CHAPTER-VII

SUMMARY AND CONCLUSIONS

GENERAL

Land suitability is only meaningful with respect to specified kinds of use. This principle embodies recognition of the fact that different kinds of land use have different requirements. As an example an alluvial floodplain with impeded drainage might be highly suitable for cultivation but not suitable for many forms of agriculture. The concept of land suitability is only meaningful in terms of specific kinds of land use, each with their own requirement, like soil moisture, rooting depth etc. the qualities of each type of land, such as moisture availability or liability to flooding are compared with the requirement of each use. Thus the land itself and the land use are equally fundamental to land suitability evaluation. Satellite remote sensing, GIS and GPS has emerged as a potential tool and efficient technology for inventorying and monitoring of natural resources especially the crops, soils, irrigation management and drought monitoring. The remote sensing techniques are very effective in estimation of expansion and prediction of suitability model for different crops over large areas both in terms of cost effectiveness and timeliness over traditional method of area and production.

The present study is aimed and developing intervention in the irrigation sector part of Nagarjunasagar command area. Hence, the present investigation on suitability model for irrigation is developed
The Remote Sensing techniques are expected to contribute for land suitability for irrigation. Hence, the present investigation on “Development of Land Suitability Model (LSM) for Irrigation Management- A Case Study of Part of Nagarjunasagar Command Area, Prakasham District, Andhra Pradesh using Remote Sensing, GIS, GPS and Field Studies” was carried out as per the objectives.

The salient conclusions drawn on the present investigation titled are summarized below:

- Survey of India (SOI) toposheet of 1:50000 scale and Satellite imagery is found to be useful in providing reliable, accurate baseline information for land suitability modelling, large areas and spatial distribution of land classification is possible by satellite imagery (IRS P6 LISS IV MX-5.8 meter Resolution) because of its synoptic view.

- The soil and water samples collected from the study area using GPS are analyzed, the spatial distribution maps are developed for all the physico-chemical analysis parameters of soil and water samples which are useful for identification of suitability sites. The number of soil samples collected are 70 soil samples (surface and subsurface) and 110 water samples were collected form the study area.

- The collected soil and water samples form each mandal during the month of February and March, 2007 after analysis, the data
is been classified according to the parameters and mean values are been calculated for each mandal and each parameters of soil and water samples, the correlation studies of soil and water parameters relationships are shown.

- The fertility status of soils of study area are classified as macronutrients (NPK), Secondary nutrients (Ca, Mg and S) and micronutrients (iron, manganese, copper and zinc). The overall quality of ground waters of study are divided into three categories- good, marginally saline and saline.

- The cropping pattern and land use constraints of soil and water quality are identified, nine types of soils exists in the study area red shallow calcareous gravelly loam, red shallow gravelly clay, red calcareous clayey soils, sandy soils, red clayey soils, deltoic calcareous black soils, alluvial soils, saline sodic soils, swampy and marshy soils. In entire study area eight types of farming situations (FS) exists FS1, FS2, FS3, FS4, FS5, FS6, FS7 and FS8, the mandal wise farming situation areas in hectares are represented and total of all the farming situations are calculated.

- Based on the physical, chemical and physico-chemical properties of soil and water the constraints of soil and water are represented mandal wise. By taking constraints of soil and water and also considering the existing crops and alternate crop plan has suggested.
The land capability classification model based on the limitations of different parameters has been developed based on soil characteristics, external land factors and environmental factors. The soil site suitability is developed based LCC, FII, ground truth and field checks a suitability criteria is developed for each individual crop and suitability ratings are given for each mandal in the study area.

The suitability for irrigation management is designed based on existing irrigation pattern in the study area and some estimation regarding surface irrigation and drip irrigation is done which could show difference in total yield. Some potential land characteristics are taken into consideration for irrigation possibilities. To develop suitability area for irrigation using GIS some factor are taken into consideration such as physical properties of soil and water and there correlation, chemical properties, drainage properties and environmental factors. The themes are developed for above factor in GIS and overlayed and final map is derived which is suitability for irrigation.

The adopted land suitability model for present investigation can be applied else were in similar conditions. The land suitability will suggest the stake holders, government and non government organisation for best land use practices for better agricultural yield. Further, this model has an adaptability to include any other parameters which are direct/indirect related to irrigation practices.
RECOMMENDATIONS

The task of preparing the country for the 21st century with confidence is indeed enormous. The engineering and technological community has a high responsibility in this respect. Planning ahead in the present circumstances is an immensely difficult exercise considering the rapid changes that have taken place and that are taking place in the society due to much demand on too few resources with this in mind the following recommendations are made for further study.

- There is a need for further investigation on the factors that contribute to land suitability at field level. Factors such as soil type used in this study were at higher level and more generalised, developed from 1:50,000 maps. As such, it could not provide detailed variation that may occur at field level. There is need for detailed study on the soil characteristics at field level and include factors like land capability, land irrigability, land classification and land use planning.

- The demand of irrigation water should be available in the reservoir and it has to be properly priced per unit area of land. Pricing should have a built in incentive to the customers of less utilization of water so that, he can get at cheaper rate. Therefore, it is proposed that an in depth study on fertiliser use efficiency is required to establish fertiliser utilisation, losses and the gaps existing at field level.
The water being used for irrigation is mainly canal water, which is released into the paddy fields. There is need to assess the quality of water, canal water recharge and specific canal water depth for the area, which may have impact on water availability and yield.

From the canal water the added water is small few, such as few kilometers of right and left side of the canal. The flow of water below this point is steady. The rate of through flow through soil, soil salt leaching, and salinization has to be controlled. The maintain of wet root zone should be possible with minimizing drainage rates.

The study did not consider the previous land management practices, which may have a residual effect on crop growth and production. Zinc is normally applied at two-year intervals and this has not been considered. If some farmers applied Zinc in the previous season or prior to the season is in question. However, it is important to assess this and incorporate into the model if found to be significant.

Further study may be carried out on adjustment of irrigation schedules for optimization of irrigation water.

- Adjustment for the non peak periods
- Adjustment for climates with considerable rainfall during the growing seasons
- Adjustment for local irrigation practices
Adjustment for shallow soils

Adjusting the irrigation schedule to actual rainfall i.e. for rotation and on demand method of irrigation.