

Table of Contents

ACKNOWLEDGEMENT	i
ABSTRACT	ii
LIST OF TABLES	iv
LIST OF FIGURES	vi

1.	Introduction	1
2.	Literature Review	10
2.1.	General	10
2.2.	Literature review:	10
1.	Objective: To demonstrate a comparative assessment of discrepancy in the hydrological behaviour of the DEMs in terms of terrain representation at the catchment scale.....	10
2.	Objective: To develop an approach to analyze Sentinel–2 satellite data using traditional and principal component analysis based approaches to create land use and land cover map, which is a prerequisite for developing the curve number.	11
3.	Objective: To perform Morphometrical analysis of Vishwamitri watershed and prioritization of sub-watersheds for assessing the flood influencing characteristics of sub-watersheds of the Vishwamitri river.	14
4.	Objective: To identify potential runoff storage zones based on the various physical characteristics of the Vishwamitri watershed using a GIS-based conceptual framework that combines through analytic hierarchy process using multi criteria decision-making method.	15
5.	Objective: To develop an approach for operational flood extent mapping using Synthetic Aperture Radar (SAR) and preparation of flood inundation map for data scarce region using 2D flow modelling using rain on grid model.....	17
6.	Objective: To quantify the effects of urban land forms on land surface temperature and modeling the spatial variation using machine learning.	22
3.	Study Area and Data Collection	24
3.1	General	24
3.2	Study areas and Data collection	24
4.	Methodology	30
4.1	General	30
4.2	Methodology	30
1.	Objective: To demonstrate a comparative assessment of discrepancy in the hydrological behaviour of the DEMs in terms of terrain representation at the catchment scale.....	30
2.	Objective: To develop an approach to analyze Sentinel–2 satellite images using traditional and principal component analysis based approaches to create land use and land cover map, which is a prerequisite for developing the curve number.	33
3.	Objective: To perform Morphometrical analysis of Vishwamitri watershed and prioritization of sub-watersheds for assessing the flood influencing characteristics of sub-watersheds of the Vishwamitri river.	37

4.	Objective: To identify potential runoff storage zones based on the various physical characteristics of the Vishwamitri watershed using a GIS-based conceptual framework that combines through analytic hierarchy process using multi criteria decision-making method.	40
5.	Objective: To develop an approach for operational flood extent mapping using Synthetic Aperture Radar (SAR) and preparation of flood inundation map for data scarce region using 2D flow modelling using rain on grid model.....	47
6.	Objective: To quantify the effects of urban land forms on land surface temperature and modeling the spatial variation using machine learning.	54
5.	Results and analysis	63
5.1	General	63
5.2	Results and analysis	63
1.	Objective: To demonstrate a comparative assessment of discrepancy in the hydrological behaviour of the DEMs in terms of terrain representation at the catchment scale.....	63
2.	Objective: To develop an approach to analyze Sentinel–2 satellite data using traditional and principal component analysis based approaches to create land use and land cover map, which is a prerequisite for developing the curve number.	75
3.	Objective: To perform Morphometrical analysis of Vishwamitri watershed and prioritization of sub-watersheds for assessing the flood influencing characteristics of the sub-watersheds of the Vishwamitri watershed.	85
4.	Objective: To identify potential runoff storage zones based on the various physical characteristics of the Vishwamitri watershed using a GIS-based conceptual framework that combines through analytic hierarchy process using multi criteria decision-making method.	93
5.	Objective: To develop an approach for operational flood extent mapping using Synthetic Aperture Radar (SAR) and preparation of flood inundation map for data scarce region using 2D flow modelling using rain on grid model.....	106
6.	Objective: To quantify the effects of urban land forms on land surface temperature and modeling the spatial variation using machine learning.	127
6.	Conclusions and Recommendations	140
6.1	General	140
6.2	Conclusions	140
6.3	Recommendations	143
7.	References	147