REGIONAL CONFERENCE

Peri-Urban Ecosystems For Enhancing Urban Resilience

18th-19th SEPTEMBER, 2017
NEW DELHI, INDIA

Organised by

Collaboration

Supported by

Acknowledgement

The organizers are grateful to The Rockefeller Foundation for supporting this Regional Conference on Peri-Urban Ecosystems for Enhancing Urban Resilience. Our thanks to Asian Cities Climate Change Resilience Network (ACCCRN), UNICEF, India and School of Planning and Architecture, New Delhi, India for the collaborative support and guidance for the commencement of this conference. We extend our most sincere gratitude to the Ministry of Environment, Forest and Climate Change, Government of India, for the vital support to this conference. Last but not the least our gratitude goes to all the participants for their active participation and valuable contribution to the conference.

Conference Report: Regional Conference on Peri-Urban Ecosystems for Enhancing Urban Resilience 2017

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Background

Around three-quarters of the world population will live in cities and towns by the year 2050 and most of this increase will occur in developing countries in the global south.[1] Though urbanization has positively contributed to lifting people out of poverty, this development is neither inclusive nor sustainable because most of the Asian cities are highly vulnerable to natural disasters and the projected impacts of climate change.

A key concern with regard to South Asia is the 'messy and hidden' nature of urbanisation as a result of widespread existence of slums and sprawls on the city peripheries[2] which are also known as peri-urban areas. Rapid and unplanned growth in the peri-urban areas leads to hidden urbanisation with increase in the number of settlements possessing urban characteristics but not satisfying the criterion to be officially classified as urban.

Rural-urban transformations (physical, socio-economic, cultural and functional) occur due to rapid expansion and redevelopment of cities, undermining their ability to become inclusive, safe, resilient and sustainable. The current urban expansion trends are leading to usurpation of ecologically sensitive lands in peri-urban areas for housing and other construction activities. The peri-urban areas, which provide natural resources for growing cities in terms of water bodies, open and green lands, as well as orchards, are increasingly at a risk of degradation due to straining of natural resources, absorption of existing agricultural lands and dumping of waste. From governance point of view, the term peri-urban is yet to enter the official discourse. Due to lack of clear cut conceptions and related concrete policies from national to local level, peri-urban areas have been the most threatened

1 United Nations Population Division, World Urbanization Prospects: The 2014 Revision (2014). United Nations Population Division: United Nations.

2 https://openknowledge.worldbank.org/bitstream/handle/10986/22549/9781464806629.pdf?sequence=17&isAllowed=y

Peri-urban areas are geographical areas near the city or outskirts of the city, essentially transitional areas, changing from rural to peri-urban and may become urban. Located between the outer limits of urban and regional centres and the rural environment, they represent a wide range of uses, such as water catchments, forestry, recreation and productive farming, as well as offer a unique ambience and lifestyle. (GEAG, 2016)

areas with regard to loss of biodiversity, vegetation and land-use changes.

Multiple aspects of urban sustainability and resilience are supported by the ecosystem services produced by the peri-urban ecosystems and the peri-urban agriculture including food security, livelihood security to the vulnerable population and disaster risk management etc.[3] In the face of changing climate with increasing flood events, increasing temperatures, drought and water scarcity, the services provided by peri-urban spaces becomes more valuable. For example, the open green spaces and peri-urban agriculture can act as flood buffers, and strengthen the resilience capacities of the cities.

Cities cannot operate in isolation but within a 'sphere of dependence' on surrounding peri-urban areas and their ecosystems (GEAG, 2016). Marked with high concentration of people living in poverty, burdened with institutional ambiguity, unplanned growth, poor infrastructure and environmental degradation,[4] these peri-urban areas need immediate attention to make the process of urbanisation inclusive, resilient and sustainable.

With this background, a Regional Conference on "Peri-Urban Ecosystems for Enhancing Urban Resilience" was organised with an aim to create an interface between policy makers, researchers, civil society organisations, academicians, practitioners and communities to understand the importance of peri-urban areas in enhancing urban resilience and to debate on how these areas can be mainstreamed in the development process without jeopardizing the environmental integrity.

The Conference

A Regional Conference on 'Peri- Urban Ecosystems for Enhancing Urban Resilience' was organized by Gorakhpur Environmental Action Group (GEAG), Gorakhpur and ICLEI-Local Governments for Sustainability, South Asia in collaboration with ACCCRN, UNICEF, India and School of Planning and Architecture, New Delhi, India with the support of The Rockefeller Foundation. In addition, the ICLEI-RUAF CITYFOOD network was also a part of the conference. The conference was held on 18th and 19th September, 2017 at Gulmohar Hall, India Habitat Centre, New Delhi, India.

The conference examined various themes including urbanization, managing peri-urban spaces, maintaining critical natural resources, food-water-livelihood security of poor and marginalized communities, gender dimensions, political frameworks, and governance issues exacerbating due to the inevitable drift of cities into peri-urban areas as well as the challenges of climate change impacts on these vulnerable areas.

3 Why Peri-urban Ecosystem Services Matter for Urban Policy (2017). Ecosystem Services for Poverty Alleviation (ESPA)

4 Marshall and Randhawa (2017). India's Peri-Urban Frontier: Rural-Urban Transformation and Food Security, IIED.

The key objectives of the conference were:

- To review and analyse challenges and opportunities associated with peri-urban ecosystems;
- To review the contribution of peri-urban areas to food-water-livelihood security and resilience of the people residing in urban and peri-urban regions;
- To understand the current state of affairs and governance issues pertaining to planning in peri-urban areas and resilience building through case studies; and
- To draw a line of action for peri-urban developmental planning recognizing ecosystem services and disaster and climate resilience for sustainable development.

The conference had participation from various practitioners and policy makers across the South Asia region including representatives of municipal corporations and government departments, representatives from key Ministries from India (Ministry of Home Affairs, Ministry of Environment, Forest and Climate Change, Ministry of Urban Development, Ministry of Agriculture and Ministry of Information and Broadcasting), Niti Aayog, researchers, scientists, development planners, academicians and civil society organizations.

The inaugural session was followed by the release of Training Handbook on *"Urban Resilience and Sustainability through Peri-Urban Ecosystems- Integrating Climate Change Adaptation and Disaster Risk Reduction, Process Guidance and Training Handbook".* The Training Handbook has been developed by Gorakhpur Environmental Action Group (GEAG) under the Asian Cities Climate Change Resilience Network (ACCCRN) initiative of The Rockefeller Foundation, USA.

The conference deliberated on the following thematic issues:

1. **Role of Peri-Urban Ecosystems in Building Urban Resilience**: To identify the significance of peri-urban spaces and ecosystem services provided by them for urban resilience and identifying the linkages and continuum of urban peri-urban rural areas for sustainability of cities.
2. **Urban Planning and Development**: To create a better understanding of rural-urban continuum with peri-urban spaces as transitional zones in the urban planning process, understanding the capacity building needs of urban planners for climate and disaster resilient inclusive development, identifying mechanisms to address the needs of peri-urban areas through the planning process.
3. **Governance Mechanisms in Peri-Urban Areas:** To identify gaps in coordination amongst urban local bodies, para-statal agencies, other government departments and private sector, which leads to haphazard development in peri-urban areas and to identify institutional cooperation mechanisms that can address the issues in peri-urban areas.
4. **Addressing Gender Concerns and Specifically Vulnerable Groups in Peri-Urban Areas:** To identify mechanisms to address specific vulnerabilities of peri-urban areas and its inhabitants while mapping priority actions for specifically vulnerable groups and promoting replication of best practices.

A "*Cities Panel*" was also constituted in the Regional Conference where elected representatives of various municipalities shared the experiences from various countries across the region. The key issues of peri-urban areas and some good practices to enhance resilience through case studies of various cities were discussed during this interactive session.

During different interactive sessions several speakers gave their remarks on the issues related to peri-urban areas and type of efforts and institutional reforms which are required for inclusive development. Dr Shiraz A. Wajih, President, GEAG highlighted the key issues faced by the peri-urban areas identified through GEAG's interventions in Gorakhpur and cities of eastern India. These are: lack of good governance mechanisms, illegal encroachments, conflicts over land-use and solid waste dumping from urban areas etc. He hoped that the conference would share some good experiences to address these issues across the region and further opportunities for innovative interventions in peri-urban areas would be identified through this regional platform. Mr Emani Kumar, Deputy Secretary General, ICLEI- Local Governments for Sustainability & Executive Director, ICLEI-Local Governments for Sustainability, South Asia, New Delhi, emphasised on the importance of "water-food-energy nexus" in urban and peri-urban areas. He said that to achieve this we need to bring together all the stakeholders including the government departments, NGOs and the communities.

Prof Chetan Vaidya, Director, School of Planning and Architecture, New Delhi, emphasised that the new approach to climate change resilience and improved urban planning process in several cities where reference to peri-urban systems also emerged prominently under ACCCRN Programme supported by The Rockefeller Foundation needs mainstreaming in the urban planning process across the region. Mr Ashvin Dayal, Associate Vice President and Managing Director (Asia), The Rockefeller Foundation, Bangkok, Thailand, in his key remarks laid emphasis on the understanding of "resilience" first to address the issues related to it. He remarked that the two concepts of role of peri-urban ecosystems in enhancing urban resilience and building the resilience of peri-urban zones itself should be looked together for sustainable and climate resilient development in this rapidly urbanising world. Dr Amita Prasad, Additional Secretary, Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India, raised concerns for developing a common platform to bring Climate Change, Disaster and Sustainable Development Planning together. Also, to understand the issues of communities in peri-urban areas, there is a need to interact with them more often and try to understand the problems from their perspective.

REGIONAL CONFERENCE ON

Peri-Urban Ecosystems for Enhancing Urban Resilience

18TH - 19TH SEPTEMBER, 2017
GULMOHAR HALL, INDIA HABITAT CENTRE, NEW DELHI, INDIA

Day-1: 18th September 2017	
09.00 - 10.00 hrs	Registration
10.00 - 11.30 hrs	Inaugural Session
	Welcome • Ms. Nivedita Mani, Coordinator, Gorakhpur Environmental Action Group, New Delhi **Context Setting and Conference Objectives** • Dr. Shiraz A. Wajih, President, Gorakhpur Environmental Action Group, Gorakhpur **Remarks from ICLEI – Local Governments for Sustainability, South Asia** • Mr. Emani Kumar, Deputy Secretary General, ICLEI- Local Governments for Sustainability & Executive Director, ICLEI-Local Governments for Sustainability, South Asia, New Delhi **Remarks from School of Planning and Architecture, New Delhi** • Prof. Chetan Vaidya, Director, School of Planning and Architecture, New Delhi **Key Remarks** • Mr. Ashvin Dayal, Associate Vice President & Managing Director (Asia), The Rockefeller Foundation, Bangkok, Thailand **Inaugural Address** • Dr. Amita Prasad (IAS), Additional Secretary, Ministry of Environment, Forest and Climate Change, Govt. of India **Book Release** • "Urban Resilience and Sustainability through Peri-Urban Ecosystems- Integrating Climate Change Adaptation and Disaster Risk Reduction, Process Guidance and Training Handbook" **Vote of thanks** • Dr. Monalisa Sen, Programme Coordinator (Biodiversity), ICLEI- Local Governments for Sustainability, South Asia, New Delhi
11.30 - 12.00 hrs	Tea

12.00 – 14.00 hrs	**Session 1: Role of Peri-Urban Ecosystems in Building Urban Resilience** **Theme Lead:** Prof. Anil K Gupta, Associate Professor, Head-Division of Policy Planning, National Institute of Disaster Management, Govt. of India, New Delhi
	Chair: Mr. Amit Prothi, Associate Director, 100 Resilient Cities, Singapore **Co-Chair:** Mrs Shobha Banshetti, Hon'ble Mayor, Solapur, Maharashtra **Speakers** • **Peri-Urban Dynamics: Observations from Sriperumbudur, Tamil Nadu -** Prof. Sudhir Chella Rajan, Indo-German Centre for Sustainability, Indian Institute of Technology, Chennai • **What does 'Peri-Urban' bring to our understanding of resilience? -** Dr. Vishal Narain, Professor, Public Policy and Governance, Management Development Institute, Gurugram • **Peri-Urbanity, Resilience and Urbanisation** - Mr. Amit Mitra, Independent Researcher, New Delhi • **Exploring Linkages between Peri-Urban Ecosystems and Urban Resilience: A Case of Bhopal City** - Dr. Rama Pandey, Assistant Professor & Coordinator, School of Planning & Architecture, Bhopal • **Speculative Landscapes across South East Asia -** Mr. Sharan Sudhindra, Acting Program Manager and Associate, 100 Resilient Cities, Singapore • **Sustainability Indices and Mapping of Peri-Urban Resilience in the Climate Context -** Dr. Dipayan Dey, Chair, SAFE, Kolkata • **Peri-Urban Water Bodies: The Key to Dual Problems of Drinking Water Scarcity and Urban Flood Mitigation -** Prof. S Janakrajan, Madras Institute of Development Studies, Chennai Q & A and Open Discussion
14.00 - 15.00 hrs	**Lunch**
15.00 - 17.00 hrs	**Session 2: Urban Planning and Development** **Theme Lead:** Prof. N. Sridharan, Director, School of Planning and Architecture, Bhopal, Madhya Pradesh
	Chair: Prof. N. Sridharan, Director, School of Planning and Architecture, Bhopal, Madhya Pradesh **Co-chair: Ecosystems Services and Urban Resilience in Rapidly Urbanising Asia -** Ms. Denia Syam, Regional Manager, Asian Cities Climate Change Resilience Network, Mercy Corps, Indonesia **Speakers** • **Reducing Disaster Risk in Urban Areas through Land Management -** Mr. Amit Prothi, Associate Director, 100 Resilient Cities, Singapore • **Settlement Gentrification -** Prof. Alka Bharat, Department of Architecture and Planning, Maulana Azad National Institute of Technology, Bhopal • **Examining Vulnerability in a Dynamic Urban Setting: The Case of Bangalore's Interstate Migrant Waste Pickers -** Ms. Kavya Michael, Indian Institute of Human Settlements, Bangalore • **Urbanisation and Sanitation Crisis in Urban Peripheries: A Case of Emerging Cities of U.P. -** Dr. Bijay K Singh and Prof S. S. Verma, Gorakhpur Environmental Action Group, Gorakhpur • **Peri-Urban Spaces: The Case of Doddaballapur -** Dr. Sujatha Byravan, Independent Consultant, Bangalore Q & A and Open Discussion
17.00 hrs	**Group Photography and Tea**

Day-2: 19th September 2017	
9.30 - 11.30 hrs	**Session 3: Governance Mechanisms in Peri-Urban Areas** **Theme Lead:** Mr. Anil K Sinha, IAS (Retd.), Ex-Vice Chairman, Bihar State Disaster Management Authority, Bihar
	Chair: Dr. J. P. Mishra, Advisor, Niti Ayog, Govt. of India **Co-Chair:** Mr. Tshewang Gyacho Bhutia, Commissioner, Gangtok Municipal Corporation, Govt. of Sikkim **Speakers** • **Perspectives on Achieving Meaningful Governance Transitions in the Peri-Urban Interface -** Dr. Nambi Appadurai, Strategy Head-Vulnerability and Adaptation Initiative, World Resources Institute, Bangalore • **Peri-Urban Interface: Resilient and Sustainable Surat -** Mr. Kamlesh Yagnik, Chief Resilience Officer, 100 Resilient Cities, Surat • **Integrating Peri-Urban Ecosystems in Urban Resilience – Cases from South Asia** - Ms. Bedoshruti Sadhukhan, Programme Coordinator – Sustainability, ICLEI- Local Governments for Sustainability, South Asia, New Delhi • **Climate Change Resilience and Urban Governance: A Case of Five Indian Cities –** Ms. Nivedita Mani, Coordinator, Gorakhpur Environmental Action Group, New Delhi Q & A and Open Discussion
11.30-12.00 hrs	**Tea**
12.00 - 14.00 hrs	**Session 4: Addressing Gender Concerns and Specifically Vulnerable Groups in Peri-Urban Areas** **Theme Lead:** Ms. Aditi Kapoor, Climate & Resilience Advisor, Red Cross Climate Centre, International Federation of Red Cross and Red Crescent Societies, New Delhi
	Chair: Dr. A. Arunachalam, Principal Scientist, Indian Council of Agricultural Research, New Delhi **Co-Chair: Decoding Peri-Urbanizatioin in Small Cities – A Case Study of Berhampur, Odisha** - Ms. Aparna Das, GIZ, New Delhi **Speakers** • **Gender and Equity Issues in Urban and Peri-Urban Agriculture -** Ms. Ranjani Krishnamurthy, Gender Specialist, Chennai • **Gender and Climate Change Resilience: Methods and Perspectives at the level of Neighborhood -** Ms. Seema Sharma, Resilience Relations, New Delhi • **Unpacking Resilience for Children and Women in Urban Low Income Neighborhoods -** Mr. Manu Gupta, SEEDS, New Delhi • **Social Interfaces Emerged in the Context of Social Innovations: A Story on Tribal Women's Collective along the Tansa Reservoir In Maharashtra -** Ms. Devisha Sasidevan, Tata Institute of Social Sciences, Mumbai • **Women Farmers and Climate Resilient Agriculture in Peri-Urban Areas -** Dr. Shiraz A. Wajih, Gorakhpur Environmental Action Group, Gorakhpur Q & A and Open Discussion
14.00 - 15.00 hrs	**Lunch**

15.00 - 16.15 hrs	**Cities Panel**
	Moderator: Mr. Emani Kumar, Deputy Secretary General, ICLEI- Local Governments for Sustainability & Executive Director, ICLEI-Local Governments for Sustainability, South Asia, New Delhi **Panelists:** • Md. Zannatul Ferdous, Hon'ble Mayor, Singra, Bangladesh • Mr. H. M. Ahidul Islam, Hon'ble Mayor, Kotalipara, Bangladesh • Md. Abdul Mozid, Hon'ble Mayor, Kakonhat, Bangladesh • Mr. Shakti Singh Chaudhary, Hon'ble Mayor, Gangtok, Sikkim, India • Mr. Deepak Babu Kandel, Hon'ble Mayor, Palungtar, Nepal • Mrs Shobha Banshetti, Hon'ble Mayor, Solapur, Maharashtra, India • Mr. Tikender Panwar, Hon'ble Former Dy Mayor, Shimla, India • Md. Abu Bakar Siddique, Town Planner, Faridpur Municipality, Bangaldesh • Mr. Tshewang Jeipo, Executive Architect, Phuentsholing Municipality, Bhutan • Dr R K Singh, Senior Health Officer, Dehradun Nagar Nigam, India • Ms. Kabita Dhungana, Deputy Mayor, Belkotgadhi Municipality, Nepal • Mr. Senaka Palliyaguruge, Commissioner, Matara Municipal Council, Sri Lanka • Md. Ashraful Haque, Chief Engineer, Rajshahi Municipality, Bangladesh
16.15 - 16.45 hrs	**Tea**
16.45 - 17.45 hrs	**Summing up and Way Forward**
	Panelists: • Mr. Amit Prothi, Associate Director, 100 Resilient Cities, Singapore • Prof. N. Sridharan, Director, School of Planning and Architecture, Bhopal, Madhya Pradesh, India • Mr. Emani Kumar, Deputy Secretary General, ICLEI- Local Governments for Sustainability & Executive Director, ICLEI-Local Governments for Sustainability, South Asia, New Delhi • Dr. Shiraz A. Wajih, President, Gorakhpur Environmental Action Group, Gorakhpur, India • Ms. Ranjani Krishnamurthy, Gender Specialist, Chennai, India • Mr. Tikender Panwar, Hon'ble Former Dy Mayor, Shimla, India

DAY 1, 18 SEPTEMBER 2017

Inaugural Session

The inaugural session witnessed key remarks from speakers such as

Dr Shiraz A Wajih, President, Gorakhpur Environmental Action Group (GEAG), Gorakhpur, Uttar Pradesh, India;

Mr Emani Kumar, Deputy Secretary General, ICLEI-Local Governments for Sustainability and Executive Director, ICLEI-Local Governments for Sustainability, South Asia, New Delhi, India;

Prof Chetan Vaidya, Director, School of Planning and Architecture, New Delhi, India;

Mr Ashvin Dayal, Associate Vice President and Managing Director (Asia), The Rockefeller Foundation, Bangkok, Thailand and

Dr Amita Prasad (IAS), Additional Secretary, Ministry of Environment, Forest and Climate Change, Government of India.

Context setting and conference objectives

Dr Shiraz A Wajih, *Gorakhpur Environmental Action Group, Gorakhpur, Uttar Pradesh, India*

Peri-urban spaces are essentially geographical areas near the cities periphery and are every so often referred to as '*cities in waiting*'. With the support of Asian Cities Climate Change Resilience Network (ACCCRN) and The Rockefeller Foundation, GEAG undertook various innovative interventions in the peri-urban areas of Gorakhpur from 2010 onwards.

Peri-urban areas provide resilience to the city in terms of disaster resilience, reducing climate change impacts and enhancing its food security. The common property resources in the peri-urban areas like water bodies, open green spaces and orchards are vital to provide resilience to the city in terms of providing flood buffering capacity, absorbing the urban heat island effect, increasing the water harvesting potential and recharging mechanisms. With the experiences gained from various activities under the ACCCRN project, GEAG developed an understanding of the inter-complementarity between urban and peri-urban areas.

Peri-urban areas provide resilience to the city in terms of disaster resilience, reducing climate change impacts and enhancing its food security.

Dr Shiraz A Wajih

Taking forward the interventions in Gorakhpur, GEAG also started working in other cities of eastern India: Saharsa in Bihar, Jorhat in Assam and Basirhat in West Bengal. The common issues of peri-urban areas identified through GEAG's interventions are lack of good governance mechanisms, illegal encroachments, conflicts over land-use and solid waste dumping from urban areas. The rules and regulations are violated leading to degradation of ecosystems. An understanding of how degradation leads to increased vulnerability of the city was developed and efforts were made to address the inter-complementarity between the well-being and rights of people especially focussing on women farmers and the resilience of the city as a whole. With this background, Dr Wajih emphasised that there is a need to share good experiences across the region and look at opportunities on how innovative interventions in peri-urban spaces can be taken forward at Asia level.

Remarks from ICLEI- Local Governments for Sustainability, South Asia

Mr Emani Kumar, *Deputy Secretary General, ICLEI-Local Governments for Sustainability and Executive Director, ICLEI-Local Governments for Sustainability, South Asia*

There is a need for effective management of the nexus among food, energy and water in peri-urban areas to create resilience to climate change.

Mr Emani Kumar

ICLEI-Local Governments for Sustainability is an association of cities all over the world with more than 1500 cities as members and partners. The association has been working in different cities in collaboration with the local governments. As a part of this, city action plans have been developed with the support of The Rockefeller Foundation for the cities of Patna, Panjim and Shimla. These action plans were also used by the cities in preparing for the Smart City challenge. The integration and mainstreaming of these actions in the Smart City plans helped these cities garner support and finance from the government and public-private-partnership. There is a need to take forward these initiatives to other cities as well.

Bringing the importance of the "**water-food-energy nexus**" in urban and peri-urban areas to everyone's notice, Mr Kumar emphasised that to manage this, there is a need to bring together all the stakeholders

including the government departments, NGOs and the public. With the collective efforts of all the stakeholders, the action plans developed for cities can be implemented more effectively as in the case of Nashik, Solapur and Vijaywada where ICLEI-South Asia is working in partnership with various city stakeholders. Under the Integrated Urban Water Management initiative, ICLEI focuses on integrated planning of water resources from source to reuse in urban and peri-urban areas. ICLEI's project involves capacity building and undertaking water sector reforms for two cities each in Rajasthan and Maharashtra. A stakeholder committee has been constituted to mainstream the activities within these cities.

Introducing a global initiative by ICLEI and RUAF Foundation to the participants, Mr Kumar gave a brief description about the CITYFOOD network. It focuses on food sustainability, food supply to the urban and peri-urban areas and maintaining a resilient urban and peri-urban food system by accelerating local and regional government action. The network provides training, policy guidance and technical expertise to its participants. Lastly, he talked about another initiative by ICLEI called INTERACT-Bio that focuses on protecting, promoting and integrating biodiversity within and around city regions by mainstreaming the biodiversity actions into the city planning. The project will be launched in Kochi, Mangaluru and Panaji with the guidance and support of the Ministry of Environment, Forest and Climate Change, Govt. of India.

Remarks from School of Planning and Architecture, New Delhi, India

Prof Chetan Vaidya, *Director, School of Planning and Architecture, New Delhi, India*

The approach to sustainable urban and peri-urban development should be place specific as India is a large and diverse country.

Prof Chetan Vaidya

The South Asian urbanisation processes are 'messy and hidden' given the lack of sustainable approaches. In the Indian context, urban areas need to improve in order to achieve fast and sustained economic development. All the urban areas in the country are not captured in the official definition of 'urban'. Around 25 per cent additional areas are there in the peripheries, in large villages, small towns and census towns. This messy trend of urbanisation is leading to increased problems of traffic congestion, lack of drinking water and sanitation in urban and peri-urban areas. These factors also increase the vulnerability to disasters.

The approach to sustainable urban and peri-urban development should be place specific as India is a large and diverse country. One size fits all approach will not be useful here. Given the importance of peri-urban areas for urban resilience, managing the environment should become a part of urban development strategies. The investment based urban sector reform projects, which started way back in 2005 like JNNURM and the other recent

programmes including AMRUT, HRIDAY, National Rurban Mission and Smart Cities Mission require an integrated approach to urban planning including of the peripheral areas. A change in the mind-set of planners and policy makers will be required to adopt an integrated approach, which should cover integrated public transport, mixed land-use and higher floor space index.

The recent 'Three Year Action Agenda: 2017-2020' developed by the Niti Aayog, Government of India, recommends the increase of floor space and recognition of specific areas for affordable housing. Developing climate change resilience and incorporating environmental concerns has to be a part of the overall approach to build smart cities. An important aspect of urban planning that should not be overlooked is public health which actually brought in the concept of urban planning in India. There is a need to involve the officials of urban local bodies in sustainable extension of the cities and peripheral areas. A major issue that needs immediate attention is of developing the capacities of government officials on these issues at local, state and national level.

The new approach to climate change resilience and improved urban planning process where reference to peri-urban systems also emerged prominently under the Asian Cities Climate Change Resilience Network (ACCCRN) supported by The Rockefeller Foundation needs mainstreaming in the urban planning process across the region. An important step towards sustainable urban development in India is the addition of the concept of sustainability in the National Building Code of India in 2016.

Lastly, Prof Vaidya highlighted a new initiative to Urban Climate Change Resilience (UCCR) by Gorakhpur Environmental Action Group (GEAG) with the support of UNICEF, India. It will focus on integrating the agenda of UCCR and child-friendly cities in SPA's post graduate Studio Programme. The Post Graduate students will be facilitated in the cities to expose them to practical problems faced by cities in the context of disasters-climate change, focusing on children and the role of urban planning. Making the young planners understand the importance of integrated urban planning considering development, climate change and disaster management is the need of the hour. He concluded his speech by giving two key recommendations:

- Mainstream resilient cities approach into urban planning and development process with focus on public health.
- Development of peri-urban areas should be an integral part of this approach.

Key remarks from The Rockefeller Foundation

Mr Ashvin Dayal, *Associate Vice President and Managing Director (Asia), The Rockefeller Foundation, Bangkok, Thailand*

Around 75 per cent of infrastructure that will exist by the year 2050 is yet to be built. This infrastructure will be built on the margins of the city leading to the peri-urban zones getting urbanized.

Mr Ashvin Dayal

Before discussing the various perspectives on urban resilience, it is important to develop an understanding of 'resilience'. *"Resilience is the capacity of individuals, communities, institutions, businesses and entire systems to survive, adapt, and thrive in the face of chronic stresses and acute shocks, and even transform when conditions require it"*. Today, there is an urgent need to make our cities resilient as we are increasingly dealing with more uncertain climate conditions leading to recurring disasters.

There are six essential characteristics of resilience building: the first is of being aware i.e., knowing your strengths, assets, liabilities and vulnerabilities, and threats and risks faced. The second is of being diverse or having surplus capacity to successfully operate under diverse circumstances, beyond every-day functioning (redundancy). The third involves self-regulation i.e., to continue functioning without extreme malfunction, catastrophic collapse, or cascading disruptions (safe failure). Fourth, resilience

building should be integrated and individuals, groups, and organizations can bring together disparate thoughts and elements into cohesive solutions and actions. Fifth, it should be adaptive and should adjust to changing circumstances with new plans, new actions, or modified behaviors, particularly when it is not possible or wise to go back to the way things were before. Last, it should be inclusive and all people and places should be included in the economic, social, political and cultural life and are equally able to access the resources, services and decision-making processes that influence their lives.

Peri-urban areas are zones of transition between the urban and the rural, the dynamic areas of change in India, South Asia and across the world. The two concepts of role of peri-urban ecosystems in enhancing urban resilience and building the resilience of peri-urban zones itself should be looked together for sustainable and climate resilient development in this rapidly urbanising world.

Highlighting the urbanisation trends, Mr Dayal discussed that in 2007, 50 per cent of the world's population was urban and by 2030 it will be 60 per cent and 70 per cent by the year 2050. Every week, 1.4 million people are moving into the cities. Around 75 per cent of infrastructure that will exist by the year 2050 is yet to be built. This infrastructure will be built on the margins of the city leading to the peri-urban zones getting urbanized.

An excellent example of resilience building in urban and peri-urban areas is the case of Surat, an ACCCRN and 100RC city supported by The Rockefeller Foundation. The efforts have helped the city in dealing with the 2013 floods. In 2006, major flood caused huge economic losses of about $4.5 billion and 45,000 low income families were affected and around 70 per cent of the city was inundated for days. In 2013, intense rainfall conditions similar to 2006 developed but the outcomes were entirely different because of the resilience measures taken over the years. These include non-capital measures with the involvement of different stakeholders like Narmada Authority, State Disaster Management Authority, Surat Municipal Corporation, South Gujarat Chamber of Commerce, NGOs, and academics. It also includes end to end flood management system, coordinated decisions, flow of information and awareness of people.

Today ACCCRN is supporting 50 cities across Asia to understand the risks associated with climate change, build capacity of local institutions and gather funding and support for concrete interventions. Towards the end of his speech, Mr Dayal emphasised that building resilience is a global issue not only limited to the developing countries or those in South Asia. The peri-urban ecosystems are emerging as a priority across Asia. GEAG's approach in peri-urban areas near Gorakhpur and other cities of eastern India has led to better management of floods, enhancement of livelihoods of urban and peri-urban communities and food security of the city on the whole.

Inaugural Address

Dr Amita Prasad (IAS), *Additional Secretary, Ministry of Environment, Forest and Climate Change, Government of India*

The needs of peri-urban areas have to be understood by interacting with the communities more often and by trying to understand the problems from their perspective in order to enhance resilience. Lack of data from peri-urban areas, unclear jurisdictions, dumping of city waste, degrading landscapes and conflicting interests over resources and land-use are the key issues faced. There is a need to generate more information and data to help these areas grow in a planned and better way.

Lack of data from peri-urban areas, unclear jurisdictions, dumping of city waste, degrading landscapes and conflicting interests over resources and land-use are the key issues faced.

Dr Amita Prasad

The rural bias in our development planning approach and livelihood generation should be addressed. Food supply and economic growth opportunities from peri-urban areas should be explored further. Dr Prasad emphasised that an integrated approach in planning for climate change resilience, urban development, smart city, biodiversity conservation and industrial development can help the cities with limited resources and capacities. Being 'aware' is important and this includes knowing the emerging issues in peri-urban areas, awareness about community problems, consequences of mal-development and the available strengths to tackle challenges. There is a need to develop a common platform to bring climate change, disaster and sustainable development planning together.

Book Release

The inaugural session was followed by the release of a training handbook on **'Urban resilience and sustainability through peri-urban ecosystems: Integrating climate change adaptation and disaster risk reduction, process guidance and training'.**

The training handbook has been developed by GEAG under the ACCCRN initiative of The Rockefeller Foundation. It is an attempt to bring diverse relevant issues and knowledge under a common ambit of climate change adaptation-disaster risk reduction integration for resilient development of cities and towns and peri-urban areas, by recognizing, promoting and utilizing the ecosystem services, along with welfare of local inhabitants, and enduring business continuity in their multi-sectoral, multi-level and multi-faceted forms.

DAY 1, 18 SEPTEMBER 2017

SESSION 1:

Role of Peri-Urban Ecosystems in Building Urban Resilience

Theme Lead: Prof Anil K Gupta, Associate Professor, Head-Division of Policy Planning, National Institute of Disaster Management, Govt. of India, New Delhi, India.

Chair: Mr Amit Prothi, Associate Director, 100 Resilient Cities, Singapore

Co-chair: Mrs Shobha Banshetti, Hon'ble Mayor, Solapur, Maharashtra, India

The session tried to develop an understanding of the definition as well as challenges faced by peri-urban spaces. It provided a clearer understanding of current patterns of growth in peri-urban areas specifically Bhopal, Chennai, Gurugram, Kolkata, Solapur and Sriperumbudur and looked at the role of the ecosystems in these transitional zones in addressing the needs of the urban areas. The session looked at climate change induced stresses and uncertainties that are leading to environmental degradation as well as how institutional discrimination and differential vulnerability leads to differences in the exposure to social stressors among various sections of people in the peri-urban spaces. The presentations underline the need for more attention to socially just, inclusive, sustainable development that addresses the needs and potentials of the diverse population – migrants, floating population, original residents and various income groups.

Key remarks by Theme Lead

Prof Anil K Gupta, *Associate Professor, Head-Division of Policy Planning, National Institute of Disaster Management, Govt. of India, New Delhi*

Cities and peri-urban systems face a growing range of adversities and challenges, these days and not just a single shock or stress. Most peri-urban areas face a combination of challenges, inadequate infrastructure system being one of these. The infrastructure is interdependent and a city's resilience helps it adapt and transform in the face of these challenges. On climate change induced stresses and uncertainties about extreme events, various studies deal with the concepts of interdependence, redundancy, carbon neutrality, sustainability and carrying capacity.

A single event does not cause devastating consequences but gets exacerbated by stresses like institutional discrimination, violence, divestment and aging infrastructure, poverty, environmental degradation, and other chronic challenges.

Prof Anil K Gupta

From the effects of climate change as manifested in disasters like the Chennai floods to growing migrant populations to public health pandemics to cyber-attacks, the challenges are many. All these put together can contribute to further threatening a city's resilience. A single event does not cause devastating consequences but gets exacerbated by stresses like institutional discrimination, violence, divestment and aging infrastructure, poverty, environmental degradation, and other chronic challenges. The compounding pressure of these unaddressed stresses undermines the city's resilience and, when a terrible shock like Hurricane Katrina or Hurricane Harvey hits the city, it exposes and exacerbates these weaknesses—ultimately making it far more difficult for the city to bounce back. Building urban resilience requires looking at a city and its peri-urban areas holistically. Defining urban narrowly will not suffice the purpose. The urban and peri-urban systems in India and in the South Asian region are very different from that in European countries. The specific characteristics of the systems that make up our peri-urban areas and the interdependencies and risks they may face will help find out the solutions. By strengthening the underlying fabric of a city and better understanding the potential shocks and stresses it may face, a city can improve its development trajectory and the well-being of its citizens. It is important to look at ecosystem services provided by peri-urban areas for urban resilience to survive, adapt, and grow no matter what kinds of chronic stresses and acute shocks an urban system experiences.

Remarks by Chair

Mr Amit Prothi, *Associate Director, 100 Resilient Cities, Singapore*

Differential vulnerability leads to social status differences in the effects of exposure to social stressors among various sections of people in the peri-urban spaces.

Mr Amit Prothi

There are important points around the definition of peri-urbanisation. Does it relate to those processes of dispersive urban growth that create hybrid landscapes of fragmented urban and rural characteristics? Does the definition shift depending on the global location or is it the same in various countries? It is important to understand the fundamental place-based, context sensitive city space. There is also a political side to the definition as planners want to manage urban areas intensively yet taking care to prevent an urban sprawl but power dynamics has its way. An urban planner can identify the best place and projects but it is the bureaucrat and politician who have the final word. After all, planners have limited powers in decisions related to the developing hybrid landscape of fragmented urban and rural characteristics.

Another question is of determining the right kind of governance system to manage the peri-urban spaces. Some places have tried metropolitan governance system but is it appropriate for all? Peri-urban areas lack the institutional capacities and governance structures to respond to the processes of change appropriately. Though seen as an expansion of the functional rural-urban linkages, peri-urban areas are complex in many ways. Differential vulnerability leads to social status differences in the effects of exposure to social stressors among various sections of people in the peri-urban spaces. Some people in the peripheral areas benefit while most do not when the processes of peri-urbanisation are underway. The latter fall into the margins and at times below it. There is a gender angle as there are different ways in which peri-urbanisation impacts men and women.

How do we bring this knowledge into practice as at the end of the day we are all practitioners? There is a need to develop collaboration across disciplinary boundaries and the role of a planner is of facilitating this. It is a challenge to work across disciplinary boundaries but there is a need of dialoguing with the conceptual and methodological legacies they represent.

Remarks by Co-Chair

Mrs Shobha Banshetti, *Hon'ble Mayor, Solapur, Maharashtra, India*

Solapur is the fourth-largest district in Maharashtra, India in terms of land area, and seventh-largest in terms of population. Located in the south-eastern region of Indian state of Maharashtra, Solapur has a number of sugar factories. It lies in the Bhima and Sina river basins of Maharashtra. It is one of the selected Smart Cities under the Smart Cities Mission of the Government of India.

There is a need to manage water efficiently and conserve the water bodies of the region.

Mrs Shobha Banshetti

The city is a centre for handlooms and power-looms. This makes Solapur one of the major water consumers in the region, sourcing water from Ujjani Dam (150 km away). The city is trying to tackle its high non-revenue water losses, water conflicts and the pollution of its water resources. Solapur has several fresh water lakes in and around the city of which Ekrukh lake is also used to supply water to the city. The degradation of the catchment and siltation has led to negative impacts on the water bodies. Solapur has taken the initiative to establish a wastewater treatment plant, which is about to go into operation soon and will help reuse the water for industrial purposes. The city's municipal corporation is working with community involvement at all stages, by conserving resources, reusing wastewater, tapping the natural runoff potential, effectively managing water and sourcing water from multiple sources, with due focus on maintaining water quality and water quantity.

Solapur, has since 2013 been implementing the European Commission funded project on Adopting Integrated Urban Water Management in Indian cities (AdoptIUWM) for capacity building and undertaking water sector reforms. In 2015, it became an ICLEI member as a part of which pilot project sites were identified for implementation. A city level committee has been constituted for implementation of the Smart Cities Mission. There is a need to manage water efficiently and conserve the water bodies of the region and as a part of this desiltation of one of the lakes in the city is being done.

Peri-urban dynamics: Observations from Sriperumbudur, Tamil Nadu

Prof Sudhir Chella Rajan, *Indo-German Centre for Sustainability, Indian Institute of Technology, Chennai, Tamil Nadu, India*

A project of Indo-German Centre for Sustainability, IIT, Chennai aims to address 'enhanced energy efficiency', sustainable habitat, and the 'water mission' objectives in the fast growing peri-urban areas (tier-II cities) in India. The broader goal of the project is to develop a clearer understanding of current patterns of growth in peri-urban areas in South Asia and to set up a 'Global technology watch for sustainable urban habitat' with peri-urban being the focus of analysis. The study examines an archetypal region, Sriperumbudur, on the outskirts of Chennai and investigates alternative integrated development scenarios in the context of climate change using various modelling frameworks to explore economic, land-use development and governance alternatives and their implications for energy, waste and water in the region.

More attention is required for socially just, inclusive, sustainable development that addresses the needs and potentials of the diverse population – migrants, floating population, original residents and various income groups.

Prof Sudhir Chella Rajan

The processes causing peri-urbanisation in Chennai were outlined and were related to the current functioning of the existing planning framework and institutions. In-depth studies were used to zoom into local contexts of socio-economic transformation and the management of water resources. The region has witnessed rapid industrial development, spurred by economic policies that aim to attract foreign investment to the state of Tamil Nadu, resulting in rapidly shifting patterns of production. Poor capacity for governing the areas beyond metropolitan Chennai has resulted in significant pressure on land, resources, infrastructure, social structures and agricultural production.

The first phase of the project develops a preliminary set of heuristics for understanding peri-urban dynamics in Sriperumbudur. For this purpose, a multi-disciplinary mixed methods approach has been developed. The processes and causes of peri-urbanisation in India and Chennai, including a brief literature review, urbanisation trends and data as well as spatial dynamics of the region are outlined. This is then related to the functioning of the existing planning framework and institutions. Two studies zoom into local contexts of socio-economic transformation and the management of water resources. The research design goes far beyond a knowledge generating project and envisages experimenting and testing an action oriented approach of knowledge management for climate change.

Peri-urban areas are also regions where access to services is becoming increasingly fragmented as a result of the development of gated communities and Special Economic Zones, along with resource constraints and the consolidation of power – all conveyed largely in terms of social and political drivers rather than only physical ones. Resilience, accordingly, needs to be characterized more broadly as well, involving normative elements of social and environmental justice in the context of ecological disruption. Rapid development, shifting patterns of production and poor capacity for governing the areas beyond urban boundaries have resulted in significant pressure on land, resources, infrastructure, social structures and the economy.

The study found that the high social resilience of land and business owners in conjunction with their ability to take advantage of the urban opportunities (such as increased education and diversity of employment options) is supporting their continued progress. The low social resilience of the labourers, on the other hand, is perpetuating their inability to take advantage of such opportunities. Subsequently, inequality between the labourers and the land and business owners is growing. This inequality has the potential to further reduce the productivity of informal networks, participation and communication within the entire community thereby lowering the overall social resilience of the municipalities.

The study found that there was a major shift from supplying water through local surface water resources to underground water supply, either through local borewells or inter-basin exchange. This has led to several far reaching consequences, apart from the physical loss of the traditional pond infrastructure for rainwater harvesting. Furthermore, the analysis shows that the village ponds are not being utilized anymore because the local population has lost their traditional knowledge of how - and often their willingness, too - to manage them as a source of fresh water.

The difference between the periphery and core manifests itself on different scales all across the region. The affluent sections of society often draw upon the water resources of the more impoverished communities by extracting larger amounts of groundwater from the surroundings

or by inter-basin exchange. This increases the water stress in the region leading to frustration of large parts of the population. The study suggests that more attention is required for socially just, inclusive, sustainable development that addresses the needs and potentials of the diverse population – migrants, floating population, original residents and various income groups.

What does 'peri-urban' bring to our understanding of resilience?

Dr Vishal Narain, *Professor, Public Policy and Governance, Management Development Institute, Gurugram, Haryana, India*

The study was done primarily to review the concepts and relationships pertaining to peri-urban water security in the context of urbanization and climate change in Gurugram. It sought to contribute to developing a shared understanding of the core concepts related to water security in a peri-urban context. A set of common issues and questions that merit investigation were identified.

Peri-urban livelihoods dependent on natural resources face a particular threat as common property resources on which people depend for their sources of fuel wood, fodder and water get diverted to other purposes.

Dr Vishal Narain

It is not possible to come to a consensus on place-based definitions of the term in terms of proximity to or distance of locations from the city. Peri-urban is instead better understood in terms of its characteristics; a mix of agricultural and non-agricultural land uses, flows of goods, services and resources between villages and urban centers and a social profile that is very heterogeneous and in a state of flux.

All these impact upon the local natural resource base, creating particular environmental and natural resource management problems that are often beyond the scope of urban or rural governments alone and require innovative ways of being addressed. It is a transitional zone around a city and also a zone of intense interactions, flows and linkages between urban and rural areas. When used in this sense, 'peri-urban' refers to the rural fringe areas surrounding cities that bear the spill-over effect of urban expansion.

These areas are marked by stark inequalities as the peri-urban elite are able to benefit from livelihood assets while the rest (landless, tenants, sharecroppers etc.) lose out. These provide the much needed land and water resources for urban expansion and serve as receptacles of urban wastes. Their residents are often portrayed as losers in urbanization and a case is made to involve them in urbanization processes. Often they come into conflict with residents of the core city over the use and allocation of land and water resources. The residents often suffer from inadequate access to basic services and amenities and face exclusion from mainstream economic activity.

The terms used to describe such locations are peri-urban settlements, rural-urban fringe, urban outgrowth or hinterland. Since they bear the spill-over of urban expansion, they are considered to be an extension of the main city. Conversely, the peri-urban zone should also be considered as part of the adjacent rural area for purposes of a holistic approach to rural research and development since there are two-way influences and interactions. Much of the problem is because of the rural-urban dichotomy. The terms 'rural' and 'urban' are still used colloquially in traditional, mutually exclusive terms, and most people have clear mental conceptions of some ideal-type landscape corresponding to each. This simple dichotomy has long continued to influence policy-making purposes.

Often the locus of control over village resources moves to urban dwellers, who take part in auctions of village natural resources. Peri-urban livelihoods dependent on natural resources face a particular threat as common property resources on which people depend for their sources of fuel wood, fodder and water get diverted to other purposes. The acquisition of common lands for the construction of brick kilns may adversely affect the access of the landless to sources of energy, who procure fuel wood from the common lands. Likewise, when village ponds are filled and acquired for urban and residential purposes, people who depend on them for their livelihoods are adversely affected.

While trying to identify the vulnerable households in terms of their poverty and access to resources or livelihoods, it is important to look at the wide range of activities that households are engaged in across the village and the city. Households with a good asset base in the cities and a more diverse livelihoods portfolio are less vulnerable to losses of income that may accrue as a result of shocks and stresses affecting agriculture. Urban assets of peri-urban households can serve as a buffer against shocks or stresses - including those related to the availability of water - that affect agriculture. Likewise, households with a larger dependence on urban assets may suffer shocks and stresses that affect urban activities. In assessing vulnerability, therefore, it is important to look at the relative role of both rural and urban activities and livelihoods opportunities in the livelihood mix of different households.

Social capital can be seen as an essential component of the institutions through which individuals access natural resources. It strengthens the resilience of communities; communities are seen to mobilize social capital in adapting to climate change. Peri-urban areas see a rapid decrease in social capital; migration can break the bonds between people that are the substrate of social capital; rapid unplanned urbanization undermines the development of social capital, just as migration to cities – very common in peri-urban areas - can undermine it as well. Rapid urbanization may have an impact on the level of structural social capital in an area; in areas where migration is prevalent there are fewer relationships networks, associations and institutions that link people and groups together.

Governments need to start by considering how to promote the maintenance of existing social capital for migrants, how to develop bridging social capital between migrant groups and how to produce urban areas with structures that allow new city migrants to be involved in local governance.

Peri-urbanity, Resilience and Urbanisation

Mr Amit Mitra, *Independent Researcher, New Delhi, India*

In the medieval period, India had a very high level of urbanisation and was marked by an intimate two way relationship between the city and the surroundings.

Mr Amit Mitra

South Asia was highly urbanised in the medieval period and a work like Ain-i-Akbari indicates how knowledge management of cities ought to be like. The focal point of the relationship between the town and its surroundings was what we call peri-urban today. In the medieval period, India had a very high level of urbanisation and was marked by an intimate two way relationship between the city and the surroundings. In the north, terms like *shahar, nagar*, denoted the urban while *gaon, gram, deh and dehat* meant rural. The peri-urban of today was denoted by *shahartali, kasba and mofussil shahar* etc. However, the symbiotic two-way relationship between the city and the surroundings was clear.

Many lessons can be drawn from traditional systems of management of natural resources such as water. There was public participation in management of the resources and the hydro-environments flourished when implemented and integrated in the urban fabric. The urban planners then recognised the role of water bodies, common property resources and open spaces. Cities and towns were built taking into account some very clear ecological aspects of the landscape. These included the slope, drainage, direction of the sun and wind according to the season, and the potential of water harvesting. The various cities of Delhi took full advantage of the hills surrounding it. Mehrauli developed around the *Hauz-e-shamsi*, Bhopal around the Bhojtal. Both lakes were made by throwing up embankments between two hills to dam some streams and rivers. The topography and the hydrology was critical.

Agriculture was a part of the cityscape, for food security as well as environmental stability. This also led to better flood management and using the silt for agriculture. All the cities grew their own food, especially vegetables and fruits. As regards water bodies, all the gazetteers of the late 19th and early 20th centuries speak of the numerous rivers, streams, lakes and ponds of the cities. Delhi had the Najafgarh *jheel*, a huge natural water body that drained 225 sq. km and was a part of the ecosystem of the Sahibi River. The lake was drained totally in 1960-61 and later a small part was restored. The Sahibi is known as the *ganda nallah* (dirty drain) now. Gorakhpur, Bhopal and Visakhapatnam similarly had many water bodies.

A simple practice was not to encroach to build '*abad*' on the water bodies, river beds and the catchment areas. The catchment areas were often used to grow vegetables and millets as well as quick growing fuel trees for the city. This also prevented siltation of the water body. Today most of these basic principles have been forgotten. Water bodies and their catchments are encroached upon for housing or industries with impunity leading to flooding and water logging in cities like Chennai, Mumbai or Gorakhpur. We do not learn from history. In the early 19th century, says the Delhi Gazetteer of 1883-84, the construction of the Western Jamuna Canal and embankments as well as the re-building of the Grand Trunk road led to flooding, drainage problems, water logging, spleen related diseases and even impotency. The gazetteer mentions mass migrations from affected villages to the core of the city. Then as now these water bodies provided livelihoods to many people. They also kept the temperature of the city cool in the hot summers.

The current crisis is marked by the balance being destroyed due to total disregard for ecologically sensitive and sensible land use patterns. It's become a situation of man versus nature where nature has to be controlled. A rising populistic form of 'environmentalism' seeks to substitute natural opens by greenfields or parks which may or may not be in consonance with the hydrology. Yet we have the example of the Mughal Bagh which we ignore. These factors lower the city's resilience (or the capacity to withstand shocks) and enhance inequality. The critical lessons include - maintaining water bodies, maintaining commons, maintaining a balance between covered areas and water bodies, common property resources and covered areas for housing and industry.

Exploring linkages between peri-urban ecosystems and urban resilience: A case of Bhopal city

Dr Rama Pandey, *Assistant Professor and Coordinator, School of Planning and Architecture, Bhopal, Madhya Pradesh, India*

The case of Bhopal city provided the links between peri-urban ecosystems and the key challenges to urban resilience. Cities do not operate in isolation but within a 'sphere of dependence' on surrounding areas and their ecosystems. As such, the degradation of these ecosystems results in loss of ecosystem services that support urban and peri-urban populations. These include water provision; disaster, storm water and erosion protection; waste treatment; food production; climate and air quality regulation; and fuel wood and timber.

Cities do not operate in isolation but within a 'sphere of dependence' on surrounding areas and their ecosystems.

Dr Rama Pandey

The study found that there has been considerable degradation of the ecosystem services. The loss of vegetative cover is to the extent of 92 per cent in 1977 to 21 per cent in 2014. Reduction in open green areas resulted in substantial decrease in natural recharge to groundwater. Also, the encroachment of drainage system has caused reduction in percolation of rainwater to the ground thereby affecting the natural recharge. Among 31 registered lakes in and around Bhopal, 21 are almost lost. The quality of water has degraded and is at various stages of eutrophication and cannot be used for drinking, except upper lake, that too after treatment. Groundwater table is in a semi-critical stage in Bhopal district. There is depletion in groundwater level and deterioration of groundwater quality as per a status report by the Central Ground Water Board. The development activity and expansion of the city leading to discharge of wastewater in the upper and lower lakes is a serious threat to these water bodies.

The study also found out perception of citizens of Bhopal through a capacity building workshop on 'Climate Informed Resilient and Smart Cities' to identify risks and challenges. The study looked at stream flow variation and found that there are temporal changes in the watershed from 1972 to 2016. Most of the first order streams are blocked or modified due to built-up areas that cannot promote infiltration. The urbanization trend in the study area reveals that groundwater levels are showing depletion with degradation in the quality of water. The residents in the area are totally dependent on groundwater due to absence of piped municipal supply. This has led to decrease in yield of groundwater over the years. It can thus be concluded that urbanization changes the natural ecology of an area by altering its surface geography and ecology. It also affects the natural water cycle and supporting ecological systems, thereby adversely impacting the services provided by peri-urban ecosystems.

The study undertook identification of potential groundwater recharge zones. The existing built-up area has moderate recharge potential so interventions related to rooftop rainwater harvesting could be undertaken. Abandoned wells and borewells could be used for recharging the aquifers. For improving urban resilience in the study area, both spatial planning as well as policy measures are required. Spatial planning measures could include identification of potential recharge zones and adopting artificial recharge techniques in consultation with CGWB. Policy measures include regulated permeable construction and mandatory minimum green cover in proposed development through Development Control Regulations.

The area is marked by water quality degradation, loss of forest areas, encroachment in catchment area and loss of vegetative cover that resulted in excessive soil erosion and reduction of storage capacity and water spread area due to siltation in upper lake. Spreading awareness of the benefits and consequences of ecosystem services can help. The Madhya Pradesh Lake Conservation Authority was dissolved in 2014 after ten years of its formation as it was unable to meet its objectives. The authority must be reconstituted and it should consider the lake and its catchment area as a single entity. The villages falling under the catchment boundary should be monitored on the basis of their population growth, economic activities, land use change, sprawling, rainfall, drainage pattern, etc. The conservation plan should consider the ecological functions through scientific inputs of physiographical and physiochemical characteristics.

Significant role of 'peri-urban ecosystem services' for enhancing urban resilience and its inclusion as an integral part of development planning process is required through case specific tailoring of methods. An enlarged role for various stakeholders, professionals and urban managers', should go beyond only assessing the challenges/stresses but also to find the solutions and monitor the implementation of interventions for maintaining the ecosystem services. Robust institutional framework such as regulatory body, implementing agencies having governance; conservation; and monitoring mechanism not only for the water bodies but also for its catchment area is important.

Speculative landscapes across South East Asia

Mr Sharan Sudhindra, *Acting Program Manager and Associate, 100 Resilient Cities, Singapore*

Land use planning is important to meet the increasing demands for human needs and at the same time to maintain the natural environment. Regional development in South Asia has for long been the focus of national investments for economy and trading. The area's rich natural resources such as minerals, oil and timber are the main drivers of its economic development. A lot of land use in India has been driven by the strong industrial sector. There is a need to fine tune the country's land-use regulatory framework and the land banks. Though 100 Resilient Cities works essentially in cities, there is a need to look holistically at both the peri-urban as well as the rural.

Desakota phenomenon encompasses more than the term 'peri-urban' and has closely interlinked rural and urban livelihoods. Much of the population here operates a mixed household economy that straddles the urban and the rural, as well as the formal and informal sectors.

Mr Sharan Sudhindra

Desakota, a term coined by the urban researcher Terry McGee of the University of British Columbia around 1990 was discussed. The term used in urban geography describes areas in the extended surroundings of large cities, in which urban and agricultural forms of land use and settlement coexist and are intensively intermingled. It is derived from the Indonesian word *desa* meaning village and *kota* meaning city. So, desakota areas typically occur in South East Asia in the densely populated, delta-shaped areas on the peripheries of urban agglomeration.

Desakota phenomenon encompasses more than the term 'peri-urban' and has closely interlinked rural and urban livelihoods. Much of the population here operates a mixed household economy that straddles the urban and the rural, as well as the formal and informal sectors. Typically, they are situated outside the peri-urban zones, from which daily commuting is easily possible, i.e. more than 30 or 50 km off the city centre. They often sprawl alongside arterial and communication roads, sometimes from one agglomeration to the next. They are characterised by high population density and intensive agricultural use especially wet-rice cultivation, but differ from densely populated rural areas by more urban-like characteristics. They are marked by: developed transport networks, high population mobility, increasing activity outside the agricultural sector, the coexistence of many different forms of land use, more female participation in paid labour, and unregulated land use.

Given their rambling extent and indistinct boundaries, the emergence of Desakota regions brings difficulties for the administration, as uniform plans, regulations or designs are hardly viable. Desakota regions are characterised by high mobility of goods and services and rapid change in patterns of settlement. They usually elude the division in functionally specialised zones that is conventionally applied in urban geography.

Sustainability indices and mapping of peri-urban resilience in the climate context

Dr Dipayan Dey, *Chair, SAFE, Kolkata, West Bengal, India*

There is the poor population that lives in and depends on peri-urban ecosystems for a living, particularly through subsistence agriculture. They are the direct stewards of the land and resources that provide ecosystem services.

Dr Dipayan Dey

The poor who live in and depend on peri-urban ecosystems are most vulnerable, but vulnerability extends to other population segments as well. These include global population, not living in cities with peri-urban expansion, but affected by the degradation of ecosystem services at the global scale. Population living in cities with growing peri-urban areas, including non-poor population are potentially vulnerable to ecosystem degradation. Then there is the poor population living in urban areas affected by ecosystem service degradation and who transact with population in peri-urban areas. Again, there is poor population that lives in peri-urban areas and depends on ecosystem services in those areas, but not for their livelihood. Lastly, there is poor population that live in and depend on peri-urban ecosystems for a living, particularly through subsistence agriculture. They are the direct stewards of the land and resources that provide ecosystem services.

The changes in land use and linear vegetation index in Kolkata between 2002 and 2012 can be attributed to a couple of socio-economic and ecological reasons. The socio-economic changes include migration both inwards and outwards of population in the age group of 18-35. The linear vegetation index shows a rise. There is incipient unemployment of women workers. There is a fall in primary productivity, increasing livelihood vulnerability and weakening of institutions.

The city has also seen wise use of wetlands. It has introduced development controls to conserve the wetlands, with these water bodies doubling up as a wastewater treatment cum recycling process. The East Kolkata Wetlands span almost 8,000 hectares and serve as a natural sponge absorbing excess rainfall and helping reduce pollution. The area comprises intertidal marshes including salt marshes and salt meadows with significant wastewater treatment areas such as sewage farms, and settling ponds.

The impact of changes on ecology include a decline in ecosystem services of wetlands, falling species diversity, falling water table, tampered food chain and decreasing carbon sequestration potentials. Solutions include (a) place based land use planning with provisions for optimal infrastructural development, (b) participatory decision making and community governance of natural resources, (c) sustainable intensification of existing ecosystem services, (d) capacity building and technology cooperation for preparedness and (e) financial inclusion and strengthening of local institutions.

Peri-urban water bodies: The key to dual problems of drinking water scarcity and urban flood mitigation

Prof S Janakarajan, *Madras Institute of Development Studies, Chennai, Tamil Nadu, India*

Urban expansion and the process of peripheralization are analogous to the case of the snake catching a frog! Urban expansion process is compulsive, coercive and exploitative. It turns out to be a contested terrain, resulting in the surfacing of conflicts especially water conflicts. Peri-urban water bodies are a key to dual problems of drinking water scarcity and urban flood mitigation. There are six fundamentals that should be taken into consideration by urban planners - density of drainage and watersheds, ecological hotspots, understanding the hydro-geography, elevation, slope & gravity and drainage system.

Peri-urban water bodies are a key to dual problems of drinking water scarcity and urban flood mitigation. There are six fundamentals that should be taken into consideration by urban planners - density of drainage and watersheds, ecological hotspots, understanding the hydro-geography, elevation, slope & gravity and drainage system.

Prof S Janakarajan

Chennai's woes during the 2015 floods were the result of a 'man-made disaster'. If only Chennai's unique macro, medium and micro drainage systems had been effectively maintained, the people of this expanding metropolis would not be undergoing the misery caused by the historic floods. The construction of storm water drainage system should have taken into consideration factors such as average rainfall during the north-east monsoon, which is around 780 mm. Since this was not done, these storm water drains have poor carrying capacity, which has further been reduced due to lack of maintenance. Chennai cannot be seen in isolation, but together with Tiruvallur, Kancheepuram and Chengalpattu as these areas constitute a single important watershed. The geographical location, topography, rainfall pattern and drainage system in these districts are hydrologically integrated. It is wrong to blame Chembarambakkam lake alone for the 2015 flooding.

As per the tank memoir prepared by the British, there are 3,600 tanks in these districts and the surplus from around 20 tanks have also contributed to inflow in Chembarambakkam. Besides natural macro-drainages like Adyar, Cooum, Kosasthaliyar and the man-made Buckingham canal, there are around eight medium drainage canals here. These include the Otteri nallah, Virugambakkam/ Arumbakkam canal, Kodungaiyur canal, Captain Cotton canal, Velachery canal, Veerangal Odai and Mambalam canal. These canals provided a very effective drainage system for the city before they were encroached. The major rivers of Chennai are unique and had a huge flood carrying capacity. Currently they are reduced to half. All this calls for a holistic approach.

The floodplains and wetlands of the city have very crucial hydrological functions such as to hold flood water, to prevent seawater intrusion and also to serve as a huge bird sanctuary. But these are encroached and remain in a pathetic state today. Most of the IT companies and other major constructions on the Old Mahabalipuram road are on floodplains and wetlands.

To make the city ecologically sustainable, there is a need to use locally available water supply options and alternate approaches. To understand and respect the given fundamentals there is need to have a water budgeting (supply and demand) and keep an account of the rainfall. Locally available water resources need to be used. There is a need to act with a motive of zero transmission loss or leakage loss (currently it is over 12 per cent as claimed by CMWSSB but potentially more – in Delhi and Bangalore it is 40 per cent). End users, both domestic and industrial should stop wasting water through leakages – one drop a second for 24 hours will result in a waste of 34 liters! The used-water – both domestic and industrial should be recycled. A substantial quantity of at least 50 per cent of water supplied can be recovered and in the process tons of bio-manure can be generated. Decentralized water supply and water treatment system should be put in place. The last resort should be inter-basin transfers and desalinated water as these are ecologically unsound solutions.

DAY 1, 18 SEPTEMBER 2017

SESSION 2:

Urban Planning and Development

Theme Lead: Prof N. Sridharan, Director, School of Planning and Architecture, Bhopal, Madhya Pradesh, India

Chair: Prof N. Sridharan, Director, School of Planning and Architecture, Bhopal, Madhya Pradesh, India

Co-chair: Ms Denia Syam, Regional Manager, Asian Cities Climate Change Resilience Network, Mercy Corps, Indonesia

The session tried to create a better understanding of rural-urban continuum with peri-urban spaces as transitional zones in the urban planning process. It also tried to look at the capacity building needs of urban planners for climate and disaster resilient inclusive development, and identified mechanisms to address the needs of peri-urban areas through the planning process.

Theme lead and Chair's remarks

Urban Planning and Development

Prof N Sridharan, Theme Lead and Chair, *Director, School of Planning and Architecture, Bhopal, Madhya Pradesh, India*

While definitions of urban areas and their boundaries vary between countries and regions, the services and benefits provided by urban ecosystems are significant. In the context of urban

Urban planners are decision thinkers and not decision makers and that is where we need political integration.

Prof N Sridharan

planning, urban ecosystems are often portrayed as embedding both the built infrastructure and the ecological infrastructure. The concept of ecological infrastructure captures the role that water and vegetation in or near the built environment play in delivering ecosystem services at different spatial scales and includes 'green and blue spaces' found in urban and peri-urban areas.

Ecosystems do not have any territories and defining clear boundaries for urban ecosystems often proves difficult. This is because the several relevant fluxes and interactions necessary to understand the functioning of urban ecosystems extend far beyond the urban boundaries defined by political or biophysical reasons. To understand the ecosystem in peri-urban spaces, the relevant scope of urban ecosystem analysis reaches beyond the city area. It comprises not only the ecological infrastructure within cities, but also the hinterlands that are directly affected by the energy and material flows from the urban core and peri-urban lands.

Whilst virtually any ecosystem is relevant to meet urban ecosystem service demands, the focus here is on services provided within peri-urban areas. It is important to know that peri-urban growth is happening more in secondary cities, census towns and not in the metropolis. Environment is the least discussed agenda in the peripheral areas. Surprisingly, given the scale of this challenge, many urbanisation debates fail to acknowledge the realities of peri-urban spaces on the city's fringe. Alongside, rapid urban expansion results in the growth of peri-urban areas, bringing flows of people, commodities, capital, natural resources, waste and pollution, and conflicts over land and water.

These areas of dynamic change raise significant challenges for basic service provision and ecosystem management – especially for the most marginalised residents, who remain excluded from the former and bear the costs of shrinking agricultural lands, poor waste management and pollution. Environment does not figure in discussions on peri-urban areas, which are wrongly viewed as being transitory and temporary. Local authorities as well as real estate development fail to address the needs of poor peri-urban communities. With both rural and urban authorities, they are often bypassed by planning processes or are subject to flawed planning decisions. Due to jurisdictional ambiguities, the authorities refuse to accept responsibility for the peripheral areas.

In India, urban planning is governed by the state's Town and Country Planning Acts. Barring the three states of Andhra Pradesh, Bihar and Kerala, the rest have not attempted to define 'country' in the respective act. In Indian cities, the thrust has been on intermediate public transport options which are highly polluting rather than on developing last mile connectivity in terms of public transport for peripheral areas. The 73rd Constitutional Amendment Act gives significance to peripheral areas and schedule XI of the act gives importance to environmental planning. The

peri-urban areas are not separate entities devoid of governance systems. The concept of urban economy is not considered while developing master plans and other development plans by the urban planners. Land-use, especially commercial land-use is spoken about, but employment generation is not.

Spatial planning and use of modern technologies is needed in urban planning. In West Bengal, mobile phones are being used to map rural areas under a World Bank project. Capacity building of planners, local agencies and implementers of various plans is a must so that the nexus of environment and economy can be understood in a better way. More attention is needed on solid waste management in peri-urban areas as the urban waste is getting dumped in these areas.

Co-chair's remarks

Ecosystem services and urban resilience in a rapidly urbanising area

Ms Denia Syam, *Regional Manager, Asian Cities Climate Change Resilience Network, Mercy Corps, Indonesia*

Urbanising centres and the peri-urban peripheries are located in a range of different ecosystems like rural, forest and coastal landscapes. Whereas they provide critical services sustaining urban systems, when neglected, eroded or otherwise mismanaged they can pose risks like floods, droughts, landslides and food insecurity. Peri-urban areas, the transitional zones between urbanising areas and the surrounding ecosystems, are key to managing these and other hazards, many of these increasingly heightened through climate change impact.

Resilience building is not a technical but a governance challenge. Lack of or weak existence of trans-boundary government coordination further exacerbates the issue. Knowledge sharing across geographic and thematic contexts is important.

Ms Denia Syam

Peri-urban areas often have semi-natural ecosystems providing natural resources for growing cities, while being increasingly influenced by urban economic drivers. This two-way interaction changes the lifestyles and choices of peri-urban inhabitants as their environment goes through rapid change. The extractive nature of urbanisation places a low premium on preserving supporting ecosystems, which are barely recognised and especially so if outside of strict administrative boundaries. In such cases, city governance functions in a vacuum isolated from perceived hinterlands. A lack of 'joined up governance' in urbanising areas usually leads to encroachment of ecologically sensitive lands for housing and other construction activities.

The general findings of the scoping study in eight ACCCRN countries suggests that ecosystem based threats are not taken into account during the planning phase. Urbanisation and planning is driven by short term political and economic interests. Research inputs support initiatives and movements and to be effective they should be contextualised. The study recommends the need to align research with work on the ground. NGOs have been found to be important players as they are more supportive than other stakeholders. Also, information needs to be presented in easy to understand, accessible formats.

Understanding of urban climate change resilience and its interaction with peri-urban and ecosystem services is dismal at policy levels on multiple scales in various countries. Causes are numerous, including governance capacity failure and obstacles to coordination within city administrations, and between these administrations and those of adjacent areas. Experience has shown that governance and policy support are critical to achieving desired long-term outcomes for inclusive urban resilience building. Legislation is needed to institutionalize approaches to ecosystem challenges, create funding streams for initiatives, formalize ownership of peri-urban areas, outline and coordinate the involvement of relevant stakeholders including municipal and other governments, and create enforceable mechanisms for accountability in the provision of ecosystem services.

The ecosystem context is characterised by multidimensional challenges related to population growth, rapid urbanisation, natural hazards and climate change. Land-use change and expansion demand lead to high land rates. Poor are hit the hardest because the burden is not shared fairly across the cities or the urban systems. Resilience building is not a technical but a governance challenge. Lack of or weak existence of trans-boundary government coordination further exacerbates the issue. Knowledge sharing across geographic and thematic contexts is important.

Reducing disaster risk in urban areas through land management

Mr Amit Prothi, *Associate Director, 100 Resilient Cities, Singapore*

Reducing disaster risk caused by natural hazards like floods, earthquakes, and tropical cyclones in urban areas is largely a development issue and needs to be addressed within the context of a wider urban development framework. It is important especially for the urban planners to have a better understanding of 'disaster risk' as reducing it contributes to strengthening urban resilience and leads to sustainable urban development.

To understand resilience we need to have an understanding of the three major changes happening in the world today - urbanisation, globalisation and climate change. It is common to understand issues of large scale transformation like the hurricane Harvey. An article in the New York Times highlighting this stated how Houston's growth created the perfect flood conditions. This is common across the board for peri-urban regions which are often floodplains, wetlands and forested areas. In Vietnam and Dhaka, new development takes place on floodplains. The question we need to ask ourselves is where are the cities expanding?

By framing disaster risk within the context of urban development processes, the economic and political viability of proposed risk reduction measures are enhanced.

Mr Amit Prothi

Urban land use management processes such as land use planning, development controls, greenfield development, and urban redevelopment provide opportunities for reducing disaster risk. Land use management processes allow us to understand how natural hazards in and around urban areas interact with existing and future urban growth patterns. It also helps identify what policy, investments, and capacity measures can be undertaken to promote development in a risk sensitive manner.

Half of India's urban development is yet to happen and a huge potential is there to change the direction of urban planning. There is a need to look at hazard prone zones, at exposure levels and vulnerability of communities and infrastructure. A risk is basically what we have when we overlay hazards, vulnerability and exposure. By framing disaster risk within the context of urban development processes, the economic and political viability of proposed risk reduction measures are enhanced. Urban planners are in a unique position to reduce disaster risk because of the land use management tools at their disposal. Reducing disaster risk requires a long-term systemic thinking as well as multi-disciplinary and multi-stakeholder inputs.

Urban planners with proficiency in land use management and understanding of complex political economy provide a natural vantage point. In order to reduce disaster risk through urban land use management processes, urban planners need technical capacity to interpret disaster risk information and its potential implications for a city's landscape. There is a need to look at the geological history of a place and make plans based on the region using instruments which help communicate the risk and analyse scenarios. A better understanding of risks can also support policies which promote and limit development in hazard prone areas.

Settlement gentrification

Prof Alka Bharat, *Maulana Azad National Institute of Technology, Bhopal, Madhya Pradesh, India*

The context of the specific settlement, in terms of its location, character, situation, behaviour and growth potential, also plays a very important role in understanding its growth dynamics and decision making.

Prof Alka Bharat

The scoping study 'Interaction between urban, peri-urban and ecosystem services in India' done for the Asian Cities Climate Change Resilience Network looked at the deterioration and the damage caused to the nature due to urbanisation, and also the casualness and heuristic nature of the decisions taken while deciding on the selection of the land for development. The study looked at a couple of questions: Is development so casual and adhoc as to take place on any patch of land? What are the results of following this casual system? Is a scientific basis for deciding which land is appropriate for development more safe, sustainable and resilient? Is the relationship between the requirements, the availability of land, and the decision making for the selection of the area and its governance important?

The study using the approach of gentrification examines the social and economic changes in the context of Bhopal. Gentrification is a phenomenon of changes, which are gradual and contextual. A community based approach was used in the case study where an understanding of threats, challenges and potentials of peri-urban areas was created through different stakeholders and experts. The potential shifting of development to urban peripheries, peri-urban and rural peripheries, the non-structural regulations and institutional set-ups in peri-urban areas and organic and adhoc piece meal decisions were discussed.

The limits of Bhopal has expanded by eating up of the peripheral villages and has now reached the area of Bhanpura in the east, which was used as the most prominent solid waste dumping ground for the city. Now there are plans to relocate that dumping ground to another area, so that the Bhanpura area could be developed properly, in order to cater to the rising demand for urban expansion in that area. Hoshangabad road is a potential stretch for development activity, significantly directing the city's sprawl in a southward direction, with a proposed metro line and BRTS. The current residential as well as commercial developments are adding to the demand, resulting in an extension of the limits by engulfing the peri-urban settlements lying there.

Bhopal has been bestowed with a lot of greenery and vegetation. However, the gradual expansion of the city into these green spaces has raised concerns about deforestation the vegetation having decreased from 36 to 27 per cent in ten years. Bhopal was once known for the many water-bodies in and around it. Most of these are now extinct, or are in very bad shape. While keeping this in view, what should be the way to protect and maintain these outskirts water bodies? Should the natural water bodies, like Hathaikheda dam, be considered with the same regard while proposing any

development activity in the areas surrounding it? How should we approach such a situation vis-à-vis the previous cases of water resources depletion in the city? The study explored these questions.

The study found that the context of the specific settlement, in terms of its location, character, situation, behaviour and growth potential, also plays a very important role in understanding its growth dynamics and decision making, thereafter. Key issues which need immediate attention in the development planning approaches are - overstressed urban services, underutilised rural resources and exploitation of ecosystem. The key recommendations to handle the challenges of peri-urban and peripheries are planned land-use conversion, phase-wise transition plan development, proper legal and administrative control, long-term planning approaches and development of surrounding infrastructure.

Examining vulnerability in a dynamic urban setting: The case of Bangalore's interstate migrant waste pickers

Ms Kavya Michael, *Indian Institute for Human Settlements, Bangalore, Karnataka, India*

The study looks at vulnerability from a structural perspective in the case of interstate migrants from West Bengal working as waste pickers in Bangalore's informal squatter settlements. Understanding the causality of vulnerability is difficult and consequently has received insufficient attention. Root causes of vulnerability needs to be understood and addressed to support adaptation that addresses climate risk and inequality. The research, using qualitative methods, examines complex intersections between a multitude of factors like climate change, agrarian distress, exclusionary patterns of urbanisation and the resultant lack of recognition that shapes and reshapes the vulnerability of a certain group of people.

The impacts of climate change are distributed along lines of social risk positions that also coincide with the existing coalitions of inequalities and power differences.

Ms Kavya Michael

Climate change is conditioned on socio-economic realities and the study points to the recent trend to attribute vulnerability to a certain natural hazard but this approach only provides symptomatic solutions. To understand vulnerability in a true sense, we need to look at the root causes of vulnerability and hence the study used the political economy framework. Vulnerability was contextualised using the pressure and release model which looked at root causes, dynamic pressures and unsafe conditions.

In this sample population, the root cause was what was happening in their home state. Marginalization in migrants' homeland, attributed to the social, economic, political as well as climatic factors, pushed them to extreme poverty and destitution in West Bengal and they had to resort to migration as a coping strategy. This caused them to move to Bangalore which is going through its own urbanisation process. The migrants lack the resources and skills to enter into safe

and secure jobs especially given the context of their language. Thus interstate migrant workers are very prone to being marginalised.

Many of the migrant workers find themselves in unsafe conditions such as having to work in collecting waste in hazardous locations with lack of basic amenities. They work in informal frameworks and often find themselves alienated. They do not have access to ration cards and health schemes etc. The waste-pickers perform an essential environmental service by handling and processing a large amount of the waste generated by the city but ironically this is unrecognised and they are denied the right to live in a clean and safe environment.

Although Bangalore offers better economic opportunities, new vulnerabilities arise that residents need to find ways to live with. So in a sense, migration is leading to the perpetuation of vulnerability. The study emphasizes that the impacts of climate change are distributed along lines of social risk positions that also coincide with the existing coalitions of inequalities and power differences.

Waste pickers are part of the 'infra economy' which they describe as an economy that is denied recognition by state and civil society and is seen only at moment of crisis, an object of condemnation or reform. Yet, this is an economy that is vital to the production of urban space such that it is conducive for capital accumulation. The areas where these waste pickers dwell are toxic sinks that encapsulate the externalities which are an inevitable part of the capitalist consumption and production practices.

The impacts of climate change on Indian cities should be seen in the light of emerging patterns of inequality in the city and concerns that these trends might exacerbate urban poverty even further. Our findings indicate that while the root causes of the vulnerability of these migrant workers can be traced back to the socio-economic and ecological conditions in their homeland, exclusionary urbanisation patterns in Bangalore result in livelihood and living conditions that have severe implications on their health and identities. The findings emphasize the compelling need for vulnerability and adaptation research to focus more on understanding inequality if improving justice is a concern. This focus on justice is insufficiently prioritized in climate change adaptation work.

Urbanisation and sanitation crisis in urban peripheries: A case of emerging cities of Uttar Pradesh

Prof S S Verma and Dr Bijay Singh, *Gorakhpur Environmental Action Group, Gorakhpur, Uttar Pradesh, India*

Sanitation challenges remain and as high as 77 per cent of the population does not have access to toilets, coupled with the fact that there is very low use of the existing toilet facilities.

Prof S S Verma and Dr Bijay Singh

GEAG has recently conducted a study on 'Sanitation crisis in the urban peripheries of the emerging cities in Uttar Pradesh'. The state has witnessed a tremendous growth in its urban population in the last three decades even though just about 22.27 per cent of its total population is urban making it one of the least urbanised states of the country. Owing, to the current hectic pace of urban development the state is witnessing a sanitation crisis in the emerging cities and its surroundings. The study looks at five cities (Allahabad, Gorakhpur, Lucknow, Jhansi and Saharanpur) from different agro-climatic zones of the state for field observation and to collect qualitative information on the issue of sanitation. The cities were selected based on population size, decadal growth and a visual assessment of land use change.

The key guiding issues for the study were: (a) Changes in surrounding areas of emerging cities of Uttar Pradesh, (b) Key issues and challenges of natural resource, health and livelihood in peri-urban areas (c) Drivers of land-use change (d) Changes in the land-use pattern over the decade that led to degeneration of ecosystem services of the area and enhanced the vulnerability of the people living there (e) The impact of the use of the areas as dumping ground for sewage and solid waste generated by the city on the inhabitants of the peri-urban areas and (f) Effective steps for stakeholder engagement in proper management of solid and liquid waste, and, how to achieve the goals of Swachh Bharat Abhiyan in these peri-urban areas.

The study is mainly based on qualitative and quantitative information relying on the visual observation of Google satellite images from two different time periods, and an ethnographic approach which includes semi-structured interviews with peri-urban residents, meetings with key informants and direct field observations. For assessing the land-use changes and identifying hot spots, the Google earth images of all the five cities for two time periods (2006 and 2016) were captured. To analyse it better, a micro-analysis of land use change was carried out using 1km X 1km grids. A total of 37 such hotspots within municipal boundaries and in the peri-urban area of the city were selected and surveyed for the study. Land-use categories assessed include open & agriculture land, civic forests & green belt, water bodies and built-up areas. The use of geographical information system enabled the researchers visualise the trend in the city's expansion and determine the land-use classes that showed the most amount of change.

The haphazard urbanisation processes have significantly influenced land-use pattern and aggravated the deteriorating sanitation situation in the peri-urban region in the cities studied. In these cities haphazard growth is already leading to the choking and obstruction of existing drainage lines, and there is also no sanitation infrastructure to link the growing city to the main sewer system, which is essential for future development of the peri-urban area as well as their seamless integration into the city.

Sanitation challenges remain and as high as 77 per cent of the population does not have access to toilets, coupled with the fact that there is very low use of the existing toilet facilities. Poor solid waste management is a key issue and discharge of raw sewage into the river and water bodies common. A key sanitation issue in the peri-urban areas of these cities was that a considerable part of agriculture here depends on the city's wastewater to irrigate crops and vegetables. Furthermore, there is indiscriminate dumping of solid waste in low lying peri-urban plots. In some cases the plot owners use the waste to increase the height of the plots.

The study recommended the need for a fundamental change in approach among the planners and policy makers to prevent further land-use change and illegal construction activities. The selling of agriculture land for short-term benefits can be reduced by motivating and demonstrating resilient farming models of agriculture and its long-term benefits to the farmers. The study suggested the need for effective master planning and proper enforcement as well as proper awareness and implementation of Real Estate Regulation Act, 2016. The need for decentralised community owned solid & liquid waste management and restoration of existing water bodies was stressed.

Peri-urban spaces: The case of Doddaballapur

Dr Sujatha Byravan, *Independent Consultant, Bangalore, Karnataka, India*

A research project by CSTEP examined the dynamic changes taking place in peri-urban areas in India. As a part of this, Doddaballapur, a transition zone between urbanised pockets of Bangalore and agricultural hinterland was chosen. The area is a part of the catchment area of Arkavathy River, which often ends up carrying Bangalore's sewage to the Cauvery. Changes in the area were triggered by various conditions depending on the social, economic and political context. In addition, global environmental changes including climate change are also transforming these areas.

Specific vulnerabilities of local populations such as nutritional deprivation need to be considered in urban development.

Dr Sujatha Byravan

The research adopted a number of approaches and methods to help gain an understanding of Doddaballapur. Geographical information systems was used to learn about land-use changes over time, while census data was analysed to understand the socio-economic changes. Household surveys were carried out to study water, sanitation, multidimensional poverty and women's empowerment. These data and tools are being complemented by participatory appraisal methods such as focus group discussions in a couple of gram panchayats.

After completing these analyses, an exercise called participatory scenario development was conducted by CSTEP. In this forum, some members of the community, decision makers, local leaders and experts considered the research findings, placed them in the context of the kind of future the community seeks, their challenges, and then back cast it to decide what they should be doing today and in the near term to reach their goals. The overall challenges faced by the people in the study area are manifold. Water is one of the biggest challenges in Doddaballapur and is likely to be exacerbated with climate variability and change. The area has had a drastic reduction in groundwater levels and the government has banned drilling of borewells in the taluk since 2013.

The nutritional deprivation in the taluk is significantly higher than the other peri-urban districts around Bangalore. Almost 50 per cent of the population of Doddaballapur is deprived as regards nutrition. For the poor, the figure is as high as 97 per cent. Sanitation, transportation, schooling, jobs are among the other main challenges. The study helped gain a layered understanding, through the several approaches taken and the findings could be used by local policy makers to better understand the problems and challenges of people living there. Multidimensional Poverty Index was used to look at the nature of deprivation people experience in peri-urban areas. A population can be deprived as a result of poor nutrition, sanitation, drinking water and cooking fuel. In fact in the study area, while 30 per cent of the population was found to be poor, double that number was found to be vulnerable to poverty.

The study suggests that specific vulnerabilities of local populations such as nutritional deprivation need to be considered in urban development. Nutrition is potentially linked up to changes in land-use patterns, produce markets, food habits and poverty levels. Water availability is the immediate challenge for peri-urban areas around Bangalore. Institutional mechanisms for regulating water use need to be considered and strengthened. There is a need to protect local ecosystems to improve livelihoods, water, food and well-being. Including ecosystem services and the potential for special ecological zones was also suggested. Future research will examine linkages between food security, water and livelihoods in the context of land-use change.

DAY 2, 19 SEPTEMBER, 2017

SESSION 3:

Governance Mechanisms in Peri-Urban Areas

Theme Lead: Mr Anil K Sinha, IAS (Retd.), Ex-Vice Chairman, Bihar State Disaster Management Authority, Bihar, India

Chair: Dr J. P. Mishra, Advisor, Niti Aayog, Government of India

Co-chair: Mr Tshewang Gyacho Bhutia, Commissioner, Gangtok Municipal Corporation, Govt. of Sikkim, India

The session focused on governance mechanisms in urban and peri-urban areas and emphasized the need to legally recognize these. The idea was to develop effective strategies to build efficient governing systems, promote integrated approach and embrace the philosophy that people have the right to influence what affects them. Urban development strategies, policies and program responses were discussed, including integrated planning approaches, regional planning, compact and inclusive development, green and blue infrastructure, agriculture and food supply, gender equality and budgeting. There are potential trade-offs and synergies between peri-urban environmental change and sustainable urban development. To understand and minimize these trades-offs, and improve the synergies, it is important to take account of the local context and social, cultural, economic and political drivers and dynamics.

Theme lead's remarks

Mr Anil K Sinha, *IAS (Retd.), Ex-Vice Chairman, Bihar State Disaster Management Authority, Bihar, India*

There is a need to integrate climate change and disaster risks in urban governance systems. Unplanned urbanization along with climate variability is magnifying risks to the most vulnerable people. This gets exacerbated by poverty, epidemics and demographic shifts leading to increased vulnerability of communities.

Community engagement is important to work on preparedness, coping strategies and resilience. For this, planners must simplify the complex urban planning vocabulary. The 74th and 73rd amendments to our constitution are based on the idea of '*swaraj*' and encompass improvement of both rural and urban governance. The governance framework includes accountability, transparency and participation without which it is not possible to build resilience.

Community engagement is important to work on preparedness, coping strategies and resilience.

Mr Anil K Sinha

There is a need to understand disaster related issues and define them appropriately. The Hyogo Framework (2005-2015) provided a global blueprint for disaster risk reduction efforts. The short and medium term risk factors from climate change induced disasters need to be understood for planning and designing strategies. Risks are not absolute and the dynamics of risk change according to individual behaviour, action and situations. The intensity and level of the risks need to be measured particularly in urban environments where the density of risks, stakeholders and communities are huge.

Chair's remarks

Dr J P Mishra, *Advisor, Niti Aayog, Government of India*

Rapid urbanization is exerting pressure on freshwater supplies, sewage, the living environment, and public health.

Dr J P Mishra

There is a need to build resilient cities and peri-urban ecosystems are critical for sustainable development of urban and rural areas. Rapid urbanization is exerting pressure on freshwater supplies, sewage, the living environment, and public health. There is a need to strengthen the efficiency of urban areas especially through a greater focus on waste disposal. Niti Aayog has taken up initiatives to enhance the capacities of urban centers through various programs like Swachh Bharat Mission and 100 smart cities project.

Policies, strategies and programs need to ensure that the social amenities and strategies cater to the needs and aspirations of all age groups and cultures. It is important to involve communities while developing such plans. The urban environment is degrading due to haphazard urbanization and hence municipalities as well as sub-urban authorities need to understand the dynamics between urban and peri-urban areas.

Co-chair's remarks

Mr Tshewang Gyacho Bhutia, *Commissioner, Gangtok Municipal Corporation, Govt. of Sikkim, India*

The municipality of Gangtok is working on improving the challenges of providing adequate amount of treated water in the city. The work includes that on distribution of water, improving the old piping, reducing water leakage which is as high as 79 per cent and improving the water quality. The high infrastructural costs are also a problem. The municipality is also working on its peripheral areas where residents are currently receiving only untreated water from springs. As these areas rapidly urbanise, they will need an adequate supply of water.

In Sikkim, the Public Health Engineering Department is responsible for providing treated water to urban areas, and the Rural Development Department is in-charge of providing untreated water to the rural communities. The source of water in rural areas is from springs. Although mostly untreated, some of the spring

The municipality is also working on its peripheral areas where residents are currently receiving only untreated water from springs.

Mr Tshewang Gyacho Bhutia

water undergoes minimal physical treatment by way of sand filtration and chemical treatment in the form of disinfection with chlorine. The rural sector comprises a significant portion of the Greater Gangtok area. While the source of spring water is of relatively good quality, distribution of untreated water is subjected to potential contamination from many urban sources such as livestock, waste dumping, wastewater pipe leakage, and sewage leakage from underground septic tanks.

Perspectives on achieving meaningful governance transitions in peri-urban interface

Dr Nambi Appadurai, *Strategy Head-vulnerability and adaptation initiative, World Resources Institute, Bangalore, Karnataka, India*

Poor tend to be neglected because of the nature of power relations and favouring of vocal urban-based interests.

Dr Nambi Appadurai

Multiple city-centric imaginations (metro, mega and a world-class city) have shaped the spatial, economic and social development of megacities. There is a lack of consensus about what exactly constitutes or defines a peri-urban interface - suburban extension, satellite town, urban-rural fringe, urban transition zone, semi-urban and rurban. Rural versus urban dichotomies that underlie all planning processes are inadequate to deal with the developmental and environmental complexities faced by peri-urban regions. Extrapolation of planning approaches designed for rural and urban areas to peri-urban is a flawed approach.

The analogy of an egg provided by Cedric Price is useful to define the complexity of urban development in the core and periphery area. The urban form resembled a hard-boiled egg in the beginning, with a dense, compact center, protected by defensive walls from the evils of the wider world. With the rapid growth of population and industry around that time, cities expanded rapidly and this is referred to as the poached-egg model. In some time, the core of the city collapses under the weight of its own sprawl and that is referred to as the scrambled-egg model and is also the most relevant type of urban development today.

Urban poor are generally employed in industries or in the urban informal sector and settle in peri-urban interfaces, along with rural poor migrants. Poor tend to be neglected because of the nature of power relations and favouring of vocal urban-based interests. Increasingly international financial institutions are playing a role in determining the city's spatial configurations and governance regimes. The city's resilience is also affected by the efficiency and capacity of the implementing agency.

An important issue in governance of peri-urban interfaces is that there is a lack of proper jurisdictional boundaries in municipal bodies versus corporations. Peri-urban areas are not being recognized with urban civic status and the definition of urban areas by the census leads to a dichotomy. Peri-urban zones are considered as no-man's land as there is no legal-technical

treatment of urban expansion in terms of zoning and encroachment. These areas have manipulated perimeters i.e., comprising not just expansion but at times the bifurcation of districts and up gradation of municipalities into corporations. There is no territorial control or licensing of activities. The areas are also marked by a lack of local administrative capacity to act, an overlap of authority, governance voids and representation failure, and legal grey areas and corruption. The peri-urban areas lack an integrated land governance legal framework. It is important to understand the peri-urban dichotomies and rethink peri-urban realities.

The cities and peri-urban areas are becoming less dependent on their regional economy with negative impacts on its natural and built environment. This is adding to its risks which are multiple and interlinked, and the current development trajectory seems to be intensifying them. Water is the most important issue in peri-urban interfaces across the world as poor peri-urban families spend large portions of their income on securing potable water or health care and are also affected by water borne diseases. The governance gaps lead to a growing greed for natural resources and encourages rent seeking behaviour.

Nagar panchayats are recognized as transitional areas for governance but are not recognized in constitutional amendments. The 74th Constitutional Amendment (1992) recognized transitional areas and granted them civic status as nagar panchayats or town panchayats. However, the central act has left it to the different states to create this new category, and the states have been slow in doing so, and in providing them with the necessary organizational and institutional support. The reasons for their slow growth are several. One, they fall in a 'land of misplaced policies' being either municipality (urban local body) or panchayat (rural self-government) in formal definitions and often end up without any protagonists. Second, vested interests keep the land use conversion and building rules ambiguous to exploit land value escalations and mining potential. Third, state governments are deterred by the fear of not getting enough development funds from the central pool, once transition to urban is shown to be high.

A governance framework for the areas would need a metropolitan apparatus and regional scope. It would also require intergovernmental articulation, popular participation in decision and law-making, involvement of private and community sectors in land management, local capacity building and new system of cities with different logic. They would also need financing for urban development based on innovative taxation mechanisms, blending traditional grant funding, structured borrowing, financial engineering and technical assistance with targeted investments in more sustainable development areas (regeneration and renewables).

Civil society organizations can play a role as in Chennai where a woman led civic society organization - Shri Shankara Nagar Mahalir Manram successfully established a community solid waste collection service in Pammal, located in the city's periphery. There is a need for a new social contract based on philosophy of 'right to the city', fair use of resources, co-existence and equity. Peri-urban zones require a new socio-political pact to recognize positive dimensions, minimize negative ones and negate the misfits; promote socio-spatial inclusion and fairer distribution of costs and benefits of urban development. The national programs like smart cities do not notify the peri-urban areas and hence shared dialogues are needed.

Peri urban interface: resilient and sustainable Surat

Mr Kamlesh Yagnik, *Chief Resilience Officer, 100 Resilient Cities, Surat, Gujarat, India*

Unplanned and informal development places unsustainable pressure on peri-urban ecosystem. This gets exacerbated by political systems that inconsistently determine land use and do not capture full ecosystem service value.

Mr Kamlesh Yagnik

Surat is one of the fastest growing cities in India with a large chunk of people's livelihood dependent on the industries present both within and in the city's outskirts. The coastal city on the riverbank of Tapi with a population of over 5 million accounts for 80 per cent of the world's diamond production and is also known for its synthetic fibre production. The eighth largest city in India, Surat sees a lot of migration and the average household income at US $7400 a year is the highest for an Indian city.

The local government here shows great interest in improving the city's condition making it attractive for any resilience initiative. The city's public services and infrastructure are maintained by the Surat Municipal Corporation, which has undertaken many large initiatives towards building city resilience against flooding, climate change, disease outbreak and crime. Surat is being developed today as a smart city by the Government of India. In the 1990s, the city was one of the filthiest in India but today it is recognized as one of the cleanest cities.

The city faced floods in 2006 and the economic loss was huge. An early warning system was set up and entails improved reservoir operation to minimize peak floods and better preparation of institutions as well as society to handle flood. The Surat Climate Change Trust was established as a multi-stakeholder trust where people came together to build a resilience plan to overcome shocks and stress. The Surat resilience strategy provides a tactical roadmap to identify resilience priorities, recognize realistic initiatives, engage stakeholders, enhance capacity by shared learning, guide city's development, provide opportunities to share experience, provides an overarching framework and develops a clear vision and mission for the city.

A lot of work has been done to deal with floods, infrastructure failure, traffic jam and lack of green spaces. Also, town planning has been integrated with other lifeline networks such as water supply,

drainage, road and energy for improving resilience. A strategy to develop better coordination between these services to bridge the gap between urban growth and planning was developed as a part of the *100 Resilient Cities* project. The project identifies areas of strength and weakness, and articulates the city's priorities for resilience building through specific initiatives. Seven areas and 65 initiatives were identified as a part of the strategy and initiatives like construction of an outer ring road was undertaken. Land rearrangement tool is being used in Surat and post-readjustment, 40 per cent of the land is sold and the collected revenue is used for further development, while 60 per cent of the land is returned to the rightful owners.

Surat Urban Development Authority could plan and finance its infrastructure to accommodate its physical area expansion by using simultaneous mechanism for land reconstitution, infrastructure provision and financing. The challenges of infrastructure management for its expanding frontiers are overcome by the Gujarat Town Planning and Urban Development Act 1976. The state government and the Surat Municipal Corporation hold the key to addressing the challenges of unplanned urbanisation and increasing resilience. The case of Surat shows how the principle of subsidiarity can increase autonomy and resilience. Most of current Surat's challenges are interlinked and require inclusive solutions. Unplanned and informal development places unsustainable pressure on peri-urban ecosystem. This gets exacerbated by political systems that inconsistently determine land use and do not capture full ecosystem service value.

Integrating peri-urban ecosystems in urban resilience – cases from South Asia

Ms Bedoshruti Sadhukhan, *Programme Coordinator-Sustainability, ICLEI-Local Governments for Sustainability, South Asia, New Delhi*

To build resilience, it is important to understand the impact of climate change on ecosystem, ecology and economy.

Ms. Bedoshruti Sadhukhan

There is a need to focus on the cities as they cover 3 per cent of the total land, yet support 50 per cent of the population. To build resilience, it is important to understand the impact of climate change on ecosystem, ecology and economy. ICLEI-South Asia has been implementing projects in different cities and regions to analyse the impact of climate change and adaptation strategies. ICLEI and ACCCRN were involved in preparing a toolkit to develop city resilience strategies for 20 cities in India and Bangladesh. ICLEI's AdoptIUWM project focuses on integrated urban water resource management. As a part of this, the project in Solapur was undertaken to provide an example of how to develop a bridge between the rural and urban. The IAdapt project deals with integrated water resource management at the catchment level considering climate impacts on water resources. The various projects show the linkages of peri-urban ecosystems with urban resilience, notable being the project on CITYFOOD Network.

The case of Nainital, a major tourist town dealt with the manner in which holistic urban development can protect peri-urban resources. Nainital is heavily dependent on Naini Lake, which is fed by an upstream lake Sukhatal. The primary issue is the decline in lake level, encroachment and degradation of recharge zone and constructions that are reducing the infiltration and enhancing siltation. A project on mainstreaming the role of ecosystem services in water supply of Nainital was implemented by ICLEI in collaboration with CEDAR.

The case of providing livelihood support through peri-urban systems in Kushtia, Singra and Mongla in Bangladesh was discussed. The economy here is strongly dependent on agriculture, fisheries and orchards. Women are largely responsible for agriculture and any impacts on agriculture adversely affects them and increases vulnerability. Singra has been facing major climate changes like droughts and change in rainfall pattern in the last few years. Singra's Chalan Beel has seen reduction in water, leading to losses in fishery and agriculture that it supports. To deal with this, an embankment has been built along the Chalan Beel to prevent waterlogging during heavy rainfall and floods.

Kushtia's main concerns are that irregular rainfall has impacted agriculture patterns. In Mongla excess rainfall and flooding leads to increased salinity of soil and impacts agriculture. In these three cities, the local administration, through ICLEI's hand-holding, is in the process of undertaking an analysis of the urban systems and the impacts a changing climate might have on them apart

from identifying the most vulnerable groups and areas in the city. They are also developing and implementing city resilience strategies that will help them better cope with the climate change impacts.

The case of Solapur, located in drought prone area of Maharashtra dealt with how integrated governance and planning for resource management can be applied to an area with low water availability. Also, in Solapur water is accessed from peri-urban and rural areas with no benefit sharing processes. The ICLEI project had worked on micro-catchment delineation and socio-environmental assessment in Solapur. Micro-catchment delineation considering topography, water resource maps and hydrological maps of the region was carried out. With the help of these, critical micro-catchments around Solapur were identified. The catchment level integrated water resource management used a rurban platform i.e., a governance system integrating rural and urban stakeholders.

The case of Shimla, a hill city and a major tourist attraction dealt with integration of resilience financing with development financing. The primary issue here is that the water availability is limited, particularly during lean season. Also, traditional water sources are neglected and degraded. Water shortage can be met through spring water in the outskirts of the city. Greater Shimla Water Supply and Sewerage Circle was created after a hepatitis epidemic to integrate the urban water supply system with peri-urban sources. There is also a pilot project on rejuvenation of traditional water sources to augment water supply connected with AMRUT.

Climate change resilience and urban governance: A case of five Indian cities

Ms Nivedita Mani, *Gorakhpur Environmental Action Group, New Delhi, India*

GEAG's project on climate change resilience and urban governance was implemented in five Indian cities: Shimla, Indore, Guwahati, Panjim and Gorakhpur. The project identified the existing gaps and evolved recommendations towards developing an enabling environment for implementation of urban climate change resilience strategies in a participatory manner addressing the poor and vulnerable population, especially children. It indicates the need to develop adaption strategies and regional plans for peri-urban and urban areas.

The vertical and horizontal coordination mechanisms between various levels – urban local bodies, para-statal and state government play a vital role in establishing linkages with city development processes and in providing basic services. Hence, strengthening the enabling environment is required for implementing such resilience measures. Climate

The inter-coordination and lack of effective linkages between various governance structures, many a times, hinders the process of addressing resilience against climate change.

Ms Nivedita Mani

change resilience being a cross-sectoral issue needs a multi-agency and inter-departmental approach for its addressal. One of the main limiting factors responsible for this has been the existing urban governance and coordination structures which usually work in silos.

Municipalities play a vital role in establishing linkages with city development processes and in providing basic services and hence strengthening the enabling environment is required for implementing the resilience measures. The level of adoption of 74th Constitutional Amendment Act in different cities and states is also relevant in this direction. Also, the participation of vulnerable communities in planning and implementation of adaptation and governance is emerging as a crucial factor in urban climate change resilience.

While analysing the sectoral vulnerabilities which are exacerbated by climate change impacts, it was found that the efficiency of any urban system depends on the availability of infrastructure and services to support its population. But, almost all the Indian cities today are facing serious deficiencies in infrastructure and lifeline services. The fragmented and overlapping (functional and geographical jurisdiction) roles in managing the services of the city and poor resource base cause an inefficient situation in terms of providing the services to citizens. The priorities of poor and 'not so powerful' groups are largely missed out and ignored.

The study indicates that the responsibilities and powers of the sectoral departments linked with climate change resilience are nested under various governance structures like urban local bodies, para-statal bodies, state government and private agencies. The inter-coordination and lack of effective linkages between these structures, many a times, hinders the process of addressing resilience against climate change. To summarize, it has been largely observed that the existence of para-statal authorities, be they water boards or development authorities, are an obstacle to the devolution of municipal functions to urban local bodies. Similarly, state departments continuing to serve the functional areas of municipal corporations are also an obstacle in the process of devolution of municipal functions.

Besides the obstacles in the formal governance process, the cities have also embarked upon some informal mechanisms to address the climate resilience issues. These practices are effective in bridging the governance gaps and providing better services to the citizens. These are also playing a catalytic role in addressing the vulnerable communities especially children's issues, thereby becoming models of good governance.

DAY 2, 19 SEPTEMBER, 2017

SESSION 4:

Addressing Gender Concerns and Specifically Vulnerable Groups in Peri-Urban Areas

Theme Lead: Ms Aditi Kapoor, Climate & Resilience Advisor, Red Cross Climate Centre, International Federation of Red Cross and Red Crescent Societies, New Delhi, India

Chair: Dr A. Arunachalam, Principal Scientist, Indian Council of Agricultural Research, New Delhi, India

Co-chair: Ms Aparna Das, GIZ, New Delhi, India

A key take away from the session was that gender should be considered in its entirety in the context of other groups. Women in peri-urban areas face different realities than those in urban and rural settings and therefore plans and programmes involving them should take this into account. There is a need to create democratic spaces and groups for women that can rally and collectively negotiate for them. Championing the rights of women can lead to a better integration of policies and better resilience for an area. Also, good social cohesion is imperative for better community actions in these spaces.

Theme lead's remarks

Ms Aditi Kapoor, *Climate and Resilience Advisor, Red Cross Climate Centre, International Federation of Red Cross and Red Crescent Societies, New Delhi, India*

Women are most vulnerable towards climate change induced disasters and ignoring their needs is an impediment to achieving the 2030 Agenda for Sustainable Development and the Paris Agreement on Climate Change.

Ms Aditi Kapoor

Enhancing the capacities of women to cope with climate vulnerabilities is important. Gender is a crosscutting issue, and it is well established that climate change affects women disproportionately over men owing to inequities in access to resources and opportunities that enable women to adapt to the inevitable impacts of climate change. This is because of the multiple roles women play and the numerous responsibilities that they shoulder. Addressing gender concerns in the context of climate change requires engendering the government-led adaptation strategies.

So far, the aspect of climate change impacts on women has not been looked into much. There is a need to find a tangible way to bring planning for climate change based disaster risk reduction and sustainable development together. Addressing disaster risk can be a palpable means to make a difference in the lives of vulnerable people especially women around the world.

There is a need to map the needs of women and vulnerable groups. As Gandhi said, there is a need to look at the last person who could be a poor young girl in a tribal or a dalit household. The last person is the most vulnerable one and has the slightest ability to adapt to or cope with shocks and stresses – be it economic shocks or climate change related shocks and stresses. Hence, priority needs to be accorded to addressing gender concerns in the various sectors within the overall adaptation framework.

The integrated risk management approach adopted by Red Cross focuses on long term-visioning and spatial planning in the context of climate change and recurring disasters. Women need to be more aware of the risks they face, of the means to reduce their vulnerability, and cope when a disaster strikes. Gender inequities can be evident in a lack of, or inadequate early warning information targeting women and evacuation procedures and arrangements. Indeed, knowledge of early warnings and the decision to evacuate may be the exclusive domain of men. In some cases, women may be ill-informed about natural hazards and not allowed to make the decision to evacuate. Therefore, inclusion of women in governance and decision making can help look at issues from a gender lens. There is a need to move beyond administrative boundaries and look at ecosystem boundaries. For this, we need to map needs, plan together and work out solutions that are inclusive.

Chair's remarks

Dr A Arunachalam, *Principal Scientist, Indian Council of Agricultural Research, New Delhi, India*

A major issue arising from urban and peri-urban agriculture is that of efficiently integrating urban and peri-urban agriculture with rural agriculture as they in general are not substitutes for each other. This helps provide adequate access to nutritious food for the growing urban populations of the developing world. The needs of most vulnerable small and marginal farmers in terms of increase in production, income and improvement of ecosystem health ought to be addressed. Dynamic agricultural practices need to be guided within and outside cities towards sustainability goals (economic, social, and environmental). These include urban farming, green initiatives like terrace farms, kitchen bins, rooftop regulation, floating agriculture, vertical farming, agri-gym, organic farming etc. It is important to promote science led agriculture and also link food security with nutritional security.

Generally women and socially or economically vulnerable groups are the most dynamic actors in peri-urban agriculture but they control few resources and that too under ambiguous or insecure tenure.

Dr A Arunachalam

There is a need to understand the importance of peri-urban agriculture for building urban resilience. Land and water policies that account for agricultural production in urban and peri-urban areas need to be developed. Some urban and peri-urban farmers are moving towards intensive production of high value-added produce, rather than basic food stuffs and there is a need to transform farmers as agripreneurs. Generally women and socially or economically vulnerable groups are the most dynamic actors in peri-urban agriculture but they control few resources and that too under ambiguous or insecure tenure. So, it is important to understand the role of women and other vulnerable sections in agriculture. There is a need to build resilience actions focussing on protection of public health and the environment.

Co-chair's remarks

Ms Aparna Das, *GIZ, New Delhi, India*

It is important to understand the basics of urban and peri-urban planning in terms of the processes and influences (both internal and external) that lead to growth of cities as we know them today. A prerequisite for making a city inclusive is the provision of adequate and safe housing for all of its inhabitants. With growing urbanisation the need for housing has expanded rapidly in India, but the housing market has not been able to keep up with this pace, creating a stark demand-supply mismatch most significantly for poor and low-income households in urban areas.

The "Inclusive Cities Partnership Programme" of GIZ attempts to support national ministries, states, and cities in implementing measures for housing the urban poor in a socially inclusive

and environment friendly manner. It facilitates the implementation of the Housing for All Mission (Pradhan Mantri Awas Yojana) launched in 2015. The project strives to synergise with other ongoing Indian urban development programmes in order to promote more integrated planning and development of Indian cities.

Increasing land and real estate prices have pushed people to occupy marginal lands in and around cities in particular in peri-urban areas. In most Indian cities, a significant share of the population lives in slums or similar precarious settlements, which are characterised by substandard housing and inadequate access to clean water and sanitation. This exposes the public to health hazards and significant environmental threats.

In most Indian cities, a significant share of the population lives in slums or similar precarious settlements, which are characterised by substandard housing and inadequate access to clean water and sanitation.

Ms Aparna Das

Crosscutting measures like those related to gender and poverty complement the activities under the programme. In order to encourage progress in terms of gender equality, all components include equal opportunities measures. To address the housing requirements of the urban poor, it is crucial to make housing markets more inclusive and transparent, to set adequate standards for the delivery of housing and basic services, and to improve the housing and living conditions in existing slums and other informal settlements as well as to integrate them into the formally recognised areas of the cities. Studies have shown that an improvement in housing conditions and basic services have significant positive impacts on the health and well-being of the urban poor.

India is at a crucial stage of urbanisation and with net increment to urban population surpassing that of the rural population, it has entered into a different phase of demographic trajectory. With urbanisation and economic growth being closely related, the growth potential of India has also increased significantly. However, Odisha has a much lower rate of urbanisation at 17 per cent, wherein only three districts are urbanising at a pace more than the national average. Hence, there is a potential to learn from the highly urbanised states and correct its course so that the state doesn't face similar challenges in the future. Amongst many challenges to urbanisation, the key is housing its inhabitants. The problem of housing cannot be addressed without looking at the issues of proximity to livelihood, physical and social infrastructure and effectiveness of governance, city management and city planning system. Housing needs to be addressed as a whole sector which would require a shift in the expectation of the urban local bodies.

Towards this end, the GIZ programme aimed at developing plans for two cities in Odisha – Berhampur and Puri. The objective was to build a consensus on the approach and activities needed for implementing integrated Housing for All Plan of Action (HfAPoA), in-situ housing up gradation, and rental housing for improving affordability across all income groups. In case of Berhampur, a small town in Odisha, synergies at the city level planning and opportunities for leverage with other

ongoing projects pertaining to provisioning of the basic services were considered. The implementation approach for the beneficiary-led individual house construction model was effective in both Puri and Berhampur. The key components for implementation of the model were beneficiary identification, project preparation and project implementation.

The city of Berhampur although classified as urban is peri-urban or rural in appearance. The city's growth did not match the expected direction of growth which the planners anticipated. This miscalculation led to wrong infrastructure investment. Outside a city, growth is not governed by bye-laws. Water and sanitation is left to the residents and this has its own impact on the area. The fringe areas of the city lacked sanitation facilities much like the city itself.

A constraint of the present system is that the city's boundary once delineated cannot be changed until the next master plan. Therefore a lot of retrofitting takes place. If there is evidence that a city is not growing in the direction expected, then why should this be ignored until an administrative cycle changes. It is a costly and inefficient way to look at things and should change. In the peri-urban areas of Berhampur, plot sizes are not rational; the plots are 50 ft in length but only 5-6 ft wide which is not practical. If course correction is not done then there will be more problems later. This is a macro-planning issue which influences decisions and leads to problems.

For formulating pro-poor housing policies and in rolling-out well-targeted support programmes and financing instruments it is important to conceptualise urban not in isolation but in a peri-urban and rural context. Also, economic planning should be supported by the spatial data, including alternate sources of data like Google maps and satellite data so that it becomes more tangible.

Gender and equity issues in urban and peri-urban agriculture

Ms Ranjani Krishnamurthy, *Gender Specialist, Chennai, Tamil Nadu, India*

Numerous development agencies have adopted gender mainstreaming strategies to ensure that gender perspectives are incorporated in all areas, sectors, and levels to promote gender equality. Gender mainstreaming strategies go beyond an exclusive focus on women to look at both women and men as actors in development, examining how their rights are defined in relation to one another. When we talk of resilience in urban context, it needs to be spelt out if it is for resilience sake or to move to a more equitable society.

In the context of South Asia, malnutrition and poor health are prevalent and gender roles have contributed to the vulnerability of girls and women by limiting their social rights and access to resources. In India, the labour force participation of women is actually declining in rural areas when compared with urban areas. This is an important issue which should be addressed in the debate of gender and peri-urban agriculture. In the peri-urban context, households vary a lot in their

structure, composition etc. There is a lot of diversity which needs to be considered to provide context specificity. Also, there is a need for decentralised planning with women's voice.

There are three arguments for gender equality a) women's wisdom can help strengthen resilience b) empowerment of women and c) welfare of society. Gender redistributive policies can strategically target both women and men or one group specifically by trying to change gender roles, access to resources, and allocation of power and responsibilities between men and women in society. This could help create a more balanced relationship between men and women. While disaster management plans integrate gender reasonably well into their framework, this is not the case with climate change adaptation plans. There is an urgent need for a shift from risk mitigation cum relief-centric approach in disaster management. Panchayats are uniquely equipped to deal with disasters on a sustainable basis and there is a need to have an urban equivalent of panchayat level disaster plans.

Gender redistributive policies can strategically target both women and men or one group specifically by trying to change gender roles, access to resources, and allocation of power and responsibilities between men and women in society.

Ms Ranjani Krishnamurthy

In rural agrarian India, other than in a few matrilineal societies, land is held by men. But nowadays it is women who work more in agriculture as the men migrate out seeking work, leading to heightened insecurity regarding land tenure and ownership among women. Therefore, it is necessary to highlight women's role in rural food production and distribution.

The context of gender and agriculture differs in urban settings compared with rural settings mainly owing to the fact that structures, institutions, and circumstances create specific gender dynamics in and around cities and peri-urban areas. Traditional gender roles and responsibilities often become hybridized with alternative perspectives like for example women involved in peri-urban agriculture may have more rights and liberties when their men work elsewhere. Thus, there is potential for different political, economic, and social scenarios in urban and peri-urban settings, compared with rural contexts.

The urban setting often brings with it more diverse sources of family income, greater opportunities for women's education, wage labour, and financial credit and new configurations of mobility. More specifically it provides flexibility in gender roles, as men and women adapt to urban and peri-urban life. A drawback is that there is more risk of losing produce in peri-urban areas and there are fewer welfare government programs to provide a safety net for producers practicing agriculture.

In communities that were gender sensitive in their approach, there are new opportunities for cooperative efforts among community members. Women were able to contribute in the decision making by forming collectives or unions like in a village in Lalitpur, Nepal where women worked to clean a local spring and were able to grow vegetables to supplement their livelihoods. In

Hyderabad, a farmer's association lobbied for the rights of the farmers taking up land grabbing issues. In Kolkata, a group of women have taken water bodies on lease and are involved in fishing. In Faizabad, Afghanistan, a women's cooperative was formed where collective dairying and food processing were taken up. For Afghanistan specifically, there is a need to train the women in rural local bodies and increase their representation in municipal bodies.

There is a need to pick up examples of women's participation in urban and peri-urban areas to strengthen the argument that women are important decision makers who cannot be left out of the planning process. Gender and food security needs to be placed at the centre to enhance equitable urban resilience.

Gender and climate change resilience: Methods and perspectives at the level of neighbourhood

Ms Seema Sharma, *Resilience Relations, Vivekananda College, University of Delhi, India*

Climate change has a greater impact on women and those sections of the population, that are most reliant on natural resources for their livelihoods and/or who have the least capacity to respond to natural hazards, such as droughts, landslides and floods. Women commonly face higher risks and greater burdens from the impacts of climate change in situations of poverty, and the majority of the world's poor are women. Women's unequal participation in decision-making processes and labour markets compound inequalities and often prevent them from fully contributing to climate-related planning, policy-making and implementation.

Adaptation interventions are mostly based on the fictitious notion that genders are economic and social equals. Therefore, inadvertently current climate regime and interventions are increasing gender disparity in several ways and are further increasing women's workload.

Ms Seema Sharma

Yet, women can (and do) play a critical role in response to climate change due to their local knowledge of and leadership in sustainable resource management. Women are able to lead sustainable practices at the household and community level. Women's participation at the political level and inclusion at the leadership level has led to improved outcomes of climate related projects and policies. Adaptation interventions are mostly based on the fictitious notion that genders are economic and social equals. Therefore, inadvertently current climate regime and interventions are increasing gender disparity in several ways and are further increasing women's workload. Therefore, interventions need to be crafted so as to not perpetuate gender injustice.

Resilience Relations, a social enterprise committed to ecological and social resilience at local level works by engaging with communities using non-invasive learning methods and creating

resilience centers as an interface between academia-industry-policy-community to deal with the issues at a local level. The study by Resilience Relations attempted to develop an ethnographic understanding of urban spaces in neighbourhoods. The study found that women are withdrawing from the workplace either due to marriage/motherhood, safety, childcare facilities, customs and practices or jobs, which do not have flexibility and suitability for working Indian women. Often times we apply western concepts and ideas without understanding the cultural and social differences. Therefore, this project developed a resilience centre at the neighbourhood level, and used the centre as an interface between the community, police, policy makers, academics and local industry. A financial gradient concept was used where the community started the initiative themselves. Some of the suggestions that were translated into programs were - the police public partnership project and bring your neighbour closer.

The resilience center allowed each and every individual to know the other. It allowed free flow of correct information; helped relevant stakeholders to take best suitable quick decision; and increased social cohesion. Due to social cohesion individuals felt bonding, became helpful, responsible and faithful to each other. Overall, it makes society more resilient by improving the environment and overall quality of life in the neighborhood. A resilience index was developed which included seven integral parameters of urban resilience – walkability, breathability, community support, public spaces, child friendliness, essential services and social harmony. The resilience score creates an experiential baseline to evaluate how the community enhances their resilience to internal or external changes in socio-ecological systems.

Unpacking resilience for children and women in urban low income neighbourhoods

Mr Manu Gupta, *SEEDS, New Delhi, India*

SEEDS, a Delhi based NGO has been working on a project on unpacking resilience for children and women in East Delhi, a peri-urban area also called the trans-Yamuna area. East Delhi grew organically from main Delhi and the growth was characterised by unauthorised constructions, migration from rural areas. Presently, it houses a population of over a million and is plagued by problems of: high population density; unattended day to day stresses – resulting into accumulation of risks; unserved localities, lack of single window solutions, apathy of officials; unauthorized and unplanned habitation areas without legal identity; women's safety & self-esteem issues and child protection issues.

Focusing on school safety is a step towards achieving the wider aim of disaster risk reduction. The countries that do a good job of school safety can do a better job at disaster risk reduction as a whole.

Mr Manu Gupta

The project wanted to look at improving resilience of high risk communities especially women and children in vulnerable districts of Delhi. A forum of urban citizens has led to the creation of specific focus groups among women and children such as a Mahila Panchayat, children forum and community action group, all of which enable neighbourhood level action. Mahila Panchayat is an initiative for empowerment of women by the Delhi Commission for Women. It involves an innovative collective approach for community participation in dispute redressal. It also offers crisis intervention and legal aid at community level and helps tackle local level legal disputes and assists in reduction and reconciliation of violence against women.

Community leaders from among women are identified and then motivated to volunteer as Mahila Panchayat members. They are trained in legal issues, dispute redressal mechanism, trained in the laws relevant to crimes against women, given exposure about the existing legal position regarding property, maintenance, marriage, custody, etc.

Although the SEEDS project started with a traditional template on resilience, it has transformed into issues of the day to day lives of residents taking into account the stresses and shocks they face. The citizen's forum interfaces with local governments and municipal actors. More recently, a disaster risk reduction programme has been launched in 50 Delhi schools. The three-year programme focuses on orienting staff based on risk assessment of each participating school and conducting exercises to make the students, teachers and parents aware of the risks of natural and manmade disasters. As a part of this, SEEDS, a Delhi based NGO will be looking to empower 25,000 students, 40,000 parents, and 1,000 teachers. Focusing on school safety is a step towards achieving the wider aim of disaster risk reduction. The countries that do a good job of school safety can do a better job at disaster risk reduction as a whole.

Often high potential risks are not recognised as imminent threats, most parents worry about threats at hand like road safety, bullying and even fire threats. There is a need to create awareness among children, parents, teachers and civic authorities to mitigate the impact of disasters.

Interfaces in development: Reflections from pokkali farming communities in Kerala

Ms Devisha Sasidevan, *Tata Institute of Social Sciences, Mumbai, Maharashtra, India*

Farmers are a highly vulnerable group as regards climate change and constantly experience a loss of lands and productivity losses.

Ms Devisha Sasidevan

Farmers are a highly vulnerable group as regards climate change and constantly experience a loss of lands and productivity losses. Traditional communities such as Pokkali farmers are vulnerable to diverse ecological and livelihood uncertainties. Pokkali farming links ecology and sustainable livelihoods and is unique to the coastal belt of Kerala. It is considered to be a traditional crop cultivation method seen in the Ernakulam, Alappuzha and Thrissur districts in Kerala. Pokkali fields have a unique ecosystem and have a very rich bio-diversity and capacity to be saline resistant. These fields generate organic variety of paddy and shrimp. This is a significant way in which people have adapted and responded to the environmental challenges to their livelihood in this area. The area is highly prone to flooding and salinity but the rice produced from here is saline and acidity resistant.

Unfortunately, these fields are fast converted for other forms of cultivation and are being used for port development, breakwaters, bridges, roads, construction projects and industrial development projects. This could have considerable impact on the environment as well as the livelihoods of the resource dependent groups.

Using a social interface frame, this research primarily attempts to understand the functions of ecosystem linkages and services in the sustenance of Pokkali farming. It examines the changes and disturbances to various ecosystem services and its implications on ecological and livelihood sustainability. The research also studies the changes in the ecosystem along with the impact of development issues on the livelihoods of the people dependent on Pokkali cultivation.

Various changes occur, cutting across the communities due to interventions of knowledge. From a knowledge systems lens within the farming communities, this research tries to capture various aspects of transitions which may indicate ecological, socio-economic, cultural, political and knowledge uncertainties and discontinuities in the day-to-day life of the community. The change that is happening in the domain of knowledge and how the identities and subjectivities come up within a community were explored.

The research took a mixed methodology with a significant bend towards qualitative research. This study has good scope in critically understanding the effects of ecological and development interventions with specific reference to coastal management and livelihood promotion in the peri-urban areas. It takes a critical perspective that will help understand and analyze the complex

everyday processes occurring in Pokkali cultivation. The research hopes to bring about insights to design Pokkali cultivation as an effective adaptation model to combat environmental challenges.

There are structures of domination which affect Pokkali farmers. Results were presented for two villages - Kuzhipilly and Kumbalangi. In Kuzhipilly, it was the panchayat which initiated sustainable farming. Here the gender structure is changing with more women working in agriculture now than previously. There is still however, gender imbalance and inequity. While there are increasing spaces for women, they do not have equal rights. In Kumbalangi there is no work for women. A lot of fields do not practice Pokkali farming as prawn farming is more lucrative and therefore the ecosystem link is ignored.

The study found that community groups and women's groups are succeeding and ensuring sustainability. Panchayat and community participation also helps. It was observed that NREGA has taken the labour force away from farming. However, farmers and labourers are expressing that they want to be involved in agriculture, the low wages as compared to that in NREGA is a deterrent though.

Women farmers and climate resilient agriculture in peri-urban areas

Dr Shiraz Wajih (presented by Ms Nivedita Mani), *Gorakhpur Environmental Action Group, Gorakhpur, Uttar Pradesh, India*

Peri-urban farming is very important for the livelihoods of local communities especially for small and marginal women farmers. It is directly related to food and nutritional security as well as fuel and fodder needs of the peri-urban communities. There exists a complementarity between urban climate change resilience and peri-urban agriculture. Climate change is impacting the peri-urban areas, the farming practices in these areas and ultimately increasing the vulnerability of the communities living there, especially of the women farmers.

There is a need to move from a gender aware to a gender efficient society where women farmers also take the lead in resilient extension, market and advocacy and where there are equal spaces and opportunities for innovation and sharing.

Ms Nivedita Mani

Increasing male migration to urban areas and decreasing interest in peri-urban farming is an emerging issue in peri-urban areas, especially in Gorakhpur and three other cities of eastern India where GEAG has been working since the last 4 years. With this, feminization of agriculture is happening, forcing women to be main farmers but without rights, access and control over resources. There is a need to move from a gender aware to a gender efficient society where women farmers also take the lead in resilient extension, market and advocacy and where there are equal spaces and opportunities for innovation and sharing.

The key challenges that are faced by the peri-urban farmers, specifically by the women are: shifting rainfall patterns, increasing workload on women and prolonged water logging. To deal with these challenges, GEAG promotes and motivates farmers to look into adopting resilient agricultural options which includes: increasing diversity, complexity and recycling in the farming system which has made the farming practices robust. Time and space management is crucial to agricultural gain as everything is market based. Reclamation of degraded land and integrating livestock and poultry with farming is also looked into. These activities have led to the development of climate, food, water and financial resilience of peri-urban farming communities in the project intervention areas.

The social structures and gender relations in peri-urban areas either enhance or reduce the vulnerabilities of women. Some key factors which increase the vulnerability of women are: low kinship, friendship and social cohesion, limited access and control over land and property resources and lack of finance, information and knowledge. Absence of a defined status of peri-urban areas leads to more suffering for farmers for example; the peri-urban farmers do not get any support from agriculture department as they are not rural farmers who are supposed to be the beneficiaries of the department schemes. Peri-urban areas should be viewed as important for the city. Some good examples of reducing the vulnerabilities of women farmers are: women farmer led extension systems which bring the communities together; training and capacity building of women farmers; linking farmers with formal institutions like farmers' field schools and agro service centres and development of social cohesion among communities which helps them to adapt to climate change.

With the efforts of GEAG and empowerment of peri-urban women farmers, these women have become the advocates of common property resources in peri-urban areas. They are doing advocacy for demarcation and protection of panchayat lands, standing against land mining, promoting decentralised waste water treatment systems in their localities and fighting for stopping waste dumping in the area.

DAY 2, 19 SEPTEMBER, 2017

Cities Panel

Moderator: Mr Emani Kumar, Deputy Secretary General, ICLEI-Local Governments for Sustainability & Executive Director, ICLEI-Local Governments for Sustainability, South Asia, New Delhi

Panelists:

Md. Zannatul Ferdous, Hon'ble Mayor, Singra, Bangladesh
Mr H. M. Ahidul Islam, Hon'ble Mayor, Kotalipara, Bangladesh

Md. Abdul Mozid, Hon'ble Mayor, Kakonhat, Bangladesh

Mr Shakti Singh Chaudhary, Hon'ble Mayor, Gangtok, Sikkim, India
Mr Deepak Babu Kandel, Hon'ble Mayor, Palungtar, Nepal

Mrs Shobha Banshetti, Hon'ble Mayor, Solapur, Maharashtra, India

Mr Tikender Panwar, Hon'ble Former Dy Mayor, Shimla, Himachal Pradesh, India

Md. Abu Bakar Siddique, Town Planner, Faridpur Municipality, Bangladesh

Mr Tshewang Jeipo, Executive Architect, Phuentsholing Municipality, Bhutan

Dr R K Singh, Senior Health Officer, Dehradun Nagar Nigam, Uttarakhand, India

Ms Kabita Dhungana, Deputy Mayor, Belkotgadhi Municipality, Nepal

Mr Senaka Palliyaguruge, Commissioner, Matara Municipal Council, Sri Lanka

Md. Ashraful Haque, Chief Engineer, Rajshahi Municipality, Bangladesh

The cities panel comprising of representatives of local governments from the South Asian countries of Bangladesh, Bhutan, Nepal, Sri Lanka and India provided an interface among cities to learn from each other's experiences. Cities around the world are facing challenges brought about by population rise as well as climate change impacts, which places greater pressure on infrastructure and services. This is likely to adversely impact the poor and vulnerable communities who lack adequate infrastructure and services. Furthermore, urban residents as well as economic activities depend on peri-urban systems that are fragile and are often subject to failure under the combination of climate and development pressures.

Mr. Emani Kumar, Deputy Secretary General, ICLEI-Local Governments for Sustainability & Executive Director, ICLEI-Local Governments for Sustainability, South Asia, New Delhi

Through the support of ICLEI-South Asia, some local governments in the South Asian region were working at the intersection of climate change, urban systems and social vulnerability. Both direct and indirect impacts of climate change in urban areas were being looked into in the urban and peri-urban context. The key issues of peri-urban areas and some good practices to enhance resilience through case studies of various cities were discussed during the interactive session. Many of the cities in Bangladesh were facing major climate change impacts like droughts and changing rainfall pattern during the last few years. Not only that, river dynamics influences the resilience of the cities and their peripheries. The local administration of select cities in Bangladesh, through ICLEI's hand-holding, are undertaking an analysis of the urban systems and the impacts a changing climate might have on them. They are also identifying the most vulnerable groups and areas in the city. Many of these cities had been identified as fragile urban systems and were undertaking urban vulnerability and risk assessment by working closely with ICLEI-South Asia in advancing towards the resilience building process of the city through the ACCCRN project.

The key points from the session can be recognised country wise. In Bangladesh, river dynamics and climate change influence the resilience of the city while in Nepal, development needs to take a cautious route in order to avoid costly mistakes that may enhance an area's vulnerability. As regards, Bhutan, the Gross National Happiness index can be applied to planning which has significant positive outcomes on resilience. In India, the creation of special ecological zones should be encouraged while in Sri Lanka, respecting the fundamentals of a region can help with inclusive and sustainable planning.

Md. Abdul Mozid, Hon'ble Mayor, Kakonhat, Bangladesh

The case of Kakonhat, a small city located in Rajshahi division of Bangladesh, situated in a drought prone hard soil area was discussed. People manage to grow paddy, mangoes, wheat and are involved in fisheries too. Water availability is a problem especially of supplying water through lifting to the city, which is at a height. The city depends on deep tube well water for drinking and its peripheral area uses it for irrigation too. Kakonhat does have many surface ponds but these are seasonal and are not conserved properly. A canal which is present needs to be renovated. Rainwater harvesting can deal with people's water needs and will further feed into the economy which can develop fruit processing with mango as the major fruit.

Mr. H M Ahidul Islam, Hon'ble Mayor, Kotalipara, Bangladesh

The case of Kotalipura in the Faridpur district of Bangladesh dealt with the hydrological changes that the town situated on the river Ghaghar on the northern edge of Sunderbans faced. The area depends on paddy and its surrounding wetlands have been able to respond to any changes in sea level. However, this has got compromised over the years. Aquaculture is also common and includes the growing of certain fish and prawn species in the rice fields. Kotalipura is working on a climate resilient strategy to deal with problem of floods.

Md. Ashraful Haque, Chief Engineer, Rajshahi Municipality, Bangladesh

The case of Rajshahi, the fourth largest city of Bangladesh with a population of over one million was discussed. Like Kakonhat, Rajshahi too experiences water issues. Due to climate change and trans-boundary issues, the Padma river is adversely affected. The city faces both floods as well as water scarcity as its rivers have gone dry. So, a lot of the farmers in its peri-urban areas irrigate their lands with the city's wastewater. This reduces saleability of the produce as consumers who are aware of this do not wish to compromise their health. Attempts have been made by the local government to green the city, develop wide and low footpaths and, develop bicycle lanes to improve mobility. The city is working on developing a climate resilient strategy, which will help it better cope with the climate change impacts.

Md. Zannatul Ferdous, Hon'ble Mayor, Singra, Bangladesh

The case of Singra, Bangladesh which is bound by the historical Chalan Beel in the east apart from two other water bodies - Atrai and Nagar River was discussed. The rivers caused a lot of flooding in the city and during last monsoon over ten thousand people were displaced. The city produces large quantities of rice and fish, the surplus of which is exported. Sustainable technologies have been introduced within the city such as solar powered digital lights which has led to a lot of money being saved.

Md. Abu Bakar Siddique, Town Planner, Faridpur Municipality, Bangladesh

The case of Faridpur, one of the oldest municipalities in Bangladesh dealt with peri-urban issues like flood or extreme weather event at the city's periphery. The city does not get inundated because it is located on a higher elevation and has good drainage. This unfortunately means that it receives a lot of influx of migrants and disaster refugees and this floating population puts a lot of pressure on the infrastructure causing a threat to the public health system.

Most of the municipalities face the problem of water scarcity, lack of finances and waterlogging because of encroachment of canals. Bangladesh's rivers are facing problems because of trans-boundary issues with India and solutions need to be found for the Farrakha barrage. Rivers are drying and getting silted and climate change is exacerbating this.

World over, the impacts of climate change on urban areas have been given less attention than rural areas, which are marked by higher poverty levels and have huge populations that directly depend on climate-sensitive livelihoods. Given this context, the need to collaborate with local, state and national governments to support local governments and forge alliances in their areas of interest was highlighted.

Mr Senaka Palliyaguruge, Commissioner, Matara Municipal Council, Sri Lanka

The case of Matara municipal council, Sri Lanka indicates that the peri-urban issues there are not as complicated as in India. The reason being the fundamentals of its geography were taken into account while planning. The major challenges that Sri Lankan municipal councils face are unauthorised constructions, filling of marshes and diversion of drains. A number of steps have been taken to prevent this - enforcement of laws to curb and suppress the destruction of peri-urban areas as well as to promote catchment area management. Another measure includes institutionalisation where leaders are there to supervise and regulate the urban local bodies: like

Urban Development Authority regulates construction, soil excavation and takes action against unauthorised construction. Zoning of the city too has been done based in geological conditions. Migration is monitored and is restricted to six months. City development committees have been constituted and meetings are regularly conducted between stakeholders. Disaster management policy was recently prepared that addresses the city's threats. Efforts are on to improve rural development opportunities to prevent urban migration. Lastly, stress is laid on educating people on the importance of ecosystem so as to enhance resilience in urban centres.

Mr Deepak Babu Kandel, Hon'ble Mayor, Palungtar, Nepal

The case of Palungtar in Nuwakhot district, adjoining Kathmandu dealt with Nepal's vulnerability to climate change. Located on a high mountain, this historical, religious, cultural, archeological and tourist attraction point had a democratic method of electing its leader through a 13 km race practiced way back in 1558 AD. The challenges faced by the city are development induced disasters like landslide, climate change induced disasters like drying up of water sources, unplanned building construction, municipal waste management issues and weakening of social, community, religious and cultural infrastructure. Nepal has taken some steps towards resilience in cities to climate change. It is implementing environment friendly local governance and has a policy in place to conduct Initial Environmental examination (IEE) in municipal development activities. It has a policy to form local adaptation plan of action for climate change induced risk. In Palungtar, the community is being mobilized in solid waste management using zero waste concept and a material recovery facility is being installed. Social and community based organization is being mainstreamed in municipal planning and project implementation activities. The city has a comprehensive development plan for integrated urbanization and a land use plan and has started land zoning based on this.

Ms Kabita Dhungana, Deputy Mayor, Belkotgadhi Municipality, Nepal

The newly formed municipality of Belkotgadhi in Nepal is in a process of transforming from a rural to semi-rural locality. This can be taken as an advantage as proper planning can be done to ensure that the city develops sustainably. The municipality is in a hilly region and therefore it is of paramount importance that road construction is done wisely to avoid landslides. Industries must also be regulated. For a growing urban area, forest conservation, and preservation of biodiversity was a major challenge. Increasing urbanisation will have major impacts on the area's fabric and must be done prudently.

Mr Tshewang Jeipo, Executive Architect, Phuentsholing Municipality, Bhutan

The case of Phuentsholing municipality, Bhutan dealt with the issues faced - security, trans-boundary cooperation, poor development in peri-urban areas, limited coordination between district officials and the city and drainage issues due to the city's topography. In Bhutan, happiness index governs many developmental principles and every department has to follow the principle which is based on four pillars - sustainable and equitable socio-economic development, environmental conservation, preservation and promotion of culture and good governance.

Dr R K Singh, Senior Health Officer, Dehradun Nagar Nigam, Uttarakhand, India

The case of Dehradun, the capital city of Uttarakhand dealt with how the city renowned for its natural resources, public schools and educational institutions, suddenly faced a construction boom, especially in residential property after it became the capital of Uttarakhand. The city's dramatic transformation from a quiet sub-Himalayan town to a bustling commercial centre put a pressure on the city corporation's plans. The city has made it to the list of 98 selected cities under the smart cities mission but it is very difficult to keep up this standard given the city's rapid growth. Dehradun Municipal Corporation is engaged in involving various stakeholders including city residents to make the plan more participatory and inclusive.

Mr Shakti Singh Chaudhary, Hon'ble Mayor, Gangtok, Sikkim, India

The case of the hill city of Gangtok, Sikkim in India, which is rapidly developing in a sustainable manner was discussed. In particular, the measures introduced in Gangtok to help make the city become more liveable, without hampering its livelihoods and ecology was highlighted. The city that aspires to become a zero-waste city soon, is already the first carbon neutral state in India. Being in the hills has problems that are different from that in the plain areas. The state government's decision to become an organic state, encourage tourism and the Gangtok Municipal Corporation's ban on crackers and its work towards better water supply and distribution systems, are some of the measures adopted for moving towards sustainable living. Village tourism has eliminated slums in cities and free space is given to cultivators to sell their produce. The case indicates how good governance was key to achieve resilience.

Mr Tikender Panwar, Hon'ble Former Dy Mayor, Shimla, Himachal Pradesh, India

The case of Shimla stressed on how unfolding urbanisation is increasingly leading to an appropriation of wealth as city managers are turning into city entrepreneurs. There should be a democratisation of the surplus and it needs to be given back to the people. Peripherals pay more for everything. It is flawed to advocate for applying the principles of smart cities to the peri-urban areas. The concept of smart cities is highly inequitable and just 3 per cent of the area consumes 80 per cent of the budget. There are budgetary constraints and it is difficult to integrate peripheral areas with the core, given that the budget for climate change adaptation is only 0.08 per cent of the smart city budget. The peri-urban areas are mainly populated by the working class and the most vulnerable communities with 90 per cent of the population engaged in the informal sector. When Shimla was preparing its application for the smart cities proposal, the municipality had identified water as the major issue. But while eliciting public opinion it was found that people put transport as the highest priority. The smart cities legislation is a direct violation of the 74th constitutional amendment act and called for more democratic processes. There is no discourse on peri-urban areas. What is needed is a regional plan for these areas and the creation of institutions and structures which encourage people's participation. A protocol for liability and accountability should be developed.

DAY 2, 19 SEPTEMBER, 2017

Summing up and Way Forward

Panelists

Mr Tikender Panwar, Hon'ble Former Deputy Mayor, Shimla, Himachal Pradesh, India

Mr Amit Prothi, Associate Director, 100 Resilient Cities, Singapore

Prof N Sridharan, Director, School of Planning and Architecture, Bhopal, Madhya Pradesh, India

Mr Emani Kumar, Deputy Secretary General, ICLEI-Local Governments for Sustainability & Executive Director, ICLEI- Local Governments for Sustainability, South Asia, New Delhi

Dr Shiraz Wajih, President, Gorakhpur Environmental Action Group, Gorakhpur, Uttar Pradesh, India

Ms Ranjani Krishnamurthy, Gender Specialist, Chennai, Tamil Nadu, India

The case of these cities and peripheral areas show how providing leadership and encouraging partnership in caring for the environment can enable cities deal with peri-urban and urban issues. Also, sharing expertise with local governments on sustainable development and mobilizing funds, technical solutions and expertise to local bodies can be of great help.

In the summing up session, all the six panelists came together to deliberate on the key issues that emerged in each of the sessions and what could be the way forward.

Mr Amit Prothi, in the summing up, said that regional planning and integration is the way forward for resilience development and technology coupled with capacity building viewed spatially are critical instruments that should be incorporated into planning. He also stressed that the capacity building of planners, local agencies and implementers of various plans is a must so that the nexus of environment and economy can be understood in a better way.

Prof N Sridharan recapitulated that the discussion on urban planning and development was on possible interventions to develop effective strategies to build resilience. He outlined the need to use technologies for implementation and mechanisms to build effective strategies to protect ecological and environmental aspects. There is a need for a better understanding of rural-urban continuum with peri-urban spaces as transitional zones in the urban planning process. It also tried to look at the capacity building needs of urban planners for climate and disaster resilient inclusive development, and identified mechanisms to address the needs of peri-urban areas through the planning process. Towards that, disaster management plans should be given more consideration and peri urban areas should be included in it. The need to adopt the aspects of good governance like accountability, transparency and participation was recognized. Use of technologies for implementation and mechanisms to build effective strategies to protect ecological and environmental aspects was also discussed. Spatial planning and use of modern technologies is needed in urban planning.

Mr Emani Kumar said that a cross-sectoral discussion underlining aspects related to differentiation of vulnerability, politics, land management and institutions was important. The focus so far has always been on a cities perspective outwards and there is a need to zoom out and look at everything in a larger frame. Regional planning from a resource point of view was necessary which would lead to integrated management of peri-urban systems. Public expenditure tracking and spatial data infrastructure would result in transparency.

Dr Shiraz Wajih said that urban and peri-urban areas share the same problems and must be managed in an integrated fashion. The discussion was on possible interventions to develop effective strategies to build resilience. The need to adopt the aspects of good governance like

accountability, transparency and participation was recognized. An enabling environment should be created for implementation of urban climate change resilience strategies in a participatory manner addressing the poor and vulnerable populations. The vertical and horizontal coordination mechanisms between various levels – urban local bodies, para-statal and state government play a vital role in establishing linkages with city development processes and in providing basic services. Hence, strengthening the enabling environment is required for implementing such resilience measures.

Ms Ranjani Krishnamurthy said that gender, poverty reduction and food security issues need to be looked into and resilience planning should weave in social and gender issues. The fact that women in peri-urban areas face different realities than those in urban and rural settings and that social hierarchies are somewhat diluted needs to be incorporated in plans and programmes involving them. People need to be mobilised to start a movement around this and democratic spaces need to be created for rallying around these concerns and to collectively negotiate for them. Gender budgeting should be considered while developing climate change action plans. Food and nutrition security are the important aspects of social development and needs to be considered. As per the estimates of the Food and Agriculture Organisation, sixty per cent people will be in urban areas by 2030. It remains to be seen how women are garnered towards food security in that context.

Mr Tikender Panwar summed up by saying that the cities need to be given adequate importance in disaster management plans and the comprehensive disaster management plans need to be revisited. The need for integration of urban and peri-urban was brought up and mayors are recognising the importance of peri-urban areas. Collaboration between political heads, practitioners and academics is possible to deal with governance issues. While policies need to be put in place for that, there is a need for informal mechanisms of governance in peri-urban areas. Because the well-being of people in urban and peri-urban areas depend to a great extent on the ecosystem services of the peri-urban areas, these should be considered special ecological zones. The case of Shimla which is a special ecological zone and where 27 peripheral villages were given forest access rights was highlighted.

List of Participants

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Notes

Notes

About Organizations

Gorakhpur Environmental Action Group (GEAG)

Gorakhpur Environmental Action Group (GEAG) is a voluntary organization working in the field of environment and sustainable development since 1975. Ever since its inception, GEAG has been actively engaged in implementing several development projects addressing livelihood issues of small and marginal farmers, particularly women, based on ecological principles and gender sensitive participatory approach. Besides, GEAG has accomplished several appraisals, studies, researches at the micro and macro levels as well as successfully conducted a number of capacity building programmes for various stakeholders including women farmers, civil societies groups and government officials etc.

GEAG has established its identity in North India as a leading resource institution on sustainable agriculture, participatory approaches, methodologies and gender. Acknowledging its achievements, GEAG was awarded with the Lighthouse Activity Award by UNFCCC in 2013. GEAG also holds the Observer status to Green Climate Fund. (www. geagindia.org)

The Rockefeller Foundation

The Rockefeller Foundation supports work that expands opportunity and strengthens resilience to social, economic, health and environmental challenges, affirming its pioneering philanthropic mission since 1913 to promote the well-being of humanity. In climate change, the Foundation develops services and strategies to protect those with the least means from an imperilled environment and changing global climate. The Rockefeller Foundation envisions a world with Smart Globalization – a world in which globalization's benefits are more widely shared and social, economic, health, and environmental challenges are more easily weathered.

The Rockefeller Foundation supports work that enables individuals, communities, and institutions to access new tools, practices, resources, services, and products. Additionally the Foundation supports work that enhances resilience in the face of acute crises and chronic stresses, whether manmade, ecological, or both. (www.rockefellerfoundation.org)

Asian Cities Climate Change Resilience Network (ACCCRN)

The Rockefeller Foundation launched the Asian Climate Change Resilience Network (ACCCRN) in 2008 to help cities strengthen their capacity to prepare for, withstand, and recover from the projected impacts of climate change. This effort has resulted in insights into the process and range of actions that are needed to confront these dynamic shifts affecting urban areas. ACCCRN began with a focus on 10 cities in Vietnam, India, Indonesia, and Thailand. City-led projects include establishing end-to-end early warning systems in Surat, India, and storm and flood resistant credit and housing in Da Nang, Vietnam.

Today, ACCCRN is leading regional network connecting professionals and communities across Asia to build inclusive urban climate change resilience (UCCR) that focuses on poor and vulnerable people affected by climate change. Several ACCCRN cities are now members of the 100 Resilient Cities Network, bringing these lessons and best practices to other cities around the world. (www.acccrn.net)

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