Projecting LULC growth and associated impacts on hydrological process through scenario-based modelling – A road ahead for sustainable future

Presented by:
Srishti Gaur

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Introduction

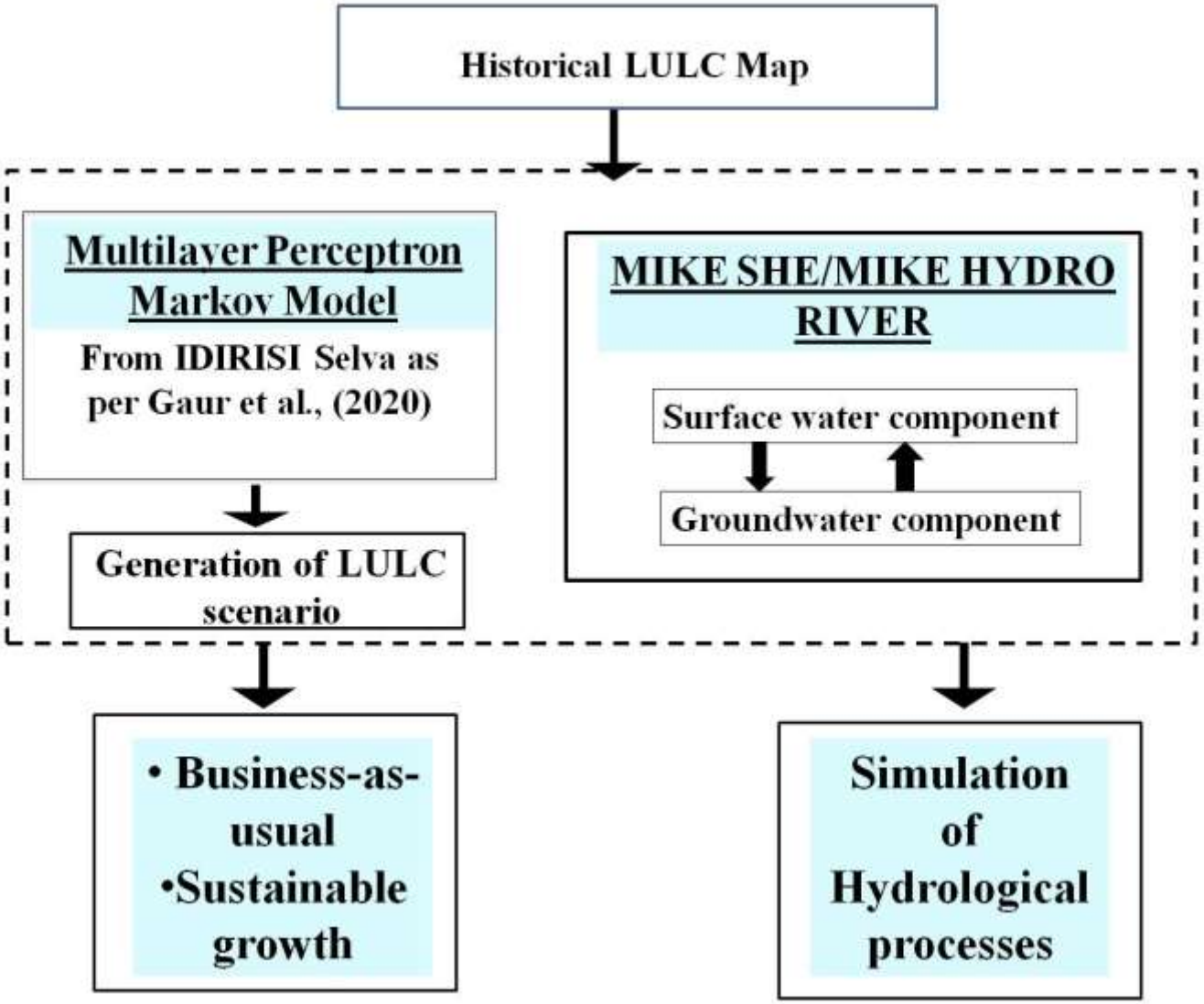
❖India has experienced significant land use and land cover (LULC) changes, including urbanisation, deforestation, agricultural expansion, and industrialisation.

❖The development of land resources may strengthen economic productivity but simultaneously affect the sustainability of the natural resources.

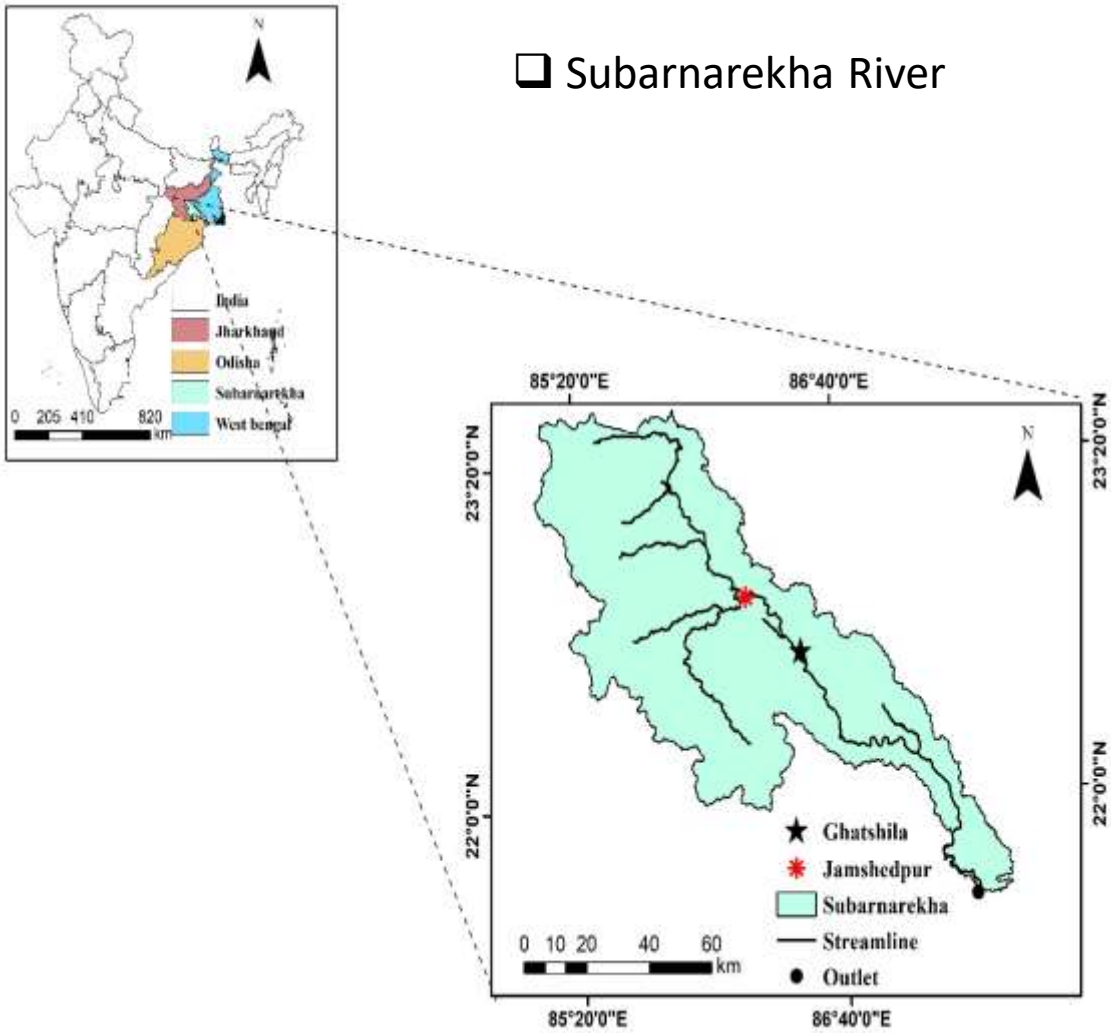
❖Scenario analysis and modelling have been recognised as robust tools for understanding the mechanism of probable LULC changes.

- Integrating the LULC scenarios in planning and management is gaining momentum for anticipating future landscapes different pathways, allowing exploring the options to reach specific goals.

Methodology



Study Area

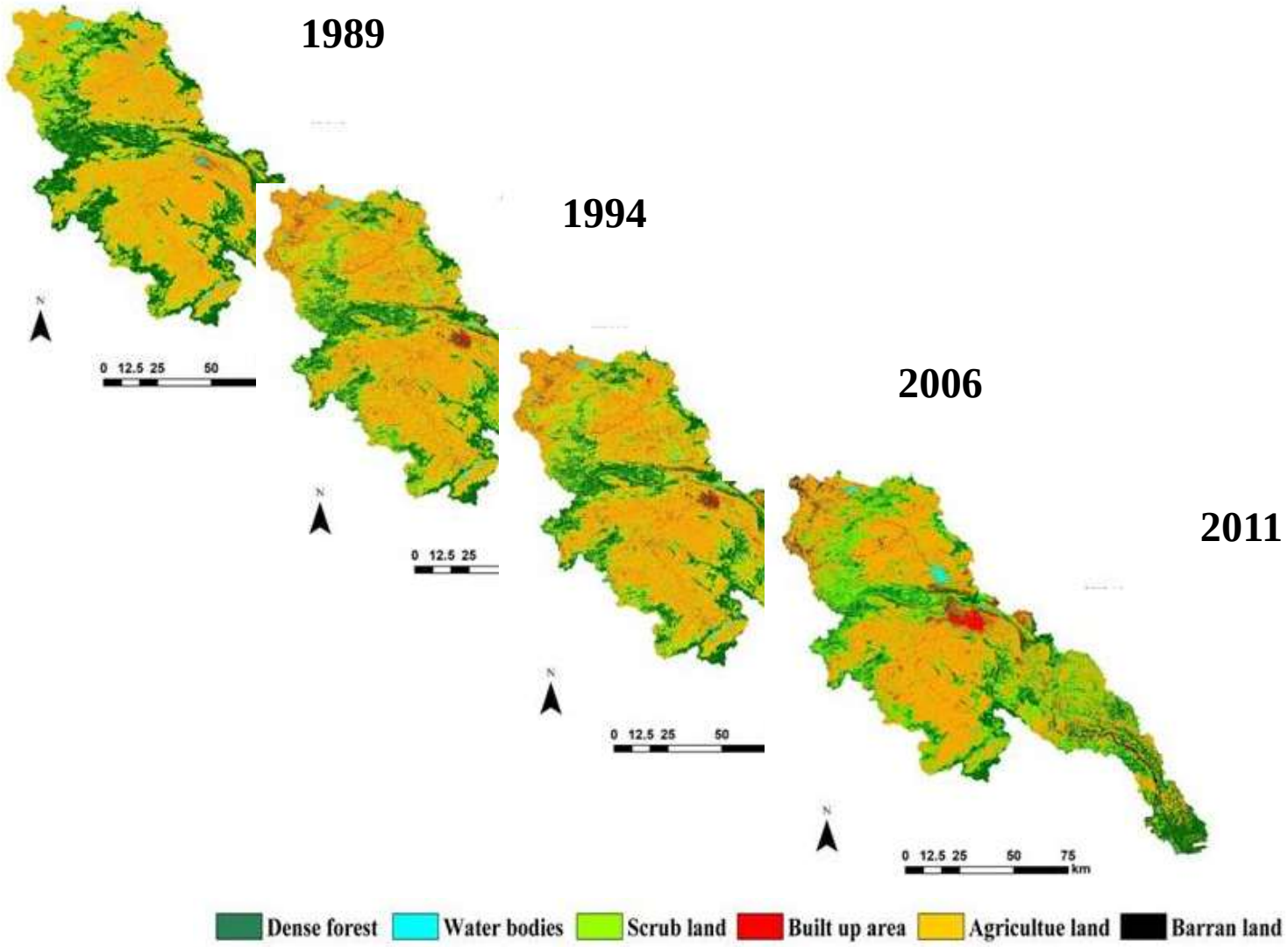


- Subarnarekha River

Over the past few decades the basin has subjected to deforestation, urbanization and industrialization

LULC Monitoring

Methodology



LULC Scenarios

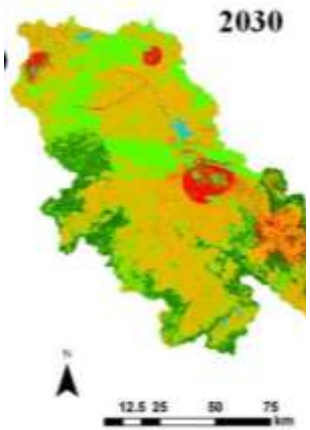
❖In the case of the BAU scenario, the historical LULC persists for the future periods, i.e., future LULC will follow the historical LULC trends

❖A sustainable growth scenario has been developed by considering the sustainable development goal-15, i.e., life on land

❖Following the SDG-15 goals, India has planned to bring 1/3rd of the land under forest cover (Kant *et al*. 2008). Therefore, our scenario aims at increasing the forest cover by 7% by 2030 mainly on the Scrublands.

BAU Scenario

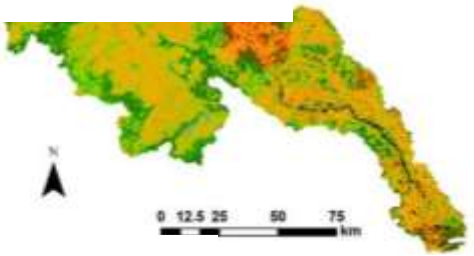
Results



	ET	OF	Runoff	Inf
2011	733	183	215	96
2030	716	190	219	87
2040	710	192	222	85
2050	713	198	223	79

High (mm)

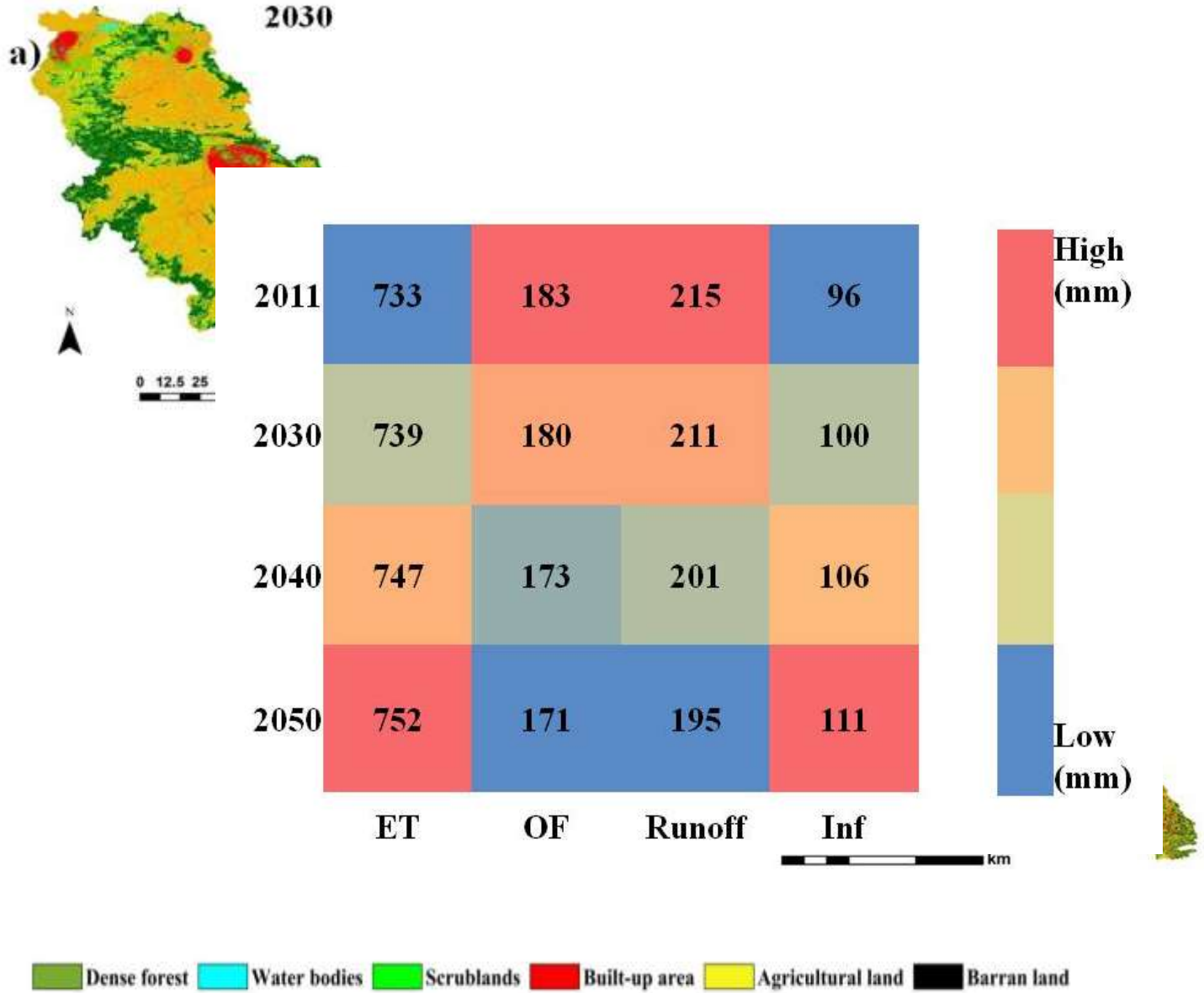
Low (mm)



Dense forest | Water bodies | Scrublands | Built-up area | Agricultural land | Barran land

SG Scenario

Results



Conclusions

Conclusions

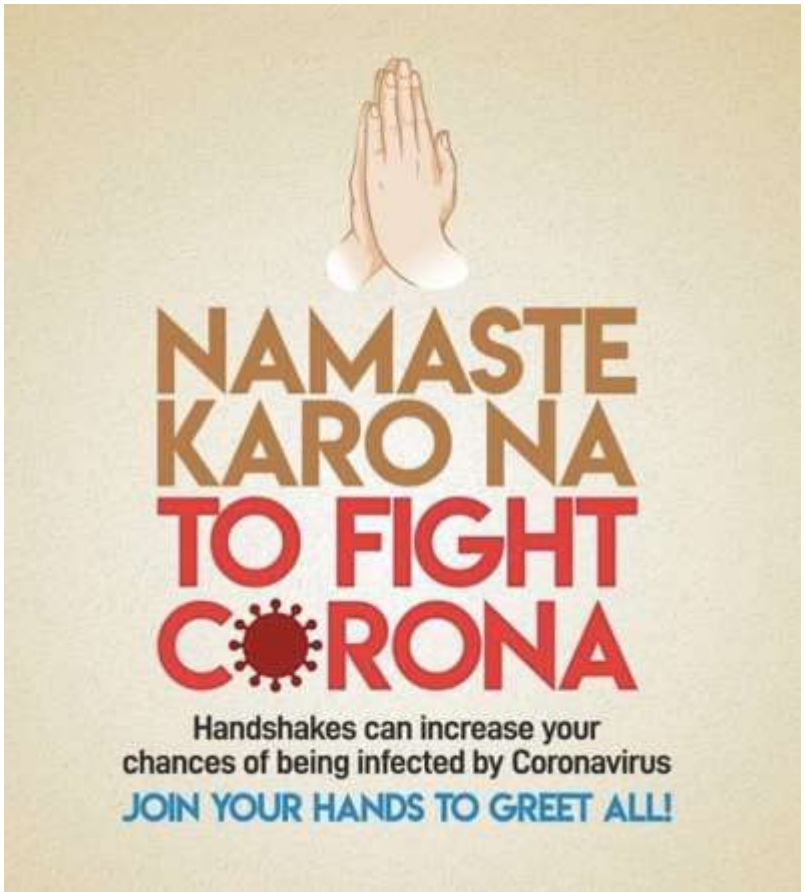
❖ The predicted LULC under BAU scenario would lead to the expansion in built-up area and scrubland along with decrease in the magnitude of dense forest and agricultural land over 2030-2050.

❖ Consequently, increased overland flow (3.8%-8.2%) and runoff (3.7%-1.9%) and decreased Evapotranspiration (2.3%-3.1%) and infiltration (9.3%-17.7%) are obtained as compared to baseline period (2011).

❖ The findings obtained from SG scenario lead to reforestation over the basin over 2030-2050.

❖ Consequently, the forested areas generated low overland flow (1.6%-6.6%) and runoff (1.9%-9.3%) with higher infiltration (4.2%-15.6%) and Evapotranspiration (0.9%-2.6%).

THANK YOU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