

IPCC Expert Meeting on the Future of the Task Group on Data and Scenario Support for Impacts and Climate Analysis

World Meteorological Organization, Geneva, Switzerland
26–27 January 2016

Meeting Report

Edited by:

Mxolisi Shongwe, Arame Tall, David Wratt, Timothy R. Carter, Bruce Hewitson, Christopher Gordon,
Christopher Hewitt, Albert Klein-Tank, Richard Moss, Judy Omumbo, Keywan Riahi,
Cynthia Rosenzweig, Roberto Schaeffer, Bruce Stewart, Maarten van Aalst, Carolina Vera



This meeting was agreed in advance as part of the IPCC workplan, but this does not imply working group or panel endorsement or approval of the proceedings or any recommendations or conclusions contained herein.

Supporting material prepared for consideration by the Intergovernmental Panel on Climate Change.
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IPCC Expert Meeting on the Future of the Task Group on Data and Scenario Support for Impacts and Climate Analysis (TGICA)

Geneva, Switzerland
26-27 January 2016

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Preface

The mandate of the IPCC Task Group on Data and Scenario Support for Impact and Climate Analysis (TGICA) is “to facilitate wide availability of climate change related data and scenarios to enable research and sharing of information across the three IPCC Working Groups”. In implementing this mandate, TGICA has since its establishment in 1996 made many important contributions to the work of the IPCC. However, during these twenty years the landscape in which TGICA operates has evolved considerably.

The IPCC at its 41st Session in Nairobi in February 2015 requested the IPCC Secretariat to undertake various activities to prepare for a revisiting of TGICA mandate at its 43rd Session in April 2016. These activities included organizing a meeting with the purpose of obtaining “input from relevant experts on the future role of TGICA in relation to the needs of the IPCC and in the context of an evolving landscape of climate change related data and scenario provision”.

This document is the report of this Expert Meeting, held in Geneva on 26 and 27 January 2016. The meeting brought together 57 invited experts from a wide range of organizations and countries. We thank these participants for engaging in a frank and productive series of presentations and discussions, and developing the key points and recommendations summarized in this report.

We are particularly grateful for the constructive guidance from the members of the Steering Committee in designing the programme for the meeting, and preparing supporting material for the meeting participants. These members worked tirelessly to produce the outputs summarized in this report. In particular, we thank TGICA Co-Chairs, Timothy Carter and Bruce Hewitson, for developing the “TGICA Vision” document and arranging for an institutional analysis of TGICA .

We also thank the staff from the IPCC Secretariat for making the practical arrangements for the meeting, and for their invaluable work in supporting the Steering Committee and the preparation of the meeting recommendations and report.

We hope this report will help guide a robust set of decisions about the future of TGICA and the DDC, for implementation through the IPCC’s Sixth Assessment Cycle and beyond.



Arame Tall
Steering Committee Co-Chair



David Wratt
Steering Committee Co-Chair

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Introduction

The IPCC Task Group on Data and Scenario Support for Impact and Climate Analysis (TGICA) was established in 1996 and comprises members with expertise and experience drawn from a cross section of research communities representing all three IPCC Working Groups (WGs). TGICA is mandated to facilitate wide availability of climate change related data and scenarios to enable research and sharing of information across the three IPCC WGs. TGICA oversees the IPCC Data Distribution Centre (DDC), prepares guidance material, and contributes to capacity building in developing countries and economies in transition.

By Decision [IPCC/XLI-4](#), paragraph 15, the Panel decided to revisit the mandate of TGICA at the 43rd Session of the IPCC. In preparation for the 43rd Session, the Secretariat was requested, in consultation with TGICA Co-Chairs, to update a vision paper prepared earlier by TGICA, taking into account views from scientists, IPCC Bureau, submissions from governments and IPCC observer organizations, and recommendations from an IPCC meeting of experts on this issue organized by the Secretariat.

The IPCC Expert Meeting (EM) was held in Geneva on 26 – 27 January 2016. The meeting was attended by 57 invited experts from a wide range of organizations and countries (Annex 4). Participants recognized many important contributions TGICA and the DDC have made to the work of the IPCC, and identified some areas that need improvement or change. The landscape within which TGICA operates has evolved considerably since its establishment, and in view of the fact that TGICA operates under a mandate that was last updated in 2003, participants welcomed the decision of the IPCC to revisit TGICA mandate at its 43rd Session.

Background documents made available to meeting participants included:

- Results from an institutional analysis of TGICA²;
- Results from the Data Distribution Centre (DDC) User Survey 2015³;
- The revised TGICA vision document (Annex 5 to this report); and
- Collated comments from Governments and IPCC Observer Organizations on the revised TGICA vision document⁴.

Building on the background documents, the meeting developed a set of key points that emerged from discussions in the plenary and in breakout group sessions on the future role of TGICA in relation to the expressed needs of the IPCC. The set of key points from each of the six breakout groups is attached as Annex 1. Topics addressed in the Breakout Groups were: a) archiving and provision of data, including the role of the DDC; b) provision of technical guidelines as IPCC supporting material; c) support for capacity building; d) partnerships with external organizations; e) collaboration within IPCC including facilitating interaction between IPCC WGs; and f) TGICA membership and resourcing.

The TGICA vision document (Annex 5), which was revised following comments from the 41st Session of the IPCC in Nairobi, in February 2015, was presented to participants and discussed during the EM. The vision paper highlighted three potential options for TGICA's future: 1) discontinue or severely curtail TGICA and discontinue the DDC; 2) maintain the status quo; 3) strengthen TGICA and upgrade the DDC. Of these options none of the meeting participants supported Option 1 (discontinuation), but the participants identified a variety of possible variants or combinations of options 1, 2 and 3.

Participants considered that, rather than selecting one of the three options in the vision document, a better approach would be to have TGICA undertake **a prioritization of activities based on a mapping of the needs of various**

² Vaughan, C. 2016. *An Institutional Analysis of the IPCC Task Group on Data and Scenario Support for Impacts and Climate Analysis (TGICA)*, International Research Institute for Climate & Society, Columbia University, 34 pp. (funded by the Government of Finland). Available on http://www.ipcc.ch/apps/eventmanager/documents/37/160320160231-INF.16_analysisTGICA.pdf

³ http://www.ipcc.ch/activities/pdf/exmot_doc3_%20ddc_user_survey.pdf

⁴ Available on http://www.ipcc.ch/apps/eventmanager/documents/37/150320160541-INF.18_SynthesisGov.pdf

functions and tasks in relation to available TGICA resources as will be determined by the Panel. This resourcing should consider the consequences to the IPCC's work of not supporting some activities, and take cognizance of TGICA's position in relation to other organizations providing related or complementary services.

Future of TGICA: Summary of Key Points and Recommendations

Future of TGICA: Summary of Key Points and Recommendations

Based on the discussions and expert contributions in the plenary and in breakout group sessions, and taking into consideration: 1) the evolving landscape within which TGICA operates; 2) results from the institutional mapping and DDC user survey which were carried out prior to the meeting; and 3) comments from Governments, IPCC Observer Organizations and academic institutions on the revised TGICA vision document, the following set of key points and recommendations were developed. Some activities under the key points are interrelated:

- 1) Continue TGICA and the DDC. While no formal consensus was established, the meeting chairs and Steering Committee believe it was the sense of the meeting that TGICA and the DDC should be continued to address high priority needs⁵ supporting the work of the IPCC and not being met through other organizations and activities. There was some convergence amongst participants that the current mode of work requires some modification.
- 2) Prioritize the internal needs of the IPCC. The primary emphasis for TGICA and the DDC should be on meeting the internal needs of the IPCC and to support the IPCC WGs in their scientific assessment work. To this end, the work of TGICA should be informed by needs emerging from the assessment and coordinated with the WG leadership. This support could include curation and provision of data and scenarios used in the assessment reports, providing timely general guidance to author teams on accessing and using the diversity of climate change data and information, and facilitating collaboration across WGs.
- 3) Acknowledge growing external information needs on issues related to climate change, recognizing that meeting such needs is contingent on resourcing and possible partnerships. There is an expanding demand from a broader range of users for information and guidance on how to access, interpret or apply observations, scenarios and other information emanating from the IPCC and elsewhere. This includes climate change related data, socioeconomic and environmental scenarios and other relevant information needed in the assessment of vulnerability, adaptation, and mitigation. This growth in demand occurs in the context of the changing landscape of providers and user needs. These include the development of the GFCS⁶, and decisions of the Parties to the UNFCCC⁷, including the Paris Agreement⁸. The mapping of needs will establish the meeting's view of priorities, and identify the possibility of information and guidance for assisting researchers and other users from some Developing Countries (DCs) and Economies in Transition (EITs). The meeting also identified opportunities for developing partnerships with external agencies.
- 4) Carefully examine current financing and support both for TGICA and the DDC. There are currently no assigned technical support resources for the overall TGICA operations moving into the IPCC's sixth assessment (AR6) cycle. In past assessments, TGICA received administrative support through one of the WG TSUs (equivalent to roughly 0.5 FTE⁹). The meeting participants identified a need of an equivalent of 1 FTE of support (approximately 150k USD) to continue TGICA's activities going into the AR6 cycle. They discussed the possibility to expand the support provided to TGICA, and a number of options for funding sources were discussed. The participants stressed that TGICA support should be considered while priorities and budgets for the future work of TGICA are being developed, for consideration in later IPCC Panel Sessions. Consistent with the sense of the EM that DDC operations should continue, a long-term and continuous funding perspective of staff and storage devices would be needed to ensure the desired high-level curation and support activities of the DDC. The participants acknowledged the generous support from three countries that

⁵ Presented in http://www.ipcc.ch/apps/eventmanager/documents/37/160320160232-INF.17_PriorityTGICA.pdf

⁶ Global Framework for Climate Services

⁷ United Nations Framework Convention on Climate Change

⁸ <https://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf>

⁹ Full time equivalent

have provided in-kind support for the DDC operations during the AR5, and invited them to continue current support as priorities are established. Of course, they may wish to revisit their contributions as the AR6 cycle begins. In recognition of the need to distribute these costs more widely, participants suggested that the IPCC should seek support for DDC operations from a wider base of countries, and particularly encourage countries which did not yet provide support to contribute, and other funders to sustain DDC operations at an appropriate level and without affecting the independence of the IPCC. An analysis of the different funding scenarios vis-à-vis corresponding TGICA work plans, operations and structures, highlighting the likely losses and risks associated with the low-resource scenario, and vice versa, need to be undertaken. This may provide some useful insights to the governments when they make their decisions on the future of TGICA and the DDC.

- 5) Consider balancing resources for TGICA and the DDC in line with their respective tasks and functions. Meeting future internal needs and external demands could require an increase of resource needs for TGICA and the DDC, or an equivalent new structure, depending on the Panel's decision on their future activities. In considering which activities to support, consideration should also be given to co-dependencies between activities to understand what the implications of reducing or expanding resources on one priority may have on other priorities. Some of the activities undertaken to meet internal IPCC needs will also inherently assist external users (and vice-versa).
- 6) Future activities of TGICA and DDC. A mapping of TGICA's potential functions and tasks in relation to resource needs (both human and financial) is needed to inform the Panel appropriately in its decision on the future work of TGICA.

Detailed Considerations underpinning the Key Points and Recommendations

- 1) Mapping IPCC internal needs, external demands and the landscape of associated providers. Some of the country comments on the vision document suggested that TGICA should undertake various mapping exercises, to better identify the needs for TGICA and DDC activities and products, and other significant providers of related material. The EM participants recommended the undertaking of these mapping processes to assist with identifying needs and gaps which TGICA and DDC are ideally suited to meet, and assist with the recommended prioritizations. Three mapping exercises are desirable: 1) a mapping of internal IPCC requirements; 2) a mapping of significant non-IPCC user requirements; and 3) a mapping of other significant institutions that provide information related to climate change data or scenarios.
- 2) Principal TGICA and DDC activities to meet internal IPCC needs. It is noteworthy that all the points mentioned require close collaboration with the WGs. Depending on their position in a potential mapping and prioritization process and on availability of funding, these include:
 - Curating, delivering and archiving (or linking to) climate and related emissions, socio-economic and environmental data, projections and scenarios from past and present IPCC assessment cycles;
 - Support for WGs and their authors through hosting and provision of projection data from CMIP6^{10,11}, which could be done in consultation between WGs, particularly the TSU of WGI and the DDC at DKRZ¹² and with the approval of the WGCM¹³ Infrastructure Panel (WIP);
 - Easing access for users from developing countries, e.g. IPCC authors or researchers contributing to IPCC assessments. This could be done by developing capabilities to run analyses remotely on DDC servers and/or to deliver large datasets on DVDs or other media;

¹⁰ The Coupled Model Intercomparison Project Phase 6

¹¹ This new DDC activity depends on the realization of the German National Climate Data Archive, which has been listed as one of the key requirements within the national strategy.

¹² Deutsches Klimarechenzentrum

¹³ Working Group on Coupled Modeling

- Developing good practice guidance material (especially on topics that cross different areas of expertise covered by IPCC assessment reports) for IPCC authors and researchers on the use of data and scenario information, including the integration of multiple scales of global and regional information. Some guidance material would usefully be developed in conjunction with IPCC Expert Meetings or Workshops; and
- Facilitating collaboration and integrated activities across WGs, in close consultation with WG Co-Chairs.

More detail is provided on this in Annex 1 covering key points from Breakout Groups A, B, C and E.

- 3) Potential extended TGICA and DDC activities for internal IPCC needs. It is worth noting that all the points mentioned require close collaboration with the WGs. Depending on their position in the mapping and prioritization process and on availability of funding, these include:
- The possibility to produce a data registry used to produce figures in at least the IPCC WG and Synthesis Report Summaries for Policy Makers, and perhaps also for further figures in the WG reports;
 - Some meeting participants suggested that the DDC could also host high resolution data from regional climate models such as those participating in the CORDEX¹⁴ project; and
 - Others suggested compiling and broadening access for use in IPCC assessments to well documented data sets of derived climate variables needed for impacts and adaptation analysis (e.g., time series of regional averages/extremes, variables related to fire risk, heat stress, flooding, changes in disease vectors).
- 4) Activities for TGICA collaborations with “external” users identified as “desirable” by the EM. Depending on their position in the mapping and prioritization process and on availability of funding, these include:
- Facilitating the usage of data underlying the IPCC assessments and scenarios to “external” users such as National Meteorological and Hydrological Services, other government agencies and consultants from the global to the regional/national levels. This would be a co-benefit of work done to ease access for IPCC authors and climate researchers from developing countries;
 - Working in collaboration with WGs to enhance the traceability of data used in IPCC Assessment Reports;
 - Serving as an authoritative and trusted go-to place for scientific data used in the IPCC assessments, and ensuring quality assurance for external users to access the best available climate science (continuing to help establish good practices);
 - Supporting capacity building¹⁵. This is a narrowly focused activity. It would not involve establishing conventional programs of training, but may engage in such opportunities if they arise. Primarily, the support would focus on the users of the underlying data and the outputs of IPCC assessments in a multi-disciplinary context. Already identified clients for such support internally are authors of assessments on topics that are cross-disciplinary or cross-WG, and externally, are representatives of government departments and university researchers. Support is also desirable in the frontier area of climate and socioeconomic data integration, for informing both regional impact assessments and the development of tailored regional climate services (and see points in Annex 1 under Breakout Groups A and C); and

¹⁴ Coordinated Regional Downscaling Experiment

¹⁵ Capacity building is a term with a very broad set of interpretations. In this context the term refers primarily to the development of materials and resources that can be used by IPCC authors and by other organizations in their activities. It involves raising awareness on critical topics and providing access to relevant skills, and is not prescriptive of practices. In the context of this document, capacity building does NOT refer to extensive and labour-intensive workshop programmes, but does include the mandated options of TGICA to hold expert meetings and provide guidance material.

- Facilitating delivery of the IPCC assessment reports and outputs needed to support climate services without having to advise policy-makers or deliver operational climate services, which is not TGICA's mandate but is rather the role of organizations such as the GFCS.
- 5) Development of guidance material. Several target audiences for guidance material were identified, both within the IPCC, and externally. Within the IPCC, authors of assessments and researchers feeding into assessments are primary targets. For external users, the meeting considered that priority targets should distinguish between "next level users", who make immediate use of IPCC products and DDC data in support of their further activities, and the extensive diversity of what may typically be termed "end-users". This will be reliant on resource-appropriate opportunistic engagement or partnerships with other organizations already active in the sphere of climate services, and climate change outreach. More detail is provided in Annex 1 under the key points from Breakout Group B.
 - 6) Partnerships. Partnerships have been vital to TGICA's activities to date, and further expansion of partnerships is highly desirable to bridge between the internal foci of TGICA's IPCC activities and the activities of external agencies which IPCC both serves and depends on. There are two types of important partnerships: 1) partnerships with organizations which provide or stimulate products used in IPCC assessments, such as climate projections, socioeconomic scenarios or impact model inter-comparisons. Example organizations include WCRP¹⁶ (overseeing CMIP and CORDEX), PROVIA¹⁷, IAMC¹⁸, ICONICS¹⁹, IPBES²⁰, Future Earth, and UNFCCC bodies; and 2) partnerships with organizations delivering climate change data and information including UN Agencies, regional governmental organizations, and non-governmental organizations. In particular, it was suggested by one keynote speaker that the IPCC could establish a formal agreement on cooperation with the GFCS. Further consultation is desirable between TGICA Co-Chairs and IPCC WG Co-Chairs over which partnerships are best led from within WGs, and which are best facilitated by TGICA. Participants identified EMs and Workshops as useful mechanisms.
 - 7) Nomination and selection of TGICA Co-Chairs and members: EM participants noted the desirability of continuing to align the nomination and selection process for TGICA with the IPCC assessment cycle, of canvassing wide input for nominations (including considering names from IPCC Lead Author country nominations), and of transparency in the selection process of TGICA Co-Chairs. It is recommended that a flexible process be established for replacing members who withdraw, do not contribute appropriately or are unable to participate in TGICA for other reasons part-way through a cycle. Further information on this is provided in Annex 1 under Breakout Group F.

¹⁶ World Climate Research Programme

¹⁷ The Global Programme of Research on Climate Change Vulnerability, Impacts and Adaptation

¹⁸ Integrated Assessment Modeling Consortium

¹⁹ International Committee On New Integrated Climate change assessment Scenarios

²⁰ Intergovernmental Platform on Biodiversity and Ecosystem

Summaries of Plenary Presentations and Discussions

Summaries of Plenary Presentations and Discussions

The Expert Meeting featured a series of plenary sessions and breakout group sessions. Annex 3 of this meeting report presents the agenda which was subdivided into six plenary sessions and two breakout group sessions. The plenary sessions featured thematic oral presentations as single contributions or contributing to a panel, followed by brief question and answer exchanges and a general discussion. Plenary presentations and subsequent discussions are summarized below.

Opening session

The meeting was officially opened by Mannava Sivakumar, Acting Secretary of the IPCC. In his opening remarks, Mr Sivakumar welcomed the participants on behalf of the WMO²¹ Secretary General and the IPCC Secretariat. He expressed his appreciation to the Steering Committee under the leadership of Co-Chairs David Wratt from New Zealand and Arame Tall from Senegal for the enormous amount of work done in preparation of the EM. He also thanked TGICA Co-Chairs Timothy Carter and Bruce Hewitson and the entire membership of the Task Group for their excellent contribution since May 2011 when the two Co-Chairs were appointed. He mentioned that the IPCC is now at a crucial moment in preparation of the sixth assessment cycle (AR6) which officially started with the election of the new IPCC Bureau in Dubrovnik in October 2015. The IPCC will soon be starting the AR6 scoping process, the nomination of authors and the refreshment of TGICA membership whose structure will depend on the Panel decision on the future of TGICA which is expected to be made at the 43rd Session of the IPCC (IPCC-43) in Nairobi from 11 – 13 April 2016. He reminded participants of TGICA's mandate which is to facilitate the wide availability of climate change related data and scenarios for application in research and information sharing across the three IPCC WGs noting that a lot has changed with regards to the needs for data, scenarios and related products since TGICA was established in 1996 and that the size and diversity of the user community have also increased considerably. It is against this backdrop, that TGICA Co-Chairs submitted a discussion document to the Panel at its 41st Session in which they highlighted challenges and opportunities, and mapped a long-term vision for TGICA and the DDC, including some alternatives. Mr Sivakumar emphasized that the IPCC and TGICA are faced with a continuously evolving landscape of initiatives and organizations handling and disseminating climate change related data and scenario information which raises a critical need for authoritative and objective support. In relation to this need, he mentioned that the TGICA vision document recommended that the operations of TGICA be strengthened through creation of a dedicated programme support position and also proposed that resource allocation for the DDC be increased to account for a growing set of demands for data and scenario archiving and preparation of new documentation and guidance required by an expanding worldwide user community. After reminding participants of paragraph 15 of Decision [IPCC/XLI-4](#) (also stated in the introduction paragraph of this meeting report), Mr Sivakumar stated the purpose of the EM which was "to obtain input from relevant experts on the future role of TGICA in relation to the needs of the IPCC and in the context of an evolving landscape of climate change related data and scenario provision." To achieve the purpose, the Steering Committee of the Expert Meeting, which was formed by the Secretariat in October 2015, identified the meeting participants who are experts in their own field and represent TGICA membership, representatives of national governments, representatives of leading science and research organizations, and those engaged in climate services, climate research, impacts and adaptation. He mentioned that during the process of identifying participants, efforts were made to achieve a balanced representation of geography, gender, and sectors, with strong inclusion of DCs and EITs, something which is quite difficult in practice. He expressed his confidence that the expertise represented in the meeting would help achieve the meeting objectives. Regarding the IPCC expectations from the meeting, he urged participants to provide clear and concise messages that will inform governments on the relevance and needs of the Task Group and the DDC to help address data and scenario needs of users of IPCC products and to help fill existing gaps within and across IPCC WGs and the whole IPCC community, information that will be used in conjunction with other supplementary materials (e.g. the government responses) to revise the vision document which will form the basis for decisions on the future of TGICA

²¹ World Meteorological Organization

at the IPCC-43. Mr Sivakumar concluded by thanking all the key role players in the preparation of the meeting and in the operations of TGICA and the DDC for their support and contribution during the AR5 cycle, speakers and panelists and all participants who accepted the invitation including those who received their invitations at a short notice.

In her opening remarks, Arame Tall, Co-Chair of the Steering Committee of the EM welcomed the meeting participants noting that the rich programme has been prepared in an endeavor to achieve the meeting objectives. She emphasized the importance of data for deriving products and services which are applied by society and decision makers. Noting the importance of data accessibility, she urged participants to raise challenges encountered with data access in their different regions, in order to stimulate discussions which would potentially identify strategies for overcoming such barriers.

David Wratt, Co-Chair of the Steering Committee thanked the Acting Secretary of the IPCC for his comprehensive introduction, the Steering Committee and the participants for attending the meeting, particularly those who had to find alternative routes to avoid the effects of the snowstorm in the north-eastern United States. He informed participants that the programme had to change slightly because of flight cancellations which affected certain speakers and panelists who were flying through Washington DC and New York and was hopeful that some speakers would still be able to participate online. He reiterated the purpose of the EM and also emphasized that the key points and recommendations from the meeting in conjunction with revised vision paper and other complementary materials will form the basis for the Panel decisions on the future of TGICA at IPCC-43. He requested the participants to formulate clear suggestions and recommendations in order that their input in shaping the future of TGICA would be effective. He also informed participants that the main outputs expected from the EM included: 1) findings, suggestions and key recommendations, which will form the basis for the report to the 51st Session of the IPCC Bureau and the IPCC-43; 2) a lengthier EM report, which will summarize the discussions, and will contain the supporting material that was prepared for the meeting and the set of key points and recommendations. This document will be published on the IPCC website; and 3) a revised vision document, which will incorporate findings and recommendations from the EM. To conclude, Mr Wratt elaborated on the structure of the EM programme, comprising three main parts. The first part of the meeting would set the scene by presenting the history and context of TGICA to provide the necessary background information to those participants who were potential stakeholders but either had not heard about TGICA before or had not yet been involved in the activities of the Task Group. He advised presenters who were more knowledgeable about TGICA to be considerate of participants who had little or no knowledge of the activities of the Task Group. The second part of the meeting would review and assess the landscape within which TGICA and the DDC operates. Finally, the third part would be dedicated to formulating a synthesis of key points and recommendations from the EM.

Plenary Session 1: The Background and Context of TGICA and the DDC

The history of TGICA and its current activities were presented by Timothy Carter, TGICA Co-Chair. In his presentation, he mentioned that after the completion of the SAR²² in 1995, it was recognized that data and scenarios were not well organized for IPCC Assessments. At an IPCC workshop held in London in September 1996, it was recommended that the IPCC establish a Task Group to focus on the provision of the necessary data to the impacts community in time for the TAR²³ and on capacity building for future IPCC assessments. The initial thought was for the Task Group to focus on regional climate projections and the group was named accordingly although this was changed a year later, in 1997, and the group became the “Task Group on Climate Scenarios for Impact Assessment (TGICIA)”. The group name was revised again to its current form in 2003. The first group meeting in May 1997, under the Chairmanship of Martin Parry, recommended that: there should be inventories of impact studies and climate model runs; climate scenarios should be made available through a Data Distribution Centre; guidance material should be developed to facilitate the use of scenarios; and a training package should be developed to support scenario activities. The DDC was launched in 1998 and was tasked to provide observed climate data, climate model projections, socio-economic baseline and scenario data, other environmental information such as atmospheric composition and sea level changes, and supporting documentation and guidance material. The first two groups who were involved in running the DDC were the Climatic Research Unit (CRU) in Norwich, UK and the DKRZ in Hamburg, Germany. CIESIN²⁴ based in New York, USA joined the management of the DDC in 2000. Currently, the DDC is jointly hosted by the BADC²⁵ which took over from CRU in the UK, DKRZ and CIESIN. TGICA has produced a set of technical guidelines on the use of data and scenarios, particularly for use in impacts and adaptation assessments. Some of the guidelines, which are considered as IPCC supporting material, are available on the DDC website while others have been published in peer-reviewed journals. During the preparation of the TAR and subsequently, the Task Group promoted the coordination of climate modelling activities across WGs and the archiving of information which could be used by the climate research community. In 2002, Martin Parry stepped down and Richard Moss became the Group’s Acting Chair in 2003, the same year the new name and mandate²⁶ were approved. Considering that the group is mandated to facilitate wide availability of climate change related data and scenarios to enable research and sharing of information across the three IPCC WGs, within the IPCC structure it locates itself across the WGs and also between the WGs and authors, reviewers, contributors and various users of data and scenarios, and oversees the DDC. After the approval of the new mandate, the group was reconstituted in 2004 when Jose Marengo and Richard Moss were appointed Co-Chairs. The group membership was refreshed in 2009 although the two Co-Chairs remained until 2011 when they both stepped down and were replaced by the current Co-Chairs. They have led the group through several milestones which include: the production of guidance material on sea level scenarios; initiating TGICA teleconferences; approval of a number of governance documents for the DDC and the linking criteria for linking data outside the DDC; promoting liaison with relevant external bodies such as PROVIA and the GFCS; providing input to the CMIP6 process; organizing meetings and regional sessions in a number of countries around the world who have interest in data and scenario provision, and engaging local stakeholders as part of the capacity building mandate; preparation and revision of the draft vision document; preparation and approval of the DDC Glossary; soliciting user feedback on the DDC through an online user survey; and long-term archiving and dissemination of CMIP5²⁷ climate model output at the DDC, and other climate data which was used in past IPCC Assessment Reports.

The vision of TGICA was presented by Bruce Hewitson, TGICA Co-Chair. He concurred with previous speakers that the landscape and needs have evolved significantly since the time the IPCC was established and the main challenge is how best to meet these evolving needs. Before discussing the vision document Mr Hewitson presented some high level

²² IPCC Second Assessment Report

²³ IPCC Third Assessment Report

²⁴ Center for International Earth Science Information Network

²⁵ British Atmospheric Data Centre

²⁶ Available on <https://ipcc.ch/pdf/activity/tgica-mandate.pdf>

²⁷ Coupled Model Intercomparison Project Phase 5

messages from decision-makers who participated in the TGICA EM²⁸ held in June 2015, which were: 1) a troubling disconnect between climate change research and the complicated context of decision making; 2) a need to clearly map the unique value of the IPCC information in relation to user contexts; 3) a continued need for context-relevant guidance on accessing and applying climate change-relevant information; 4) a strong need for smaller (information-based) products that complement the larger Assessment Reports; and 5) greater knowledge sharing (co-production) with other relevant organizations to enhance the collective resource value available to decision makers. He disclosed that the group is currently focusing on reaching closure of existing activity streams, maintaining momentum on the discussion items of importance to TGICA ahead of the AR6, and preparing the groundwork of possible future activities contingent upon the decision to be taken at IPCC-43 on the future of TGICA. He summarized the key areas which have to be addressed to meet the evolving needs into: 1) Resource and capacity, which relates to the fact that the group operates with intermittent technical support which was offered by the WGII TSU²⁹ during AR5, and that the DDC is currently operating at maximum capacity which makes it almost impossible to resource new additional activities. These resource needs should be addressed in a timely manner with whatever entity takes the work forward, to avoid gaps in operations; 2) Mandate and scope, which relates to the evolving landscape in which TGICA operates, requiring a realignment of the group's activities (while maintaining the unique position it occupies as an IPCC activity) in a manner that is non-partisan, spans WG domains of foci and best facilitates the appropriate adoption and use of IPCC outputs; 3) Internal role within IPCC, which refers to facilitating cross-WG dialogue and sharing of materials to enable a cohesive preparation of assessment products, backed by the need for long-term curatorship and quality control of the reference data underpinning assessments. Guidance material for authors is also required to raise awareness on key issues that are not within their normal domain of expertise, something that can be of great benefit to developing country authors; and 4) Role with organizations external to the IPCC, which relates to the need for IPCC's engagement with organizations such as WCRP and PROVIA to enhance their contribution to IPCC assessments as well as the use of IPCC products in their own work. Finally, Mr Hewitson discussed the three options laid out in the revised TGICA vision document, cautioning that there could be several other alternative options. One option is to discontinue or severely curtail TGICA and discontinue the DDC. The implication of this option would be that the TGICA mandate would require a substantial alteration, TGICA will be limited to the preparation of guidance material and support for capacity building and transferring the DDC to TSUs would have challenges with regards to continuity because of the transitory nature of TSUs. The second option is to maintain the status quo. The concern associated with this option is that the volunteer members of the team and resource limitations preclude the group from delivering optimally on its mandate. The third option is to strengthen TGICA and upgrade the DDC. This option would require careful consideration of the nomination process to refresh membership, setting priorities for the DDC and establishing a support structure for the group that would enable continuity and sustainability.

During the ensuing discussion TGICA Co-Chairs were requested to detail the current membership of the group. In response, it was shown that the group has about twenty members and about eight ex-officio members. Members are: Timothy Carter, Finland (Co-Chair); Bruce Hewitson, South Africa (Co-Chair); Daniel Bouille, Argentina; Stewart J. Cohen, Canada; Suraje Dessai, UK; Mariane Diop-Kane, Senegal; Seita Emori, Japan; Kejun Jiang, China; Volker Krey, Austria; Won-Tae Kwon, South Korea; Jason Lowe, UK; Francisco Meza, Chile; Andy Reisinger, New Zealand; Fredrick Semazzi, USA; Allison Thomson, USA; Rachel Warren, UK; Arthur Webb, Fiji; and Fernanda Zermoglio, Sweden. Most of these members were part of the group during AR5 while some joined during the previous assessment cycle. A few requested to step down but were persuaded to continue but had their commitments reduced. It was mentioned that ideally, the membership of the Task Group should be refreshed more regularly than the duration of an assessment cycle to keep members motivated. However, membership refreshment is an involved process requiring government nominations. It was mentioned during the discussion that difficulties were encountered during the reconstitution of TGICA because several governments could not submit nominations for appropriate individuals to serve

²⁸ IPCC TGICA Expert Meeting and Clinic: "Decision-centered approaches to the use of climate information" 30 June – 2 July 2015, Lamont campus, Columbia University, New York, USA

²⁹ Technical Support Unit

in the group. Ex-Officio members who include Heads of TSUs and DDC Managers are: Martin Jukes (DDC, BADC); Martina Stockhause (DDC, DKRZ); Robert Chen (DDC, CIESIN); Gian-Kasper Plattner (IPCC, AR5 WG I TSU); Michael Mastrandrea (IPCC, AR5 WG II TSU); Jan Minx (IPCC, AR5 WG III TSU); Karl Taylor (PCMDI³⁰); and Xianfu Lu (UNFCCC). Apart from the heads of institutions which support TGICA and the DDC, there are other individuals who make substantial contributions in support of the group within these institutions.

The implications for the TGICA mandate of the current focus on climate services and the emergence of organizations offering these services was discussed. In the institutional analysis report there is a section covering the topic of climate services and information portals. More discussion was deferred to the breakout group session.

TGICA Ex-Officio member, Xianfu Lu, who represents the UNFCCC in the group, presented on TGICA's role in capacity building. In her presentation, she highlighted the need to build capacity, particularly in DCs and EITs to enhance the understanding of climate risks at all levels and in different systems and also for action-oriented climate risk management decisions and practices. She showed examples illustrating the increasing interest in science to inform decisions arising out of the Paris COP21³¹, involving private sector businesses and the financial sector. She suggested that TGICA may need to: locate its own niche from the large group of providers of similar kind of capacity building activities and services; shift from developing only research-oriented guidance material and expert meetings to include decision-oriented guidance for practitioners by sector or region and continue to engage them in expert meetings; enhance the provision and uptake of actionable climate data and scenarios, particularly within the context of a post-Paris action dominated global climate regime; and build sustainable strategic partnerships to maximize the benefit of the group's capacity building efforts.

During the discussion session, the World Bank Africa Region participant endorsed the presentation on capacity building and mentioned some projects the Bank is supporting in Africa, particularly on assessing the impacts of climate change on long-lived infrastructure development on the continent. These assessments will provide the scientific basis for a multi-billion investment plan for the next decade or so. He also reported that the African Union has requested the Bank and the UNECA³² to continue with capacity building efforts within the region and also that they are developing a facility for climate resilient investment planning. He identified an opportunity for partnership with TGICA in capacity building with a focus on end users and practical application of scientific information.

On the TGICA user context, the discussion addressed the possible niche for the group to undertake an objective assessment and provide guidance to professional bodies, decision makers and other practitioners on what kinds of information are suitable for various sectoral and regional needs and applications. TGICA, because of its breadth of exposure and coupling to the robust science contained in the assessment reports, is suitably positioned to make authoritative statements and provide clear guidance to inform confusing decision areas.

It was also highlighted that some authors, even CLAs³³ in AR5, had very little or no interaction with TGICA and therefore there is a need to have a clear plan in future on how authors could use the products and guidance from the group, including a more visible role in facilitating cross-WG dialogue and collaboration. It was pointed out that the cross-WG structure of TGICA membership is designed to facilitate dialogue, as was the case during the development and application of scenarios leading to AR4, contributing to the discussions on appropriate model simulations prior to the CMIP era, in facilitating dialogue between the climate modelling and integrated assessment modelling communities and in providing guidance on the application of scenarios by the IAV community. Although the development of scenarios is currently done outside the IPCC, TGICA still has a crucial role to play in reflecting on the scenario development process within the research community and other cross-cutting issues. Resource limitations were cited as a primary constraint which determines the extent to which TGICA could interact with IPCC authors at all levels and establishing collaborative partnerships with other relevant external organizations.

³⁰ Program For Climate Model Diagnosis and Intercomparison, which co-ordinated and hosted CMIP5 data

³¹ 21st UNFCCC Conference of the Parties

³² United Nations Economic Commission for Africa

³³ Coordinating Lead Authors

Plenary Session 2: Perspectives and Needs in Supporting Internal IPCC Activities

The introductory presentation, by Bruce Hewitson, offered a TGICA view of needs in supporting IPCC activities. He provided clarity that TGICA is not essentially a service provider which means that the group is not serving as a data portal or attempting to provide climate services but is uniquely positioned to support service providers and the research community. He highlighted three broad areas of need that TGICA should address internally within the IPCC, which cannot be done by any of the external organizations such as GFCS and Future Earth. These areas include: facilitating, supporting, and informing internal cross-engagements within the IPCC and its assessment processes, particularly across WGs on issues such as the use of scenarios and regional climate information; presenting a framing of key concepts and understanding for authors assessing the literature, in order to address the apparent lack of consistency and understanding across WGs; and providing a reference on issues and topics to frame the actions of external communities in both developing research activities and adopting IPCC information products. Specific gaps that could be filled by TGICA include: 1) Provision of information at the regional or decision scale, recognizing that while each WG contributes information relevant at the regional level, messages may not always be consistent across WGs and TGICA's multi-WG membership is suitably positioned to bridge different views and facilitate the formulation of consistent messages across WGs; 2) Developing frameworks for authors to evaluate and incorporate data and information resources provided by external institutions and organizations to increase the cohesion of the assessment across the report; 3) Providing a cross-WG perspective in the collation and curatorship of source materials which underpin key messages in WG reports and the Synthesis Report; 4) Enhancing the participation of developing nation authors in the IPCC assessment process by addressing the large disparity of capacity between nations and authors, which raises challenges in reaching consistent treatment of topics; and 5) Facilitating a dialogue on scenarios between WGs on their interpretation, use and assessment.

TGICA's role from a WGIII perspective was presented by Volker Krey, a member of the Task Group who was also a Lead Author in WGIII AR5. Highlighting WGIII experience in handling data sets, he mentioned the historical data base, also known as the data spine, which archives data from different sources on emissions, land use and the economy, and emission scenario data from integrated studies involving about 1200 scenarios from 31 models. These data were used across many chapters of WGIII AR5 to ensure consistency. The scenario data are community managed based on an agreement between the WGIII TSU, IAMC and IIASA³⁴. His ideas for TGICA's future role include: improving the scientific credibility of the IPCC by providing transparent access to information used in assessments which may entail fully documenting the assessment cycle from primary data through underlying methods to figures that underpin key messages in the reports, something which has been stressed by the Inter-Academy review of IPCC; providing information on cross-WG issues (e.g., "new" scenarios process); and coordinating with authors to prepare and provide guidance material on good practices to avoid misuse of data sets (e.g., emission scenario database). He concluded by suggesting that TGICA members be co-appointed with AR6 author teams to avoid duplication of processes and a disconnect between coordination within TGICA and the WGs.

During the ensuing discussion it was revealed that in AR5, cross WG collaboration, particularly between WGI and WGIII on the use of scenarios was at author level with or without the facilitation of the TSUs. The author collaboration was viewed as successful as evidenced by the team spirit which prevailed during the preparation of the Synthesis Report. A concern was raised regarding the proposal to document the primary data, provide the analysis methods and scripts, and the resulting figures for the whole assessment report. For instance, in WGI AR5 experience with a total of about 1200 figures, primarily because of Annex I: the Atlas of Global and Regional Climate Projections, the task would be quite big. In WGIII AR5, with approximately less than 150 figures in the entire report, efforts were made to document the data which used the scenario database to produce figures.

WGI Co-Chair Valérie Masson-Delmotte emphasized the need to strengthen the traceability, transparency and accessibility of WGI primary data such as historical observations, process studies, detection and attribution, and model evaluation and projections amongst the authors and reviewers and distribute the data broadly after the completion of the assessment. She also expressed her expectation of an increased focus on regional information and output

³⁴ International Institute for Applied Systems Analysis

from regional climate models and downscaling, an area which had been mentioned as an opportunity for TGICA to bridge the different views across WGs. She recalled a recommendation from the IPCC Workshop on Regional Climate Projections and their Use in Impacts and Risk Analysis Studies for parallel atlases for WGI and WGII on regional climate information. She proposed that the simulation archive be somewhat 'frozen' to enhance the traceability of the relevant data, strengthening the documentation of figure recipes with links to enable public access to data sources, and clarifying the role of the TSUs and other bodies internal (e.g. TGICA) and external (e.g. WCRP) to the IPCC. She emphasized the need to strengthen the integration across WGs and TSUs in a simple and pragmatic manner while enhancing the response time within each component in the overall structure. She concluded by posing a question re-emphasizing the need to clarify the strategic contribution TGICA and the DDC would make during AR6, both within WGI and across the three WGs, and also the role of TGICA vis-à-vis the WG TSUs.

Another WGI perspective was presented by Panmao Zhai, WGI Co-Chair. He appreciated the contribution TGICA and the DDC have made by providing a wide availability of climate change related data to the research community in China. He expressed the need for TGICA to play a coordination role to minimize the likelihood of WGI authors needing to approach research institutes and operational centres individually for their data and scenario needs, and also to coordinate data requirements across WGs.

Hans-Otto Pörtner, WGII Co-Chair, suggested that TGICA should strengthen its role within the IPCC, *inter alia*, through promoting cross-WG collaboration instead of this being amongst individual authors as was mainly the case during AR5, and for TGICA expertise to become more easily accessible to users, particularly authors across the three WGs to provide guidance on the use of scenarios and other cross-cutting data and information. Noting that the WGII community is broad and has a very diverse expertise, the authors are not usually trained to communicate amongst themselves, a shortcoming those involved in the facilitation of collaboration and integration should attempt to address.

Debra Roberts, WGII Co-Chair, suggested that TGICA may consider developing a roadmap that will to some extent identify how to assist the IPCC meet the demands expected under a post-Paris climate world. She made an example of how cities are not currently adequately simulated in low-resolution climate models yet they are recognized in the Paris agreement. TGICA can play a role in providing guidance on the application of models and other tools used to produce policy relevant information for cities. The group can also play a role in helping the IPCC coordinate more effectively with the data infrastructure that will emerge around sustainable development goals (SDGs) over the next few years.

During the subsequent discussion, the need for TGICA to improve the facilitation of cross-WG collaboration at all levels was emphasized, as pointed out by a number of previous speakers, and also the observation that almost all current Co-Chairs in the panel were unaware of the activities of the group despite their previous role as CLAs and LAs in AR5. A suggestion was made to make a presentation on TGICA during the Lead Author Meetings (LAMs) to sensitize the author teams about the roles and activities of the group. Regarding the transparency and traceability of data used to produce figures in assessment reports, it was noted that while this may be a huge task, the group can draw from lessons learnt in the USA National Assessment. It was acknowledged that the Paris agreement demonstrated an increasing awareness of the need for policy decisions informed by the best available science. The invitation extended to the IPCC to prepare a Special Report on 1.5°C demonstrates the seriousness with which the UNFCCC considers the scientific information produced by the IPCC, and the commitment to a periodic global stocktake of actions may also require the IPCC to align its activities accordingly.

The concern related to resource availability to support the future mandate of TGICA subject to the decision to be taken at the IPCC-43 was raised. Related to this are the difficulties encountered by countries to resource TSUs for AR6 which could indicate that resource availability might limit future TGICA activities to address the gaps and opportunities identified during the Expert Meeting. It was also observed that TGICA has had some difficulties to maintain the active participation of all its members during the last assessment cycle, which warrants consideration of the reasons and formulation of possible remedies in the future.

The history and needs for Technical Guidelines produced by TGICA was presented by Timothy Carter. People involved in carrying out assessments are often bewildered by the ever-increasing availability and diversity of climate-related data, information, terminologies and scenarios and require guidance on how to understand and interpret these. Technical

Guidelines and their variants (i.e. fact sheets and FAQs³⁵) are developed by TGICA as part of its mandate to indicate the types and format of data and scenario information available, to suggest methods for accessing, selecting, applying, interpreting and presenting such information, and to provide good practice examples and tools. In recent years, formal procedures for preparing guidance documents have been developed which guide authors in defining their target audience and determining the length, structure and format of the document. To ensure that the technical guidelines are robust and supported by the available science contained in IPCC assessment material, the group has developed a formal review process in consultation with the WGs, which the documents undergo before their final approval and publication. Examples were shown of several technical guidelines that the group has developed in recent years, and an illustration of certain guidance documents which have been updated more than once such that on the use of scenario data for climate impacts and adaptation assessment, which was updated in 2007 with a third version already in preparation. If TGICA retains the mandate to develop guidance documents, the group would like to address and/or focus on the issue of identifying target audiences, prioritising topics, author recruitment and participation, publication modes, capacity building and technical support (which has been sporadic in the past).

Experiences with guidance documentation in the context of Small Islands was presented by Arthur Webb, a member of TGICA who was a Lead Author in Chapter 29 of WGII AR5. He cautioned that TGICA's mandate to contribute to capacity building in the use of data and scenarios for climate-related research raises expectations which might not be met with the current resources available to the group, particularly considering that a few if any of the South Pacific Small Islands have benefited from TGICA capacity building activities in the past. He mentioned that the tropical Pacific Islands region does not have established climate modelling capacity, but relies on neighbouring developed countries for model-based projections, which make them unlikely to be direct users of TGICA/DDC products. In the Caribbean region, however, the awareness about TGICA appears to be higher and the research community there has used DDC products, including the guidance documents produced by the group. Small Islands in the Indian Ocean region (e.g. Maldives) appear to have an intermediate degree of interaction with TGICA. He highlighted the need for TGICA, contingent on availability of resources, to expand its work in the small islands by producing guidance material on topics such as coastal erosion, and advice on applying data and scenarios for impacts and adaptation, because the group's success would hinge on the appropriateness of products to local needs and audiences.

It was made clear during the discussion that in the preparation of guidance documents, TGICA does not undertake new research but relies on information contained in IPCC assessment reports. Guidance documents commonly refer to case studies where the methods and tools that are described have been successfully applied.

³⁵ Frequently Asked Questions

Plenary Session 3: Serving Data to User Communities and Curating IPCC Data and Data Sources

Martin Jukes, DDC Manager from CEDA³⁶, presented the UK contribution to the DDC. The CEDA is a data centre for the UK atmospheric science research community funded mainly by NERC³⁷, the European Commission, the European Space Agency and the UK Department of Energy and Climate Change. The main data sources are UK Universities, the UK Met Office, research aircrafts, space missions and international programmes such as CMIP. They have recently established a data storage and analysis system which enables users to login remotely and perform some data analysis on the remote server. As part of a brief history, he mentioned that the DDC was founded in 1997 by the CRU in partnership with DKRZ and CIESIN (which joined in 2002). In 2007, the BADC which is now part of CEDA took over the UK component of the site. The site layout of the DDC between the three host institutions has recently been reorganized according to observations, model simulations, a synthesis of observations and simulations, and guidance documents. The UK role is mainly maintenance of core pages, climatologies of observations and climate model output, running the user support and user survey, performing regular checks of links, backing up the DKRZ CIMP5 archive, providing a standard web visualization page, preparing a DDC glossary consistent with that prepared by the three IPCC WGs for the AR5, providing data sets defining the regions that were used in Annex I of WGI AR5, hosting a regional extremes database taken from AR5, and installing software to perform some data analysis. He described an 18 minute video guide which gives users a tour around the website, and an advanced search tool which helps to locate material on DDC pages, IPCC reports and UNFCCC pages. He concluded by encouraging the development of a comprehensive index of datasets that could be used to develop figures in IPCC assessments and that would not only aid users but could also improve communication between WGs.

The DKRZ contribution to the DDC was presented by Martina Stockhause. DKRZ operates the World Data Center for Climate which has been a long-term archive specializing on climate data since 1992. Their node of the DDC hosts the reference archive for the climate model output data which has underpinned the WGI contribution to the AR5 since the Second Assessment Report (SAR) in 1995. Certain data which were used in the First Assessment Report (FAR) were added in 2008. The current DDC data volume is about 1.7 PBytes with the largest data amount being that used in AR5, largely because of the increase in number of models, climate variables, and the spatial and temporal resolution of the model data archived. She demonstrated an increasing trend in the data download rate with the data used for the AR4 still being downloaded at a similar rate in 2015 compared to previous years, implying that those data are still relevant to users. The geographical distribution of the downloads reveal that in 2015, Asia had the most active users (~59%). Apart from the data collected from the multiple centres that are ESGF³⁸ data nodes, DKRZ also hosts a subset of the CMIP5 climate model data that were collected by ETH³⁹ in Zurich for WGI. Ms Stockhause mentioned the data archival procedure which involves data replication, enrichment of metadata, quality assurance, long-term archival, preparing a DataCite DOI⁴⁰ registration to enable citation of the data, and long-term data curation. Some of the challenges encountered during AR5 included the increasing data volume, heterogeneity of data centre quality standards, increase in the number of repositories providing metadata and the broadening of the user community. The current staff demand is at 0.7 FTE which is higher than the average 0.5 FTE primarily because of the preparation for AR6. Staff limitations impact on the ability to maintain the required high quality standards and the provision of additional data services to the broadening data user community.

The DDC Socioeconomic data node at CIESIN was represented by Alex de Sherbinin (kindly standing in for the CIESIN Director, Robert Chen who was unable to attend). He gave some background information that CIESIN joined the DDC

³⁶ Centre for Environmental Data Analysis

³⁷ Natural Environment Research Council

³⁸ Earth System Grid Federation

³⁹ Eidgenössische Technische Hochschule

⁴⁰ Digital Object Identifier

during the TAR⁴¹ after the SRES⁴² process. The site contains the SRES scenarios, the earlier six alternative IPCC Scenarios (IS92), socioeconomic baseline, observed climate impacts, the scenario process for AR5 including links to the long-term archiving of the RCP⁴³ scenario database, and the socio-economic dataset from the 1998 IPCC Special Report on Regional Impacts. Ongoing and future plans include working with TGICA and IPCC Lead Authors on the long-term archiving of the RCP scenario database from IIASA, to add AR5 WGII observed climate change impacts materials to the DDC and to archive and disseminate the AR5 historical emissions database by the WGIII Data Task Group. SSP⁴⁴ scenarios will also be archived if they make their way into AR6.

Messages that came out of the IPCC DDC User Survey, which was open between March and November 2015, were presented by Charlotte Pascoe from CEDA. She reported that about 240 respondents participated in the survey, representing a diverse community of user groups, the majority being the academic community (i.e. students, postdoctoral and other researchers, and higher education teachers) and government officials. She showed that the perception of the DDC was to some extent related to the type of user responding. Key messages included: 1) More than 80% of the users were satisfied with the DDC. Those who appear dissatisfied are predominantly non-academic users; 2) A majority of the respondents who had read the guidance documents felt that the level of detail was about right; 3) Suggestions for improvement were made such as guiding non-academic users to information-centric content, adding more worked examples to the guidance material to help practitioners on how to use the data, providing clear and easy-to-find advice for users who need data at high spatial and temporal resolution, more regional data and information, more timely access to IPCC data including links to other climate data providers, enhancing the data download experience, and advertising the DDC more effectively. Ms Pascoe concluded by suggesting that the DDC should provide support for people outside the climate change research community, which may require a change and clarification of the objectives of the DDC website.

Former TGICA Co-Chair Richard Moss, who was involved in TGICA when it was established, joined the meeting online and shared his views on the Task Group's functions highlighting the two most important constants, namely facilitating research related to scenarios and coordinating practical issues related to scenarios across WGs. He suggested that the group's and DDC activities may need to change in response to the changing data landscape to include, inter alia, preparing a catalogue of relevant derived information that is developed by different groups and institutions for their own purposes. While there has been proliferation of groups providing relevant climate and impacts data and information, some derived from the DDC products, little has been done to address issues related to cataloguing and accessibility of the data and information, a role that TGICA and the DDC could play. Since the DDC and the Task Group were established there has been significant progress made in developing new approaches for decision support without much testing and evaluation, another possible gap TGICA could fill on behalf of the IPCC, through an assessment of the state of science and providing guidance on how one should apply the new approaches. Regarding the traceability and accessibility of data underlying key messages and figures in IPCC reports, he shared some of the experiences with the US National Climate Assessment (NCA) where indexing data has been successfully done, a lesson that TGICA and the DDC could learn from. However, this would require a high-level decision at the beginning of the assessment process that will require authors to provide access to data they use and facilitate ease of access.

During the discussion session, concerns were raised regarding the ability to download large global data files from the DDC in parts of the world with insufficient internet bandwidth, such as in most African countries. It was suggested that it could be helpful if the DDC offered a facility that allows selection of specific regions to reduce the data file sizes or to bring the calculation to the data in such a way that the analysis is performed on the server where the data resides and then download the derived quantities in much smaller files. The CEDA was receptive to the suggestion to facilitate pre-processing of data within their server if TGICA would mandate it and if resources would allow it. The DKRZ

⁴¹ IPCC Third Assessment Report

⁴² Special Report on Emissions Scenarios

⁴³ Representative Concentration Pathways

⁴⁴ Shared Socioeconomic Pathways

representative mentioned the possibility of providing data for certain variables and regions on storage media and sending them by regular mail to users.

Results from an institutional analysis of TGICA were presented by Catherine Vaughan, who undertook the study. She provided the history of the group, background information and accomplishments, persistent and emerging challenges most of which were similar to what was presented during previous talks. Amongst the emerging challenges she mentioned the proliferation of data portals (she identified approximately seventy during her analysis) and information providers, which include international, regional and national institutions, research institutes and the private sector. She concluded by outlining some opportunities for the Task Group that she had identified, such as developing a meta-database and cross-WG dataset index to improve discoverability, transparency and robustness of reports, exploring approaches for harmonizing research strategies, co-developing capacity building activities and better engaging the UNFCCC process.

Clarity was sought on where the resources are most needed, a request prompted by the repeated mention of a need for technical support to help with the development of technical guidelines. These are in fact supposed to be produced by the Task Group membership in a similar way to chapters of assessment reports, for which authors work on a voluntary basis. It was clarified that there are several levels where resource constraints are currently impacting on the group's ability to deliver optimally on its mandate, one being the DDC which is already operating either at maximum capacity or above its capacity (e.g. the staff issues at DKRZ), another being the coordination role to facilitate meetings, following up with authors and reviewers of guidance documents, and also the resources required to reach out to author teams to efficiently facilitate cross-WG collaboration, and for external engagement with potential collaborating institutions.

Plenary Session 4: Government Comments, Emerging Needs and Opportunities

Collated Governments' comments on the revised TGICA vision paper (version 31 August 2015) were presented by Mxolisi Shongwe from the IPCC Secretariat. He reiterated paragraph 15 of Decision [IPCC/XLI-4](#), which mandated the Secretariat to update the vision paper in consultation with TGICA Co-Chairs taking into account views from scientists, IPCC Bureau, submissions from governments and IPCC observer organizations. According to this decision, the Secretariat sent out invitation letters to member states, observer organizations and the IPCC Bureau on 14 October 2015 seeking their comments on the revised TGICA vision paper (31 August 2015). Fifteen governments responded to the invitations: Canada, China, Finland, France, Germany, Korea, Libya, The Netherlands, Norway, Poland, Russian Federation, Switzerland, Turkey, United Kingdom and USA. Observer Organizations which responded were the European Union, FAO⁴⁵, SEI⁴⁶, UNEP⁴⁷, UNFCCC and Indiana University. In his presentation Mr. Shongwe reported that only the government of Germany endorsed Option 1 in the vision document (i.e. discontinue or severely curtail TGICA and discontinue the DDC). However, during the discussion session, the German Government representative clarified that their government only suggested that Option 1 should be thoroughly considered. The government of Germany recommended that the interactions of the DDC with other activities related to data within the IPCC (WGs, TFI⁴⁸, and the Secretariat) and outside the IPCC (GFCS, WGRC⁴⁹, PROVIA, IASA, ESGF) and potential synergies should be further explored, and also stressed the need for wider and potentially enhanced support for the DDC which is currently dependent on in-kind support from only three countries.

The Netherlands Government supported Option 2 (i.e. maintain the status quo) but went on to suggest that if TGICA is strengthened regarding data, structure and governance, there would be a need to incorporate more WGIII material to integrate it with WGI/WGII material as well. They suggested to strengthen TGICA in that direction instead of upgrading the DDC.

Option 3 (i.e. strengthen TGICA and upgrade the DDC) received support from China, Korea, Libya, Poland, Russian Federation, Turkey, European Commission and FAO. There was a wide range of views from these parties on where priorities should be placed. The government of Poland proposed that TGICA be upgraded to a Task Force.

Governments and Observer Organizations that proposed other options include Canada, Norway, United Kingdom, Switzerland, SEI and UNFCCC. For instance, the government of Canada suggested that an alternative option focusing on the DDC be developed because they may support an option that discontinues TGICA's efforts which are focused on providing guidance and building capacity, but maintains and strengthens the DDC.

During the discussion session, concerns were raised regarding the small sample size of governments (particularly developing countries) and Observer Organizations that submitted responses. The Secretariat reported that the invitation letters were sent on 14 October 2015 with a deadline for submitting responses set for 20 November 2015. A follow up letter was sent on 11 November 2015, submitting the interim report for the DDC User Survey and reminding governments and Observer Organizations about the vision document and the request to submit comments. It was suggested that the preparations for the COP21 in Paris may have contributed to the low responses from member states.

Felipe Lucio, the Director of the GFCS at WMO, introduced the GFCS framework to participants, highlighting its vision, membership, governance and the strategic objectives of its operational plan. He explained that GFCS aims at enabling better management of the risks of climate variability and change, and supports adaptation to climate change through the development and incorporation of science-based climate information and prediction into planning, policy and practice at the global, regional and national scales. The priority sectors are agriculture and food security, disaster risk reduction, water, health and energy. He identified certain roles TGICA could play in support of climate services

⁴⁵ Food and Agriculture Organization

⁴⁶ Stockholm Environment Institute

⁴⁷ United Nations Environment Programme

⁴⁸ Task Force on National Greenhouse Gas Inventories

⁴⁹ Working Group on Regional Climate

focusing on the five priority sectors of GFCS, such as playing a curator role in impact assessment at regional and local levels, streamlining of IPCC data used in assessment reports for use by regional/national level and sectoral researchers to enable the latter to develop improved tailored climate services for specific users, and conducting training workshops for regional/national level and sectoral researchers to support their access to IPCC data for enhancing research and modelling whose output is applied in the development of improved climate services. He suggested areas of interaction between GFCS and TGICA, including: contributing as a curator of climate and impacts data and scenarios; acting as an ethics overseer by contributing to quality assurance of the best available data, research on climate and related science and derived information; contributing as a recognized voice on IPCC statements by developing guidance for researchers and global policy-makers on how to apply IPCC findings; and training regional and sectoral researchers engaged in developing improved climate services. He concluded by raising a need for a partnership agreement to define specific TGICA roles in support of GFCS.

Geoff Gooley, from CSIRO⁵⁰ in Australia, shared an Australian and SIDS⁵¹ perspective on climate services. He highlighted the importance of applying climate science knowledge such as that produced by IPCC WGI to inform climate services including those coordinated by the GFCS. He also stressed the need to focus on multiple spatial and temporal scales, with emphasis on multi-decadal projections and future climate scenarios to inform targeted users, not only researchers but also end users such as policy makers, planners and associated decision-makers at regional, national/sectoral and sub-national/community scale. When discussing the critical importance of climate science in the climate resilience value chain, he mentioned that the best science in itself will not have the desired end-user impact in isolation, and also that the overcrowded space of information providers requires better coordination to identify the actors, assess their capabilities and an investigation of what is done by others elsewhere. He stressed that guidance and capacity development are key components to facilitate the usefulness of climate services, although products and services need to be customized to accommodate diverse circumstances and needs. He identified knowledge of the user communities, their needs and institutional arrangements as key pre-requisites for the efficient design and delivery of products and services.

Katharine Vincent, from Kulima Integrated Development Solutions, stressed the need for more information and services to guide decision-centred adaptation and related processes, and actions. She gave an example of the agricultural sector, where farmers do not need data but rather require actionable information on what to expect and what actions to take to address the expected conditions. She emphasized the need to simplify messages derived from scientific assessments such as explaining the uncertainties associated with climate projections which potentially impede the use of information derived from them. Regarding the future of TGICA, she suggested that the group could target a wider user community outside the research community.

Ousmane Ndiaye, from the National Agency of Maritime Affairs in Senegal, urged TGICA to put more efforts to help National Meteorological Services and academic institutions, particularly in Africa, with data access and also increase capacity building activities on the continent. The main challenge, in his experience, was in downloading model data for climate change research in Africa, which is almost impractical to obtain from most global data repositories, such as PCMDI or the DDC, because of the internet bandwidth. He gratefully acknowledged the KNMI⁵² Climate Explorer, which has a lot of computational tools that allow users to perform data analysis on the server and only download the derived or final products in a simplified form. He also commended the fact that whenever users seek clarity on anything within the Climate Explorer, they always receive helpful feedback.

Maarten van Aalst, from the Netherlands Red Cross/Red Crescent Climate Centre, reiterated that the landscape in which TGICA operates has dramatically changed during the last 10 years or so. Within the overcrowded space of role players, there is need to establish partnerships, something which is encouraged by the World Bank. Despite the change in landscape, there are still existing loopholes such as the lack of authoritative sources of local scale data and information for impact studies in many regions. There is an increasing focus on risk attribution and there is still insufficient data and information to meet the emerging demands, something TGICA is suitably placed to address.

⁵⁰ Commonwealth Scientific and Industrial Research Organization

⁵¹ Small Islands Developing States

⁵² Koninklijk Nederlands Meteorologisch Instituut

Plenary Session 5: Views on TGICA Mandate and the Vision Document

Fredolin Tangang, former IPCC WGI Vice-Chair from Universiti Kebangsaan Malaysia, offered an assessment of the deliberations during the meeting. In his opinion, Option 3 in the vision document (i.e. strengthen TGICA and upgrade the DDC) had the most support. He recommended that following the discussions on existing gaps and emerging challenges and opportunities, the group be better resourced as we go into the AR6 cycle, notwithstanding the limited funding and other resource constraints within the IPCC mentioned a few times during the meeting. He urged TGICA Co-Chairs and the Steering Committee to carefully revise the vision document taking into consideration the support for continuing and strengthening TGICA which was expressed by most participants to help the governments in making decisions on the future of TGICA when they meet at the IPCC-43. He was of the view that the list of activities which should be carried out by the group in the future and the justifications be well articulated in the vision document. From a developing country perspective, he encouraged a continuation of capacity building activities by the group.

Colin Jones, from the UK Met Office, observed that if TGICA does not receive more funding, then by implication Option 1 should be chosen. He thought there is no way the group could deliver on its tasks such as WG integration, capacity building and guidance without additional funding. He suggested that all possibilities be explored to solicit funding for TGICA and strongly urged the participants to recommend this as a necessary condition for Option 3. He also suggested that in the future, TGICA should focus more on integrative activities linking climate science with impacts, adaptation and decision making, where in his opinion there is currently room for improvement. The group could promote or provide oversight in the use of regional climate information in regional- or local-scale impacts assessments and adaptation. He expressed his concerns that the international research community in general, and the IPCC in particular, are not doing enough to build the capacity of all countries to contribute in some sensible way in the development of IPCC assessment reports, which might lead observers to conclude that the IPCC is not representative of the global community. In this area, TGICA could play a role in classical capacity building, targeting upcoming scientists and/or researchers in countries with the least capacity. He also touched on the need to improve data access, and reiterated the point he made earlier on bringing the calculation to the data instead of always wanting to take the data to the calculator.

Judy Omumbo, from the MEASURE Evaluation PIMA Project in Kenya, expressed her opinion that over the past few decades or years she has observed the capacity of African climate scientists grow. For this reason, she felt that with reference to Africa and taking into consideration resource limitations, TGICA should clearly define a narrow target community for capacity building. There are still challenges regarding silos and unavailability of fora to discuss cross-cutting user needs, as well as lack of data which are required by specific sectors at regional, national and decision scale. She encouraged TGICA to demonstrate what makes the group unique, in order to make them saleable and hence get the support they deserve.

John Charlery, from the University of West Indies in Barbados, stressed the urgency for actions to support climate change adaptation and TGICA's role in SIDS in general, and the Caribbean in particular. This is mainly because of the desperate need for actionable science and information to inform climate change response measures in those regions lest they invest the limited resources in maladaptive strategies. He mentioned that the demand for climate information across sectors is rapidly increasing in the Caribbean and that TGICA should provide guidance on the most credible sources of information and tools on how to use data and information appropriately. In the Caribbean there is a huge support of Option 3 that TGICA be strengthened and the DDC upgraded, but make the data access more user friendly.

Richard Moss, joining online, suggested that TGICA has a role to play in internal IPCC assessment related functions and those external in support of the broader research community. While it may be true to some extent that certain roles that TGICA was established to do are already done by other groups, there are still unique roles the group should continue to play internally with regards to cross-WG integration and data curation. For the WG integration to be effective and efficient, TGICA's integration functions should be planned and negotiated with the WG Co-Chairs and TSUs. The curation functions require a high level decision at the beginning of the assessment, such as creating a 1 FTE technical support as was done during the US National Climate Assessment. He suggested that it is vital to continue with the DDC and guidance material to support the external research community whose outputs in turn feed into the IPCC assessment process. He concluded by remarking that authors involved in the assessment reports need training, particularly those who participate for the first time and do not know the essential functions of an assessment.

A suggestion was made during the discussion session that given that resource limitations might be a concern to adopt Option 3, which had the highest support, participants could consider identifying a few of the current activities which could be supported under Option 2 but ensuring that the group focusses on fewer tasks which they could do well than to attempt to perform too many tasks inadequately. This could be approached by having a focused set of priorities which could evolve in time according to existing and emerging needs, but would still require some increase in the current resource base. The suggestion for prioritization was supported by the CEDA representative who mentioned that the UK as funders of one component of the DDC would like to see a clearer, narrower focus than one that is spread across a wide range of objectives, which may put the funding at risk. The participant from the UK Department of Energy and Climate Change, which funds the DDC, reported that preparations are underway to extend the funding by another year up to March 2017 after which they will need to redirect the resources to support the WGIII AR6 TSU and explore other UK funding options for the DDC, the outcome of which was unknown at the time of the EM. A need was also raised to identify an additional centre to join the DDC and support CORDEX.

A proposal was made to analyse the funding scenarios vis-à-vis corresponding TGICA work plans, operations and structure, highlighting the likely losses and risks associated with the low-resource scenario, and vice versa. This may provide some useful insights to the governments when they make their decisions on the future of TGICA and the DDC. It was noted though that there are components and activities of TGICA and the DDC that are strongly interrelated in a way that discontinuing one may have a negative impact on others that may still be continued.

Plenary Session 6: Emerging Messages and Suggestions for Future Directions

David Wratt, reminded participants about the expected outputs and outcomes from the EM which include: a concise summary of key points and recommendations to be submitted to the 51st Session of the IPCC Bureau (B-51); a comprehensive EM report which will be circulated to participants for their feedback before it would be finalized; a revised vision document to be prepared by the Secretariat in consultation with TGICA Co-Chairs taking into consideration the recommendations from the EM; and a decision document with options for the future of TGICA to be submitted by the Secretariat to IPCC-43.

Mr Wratt invited participants to contribute to the discussion on the draft report to be submitted to B-51, particularly the key points and recommendations and requested them to give the Steering Committee the mandate to report to the Bureau after the discussion. He introduced the perceived outline of the draft B-51 report, which would include brief background information on TGICA and the EM, key points on priorities for TGICA, what can be done, where the demand is for the group and the DDC, and key messages from Breakout Group Sessions.

Arame Tall presented some of the key points captured during the plenary discussions which were:

1. TGICA Futures Option 3 (enhance TGICA role and strengthen DDC), had the majority of support, although some voices emerged calling to explore alternative options;
2. Financing implications of each option suggested for TGICA to have a future need to be defined, and budgetary implications for governments clarified. For Option 3 to be realized, funding has to come from somewhere;
3. TGICA will need to focus going forward on its internal users, going back to its core mandate of IPCC data curatorship and data sharing facilitation. In this, its first constituency remains the IPCC WGs. As such, it is recommended that TGICA works to establish closer relationships between the DDC and WG Lead Authors. In keeping this focus, improvements in IPCC data availability for all users (internal and external) can take place, as demonstrated via the successful example of the KNMI Climate Explorer, which has made data available on the web which can be easily accessed and analyzed by authors;
4. The point was clearly made that, notwithstanding IPCC internal priorities, there may also be opportunities for TGICA to expand into the sphere of climate information provision. Demand for credible climate data and information has grown exponentially, and the engagement of the IPCC is absolutely essential. Indeed as demonstrated in the institutional analysis, the landscape has changed dramatically over the past 10 years, and data are no longer only downloaded solely for research purposes, they are used to develop tangible decision-support information and downstream services for specific users under a changing climate. In a post-Paris world defined by climate action, TGICA will thus be needed to:
 - a. Facilitate access to IPCC data and scenarios for Met Services and university researchers, from the global to the regional/national levels. In so doing, overcome the technical divide precluding access to IPCC data in Africa and other developing regions (specific suggestions: put the data on CDs, web portals, etc.).
 - b. Serve as an authoritative and trusted go-to place for scientific data, serving as a curator for IPCC data and ensuring quality assurance for external users to access the best available climate science (ethics overseer).
 - c. Support capacity building: Narrowly and opportunistically. Train the first-level users to access and use IPCC data and outputs. Already identified clients for such training are Met Services and university researchers. Also, training is needed in the frontier area of climate and socio-economic data integration to define regional impact assessments, essential for the development of tailored climate services in the regions. However:
 - i. There is a need to conduct a thorough mapping of users and actors in the pathway from climate data to information and to service delivery, in order to clarify who are the next-level users of IPCC data and science, define effective partnerships and enable TGICA to define its niche so that it can become more efficient in supporting the use of IPCC data for the development of climate information and downstream climate services tailored to the specific needs of regional/national/local users.

- ii. It is not TGICA's mandate to advise policy-makers or deliver climate services for users. This is the role of organizations such as the GFCS and RCCs⁵³. Nevertheless, TGICA can facilitate delivery of the best available science and research outputs needed to support climate services.
5. Capacity Building and Guidance activities of TGICA will need to be targeted at specific and pre-identified next-level users, and will need to be reliant on opportunities and partnerships with the organizations already active in the sphere of climate services. Use of Expert Meetings and Workshops was suggested as the fastest process for producing guidance material.
6. The importance of partnerships has to be underscored. Partnerships with the GFCS and UNFCCC were strongly suggested. TGICA will need to serve as a vehicle for the IPCC to interface with these important user platforms, setting up meaningful engagements with these groups and a trusted community of people dedicated to linking IPCC science with researchers and final end users downstream.

David Wratt added more points related to:

- 1) Prioritizing activities and needs that TGICA and the DDC should focus on taking into consideration co-dependencies amongst tasks and mapping of other role players, and identifying unique internal and external roles the group could play on behalf of the IPCC;
- 2) The development of a new mandate for TGICA could be deferred to later;
- 3) The DDC should play an important role in curatorship of data, supporting authors by providing the relevant data such as CMIP and guidance material, and creating a mechanism to enhance easy access to the data used for deriving key messages and figures in IPCC Assessment Reports; and
- 4) Enabling some analysis on the data servers where the data resides so that users, particularly from developing countries with low internet bandwidth could download derived products of much smaller sizes than the global datasets.

During the ensuing discussion, comments and suggestions were made, which were incorporated to produce the set of key points and recommendations presented in this report.

⁵³ Regional Climate Centres

Annexes

Annex 1 – Key Points and Recommendations from Breakout Groups

This annex contains the exact report-back text provided by the Breakout Group Chairs and Rapporteurs during the two-day meeting.

Breakout Group A: Data (Internal IPCC data requirements for support of WGs & Lead Authors; Data for external users)

- 1) The DDC is recognized as an authoritative source for data of high quality by internal as well as external users.
- 2) The primary focus in future should be on the internal users, recognizing the co-benefits for the larger external communities.
 - We recommend to improve the integration of TGICA/DDC with the IPCC Bureau, WGs, TSUs on the organizational and on the working level:
 - service point and resource for LAs (using common language across WGs);
 - co-ordination on data (dataset index and critical review of data);
 - transparency and traceability of figures data at least for the SPM⁵⁴ figures (IAC); and
 - CMIP6 repository by DDC at DKRZ.
 - Special support for developing countries is needed in particular for WG authors.
 - More services around data are desirable, e.g. server side processing (bring the calculation to the data). We recommend that IPCC/TGICA encourages the DDC to explore provision of such services.
- 3) The level of ambition for supporting external users depends in part on resources and partnerships:
 - We recognize the emerging needs for more regional and sectoral (derived) data, services and tools, but TGICA involvement needs to be investigated with partners, e.g. the regional climate centres in the GFCS (including joint funding possibilities).

⁵⁴ Summary for Policy Makers

Breakout Group B: Guidance Materials

- 1) It is difficult to make recommendations about changes in TGICA's role in the production of guidance material without an understanding of future resourcing dynamics.
- 2) There was agreement that TGICA/IPCC has a unique level of authority and objectivity and these values make it ideally suited to offering high quality guidance material.
- 3) There was broad agreement that existing general guidance material produced by TGICA is useful (and will increasingly be so). However, there were mixed responses to TGICA's expansion towards sector- or region-specific material.
- 4) There was general agreement that a mapping exercise to better understand audience needs and demand for products would be useful. We may assume that the audience has primarily been the IPCC and research community, but has this priority changed or evolved, e.g. post Paris COP?
- 5) Some TGICA guidance documents would benefit from being regularly updated, and better integration with AR cycle may provide the opportunity for AR author involvement (i.e. more resources). The IPCC Special Report mechanism could also be an avenue for generating new or updated guidance material.
- 6) There is agreement that we need to raise awareness and the profile of TGICA's efforts and products, which require revisiting the question of who are the audience.

Breakout Group C: Capacity Building

The group formulated the following questions which informed the recommendations:

- 1) Should TGICA be involved in supporting capacity building in the use of data and scenarios for climate-related research?
 - Very large majority recommended that TGICA should be involved in supporting capacity building for the benefit of others, and for the benefit of the IPCC's understanding of external realities, although the context and scope of capacity building should be clearly defined: what kind, for whom, how, and through what mechanisms?
- 2) Is the current level of TGICA activity appropriate?
 - Not ideal in relation to the needs – but the current limited and opportunistic approach is appropriate based on mandate and technical capacity.
 - Weaknesses in current government nomination of membership – and role within “IPCC universe” needs to be clarified.
- 3) Are there new or enhanced capacity building activities that TGICA should be engaged in?
 - Cross-WG regional-based work (projections and impacts).
 - Problem-oriented approach (highly vulnerable areas).
 - Work through ongoing national processes (e.g. under UNFCCC).
 - Supporting data accessibility issues.
- 4) What resources are required by TGICA for maintaining or enhancing support for capacity building?
 - Considering that a serious approach to data management and capacity building requires serious resources, a TGICA TSU or support within IPCC Secretariat are recommended.

Breakout Group D: Partnerships with External Organizations

- 1) There is a need to map partnerships – distinguishing between providers and users of data/information, guidance and capacity building and identification of the overlaps and intersection of all three TGICA areas.
- 2) TGICA should be the IPCC interface within a fast moving landscape, regarding climate change related data and information and also to facilitate the flow of relevant data and scenario information from external interactions to help IPCC authors, particularly those from developing countries.
- 3) One clear external need is for facilitating developing countries access and use of IPCC data and guidance. In particular, TGICA can provide relevant guidance on generating climate change related information leading to decisions (e.g. for national assessments or adaptation plans)
- 4) Recommended relevant partners include PROVIA, WCRP (CMIP6+CORDEX), IAMC, IPBES, Future Earth, GFCS, UN bodies and other regional and international organizations.
- 5) Other potential partners need further consideration:
 - DDC: Partner with other portals and data sources to produce decision support information.
 - Sectoral organizations (e.g. AgMIP⁵⁵)
 - Organizations with resources (e.g. World Bank, European Commission)

⁵⁵ Agricultural Model Intercomparison and Improvement Project

Breakout Group E: Collaboration within IPCC – including facilitating interaction between Working Groups

1. Differentiation of TGICA objectives is necessary (technical guidance; integration across WGs; data management; and capacity building).
2. TGICA priorities need to be aligned accordingly with the WG and broader IPCC needs (e.g. WGI's expressed need for guidance materials for authors on the attribution of extremes, and on downscaling).
3. There is a broad agreement that the IPCC-internal role is central for TGICA.
4. The differing views on the possible role for TGICA beyond IPCC internal activities should be clarified.
5. TGICA role in cross-WG activities should be driven by needs emerging from the assessment, informed and coordinated with WG leadership.
6. The structure of supporting collaboration could follow two models; be embedded within working groups, but at a cost of additional load on the TSU's and weaker cross-working-group perspectives, or in a separate entity (such as TGICA) which brings different resource requirements but affords a more holistic view across working group perspectives..
7. TGICA role in facilitating exchanges between IPCC WGs and core community research activities (e.g., WCRP CMIP, ICONICS and IAMC) should be improved.

Breakout Group F: Membership, Resourcing and Technical Support

The group formulated some questions to stimulate the discussion which led to the recommendations:

- 1) Should the selection procedures, turnover or other aspects of TGICA membership be re-considered?
 - Term of Office – should begin at end of cycle so that authors would have both time and expertise to produce guidance.
 - Nomination process – same problems as for authors – there is a need identify experts “under the radar” - could publicise opportunities on website. Work more closely with observer organizations.
 - There is a need clarify how TGICA Co-Chairs are chosen.
 - Draw on pool of previous author nominees including those not selected.
 - When partnerships are established, they could be ex-officio members.
- 2) Is there interest in expanding or otherwise re-configuring the IPCC Data Distribution Centre (DDC)?
 - There is a need to raise awareness about what DDC can and can't do. (there are some requests for real-time data, data which doesn't exist, data products not permitted by owners, IPR limitations).
 - Continue expansion of DDC to link datasets held elsewhere (according to existing protocol), noting services will be limited to own data holdings.
 - There is poor access where internet connections are limited.
 - Best practice guidance needed – is under development.
- 3) What are the resource implications of future challenges and opportunities identified for the DDC?
 - Changing cycle would aid author participation.
 - During the AR scoping, begin good practice guidance on data that will be released at end of cycle.
 - Move away from funding model relying on just 3 countries.
 - Consider hosting at institutes with multiple, stable funding.
- 4) Should there be further consideration of resourcing and continuity in the technical support of TGICA?
 - Option 2 requires 1FTE.
 - Needs continuity – TSUs have helped in the past. No provision for this in AR6 cycle.
 - Could the IPCC Secretariat help?
 - Could partnerships help?

Annex 2 – Scoping Note for the IPCC Expert Meeting

"Supporting IPCC needs in data and scenarios for climate change research and assessment"

Date and duration: 2-day meeting from 26-27 January, 2016

Location: WMO Building, Geneva

Host: IPCC Secretariat

Motivation

At the 41st Session of the IPCC governments requested that the Task Group on Data and Scenario Support for Impacts and Climate Analysis (TGICA) mandate be revisited at the 43rd Session of the IPCC. To this end it requested the Secretariat, in consultation with the TGICA Co-Chairs, to update the TGICA vision paper for the 43rd Session, taking into account views from scientists, IPCC Bureau, submissions from governments and IPCC observer organizations. In addition, the governments requested the development of recommendations from an IPCC meeting of experts on this issue, to be organized by the Secretariat.

Purpose

The Expert Meeting is intended to obtain input from relevant experts on the future role of TGICA in relation to the needs of the IPCC and in the context of an evolving landscape of climate change related data and scenario provision. The report from this meeting, in conjunction with the revised vision paper and related complementary materials (e.g. relevant messages from three 2015 expert meetings on scenarios, on use of climate information and on regional projections) will form the basis for decisions on the TGICA future at the 43rd session of the IPCC.

Participants

The participants will be identified by the Steering Committee of the Expert Meeting and should include representatives from the IPCC Working Groups, national governments, TGICA membership, leading science and research organizations (e.g. WCRP, Future Earth, PROVIA, etc), organizations engaged in climate services (e.g. GFCS, CSP⁵⁶, CKB⁵⁷), climate science research (e.g. CMIP6), impacts and adaptation research (e.g., AGMIP, ISI-MIP⁵⁸), integrated assessment modelling (e.g. IAMC) and scenario development (e.g. UNEP-GEO⁵⁹, ICONICS, CCAFS⁶⁰), major funding and aid agencies (e.g. development banks, national foreign aid agencies), and civil society.

The participants should reflect balanced representation of geography, gender, and sectors, with strong inclusion of developing countries (DCs) and economies in transition (EITs).

Request for inputs to the Expert Meeting

Ahead of the Expert Meeting, governments and IPCC observer organizations, IPCC Bureau and participants will be kindly invited to provide comments and feedback on two items:

- 1) The Co-Chairs of TGICA have updated the **TGICA vision paper**, revised from an earlier document presented at IPCC XLI in Nairobi ([IPCC-XLI/Doc. 10](#), Annex 2). This will be sent to governments and IPCC observer organizations, and the IPCC Bureau. As soon as the list of participants has been compiled, the document will also be sent to the potential participants. The expectation is that comments should be received by the Secretariat no later than **30 November 2015**.

⁵⁶Climate Services Partnership

⁵⁷Climate Knowledge Brokers

⁵⁸Inter-Sectoral Impact Model Intercomparison Project

⁵⁹UNEP's Global Environment Outlook

⁶⁰Research Program on Climate Change, Agriculture and Food Security

- 2) TGICA oversees the operations of the IPCC Data Distribution Centre (DDC) and has developed an online **DDC User Survey** for obtaining feedback on the utility of the DDC. IPCC Focal Points have been contacted with a request to notify relevant persons and organizations in their countries who make use of data and scenario information for climate change research and assessment. This is available to be completed at the DDC home page:

<http://www.ipcc-data.org/> (under "Highlights")

The survey will be kept open until **16 November 2015**, after which results will be compiled and analyzed ahead of the Expert Meeting.

Potential content and format

The meeting should be expressly designed to maximize discussion and opportunity for input from participants to obtain a full spectrum of perspectives. To this end, the Expert Meeting will cover three core sections:

Section A: Context

2-3 Keynote presentations setting the context with the history of TGICA, its activities, and the current foci that seeks to address emergent issues. This will include reviewing the current mandate, the discussions from the 41st Session of the IPCC that called for the meeting, the current profile of TGICA initiatives, and the role and usage patterns of the DDC. Supporting this will be a summary of the key relevant messages emerging from the 2015 Expert meetings on scenarios, use of climate information, and regional projections.

Section B: Review and assessment of the landscape in which TGICA operates

3-4 Keynote presentations that review and assess the current landscape within which the IPCC and related organizations operate, and how they approach data and scenarios in support of impacts, adaptation, mitigation and integrated assessment research. This is best served with a presentation to map the overall institutional landscape as well as presentations from key organizations such as GFCS, Future Earth, WCRP, PROVIA, UNFCCC. This session will include three breakout sessions to allow participants to provide input on:

- a) Institutional relationships globally and regionally, and an identification of institutional roles in relation to IPCC activities, and their sustainability and resourcing.
- b) Sectoral needs for scenarios and data support: scientific and research institutions / IAV communities / mitigation sectors / decision makers / GFCS & related climate service institutions / governments and development agencies / industry & business.
- c) Needs of IPCC, including identification of gaps in relation to IPCC Working Group needs, cross-Working Group liaison and co-ordination on data and scenario issues during assessments, collaboration with external research programs on data processing, dissemination and quality assurance

Section C: Developing the recommendations for TGICA's future

This section of the meeting would begin with a closer review of the existing vision document in light of the emergent messages from the prior two sections of the meeting. Following 1-2 presentations reviewing the current discussions, the meeting would continue in breakout groups to address key questions including: identified roles that the TGICA uniquely fills; existing roles that need to be evolved; evaluating the fit of the existing mandate to the landscape of needs; opportunities for building fruitful relationships with other organizations; the needs of curating IPCC data and making these available to relevant communities; facilitating cross Working Group integration; needs for authoritative technical guidance; TGICA's role in addressing the growing regional information needs; opportunities to support capacity building (especially among DCs/EITs).

The meeting would conclude with a plenary to consolidate the key messages of the meeting for refinement by the organizing committee into a proposal to the 43rd session of the IPCC.

Organization

As per the request by the governments, the Secretariat carries the primary responsibility for the organization and logistics of the meeting. An Expert Meeting website will be created by the Secretariat for posting the agenda and supporting materials as they become available. As appropriate, the TGICA Co-Chairs will provide necessary guidance and input.

Annex 3 – Programme

IPCC Expert Meeting on the Future of the Task Group on Data and Scenario Support for Impacts and Climate Analysis (TGICA) Geneva, Switzerland • 26-27 January 2016

WMO BUILDING – SALLE C1 Annotated Programme

Tuesday 26 January 2016

08:00-09:00	Registration	Speaker / panelists
Session 1 (Chair: Steering Committee Co-Chair David Wratt)		
09:00-09:10	Welcome and objectives	Mannava Sivakumar
09:10-09:30	Introduction to the Meeting	David Wratt/Arame Tall
09:30-10:00	Background to TGICA and DDC (2 x 10 min, 10 min discussion) - History and Mandate - Current Activities and Vision Document	Timothy Carter/ Bruce Hewitson
10:00-10:30	Panel: Strengthening capacity for research and analysis in underserved communities: TGICA's role in capacity building (15 min, 15 min discussion) The presenter should explore past activities and present perspectives of how TGICA activities could further support capacity building. Consideration of the TGICA Expert meetings should be included.	Xianfu Lu
10:30-11:15	Refreshment Break	
Session 2 (Chair : IPCC Vice-Chair Thelma Krug)		
11:15-12:15	Panel: Perspectives on needs and opportunities in supporting IPCC Assessments Perspectives on TGICA's role in supporting the IPCC assessment process both within and across Working Groups. Speakers should consider WG needs, as well as facilitation of communication across WG groups, an issue of increasing importance as more and more urgent topics requiring assessment integrate cross-WG perspectives. Include key messages from expert meeting and workshop outcomes. Supported by meeting reports.	Bruce Hewitson (TGICA) Volker Krey (WG III) Valérie Masson-Delmotte/ Panmao Zhai (WG I) Hans-Otto Pörtner/ Debra Roberts (or WG II representative)
12:15-12:45	Needs for technical guidelines (2 x 10 min) a) Background to TGICA technical guidelines b) Experiences of guidance documentation in a small island context Speakers should discuss the need for technical guidelines in different user communities and TGICA's role in meeting this need. Explicitly tied to TGICA mandate to provide technical guidelines and fact sheets on the use of data and scenarios as "supporting material" under the Principles Governing IPCC work.	Timothy Carter Arthur Webb

12:45-14:00	Lunch	
Session 3 (Chair: Chris Hewitt)		
14:00-14:50	<p>Panel: Serving data to user communities and curating IPCC data and data sources: the DDC's function 5 x 7 min + 8 min, 15 min discussion</p> <p>a) Perspectives on IPCC data and curatorship – past and future by DDC centre representatives</p> <p>b) Report of DDC User Survey</p> <p>c) Data curation</p> <p>Panel discussion on IPCC data and curatorship, with representatives from each of the three nodes to report on current activities as well as outlining prospects and opportunities for the future. This to be followed by headline messages from the DDC User Survey and examples of data curation from the US National Assessment</p>	<p>Martin Juckes Martina Stockhause Alex de Sherbinin Charlotte Pascoe Richard Moss</p>
14:50-15:20	<p>TGICA in the broader context: institutional analysis (15 min, 15 min discussion, with supporting report)</p> <p>Main conclusions from an institutional analysis of TGICA.</p>	Catherine Vaughan
15:20-15:30	<p>Introduction to Break-out groups A, B, C</p> <p>Describe objectives, and process of dividing participants. Initially, the choice of Break-out group participation should be free; if groups are unbalanced, some adjustment may be required</p>	David Wratt/Arame Tall
15:30-16:00	Refreshment Break	
Session 4		
16:00-17:30	<p>Break-out groups A, B, C</p> <p>A. Data (Internal IPCC data requirements for support of WGs & Lead Authors; Data for external users) – Salle C1</p> <p>B. Guidance – Salle C2</p> <p>C. Support for capacity building – Room Jura 8</p>	<p>Chairs (Rapporteurs):</p> <p>A: Albert Klein Tank (Martina Stockhause)</p> <p>B: Chris Hewitt (Arthur Webb)</p> <p>C: Judy Omumbo (Katharine Vincent)</p>
17:30	Adjournment	
18:00-21:00	Reception	

Wednesday 27 January 2016

08:00-09:00	Registration	
Session 5 (Steering Committee Co-Chair Arame Tall)		
09:00-09:20	<p>Summary of government responses to TGICA Vision document. (10 min, 10 min discussion)</p> <p>Presentation of government submissions based on compilation prepared by Secretariat, supported by availability to relevant documents. Highlight key messages, common views of agreement and contention.</p>	Mxolisi Shongwe
09:20-10:00	Report back Breakout groups A, B, C and discussion (3 x 10min, 10 min discussion)	Break-out groups Chairs or Rapporteurs
10:00-10:40	<p>Panel: Towards a synthesis regarding data, technical guidelines, and capacity building needs in the context of emerging climate services 5 x 5 minutes + 15min discussion</p> <p>Discussion of how evolving global and regional aspects of climate services affect TGICA's mission. This panel will discuss the wider landscape of data and scenario provision worldwide. Representatives from the global and regional climate services communities will discuss sectoral issues of data and scenario provision, focusing on areas of progress and continuing need.</p>	Felipe Lucio Katharine Vincent Maarten van Aalst Goeffrey Gooley Ousmane Ndiaye
10:40-11:00	<p>Introduction to Break-out groups D, E, F</p> <p>Describe objectives, and process of dividing participants. Initially, the choice of Break-out group participation should be free; if groups are unbalanced, some adjustment may be required</p>	David Wratt/Arame Tall
11:00-11:15	Refreshment Break	
Session 6		
11:15-12:45	<p>Breakout groups D, E, F</p> <p>D. Partnerships with external organizations – Salle C1</p> <p>E. Collaboration within IPCC - including facilitating interaction between Working Groups – Salle C2</p> <p>F. Membership, resourcing and technical support - Room Jura 8</p>	<p>Chairs (Rapporteurs):</p> <p>D: Carolina Vera (Mark Tadross)</p> <p>E: Keywan Riahi (Gian-Kasper Plattner)</p> <p>F: Cathy Johnson (Kristie Ebi)</p>
12:45-14:00	Lunch	

Session 7 (Chair: Roberto Schaeffer)		
14:00-14:45	Breakout groups D, E, F Report Back and discussion	Break-out group Chairs or Rapporteurs
14:45-15:30	<p>Panel: TGICA Mandate and Vision Document 6 perspectives: 6 x 5min + 15 minutes discussion.</p> <p>Based on consideration of the evolving foci of IPCC and the upcoming AR6, as well as the changing landscape of players, perspectives on need and suggestions for TGICA's role in serving the IPCC and broader research community. Speakers will consider implications for revision of the TGICA vision</p> <p>Detailed briefs contained in mails to proposed speakers</p>	<p>Richard Moss FredolinTangang John Charlery Colin Jones Judy Omumbo</p>
15:30-16:00	Refreshment Break	
Session 8 (Chairs: Felipe Lucio and Colin Jones)		
16:00-16:20	<p>Messages emerging and suggestions for future directions for TGICA</p> <p>The SC co-chairs consult over the break with the 6 speakers of the previous session and bring a collective perspective of the key messages to inform the development and rewrite of the vision document and proposal for taking to IPCC-43</p>	David Wratt / ArameTall
16:20-17:00	Discussion of key messages and recommendations	
17:00	Meeting Closure	

Annex 4 – List of Participants

IPCC Expert Meeting on the Future of the Task Group on Data and Scenario Support for Impacts and Climate Analysis (TGICA) Geneva, Switzerland • 26-27 January 2016

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Annex 5 – Revised TGICA Vision Document (31 August 2015 version)

The Future of TGICA and the IPCC Data Distribution Centre Version 2⁶¹ of a Report on Future Options from the IPCC Task Group on Data and Scenario Support for Impact and Climate Analysis (TGICA)

Document history. This is a revision of a document originally prepared for IPCC XLI (Nairobi, 2015), presenting a vision for the Task Group on Data and Scenario Support for Impact and Climate Analysis (TGICA). At IPCC XLI the Panel decided to revisit the mandate of TGICA at IPCC XLIII, inviting comments on the document from scientists, the IPCC Bureau, governments and IPCC observer organizations ahead of an IPCC meeting of experts to be held in early 2016. Based on these comments and on the recommendations of the meeting, the document will then be revised by the Secretariat, in consultation with the TGICA Co-Chairs, for submission to IPCC XLIII.

Summary

This document presents perspectives of the Task Group on the future of TGICA as the IPCC enters the next cycle, also incorporating feedback received at IPCC XLI and subsequent discussion at TGICA-22 in New York (June 2015). Three options are presented for the future of the TGICA and the Data Distribution Centre (DDC) it oversees: (1) Discontinue or severely curtail TGICA and discontinue the DDC; (2) maintain the status quo; or (3) strengthen TGICA and upgrade the DDC. Each of these options carries with it organizational and resource implications.

While comments on TGICA at IPCC XLI indicated broad support for a continuing role in the IPCC (Options 2 and 3), Option 1 is also retained here for completeness. That notwithstanding, the document focuses on ideas for strengthening the operations of TGICA and the DDC. Dedicated programme support for TGICA would facilitate an enhanced liaison role across the IPCC Working Groups and with the Secretariat and wider user community. Increased resource allocation for the DDC would ensure essential continuity in the archiving and curating of data and scenario information used in IPCC assessments, enable the development of a proposed new dataset index, guarantee sufficient capacity for processing a more comprehensive set of data, and facilitate development of new documentation and guidance required by an expanding worldwide user community. In light of a significantly changed landscape of institutions and organizations, the Task Group would thus be better placed to serve a range of user requirements not being addressed elsewhere, and the DDC can provide a much needed authoritative reference among the proliferation of online data and scenario products of mixed quality being offered from other sources.

1. Current status

1.1 Task Group on Data and Scenario Support for Impact and Climate Analysis (TGICA)

TGICA is an IPCC body with members nominated by national Focal Points, bringing together diverse expertise and experiences drawn from a cross section of research communities representing all three IPCC Working Groups as well as DDC users. TGICA's current mandate⁶² is to "facilitate wide availability of climate change related data and scenarios to enable research and sharing of information across the IPCC Working Groups". The Task Group co-ordinates the DDC, produces guidance materials distributed through the DDC as peer-reviewed documents of IPCC Supporting Material and contributes to building capacity in the use of data and scenarios for climate change research. Face-to-face or teleconference meetings of the Task Group are held 2-3 times per year, with sub-group tasks requiring more regular correspondence. The activities of TGICA are conducted by volunteer members, with limited administrative support provided from within the resources of one of the Working Group TSUs.

⁶¹ Version finalized on 31 August 2015

⁶² <https://www.ipcc.ch/pdf/activity/tgica-mandate.pdf>

1.2 Data Distribution Centre (DDC)

The DDC provides a means of accessing climate, socio-economic and environmental data, both from historical observations and from future scenario projections, in support of IPCC work and as used in the IPCC assessments. It is jointly managed by institutions in the UK, Germany and USA⁶³. The DDC is designed primarily for climate change researchers, but is also relevant to educators, practitioners, governmental and non-governmental organisations, and the public⁶⁴. The DDC complements the dissemination of data and information from elsewhere in the IPCC, such as from the IPCC Working Group websites, and wider international research community, such as the CMIP5 portal at PCMDI, socio-economic data at CIESIN⁶⁵ and emissions scenario databases at IIASA⁶⁵, by providing access to key datasets used in IPCC assessment reports. Importantly, the DDC co-locates data relevant across Working Groups with a consistent quality control and appropriate supporting materials. Uniquely, it provides a persistent (though not fully comprehensive) repository of data and information from all five IPCC assessments. Discontinuing the DDC would raise serious questions about the ongoing curatorship of these and future data used in IPCC assessments.

DDC managers also provide expertise on data management in support of IPCC reports. For example, for the Fifth Assessment they designed the quality control protocol for climate model data, digitised key tables from the final report and in the process identified a number of minor errors, and provided guidance to the IAM⁶⁶ and IAV⁶⁷ communities on data stewardship. They also handle data and scenario information contained in Supplementary Material and Annexes that are included in the Assessment Reports, for eventual inclusion in the DDC.

2. Challenges and opportunities

TGICA (and the IPCC) are faced with a rapidly evolving landscape of initiatives and organizations handling and disseminating climate change related data and scenario information. This raises a critical need for authoritative and objective support of relevant data and guidance on their use.

2.1 Knowledge exchange across IPCC Working Groups

The mandate of TGICA is to facilitate wide availability of climate change related data and scenarios to enable research and sharing of information across the three IPCC Working Groups. To date, this has primarily been accomplished through development of guidance materials for use by researchers working on topics at the interface between different Working Groups, for example, scenario data applications for IAV assessment, climate data downscaling and the nature and attributes of climate model data. The DDC also hosts data and scenario information generated by and of importance to the Working Group reports. There is growing pressure to facilitate enhanced cross-Working Group exchanges of data and scenario information, and the TGICA is uniquely constituted and well placed to contribute to this and complement the direct interactions between authors from different Working Groups that already occur.

2.2 Increasing engagement with users and accessibility of IPCC information

DDC managers have identified two broad categories of users. One group, the climate change research community, is beginning to expect a higher standard of data availability, including data and outputs generated as part of IPCC assessments. Furthermore, not only are high quality data essential for undertaking new research, but the outcomes of

⁶³ UK: Funding from Department for Energy and Climate Change (DECC) – work undertaken at British Atmospheric Data Centre, Rutherford Appleton Laboratory (BADC), Science and Technology Facilities Council (STFC) Centre for Environmental Data Archival; Germany: Funding from Federal Ministry of Education and Research (BMBF) and Deutsches Klimarechenzentrum (DKRZ) – work undertaken at DKRZ, Hamburg; USA: Funding from NASA Socioeconomic Data and Applications Center (SEDAC) and US Government (for TGICA travel) – work undertaken at the Center for International Earth Science Information Network (CIESIN), Columbia University, New York

⁶⁴ More than 112,000 user sessions logged from Nov 2013-Nov 2014, representing over 86,000 users from developed and developing countries. The most active users are in USA and UK, with India, China and Brazil in the top 10. Most accessed pages: carbon dioxide projections, climate observations, guidance on global climate models.

⁶⁵ International Institute for Applied Systems Analysis

⁶⁶ Integrated Assessment Modeling

⁶⁷ Impacts, adaptation and vulnerability

this research may themselves find their way into subsequent IPCC assessments. Through the DDC the IPCC already has the infrastructure in place that, with appropriate resourcing, can make data and supporting information from the assessment reports available in a comprehensive manner.

A second user group, more oriented towards regional to local scale applications, and arguably of priority societal importance, has different data and information needs. For example, the increasing interest from adaptation practitioners (engineers, urban planners, etc.) for derived products at the regional scale (such as intensity-duration-frequency rainfall curves, or heat stress indicators). Current resources do not enable TGICA and the DDC to engage with or contribute to the needs of these communities, leaving a gap in connecting them to IPCC data and scenario information and in feeding back their insights to the IPCC processes.

An online DDC User Survey, comprising 17 questions, is currently in progress⁶⁸. Results will be reported ahead of the IPCC meeting of experts in early 2016.

2.3 A new look at documenting data associated with IPCC Assessments

The current process to distribute data and information used in the IPCC assessment through the DDC involves time consuming post-processing by the authors, the TSUs and the DDC. An opportunity exists to greatly improve the efficiency and use of shared data throughout the assessment process by the development of a dataset index and supporting metadata to record the source and provide a reference for each dataset used (see summary in Annex A). This would support the work of the author teams and would involve only a modest addition to the responsibilities of chapter authors and TSUs to contribute their metadata to the index. It would yield a significant and long lasting benefit through sharing of consistent and traceable information across the working groups during the assessment process, and provide systematic and complete documentation of all the data resources used. The intent is to be comprehensive in terms of the data resources covered, but for the index to be simple enough to avoid imposing a burden on resources.

2.4 Aligning TGICA's work with other international fora

Internationally, there is a burgeoning number of activities co-ordinating data and scenario information for use in climate change assessment. Though these may exhibit some overlaps with the work of TGICA – for instance, drawing on some of the same sources of data or providing guidance on similar topics – there are also important differences in terms of objectives, target audiences, topical scope and quality assurance. Here we provide a few comparative examples – a more thorough institutional mapping will be carried out ahead of the IPCC meeting of experts in 2016.

Climate change is the central theme of IPCC and of TGICA, whilst this may be only one of a range of issues considered in some other initiatives (e.g. the periodic Global Environmental Outlook scenarios exercise conducted by UNEP or WMO's Global Framework for Climate Services). On the other hand, some international activities may limit their attention to only a narrow set of applications (e.g. climate information for agriculture and fisheries in the international research program on climate change, agriculture and food security, CCAFS), whereas TGICA's remit extends to all potential applications of climate change data and information. While the DDC has archived and quality checked the full set of global climate model outputs assessed by the IPCC, some other providers of climate projections may select an illustrative subset of projections (e.g. the World Bank Climate Change Knowledge Portal), may focus only on specific regions of the world (as in many regional and national climate information providers), and may not necessarily provide the most up-to-date information. Moreover, the quality checks applied to data and information and the peer review process applied to guidance material, may not always meet the same rigorous standards required by TGICA.

2.5 Resource limitations constrain ability to achieve objectives

The IPCC assessments and Special Reports generate a considerable and growing amount of information relevant to climate applications and cross-disciplinary analyses. With limited resources, it has been challenging for the DDC and TGICA to offer adequate support for contributing to capacity building activities in accordance with the mandate. The

⁶⁸ See the home page of the DDC under Highlights at: <http://www.ipcc-data.org/>

main limitation is that the volunteer capacity of TGICA does not have dedicated staffing for support, such as for facilitating meetings, coordinating the development of new guidance materials, and liaising with the Working Groups. Instead it relies on the assistance of Working Group TSUs, when available. It has been particularly difficult to establish ongoing activities within the impacts, adaptation and vulnerability research and practitioner communities, who are more fragmented than the climate science and energy-emission modelling communities and so need more time-consuming engagement. It is important for TGICA and the DDC to engage on this issue more effectively and on a more continuous basis, especially with the advent of global initiatives such as the GFCS and Future Earth, who stand to benefit strongly from the TGICA's perspectives.

3. Options for the Future Role of TGICA and the DDC

The TGICA members have considered a range of options for the future, all except Option 1 falling within the terms of the current TGICA mandate.

3.1 Option 1 – Discontinue or severely curtail TGICA and discontinue the DDC

One option is to discontinue the DDC, and pass over its functions to the Working Groups. Since the DDC is an integral part of the current TGICA mandate, this would imply either substantially revising the TGICA mandate, or discontinuing TGICA. A revised mandate could limit TGICA activities to the production of guidance material and support for capacity building.

We have considered whether elements of the DDC, particularly archiving of climate scenario and emissions data, could be carried out by others. For instance, the responsibility and tasks could be taken up by the IPCC Working Groups who could individually store all of their relevant information in an accessible form, supplemented with guidance notes on the use of their data sets. With a commensurate revision of the mandate, the role of TGICA would be limited to providing guidance for the Working Groups on developing the necessary additions to their web pages.

This would shift the burden of curatorship onto TSU resources, including additional needs for information technology support. Further, it would necessitate that TSUs develop mechanisms to accommodate the interests of other Working Groups, where data sets are of direct relevance to more than one Working Group. Such a transfer thus carries substantial resource implications for personnel and infrastructure at the TSUs, and risks weakening the coherence of the archival activities. Moreover, the transitory nature of the Working Group leadership and TSUs poses an important continuity challenge for providing secure, long-term preservation of data, backed by the necessary expertise on data management and user support.

Additionally, sites developed by the research community outside of the IPCC structure serve an important role in supporting the scientific work that is assessed by the IPCC. A good example is the RCP database, developed for the Integrated Assessment Modeling Consortium and hosted by IIASA. Since these data were fundamental inputs to the IPCC AR5, the DDC still assumed a critical role in hosting a curated, quality controlled version to provide secure long term preservation of this resource. The fate of such resources would thus also need to be considered following discontinuation of the DDC.

3.2 Option 2 – Status quo

The second option is to maintain the status quo with no expansion of activities. Continual assessment of priorities to put existing resources to best use will be needed as not all needs could be served. For example, while at least the creation of a dataset index (see Annex A) might be conceivable with existing resources, without additional support the number of new technical guidelines and fact sheets, and any expansion of data hosted by DDC, would necessarily continue to be limited (TGICA has identified over 10 key topics for which guidance documents would be of potential value but which have not yet been developed due to limited resources). Likewise, the role of TGICA in enabling research and sharing of data and scenarios across the IPCC Working Groups and support for capacity building would continue to be small. The existing challenge to maintain current capabilities would continue, as it rests largely on the voluntary contributions and dedication of Task Group members who are often already heavily committed to other IPCC duties as well as their own institutional responsibilities. Under the status quo option, continued travel funding from the IPCC Trust Fund would be required to facilitate two full face-to-face meetings per year, with support for these and related teleconference meetings resourced by a responsible Working Group TSU (currently Working Group II).

3.3 Option 3 – Deploy increased resources for strengthening TGICA and upgrading the DDC

The evolving context of climate change research and associated support for decision making, the growing need for regional decision-oriented information from the IPCC that cuts across Working Groups, alongside the emergence of major new related initiatives (e.g. GFCS), raises important implications for TGICA's mandated activities that cannot be met under current resourcing. TGICA has a unique mandate within the IPCC: enabling cross-Working Group data and scenario exchange and interaction, co-ordinating the DDC (which is itself a unique resource) and developing related supporting and guidance materials, and contributing to relevant capacity building activities. The data and scenario archive, documentation, technical guidelines and other IPCC supporting material provided by TGICA represent an authoritative source of information for the research community. To fully exploit the TGICA potential in the context of the evolving priorities, and to leverage the unique capacity of the TGICA, would require increased funding for TGICA and DDC beyond current levels, and full-time programme support beyond reliance on existing IPCC WGTSUs.

Full-time TGICA programme support. We envision a new position of one full-time professional for TGICA and DDC programme support that would serve the role of coordination of activities within TGICA, across the DDC centres, and between TGICA, the DDC, IPCC Working Groups and Secretariat (Table 1). Such support would also take over some functions currently supplied by the Working Group TSUs, such as meeting coordination, and logistics associated with scoping, hosting, and reporting from ad-hoc expert meetings the TGICA may propose.

Table 1: Resourcing of TGICA and the DDC during the AR5 and suggested for the future

2015 (AR5)	Future (AR6)
TGICA	
<i>Current and past technical support</i>	<i>Suggested technical support</i>
<ul style="list-style-type: none"> ● WG TSU during IPCC cycle - currently WG II; earlier WG I (WG III for some meetings) ● WG TSU has limited resources; variable workload; not co-located with TGICA Co-Chairs; lack of permanent support constrains TGICA effectiveness; disrupts continuity ● Support for meeting organization; meeting minutes and website; some TGICA correspondence; production of supporting material 	<ul style="list-style-type: none"> ● Professional full time programme support ● Experience of (climate change) research and administration located with TGICA Co-chair(s) <u>or</u> at DDC institution <u>or</u> at Secretariat <u>or</u> at a TGICA TSU ● Co-ordination of activities across TGICA, DDC centres, with WGs, with Secretariat; meeting organization including drafting agendas; minutes, website, production of TGICA supporting material; supporting contributions to capacity building (e.g. expert meetings, workshops, outreach)
<ul style="list-style-type: none"> ● TGICA resourcing: ~0.25 FTE/year during AR5 cycle 	<ul style="list-style-type: none"> ● TGICA resourcing: ≥1 FTE/year independent of IPCC assessment cycle
Data Distribution Centre	
<i>Current activities</i>	<i>Suggested additional activities</i>
<ul style="list-style-type: none"> ● Project management ● Partner liaison/Help desk ● Website re-structuring ● AR5 archiving ● Dataset linking ● Unified reporting system 	<ul style="list-style-type: none"> ● Generate content for less technical/resource-limited audiences ● Create dataset index (for traceability and cross-WG exchange) ● Archive increased data volumes to current DDC standards ● Archive results from IPCC assessed impact studies (observed and modelled) ● Greater support for data users (tools, software and guidance) ● Archive (rescue) and disseminate socioeconomic data/MIPs data ● Develop regionally relevant data and support materials that integrate across WGs.
<ul style="list-style-type: none"> ● DDC resourcing: 3 donor countries: 2.1 FTE/yr+ in kind equipment and facilities 	<ul style="list-style-type: none"> ● DDC resourcing: Donor countries: 4.5 FTE/yr+ in kind equipment and facilities

FTE = Full time equivalent staff

In addition, the support would serve an expanded role in two main areas:

1. Co-ordinating production of technical guidelines, fact sheets, and new material for the DDC by setting timelines, arranging virtual meetings, communicating with contributing authors, coordinating document review and publication.
2. Assisting TGICA in capacity building activities, including the possible organization of an annual or bi-annual workshop to serve developing region scientists, establishment of a contact point for feedback on TGICA guidance material and other initiatives, and maintenance of an existing list of networks for future outreach.

Establishing such a support position would greatly enhance the productivity of TGICA and its value to a broader community, and make the best use of the scientific and technical expertise of TGICA volunteer members and DDC managers. There are several options for location of such a position. The first option could be for a person to be located with one of the TGICA Co-Chairs, possibly funded by the nominating member country. However, this arrangement presumes that the Co-Chair remains in post for the full cycle, and may also pose difficulties of continuity between cycles. A second option would be for one of the countries supporting the DDC to host the position, with additional travel and subsistence funds for short-period secondments to work at the institution(s) of either or both of the Co-Chairs. A third option would be for the Secretariat to host the position with additional funds for short-period secondments. Finally, a more substantive option would be to accord TGICA an equivalent status to that of the IPCC Task Force on National Greenhouse Gas Inventories (TFI), with its own office and TSU.

Increased resourcing of the DDC. In addition, we propose increased funding for the DDC, to complement the current generous long-term support from the UK, Germany and USA (Table 1). We would estimate that an approximate 100% increase of personnel time allocated to the DDC, along with an expanded budget for infrastructural support (e.g. computers, data storage facilities) could yield substantial dividends. It would enable new datasets to be archived for which resources are currently insufficient, including data from chapters on observed impacts of climate change and impact projections from various global models. It would also facilitate an enhanced focus on linking to data and information for different world regions and on generic guidance for users in applying these. A third priority would be to improve accessibility and efficient distribution of data to users, especially in developing countries and EITs, where the potential for application of DDC data has yet to be fully realised. Finally, it would offer an additional impetus for the establishment of a dataset index (see Annex A) that could embrace a wider range of holdings than at present, including datasets from IAV research.

General strengthening of TGICA. Under all three options that assume a continued role for TGICA, its effectiveness could benefit from improved co-ordination of the TGICA nomination and selection process with that of the author selection for assessment reports, drawing from authors with data and scenario expertise as well as authors tasked with specific cross-Working Group activities. Liaison between the TGICA Co-Chairs and Working Group Co-Chairs could also be strengthened with a view to harmonising TGICA activities with the data and scenario needs of IPCC work during the assessment cycle.

3. Suggestion from the current TGICA membership

Based on the experiences of the current TGICA membership (2010-date), we suggest that IPCC strongly consider the merits of Option 3. A strengthened TGICA and upgraded DDC, with dedicated support and more efficient use of scientific and technical expertise, would bring greater value to the IPCC and to the climate change research community, offer continuity of archiving of data and information used in the IPCC assessments, support and guidance for worldwide knowledge transfer, and serve to buttress the cyclical process of IPCC Working Group and topical assessments.

Annex A: IPCC Assessment Dataset Index

The presentation of IPCC results relies heavily on references to data resources. Many visitors to the IPCC Data Distribution Centre web site are disappointed to find that data products cited by IPCC representatives are neither available nor discoverable through the IPCC DDC. The DDC has recently focused on making data which are held elsewhere discoverable, since resource limitations and intellectual property rights issues limit what can be held locally. A substantial range of resources referred to in the Fifth Assessment Report will be captured by the ongoing work by TGICA and the DDC to index the data used and provide appropriate links to the primary sources. This runs in parallel to ongoing efforts to collect core climate projections to ensure that this data are well documented and archived.

We propose the establishment of a cross-Working Group dataset index, which will exploit the system being used in the DDC for a posteriori capture of information about data and move to a more efficient procedure based on a priori capture of such information. The index would gather information from the authors as they prepare the report. The information would be no more than that authors would ordinarily be expected to record for their own use: where the data came from, an appropriate citation and possibly some keywords. The precise formulation of the questions to be answered would have to be agreed across TSUs, but should be of the order of 3 or 4 questions. The objective would be to reach an agreement on a level of information which is consistent with good practice and which can be recorded without disrupting the review process. The added value of the index would come not from any additional assessment but from being able to share information in a searchable form across Working Groups during report preparation and externally after publication.

The index would lead to efficiency savings by providing a systematic means of sharing information on data resources. It is important to decide on an appropriate level of detail, and this decision needs to be taken early in the review process (e.g. when the report outline is approved). From the DDC perspective, the implementation of an index would make it possible to develop a comprehensive index within the existing resource envelope.

There is an opportunity to improve substantially the way in which data resources are documented within the IPCC assessment reports. By exploiting a framework developed by TGICA and the DDC in co-operation with the Working Groups, this improvement can be achieved with modest resources.