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Urban Resilience and Adaptation for India and Mongolia:  
curricula, capacity, ICT and stakeholder collaboration to support green & blue infrastructure and nature-based solutions  
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URGENT

Lecture Series

**3<sup>rd</sup>**  
Lecture

## Sustainable Urban Watershed

**Date : 25 September 2021, Saturday**  
**Time : 1315 – 1445 Hrs IST**

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### Speakers



**Dr Daniele La Rosa**  
*Associate Professor*  
*Department Civil Engineering and Architecture*  
*University of Catania, Italy*

He is a urban and environmental planner, and teaches spatial planning and urban design in Building Engineering MSc course at the University of Catania. His research interests are sustainable urban planning, ecosystem services, GIS for urban & landscape planning, environmental indicators, environmental strategic assessment, land use science & landscape studies. He has published ~80 articles on the above mentioned topics. He will speak on the topic '*Reducing Risk of Urban Pluvial Flooding through Spatial Equity Approach*'.



**Prof. R Parthasarathy**  
*Director*  
*Gujarat Institute of Development*  
*Research, Ahmedabad*

He has undertaken many studies relating to large scale irrigation, river basins, water management, fisheries, mangroves, and the coastal cities. Besides serving as a consultant to ADB, DFID, London and the Centre for Development Studies, University of Wales, UK, he has also served as a member in a number of governmental committees and has collaborated a network of researchers. He has been a Visiting Scholar at UBC Canada and at University of California, Berkeley. He will speak on the topic '*Whose urban watershed is it anyway?*'

*Facilitating Institution*

**Nirma University**

Speaker: **Dr. Daniele La Rosa**, Associate Professor, Department of Civil Engineering and Architecture, University of Catania, Italy

Topic: **Reducing Risk of Urban Pluvial Flooding through Spatial Equity Approach**


Dr. Daniele's presentation focused on resilience of the urban system. His main question of research was *How the spatial distribution of the benefits from urban green infrastructure can be planned with respect to urban drainage?* The inequalities arising from the distribution is investigated in terms of types, quantity, and the location. The research is focused on *How nature based solutions and sustainable urban drainage can work to reduce the risk of pluvial flooding?* The three main objectives of his research were- (1) modelling scenarios of nature-based solutions (NBS) (particularly Sustainable Urban Drainage Systems -SuDS) to describe their potential in reducing risk related to urban water run-off, (2) understanding and mapping where positive impacts from SuDS are produced and for whom are supplied, and (3) assessing which SuDS scenario is more effective and equal in terms of number and location of beneficiaries. He provided a brief introduction of NBS in urban context. Specific advantages of NBS which were highlighted includes "sustainable, cost-effective, multi-purpose, and flexible alternatives for various planning objectives". Next, a number of possible applications in cities were listed, of which *Water management* was the focus of his research. The SuDS is defined as a sustainable approach which uses the 'soft' green infrastructure to manage excess water in the city. This approach also attempts to manage stormwater as close to source as possible with use of natural drainage processes. Following this, few examples of categories of SuDS were shown which are effective option within cities. In his research, Dr. Daniele showcases the use of aggregated indexes to study impacts of SuDS such as combination of hydrologic/hydraulic parameter to proxy resilience. The topic of spatial equity is also discussed with focus on quality and quantity of services. Some key aspects to be considered when planning and designing SuDS were also discussed, such as – *Which are the positive impacts of SuDS? Who's benefitting from SuDS? How much benefit? How to quantify it? Where are the benefits actually delivered within the city?* This research is applied in the city of Avola, which is in the island of Sicily, Italy. The formulated methodology used in this research is discussed next. This includes use of hydraulic modelling, SuDS scenarios modelling, land use and demographic data, distance analysis, and assessment of risk and spatial equity benefits. The research uses the Dual Drainage System (DDS) approach. Few tested scenarios include – No SuDS, 100% built-up area with green roofs and 50% built-up areas with green roofs. The distribution of green roof is considered according the possible variation of urban catchment. To include the social dimension, social data is used along with the land use data. This helped in identifying the exposure of population. The risk assessment was carried out using the distance analysis and population data of the city. The results show the exposure map of the spatial locations which may be affected by flooding and different outcomes of applied scenarios. Lastly, the presentation concludes that NBS have positive impacts for people, but benefits are not equally distributed, and thus should be researched more in the future. More questions pertaining to Dr. Daniele's research work can be corresponded through his email- [dlarosa@dar.unict.it](mailto:dlarosa@dar.unict.it)

Speaker: **Prof. Parthasarathy Rengarajan**, Gujarat Institute of Development Research, India  
Topic: **Whose urban watershed is it anyway?**

Prof. Parthasarathy's presentation starts with sharing his understanding about watershed and how it differs in rural and urban areas. In the recent past, rural watershed has changed its focus and foci to be largely technical i.e., it is not just construction, but with the help of Indian Meteorological Department (IMD) has developed micro-level weather monitoring systems. This has resulted in including the context of climate change into planning. In case of urban watersheds, he states that we are clueless to large extent. The importance of natural drainage systems was highlighted and the shortcomings in planning were also discussed in detail. The major shortcomings in the planning tools and rules were stressed upon. In most of the cities, it was discussed that the tanks, and ponds are usually first used as refill site and then it is used for construction of built-up structures. He stressed that the relevance of planning act is not only at the city-level, but also at neighbourhood level. Some examples of watershed planning and management were showcased. It was noted that it is important to allow a natural gradient for the flow of water for watershed management. One of the identified problems that hamper planning includes property rights. In India, 73<sup>rd</sup> and 74<sup>th</sup> constitutional amendment has provided the *Panchayat* and the Urban Local Bodies (ULBs) a mandate for planning water and natural resources under their jurisdiction. As a case study, Bhuj city, which is the capital of Kutch district was used to understand the implementation of planning approaches. It is situated in an arid region and thus water is scarce. The city is largely dependent on external water. To make this city water secure, the major options include reviving old lakes, treating watershed and recharge the local groundwater structures through water harvesting systems. The drainage pattern of the city was showcased through the map, highlighting the lack of importance given to drainage in the past. The map showed the location of tanks and wells which existed in the city. Another concerning point highlighted with respect to water availability is the groundwater level (>60m). The brackish nature of water is also a problem in the region. Thus, portal water is very scarce. Post 2001 earthquake, haphazard construction has taken place in the city and has recently led to flooding. A part of the solution is suggested to be rejuvenation of *Hamirsar* lake in the centre, which has grown over time with the help of community, NGOs and government initiatives. To coordinate the activities for water conservation, an umbrella organization was formulated which also had watershed associations at different scales. This also included private areas. The results showed very good improvement in the availability and quality of water. In conclusion, it was stated that urban watershed delineation methodology and its inclusion in the urban planning is necessary. This was achieved by the Bhuj city by acting at the smallest scales and by mobilizing the community. Also, the rain water harvesting strategy needs to be tailored for a city and not applied uniformly based on common policy. The incentive for locals is the water security which is improving with years.

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Debjani Ghosh Neeru Bansal

Director IA-NU Sundaravel SS

Akhlaq Wani S. Jaya kumar

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44

REC Lalitha Narayanan is presenting



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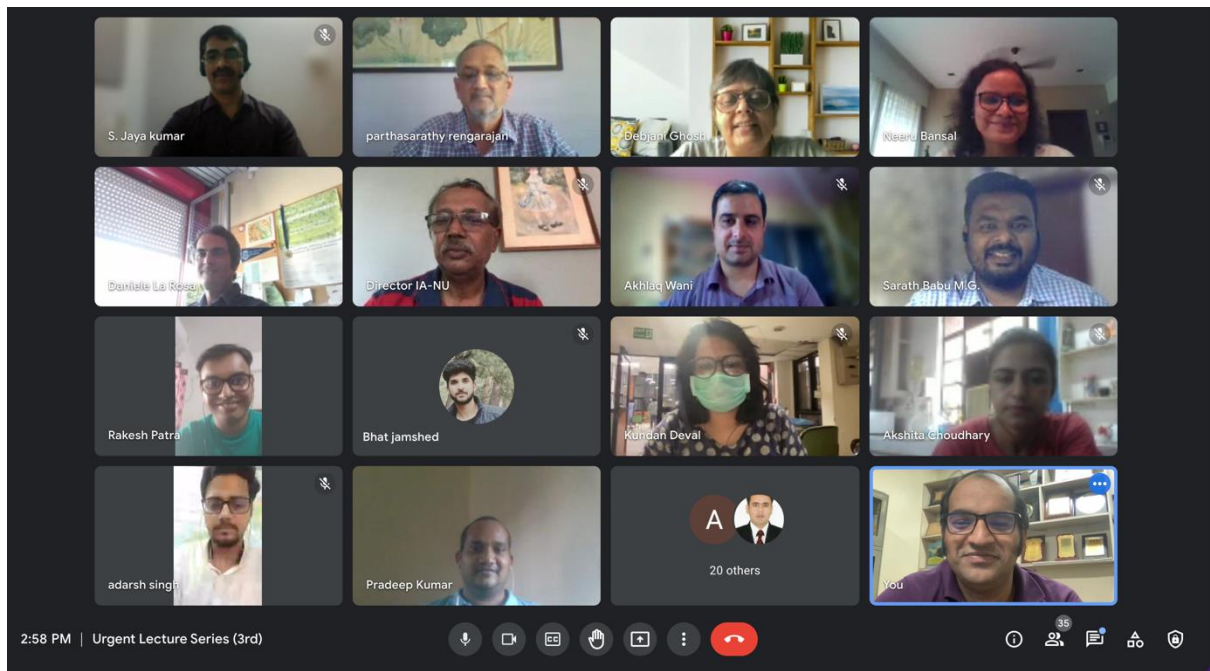
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Lalitha Narayanan (Presentation)

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48



Link to Lecture

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