CHAPTER 1

INTRODUCTION

1.1 GENERAL

Construction of irrigation projects has been taken up on a massive scale in Andhra Pradesh, India. In the history of irrigation development, there is no precedence in the state and this activity is going to boost the irrigation sector in a significant manner, benefiting irrigated agriculture throughout the state. Twenty six major and medium irrigation projects are taken up for execution. Out of these, eight projects are programmed to be completed within two years span and remaining eighteen projects within five years. Srisailam Left Bank Canal (SLBC) gravity scheme is also one of such major projects expected to be completed within five years.

1.2 NECESSITY OF STUDY

Irrigation is an artificial application of water to soil usually for assisting the growth of crops. In crop production, irrigation is mainly used to replace the missing rainfall during the periods of deficit. The upland areas of Nalgonda, an elevated district of Andhra Pradesh are constantly subjected to drought and are in urgent need of water for meeting their irrigation requirements. As large areas in the district are in the grip of flourosis (a shattering disease caused by high fluoride content in the water), there is an urgent need for provision of wholesome drinking water. The only source of water to the people of this area, is the Krishna River, which forms the southern boundary of
the district. There are several public representations to Government of Andhra Pradesh for taking up a scheme on supply of water from foreshore of Srisailam Reservoir on river Krishna to irrigate the lands on the left bank of the river. Accordingly the State Government has taken up detailed investigation of the Srisailam Left Bank Canal (SLBC) to irrigate command area of 1.2 lakh ha (3 lakh acres) for raising I.D (Irrigated Dry) crops. The detailed investigations, execution of components of SLBC gravity scheme was started in August 2005.

The Srisailam Reservoir and the command area of the SLBC project are separated by high mountains, called Nallamalai Hills. Therefore it has become inevitable to pierce the Amarabad plateau of Nallamalai Hill range through a tunnel of 43.5 km length in the Mahaboobnagar District of Andhra Pradesh. It forms part of Srisailam-Nagarjunsagar wild life sanctuary and Srisailam-tiger sanctuary. The five main components of Srisailam Left Bank Canal are 1. Canal Head Regulator located at 4 km upstream of the existing Srisailam dam which is proposed to draw the water from the foreshore of Srisailam Reservoir. 2. Tunnel 1 of 43.5 km length passing through the wild life sanctuary and tiger reserve. 3. Dindi Balancing Reservoir located at 30 km on the down stream of existing Dindi Reservoir to store excess flow of Srisailam Reservoir and supply according to demand in the command area of SLBC. 4. Tunnel 2 of 7.25 km length passing through wild life sanctuary and tiger reserve. 5. Udayasamudram Tank at Pangal (Village) to meet the water supply requirement of fluoride affected Nalgonda town and to irrigate 1.0 lakh
acres between Udayasamudram Tank and Musi reservoir. The total length of the Srisailam Left Bank Canal (SLBC) including tunnels is about 185 km. Proposed cropping pattern based on soil suitability & meteorological factors by the Govt. of A.P under SLBC is 12,141 ha (30,000 acres) of Cotton, 36,422 ha (90,000 acres) of Chillies, 18,211 ha (45,000 acres) Ground-nut (Kharif), 36,422 ha (90,000 acres) Ground-nut (Rabi), 18,211 ha (45,000 acres) of pulses totaling to 1,21,408 ha (3 lakh acres). There is no allocation of water to SLBC scheme by the Krishna Water Dispute Tribunal (KWDT), therefore the proposed scheme met out of remaining water (excess flow).

1.3 OBJECTIVES OF PRESENT STUDY

The specific objectives with which work was undertaken are

- To develop Stochastic Dynamic Programme Model and codify into C language for the optimal operation of Srisailam Reservoir without considering SLBC demand and with considering SLBC demand.

- To develop simulation modeling technique in ‘C’ language which helps evaluate system performance.

- To determine excess flow available to SLBC from the simulated releases and past releases of Srisailam Reservoir.

- To assess the feasibility of SLBC project.

- To optimize agriculture productivity of SLBC cropping pattern through optimal allocation of irrigation water using CROPWAT Model.
To estimate monthly demands for SLBC, for designing main components of SLBC gravity scheme.

To prepare irrigation schedules for the crops of SLBC

To design the main components of SLBC namely

a) Canal Head Regulator
b) Tunnels
c) Dindi Balancing Reservoir
d) Udaysamudram Tank according to demand of water in SLBC command area.

1.4 Overview

Srisailam left bank canal gravity scheme is an ongoing project to irrigate 3 lakh acres, including High level canal command area of 2.2 lakh acres and low level canal command area of 80,000 acres. Source of water to SLBC gravity scheme is Srisailam Reservoir. High level canal and low level canal are connected by proposed distributary channel near Dindi Balancing Reservoir. SLBC has no water allotment as per the Krishna Water Dispute Tribunal (KWDT). The requirement of SLBC is to meet out of the remaining water (excess flow). It was agreed to use flood water of Krishna River for irrigation by left bank, right bank and Telugu Ganga canals, including water for drinking purpose drawn during four months from 1st July to 31st October and stored in the balancing reservoir. The same may be used as and when requirement arises.

For early benefits, SLBC lift scheme is in execution from 1995 onwards. Lift scheme is for 2.8 lakh acres, including High level Canal
command area of 2.2 lakh acres, and Low level canal command area of 50,000 acres. Source of water for SLBC lift scheme is Nagarjuna Sagar reservoir.

Optimal operation policy developed with and without considering SLBC demand using SDP is similar to the one described by Loucks et al., (1981). Simulation technique along with SDP model without considering SLBC demand was used to evaluate system performance and to determine excess flow of water by comparing simulation releases and past releases. Past releases data includes releases through power house, radial crest gates, river sluice gates and Pothireddypadu head regulator. Simulation technique along with SDP model with considering SLBC demand was used to evaluate performance indicators for SLBC releases, to identify the feasibility of the SLBC project. Water availability to SLBC gravity scheme is justified by SDP through simulation.

Water requirement and as per month for the development of 3 lakh acres command area is assessed with the help of simulation result of CROPWAT software. Estimation of monthly water demand is justified by CROPWAT.