of children to environmental tobacco smoke (Type I)			
					Indoor exposure to formaldehyde (Type III)			
			Outdoor air pollution*		The concentration of small particles, between 2.5 and 10 micrometers (PM 2.5 to PM10) in diameter, suspended in the air. (Type I)			20 ug/m3 of PM10
					Total emissions of Toxic air contaminants (Type II)			
					Visibility on an average summer and winter day in wilderness areas (Type II)			

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ANNEX C: Required Features of Web-based Spatial Decision Support Systems

1. INTRODUCTION

Below are detailed features and capabilities that must be available in the web-based spatial decision support systems for Kuwait.

1.1 Data Management Issues:
- Consolidates Data Storage.
- Secure system.
- Web-based access.
- Control of data in web services.
- Increase productivity through IT.
- Support for future growth.

1.2 Technical Capabilities:
- Publish existing data, functions, and indicators as web services by a GIS server.
- Share and reuse of web services.
- Register web service into a registry platform for further accessibility.
- Web-based SDSS.
- Assessment of hot-spots of different decisions.

1.3 Training:
- In-depth training of technical staff as professional trainers.
- Hands on training of management and technical users.

2. TECHNICAL SPECIFICATION

Figure 1 illustrates the framework and process of the web-based SDSS, which contains three components: (1) a GIS server; (2) a web service registry platform; and (3) web-based SDSS.
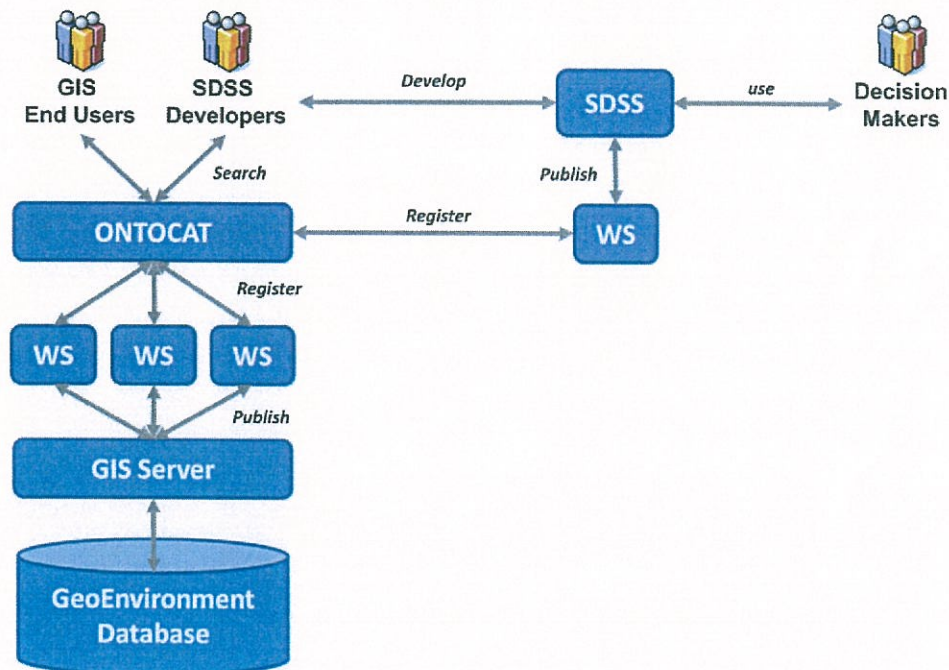

Figure 1: the framework and process of web-based SDSS

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2.1 GIS server

During the implementation of KIEIN projects from phases I to III, a geo-environmental database was well established for managing a diverse range of GIS data in Kuwait. However, the data in the database can be shared in a limited group of users or organizations. It cannot be widely used by more users across different organizations or nations, because of security and authority implications. Therefore, the same data or functions are usually duplicated in the databases of various organizations.

In order to avoid duplication of efforts, publishing data and functions as web services was considered to be one possible solutions for sharing and reusing these data and functions. Open Geospatial Consortium (OGC) and the ISO/TC 211 committee have been a leading force in developing geospatial standard technologies, such as GML (geography mark-up language), ISO 19115 (metadata standard), WMS (web mapping service), WFS (web feature service). This is to promote interoperability and the challenges of semantic interoperability remain as to properly identify correspondent meanings of different terminologies adopted by data providers over the web. Thus, a GIS server is required for publishing data and functions as web services followed by the OGC standard to facilitate increased reuse and sharing across organizations and over the Internet.

2.2 Web service registry platform

However, two critical problems will be faced as continuously publishing data and functions as web services over the Internet. These are the problems of management and search ability of web services. Where to find useful web services and how to manage numerous web services will be the two critical tasks in the future. Thus, a Web service registry platform could be a possible solution for management of Web services.

The concept of the registry platform is similar to the registry in spatial data infrastructure (SDI). Web service providers can register the metadata (e.g. names, keywords, Web service types, or coordinate systems) of published Web services into the registry. End users can then use keyword search to discover the registered Web services for further usage.

The registry platform will use the concept of ontologies to manage the classification of Web services. In Information Science, ontology is defined as "an explicit specification of a conceptualization," where a conceptualization is a way of "thinking about a domain" in terms of concepts (i.e. a set of individuals) and relationships relevant to that domain. Therefore, an ontology is to explicitly and formally describe terms and relationships in a domain, and by doing so, information can incorporate the domain ontology in data integration processing, search algorithms and analytical methods. Ontologies can be used to delineate the definitions and relationships (including classification) of concepts, and then Web services (i.e. individuals) can be registered into corresponding concepts in ontologies. Additionally, ontologies can be read, searched, and inferred by machines. Machines can automatically infer relevant Web services among predefined relationships, and check inconsistent relationships in the ontologies. Therefore, ontologies will be used in the registry platform to manage Web services and to expand the search ability of Web services.

2.3 Web-based SDSS

Web-based SDSS will include a number of selected SDSS applications in different areas that support environmental planning and management, to ensure the sustainability of our natural resources and habitats in Kuwait. This Web-based SDSS will support decision makers to make the right decisions concerning environmental issues and sustainable development. In addition, another enhancement and upgrade to the Web-GIS application will be carried out to enhance the capabilities of this network in the dissemination of relevant geo-environmental information everywhere inside and outside Kuwait.

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Therefore, in the framework of Web-based SDSS, GIS end-users and developers can use the Web service registry platform to search suitable Web services and to use them for composing different types of SDSS for decision makers. The SDSS will be developed as a Web-GIS application to facilitate the usability of the application in everywhere inside and outside Kuwait.

Popular Examples of SDSS GIS tools include but are not limited :

Data Inquiry - the ability to search the website and associated GIS databases for relevant and useful data using keywords, phrases, place names etc to identify and access the data. This also means the ability to search and select features based on the attribute (characteristic) tables based on a criteria or set of criteria (age of homes, age of homes within Kuwait City which are more than 25 years old).

Data Compilation - the ability to compile (overlay) multiple sets of data at a specific location to understand relationships, look for statistical relationships amongst and between datasets. For example, to combine and analyse wind direction, ground elevations and point source air pollution to better understand the movement of pollutants from a specific site.

Data Aggregation - to reclassify complex data sets based on a desired characteristic, such as a ranking (high, medium, low) or within a location (total population in a governorate). These aggregated data sets can also be compiled and inquired.

Data Comparison - change detection functions, commonly based on time and space. For example amount/rate of urban development each year using time series and change detection.

Data Trends, Prediction Modelling-Uses advanced statistical capabilities to map and quantify statistical trends, predict risks (e.g. fire, traffic, sandstorms),

Sample point data modelling-density mapping and analysis, distance, travel costs and barrier analysis, creating interpolated surfaces to show distribution amongst samples, determine mathematical clusters or prove random distributions of data,

The detailed objectives of the KIEIN-V SDSS /Web GIS phase are as follows:

- Analysis, design and build up a customized Web-based SDSS as a tool for decision making in the environmental issues.

- Integrate other GIS databases inside KISR –that have not been integrated before- with the comprehensive geo-environmental database of the KIEIN.

- Enhance and upgrade of the Web-GIS application to be a more sophisticated analytical tool on the Web.

- Carry out a human resources development program.

- Introduce procedures for the continuous maintenance and update of the KIEIN geo-environmental database and related applications.

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ANNEX D: Risk Analysis Matrix

Project Title : KfEIN-IV		Award ID :		Date :

#	Description	Date Id'd	Type	Impact & Probability	Countermeasures / Management response	Owner	Submitted updated by	Last Update	Status
1	Institution/Execution/Capacity		Organizational	P = 1 I=4	• Implement automated tracking of skill development • Set performance standards and conduct periodic performance evaluation • Take adequate timely actions when performance standards are not met	Project Manager			
3	Implementation arrangements		Organizational	P = 1 I=4	• Adopt integration methodology among team leaders, project manager and project support • Adopt clear communications plan • Ensure systematic reporting by team leaders to project manager • Conduct periodic meetings to ensure that team leaders are responding to project requirement in a timely manner	Project Manager			
	Human Resources Processes and Procedures		Organizational	P = 1 I=5	• Understand civil services regulations and ensure compliance with these regulations • Submit a plan of resource utilization to human resource department with	Project Manager			

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					approval of EPA's director general. • Ensure tasks are understood by staff and documented for follow-up with Human Resource department • Adopt problem-solving approach in coordination with Environment Strategy Office, DG office and human resource department to prevent delays. • Set annual plans for resources utilization.	
4	Partnerships failing to deliver on time	Strategic	P=2 I=3	• Understand partners internal requirements and set response scenarios when delays occur • Establish effective communication plan • Maximize effort integration and assign roles, responsibilities and accountabilities at an early stage	Project Manager
5	Stakeholder relations	Strategic	P=2 I=3	• Conduct awareness training • Establish effective communications plan • Maximize effort of integration among concerned parties and assign roles, responsibilities and accountabilities at an early stage.	Project Manager

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ANNEX E: Terms of Reference for 2012 Team Members

TERMS OF REFERENCE (TOR)

Job Title: Assistant Project Manager

Duty Station: Kuwait

Section/Unit: Programme/Governance and Development Planning

Project Reference: Kuwait Integrated Environmental Information Network (KIEIN) Project Phase IV

Duration of Consultancy: 1 year with possibility of extension

Background: The Kuwait Integrated Environmental Information Network (KIEIN) is a national project that aims to provide decision/policymakers and planners in Kuwait with relevant and updated environmental information. KIEIN is a key tool to support the national efforts for a sustainable development program in Kuwait. KIEIN comes as the fruit of a collaboration between the Kuwait Institute for Scientific Research (KISR), the Supreme Council for Planning and Development (SCPD) and the United Nations Development Programme (UNDP).

The KIEIN project is an integrated solution to unify the different environmental data sets (either geographic or attributes) inside a comprehensive Geo-environmental database. It is currently easily accessible inside KISR. KIEIN has been developed through three phases (1994-2007).

In the final phase of KIEIN will ensure the sustainability and continuation usage of KIEIN; develop the environmental indicators; and carry out relevant spatial decision support systems (SDSS).

Objectives: The overall responsibility of the Assistant Project Manager is to support the KISR Project Manager in providing on-site management of the KIEIN IV project in accordance with UNDP guidelines and project objectives. The Assistant Project Manager is responsible to:

- Finalize all UNDP reporting and documentation requirements in collaboration with GIS System Analyst, Project Manager, and GIS Consultant(s).
- Assist the communications consultant with the awareness programme.
- Supervise the day-to-day implementation plan and report to the project manager.
- Manage the schedule and budget of the Environmental Indicators task in cooperation and coordination with the project manager.
- Manage the schedule and budget for the analysis, design and implementation of the Spatial Decision Support Systems (SDSS).
- Support the Project Manger with various tasks and activities along the project period, as required.

Tasks and Deliverables:

- Prepare quarterly and annual reports in collaboration with PM
- Attend/conduct meetings, presentations, seminars and workshops with and/or on behalf of PM.
- Manage all tasks and activities in collaboration with team, project management, and stakeholders
- Follow up on daily activities including the development of:
  - Public awareness and communication plan.
  - Environmental indicators study
  - Spatial decision support systems (SDSS) production planning and reporting.
  - Web GIS planning and reporting
  - Progress reports and technical reports

- o   Final report.
- Report and document the environmental Indicators in collaboration with GIS System Analyst and GIS Consultant(s):
  - o   Conduct literature review of environmental indicators for Kuwait
  - o   Collaborate with stakeholders to document input
  - o   Select key indicators to model
  - o   Identify and document required data types and sources for developing indicator models
  - o   Draft, review and publish environmental indicators study
- Coordinating regulatory on-the-job training activities.
- Coordinating and interacting with all team members, stakeholders, consultants and management
- Reporting to Project Manager about the progress in the project.
- Following up on project task execution and ensure timely quality criteria evaluation.
- Carry out relevant spatial decision support systems (SDSS) suitable for Kuwait. The KIEIN project document should includes, but not limited to the following:
  - o   Detailed Public awareness and communication program.
  - o   Detailed Environmental indicators production plan includes the main indicators categories and sub-categories.
  - o   Identify the relevant spatial decision support systems (SDSS) based on available data sets inside the Geo-environmental database of KIEIN previous phases.

Qualifications:

Education:

B. Sc. In Engineering or closely related field and Higher Diploma or M. Sc. in GIS.

Work Experience:

- Minimum of 10 years experience implementing and managing GIS projects
- Experience in writing project proposals in the area of GIS and/or environmental applications
- Experience working GCC countries is favorable
- Experience working with Kuwaiti governmental institutions is highly desirable
- Knowledge of UNDP program policies and procedures is an advantage
- Should have excellent personal interaction, oral and written communication skills,
- Ability to appropriately identify and respond to internal project needs and facilitate the presentation of recommendations.
- Excellent English writing and editing skills.
- Excellent management skills and capabilities.
- Proficient in use of standard computing software tools.
- Good experience in GIS applications development especially in the field of environment.

Competencies:

- Conduct project liaison activities
- Demonstrated organizational skills
- Have experience in various GIS, Project Management, and Presentation software and technology
- Work independently, analyze issues, and write clearly and quickly.
- Maintain focus when under pressure.
- Must demonstrate the ability to interface effectively and collaborate with peers, project personnel and all levels of management
- Ability to identify and document issues,
- Good judgment to resolve conflict, recommend mitigation measures and develop solutions.
- Take initiative and accountability for results.

Corporate Competencies:

- Demonstrates integrity by modeling the UN's values and ethical standards
- Adheres to the GIS Code of Ethics
- Promotes the vision, mission, and strategic goals of the UNDP
- Displays cultural, gender, race, nationality, and age sensitivity and adaptability
- Treats all people fairly and without favoritism

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TERMS OF REFERENCE (TOR)
Kuwait Integrated Environmental Information Network (KIEIN) Project Phase IV

Job Title: GIS Specialist-Environment Indicator

Duty Station: Kuwait

Section/Unit: Programme/Governance and Development Planning

Project Reference: Kuwait Integrated Environmental Information Network (KIEIN) Project Phase IV

Duration of Consultancy: 6 months with possibility of extension

Background Kuwait Integrated Environmental Information Network (KIEIN) is a national project that aims at providing decision/policy makers and planners in Kuwait with relevant and updated environmental information. KIEIN is a key tool to support the national efforts in sustainable development program in Kuwait. KIEIN comes as the fruit of a collaboration between the Kuwait Institute for Scientific Research (KISR), the Supreme Council for Planning and Development (SCPD) and the United Nations Development Program (UNDP).

KIEIN project is an integrated solution to unify the different environmental data sets either geographic or attribute inside a comprehensive Geo-environmental database. It is currently easily accessible inside KISR. KIEIN has been developed through three phases (1994-2007).

In the upcoming phase of KIEIN, the major activities are proposed to ensure the sustainability and continuation usage of KIEIN; develop the environmental indicators; and carry out relevant spatial decision support systems (SDSS).

Objectives: The overall responsibility of the GIS Specialist to the provide technical support to the GIS Developer, and other team members, in order to prepare the environmental indicator GIS data and models for use in SDSS programming and Web GIS services

Tasks and Deliverables:

- Work closely with Developer-Indicators and GIS Systems Analyst to:
  - Acquire data from best available sources for conversion and compilation into GIS
  - Record sources for capture in metadata and data dictionary
  - Perform data conversions and attribution of working geodatabase
  - Provide technical support for the different activities of designing and implementing the needed environmental indicators models.
  - Record processes for capture in metadata and project reporting, and technical documentation
- Coordinating and interacting with other team members and stakeholders.
- Meeting with and reporting to Project Manager.
- Support GIS Consultant in Literature Review of relevant documents: evaluation reports, survey/study reports
- Collect and compile environmental data available from stakeholders, partners, agencies
- Compile working and final geodatabases according to project specifications
- Assist in the development KIEIN project document, based on the UNDP guidelines, to capture environmental indicators and indices for marine terrestrial and atmospheric habitats

Qualifications:

Education:

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- B.Sc. Degree in Geoinformatics and/or Environmental studies or other closely related field resulting in the integration between GIS and environmental applications.

Work Experience:

- Minimum of 5 years experience in the field of GIS and related environmental applications, especially the environmental indicators.
- Experience in GIS applications in the field of environment.
- Experience in writing project documents in the area of GIS and/or environmental applications.
- Excellent personal interaction, oral and written communication skills, and be focused to appropriately identify and respond to internal project needs and facilitate the presentation of recommendations.
- Proficient in use of standard computing software tools.
- Excellent English writing and editing skills.

Competencies

- Focuses on impact and result for the client and responds positively to feedback
- Coordinates and collaborates with management, team members, and stakeholders effectively and efficiently
- Consistently approaches work with energy, and a positive constructive attitude
- Demonstrates strong oral and written communication skills
- Demonstrates ability to build strong relationships with clients and external actors
- Remains calm, in control, and good humored at all times and in all situations
- Demonstrates openness to change, and the ability to manage complexities
- Work independently, analyze issues, and write clearly and quickly.
- Take initiative and accountability for actions and results

Corporate Competencies

- Demonstrates integrity by modeling the UN's values and ethical standards
- Adheres to GIS Code of Ethics
- Promotes the vision, mission, and strategic goals of the UNDP
- Displays cultural, gender, race, nationality, and age sensitivity and adaptability
- Treats all people fairly and without favoritism

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TERMS OF REFERENCE (TOR)
Kuwait Integrated Environmental Information Network (KIEIN) Project Phase IV

Job Title: Communication Specialist

Duty Station: Kuwait
Section/Unit: Programme/Governance and Development Planning
Project Reference: Kuwait Integrated Environmental Information Network (KIEIN) Project Phase IV
Duration of Consultancy: 2 months with possibility of extension

Background: The Kuwait Integrated Environmental Information Network (KIEIN) is a national project that aims at providing decision/policy makers and planners in Kuwait with relevant and updated environmental information. KIEIN is a key tool to support the national efforts in a sustainable development program in Kuwait. KIEIN comes as the fruit of a collaboration between the Kuwait Institute for Scientific Research (KISR), the Supreme Council for Planning and Development (SCPD) and the United Nations Development Program (UNDP).

The KIEIN project is an integrated solution to unify the different environmental data sets (either geographic or attributes) inside a comprehensive Geo-environmental database. It is currently easily accessible inside KISR. KIEIN has been developed through three phases (1994-2007).

In the upcoming phase of KIEIN, the major activities are proposed to ensure the sustainability and continuation usage of KIEIN; develop the environmental indicators; and carry out relevant spatial decision support systems (SDSS).

Objectives: The overall responsibility of the Communication Specialist is to assist on developing awareness programs to all stakeholders in Kuwait. The specialist will also create, implement and manage a communication strategy for KIEIN and train the communications team at KISR.

Tasks and Deliverables:

- Prepare materials and media for kick off meeting presentations in coordination with Project Management
- Prepare press releases, and arrange for media interviews as appropriate
- Establish and maintain social networking websites (Facebook/Twitter) to promote project
- Monitor and report public feedback from social networking sites to team members
- Prepare regular reports/documentation with a publicity value in English and Arabic i.e. brochures, program fact sheets etc
- Develop concepts for quarterly newsletter for approval
- Cultivate and maintain effective networks and working relationships with local and international media, civil society organizations and other relevant partners
- Captures KIEIN results and prepares briefs and ensures media publicity for them, train the team to prepare regular press released, talking points, and Web content.
- Assist the KIEIN team with advocacy activities, including support to public events, launching ceremonies, field visits, and workshops.
- Work to improve the profile and awareness of KIEIN. This includes support and coordinate advocacy and public awareness activities

Qualifications :

Education:

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- Bachelors degree in Communications, Public Relations, or other closely related field

<u>Work Experience:</u>

- Minimum of 5 years experience
- Experience in promoting technical and/or scientific projects
- Demonstrated experience in communication and media relations
- Excellent English writing and editing skills.
- Excellent management skills and capabilities
- Should have excellent personal interaction, oral and written communication skills, and be focused to appropriately identify and respond to internal project needs and facilitate the presentation of recommendations.
- Proficient in use of typical computing software tools.

Competencies:

- Ability to prepare press releases
- Ability to arrange and coordinate TV and media interviews
- Ability to develop, monitor and maintain social network sites for the project
- Ability to develop presentation media for training
- Ability to aid team in training, seminars, workshops, and any public outreach events
- Ability to work independently and as a team
- Maintain focus when under pressure.
- Must demonstrate the ability to interface effectively and collaborate with peers, project personnel and all levels of management to develop solutions.
- Take initiative and accountability for results.

Corporate Competencies:

- Demonstrates integrity by modeling the UN's values and ethical standards
- Adheres to the GIS Code of Ethics
- Promotes the vision, mission, and strategic goals of the UNDP
- Displays cultural, gender, race, nationality, and age sensitivity and adaptability
- Treats all people fairly and without favoritism

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ANNEX F: KISR Letter of Agreement to Authorize UNDP to Conduct Recruitment

Dear Sir,

1.   Reference is made to consultations between officials of the Government of Kuwait (hereinafter referred to as "the Government") and officials of UNDP with respect to the provision of support services by the UNDP country office for nationally managed programmes and projects.   UNDP and the Government hereby agree that the UNDP country office may provide such support services at the request of the Government through its institution designated in the relevant programme support document or project document, as described below.

2.   The UNDP country office may provide support services for assistance with reporting requirements and direct payment. In providing such support services, the UNDP country office shall ensure that the capacity of the Government-designated institution is strengthened to enable it to carry out such activities directly. The costs incurred by the UNDP country office in providing such support services shall be recovered from the administrative budget of the office.

3.   The UNDP country office may provide, at the request of the designated institution, the following support services for the activities of the programme/project:
(a)   Identification and/or recruitment of project and programme personnel;
(b)   Identification and facilitation of training activities;
(c)   Procurement of goods and services;

4.   The procurement of goods and services and the recruitment of project and programme personnel by the UNDP country office shall be in accordance with the UNDP regulations, rules, policies and procedures. Support services described in paragraph 3 above shall be detailed in an annex to the programme support document or project document, in the form provided in the Attachment hereto. If the requirements for support services by the country office change during the life of a programme or project, the annex to the programme support document or project document is revised with the mutual agreement of the UNDP resident representative and the designated institution.

5.   The relevant provisions of the Revised Standard Agreement (RBA), signed on 13 February 1962, including the provisions on liability and privileges and immunities, shall apply to the provision of such support services. The Government shall retain overall responsibility for the nationally managed programme or project through its designated institution. The responsibility of the UNDP country office for the provision of the support services described herein shall be limited to the provision of such support services detailed in the annex to the programme support document or project document.

6.   Any claim or dispute arising under or in connection with the provision of support services by the UNDP country office in accordance with this letter shall be handled pursuant to the relevant provisions of the RBA.

7.   The manner and method of cost-recovery by the UNDP country office in providing the support services described in paragraph 3 above shall be specified in the annex to the programme support document or project document.
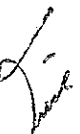
8.   The UNDP country office shall submit progress reports on the support services provided and shall report on the costs reimbursed in providing such services, as may be required.

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9.   Any modification of the present arrangements shall be effected by mutual written agreement of the parties hereto.

10.   If you are in agreement with the provisions set forth above, please sign and return to this office two signed copies of this letter. Upon your signature, this letter shall constitute an agreement between your Government and UNDP on the terms and conditions for the provision of support services by the UNDP country office for nationally managed programmes and projects.

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DESCRIPTION OF UNDP COUNTRY OFFICE SUPPORT SERVICES

1.   Reference is made to consultations between the Kuwait Institute of Scientific Research (KISR), the institution designated by the Government of Kuwait and officials of UNDP with respect to the provision of support services by the UNDP country office for the nationally managed project "Kuwait Integrated Environmental Information Network Phase-IV" (hereinafter referred to as "the Project")

2.   In accordance with the provisions of the letter of agreement and the "Kuwait Integrated Environmental Information Network Phase-IV" project document signed on......................., the UNDP country office shall provide support services for the Project as described below.

3.   Support services to be provided:

Support services	Schedule for the provision of the support services	Cost to UNDP of providing such support services	Amount and method of reimbursement of UNDP
1. Identification and recruitment of project personnel	As determined in the project Annual Work Plan	As determined in the project Annual Work Plan	The Annual Work Plan budget includes 3% Facilities and Administration to UNDP defined as General Management Support (GMS).
2. Identification and facilitation of training activities	As determined in the project Annual Work Plan	As determined in the project Annual Work Plan	The Annual Work Plan budget includes 3% Facilities and Administration to UNDP defined as General Management Support (GMS).
3. Procurement of goods and services	As determined in the project Annual Work Plan	As determined in the project Annual Work Plan	The Annual Work Plan budget includes 3% Facilities and Administration to UNDP defined as General Management Support (GMS).

4.   Description of functions and responsibilities of the parties involved:

The project will be implemented and managed by KISR with operational support provided by UNDP. KISR has agreed to delegate support services to UNDP which will act in its capacity as a responsible party. These support services include recruitment, procurement and direct payments. KISR will enter into a contractual agreement with consulting firms and service providers through a tendering and competitive bidding process according to UNDP procurement rules and regulations. In its capacity as responsible party, UNDP will be responsible for disbursing payments to the service provider based on the KISR requests for payments. KISR will remain accountable to UNDP with regards to utilization of the financial resources for the project. The General Secretariat of the Supreme Council for Planning and Development will act in its capacity as national coordinating agency and will conduct field visits and receive regular progress and financial reports on the status of the project's progress.

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ANNEX G: GIS Code of Ethics (URISA)

The GIS Code of Ethics (URISA)

Approved by the URISA Board of Directors
April 9, 2003
http://www.urisa.org/about/ethics

This Code of Ethics is intended to provide guidelines for GIS (geographic information system) professionals. It should help professionals make appropriate and ethical choices. It should provide a basis for evaluating their work from an ethical point of view. By heeding this code, GIS professionals will help to preserve and enhance public trust in the discipline.

This code is based on the ethical principle of always treating others with respect and never merely as means to an end: i.e., *deontology*. It requires us to consider the impact of our actions on other persons and to modify our actions to reflect the respect and concern we have for them. It emphasizes our obligations to other persons, to our colleagues and the profession, to our employers, and to society as a whole. Those obligations provide the organizing structure for these guidelines.

The text of this code draws on the work of many professional societies. It is not surprising that many codes of ethics have a similar structure and provide similar guidelines to their professionals, because they are based upon a similar concept of morality. A few of the guidelines that are unique to the GIS profession include the encouragement to make data and findings widely available, to document data and products, to be actively involved in data retention and security, to show respect for copyright and other intellectual property rights, and to display concern for the sensitive data about individuals discovered through geospatial or database manipulations. Longer statements expand on or provide examples for the GIS profession.

A positive tone is taken throughout the text of this code. GIS professionals commit themselves to ethical behaviour rather than merely seeking to avoid specific acts. The problems with listing acts to be avoided are: 1) there are usually reasonable exceptions to any avoidance rule and 2) there is implicit approval of any act not on the list. Instead, this code provides a list of many positive actions. These explicit actions illustrate respect for others and help strengthen both an understanding of this ethos and a commitment to it.

This code is not expected to provide guidelines for all situations. Ambiguities will occur and personal judgment will be required. Sometimes a GIS professional becomes stuck in a dilemma where two right actions are in conflict with each other or any course of action violates some aspect of this code. Help might come from talking with colleagues or reading relevant works such as those listed in the bibliography. Ultimately, a professional must reflect carefully on such situations before making the tough decision. Contemplating the values and goals of alternative ethical paradigms may be useful in reaching a decision:[ii]

- View persons who exemplify morality as your own guide (Virtue Ethics)
- Attempt to maximize the happiness of everyone affected (Utilitarianism)
- Only follow maxims of conduct that everyone else could adopt (Kantianism)
- Always treat other persons as ends, never merely as means (Deontology)
-

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I. Obligations to Society

The GIS professional recognizes the impact of his or her work on society as a whole, on subgroups of society including geographic or demographic minorities, on future generations, and inclusive of social, economic, environmental, or technical fields of endeavor. Obligations to society shall be paramount when there is conflict with other obligations. Therefore, the GIS professional will:

1. Do the Best Work Possible

- Be objective, use due care, and make full use of education and skills.
- Practice integrity and not be unduly swayed by the demands of others.
- Provide full, clear, and accurate information.
- Be aware of consequences, good and bad.
- Strive to do what is right, not just what is legal.

2. Contribute to the Community to the Extent Possible, Feasible, and Advisable

- Make data and findings widely available.
- Strive for broad citizen involvement in problem definition, data identification, analysis, and decision-making.
- Donate services to the community.

3. Speak Out About Issues

- Call attention to emerging public issues and identify appropriate responses based on personal expertise.
- Call attention to the unprofessional work of others. First take concerns to those persons; if satisfaction is not gained and the problems warrant, then additional people and organizations should be notified.
- Admit when a mistake has been made and make corrections where possible.

II. Obligations to Employers and Funders

The GIS professional recognizes that he or she has been hired to deliver needed products and services. The employer (or funder) expects quality work and professional conduct. Therefore the GIS professional will:

1. Deliver Quality Work

- Be qualified for the tasks accepted.
- Keep current in the field through readings and professional development.
- Identify risks and the potential means to reduce them.
- Define alternative strategies to reach employer/funder goals, if possible, and the implications of each.
- Document work so that others can use it. This includes metadata and program documentation.

2. Have a Professional Relationship

- Hold information confidential unless authorized to release it.

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- Avoid all conflicts of interest with clients and employers if possible, but when they are unavoidable, disclose that conflict.
- Avoid soliciting, accepting, or offering any gratuity or inappropriate benefit connected to a potential or existing business or working relationship.
- Accept work reviews as a means to improve performance.
- Honor contracts and assigned responsibilities.
- Accept decisions of employers and clients, unless they are illegal or unethical.
- Help develop security, backup, retention, recovery, and disposal rules.
- Acknowledge and accept rules about the personal use of employer resources. This includes computers, data, telecommunication equipment, and other resources.
- Strive to resolve differences.

3. Be Honest in Representations

- State professional qualifications truthfully.
- Make honest proposals that allow the work to be completed for the resources requested.
- Deliver an hour's work for an hour's pay.
- Describe products and services fully.
- Be forthcoming about any limitations of data, software, assumptions, models, methods, and analysis.

III. Obligations to Colleagues and the Profession

The GIS professional recognizes the value of being part of a community of other professionals. Together, we support each other and add to the stature of the field. Therefore, the GIS professional will:

1. Respect the Work of Others.

- Cite the work of others whenever possible and appropriate.
- Honor the intellectual property rights of others. This includes their rights in software and data.
- Accept and provide fair critical comments on professional work.
- Recognize the limitations of one's own knowledge and skills and recognize and use the skills of other professionals as needed. This includes both those in other disciplines and GIS professionals with deeper skills in critical sub-areas of the field.
- Work respectfully and capably with others in GIS and other disciplines.
- Respect existing working relationships between others, including employer/employee and contractor/client relationships.
- Deal honestly and fairly with prospective employees, contractors, and vendors.

2. Contribute to the Discipline to the Extent Possible

- Publish results so others can learn about them.
- Volunteer time to professional educational and organizational efforts: local, national, or global.

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- Support individual colleagues in their professional development. Special attention should be given to underrepresented groups whose diverse backgrounds will add to the strength of the profession.

IV. Obligations to Individuals in Society

The GIS professional recognizes the impact of his or her work on individual people and will strive to avoid harm to them. Therefore, the GIS professional will:

1. Respect Privacy

- Protect individual privacy, especially about sensitive information.
- Be especially careful with new information discovered about an individual through GIS-based manipulations (such as geocoding) or the combination of two or more databases.

2. Respect Individuals

- Encourage individual autonomy. For example, allow individuals to withhold consent from being added to a database, correct information about themselves in a database, and remove themselves from a database.
- Avoid undue intrusions into the lives of individuals.
- Be truthful when disclosing information about an individual.
- Treat all individuals equally, without regard to race, gender, or other personal characteristic not related to the task at hand.

GIS Code of Ethics Bibliography:

American Institute of Certified Planners. 1991. AICP Code of Ethics and Professional Conduct.

ASPRS. 2001. Code of Ethics of the American Society for Photogrammetry and Remote Sensing

Association for Computing Machinery. 1992. ACM Code of Ethics and Professional Conduct.

Craig, William J. 1993. A GIS Code of Ethics: What Can We Learn from Other Organizations? Journal of the Urban and Regional Information Systems Association, 5(2): 13-16.

Edson, Curtis, Brian Garcia, Jordan Hantman, Nicole Hartz, Hannah Jensen, Jill Leale, Kelley Lewelling, John Marks, Jeff Maxted, Bruce Moore, Brendan Vierk Rivera, Anna Weitzel. 2001. "Code of Ethics for GIS Professionals," paper for IES 400, GIS and Society, Institute for Environmental Studies, University of Wisconsin-Madison.

Kidder, Rushworth M. 1995. How Good People Make Tough Choices, New York: William Morrow and Company, Inc.

Olson, Andrew. 1998. Authoring a Code: Observations on Process and Organization, Center for Study of Ethics in the Professions, Illinois Institute of Technology.

Pennsylvania Society of Land Surveyors, 1998. Manual of Practice for Professional Land Surveyors in the Commonwealth of Pennsylvania.

Rachels, James. 1999. The Elements of Moral Philosophy, Boston: McGraw-Hill College.

[i] URISA's Ethics Task Force consisted of William J. Craig, chair, Al Butler, Tim Case, and Rebecca Somers. Craig authored the first draft with significant input from James H. Fetzer and Harlan Onsrud. Somers and Judy M. Olson provided comments in numerous significant areas on subsequent revisions.