Chapter I

Introduction

1.0 General

The spatial and temporal variations in the resource base of a region play an important role in the integrated analysis of resources for preparing developmental plans for that region. Water resources analysis is of utmost importance for assessing the availability and demand for water for various purposes vis-à-vis for development of other resources like human resources, services, infrastructure and so on. Thus water is the critical resource for development of other resources and it is at the center of any type of planning activity. Since, district is treated as basic unit for preparing growth oriented developmental plans in India an integrated analysis of all the resources available in the district vis-à-vis the water resources available in the district is very much essential.

'Populations require water for domestic and municipal usages; as an input in productive activities, agriculture, industry (including energy production) and services activities; and finally, in all usages, for the evacuation of effluents (sanitation, removing industrial waste etc). Demands from all these sectors are mounting and competing with one another'.

1.1 Importance of Resource Analysis

As resources are scarce and most of the resources are not renewable, optimal utilization of resources is very much essential for sustainable development and to avoid wastages. In case of resource management the policy makers concentrate on the demand side management where as the aim of resource analysis is to analyze the resource potential of the region and optimize the allocation of resources for distribution among various users. Moreover, an integrated approach is essential in resource allocation and distribution so that the policy makers and resource managers can assess the impact of the developmental measures and scenarios on the socio, economic systems and the environment.
1.2 Relevance of Resource Analysis in the Current Scenario

The importance of resource analysis has already been explained in the preceding para. The increase in population necessitates more production which will lead to pressure on various resources. As the resources are limited they will be subjected to stress due to over exploitation. ‘Technology variables in water resources management have to be coupled with water resources management decisions in the context of socio-economic policies at national and state levels to narrow down the gap between water resources analysts and district planners’.

Water is a critical resource and it is finite. Most of the water resource systems are complex and uncertain in nature. Water resource system “is composed of many interacting components and interfaces with social, economic and environmental systems, which are also complex and uncertain”.

As water resource is the main life line for life, development and environment, it is necessary to assess the availability of this critical resource in the first instance. Then using the inventory of other resources, projections have to be made for resource requirement including water, to meet the demand from ever increasing population. In view of its interactive nature with other systems and because of its critical nature as the primary resource for sustaining life and development, water needs to be allocated judiciously among various competing needs by optimizing the planning and management process of the water resources system with focus on supply side management. In doing so, the objective should be to avoid wasteful usage of water and other resources and also to ensure fulfilling the needs of future generations.

Thus, resource analysis rather than resource management is the key to sustainable development and it can be used as a tool for preparation of plans for integrated development.

The issue of water as a general constraint on development should be worked out from actual use levels with some spatial disaggregation; for policy purposes, it is essential to determine which economic factors,
geographic areas or group are at risk of water shortages.¹⁸

1.3. Resource Classification

The resources can be broadly classified into three groups namely
(i) water resources consisting of surface and subsurface water resource
systems (ii) Socio-economic resources consisting of human resources
and agro economic resources including mineral resources and (iii)
Services network and other infrastructural resources.

Water resource system is core to the resource base of any region.
Water resources are classified into surface water resources like rivers,
canals, tanks and lakes and the second group i.e. subsurface water
mainly consists of ground water.

The Socio-economic resources can be classified into the following
categories:

(a) Human resources; the demography including rural and
urban population, sex ratio, scheduled castes and scheduled
tribes population, literacy and occupational pattern and also
population between 0-6 years age group, plays a dynamic role in
resource exploitation and utilization.

(b) Agro-economic resources : Information on arable land
including the size of land holdings, area and production under
principal crops, area irrigated, fertilizers, mechanical and power
equipment, animal husbandry population, fisheries, forests,
mineral resources and industrial development will enable
planners to assess the resource potential of a region and the scope
for resource development.

Services and infrastructural resources can be categorised into
education, health and medical facilities, banking, co-operation and
marketing, transport and communications including road and rail
network, posts and telecom, electricity, veterinary facilities, industrial
areas and industrial estates, social welfare hostels, anganwadis,
mahilamandals and so on.

1.4 Organisation of the Report

In Chapter I, importance and relevance of resources analysis has been delineated. An attempt has been made to classify the resources into various categories and sub groups. The problem has been identified in para 1.5. In para 1.5.1 objectives of the study have been provided.

In Chapter II literature review has been carried out. An attempt has been made to define the problem and identification of the tasks.

In Chapter III Part A, the study area and data collection has been discussed. In para 3.1. the description about the study area i.e. Kurnool district has been presented. In para 3.2 the sources from which the data has been collected is described. Para 3.3 gives the present scenario of human resources in Kurnool district. Para 3.4 gives present picture of agro-economic resources in the study area. In para 3.5 present status of services net work in Kurnool district has been discussed. While para 3.6 presents the resource base of minerals and mines, para 3.7 provides data on existing infrastructure base in the study area.

In Chapter III Part B, the development of data banks has been discussed in detail. In para 3.8 the conversion of field data into GIS compatible format has been discussed. Para 3.9 provides a description of Arc GIS features. The information on data structures has been given in para 3.10. The topographic map, base maps related to resource potential, resource utilization, resource requirement and resource deficit maps have been presented from para 3.11.1 to para 3.11.3.

In Chapter IV, the results of research with discussion on resource demand estimations and resource analysis studies has been presented. While para 4.1 provides resource demand estimations, para 4.2 provides discussion on resource analysis studies. In para 4.1.1 population growth estimates have been presented. In para 4.1.2 resource potential estimates have been given. Resource deficit estimates have been presented in para 4.1.3. In para 4.2.1, a discussion on integration of resource potential maps has been made. Correlation studies on resource potential of study area has been presented in para 4.2.2.
Chapter V provides a discussion on preparation of strategic plans for resource management in the study area. Para 5.1 provides plans for utilization of resources available in the study area. Para 5.2 provides plans for resource development and scenario in the study area. In para 5.3 plans for capacity building by strengthening of service network has been presented. The plans for establishment of infrastructure base to meet the future demands has also been delineated. Para 5.4 provides plans for development of industries by expansion.

Chapter VI provides summary and conclusions of present study. Para 6.1 provides summary and conclusions and para 6.2 provides scope for further study. In para 6.3 limitations on the present study have been discussed. Finally in para 6.4, the recommendations for preparation of plans for the integrated development of the study area, that is Kurnool district has been presented.

1.5 Identification of the Problem

Reliable information on water use patterns both on temporal and spatial dimensions and the impact of demand-supply imbalances on human populations is essential for policy making. Application of this information enables planners to identify areas of concern for strategy formulation.

Retrospective, situational and perspective studies are carried out by FAO to establish linkages between population factors, socio-economic variables and water resource dynamics; cross sectional assessments and scenario analysis. Thus, research studies in the area of perspective studies is done using scenario analysis. ‘ The following steps are envisaged in scenario analysis for application in policy making:

(a) Construction of a “trend scenario”
(b) Assessment of the said scenario on the basis of selected criteria and indicators
(c) Construction of alternative scenarios
(d) Simulation of scenarios
(e) Comparative assessment of alternative scenarios
(f) Choice of the best alternative
The basic premise for conducting this type of study is to recognize population factors in water issues.

Present study area i.e., Kurnool district is located in Rayalaseema region of Andhra Pradesh State. The average rainfall of the district is 670 mm and the district is endowed with reasonably good coverage of forest which is nearly 20 percent of the total land area. As Kurnool district is located in the semi-arid region with normal rainfall of 670 mm only, very often the district is experiencing drought conditions prevailing in most of the mandals. Though the district has got surface and sub surface water resources, the development of agriculture, service network, industries and infrastructure base is far below the State and national averages. In the present study, it is aimed at preparing a comprehensive inventory of not only water resources but also other resources like minerals, services and human resources.

1.5.1 Objectives of the study

The objectives of the study are:

I) To prepare an Inventory of Resources
ii) To create a Data Bank of Resources
iii) To assess the Potential of Resources
iv) To estimate the Future Demand on Resources
v) To estimate the Deficit
vi) To prepare
   a. Base Maps
   b. Resource Potential Maps
   c. Resource Utilization Maps
   d. Resource Deficit Maps
vii) To carry out Integrated Analysis
viii) To do Correlation Studies
ix) To prepare Strategic Plans

With the above objectives, the study aims at analyzing the resource base of the district and assess the future requirement of resource to arrive at surplus or deficit in resource potential so as to prepare plans for integrated development of the district.
Evapotranspiration Studies
- Penman – Montieth
- Blaney Criddle

Population
Land Use
Water Resources:
- Surface
- Sub-surface
(Base Maps, Resource Potential Maps)

Crop Water Demand:
- Rice, Jowar, Cotton & so on

Resource Requirement
- Crop Water Demand

Mandal-wise Domestic and Agricultural Water Demand projections
(Resource Requirement Maps)

Resource estimates for agricultural production based on population projections
(Resource Utilisation Maps)

OUTPUT/GUI
(GIS Maps / Graphs)

Fig. 1 - Flow chart of the work carried out