**CRG\_2023\_004624\_v1\_500508.pdf: Transport of Pesticides and Bacteria Through Macropores Created by Plant Root Network => (Field and Laboratory experiments(using model) included)**

* **The objectives of this proposal is to**  experimentally characterize enhanced transport of nutrients, pesticides and bacteria through the preferential flow paths created by the roots using artificial analogue (made by wires) and natural root network. The transport model can be used to optimize the use of fertilizers and to simulate transport of nutrients, pesticides and bacteria through the root zone to the unconfined aquifer underneath. Thus, it will provide a tool to assess the potential for contamination of the aquifers.

**CRG\_2023\_005267\_v1\_500519.pdf: Physics-informed Neural Network (PINN)-based component-wise condition assessment approach for floating offshore wind turbines (FOWT) using non-intrusive sensor measurements. =>(Numerical and globally emerging work)**

* This proposes non-intrusive continual targeted CA approach for FOWTs that combines physics-based and data-driven approaches through a physics-informed learning approach. Three subsystems, namely: blades, tower, and mooring lines will be investigated in this attempt. Validation will be based on Openfast software. Non-intrusive sensor measurements using ML based image processing approaches will be used.

**PDF\_2023\_000079\_v1\_485064: Assessing flood-prone area in an ungauged basin by calibrating a hydrological model using various hydrological components (ET, Surface runoff, Soil moisture) driven from remote sensing => (RS based study only)**

* This research aims to study of water cycle components of an ungauged basin to identify the flood-prone area using water balance. Other objectives are generating a future land use map and projection of the future flood-prone area under different climate scenario.

**PDF\_2023\_000206\_v1\_486492: A robust skill verification of hindcast decadal data on hydroclimatic systems. (AI-ML based study)**

* This study proposed a hybrid framework for downscaling climate variables from coarser to finer space-time scale and optimising the hydrological model through an adaptive machine learning algorithm . This study aims to detect the impacts of decadal predictions of extreme scenarios on regional systems.

**PDF\_2023\_000774\_v1\_488928: Climate Change Impacts on Land Degradation, and Mitigation Strategies in Semi-Arid Regions of Andhra Pradesh, India- A Geospatial Modeling Approach.=> (RS and GIS based work)**

* This study aims to create a geodatabase using various band rationing approaches, like NDVI, NDBI, TGSI, LST, NDSI, NDWI for environmental, climate change, and land degradation assessment. Preparing Thermal Comfort Zones (TCZ) mapping, identifying the Groundwater Potential Zones (GWPZs), and Land Suitability Analysis (LSA) for sustainable agricultural growth in the study region are the major objectives.

**PDF\_2023\_000865\_v1\_489549: Improving management strategies for flood and river bank erosion employing artificial intelligence (AI) and explainable artificial intelligence (XAI) => (AI-ML based)**

* The goal of this research is to assess the flood and river bank erosion susceptibility by utilizing various machine learning and deep learning algorithms like CART, RFF, CNN for floods; MARS, XGBoost, DNN for river bank erosion. Then to formulate effective hazard management strategies based on the study findings.

**PDF\_2023\_000867\_v1\_492369: Integrated Approach for the salinity sources in Groundwater from Aligarh to Firozabad District, Uttar Pradesh (field survey based)**

* Objective is to find out the saline zones by the analysis of Groundwater and Soil samples and geophysical survey. Also, to develop a salinity-tolerable bore well which will extract the saline water with the intermixing of fresh water. Thus, the saline zone/ saline water will decrease and eventually, it will be diluting out with the groundwater recharge as per the proposal.

**PDF\_2023\_001223\_v1\_489638: Deconstructing Embodied Intersectionalities of Climate Crisis, Space and Gender in India.**

This project focuses on understanding how issues related to space, gender, and the environment intersect and play out in specific areas, particularly in mountainous and coastal regions facing various risks. The goal is to create maps that highlight existing inequalities in access and participation, using a lens that considers both gender and indigenous knowledge. The study also aims to investigate unfair social practices. Furthermore, the research will examine the effects of climate extremes like heat waves and floods on people's daily lives and map out these impacts. Overall, the project seeks to uncover and visualize social and environmental disparities in different geographical settings.

**PDF\_2023\_001498\_v1\_487613: Assessment and modelling of various hydrological process in small watershed of the Imphal valley, Manipur. => (RS and GIS based work)**

* The work is intended to make an assessment of hydrological change in the small watershed of Imphal Valley using SWAT model. To assess the potential zone for groundwater recharge, Impact of land use and land cover change and climate change on the hydrological process are also investigated.

**PDF\_2023\_001763\_v1\_491574: Prediction of large-scale spatial and temporal variability of droughts over Indian region**

* The research aims to analyze the enduring spatiotemporal fluctuations of drought across the Indian region in terms of occurrence, severity, and periodicity employing the Standardized Precipitation Index (SPI) and Standardized Precipitation Evapotranspiration Index (SPEI) as drought metrics across various timescales (1-, 3-, 6-, 9-, 12-, and 24-month) and to predict the spatiotemporal droughts characteristics using AR5 data from the Canadian Earth System Model (CanESM5.0.3).

**PDF\_2023\_001948\_v1\_493768: Adaptive Water Governance in the Upper Indus Basin: Navigating Climate Change Challenges for Water Resource Management**

* The research aims to assess the magnitude of future climatic changes in Upper Indus Basin using CMIP6 simulations and to project the sectoral water demand and development of optimum water allocation strategies using CROPWAT and integrated WEAP-LEAP models.

**PDF\_2023\_002155\_v1\_492256: Influence of urban land use types and urban-rural gradient on Plant Functional Traits of Common Woody Plants of Delhi India and its implication on soil ecosystem Services provision in the Urban system. =>(Extensive field survey laboratory experiments seem to be required to estimate a large number of proposed Plant Functional Traits)**

* Objective is to examine variation in different plant functional traits (parameters of leaf, stems, quantity of biomass, N, P, C, K content etc) across different land use (Natural/ roadside/residential areas/parks) in urban area as well as along the urban–rural gradient. Also to investigate whether changes in soil and micro-climate across different land use types affect plant functional traits and to comprehend the trade-off relationship between plant functional traits and urban soil attributes for Carbon storage.

**PDF\_2023\_002337\_v1\_396093: Land subsidence assessment using geospatial (UAV, DInSAR), artificial intelligence and GPR techniques in Coal mining regions of East India.**

* This research aims to establish the robust novel machine and deep learning predictive models for land subsidence assessment and to provide actionable recommendations for sustainable mining practices and land subsidence mitigation strategies. Finally, to validate the results obtained from UAV, DInSAR, and AI using ground-truth data collected through GPR surveys.

**PDF\_2023\_002543\_v1\_493980: Impact of mining activities on the water resources around Perambalur and Ariyalur district, southern India. (Geochemical modelling softwares and water quality laboratory tests are required)**

* To determine water quality for drinking and agricultural purposes in and around the mining region of Perambalur and Ariyalur districts. Electrical conductivity, pH, oxidation redox potential (ORP), salt content, and groundwater level these parameters are under consideration. And finally, to predict the water contamination around mining regions using geochemical modelling with the following proposed softwares: ArcGIS, Aquachem, Phreeqc, SPAA and IBM SPSS statistics.

**PDF\_2023\_002753\_v1\_494028: Assessment of Climate resilience capacity of a smart city of Haryana: Gurugram city. (ML, RS-GIS based work)**

* The research is intended to prepare time series maps of Climate hazard and risk maps of the city using traditional methods and machine learning algorithms and to classify in different zone of impact based on skills and socio-economic status of population and to Identify and cluster the vulnerable populations living in the city.

**PDF\_2023\_002763\_v1\_490447: Improving the Budyko framework to better understand the drivers of interannual variability in water cycle.**

* The aim is to improve the Budyko framework by including storage term and to use the atmospheric water –flux and land water-budget equations to derive a relation between evaporative index and aridity index. Once, the updated framework is ready, the deviations from the theoretical mean will be investigated to identify the drivers, i.e. climate change or human intervention. The resilience of Indian catchments will also be estimated using updated framework.

**PDF\_2023\_002841\_v1\_489682: Contrasting distribution of arsenic and uranium in the groundwater of alluvial plains, North India: Implications for origin, fate control, and Health Perspectives. => (sample collection, lab tests for water quality, circular column experiments,PhreeQC software required)**

* The objective is to study sources, sinks, and responsible accumulation and mobilization processes of As and U using multi-method and multidisciplinary approach. A geochemical model will be developed using PhreeqC. The study of spatial relationship between the incidence rates of bladder, liver, lung, breast, and kidney cancers and the contaminant concentrations will be carried out.

**PDF\_2023\_002841\_v1\_489682: Correlation of Various Water Quality Parameters and Water Quality Index of Lonar Tehsil Area, Buldhana, Maharashtra =>(Water quality lab test and GIS softwares are to be used)**

* To carry out the rate of degrading water quality and provide information about the following parameters: : Ca2+, Mg2+, Na+, K+, HCO3-, CO32-, SO42-, Cl-, PO43-, NO3, Total dissolved solids (TDS), Total Hardness, Alkalinity and to demarcate the groundwater polluted zone using GIS techniques.

**PDF\_2023\_003596\_v1\_492528 : New Planned Hydrological Structures (dams) in the Upper Himalayas Region and Their Consequences on the River Sediment Delivery.**

* The goal of the research is by taking SWAT-CUP model and GSD as input, to assess and establish longitudinal sediment connectivity and finding dis-connectivity caused by the Dam over the river network using ‘CASCADE’ tool.

**PDF\_2023\_003661\_v1\_490036: Groundwater Quality, Health Risk Assessment, and Source Distribution of Heavy Metals Contamination around the industrial areas of Aurangabad Municipal Corporation Area. =>(Water quality lab test and GIS softwares are to be used)**

* To create the database of groundwater potential zone by observing inventory of wells and identify the potential groundwater recharge zone through Remote Sensing and Geographical Information System (GIS) and to identify the suitable structure for artificial recharge and to demarcate favourable areas for percolation.

**PDF\_2023\_003673\_v1\_493913: Enhancement of Compound Extreme Event Forecasting by Integrating Machine Learning and Physical-based Approaches. => (ML and physical model based approach for for Ganga-Brahmaputra-Meghna Basin)**

* This research aims to expand capabilities to forecast compound extreme weather events, like floods and droughts, by combining ML algorithms (SVM, ANN, CNN, LSTM, or DL) with traditional physical based models (XAJ-DCH, TOPKAPI, Sacramento model, MCQRNN). This will involve statistical characterization of discharge, catchment rainfall, and other meteorological parameters and exploring their connection to the occurrence of floods and droughts.

**PDF\_2023\_003983\_v1\_495489: Evaluation of Climate Extremes in the Indian Himalayan Cities: Historical Trends and Future Projections**

The work is proposed to assess the historical trends in precipitation and temperature extremes in selected Himalayan cities using MK test and Sen’s slope and project future tends using CMIP6 climate models. Finally, vulnerability maps will be generated for selected cities using GIS tools.

**PDF\_2023\_003985\_v1\_495445: A watershed level framework to assess the self-sufficiency and sustainability of water and food resources for the consumption and production in the current and future climate change scenarios (SWAT, CROPWAT models will be used)**

* Motive of the research is to develop a watershed-level framework to draft policies for water and food resources between consumption and production regions; as well as between dry and wet region. Self-sufficiency and sustainability of the region's food and water resources will be assessed at different spatial scales. Some alternate crops will be suggested based on the study to reduce the water intensive practice.

**PCR\_SRG\_2019\_001251.pdf: Interactive Desktop Tool for Nonstationary Intensity-Duration-Frequency Curves under Climate Change. => (GCM model and non-stationary based on Generalized Extreme Value (NS-GEV) models are used)**

* The objective is to assess the skills scores of general circulation model (GCM) outputs for nonstationary IDF curves. Also aims to develop an interactive desktop tool for the implementation of the nonstationary IDF curves for advancing the capabilities in decision making for policy makers/stakeholders.