Project No. 4

**Integrated Planning and Identification of Water Resources in Thi-qar Province, Iraq**

**Introduction**

The purpose of this study is Identification and checking the conditions and the feasibility of according to cropping pattern, water resources, water consumption, Infrastructure needed (like; elecommunication,…) instruments, equipments and method of collecting statistics, and Factors related to the research objectives.

**Wetland Restoration and Conservation**

Production and storage of water, supporting biological diversity, preventing floods and erosion, tourism promotion, food production, aquaculture and moderating local climate and temperature are among wetlands ecological and economical profits. The first step in wetland conservation and restoration is investigation of human and natural factors causing wetland being dried. A study will conduct to survey the characteristics of wetland including area of Wildlife refuge, area of the wetland, ecological area of the wetland, area of the catchment, elevation, main ecological values, wetland products, wetland functions, wetland services, Main ecological changes and so on. Wetland problems and threaten factors will be identify to using a SWOT analysis to addresses strengths, weakness, treats and opportunities to save wetland. Based on performed analysis matching and conversion strategies will developed and necessary action plan will be designed and implemented. Empowering local communities to support the sustainable wetlands restoration, paying enough attention to develop strategies for collaborative management and specialized training in the area of wetlands will be pursued.

The aim of this part of project is to study and identify of water resources potentials and consumptions in the studied areas. In this phase of study, different water resources in Thi-Qar plain will be identified and the possibility usage of these resources for different consumers are investigated. Possibility use of water resources in agricultural, industrial, and residential areas will be studied. For this purpose, following items will be considered in the studies of this project. It should be noted that all of these items will be studied, in this phase of project, on the scale of possibility and identification.

1- Feasibility of qualities of surface and ground water resources

 2- Feasibility of quantitative surface water resources

 3-Feasibility of quantitative ground water resources(geophysics and geoelectric studies)

4-Feasibility study of soils (determining the structure, texture, permeability)

5-Preparation of land usage maps with GIS & RS techniques

6- Determining the location suitable for stations of meteorology, hydrology, sedimentation

 7- Feasibility study of flood water

 8- Feasibility study of drought warnings

9-Feasibility study of base drainage

10-Feasibility of water resources and water supply

 11- Feasibility of Determining the Irrigation requirements with remote sensing technique

 12- Feasibility of Optimization cropping pattern

 13-Feasibility study of irrigation methods

 14-Feasibility study of recycle gray water and wastewater

**In this respect, There are necessery the following actions plan:**

1-Planning for Preliminary field survey

2- Negotiation with citizens, Regional officials in data collections and other information’s

3-Preliminary identification of the study area

3-1-Road conditions, facility for gathering required information

3-2-Identification of environmental characteristics

3-3- Identification of Available water resource

3-4-Investigation of land suitability evaluation for irrigated crop, using remote sensing and geographical information system techniques (RS & GIS)

3-5- Identification of types of crops and crop pattern

3-6- Modeling of crop water requirement using RS & GIS

3-7- Modeling of Irrigation schedule using using RS & GIS

3-8- Modeling of Conjunctive water management

3-9- Identification of the various irrigation methods, (i.e. surface, sprinkler or drip irrigation, depends mainly on the following factors: - natural conditions - type of crop,..)

4- Collecting and Analyzing Data, reports, maps and other information contained of the past time

4-1-Geographic position maps, maps of villages and roads

4-2- Aerial photography and satellite image data

4-3- Topographic maps with available scale

4-4- Geological reports and maps with available scale

4-5-Meteorological reports and maps (precipitation data, evaporation, temperature, wind, humidity, meteorology station position)

4-6-Physiographic reports, maps related to available surface water in the zone including:

4-6-1- Hydrography Network Map of Rivers Watershed Basin

4-6-2- Map of hydrometry station

4-6-3- Map of irrigation networks, Traditional open channels,wells, pumping station from river

4-6-4- Water Resource Data (Data of the quality and quantity of surface water, groundwater,recyclable water,wells, Monthly and annual Mean flow.)

4 -7-Information and soil reports, Land use map, agriculture and environmental reports in case study Scope

4-8- Evaluating and validation of Meteorology data

4-9- Investigating the available meteorological stations, equipments, and their utilization

 4-10- Determining the position of meteorology station

4-11- Preparation of table characteristic stations, including: equipment class, Establishment year, the length of statistic year, statistic diagram

4-12- Control, correction, and completes the selected data

4-14- With regarding the study goals, Necessary recommendation for equipment completion, changing the station location, establishing new meteorology station

4-15- The study of climatic condition such as:

4-15-1- Monthly evaporation from free water surface in study area

4-15-2- Potential monthly evapotranspiration

4-15-3- Determination of velocity and direction of wind

4-15-4- Average, minimum, maximum monthly temperature determination

4-15-5- Average annual precipitation, seasonal and monthly distribution

4-16- The study of hydrology as follows:

4-16-1- sampling of surface water sources in determining points for chemical analysis

4-16-2- Evaluating hydrometer data accuracy, editing, Completion and restoration

4-16-3- Recommendations for completing equipment, Possible changes in station location, Establishment of new hydrometer station and sampling water in Required location.

4-16-4-Determining monthly and yearly average discharge in hydrometer station

 4-16-5-Study of physical and chemical quality of the water in the river

4-16-6- Examine of vegetated zones, desert and Relative spread with using satellite Image

4-17- Types of water consumption

4-17-1-Determine the amount of water consumption in agriculture

4-17-1-1- Surface water

* Water regulation by dams
* Traditional Rivers
* Pumping from rivers

4-17-1-2- Groundwater

* wells
* Springs

4-18-The measure of returning water

4-18-1- Estimate amount artificial of aquifer from returned irrigated water

4-19- Environmental survey

4-19-1-Overview of environmental capacity

4-19-2- Identify potential sources of contamination in groundwater and surface water

4-19-3- Identify environmental regulations and standards at different levels

5-Preparation and Compilation technical reports and suggesting programs required for next steps

6-Conclusions and suggestions

**Table of Projects cost, Study Timing Duration and Research working Team**

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| - | **Number**  | **Name of project** | **project cost/ US.$** | **Time Requirement/Months** |
| 1 | **project No 1** | **Efficient Program of Agricultural Cropping Pattern and Using New Technology in Thi-qar Province, Iraq** | 120.000 | 10  |
| 2 | **project No 2** | **Investigation of Dust Haze Phenomenon, Resources and Control Techniques in Thi-qar Province, Iraq** | 160.000 | 12 |
| 3 | **project No 3** | **Green Belt Establishment and Afforestation Development in Thi-qar province of Iraq** | 80.000 | 8 |
| 4 | **project No 4** | **Integrated Planning and Identification of Water Resources in Thi-qhar Province, Iraq** | 150.000 | 12 |