Regional Meeting on Experiences & Best Practices in Environmental Information Development and Management in West Asia, 9 – 10 January 2005 Abu Dhabi - UAE	Disrt. LIMITED UNEP/ROWA/AGEDI/RMEIDM/RS 14 January 2005 ORIGINAL: ENGLISH

Regional Study
Abu Dhabi Global Environmental Data Initiative

ACSAD Report

By

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TASK -1

Answer to Set of Question/ Inquiries

1-What are the focus areas for environmental data and information In ACSAD;

The focus areas are;

- Fresh water
- Soil and land use
- Land degradation
- Vegetative cover
- Biodiversity
- Desertification
- Drought monitoring
- Climate change
- Waste water reuse
- Water quality

2-What is the environmental information needs common across stakeholder groups in the region.

The environmental information needs can be subdivided depending on the stakeholder group:

There are several categories;

- Information needed by the national institutions: it concerns the assessment monitoring, trends of evolution of the natural resources, data management by using a selected set of indicators, data processing.

- Information needed by the decision makers: The information needed her is an integrated environmental information system which links all the information and data on the components of the natural system, assessment, monitoring, population growth, and development activities as a support for planning and decision making.

- The public sector is concerned about the availability of natural resources quality of the environment, the environmental legislation and regulations, best practices for the use of natural resources in a sustainable way.

- Research institutes, they are mainly concerned by the information regarding the evolution of the environment through the development of appropriate indicators, natural resources geographical distribution.

The basic information needed for all the categories can be summarized as follows;

-Water and soil resources; implies all the data and information regarding their assessment, quality, geographical distribution, legislations and regulations regarding uses of water and soil resources, water and soil quality control and water quality, monitoring system, indicators

used, land and water uses, soil characteristic, hydrology and hydrogeology, waste water reuse regulations and guidelines.

- Drought events frequency and adopted policy for mitigation
- Land cover status and geographical distribution, plants species, crops resistant to salinity and aridity .
- Institutional arrangements, regulations
- Environmental assessment
- Vulnerability of environmental system.

3-Is there a regional (national) environmental information system initiative, programme, projects, etc., that address those needs? When it started and when it will be completed? Who is overseeing?

At present there is no integrated environmental information system. There are only some fragments of such system, separated from each other, soil, water, and plants without any geographical link. An initiative has been launched to build an integrated information system (NETWORK) for monitoring and observe the evolution of different components of the ecological system in selected pilot areas in the Mashreq countries, Syria, Lebanon, Jordan. This initiative has been considered as a continuation of the network, which is operated at present by OSS (Sahara and Sahel Observatory) in North and South of large Sahara in Africa and known as ROSELT Unfortunately, this initiative due to financial constraints, could not be settled.

ACSAD is now in process to launch a new initiative in cooperation with GTZ and Trier University in Germany, to build an early warning system for desertification to which remote sensing centers in the Arab region will be associated within a network. This initiative launched this year and needs unless three years to be really settled. The work in this system will focus mainly on the use of GIS and remote sensing techniques with a set of selected indicators to follow the evolution. A new project is also under achievement is the establishment of the Arab water resources digital map which will make use of a big data base gathering the data and information on the water resources, water use and different related socio-economic activities. This database will be based GIS to produce different thematic maps.

Meanwhile there are several databases, operating in ACSAD, such as soil database, water resources database, plants and vegetative cover database. They are all based GIS (Arc-View or ARC INFO).

4- What are the strength and weakness of current public information systems and services provided in your country (region).

The strength of the different information systems is that they collect data and information at the regional level. The information and data collected were provided to the systems through the implementation of different ACSAD projects in the region in cooperation directly with

the Arab countries or with other regional or international organizations. The regional distribution of the environmental information helps in giving a regional over view on the environmental system in the region. Such issue cannot be done through the national information systems. The out puts of the regional systems can be provided also in a digital forms or thematic maps showing for example the regional distribution of one environmental issue (water quality of groundwater resources, land use).
The data and information stored are well quality checked and processed, so it is ready to be used by all the Arab countries, League of the Arab states and the Council of the Arab Ministers for the environment.

Good skilled staff exist in ACSAD, they were trained on job and are ready to provide services and consultations to the Arab countries and even to implement any new information system in the region .

The weaknesses of the different information systems are:

- The continuity of the flow of information from the national institutions.
- Harmonization of the environmental data, and indicators used by the countries.
- Compatibility of different hard ware and soft ware used in the different countries.
- Lack of funds.
- Lack of commitments of the countries to cooperate with ACSAD in exchanging and providing the data requested.

5- What are the preferred information acquisition methods? Internet, CDs, printed materials, etc.

Due to the weakness of communication systems in the Arab countries, and facility access to the internet (in most of the countries of the region the access to the internet is still considered as a luxury and is a privilege for directors) or even the existence of computers is lacking every where, the hard copies of reports, brochures is still used as information acquisition methods. Mean while in ACSAD all the technical facilities exist and we can receive the information in all types (internet, CDs,).

6-What are the constrains and barriers to access environmental information in your country (region).

The main constrains are the confidentialities of information. The environmental information is still considered by some decision makers as confident and accessibility must be restricted. The environmental information in some countries is still not recognized as a major need.

The environmental information is dispersed within the different national institutions, which will limit their exchange. There is no central service at the national level, which handle the environmental information. In most of the cases there is a gaps in the continuity of information, due mainly to the lack of monitoring data.

7- Is there a national (regional) programme or project on environmental indicators? Please provide titles, starting and ending dates, thematic areas covered, indicate whether it has been successful and why?

There are several regional programmes on environmental indicators in the region such as;

The project implemented by the Mediterranean Action Plan and sponsored by UNEP:

The objective was to select an appropriate indicators for sustainable development in the Mediterranean region. The selection has been done by the Mediterranean Commission on Sustainable Development. A first set of 130 basic indicators have been selected (of which 55 are more easy to calculate in view of relevance and availability of data for an adequate number of countries). The report on sustainable development in the Mediterranean, mainly based on selected indicators has been drawn up in the year 2002. It has been launched following Malt declaration in1999. The indictors cover, the population and society, Lands and Areas, Economic activities and sustainability, the sustainable Development and Exchange and cooperation in the Mediterranean.

- UNEP - ROWA has organized a workshop in Bahrain in October 2003 on priority environmental indicators in West Asia. Two sets of indicators has been selected, the first one concerns, water, land, coastal and marine. The second one concerns biodiversity, energy, health and environment.

- UNESCO – Cairo office has launched an activity in the Arab region, in cooperation with ACSAD, ESCWA, CEDARE, for defining a water indicators in the Arab region. This activity is conducted within the framework of the project implemented by UNESCO on integrated water resources management in the world. A set of indicators regarding different water issues, such as, water quality, water and health, water and social activities, etc.. has been adopted in 2004.

Most of these programmes and resulting outputs are still at theoretical stages because there is no a real monitoring programme which has been implemented to test the validities of different selected indicators.

8- Are there any monitoring programmes (national or regional) aiming at collecting data and filling in data gaps, what are the thematic areas covered.

There is no real programme operating at the regional level .As it was mentioned before the only operating one is the ROSELT which covers the area in North and southern Grand Sahara in Africa. This programme covers all the ecological aspect ACSAD has tried to launch the same programme for the Mashreque countries with out any success. Within the European project MEDA, there is a programme dealing with monitoring of the environment of the Mediterranean coast .At present, no such programme exist at the regional level.

At the national level in most of the Arab countries there are monitoring programme dealing mainly with freshwater (quality, quantity), climatology as is the case in Jordan, Syria Egypt, Tunisia, There is no monitoring programmes dealing air quality, land degradation (unless in the Mashreque countries), coastal zones, industrial pollution. There are probably some sporadic studies covering certain aspects of the environment.

9- Does your country (region) produce state of environment (environmental outlook) reports? Please give dates produced; what is the information sources being used in producing this report.

ACSAD has participated in cooperation with the Arabian Gulf University in the preparation of the state of the environment (environment outlook) reports regarding West Asia region, such as, GEO 20002 GEO 2003 and GEO 2004. These activities have been coordinated by UNEP –ROWA. The sources of information being used in producing this reports are mainly ACSAD databases and results of related projects implemented by ACSAD in the region. Some consultations with selected countries of the region were also utilized in these reports.

10- Please give recommendations to improve public access to environmental data at the local, national and regional levels (address the following aspects policy institutional, technical, financial, sustainability).

Public awareness about the environmental issue has emerged very recently in the Arab region. The preservation of the natural resources, air pollution, shortages in water supply, pollutions of effluents, industrial pollution, etc., became a major concern for the population. People in most countries of the region became more familiar with environmental issue. The NGO's, local associations try to put more pressure on politicians, decision makers, planners to assess the impacts of their decisions and actions of development on the environment. So the access to environmental data became in some sort one of their recognized rights.

Policy;

With the emerging boom of the Media and the increasing in education level of the populations in most of the countries of the Arab region, the public became more aware about the different environmental aspects. The public became also more exigent about his rights to have good environment and request to be more involved in policy discussion and decision making. Such involvement necessitate that the accessibility to the environmental information must be facilitated. Consequently the national policy should be changed regarding the restrictions on the exchange of information at the national and regional level. It is evident that, there is also a need to adopt some regulations regarding this issue. It is not possible to take out all the restrictions by for example, separating the information in two types, one which request a special authorization (because in some cases the deliverance of some information could create a trouble in the country) and the second one without. There is also a need to enforce the exchange of information at the regional level. A commitment of each country of the region regarding this issue is necessary. This will help in getting a regional overview on the environment, which will be of profit for all the countries of the region.

Institutional;

Since the environment concern different national institutions, this situation implies that the environmental information are in most of the cases dispersed between different services. The creation of a strong structure at the national level which will be assigned to take in charge the responsibility to harmonize standards, data bases, guidelines to collect the data and validate the data and information and finally coordinate actions. The existence of such body will also help in resolving conflicts between various national services and in the same time accelerate the coordination and exchange of information at the regional level by arranging some agreements that facilitate contacts coordination and flow of environmental information.

Technical;

A good management of the environmental information system requires a well skilled and trained staff at the central structure, able to deal with up to date technology and software. They will take in charge the organization of the work; arrange links between different existing databases and monitoring systems at the national and regional levels. They have to set up standards and other technical issues to facilitate, exchange of data and information and ways of communications and connections with regional databases through Internet, networks etc. A bi- annually meetings should be arranged between technical staff at the national and regional to coordinate and standardize the collection of data and information, looking to the compatibility of different systems used and to discus ways and means to accelerate exchange of data and communications. Such meetings will help also in creating confidence and friendly relationship between the national and regional technical staff.

Financial;
The availability of funds is a prerequisite condition for the sustainability of the environmental information system at the national and regional level. The feeding of the national data bases with data and information require the existence of an operational monitoring systems for all the components of the environment, well equipped laboratories and IT services. Such issue demands big financing efforts from all partners, national institutions, funding agencies and regional organizations. A coordination effort between different concerning parties is needed to achieve the objective to have operational environmental information systems at the national and regional level. Minimum funds should be ensured by different parties to run the system and avoid creating gaps in the information. A regional and international cooperation should be promoted to create more frequently projects, which can help in sustaining the environmental information system. Such initiative would push the countries to allocate a continuous fund, for maintaining the environmental information system.

The private sector should be involved in financing the activities of the environmental information system, since it will be one of the beneficiaries of the available data and information. In this case the data for example can be even soled which can help in creating additional source of finance.

Sustainability;
The sustainability of the environmental information system can be ensured through;

- Allocation of enough funds at the national and regional level, to run the system.

- Enhancement of legislation and institutional arrangement to handle the system in a proper way.

- Involvement of all parties, public and private sectors in the effort.

- Maintaining the high level of technical staff in different services

- Promoting cooperation between national services and regional and international organizations for developing new projects to give more support to the system.

- Development of a programme for increasing awareness of the public about the environmental issue, which will create more pressure on the national governments and the regional organizations (through the representatives of the countries in their council o general assembly) to allocate more funds and integrate the environment aspects in projects planning.

TASK -2

Identification & Providing of Information on Initiatives Projects, Systems, or Networks on Environmental Data and Information

- Name: Arab data bank for Arid Plants (ADAP).

- **Lead Agency: ACSAD** (The Arab Center for the Studies of Arid Zones and Dry Lands)

- **Purpose, aims, objectives**;
To improve the information base regarding the plants growing in arid Arab region in view to conserve the environment and improve productive potential.

It aims at preparing a comprehensive and integrated data base management system that stores and retrieve data related to plants in the Arab region.

The main objective is to disseminate information to scientists working in the field of agriculture, desertification control, land rehabilitation, soil and water conservation. A complete set of information about different varieties of plants species in the Arab region, including nomenclature, local plant name, season of growth and flowering geographical distribution, economic importance and medicinal attributes.

- **Users**;
Research centers, universities, decision makers, regional organizations, NGO's and other public associations interested in the protection and preservation in the environment.

- **Methods**;
A unified data collection forms were prepared based on the following criteria;

- Serve project aims
- Be compatible with other Arab and international forms
  The forms include;

- Nomenclature data
- General data about the plant (economic value, botanical, phyto-sociological)
- Country data
- Site data
- Main climatic data
- Topography and soil type.

It was also found necessary to create another database to include a complete THESAURUS of all plants which are being documented in the main data base Because a huge amount of data is linked to scientific name, but in case a query is made through one of the synonyms, then it will be difficult to find the plant.

Thus the management system includes one main data bank linked to two secondary ones, the REFERENCES base and the THESAURUS of dry plant names. A data collection forms guide has also been prepared.

The structure of the system was designed based on the following criteria;
-The plant is considered the main pivot for storing all related data.
- A plant is identified by its family, genus, species, sub-species and varieties
- A plant ‘s scientific name is linked with its synonyms
- A plant ‘s Arabic name should be documented, in addition to any local name
- A plant should be related to its actual distribution.

The system used to build up this database was one of the systems known at that time as good international documentation systems. This system was CDS/ ISIS prepared by UNESCO. This system is considered more or less out of date and the database should be rebuilt using the recent data base management system.

-Appropriateness of the approach;
The approach is appropriate in terms of design, data collections, and to show the characteristics of all plant species in the Arab region. But at the time when the system was developed (1989 - 1990), GIS and other new systems used in data base management were not existing, so the system needs to be updated by including GIS technique since the main out put and query of the system is the geographical distribution of plants.

- Institutional capacity;
The system was designed by ACSAD staff who are well skilled to manage the system. The design aimed at being user friendly. Additional functional testing was done during several training sessions which were held in ACSAD for participants from Arab countries.

- Outcomes and benefits expected or achieved;
The system was the first one to integrate all the information regarding plants in arid Arab region, their geographic distribution and locations, economic importance, plant identification, (family, genus, species, subspecies and variety name), The plant’s specific name is linked with its synonyms. The system is linked with standard geographic systems and local country geographic grid. The environment data for each site where the plant is found is documented. The local and scientific names of the plants are also documented. The system was built to be in harmonization with the other international operated systems.

The system helped in assessing all varieties and types of plants in arid Arab region and documenting their sources of information. It help’s in ensuring good management of

renewable natural resources and conservation of the environment. It can also assist specialists working in the field of compacting desertification and land degradation.

- Results;
In addition to the database built, a manual was prepared including a complete description of the system It explains the different structure of the bank, describes the details of filling the data sheets, the Thesaurus. It explains also how to make a query about a given plant, and finally detailed information about of mode of utilization. At the time when the bank was completed, detailed information to depict 1310 plants 1310 plants were introduced and their general distribution. This information covers 13520 sites where those plants are found.

- Effectiveness and efficiency;
The bank in it self is very effective for documenting all the relevant information regarding plant species in the Arab arid region. Giving the location or the sites where a certain type of plant is found could be used as an indicator in future works in case for example, within a new survey in the area the same plant disappear. It means that something has happened; degradation or other causes and the results can be compared with other areas where the same plants exist. The efficiency of the system can be ameliorated if the system it self can be up-graded by using new software for system management and linked it to GIS. In this case the efficiency would be very high and the query became faster.

- Discussion on the results in relation to the intensions;
Results obtained were very promising for documenting and storing all the data related to a specific plant. The test on about more than 1000 plant species were encouraging to be extended later on to include other plant species and to cover all the flora of the Arab region. The out puts can help for the production of reports regarding the biodiversity and land cover status in the Arab region. The existing of such database can encourage decision makers to support the establishment of a monitoring system.

- **Lessons learned and experiences;**
- It is necessary for the sustainability of any environmental system to create a good funding system. Because it is always possible to build a good structured system, from the technical point of view, but if there is not enough funds for maintaining the system, all the efforts spent would be lost.

- The legal and reliable structure is also another pre-condition for the success and sustainability of any environmental information system. This structure should take in charge the management of the system and handle the monitoring system which will feed the system by the relevant information.

- The necessity to conserve a good relation ships with national services through the organization of workshops, seminars and other training programme. The participation of some NGO's in such activities will help in defining better the outputs of the systems to be more useful for the end users.

Name; Inventory Study and Regional Data base on Sustainable Vegetative Cover Management in West Asia (TN 2).

- Lead Agency: ACSAD, INCCD, UNEP /ROWA

- Purpose, Aims, Objectives;

The objective is to carry out an inventory and establish a data base on sustainable vegetative cover management in West Asia region, addressing the existing institutions, projects, personnel and out puts associated with status of vegetative cover in West Asia, its use, degradation etc. It aims to facilitate links, exchange of information and sharing of existing knowledge and technologies. It also help in recognizing knowledge and research gaps as perceived by different stakeholders.

- **Users**;

Users include research institutions, governmental institutions, universities, NGO's, regional and international organizations. Each focal point in each country has access only to his country. He can modify, upgrade and update his country data. Guests have restricted access; they are only allowed to interact with the database through structured queries and reports.

- Methods;

A questionnaire for collecting the needed data to the inventory study and database were developed. The questionnaire included basic data on each country, in addition to environmental data such as climate, soil, water, resources, and types of land use (rangeland, forestland, irrigated and rain fed crops. Information about major land degradation of each vegetative cover land use, projects executed and planned are also included. The database was developed to be suitable and accessible through Internet. The vegetation cover data base system is being hosted by ACSAD and UNCCD websites. The system used is rational system database management (RABMS) net.sql seven 2000. The database can be managed and maintained virtually from anywhere. A password has been assigned to the focal point in each country.

- Appropriateness of the approach;

The approach adopted is very appropriate. It clearly revealed that there is a lack of proper reporting and documentation regarding the out puts experience and results of vegetative cover studies, assessment and evaluation, implementation and management It also revealed the lack of coordination and harmony among different concerned national institutions. It was found also that many countries have neglected the human resources and even they do not have the kind of data that is needed for effective sustainable vegetative cover management. Such conclusions were very useful for the identification of gaps and the root causes for the unsustainable use of natural resources and their degradation.

- Institutional capacity;

The database has been designed and developed, as well as the questionnaire by ACSAD team. It is developed as web-based vegetation cover resources inventory database according to ACCESS 1998. Several modules were prepared within the data base such as, website module, stored procedures, configurations, maintenance, linkages with other data bases, reporting and finally organizing and control the access to the site.

Through the database it is possible to identify who is doing what, where and how. It helps in assessing and evaluating the activities undertook to identify agreed – upon priorities for the future activities. The data base gives, information about, on past, on going and planned projects and activities including responsible institutions and organization involved. It shows also the accessibility to the concerned public to the results of different projects and activities implemented.

-Outcomes and benefits expected or achieved;

The work done clearly revealed the main causes of land degradation in the assessed countries. It also revealed that there are many inefficient technical, institutional, social poor

enforcement of environmental legislation. Poor assessment, seasonable monitoring and misuse and management of vegetative cover have been clearly reflected. There is a striking lack of data on the grazing capacity of rangeland economic use of forest land, natural regeneration of vegetative cover as well as the extent of land degradation in the countries of West Asia. The involvement of main stakeholders has been revealed very modest.

- **Results (Impacts);**

A report giving an inventory of vegetative covers status, technology and research gaps has been prepared for the countries in West Asia. It shows the status of rangeland, forest status, cropland and efforts undertaken for compacting land degradation and desertification. The report high lights types of studies, projects and research carried out by the countries within the strategies and technique to combat desertification and vegetation cover degradation. Lack of harmonization and coordination among the different national services and agencies involved in the issue of vegetative cover have been revealed. The participation of all concerned stakeholders in management of vegetative cover is shown very poor.

- Effectiveness and efficiency;

The system is very effective since it is able to maintain continuous communication through the national focal pints for up-dating information and allow efficient collection and processing of information.

- Discussion on the results in relation to the intensions;

Results were very interesting as they identify the main causes of land degradation in the assessed countries which is one of the mandate of this study. For example, it is shown that in Iran, Yemen, some parts of Oman and Lebanon the main cause of land degradation in the mountain areas is water erosion, forest cutting, fires and urbanization. The other causes is raising coasts for maintaining past benching and terracing conservation and other runoff control structures on the slops. The results obtained have also shown the lack of coordination is also one of the causes of non-sustainable management of vegetative cover in West Asia.

- Lesson learned and experiences;

- The necessity to have an independent administration or national system that takes the responsibility of implementing and achieving the desired coordination and integration among all institutions and decision makers regarding environmental issue.

- The necessity to harmonize the data collection sheets or forms to fit with the required data needed for effective sustainable management of the environment.

- The necessity to handle a continuous capacity building programme for upgrading the capacity of national teams and promote contacts and relationships between national and regional teams.

- Involvement of all stakeholders is a necessity to ensure sustainable management of natural resources.

Name; Arab water resources data base and mapping

- **Lead Agency; ACSAD, UNESCO, ALECSO**

- **Purpose, aims, objectives**;

To develop an interactive water resources assessment database and assessment mapping in the Arab region using data compiled by various national and regional institutions. The main objective is to contribute to the sustainable management and development of water resources in the Arab region focusing on management, capacity building and environment through providing interactive, accurate and timely digitized water resources maps and digital geo-environmental data bases required for the region.

- **Users;**

Different national stakeholders and decision makers, regional and international organizations interested in water resources management and environment.

- **Methods;**

This project, building on the achievement of the many previous endeavors, focus on assessing the developing situation regarding water resources through the building of a data base linked with GIS to produce an interactive resources maps. This interactive map shall comprise layers of topographic, geology hydrogeology, surface water systems and wadis, water use; land use data .It shall be dynamic and can easily incorporate any new data into it. The project focuses on terrestrial fresh water, but this will be linked with the marine near shore environments and coastal zone regions as principal sinks for land- based source of pollution and sedimentation and as areas where the potential impact of sea level rise on fresh water resources is particularly acute. The system will be linked with the data and information systems of the UN agencies.

- **Appropriateness of the approach**;

The approach was appropriate in terms that it will involve all concerned parties at the national and regional levels and building on the compilation of the data produced from previous achievement and studies. The system will make use of GIS tool which will facilitate the production of different thematic maps in addition to a website which include on-line library and database.

- **Institutional capacity;**

ACSAD team is leading the work. Based on his vast experience in mapping and data base systems ACSAD has designed the data base structure, the linkages with other national and regional data bases through the internet for the exchange of information and feed back and mapping tool such as GIS, have all been considered in the system.

Several expert group meetings have been organized where ACSAD team has presented and explained the structure of the system.

- **Outcomes and benefits expected or achieved;**

The outcomes of the project can be summarized as follows;

- Produce database for digital geo-water resources and GIS interactive water maps.

- Develop mechanisms for the transfer of knowledge and expertise on water resources maps and geo-environmental data to national government, decision makers at all levels from local to international, user organizations and general public.

- Alleviate distress in disadvantaged regions of the Arab region with regard to

water resources and increase awareness of policy – makers, stakeholders and the public.

- Identify and assess the state of fresh water and its management in the Arab region.

-Results (impacts);
The state of water resources and its management in the Arab region can be summarized in a geographical (maps) and reports forms. The project helped in high-lighting the region facing very acute water crisis, in terms of shortage in water resources or pollution. The needs for up-grading human capacity in various national water institutions has been identified. The units related to the procedure has also been supported with necessary equipment and concerned staff trained on use of new systems.

Effectiveness and efficiency;
The work it self is very efficient since it helps in developing an interactive water resources assessment map in the Arab region using data compiled by various national and regional institutions with the help of GIS tool. The interactive map is dynamic and can incorporate any new data into it.

Discussion on the results in relation to the intensions;
Results are encouraging as the produced map and the system linked with can be interactive. It means that the updating and exchange of information among different concerned institutions can be very fast and at each moment the water resources situation in the region can be shown geo referenced.

- **Lessons learned and experiences;**

The major lesson learned is that;

- The necessity to have a very accurate system for monitoring and storing and processing data.

- There is a need to harmonize data collection forms, compatibility of database systems at the national and regional levels.

- There is a need to establish an independent system, that takes the responsibility of achieving coordination and integrating information among different concerned institutions.

-The involvement of different stakeholders is also an urgent need, since every body is concerned with water issue, at the national and regional level (in the case of shared water resources).

- For ensuring the sustainability of monitoring system and related database it is necessary to allocate the appropriate funds for maintaining the system and up grading the equipments.

- It is very helpful to have the data in a digital form which can accelerate its exchange among different users.

Name; Inventory Study and Regional Data base on Sustainable Water - Management in West Asia (TN1).

- **Lead agency; ICARDA, ACSAD, UNEP / ROWA, UNCCD**

- **Purpose, aims, objectives;**
  The purpose is to develop and define a strategy to combat desertification in West Asia. The objective is to develop an inventory and database of past, on-going and planned activities related to TN1, institutions and organizations working in water related projects principal outputs and research and knowledge gaps as perceived by different stakeholders. The project aims to provide a dynamic database with information from member countries on water resources management activities accessible to all users. It aims also to allow focal point members and stakeholders to use the database and utilize the information to develop and conduct activities within TN1.

- **Users;**
  Stakeholders at different national institutions, decision makers, regional and international organizations and funding agencies.

- **Methods;**
- A questionnaire has been prepared and then sent to the national focal points to start the process of collecting information. Parallel to that, the database has been designed and developed for entering the data. The linkages of the database to the internet was also done. Once the database was operative and the collected information were entered into it, the inventory of strategies and technologies to combat desertification has been done. A workshop has been organized to discuss the database, the findings of the inventory study to put recommendations for future action. Training on use of database was done. Several modules were prepared within the data base to satisfy all the requirements, such as website module to keep the data base on line for continuous updating of the information search, retrieval and queries modules, security and maintenance module. The database is hosted by CGIAR and the International Plant Genetic Resources Institute (IPGRI) in Rome.

- **Appropriateness of the approach**;
  The approach is certainly appropriate as it allow to have an overview about the on going activities and projects regarding the water issue in the region, the national institutions concerned, to identify the gaps, lack of knowledge and required capacity building regarding water resources management. These out puts can help in defining the needs of the countries in the field of water resources management and better planning future actions.

- **Institutional capacity**;
  The inventory exercise has revealed that there is a lack of coordination and harmony among the national institutions dealing with water resources management. There is also a lack in the harmonization of the data collected. This was clearly reflected in the difficulties and the delay that the focal points have had in collecting the required information to fill the questionnaire. It was also found that most of the countries do not have their information in a digital form, which means that they do not have an electronic database.

- **Outcomes and benefits expected or achieved**;

The inventory achieved has provided an overview on the water resources management issue in West Asia. The on-going activities and projects implemented or under implementation. It helped in identifying the main stakeholders, the gaps in knowledge, and needs in capacity building. The study enhanced to a certain extent the establishment of links, information exchange, consolidation and sharing existing knowledge and technologies relating to water resources management.

- **Results (impacts);**
  The state of water resources management can be done. Gaps, harmonization and coordination needs for the region can also be defined. The results were important and useful in the sense that no previous work has been conducted of that type in the region, besides the training provided.

  - **Effectiveness and efficiency**;
  The work done was very effective in the terms of methodology adopted Meanwhile the delay in providing the data from the countries proved that there is a need to enhance the capacity of national institutions to handle better the information. Big efforts are needed in this regard. Even the coordination among national and regional institutions is also needed.

- **Discussion on the results in relation to the intensions;**
  The results were useful as the outputs can be used to define a new strategies and activities in the field of water resources management in West Asia. It helped in identifying gaps in knowledge and lack in coordination among different services concerned by water resources management. Even at the regional level there is lack in coordinating activities. Depending on that we can say that the results were encouraging as the out puts are meaningful for better planning the new activities in the region.

- **Lessons learned and experiences**;
  -The necessity to create a service which has the responsibility to coordinate and harmonize the data collection and processing.

  - The necessity to establish a mechanism that facilitate links between data producers and beneficiaries.

  - The necessity to allocate enough funds for operating a monitoring system linked with a database.

TASK-3

Experience, Practices and Status of Environmental Data and Information systems In ACSAD

Experiences, Practices and Status of Environmental Data and Information Systems in ACSAD

1- Executive summary

ACSAD has started to develop several databases on water resources, Plants, Soil since more than 10 years. ACSAD has used many data base management system software. The department of Information Technology in ACSAD has good skilled specialists. They manage the data generated by different projects executed by ACSAD in the region. All the databases are linked to GIS (ARC View and ARC- INFO), which helps in producing different thematic maps and sheets. The software used for the management of the available database are ORACLE and ACCESS.

ACSAD works closely with national concerned institutions and regional organizations ACSAD has been involved in various regional projects of cooperation with regional and international organizations, such as UNCCD activities, UNESCO, FAO.

The sustainability of the information systems depends on the availability of funds or projects implemented in the region, by which some funds can be provided to maintain and develop the

information system. It depends also on the willing of national institutions to cooperate and facilitate the flow and exchange of information. The public access to the data and information system is free of charge. Looking to the future, it is necessary to organize a structure, such as a network, where all the concerned institutions at the national level (one focal structure in each country) are linked to the regional database. Harmonizing environmental standards, databases compatibility of different systems used are a prerequisite steps for the success of the regional environmental information system.

2- Introduction and Background:

The Arab countries share a number of physical, social and institutional characteristics Most of the region lies in the arid and semi arid zone and characterized by a fragile environment. Rainfall is low, variable and unpredictable in most of the area. Rapid population growth is exacerbating the pressure on natural resources. For example, the total population of West Asia has increased from about 34.8 million in 1970 to 106.4 million people in 2002 and is projected to increase to about 130 million in 2010 (GEO year book 2003). The availability of renewable water resources has dropped, from 3500m3 per capita to 1500 m3 per capita in 1990 and it is expected to drop further to 700 m3 per capita by the year 2025 (World Bank 1995). Concerned with maintaining their rapid pace of development, the Arab countries were slow to recognize the significance of environmental issues when they were first introduced at the Stockholm Conference in 1972. Later, in the eighties, a large number of them concentrated their efforts on establishing an institutional and legal framework for environmental management. Ministries, agencies and commission were formed and comprehensive environmental laws were enacted in few countries.

However, these institutions remained weak because of lack of resources, monitoring capacity and enforcement mechanisms.

Most of the countries of the region are facing critical problem of environmental degradation which, based on current trends, are getting worth. Some aspects of this environmental degradation include loss of productive arable land, rangelands and forests, depletion or decline in the quality of water resources and loss or damage of ecosystems and species, extension of desertification are Specific quantification of the extent of desertification in the Arab region is not possible due to lack of data, but it is estimated that between 30 and 60% of the crop, range, and forest lands in the region are subject to various forms of degradation which contribute to the process of desertification. Many of these problems are directly attributable to natural phenomena, floods, drought and specific land use practices, such as unsustainable forms of agriculture, miss use of water in irrigation, overgrazing and urbanization Environmental sustainability issues need to be addressed now for two reasons.
First, environmental degradation is already posing a threat to regional economic growth prospects and human well-being, especially among the poor. Second, failure to act now will greatly compound the cost and complexity of later remedial efforts.

The ideal of sustainable development is harmonization between economic growth and environmental preservation.

Several countries of the region are already in the process of strengthening institutions and implementing policies that will encourage more sustainable development.

Since water and arable land scarcity are the fundamental constraints to future economic growth in the Arab region, a sustainable development require a careful management with more attention given for monitoring and enforcement of environmental information system.

Such system will help in assessing and monitoring the trend in the evolution of the environmental system.

Meanwhile it is well known that the principal tool for providing information, assessing the state of natural resources, monitoring progress and trends in the use and management of natural resources over time and space is the use of environmental indicators.

Environmental indicators are becoming increasingly important as a means of communicating information to decision makers and the public.

But the cause for concern, however in the region, is not only also the precise information about the natural resources assessment, monitoring and availability .It is rather, the accessibility to available data and information and the flow of that information from producers to users.

The main purpose of this report is to present the state of the art regarding the existing and functioning of environmental data and information system in ACSAD (The Arab Center for the Studies of Arid Zones and Dry Lands) as a regional organization dealing with the enhancement of knowledge and generation of information required for promoting sustainable agriculture development and preservation of the environment in the Arab region. An overview on the existing information systems and initiative in ACSAD and the Arab region is described below.

3- Methodological approach;

A variety of activities undertaken over the last several years in ACSAD and in the region form the basis for this report .The environmental information systems managing by ACSAD or in cooperation with other regional organizations. Environmental action plans prepared by several countries of the region have been also consulted. Some consultations were undertaken with relevant officials in Syria, Jordan to get more information.

The report begins by analyzing some of the existing initiatives and programmes regarding the environmental information systems in the Arab region, their linkages to evolving patterns of the different environmental issues in the region and their effectiveness for helping policy makers to make better – informed decision. It then examines the institutional capacity for handling and managing environmental data and information and the major constraints for improving availability and accessibility of environmental data and information mainly to the public. Some emphasis is also given to the organizational aspect of environmental information system, since there is a need for a common understanding of integrated environmental information system in the Arab region.

The final chapter of the report provides a set of recommendations and priorities for actions for improving environmental information availability.

4- Status of environmental data and information:

One of the main objective of the integrated environmental assessment is to provide information to help decision makers understand the state of environmental resources and relate the findings to appropriate management decision.

Through building an appropriate information system, we can identify, follow and understand effects of nature and human actions on the biophysical and socio-economic environments to be effected. For example, the lack of information on past flooding encourages people to settle in flood – prone lands.

4-1 Analysis of existing initiatives, programmes, projects, systems and network in ACSAD:

Since the main target of ACSAD is to assess and conduct studies relating to natural resources management, several databases have been developed in the areas of water resources, plants and soil.

A- Data base for arid zones plants (ADAP):

A database for arid zones plants (ADAP) project has been initiated in 1993. It aims to prepare a comprehensive and intimately integrated data base management system that store and retrieve data related to plants in arid Arab region.

A list of thousand of plant species representing the flora in the Arab countries has been prepared to work on during the first phase. The selection of the plant species was done according to special criteria which gave the species a certain importance in arid and semi arid areas. The economic value of the species, grazing, medical, industrial, aromatic and ornamental use were considered. The importance of the species in sand dune fixation, erosion control, maintenance of wild life and economic plant genetic resources were also taken into account for the selection. Geographic distribution of the species, its tolerance salinity and resistance to drought, plant pests and disease were also taken in consideration. A thesaurus has also been prepared, which relates each plants scientific name to its own collection name. The dbase IV package from Ashton – Tate was chosen to be the database programming system. The CDS/ ISIS documentation system, which was prepared by UNESCO, was also used for preparing the references sub data base (Fig 1.).

B- ***Arab Water Resources Data Base***:

Since water in the Arab region is becoming scarce in quantity and inadequate in quality, due mainly to the fact that the ever increasing demands persist to exceed the supply ACSAD has launched a project for the establishment of an Interactive Regional Arab water resources data base. The project, building on the achievement of the many previous endeavors, focuses on assessing the developing situation regarding fresh water throughout the Arab region. The system shall be developed by ACSAD in collaboration with UNESCO, Cairo office and ALECSO within the framework of the UN System – wide project on World Water Assessment Programmes. The primary output is interactive digital maps and database. This interactive map shall comprise layers of topographic, geological, hydro-geological, surface water bodies and wadis, water use, land use data, etc.. It shall be dynamic and can easily incorporate any new data into it. The database is built within a GIS Arc info. Environment, using ORACLE database management system. The database will include data compilation (geo-referenced meta-data bases) data interpretation, comparative trend analyses, data dissemination. A first proposal of the system has been presented last July 2004, during an expert group meeting held in ACSAD (Fig 2). The map will be useful for decision makers and other regional and international agencies. It will identify situation of water crisis and provide the knowledge and understanding for further studies.

C- Regional data base on Sustainable Vegetation Cover Management in West Asia TN 2:

This data base has been established within the framework of the Sub – regional Programme (SRAP) to combat desertification and drought in West Asia, realized in collaboration with ACSAD, UNEP –ROWA, UNCCD and GM/UNCCD. This activity known as TN2 has the objective to carry out an inventory and establish a data base on sustainable vegetative cover management in West Asia, addressing the existing institutions, projects, personnel and outputs associated with status of vegetative cover in west Asia, its use, degradation, etc.

The data base established compile information on past, on going and planned projects and activities, including responsible institutions and organization involved, location, projects description and objectives, contact persons, results and eventually accessibility to the concerned people.

ACSAD in collaboration with ICARDA has selected and developed the data base using ACCESS system and the Web site to serve the data base and link it to all the concerned countries through the focal points with a pass word for each country for facilitating the access to the data base and feed back This data base is now operational in ACSAD.

D***. Regional data base on sustainable water management in West Asia TN1:***

This database was developed as part of the Sub-Regional Action Program (SRAP) to combat desertification and implemented by **ICARDA in cooperation with ACSAD**. The objective is to develop an inventory and data base of past, on going, and planned activities relate to TN1, institutions and organizations working in water related projects, principal out puts, and research and knowledge gaps as perceived by different stakeholders. The project aims to provide a dynamic database with information from member countries on water resources management activities accessible to all users .It allows all focal point members and stakeholders to use the database and utilize the information to develop and conduct activities within TN1 in West Asia.

The database design and schema were developed using MS-SQL2000, Ms-visio. An internal website was established to enter the data on line by the countries (the focal points). The website was based on the questionnaire prepared by ICARDA and approved by ACSAD. It was planned to host the database on a server operated by another CGIAR Center, the International Plant Genetic Resources Institute (IPGRI) in Rome.
This database is now operational in ICARDA.

Regional Thematic Network in Water Resources Management for Agriculture in Arid Semi Arid and Dry sub humid Area (TPN4):

The 1997 Beijing Ministerial Conference on Regional Cooperation in Asia decided on a framework to implement CCD in Asia. Six thematic programme Network areas that constitute the core structure of the Asian Regional Action Programme. Were identified for promoting regional cooperation. One of these networks is the TPN4 which is coordinated by the Ministry of Irrigation in Syria. ACSAD is invited to be member of the steering committee of this network. One of main objectives of the Network is to alleviate persistent lack of scientific data and information of arid regions relating to water resources management that severely impede an effective development of water management measures and policies. By gathering national stakeholders and collect and improve the information networking within the countries involved, this objectives could be achieved.

This network has been launched 3 years ago but nothing concrete up to now is achieved.

E – ***Long Term Ecological Monitoring Observatories Network in East Mediterranean ROSEEM.***

In order to better understanding the desertification phenomena and act more effectively against its negative impacts, ACSAD in cooperation with Sahara and Sahel Observatory (SSO) has launched a project for developing an observation, monitoring and evaluation mechanism of the ecological system in East Mediterranean countries using remote sensing and GIS technique .The data collected (climatology, Biodiversity, hydrology, range land, sand dunes movement) is stored in harmonized way to provide the manager or decision makers the accurate information regarding the process and evolution of desertification in the studied areas. This network would constitute an extension of other network operating by OSS in the region northern and southern Sahara known as ROSELT. Un-fortunately this network could not be established, due to lack of fund.

F***- Desertification Assessment and Monitoring System;***

ACSAD in cooperation with GTZ has launched a project for the establishment of a regional database linked to GIS and building an early warning system for monitoring desertification in the Arab region. This system shall link all the remote sensing centers in the Arab region through a network to exchange information. This system is under preparation by ACSAD. A network of remote sensing centers in 4 countries, Syria, Lebanon, Egypt and ACSAD is already established.

G ***– Water points data bases***

ACSAD has developed in cooperation with the ministry of irrigation in Syria several databases for the management of water resources in 5 water basins (in Syria there are 7 water basins directorates). These databases were based on water points (borehole, springs, hydro-metric stations). All the data concerning each water point is included in the database, such as pumping test, water quality, water levels. All the databases were built within GIS environment using ORACLE database management system.

H- ***Wadi hydrology Network and Groundwater Protection Network***:

Both networks have been initiated by ACSAD, UNESCO Cairo office and ALECSO. ACSAD is coordinating the wadi hydrology network which aims to generate and disseminate data and information regarding management of wadi systems in arid and semi arid zones in the Arab region. A database has been established to include all the available information on the wadi systems in the Arab region. A website for the network has also been developed and hosted by ACSAD home page.

The Groundwater Protection networks aims also to improve and disseminate information regarding the protection of groundwater in the Arab region. ACSAD is member of this network, which is coordinated by the Institute of Groundwater Research in Egypt.

4-2 Data and information availability (collectively, sectoral and thematic)

The generation of data and information to the different data bases is ensured through the different projects and programmes implemented separately by ACSAD or in cooperation with

other national or regional organizations .As described above there is no unified data base or a core data set in ACSAD covering all the environmental information sectors. So the flow of data and information is directed to each specific database, water or soil or plants etc. There is a need for a unified framework for the development of environment information system. Such framework is needed to structure the collection, analysis and presentation of environmental information and integrate environmental data on a geographic basis. This task is probably easy since the binding elements between all this data bases is that all related to a specific geographical location or area. Thematic maps and remote sensing layers of terrestrial environment are also stored in the different databases.

Un-fortunately ACSAD does not also have a special sectoral monitoring programme to feed the different databases.

The produced databases were used in most of the regional projects and studies implemented by ACSAD and also for providing the League of Arab States, the Council of the Arab Ministers of Environment by the information and reports about the status of the environment in the Arab region.

4-3 Public Access:

All the data, information and reports generating by ACSAD activities are accessible to the interested public through direct contacts or ACSAD home page. The restriction imposed concerns only data and reports that have been produced through special contracts upon request from national concerned institutions in the Arab countries. All the available data and information including maps, printed materials are distributed free of charge to the interested persons, researchers and university students. The access to the data bases is not permitted, but ACSAD can provide all the data and information requested by means of hard copies, tables, C.D, maps, etc.

4-4 Information policy and legislation

As per mandate ACSAD is supposed to be the depository center for all the environmental information in the Arab region. ACSAD is mandated to represent the league of the Arab states in all the international conventions, such as desertification, biodiversity and related issues. Un-fortunately, the lack of structured approach to structure the collection, harmonization of environmental standards within the Arab countries, analysis and presentation of environmental information, integrate environmental data on a geographic basis, commitment of the countries to provide the necessary data and information, constitute all a major constraints to meet the objective assigned to ACSAD to be the focal center for environmental information in the Arab region. The question of confidentiality of certain data released by the countries is also another obstacle for building integrated environmental information systems.

Having some sort of conventions to organize the flow of information and data between the ACSAD and the national institutions and regulating the exchange of information and the accessibility to public will be highly appreciated.

4-5 Institutional capacity for managing environmental data and information:

ACSAD has developed several databases for different environmental elements of the natural resources, water, soil, vegetative cover, plants with the exception of air pollution, health, diseases. The experience gained from the implementation of more than 5 information

systems in addition to several punctual data bases, more than 10 mainly in the water sector, prove the capacity of ACSAD for holding and managing a regional environmental information system. Highly qualified and well trained personal in IT, use of GIS design of databases, linking data bases to GIS, well equipped remote sensing department, system managers with all the needed soft and hard wares are available at ACSAD. Therefore an integrated environmental information system could easily be managed by ACSAD as a regional focal center for collection and dissemination of environmental information.

4-6 Financing of environmental data and information:

ACSAD is a regional organization, therefore funds for any activities comes either from its assigned budget or through programmes and projects funded by international funding agencies. ACSAD can not maintain any monitoring programme that generate the environmental data but he covered the expenses of producing of its data bases Therefore the establishment of a network or any adequate mechanism with enough financial support, through which the flow of data and information from the national or regional institutions to feed the regional information system will be very opportune. Without the external financial support to maintain the adopted system, with eventually a legal framework, such system will not be sustained, even if the countries express their commitment to cooperate.

5- Effectiveness and efficiency of current information systems (include strengths and weaknesses).

The existing information systems are, from the technical point of view, very effective. It is possible not only to store data and information, but also to produce, using GIS system, different thematic maps readily useable by planners and mangers. The databases have been used in preparing for example, the Arab water digital map and showing the status of land cover in West Asia using by producing some specific maps.

So the strengths of the systems are that they can permit to have a good idea about the spatial distribution and evolution of different elements of the environmental system and produce a good assessment reports .It helps also to integrate and interlink the different environmental data and get a global over view on the environmental system.

The Weaknesses come not only from the system it self, but from;

- The capacity to ensure a continuous feed back for updating the databases.
- Lack of a structure for integrating and hosting all the data bases in one environmental information system and supervising the functioning of the system.
- Lack of a mechanism linking the regional database (in ACSAD) to national databases (including harmonization of environmental standards, compatibility of used soft wares in different countries etc.)
- Lack of fund, which affect negatively the sustainability of the system.
- Lack of awareness and perspectives about the usefulness to have a regional information system and the profit of the Arab countries from such system .

6- Constrains and barriers to manage and improve availability and accessibility of environmental data and information:

The major constraints to manage and improve availability and accessibility of environmental data and information can be classified in two issues; Technical and political.

The technical constraints can be summarized as follows;

- Lack of commitments of the national institutions to provide or facilitate the access to their own data and information systems.
- Lack of reliable data or information mainly from the past.
- Lack of harmonization of environmental standards and indicators according to prevailing global guidelines.
- Inadequacies and consistency of available environmental data and information
- Lack of an adequate mechanism composed of cooperative and coordinating activities under taken at the regional level and in close cooperation with national institutions.
- Un-adequate monitoring system at national and regional level.
- Lack of fund to provide the necessary equipments, organizing and maintaining a network for collecting and updating data and information and a hosted structure for processing, analyze and disseminate of data and information.
- Lack of well skilled people in IT or different environmental issues

The political constraints can be summarized as follows;

- Deliverance of data and information is still considered, by some decision makers in the Arab countries confidential.
- The environmental issue is still considered in some countries as a luxury, so no funds or legal support are allocated to build any environmental information system or even a monitoring system for different environmental elements.
- The dispersal of services assigned to deal with environmental issue and lack of coordination.

7- Assessment of general requirement:

Based on the previous description, it is possible to summarize the following requirements needed for the establishment of an adequate environmental information system in the Arab region.

7-1 Environmental priority issue:

The environmental priority issues in the Arab region are, freshwater degradation in quantity and quality, water pollution, land cover degradation, desertification, soil degradation and salinization, biodiversity, urbanization and coastal environment, industrial pollution.

7-2 Priority environmental information needs of various groups (stakeholders) to support decision –making:

The environmental information needs of various group of users can be classified as follows;

For stakeholders: Their needs can be summarized as follows;

- Existence of a service or environmental body which can provide stakeholders with the information and advices to assist them to get best benefit and ensure sustainable use of natural resources (water availability, water quality, soil characteristics, etc).

- Easy access to the environmental information.

- Provide them with the environmental information they need in a simple and useful form and ready to use.

- Improve public awareness about the existing and available of different environmental information systems, where and how to access to the required information.

For decision makers: their needs can be summarized as follows;

- Facilitating information flow between different actors.

- The existence of an integrated and flexible environmental information system

- Presenting the environmental information in an understandable fashion to assist them in taking their decision.

- Have a trend about the past and future vision about the evolution of the different elements of the environmental system using a specific indicators.

- Provide models linking environmental processes and human- environment interactions.

7-3 Technological need:

There is no real problem to purchase all the materials, hardware and soft ware required to build and maintain the information system. Accessibility to regional or international sources of information is also possible. Meanwhile, we have recently encountered difficulties to seek some soft wares like ORACLE, the new version of ARC-INFO with licenses from the United States, due to the embargo imposed on Syria and even the purchase of some powered computers is also not possible Regarding skilled and well trained persons for utilizing the different IT technology, no problem is envisaged here.

7-4 Institutional needs (including training and finance):

The structure of information systems section needs to be further re- enforced, in case an integrated information system would be set up. There is probably a need to create a new special service to organize collection, manage, coordinate and integrate environmental information originating from different departments or institutions. This service can also assume the connection of the system to other existing systems, at national, regional or international levels. For making the work of the proposed service more efficient, there is need to arrange agreements between different institutions (national regional and international) for facilitating the flow of information.

ACSAD can afford, due to its mandate, such programme or service, but the availability of funds will limit the activity and efficiency of this service and even its sustainability. If needed funds can be made available, then ACSAD can take the leading role in the region for holding a regional and integrated information system.

8- Regional and international cooperation (including UNEP and other UN agencies):

Mutual cooperation between ACSAD and other regional organizations like, AOAD ICARDA, ESCWA, UNESCO and UNEP is strongly recommended .A good example of mutual cooperation is the work which has been done between ACSAD and UNEP for the preparation of GEO -3, and also within the implementation of sun-regional activities of the UNCCD. Another example is on going activities between UNESCO and ACSAD for the preparation of a digital water resources map of the Arab world ACSAD will welcome any cooperation with UNEP for making use of their existing information systems. The cooperation between ACSAD and ICARDA for the implementation of SRAP programmes is also a good example.

9–Opportunities for the future:

Maintaining the environmental information systems in ACSAD and even build a new integrated one depend strongly on the support coming from regional and international programmes, which provide not only the funds but also the arguments for maintaining and up-dating and making the systems more effectiveness. Such programmes will also help in maintaining the flow of data generating by various projects and activities conducted in or outside the region.

10- Lessons learned and experiences:

- The importance to have a reliable data and monitoring system is a prerequisite to have a good and effective information system.

- The necessity to have a reliable body for organizing and managing the information systems .

- The necessity to promote communication and information exchange between different concerned parties, decision makers, stakeholders, national institutions.

- The necessity to create a good funding system as a guarantee for the sustainability of the system.

- The necessity to harmonize environmental standards in different environmental sectors, format, compatibility of data and systems used.

- The importance to have the commitments of national and regional institutions for cooperating and providing and exchange the data and information without restrictions.

- The necessity to involve, stakeholders, decision makers, planners in the planning phase of the system.

- The importance to include the socio-economic issue in the system.

- There is a need to develop a plan for the harmonization process of, data system, information system, data analysis and to select related indicators.

11- Recommendations of priorities for action.

11-1 Policy:

There is a need to adopt an open policy regarding the free exchange of data and information at the national and regional level. The environmental information should not no more be considered by politician and decision makers as confidential with restricted distribution. The future concerns all the people of the region, so the free circulation of environmental information at all levels, should be encouraged. In this case there should be a legislation that organize all the issue related to the environmental information system, collection, processing, integration, uses of all environmental databases and accessibility of the public to the environmental information system. At the regional level there should be an agreements and convention signed between the countries and regional organization that organize and guaranty the sustainability of the flow and exchange of data and information and regulate the accessibility to the environmental information system.

11-2 Institutional:

The guaranty of the sustainability of a regional environmental information system is depending on the existence, at the national level, of a proper institutional arrangement with appropriate funds, that handle the national environmental information system and ensure the coordination and integration among national services working or generating environmental information. The establishment of a regional environmental information system network through the creation of Internet site, linking these national institutions with regional and international organizations or initiatives concerned by the environmental issues can be considered a good arrangement. Such network should be managed by a regional organization, which has the technical and institutional capacity and accessibility to funds.

11-3 Technical:

An arrangement should be undertaken between the national leading agencies and regional concerned organizations, for harmonizing environmental standards, guidelines, indicators, compatibility of different data bases systems used (hard ware, software) at the national and regional level, type of outputs, data to be exchanged, etc.

A continuous training programme should also be maintained gathering the persons concerned by the environmental information system at national and regional level. Such programme will permit them not only to upgrade their knowledge but also to have the same vision of the system and to speak the same technical language. Such programme will help in accelerating the establishment of the regional system and in the same time ensure the flow and exchange of information.

11-4 Financial:

This is a key issue for sustaining the system. Funds is necessary for maintaining the cooperation among the concerned institutions at the national and regional levels and consequently the regional network, to seek up to date or up-grading the available technical materials, holding continuous capacity building programmes, organizing periodical regional meetings between different actors in the system for maintaining the dialogue and the contacts among them. From our experience in the region without such meetings the progress in achieving the tasks will not succeed. Generally speaking the national funds are always

limited and if we want the success in implementing the environmental information system in the region adequate funds should be ensured for unless 5 years or even more.

11-5 Sustainability:

As mentioned previously the key factors ensuring the sustainability of the environmental information systems are the following;

- The creation of a leading institution at the national level which manage the system in all its steps and integrate the data from different actors, (monitoring, collection, processing, dissemination, etc.).

- Good awareness of decision makers about the importance of establishing and maintaining environmental information system.

- The existence of a regulation that organize the collection and flow of information, accessibility of the public, exchange and flow of information with regional organizations or nearby countries.

- Providing sufficient funds for maintaining the national and regional system as described before.

- The presence of well skilled and enthusiastic staff for the management of the system.

- Support of international funding agencies and Global programmes, such as, UNCCD, Global climate change, Biodiversity.

- Holding frequent regional meetings and workshops in view to encourage the national staff from different nearby countries and regional concerned organization to cooperate and exchange experience and know how.

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