Conceptualizing Resource Management Domain Framework for Addressing Differential Agricultural Needs of Mewat District, Haryana, India

Agriculture is facing a serious challenge of resource degradation (soil, water, forests, etc.) in India, which has been further aggravated with the increasing variability in climatic parameters. Thus, a need for managing the natural resource base along with sustaining agriculture has been identified to provide a way through land based solutions. Most of the initial concepts (land systems, agroecological units, and major land resource units) were based on biophysical parameters only. Resource Management Domains (RMD) concept represents a way to characterize land units, based on biophysical and socioeconomic characteristics, for better resource management and sustainable agricultural production.

This concept has been applied to delineate and characterize sustainable land units for agricultural use in the Mewat District of Haryana, India. The first objective of the research aims at delineating RMDs in the study area. A geographical information system (GIS) based framework was conceptualized to delineate RMD and appropriate biophysical and socioeconomic parameters were identified based on local conditions and expert opinion. The biophysical characteristics of the region were represented by soil (soil erosion and fertility) and groundwater (groundwater quality, potential and vulnerability) parameters. Population density, landholding, cropping pattern, irrigation source, fertilizer type, sprinkler density, tubewell type and tractor density were considered for socioeconomic characterization. Each of these parameters was modelled and mapped using well established methods. The biophysical and socioeconomic parameters were integrated using a multivariate clustering method. The integration modelling results in the delineation of the region into seven RMDs, which were validated with the findings of two focus group discussions (FGD) conducted in each of the RMD's. The correlation between the RMD modelling results and the FGD was found to be more than 90% in five RMDs and 65% and 39% in the remaining two RMDs, respectively. The result was also validated with the feedback from the local administrative authorities.

The second objective focuses on examination of RMD specific differential agricultural needs of the farming community. FGD and participatory resource mapping were conducted in representative villages of each of the delineated RMD to get detailed insights about the key characteristics and major constraints of each RMD.

The third objective presents the identification of RMD specific best management practices. First, analysis of the government programs in the study area was conducted by reviewing the available government reports, data, research papers, policy papers, annual reports, etc. This analysis was then compared with the RMD specific differential agricultural needs, to identify the gaps between the programs and the needs. The gaps were addressed by the identification of best management practices by combining information gathered from FGDs, from administrative authorities, from experts in the fields, and from the literature review conducted in the similar settings. So, the final output of the thesis was the identification of the RMD specific best management practices.

In conclusion, the thesis provides a GIS based framework for RMD delineation and characterization, identification of RMD specific best practices, roadmap for implementing RMD in the existing administrative setup, and a sound basis for policy makers for taking the necessary steps to address location specific differential agricultural needs in any region.