Conference on the IPCC Special Report on 1.5°C No. **2018GW10**



Proceedings of the Conference on the IPCC Special Report on 1.5°C: Significance, Challenges and Implications

Co-hosted by the Ministry of Environment, Forest & Climate Change and The Energy and Resources Institute



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BACKGROUND

On 8th October 2018, the Intergovernmental Panel on Climate Change (IPCC) released the Special Report on the 'impacts of global warming of 1.5 °C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty' (SR1.5) in Incheon, Republic of Korea.

This Special Report was prepared by the IPCC following a specific decision of the Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC) at its 21^{st} Session in Paris, France (30 November to 11 December 2015), inviting the IPCC to provide a special report in 2018 on the impacts of global warming of 1.5 °C above pre-industrial levels and related global greenhouse gas emission pathways. At its 43rd Session (Nairobi, Kenya, 11 – 13 April 2016), the IPCC Panel decided to accept the invitation from the UNFCCC and to prepare a Special Report on this topic in the context of strengthening the global response to the threat of climate change, sustainable development and efforts to eradicate poverty.

The SR1.5 was developed under the joint scientific leadership of Working Groups I, II and III with support from Working Group I Technical Support Unit. It was considered by the 48th Session of the IPCC on 1 - 5 October 2018 in Incheon, Republic of Korea.

The SR1.5 is likely to be a major input for future policy decisions on global climate change, and will <u>inform</u> the Talanoa Dialogue. Officially launched COP23, the Talanoa Dialogue will take stock of the collective efforts of Parties in relation to progress towards the long-term goal of the Paris Agreement, and to inform the preparation of nationally determined contributions.

The SR1.5 was prepared over two years by 91 Authors and Review Editors from 40 countries. Authors responded to 42,001 comments from over 1000 experts, governments and international organizations. The report has over 6,000 cited references to the scientific literature. The final report and summary for policy makers present a rich, but sobering account of the current state of scientific knowledge relevant to a 1.5°C global warming. The SR1.5 assesses the most recent scientific, technical and socio-economic information produced worldwide relevant to the understanding of the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways.

Considering the significance of the SR1.5 and its implications for international and national strategies for addressing climate change, TERI and the MOEFCC co-hosted a Conference on the IPCC SR.1.5 on the 15th October 2018, at the India Habitat Centre, Silver Oak Hall, New Delhi. This was part of an effort to hold informed discussions on the implications of the SR1.5 for India, with the involvement of stakeholders from government, scientific & research institutions, think tanks, and from the industry including buildings, transport, and power sectors in India.

The Conference included an Opening session, a Closing session, and three panel discussions. In each of the panel discussions, authors of the SR1.5 first presented the report findings, followed by a discussion through which the panellists reacted and commented on the findings and their implications for India in light of their knowledge/expertise. Panel 1 discussed key findings of the SR1.5 on impacts; Panel 2 looked at global transitions required for 1.5 consistent pathways and their viability at the national level; and Panel 3 discussed implications for sustainable development and eradication of poverty, with perspectives from India (see Annex 1 for the agenda).

This report provides the proceedings and minutes of the day of discussions. The Conference was held under Chatham house rules and this report is therefore not for further distribution.





Opening Session



Opening Session

D r Ajay Mathur, Director General, TERI, in his Opening Remarks provided a framework within which to steer the discussions during the course of the day. Importantly, he raised the question of whether 1.5°C consistent pathways could essentially be considered as similar to 2°C ones but on steroids. The significance of this question lies in the fact that if this is the case and if we are on track for a 2°C path, it should be possible to accelerate the scale and speed of the ongoing transitions to reach for 1.5°C. Alternatively, if 1.5 and 2°C pathways are fundamentally different, this would be worrying for potentially reaching for 1.5°C. This frames the question of whether 1.5°C is still possible and if so how, bearing in mind development imperatives of countries like India. He also highlighted the report finding that risks are not only higher at 2°C compared to 1.5°C, but are riskier than previously thought. Understanding what riskier means for India is crucial.

He provided guidance on how to use this report which is global in nature to drive the action at national level, considering the fact that stabilising climate is a here and now issue, and not one for the future, nor a generic one. Indeed, many industries and sectors in India and globally are making infrastructure investment decisions today which if not made smartly could lead to stranded infrastructure situations and economic losses, if low carbon strategies required new climate friendly investments to be made later instead. It would therefore be common sense

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Mr C K Mishra noted with satisfaction that the framing of the SR1.5 mirrors India's triple transition challenge of simultaneously raising a substantial portion of its population out of poverty, moving towards a low carbon economy and safeguarding against climate change. to leapfrog and make these climate friendly infrastructure investments now. This is also true of institutional strengthening.

Mr C K Mishra, Secretary, MoEFCC, in his Special Remarks welcomed the timely report and consultation to understand the implications for India. He urged the gathering to discuss what agenda India should set out for itself in light of the assessment the report makes of impacts, vulnerabilities and pathways. He also questioned the implications for India of the finding that all 1.5°C consistent pathways need different levels of Carbon Dioxide Removal (CDR) and negative emissions, even if Bioenergy Carbon Capture and Storage (BECCS) can be avoided, provided some specific measures and conditions are met.

He noted with satisfaction that the framing of the SR1.5 mirrors India's triple transition challenge of simultaneously raising a substantial portion of its population out of poverty, moving towards a low carbon economy and safeguarding against climate change, given India's vulnerability and dependence of climate sensitive resources for the wellbeing and livelihood of a majority of its people. The SR1.5 indeed assesses global warming of 1.5°C specifically in the context of sustainable development and poverty eradication, in support of India's narrative which focuses on sustainable development, responsible growth and climate justice as three pillars of a potential 1.5 consistent pathway. The report, in tune with India's approach,



suggests that only a holistic approach would be desirable and effective.

Secretary recalled India's climate leadership at the national and international levels, and said that India had not waited for this report to get the ball rolling towards the transitions that will eventually promote sustainable development, poverty eradication and climate action. He referred to India's ambitious Nationally Determined Contribution (NDC) and goal of achieving 175 GWs of renewable energy by 2022, and agreed that it was an opportune time to discuss whether India's commitments are achievable and enough. He agreed that India's climate commitment should not falter; however he cautioned that ambition cannot be artificially raised, and stressed that, since India had already overstretched its level of ambition, it will only be able to do more as part of a global effort, provided international finance and technology are made available at affordable costs.

The Secretary also cautioned about global theory and models – as those assessed in the SR1.5 – not always being applicable in countries of the size and complexity of India, and noted the importance of taking capacities and context into consideration when thinking of how to implement 1.5° C pathways.

Finally he appealed to all stakeholders to come forward with suggestions for policy makers on the policies and regulations that would enable 1.5°C consistent pathways. He strongly felt that this was not solely the responsibility of government; but that the government would happily provide a platform to catalyse contributions from all stakeholders and work out the best path for India to move on.

Mr **R Rashmi**, Distinguished Fellow, TERI, while noting the many imponderables that still remain regarding the nature, scale, scope and feasibility of the transitions required to avoid overshoot, the challenge of negative emissions, and availability of finance and technology; lauded nonetheless the importance of the SR1.5 as a robust basis for sound decision making towards a safer future. He flagged carbon pricing as a tool that should be promoted to generate finance, especially in the current context of substantial amounts of finance being required for deeper and faster transitions. Carbon pricing is also a way to alleviate the government's burden of dealing with climate change and shift some of that responsibility to the corporate sector.





Panel 1



Panel 1 – Key findings of the SR1.5 on impacts at 1.5°C of global warming

This session was chaired by Ambassador **Ajai Malhotra**, Distinguished Fellow, TERI who invited all panellists and participants to come forward with ideas and perspectives on how to make the best use of this report, both domestically and globally.

Dr **Youba Sokona**, Vice Chair, IPCC gave a <u>presentation</u> on potential impacts and associated risks for ecosystems and human systems with a comparison of those at 1.5 and 2°C. He highlighted that every fraction of degree matters because while we can strive to limit global warming to 1.5°C, this is at best an average, and warming and impacts will actually substantially differ regionally. Critically, the report finds that limiting global warming to 1.5°C, compared with 2°C, could reduce the number of people susceptible to poverty by up to several hundred million by 2050. This is an opportunity to grasp by which decarbonisation, sustainable development and poverty eradication go hand in hand.

Dr Sokona also summarised the 4 key conclusions of the report as (i) climate change impacts are already affecting people, ecosystems and livelihoods globally, (ii) achieving the 1.5°C is not impossible but will require unprecedented socio-economic transitions globally, (iii) there are clear benefits of limiting global warming to 1.5°C as compared to 2 and (iv) limiting global warming to 1.5°C goes hand in hand with sustainable development and efforts to eradicate poverty. He said that while most of the report findings were based on projections rather than observations, the report was still very robust, and he welcome the scrutiny it had been subjected to by Indian scientists.

Prof **J Srinivasan**, Distinguished Scientist, Divecha Centre for Climate Change, Indian Institute of Science, Bangalore, had concerns over the lack of available studies on the effect of SO_2 on global warming. He reminded the audience of the cooling effect of SO_2 when it is converted into highly reflective sulphate aerosols that bounce a portion of the incoming solar radiation directly back into space, and warned that as developing countries like India tackled their air pollution problem and reduce SO2 emissions, the cooling effect which SO2 has will be cancelled, leading to increased global warning. He also cautioned against global models which have limited use regarding regional phenomena such as total rainfall. He pointed out that developing countries face multiple threats including but not limited to global warming; hence one of the report's shortcomings is that it looks at impacts only from a temperature rise lens. He gave the example of land subsidence leading to flooding of the Sundarbans and Bangladesh much faster and more immediately than the anticipated temperature rise. He urged for more scientific studies to be undertaken on the matter.

Prof **Pramod Aggarwal**, Head, South Asia Regional Program for the CGIAR Research Program on Climate Change, Agriculture and Food Security, said that understanding the difference in impacts on agriculture between 1.5 and 2°C is not crucial because those at 1.5°C are worrying enough. The report may find that human activities have caused approximately 1.0°C of global warming already; however, this is an average and certain parts of India such as Himachal Pradesh have seen a greater increase, with apple farming coming under stress and migrating northward. According to him, the two greatest climate-related threats to agriculture are (i) climate extremes, as a single-day



variation of a few degrees alone is enough to kill a crop, and no amount of adaptation can alleviate the losses or enable reliable forecasting, and (ii) salinity ingression especially around deltas which are already stressed areas due to population increases, poverty, migrations etc. He encouraged looking at the 1.5°C target as an inclusive package made of technology innovation, adaptation strategies and ground realities, and considering all elements as complementary.

Dr **R Krishnan**, Executive Director, Centre for Climate Change Research, Indian Institute of Tropical Meteorology, talked about the reliability of heatwave projections on a global scale, and the limitations of these at the regional scale, given that heatwaves are modulated by internal climate variability including ENSO and El Niño effects. Similarly, assessments of regional water cycle and precipitation changes must be tempered because those variations are not specially and temporally uniform as in the case of temperature changes, and are subject to natural forcings, increasing anthropogenic aerosols, land use and land cover changes, ENSO and El Niño effects etc. With regard to sea level rise, models project sea level rise to increase as a function of temperature rise, but regional sea level variations show multi-decadal variations which are related to changes in the monsoon circulation. His remarks were an illustration of global model biases at regional scales.

The floor was then open to questions and answers with the audience. One important topic that the discussion focused on was the limitations of global climate models, given that all impacts are local and regional. In terms of significance for India, this means that many of the Indian realities do not get considered. It was agreed that to understand the impacts of climate change, it is indispensable to use models, keeping in mind that global or regional models will provide no insight on local factors and phenomena that may have an incidence on local climate. Hence, broadening the understanding and perspectives beyond mere temperature increase is crucial when thinking of solutions, especially so in the case of India which has vulnerabilities of various kinds and has wide array of mountain and water ecosystems, arid and desert areas, and has close to 1000 islands.

Participants also pointed to the lack of mention of impacts of 1.5°C global warming on Himalayan ecosystems which, Dr Sokona clarified, is due to a lack of available data and scientific literature on the matter. The hope is that the SR1.5 stimulates the scientific community to address those information gaps, so that they can be filled in the Sixth Assessment Report (AR6). It was noted that the SR1.5 was never intended to provide all the answers; rather, it represents substantial progress and a new framework within which to work, and will hopefully lead to more regional and local studies. Participants felt that Indian climate related research should be encouraged in order to be fed into the AR6.

It was also suggested that India and African countries should join hands, given similarities in their contexts and capacities in addressing energy access, security and importance of sustainability through low-carbon growth strategies. If successful, these would be the new paradigms of development.





Panel 2



Panel 2 – Global transitions required for 1.5 consistent pathways and their viability at the national level

This session was chaired by Dr Youba Sokona, Vice Chair, IPCC. Prof **P R Shukla**, Working Group III Co-Chair, IPCC and Chair, Global Centre for Environment and Energy, Ahmedabad University, made a <u>presentation</u> on the different 1.5 consistent emissions pathways. A major finding of the report is that to limit warming to 1.5°C, CO2 emissions would need to fall by about 45% by 2030 from 2010 levels, and reach 'net zero' around 2050. If these global targets are not met, CO2 will have to be removed from the atmosphere if we still want to achieve 1.5°C. He noted that while temperature stabilisation will take time, the co-benefits of reaching for these targets are immediate.

Using an improved global mean surface temperature (GMST) methodology as compared to the one used in the Fifth Assessment Report (AR5), the remaining carbon budget is 770 Gt CO2 for a 50% probability of limiting warming to 1.5°C and 570 Gt CO2 for a 66% probability. At the current rate at which the carbon budget is being depleted, we have about 18 and 13 years left respectively. The carbon budget story does not reflect the old narrative of historical responsibility but looks to the future with how much space is left.

He presented figure SPM3 and the characteristics of four illustrative model pathways consistent with 1.5°C: a sustainability oriented scenario (S1), a fossil-fuel intensive and high energy demand scenario (S5); a middle-of-theroad scenario (S2), and a scenario with low energy demand (LED). These scenarios show a range of potential mitigation approaches and vary widely in their assumptions including projected energy and land use. They also present a breakdown of the 3 major contributors to CO2 emissions: emissions from fossil fuel and industry, agriculture, forestry and other land use (AFOLU), and BECCS. He said that S5, with less mitigation in the coming decades and high requirements for BECCS in the future is probably the path the world is on today.

The SR1.5 also assesses the feasibility of each scenario, through the lens of six characteristics: economic, technological, institutional, socio-cultural, environmental and geophysical. He emphasised that the solutions for all these 1.5 consistent pathways are available today, but scaling and speeding up in implementation is required.

Prof. Joyashree Roy, Coordinating Lead Author, Chapter 5, *Sustainable development, poverty eradication, and reducing inequalities,* IPCC SR1.5 made a <u>presentation</u> on the positive and negative impacts that a mix of mitigation measures can have with the Sustainable Development Goals. She said that knowing all the implications is crucial to enable good policy making in different contexts and socio-economic priorities.

She presented figure SPM 4 which shows the potential synergies and trade-offs between the sectoral mitigation options and the 17 SDGs. In the energy supply, energy demand, and land-based sectors for instance, each mitigation option has been assessed for its negative and/or positive impacts. It finds that energy demand mitigation options have more positive than negative impacts on SDGs; but it also finds that SDG6 (clean water and sanitation) sees some important trade-offs that must not be overlooked. Similarly, bioenergy, if poorly managed, can compete with food security (SDG2). The assessment however finds that redistributive policies across sectors and populations can resolve many of these trade-offs.

Dr **Ritu Mathur** noted that the SR1.5 gives us much food for thought in terms of how to weave these global findings into India's national decision making. Based on TERI's research, the kinds of mitigation and adaptation actions that India will implement are different in 1.5 and 2°C consistent pathways, because the carbon budget available varies. In this regard, thinking about budget sharing principles is important. There are certain choices that stakeholders need to think about now to minimize losses and trade-offs in the future, such as measures to decarbonise the electricity feeding every demand-side sector if we are looking at deep decarbonisation pathways, and measures to introduce behavioural changes.

Dr **Anshu Bharadwaj**, Executive Director, Centre for Study of Science, Technology & Policy (CTSEP), said that based on CSTEP's research, India is on track to achieve its immediate target of 33-35% reduction in energy intensity of GDP by 2030, but can do more. He explained that if aggressive energy efficiency measures are implemented, the primary energy/GDP ratio could decline by 40-45% and would enable India to over achieve its target.

He pointed out that, according to the Report, the share of primary energy from renewables increases while that from coal decreases across 1.5°C pathways. In India, however, projections find that by 2030 RE generation will be at about 35% including nuclear and hydro, and that coal capacity will continue to be added until 2030 even though some existing capacity will be retired. Importantly, considering that the Plant Load Factor of coal power plants has dropped to about 60%, and if MoEFCC emissions regulations are implemented, the cost of coal generated electricity may increase and become unattractive as compared to solar. As regards BECCS, he said that economic costs were higher and was not in its favour in the Indian context, given land availability and over-population problems.

Ms **Ulka Kelkar**, Director, Climate Policy, World Resources Institute India (WRI), <u>presented 3 maps</u> on trees, electricity and wheat, illustrative of 3 aspects of what Indian transitions could look like. The first map shows that a combination of existing forests' protection, wide scale restoration in less-populated areas, and increasing tree cover in rain-fed cultivated areas can increase tree cover by 20%, sequestering 3 billion tons of carbon. The feasibility of this is currently being tested in Madhya Pradesh involving local actors.

The second map shows that from 2011 to 2016, while India's electricity generation increased by 40%, so did its water consumption given that thermal power plants (TPP) use fresh water for cooling. This has increased water stresse and caused some TPPs to shut down due to a lack of water, leading to billions of dollars of revenue losses. Instead, if India were to meet it RE targets and comply with MoEFCC regulations, water consumption levels by TPPs could be capped at 2016 levels until 2027.

The third map superimposes wheat-growing areas, with critically water-stressed areas, with future climate projections of declining rainfall in Madhya Pradesh. This importantly gives data in the hands of district officials on where to focus their resources today. She suggested that we must mainstream adaptation into our development strategies now.

Based on the findings of the <u>New Climate Economy report</u>, she said that the 1.5 consistent transitions should be viewed as having not only costs but also gains in terms of generation of over 65 million new low-carbon jobs and 26 trillion USD in economic benefits by 2030. She also referred to the importance of carbon pricing as a clear economic signal to corporates; they would generate more sustainable businesses, once they realise that the price of carbon is not zero.

The floor was then opened to questions and answers with the audience. Participants asked about adequacy of BECCS in the Indian context, and Dr Bharadwaj responded that given land constraints in India and the low yield of biofuels (10-15 million hectares would cater to about 10 to 15% of India's oil requirements), such use of land for energy is not worth considering.

On policies to minimise trade-offs, it was emphasised that there is no one silver bullet for all and that contextualisation is crucial. The findings of the report are to be used as a framework for each country to work in, according to their domestic realities. What is more, trade-offs can happen at different scales of deployment of



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mitigation options and therefore, time- and special-scales should be considered when looking at trade-offs and synergies. The SR1.5 has looked at the deployment scales of mitigation portfolio and how they vary from decade to decade, and also scored the trade-offs and synergies to make them comparable. For a greater understanding in the Indian context, it was highlighted that more regional and context-specific case studies and research are needed.

Questions were raised about the carbon budget sharing principles and whether these should be based on technoeconomic or equity considerations. A question was askedon reasons for the global economy being slow to pick up the economic opportunities presented by these transitions. Ulka Kelkar responded that absence or presence of policies was the main reason: one set of policies that do not exist yet and are required such as carbon pricing are likely to facilitate the transition, the other set of policies that do exist and should not, like fossil fuel subsidies hinder the transition.





Panel 3 – Implications of the IPCC SR1.5 findings for sustainable development and poverty eradication, with perspectives from India



This session was chaired by Dr J R Bhatt, Advisor, MoEFCC. Dr Purnamita Dasgupta, Lead Author, Chapter 5, *Sustainable development, poverty eradication, and reducing inequalities*, IPCC SR1.5, gave a <u>presentation</u> on what the report tells us in terms of strengthening the global response in the context of sustainable development (SD) and eradication of poverty. In order to achieve the 1.5 target, every bit matters including technology, investment, support that has to come together at national, sub-national and sectoral levels, international cooperation, and strengthening capacity.

The conventional paradigm has changed and it is now accepted that we need to limit global warming in order to achieve 1.5°C. Instead the discussion now focuses on synergies and trade-offs. In addition, SDGs have the best chance of being achieved if mitigation and adaptation are pursued in complement, rather than exclusively of each other. She said that, while there are many challenges, importantly, the SR1.5 tells us that there are choices that can be gainfully exercised.

Dr **Prodipto Ghosh**, Distinguished Fellow, TERI, stated that in terms of the sustainability and climate-friendliness of its development path, India was already on track, especially when looking at the impact of lifestyle choices on resources. He was not confident of the UNFCCC process being able to settle equitable principles for carbon budget sharing and said that ultimately this will be resolved by power play. He also doubted that solar energy was cheaper than coal, given multiple externalities that could outweigh the benefits of falling costs of solar. He was sceptical of the high hopes placed on storage technologies and second generation biofuels to accelerate the required transitions. In his view, more empirical modelling was required to get those answers. He stressed the need to focus on water availability and management as a more critical problem for India and said that inter-basin transfers were the answer to India's water problems, and encouraged more research on the matter.

Mr **J M Mauskar**, Member, Prime Minister's Council on Climate Change, said that countries' priorities should be poverty eradication, and was troubled at the consideration of trade-offs. He said that India's NDC was its best possible effort with its own financial and technological resources, and that it could only do more provided international support was available. He also said that while the report was useful in making a differentiation between 1.5 and 2°C impacts and pathways, it did not give much specification in relation to the Indian context, and urged that AR6 be upfront about recognising knowledge gaps.

Mr **Chandra Bhushan**, Deputy Director General, Centre for Science and Environment said that India's response to the report will depend on India's level of confidence in the Report. It is a common sense report when it comes to describing the impact that climate change will have on the poor; impacts such as those of the Kerala floods and Cyclone Titli are already visible. It is common sense that more people will be exposed and affected by poverty at 2 than at 1.5°C because so many people in India depend on climate sensitive resources for their livelihood. As poverty is the cause of environmental degradation, the logic that climate action will lead to poverty eradication is beyond reproach.

He said that the transitions are happening one step at a time in India, and that while coal will not be done away with tomorrow, it will eventually become economically unviable. It is important to start designing today the transitions that will make economic, environmental and social sense for India a decade or so later.

At the international level, he said that politics may make it difficult to reach the level of cooperation that is required in 1.5 consistent pathways. In his view, neither the UNFCCC nor power play are likely to get us there. He believes that discussing how to share the carbon budget is like fighting over scraps because there is none left, and he urged that we should think out of the box in order to get the global cooperation required. He also urged to make 1.5°C the target for all countries, even if aspirational, so as to improve the chances of achieving 2°C.

Prof **T Jayaraman**, Professor, Tata Institute of Social Sciences, talked about the need to contextualise the report, and for more climate research in India. He cautioned that the SR seemed to present sustainable development as a hook for all developing countries, while omitting the burdens that may arise for developing countries while moving along



that path. In addition, framing the report in the context of SDGs gave the impression that dealing with climate change is a developing country problem when actually it is a global responsibility.

The floor was thereafter opened for questions from the audience. Building on Secretary MoEFCC's speech, one participant suggested that MoEFCC, as a catalyst for climate actions, should provide an enabling platform for all stakeholders to come on board and allocated/assign the NDC target amongst them, especially between central and state governments. This would also mean dividing and allocating resources to achieve the target as allocated.

Responding to questions on the carbon budget, Chandra Bhushan re-emphasised that this discussion made sense in the 1990s when adequate carbon space was still left; now it has become an obsolete question and will certainly not help us reach 1.5° C or even 2[°]C goal. He suggested a different way to approach the negotiations and address the global problem. Instead of segmenting 193 countries – all with their own separate interests – it could make far more sense to look at the major companies or corporates around the globe dealing with fossil fuels, as the object of targeted action. Indeed, approximately 10 companies account for 80% of global oil production and concerted action by them within an agreed framework could result in quick and predictable action in the interest of global goal of 1.5° C or 2[°]C stabilisation.



Closing Session



Closing session



Mr R R Rashmi, Distinguished Fellow, TERI, gave a comprehensive summary of the day's discussions.

Ms **Ruchi Ghanashyam**, Secretary (west), Ministry of External Affairs, gave the Valedictory Remarks. She spoke about the progress that climate change had made from being considered a purely academic and scientific issue a few decades ago to now being one of the most serious political and economic challenges. She emphasised that 1.5°C is an average, meaning that some parts of the world will experience higher temperature rises and therefore greater impacts.Besides, even if stringent mitigation action was taken today, we are still committed to a certain amount of climate change due to cumulative past and present emissions.

She talked about the socio-economic, environmental and developmental challenges faced by India. While the SR1.5 finds that the current global NDCs are not enough to achieve the 1.5 target and hints at countries having to enhance ambition, she reminded the nationally determined character of NDCs, that developed countries are expected to take the lead, and that increased ambition by developing countries must be matched with increased technological and financial support from developed countries.

Ms **Noemie Leprince-Ringuet**, International Expert of the climate and energy transitions in India, TERI, delivered the vote of thanks.



Appendix I – Agenda





Conference on the Intergovernmental Panel on Climate Change Special Report on 1.5°C: Significance, Challenges and Implications

India Habitat Centre, Silver Oak Hall, New Delhi 15 October 2018 | Agenda

Time	Session		
09:30 – 10:00	Registration (Tea & Coffee)		
10:00 – 11:00	 Opening Session Dr Ajay Mathur, Director General, The Energy and Resources Institute – Opening Remarks Dr Youba Sokona, Vice Chair, the Intergovernmental Panel on Climate Change – Special Remarks Mr C K Mishra, Secretary, Ministry of Environment, Forest & Climate Change – Keynote Address Mr R R Rashmi, Distinguished Fellow, The Energy and Resources Institute – Closing remarks and Vote of Thanks 		
11:00 - 11:30	Tea & Coffee break		
11:30 - 13:00	Panel 1 - Key findings of the SR 1.5 on impacts at 1.5°C of global warming Session Chair: Mr Ajai Malhotra, Distinguished Fellow, The Energy and Resources Institute IPCC Presentation – Dr Youba Sokona, Vice Chair, the Intergovernmental Panel on Climate Change Panellists: o Prof. J Srinivasan, Distinguished Scientist, Divecha Centre for Climate Change, Indian Institute of Science, Bangalore o o Prof Pramod Aggarwal, Head, South Asia Regional Program for the CGIAR Research Program on Climate Change, Agriculture and Food Security o o Dr R Krishnan, Executive Director, Centre for Climate Change Research, Indian Institute of Tropical Meteorology		
13:00 - 14:00	Lunch		
14:00 – 15:30	Panel 2 – Global transitions required for 1.5 consistent pathways and their viability at the national level		





	Session Chair: Dr Youba Sokona, Vice Chair, the Intergovernmental Panel on Climate Change		
	 <u>IPCC Presentation</u> – Prof P R Shukla, Working Group III Co-Chair, the Intergovernmental Panel on Climate Change and Chair, Global Centre for Environment and Energy, Ahmedabad University 		
	 Panellists: Prof. Joyashree Roy, Coordinating Lead Author, Chapter 5, Sustainable development, poverty eradication, and reducing inequalities, IPCC SR1.5, and CLA Chapter 5 Demand, services and social aspects of mitigation, IPCC AR6 WGIII Dr Ritu Mathur, Senior Fellow and Director, Integrated Assessment and modelling, The Energy and Resources Institute Dr Anshu Bharadwaj, Executive Director, Centre for Study of Science, Technology & Policy Ms. Ulka Kelkar, Director, Climate Policy, World Resources Institute India Q&A 		
15:30 - 16:00	Tea & Coffee break		
16:00 - 17:30	Panel 3 – Implications of the IPCC SR 1.5 findings for sustainable development and poverty eradication, with perspectives from India Session Chair: Dr JR Bhatt, Advisor, Ministry of Environment, Forest & Climate Change IPCC Presentation – Prof. Purnamita Dasgupta, Lead Author, Chapter 5, Sustainable development, poverty eradication, and reducing inequalities, IPCC SR1.5 Panellists: O Dr Prodipto Ghosh, Distinguished Fellow, The Energy and Resources Institute Mr J M Mauskar, Member, Prime Minister's Council on Climate Change Prof. T Jayaraman, Professor, Tata Institute of Social Sciences Mr Chandra Bhushan, Deputy Director General, Centre for Science and Environment Q&A		
17:30 – 18:00	 Closing Session Mr R R Rashmi, Distinguished Fellow, The Energy and Resources Institute – Summary of the day and Closing Remarks Ms Ruchi Ghanashyam, Secretary (west), Ministry of External Affairs – Valedictory Remarks Noemie Leprince-Ringuet, The Energy and Resources Institute – Vote of thanks 		



Appendix II – List of participants

Last name	First name	Organization
ACHARYA	Mohit	TERI
AGGARWAL	Pramod	CGIAR Research Program on
		Climate Change, Agriculture
		and Food Security
AGGARWAL	Savita	Delhi University
AGRAWAL	Aman	TERI
ARORA	Anil	Earth Day Network
ARORA	M	NIH, Roorkee
ARYA	Prashant	CPR
BAJAJ	Каvya	TERI
BAKRE	Abhay	BEE
BASU	S	Shell
BATRA	Ashok	Rainforest Alliance
BATRA	Pankaj	Central Electricity Authority
BHARDWAJ	Ankit	CPR
BHARADWAJ	Anshu	CSTEP
BHARDWAJ	Saurabh	TERI
BHARTI	Neha	TERI
BHATT	J R	MoEFCC
BHUSHAN	Chandra	CSE
BISHT	Arpita	TERI SAS
BURNWAL	Kundan	GIZ
CHAKRAVARTY	Smita	Delhi University
CHANDRA DUBE	Lokesh	MoEFCC
CHATPALLIWAR	Siddharth	Shakti Sustainable Energy Foundation
CHATURVEDI	Ashish	GIZ
CHAUDHARY	Anusha	Guru Gobind Singh Indraprastha University
CHAWLA	НС	Sigma



Last name	First name	Organization
CRETTAZ	Mary Laure	Swiss Agency for Development and Cooperation
DASGUPTA	Purnamita	Institute of Economic Growth
DATT	Divya	TERI
DIDDI	Saurabh	BEE
DIVAKARAN NAIR	Unnikrishnan	Global Green Growth Institute
DOUNGEL	Mang	EFICOR
FIELDMAN	Courtney	UEF
FINK	Andrin	Swiss Agency for Development and Cooperation
GANGULY	Anirban	DFID British High Commission
GAURAV	Jai Kumar	GIZ
GAUTAM	Siddhartha	DPCC
GAWANDE	Rajesh	MEA
GHANASHYAM	Ruchi	MEA
GHOSH	Prodipto	TERI
GOEL	МК	NIH, Roorkee
GOLDAR	Amrita	Indian Council for Research on International Economic Relations
GOSWAMI	Urmi A	The Economic Times
GOTMARE	Shantanu	Global Green Growth Institute
GOYAL	Т	Galileo Israel
GULATI	Urvi	GAIL
GUPTA	Joydeep	The Third Pole
GUPTA	Nilanjan	Independent
IDNANI	Taruna	Climate parliament
JAIN	Sajal	Indian Council for Research on International Economic Relations
JALAN	Ishita	CEEW
JANARDHANAN	Nandakumar	IGES



Last name	First name	Organization
JASWAL	Fantry Mein	Integrated Mountain Initiative
		& Sustainable Development
		Forum Arunachal Pradesh
JAYARAMAN	T	Tata Institute of Social
		Sciences
К	Shanmuganathan	TERI
KALSI	Arshpreet	Shakti Foundation
	Cubbenlar	
KARMAKAR	Subhankar	ICRIER
KATARIA	Hitesh	Mahindra Group -
		Sustainability
KATHPALIA	G N	A P Fuel
KAUR	Daljeet	DFID British High Commission
KAUR	Mandeep	BEE
KAUSHIK	Abhishek	TERI
KEDIA	Shailly	TERI
KELKAR	Ulka	WRI India
KHANDEKAR	Neha	Independent
KHANNA	Anupam	Independent
KHARE	Ayush	ICRIER
KHER	Jagriti	Delhi University
KHOSLA	Aarti	GSCC India
KOSHY	Jacob P	The Hindu
KRISHNAN	R	CCCR, IIM, Pune
KULANDAISANG	K Yasodha	MoEFCC
KUMAR	Ashvini	TERI
KUMAR	Atul	TERI SAS
KUMAR	Avinash C	BSES Rajdhani
KUMAR	Praveer	GAIL
KUMAR	Vivek	Royal Norwegian Embassy
LAKHANPAL	Shikha	ATREE



Last name	First name	Organization
LEPRINCE-RINGUET	Noemie	TERI
MAHADEVAN	Bharat	TERI
MALHOTRA	Ajai	TERI
MALHOTRA	Neeti	DFID
MANGOTRA	Karan	TERI
MAITHANI	PC	MNRF
MATHUR	Aiay	TEBI
MATHUR	Mrinal	TERI
MATHUR	Ritu	TERI
		DM Council on Climate Change
	J IVI	Pro Council on Climate Change
MEHTA	Tarini	Pace Law School
MISHRA	СК	MoEFCC
MITRA	Apurba	Country lead, WRI India
MURALI	К. S.	Asia Regional Office, International Development Research Centre
NAGARKOTI	Poonam	CEEW
NALACHERUYU	Ram Prasad	Rio Tinto
NANDA	Nitya	TERI
NIGAM	Rishu	TERI
OJHA	Manini	Jindal Global University
PANWAR	TS	WWF India
PARIKH	Jyoti	IRADe
РАТНАК	Minal	IPCC WG III TSU, Ahmedabad University
PRASAD	N S	TERI
PRASAD	Shalini	GAIL
PRUTHI	Aanchal	TERI
PURI	Rhea	TERI
RAGHAVA	Ajay	MoEFCC
RAJAMANI	Lavanya	CPR



Last name	First name	Organization
RANKA	Saloni	TERI SAS
RASHMI	RR	TERI
RASTOGI	РВ	MoEFCC
RAUTELA	Deepali	Network for Certification and Conservation of Forests
REDDY	BMS	Delhi Pollution Control Committee
RIJHWANI	Vani	TERI
ROY	Joyashree	Jadavpur University
SALVAIRE	Paul	French Embassy in India
SANCHANIA	Dipjay	CLP India
SANJAY	J	Centre for Climate Change Research, IITM
SASTRY	Mekhala	TERI
SAWANT	Kedar	AFD
SAWANT	Viraj	ICRIER
SENGUPTA	Arijit	BEE
SETHI	Nitin	Business Standard
SHANMUGANATHAN	к	National Chemical Laboratory
SHARMA	Anjali K	SFHEA
SHARMA	Divya	TERI SAS
SHARMA	Piyush	PHD Chamber of Commerce and Industry
SHARMA	Nehha	Wetlands International South Asia
SHARMA,	Shaifali	Integrated Mountain Initiative & Sustainable Development Forum Arunachal Pradesh
SHEKHAR	Himanshu	ICRIER
SHUKLA	PR	IPCC WG III and Global Centre for Environment and Energy, Ahmedabad University
SINGH	Damandeep	CDP India
SINGH	Jarnail	The Climate Group
SINGH	КD	FAO



Last name	First name	Organization
SINGH	Karuna A	Earth Day Network
SINGH	Manjeet	TERI
SINGH	Nayanika	NATCOM Cell, MoEFCC
SINGH	Nisha	Bihar Rural livelihoods promotion society
SINGH	Ravi	WWF India
SINGH	Swati	TERI SAS
SINGH	Tamiksha	TERI
SINHA	Amitabh	Indian express
SOKONA	Youba	IPCC
SONI	Alankrita	Sharp Developments
SOOD	Praveen Kumar	Regnant Energy Solutions
SREEKESH	S	UNU
SRIKANTH	Kavitha	Institute of Economic Growth
SRINIVASAN	J	Divecha Centre for Climate Change, Indian Institute of Science, Bangalore
SRIVASTAVA	АК	Gol
SYIEMLIEH	Jonathan Donald	TERI
TANNER	Gemma	DFID, British High Commission
THAKURAL	GS	Nishtha Law Firm
TOMAR	Risika	Delhi University
νк	Ashwathi	ATREE
VAIDHYANATHAN	Raghuraman	Suzlon Energy
VARSHNEY	Prabhat	PTC India
VASHISHT	Pradeep	TERI SAS
VATS	Deeksha	Aditya Birla Group
VERMA	Abhilash	Research Triangle Institute (RTI) International - India
VOHRA	Sachi	TERI
YADAV	Aviral	WWF India
ZENK	Georg	EESL