Pre-scoping questionnaire's responses for IPCC special report: Impact of global warming of 1.5 ºC above pre-industrial levels

Background

The 21st Conference of the Parties (COP21) to the United Nations Framework Convention on Climate Change (UNFCCC) negotiated the Paris Agreement, a global agreement on the reduction of climate change, the text of which represents a consensus of the representatives of the 196 parties attending. The COP21 Paris Agreement seeks to strengthen the global response to climate change's threat, limiting the increase of global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels. In addition, a balance is sought between anthropogenic emissions by sources and removals by sinks in the second half of the 21st century. Nationally determined contributions will be evaluated on a 5-year cycle through a global stocktaking mechanism being established by the UNFCCC, supported by a facilitative dialogue in 2018, and a first formal review in 2023.

The Paris Agreement issued an invitation to the Intergovernmental Panel on Climate Change (IPCC) to provide a special report in 2018 on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways. The IPCC accepted the invitation at its 43rd Session (11-13 April 2016, Nairobi, Kenya), noting the context of strengthening the global response to the threat of climate change, sustainable development and efforts to eradicate poverty and scheduled a scoping meeting for the special report, to be held from 15-18 August 2016 in Geneva, Switzerland.

Ahead of the scoping meeting for the special report, the IPCC invited interested parties to fill a questionnaire prepared by the scoping meeting Scientific Steering Committee and offer recommendations on the structure, format and contents of the special report. The questionnaire was sent by the IPCC Secretariat to all IPCC focal points and observer organisations. The questionnaire consisted of 12 questions combining multiple-choices, scaled and open-ended questions soliciting the respondents to address a broad range of issues. The deadline for submission of the contributions was set the 15th July, 2016. The questionnaire is provided in Appendix A.

Understanding the impact of global warming of 1.5°C above pre-industrial levels and the associated transformative pathways necessitates a concerted level of multidisciplinary dialogue and integration of knowledge. This special report poses challenges for the IPCC, requiring a cross-Working Group oversight.

The current document provides a brief analysis of the questionnaire responses and a synthesis of the findings. Section 1 discusses features of the respondents' population. Section 2 narrows down the analysis by categories of responses including: (i) population of respondents, (ii) priority needs and areas of expertise, (iii) sectors of interests, (iv) geographic distribution, and (v) emerging key questions. Section 3 discusses options for the special report format and related recommendations.

1. Methodology

The analysis of questionnaire's responses is undertaken by triangulating the responses through clustering and ranking areas of interest, key topics and common patterns, identifying emerging trends, and measuring the frequency of requests. Wherever feasible, outputs are normalised (by type of population), and priority interests are contextualised (for instance by representativeness of the categories). Topics of interest are catalogued and counted using a quasi-objective approach.

The analysis of findings is conducted through splitting the global sample size population into six main categories including institutional responses, individual responses, focal points, observer organisations, developing countries, and developed countries. Results from the global sample size population are also compared against those from the different respondents' categories.

2. Typology of respondents

A total number of 226 questionnaire responses were received – with more than half of the responses originating from research institutes, academia and national government representatives (Figure 1.1). The other half of responses originates from IPCC focal points, observer's organisations, and NGOs. Only few contributions reflect views of the industry sector and local authorities.

While 143 responses express an individual opinion, 99 responses reflect the view of affiliated institutions. In terms of geographical distribution, responses are unbalanced and predominantly provided by respondents based in developed countries, particularly in Europe and North America (Figures 1.2 – 1.4).

The global sample size population spans a wide range of expertise, but questionnaire's responses are dominated by contributions from experts in the areas of physical science, natural resources, energy, water management, social sciences, agriculture and food security, and economics (Figure 1.5). The individuals, institutional and focal points' responses share a similar trend.

Figure 1.6 provides further insight on the spectrum of available expertise, focusing on the following four respondent's top ranked organisations: energy, agriculture and food security, water and health. The predominant contribution of individuals with expertise in physical and natural sciences persists, but expertise in policy and law, and coastal issues are important feature of the national governments' population.

Figure 1.7 depicts the regional distribution of expertise. The expertise tends to be concentrated within Europe and North America – in line with the regional distribution of respondents' responses, in particular the individuals and Academia's responses. The institutional responses indicate strong contributions from Africa, Asia and Europe.

3. Report's content

3.1. "In your vision, which are the main, relevant elements that could be addressed in the Special Report?"

The responses of the survey's first question resulted in identification and ranking of 63 key topics (Appendix B). Figures 2.1-2.4 illustrate the key topics, considering specifically the regional distribution, global sample population, institutional responses, individual responses, and focal points' responses. The topics of interest vary across regions, though there is high level of agreement on the top priority subjects to be discussed in the special report.

Globally, the questionnaire's responses are dominated by the following topics:

- differential impacts;
- emission and mitigation pathways;
- improved understanding and knowledge review;
- regional aspects;
- adaptation;

- cost-benefit analysis;
- climate extremes;
- feasibility of 1.5°C global warming above pre-industrial levels;
- sectorial impacts;
- sustainable development;
- avoided impacts

Institutional and focal points' responses are in particular concerned with:

- differential impacts;
- emission and mitigation pathways;
- regional aspects;

Individual responses show a similar trend, but with increased focus on the issue of sustainable development.

Figure 2.5 compares the interests of developing and developed countries. The two set of countries converge in that assessing the differential impacts across different levels of warming is a top priority issue. Developing countries also prioritise regional aspects and improved knowledge, while, developed countries show strong interest for emission and mitigation pathways, cost-benefit analysis, climate extremes, and avoided impacts.

2.3 Emerging scientific questions

The top priority scientific of the global population's responses can be framed as follow:

- What local-to-regional, sectorial and socio-economic impacts are avoided with limiting global temperature warming to 1.5?
- What is the adequacy of research attempting to quantify the differential impacts of 1.5C, 2C and beyond global temperature targets, taking into account the contribution of short-lived climate pollutants (black carbon, methane, hydrofluorocarbon, and ozone)?
- What development and emissions pathways (including with/without negative emissions and/or overshoots) are consistent with limiting the rise in global mean surface temperature to no more than 1.5degC?
- Feasibility of the 1.5-degree temperature rise limit and implications for adaptation strategies, emission pathways, mitigation pathways and sustainable development goals (SDGs)?

The academia and research population shows particular interest for the following issues:

- Assessing the timescales for dangerous climate change and accounting for areas of unharnessed mitigation potential for limiting global temperature warming to 1.5°C.
- Providing paleoclimate perspectives in assessing the avoided impact under different global temperature targets

A few contributions from national governments and academia stress the need to discuss options for geoengineering, especially BECCS (Biomass energy with Carbon dioxide Capture and Storage) that would be affordable and estimate the feasibility and horizon for availability.

2.4 Question: "Please highlight emerging knowledge (including scientific, technological, policy) that you consider highly relevant for this Special Report. Are there any potential overlaps with assessment reports from other bodies?"

The emerging knowledge include:

- FAO's data on crop, livestock, fisheries and forestry. FAO is conducting impact assessment under 1.5° C global temperature target and developing information system on damage and losses from climate extremes in agriculture. FAO's data could be used and analysed for the report.
- Literature from the HAPPIMIP (Half a degree Additional warming, Prognosis and Projected Impacts; http://www.happimip.org/) or ISIMIP (Inter-Sectoral Impact Model Intercomparison Project; https://www.isimip.org/) projects will be available soon.
- Recently published articles with a focus on the issue of 2.0°C and 1.5°C, as well as differentiation of climate impacts at different levels of warming – including trend, cost, and availability of renewable energy (Mitchell et al.,2016; Schleussner et al., 2015); .
- The PAGES (PAst Global changES; http://www.pages-igbp.org/ini/wg/floods/intro) Floods Working Group was launched in autumn 2015 with the aims to gather all scientific communities working on historical and natural archives and document past floods.
- New literature on the integrated assessment model (IAM) emissions pathways that assume significant negative emissions technologies, such as BECCS (e.g. impacts on food security: Wiltshire et al., 2016; http://www.avoid.uk.net/publications/).
- New literature on estimates of the global economic impacts of climate change, particularly failure to reflect differential impacts between 1.5 and 2.0°C global temperature targets (Stern, 2016;http://www.nature.com.biblioplanets.gate.inist.fr/polopoly_fs/1.19416!/menu/main/topColumns/topLeftColumn/pdf/530407a%20%28corrected%29.pdf).
- Methodological developments to assess policies and measures that integrates social, environmental and economic aspects have emerged in the last decade.
- New research on regional climate change and future climate projections – focusing on the specific influence of short and long-lived climate pollutants, spatially and temporally resolved extreme events

2.5 Question: "In your view, which sectors would you deem relevant to be addressed in the report? Please prioritize your choices (maximum 300 characters)"

The sectorial interest varies across categories of the population and regions, but globally a strong demand is directed toward the following sectors (Figure 2.6):

- Energy;
- Agriculture and food security;
- Water;
- Transport;
- Health;
- Forestry;
- Urban and cities;
- Land use;
- Infrastructures;
- Education

There is a great deal of convergence between institutional and individual responses, developing and developed countries – with emphasis put on the energy, agriculture and food security, water, transport and health sectors (Figure 2.7 – 2.8). Developed countries and academic community are also concerned with the transport sector.

2.6 Question: "Which stakeholder challenges or decision contexts is this Special Report relevant for? Please rate (low, lower, medium, high priority) each of the following key words:

The decision making context span a wide range of issues, but high priority is given to sustainable development, adaptation and mitigation. However, institutional and individuals' responses place also some emphasis on disasters and risks, and increasing resilience (Figure 3.1).

2.7 Question: "How do you expect this special report be used and what is its expected impact for your institution and/or field of expertise? (Maximum 600 characters)"

The main expectations for the special report is to provide the scientific foundation for:

- informing climate policies, programs, and services as well as adaptation and mitigation decision-making;
- raising awareness of impacts and ability to assess vulnerability of sectors, regions and populations;
- enhancing adaptive capacity and resilience

3. Format of the special report

3.1. Question: "Please provide your suggestions for the format of the Special Report)?"

A majority of questionnaire responses underline the need for limiting the report size to 5 chapters and 200-300 pages (Figures 3.2 – 3.4). A few observer organisations and NGOs favour instead a report of larger size with 6 to 8 chapters.

3.2. Appendix and technical summary

Figure 3.5 illustrates the global view on elements to be included in the appendix and technical summary sections. For the appendix section, the dominant request is for a description of methodologies and datasets, and a discussion of case studies. The technical summary should be small in size, written in technical but clear language, and highlight key findings.

Summary for policy makers and frequently asked questions are perceived by the majority of respondents as critical components of the special report. These should be concise and for example, follow the format used in the IPCC fifth assessment report.

Conclusions

This document provides an evaluation of the pre-scoping questionnaire responses on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, establishing a basis for understanding the nature of these responses. The respondents' population span a wide range of geographic regions, areas of expertise, opinions (institutional and individual), and organisations. Overall, suggestions for key topics to be dealt with in the special report include differential impacts, emission and mitigation pathways, improved knowledge and understanding, regional aspects, adaptation, cost-benefit analysis, climate extremes and feasibility of

1.5°C global warming above pre-industrial levels. The respondents' population by enlarge favour a small sized report of 5-6 chapters, 200-300 pages, with concise appendices and technical summary.

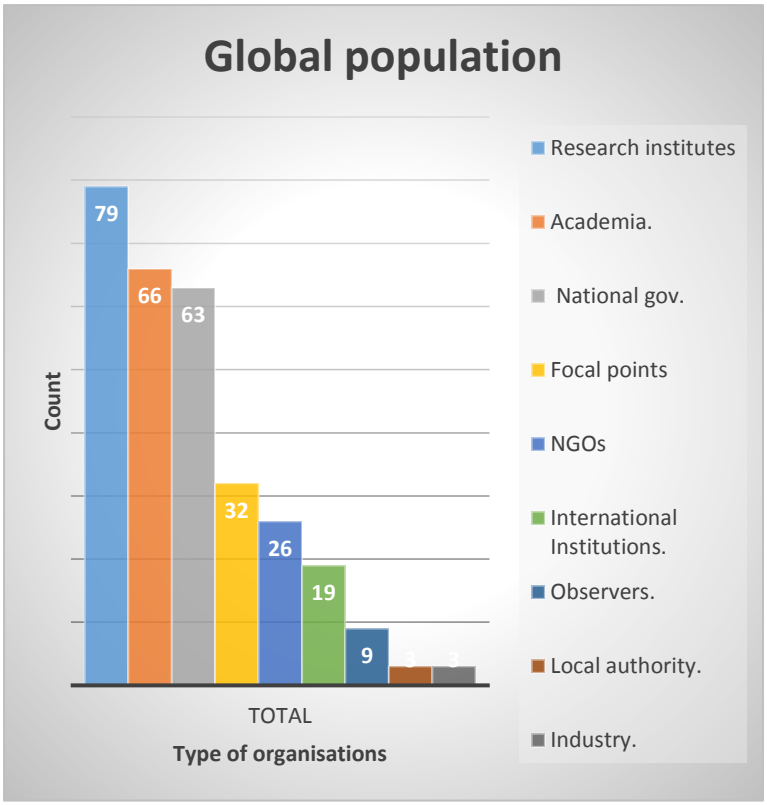


Figure 1.1: Global respondents' population

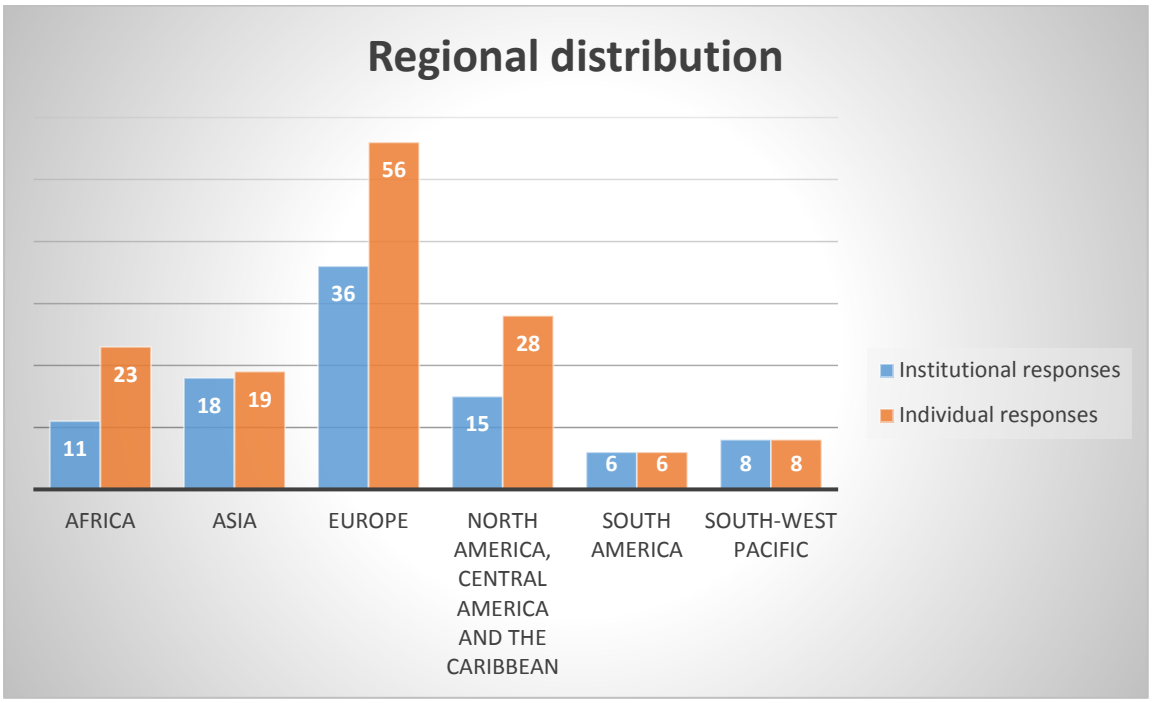


Figure 1.2a: Regional distribution of responses

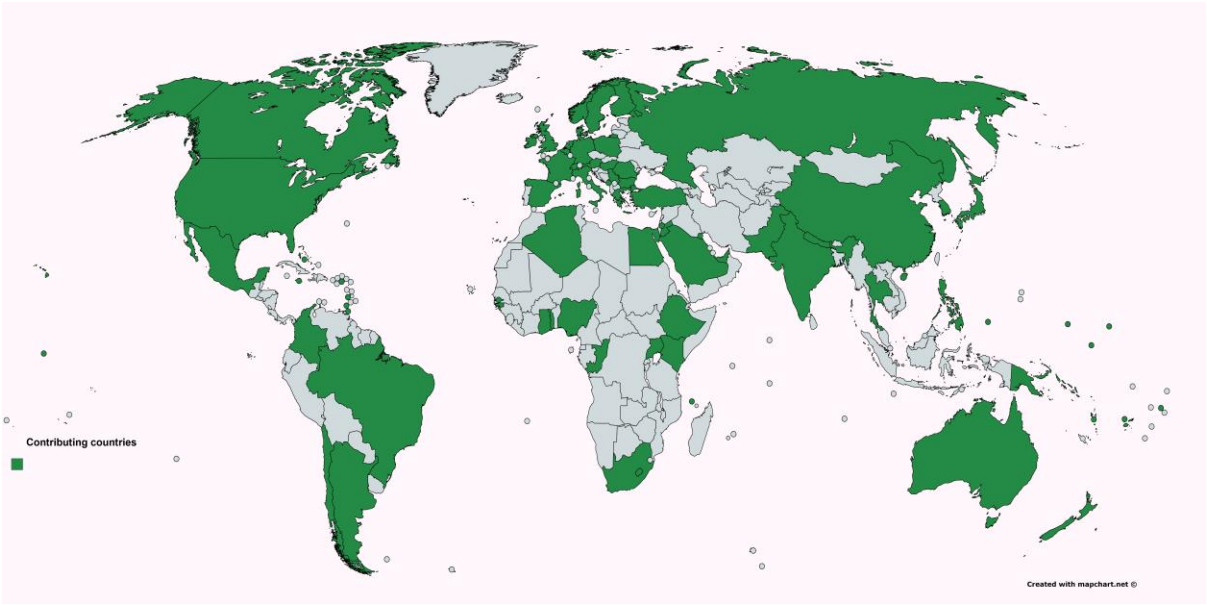


Figure 1.2b: Countries contributing to the survey

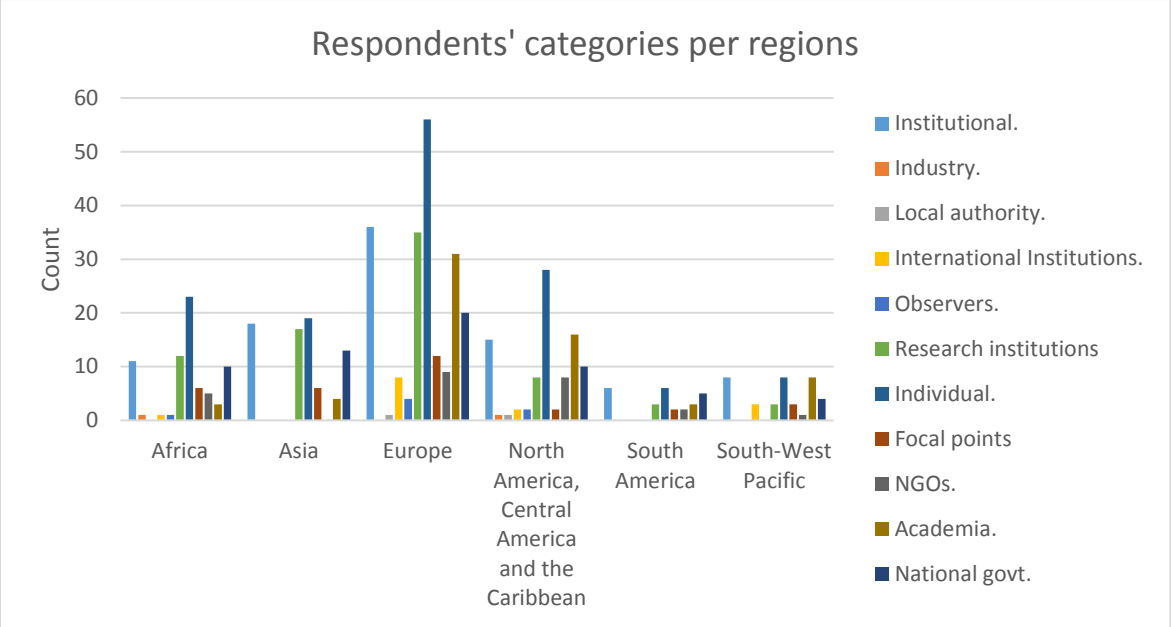


Figure 1.3: Regional distribution of responses per organisations and opinions

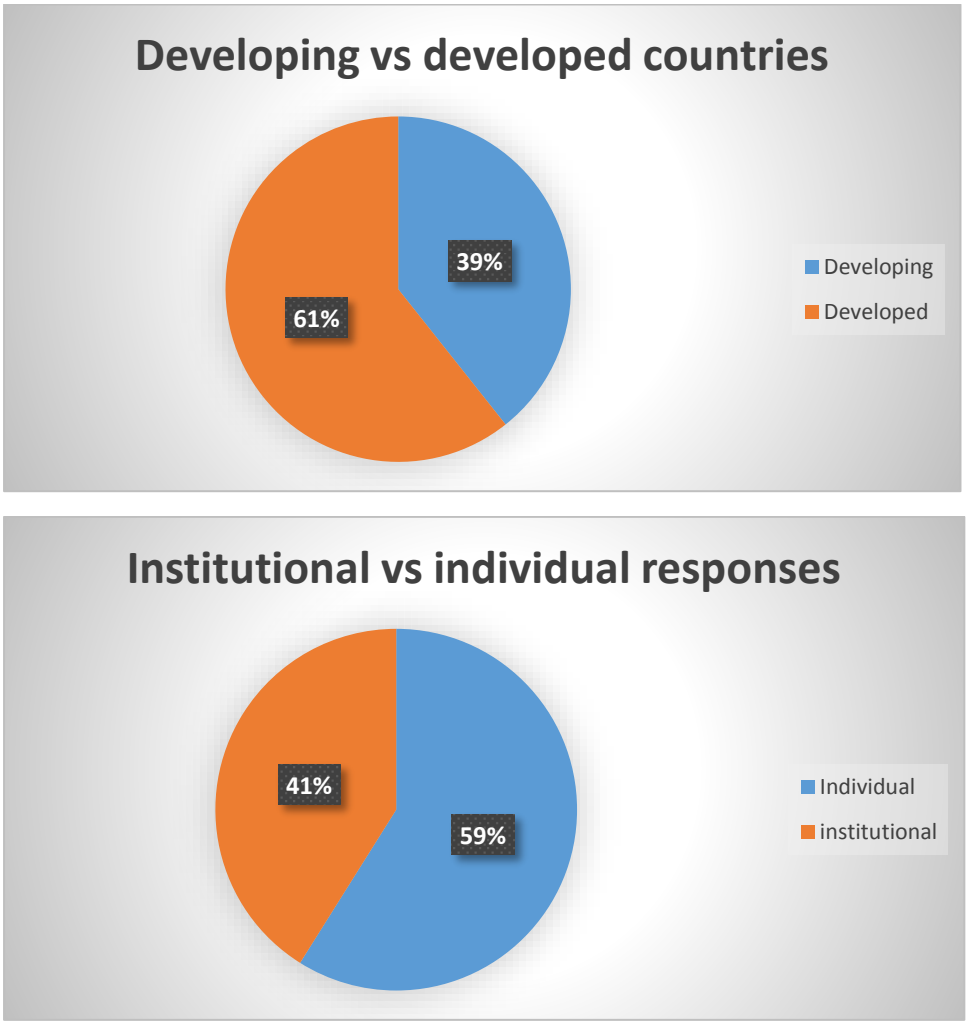


Figure 1.4: Global view of responses per country development ranking and opinion

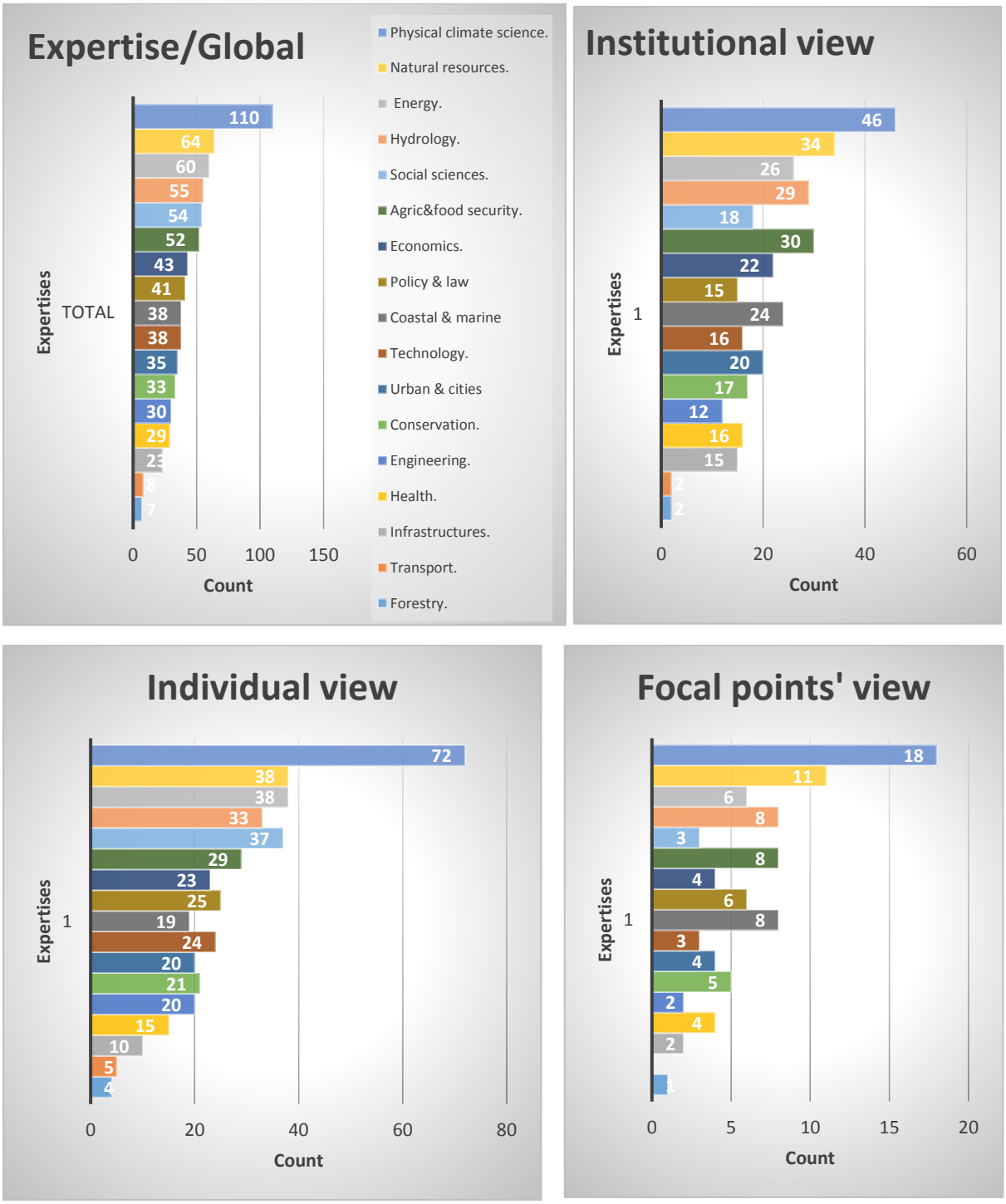


Figure 1.5: Fields of expertise within the global sample size population, institutional and individual responses

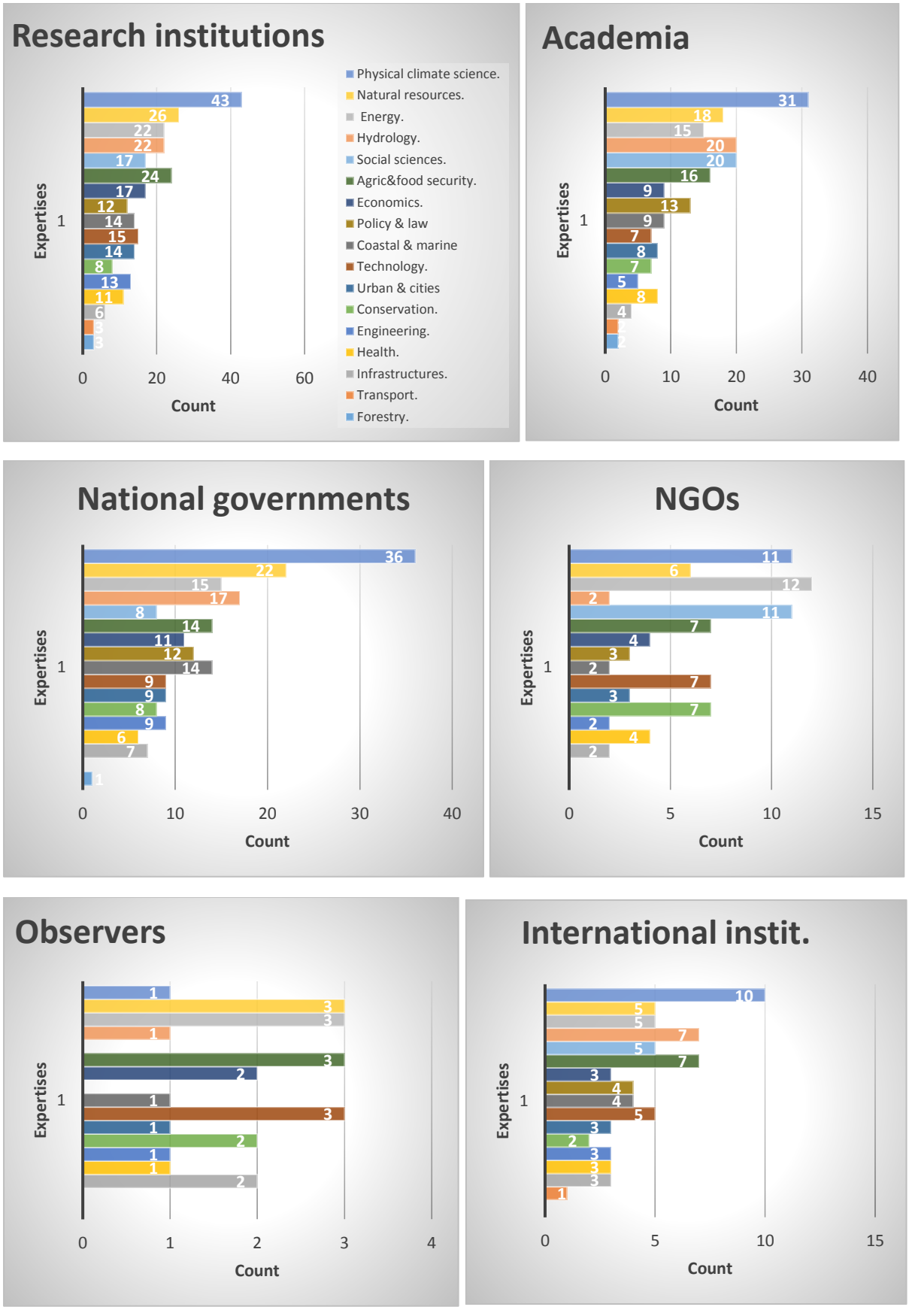


Figure 1.6: Fields of expertise within research institutions, academia, national governments, NGOs, observer organisations, and international institutions responses

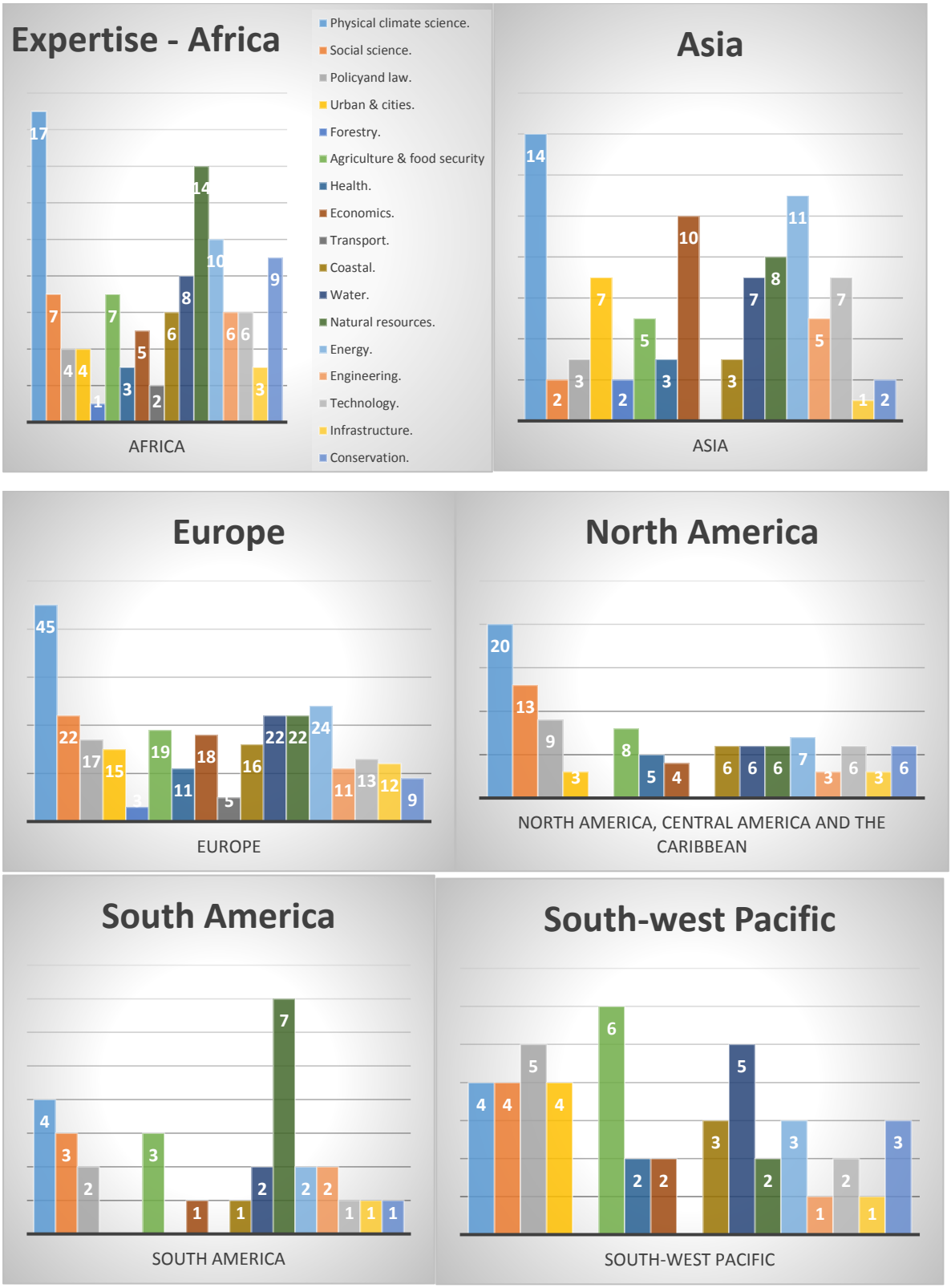


Figure 1.7: Regional distribution of expertise.

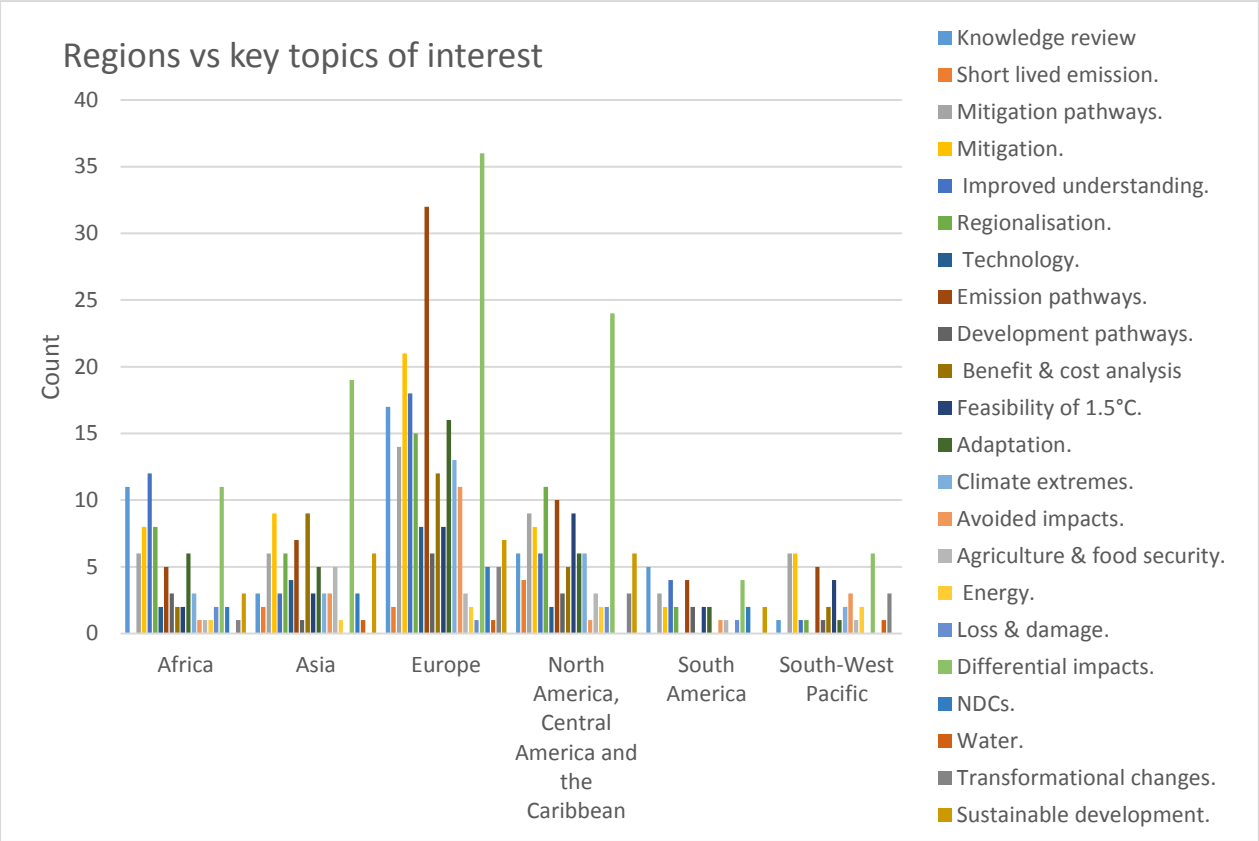


Figure 2.1: Topics of interest per regions

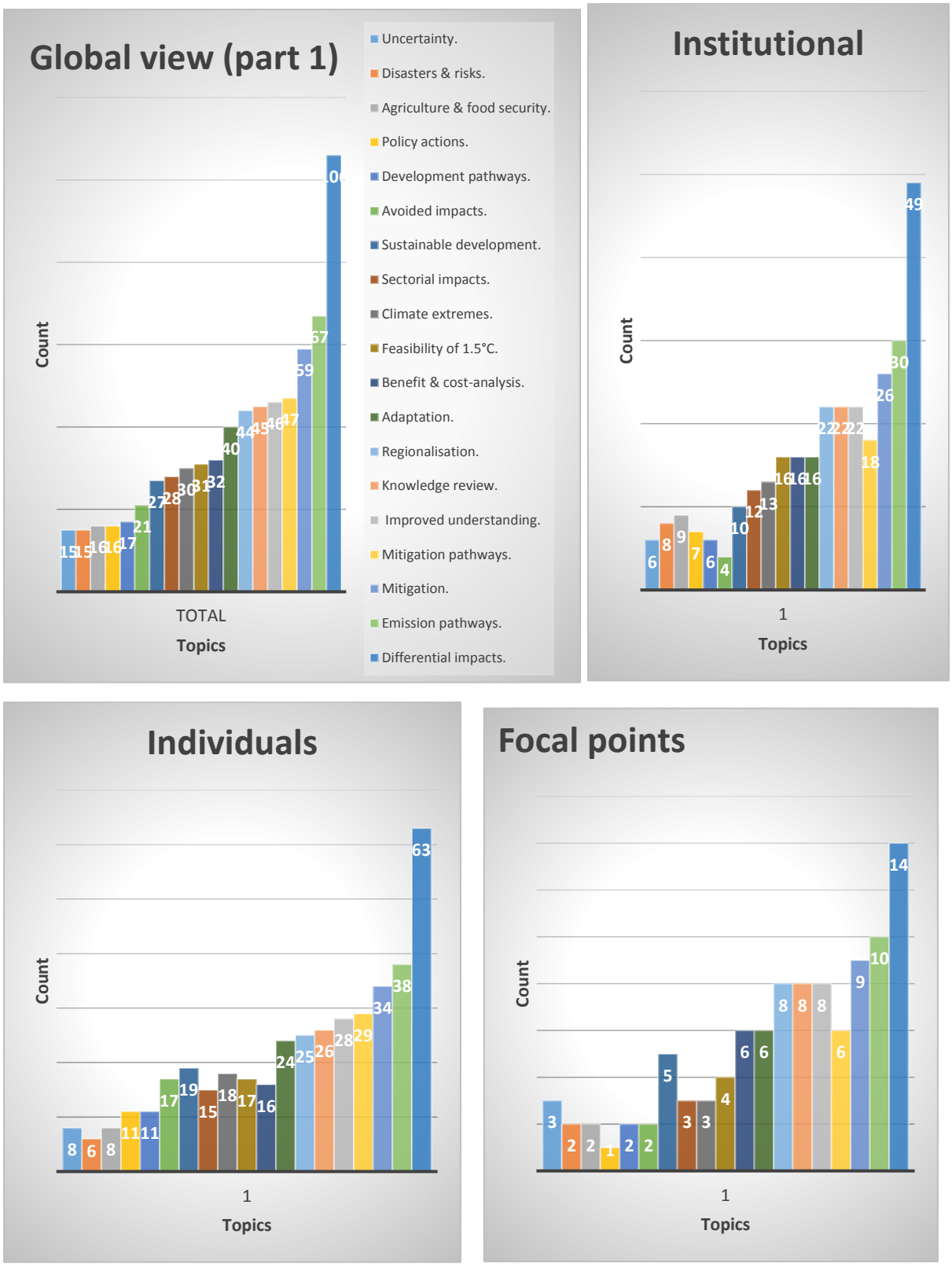
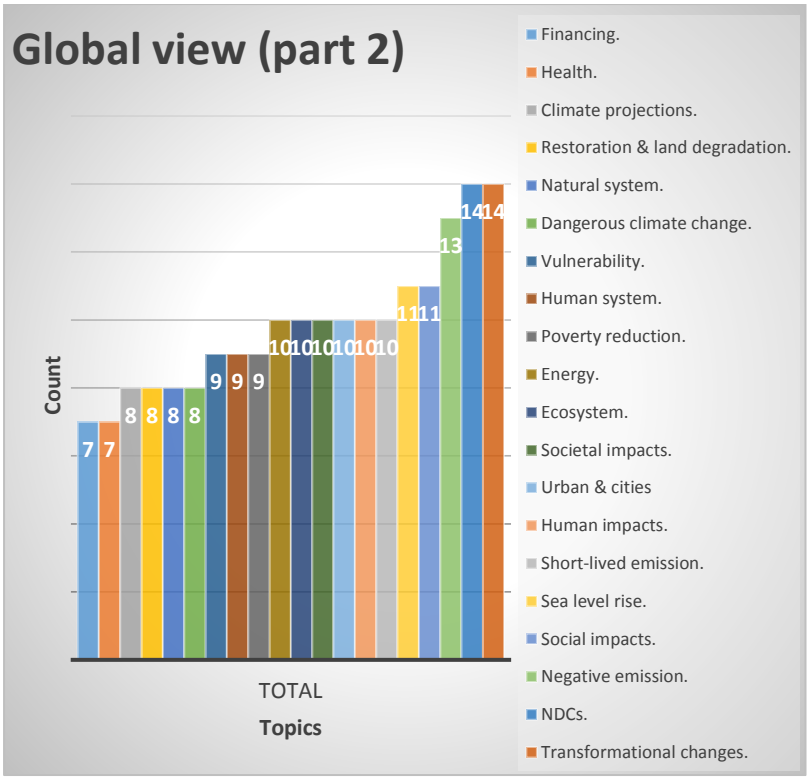
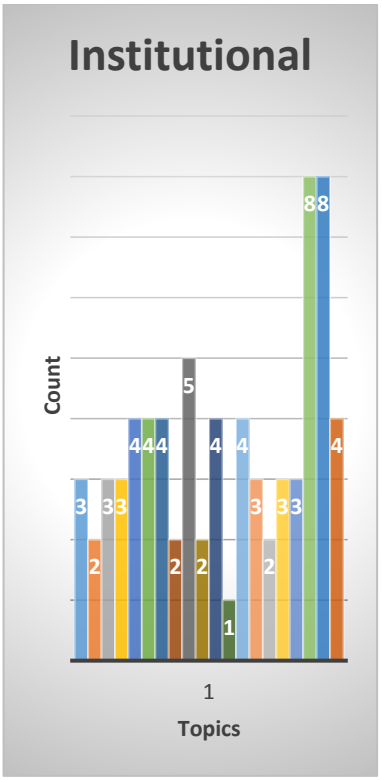
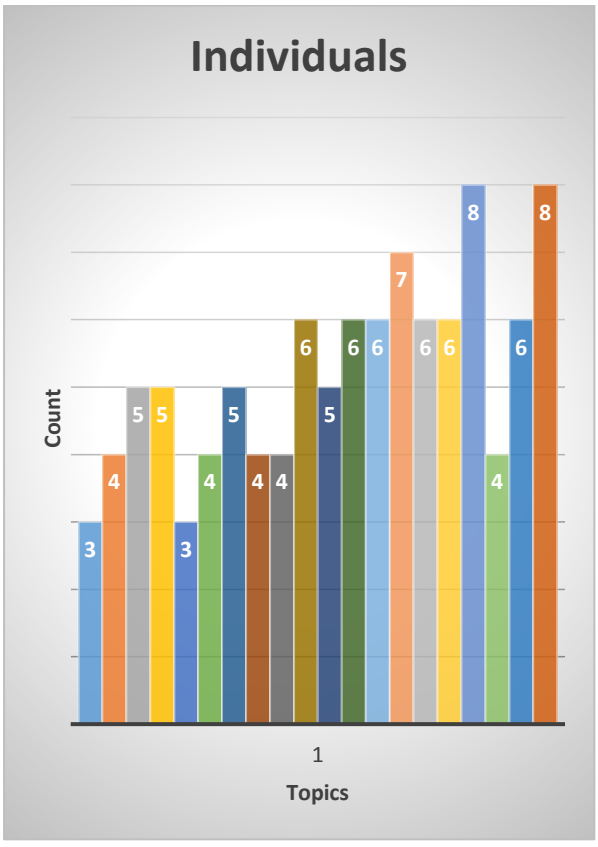


Figure 2.2: Key topics for the global sample size population, institutional and individual responses, and focal points' community (part 1)







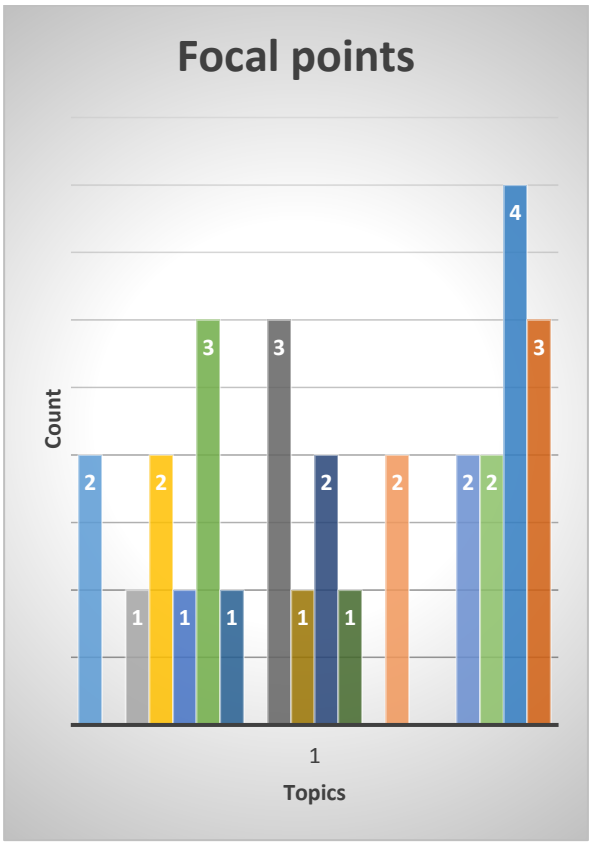


Figure 2.3: Key topics for global sample size population, institutional and individual responses, and focal points (part 2)

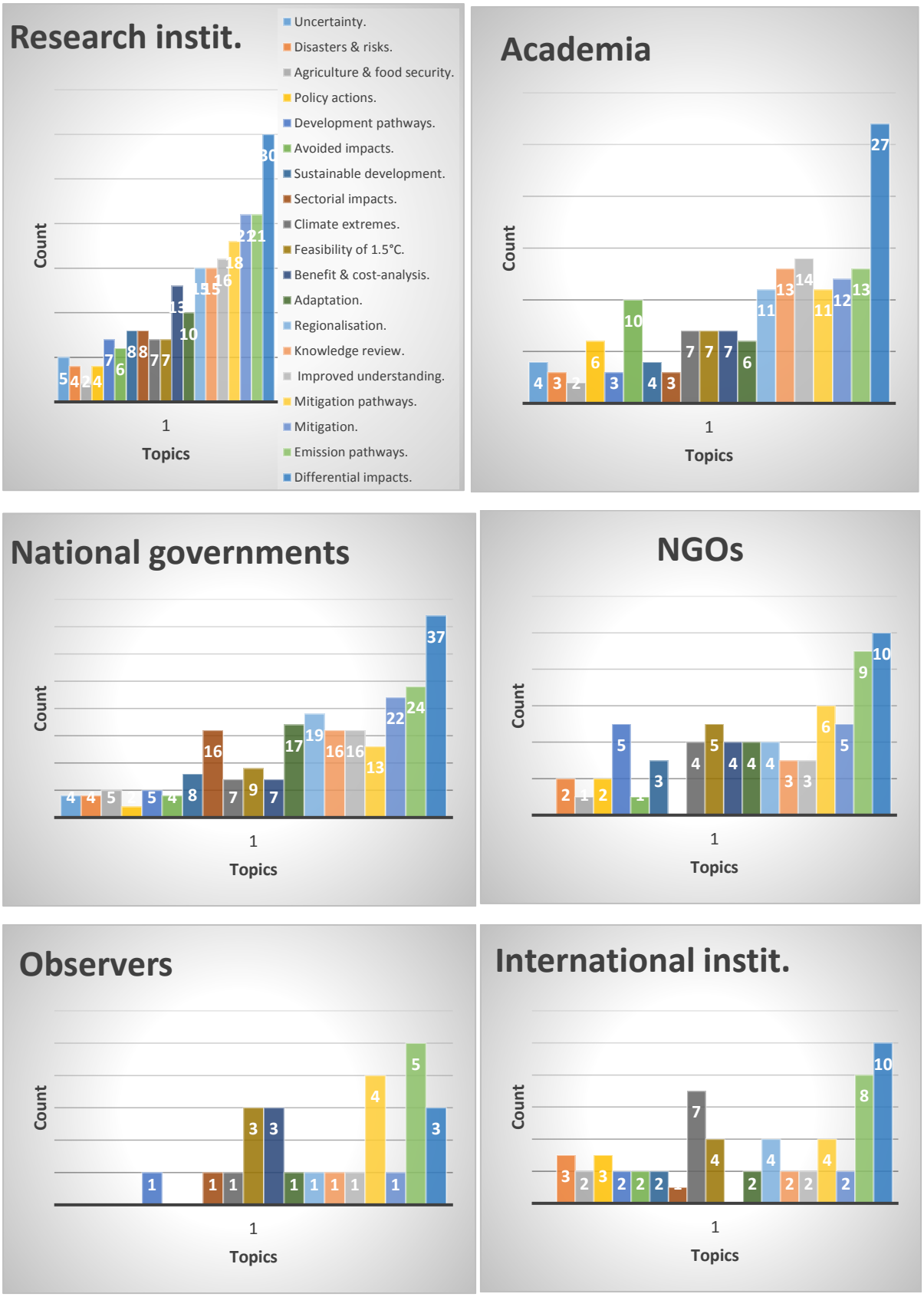
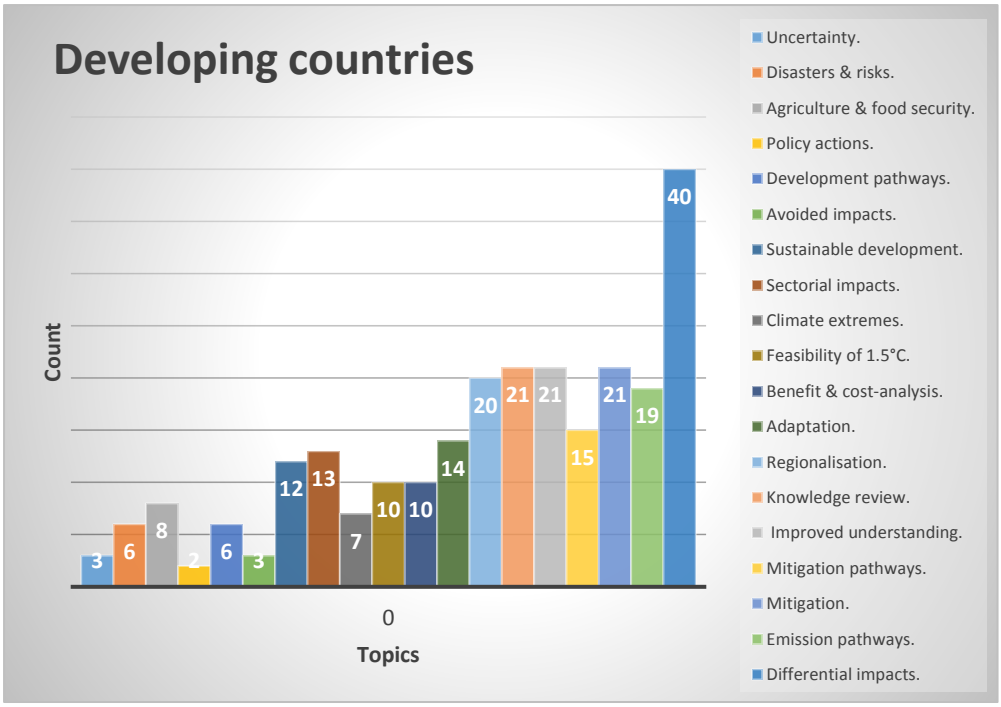


Figure 2.4: Key topics for research institutions, academia, national governments, NGOs, observer organisations, and international institutions responses



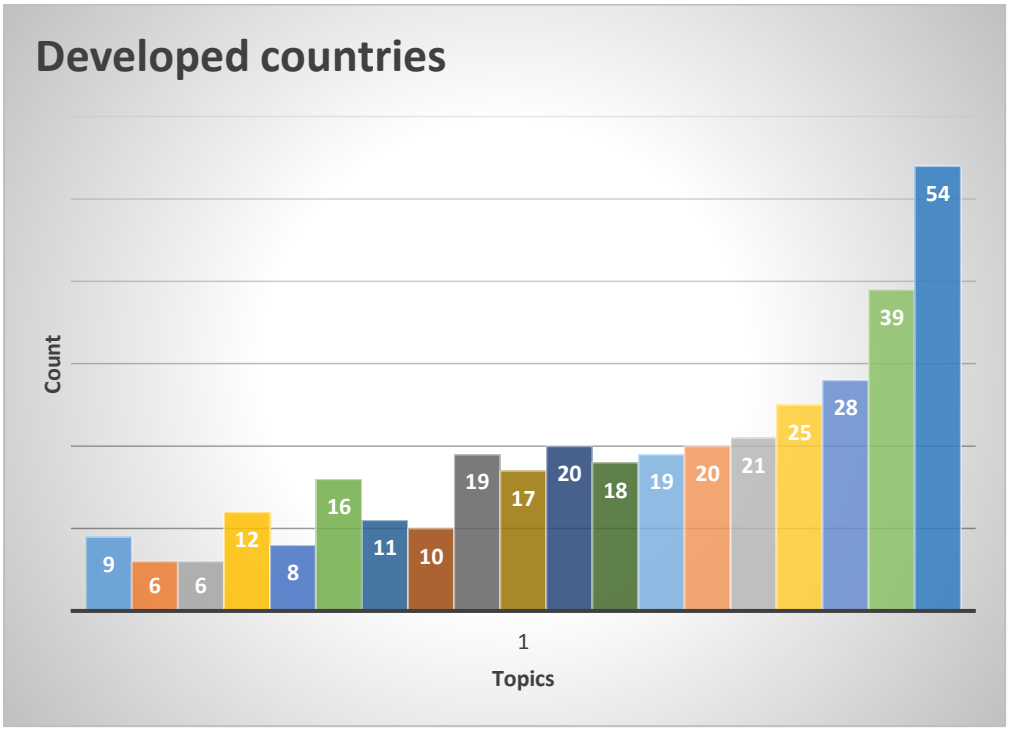


Figure 2.5: Topics of interest for developing and developed countries (part 1&2)

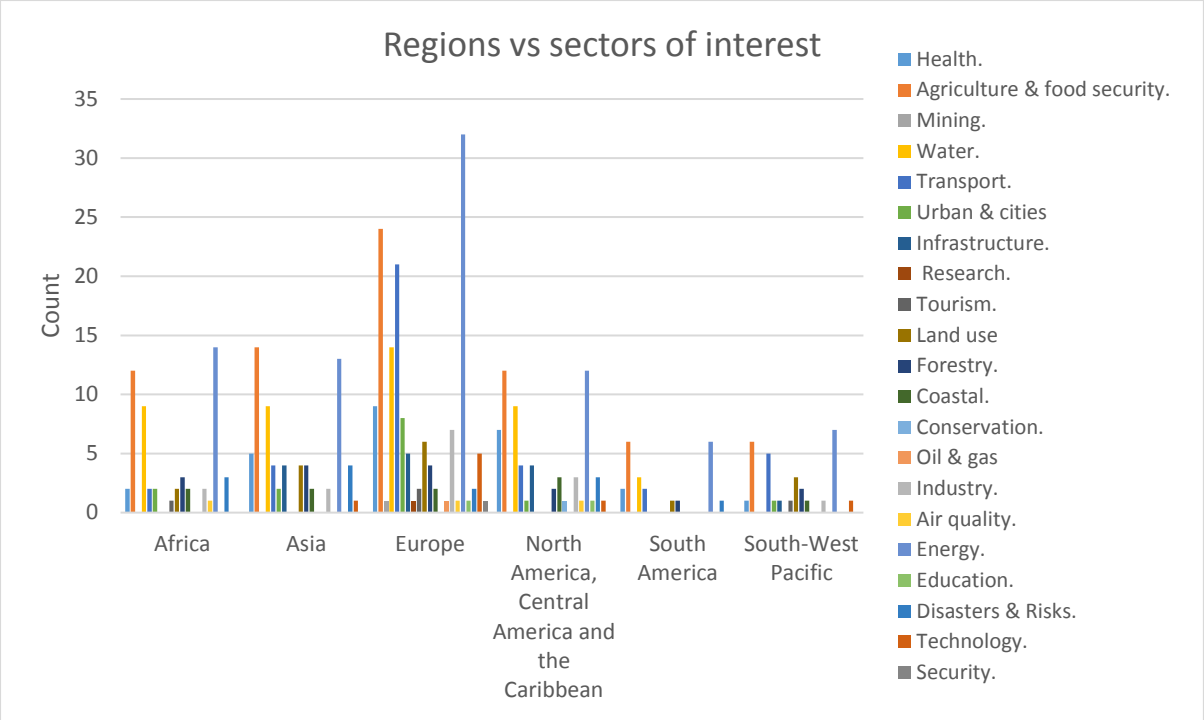


Figure 2.6: Regional distribution of sectorial interest

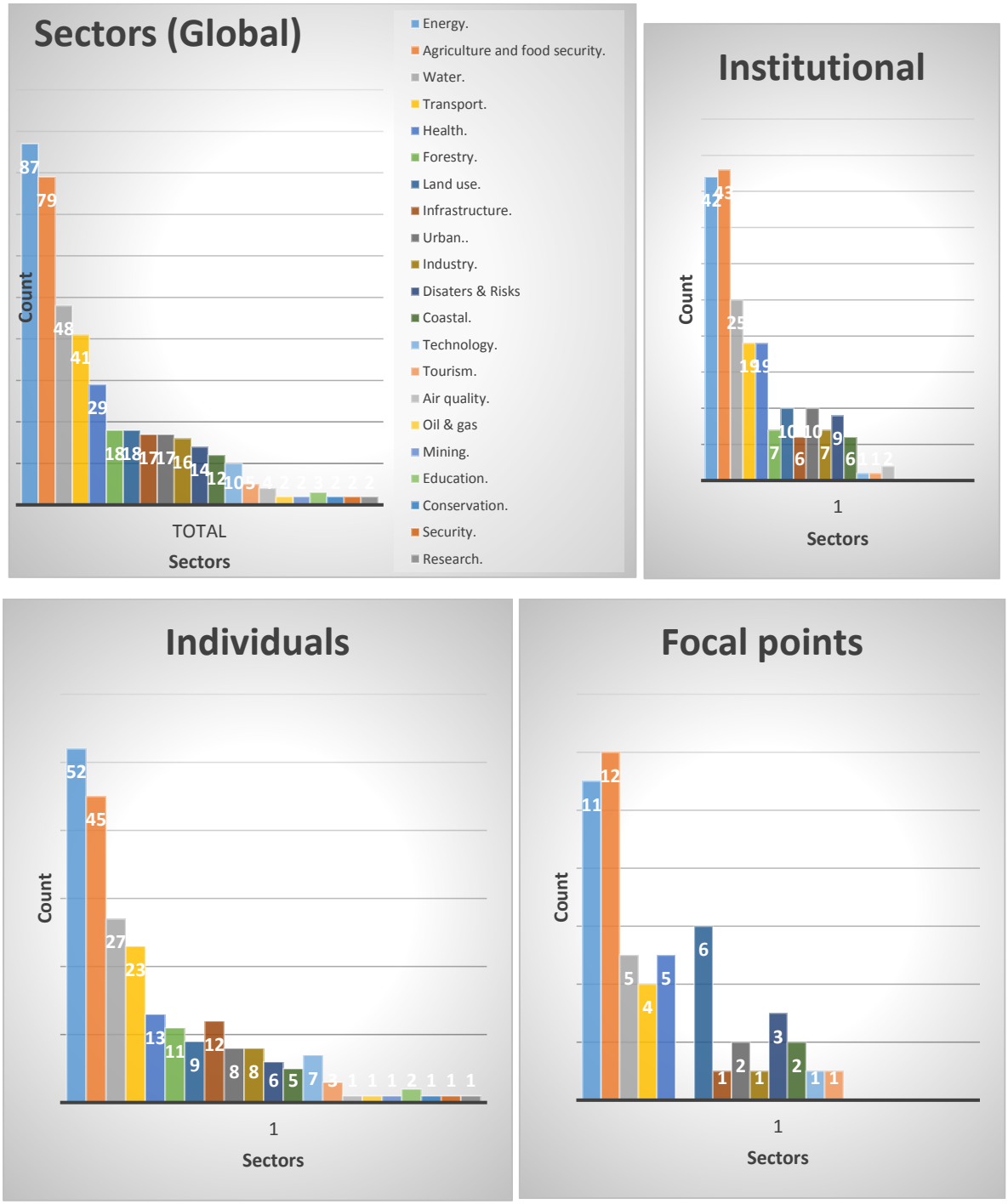


Figure 2.7: Sectors of interest for global sample size population, institutional and individual responses, and focal points

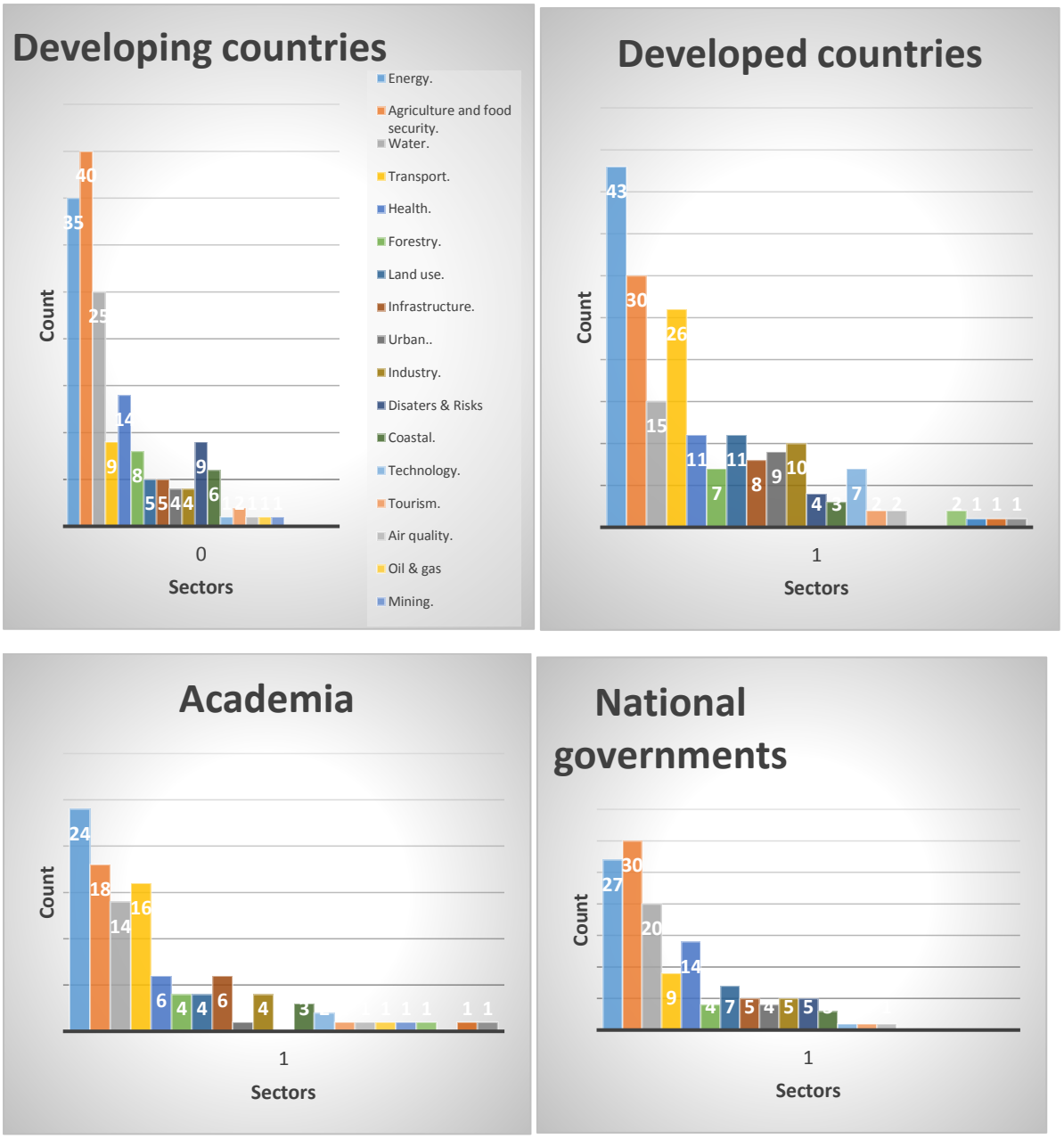


Figure 2.9: Similar to figure 2.7 but for developing and developed countries, academia and national governments.

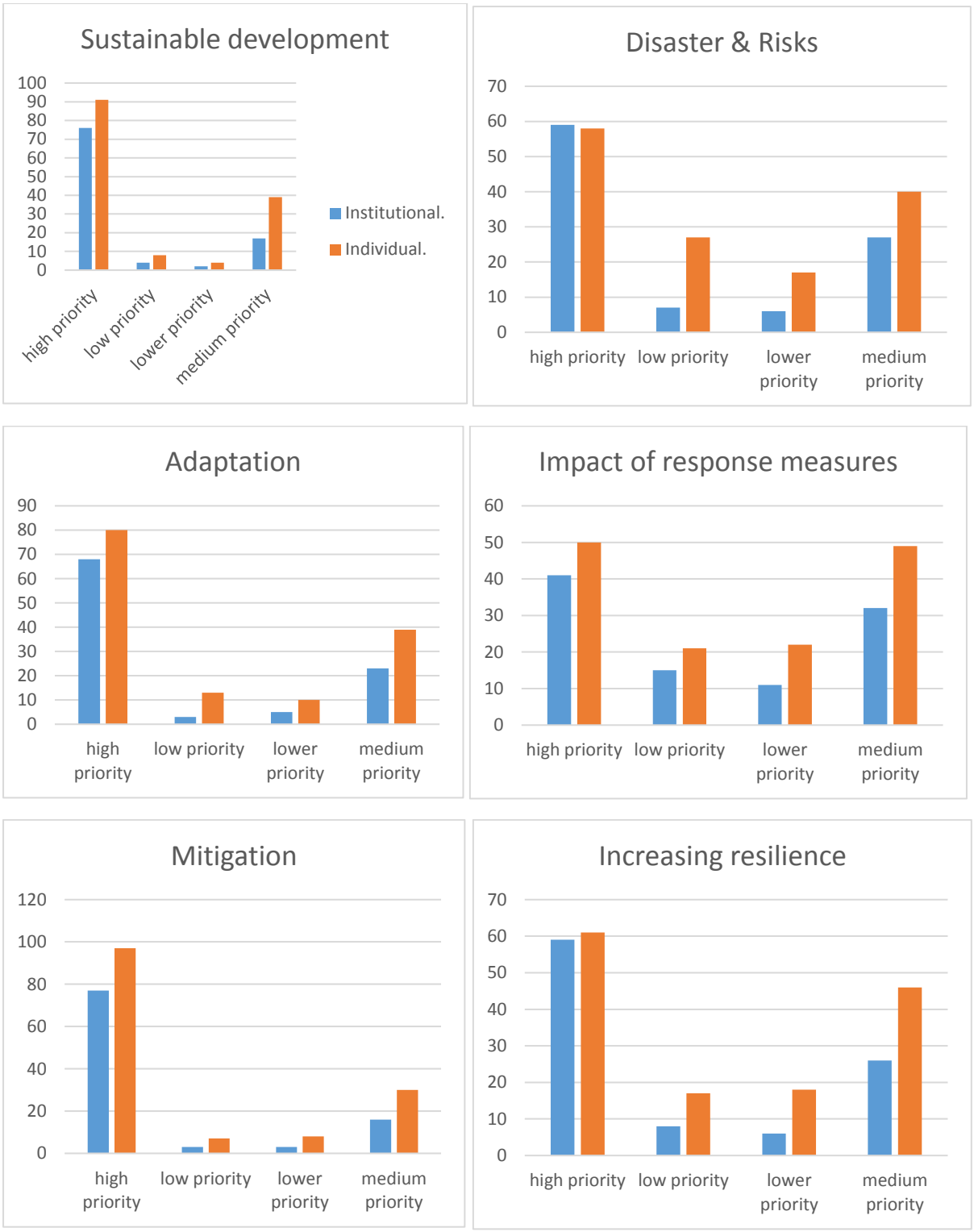


Figure 3.1: Stakeholder challenges: institutional versus individual responses

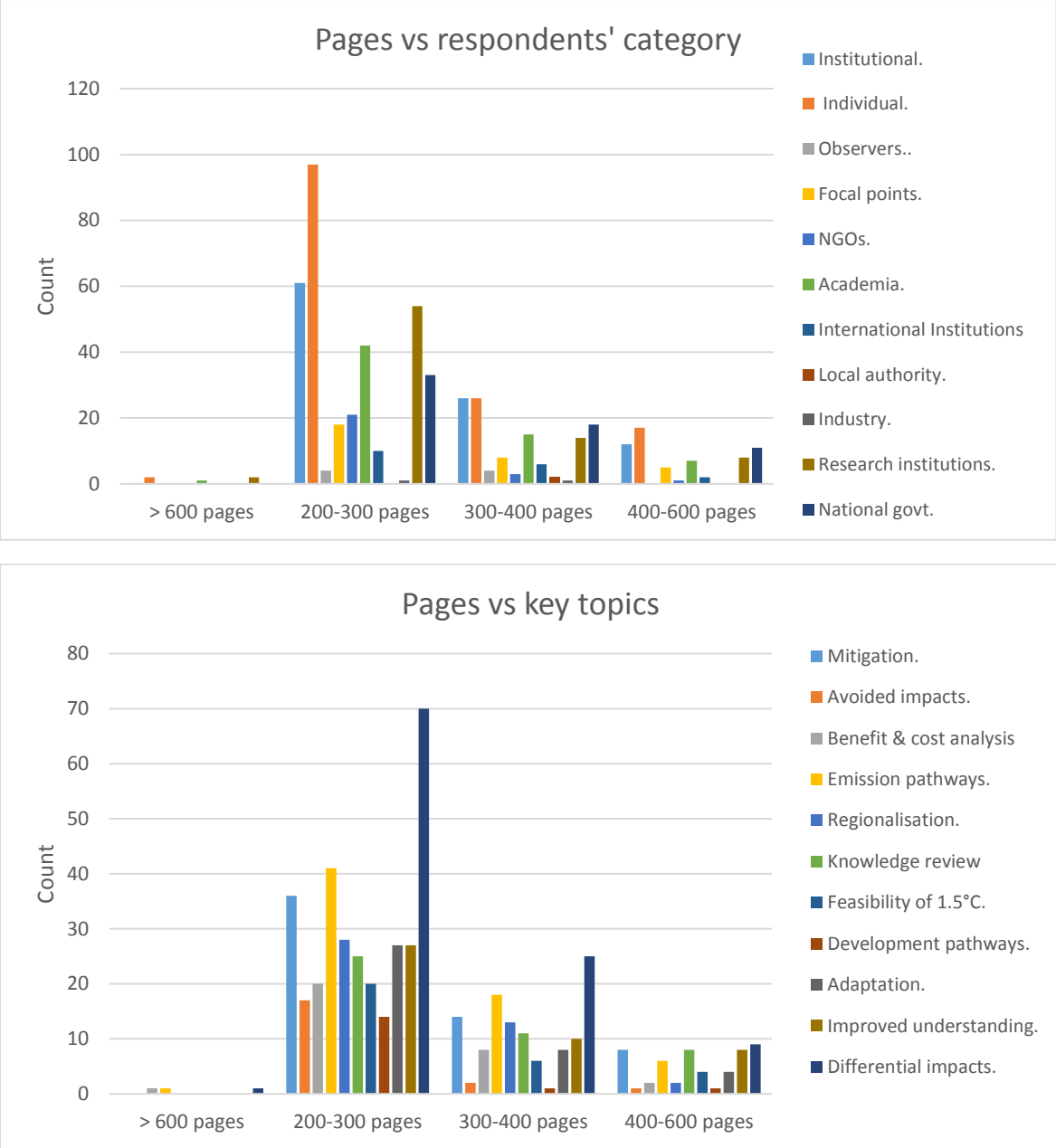
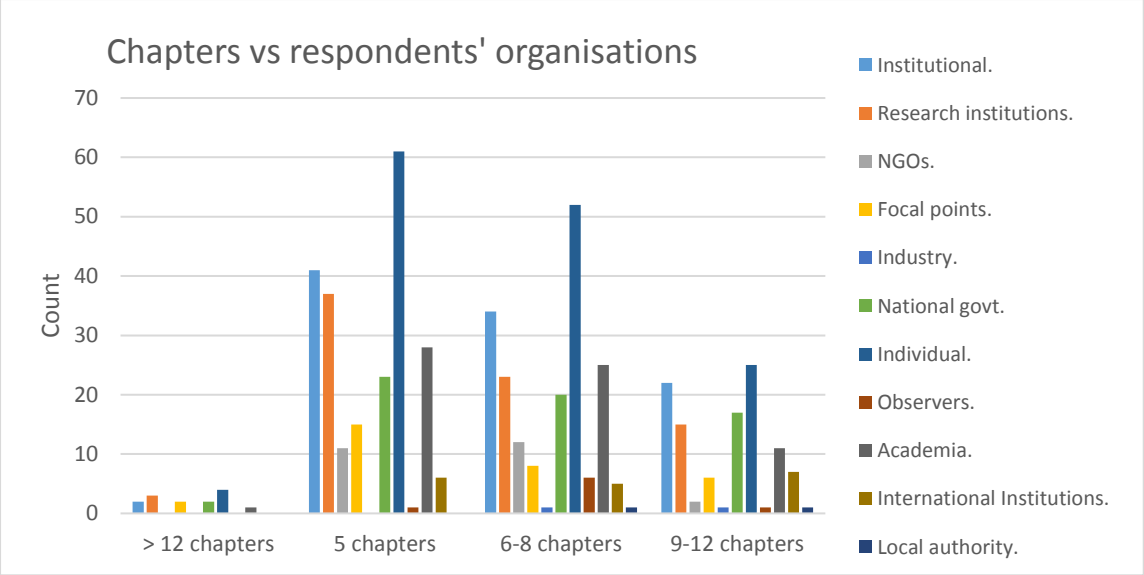


Figure 3.2: Number of chapters from key respondents' topics



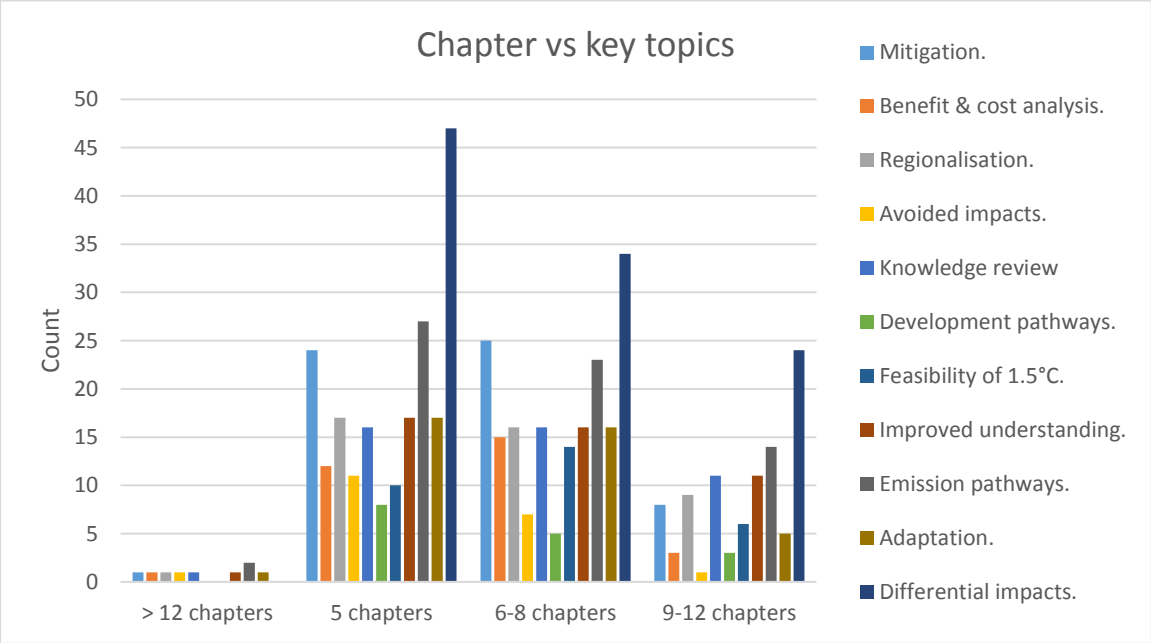


Figure 3.3: Number of chapters per key respondents' organisation and topics

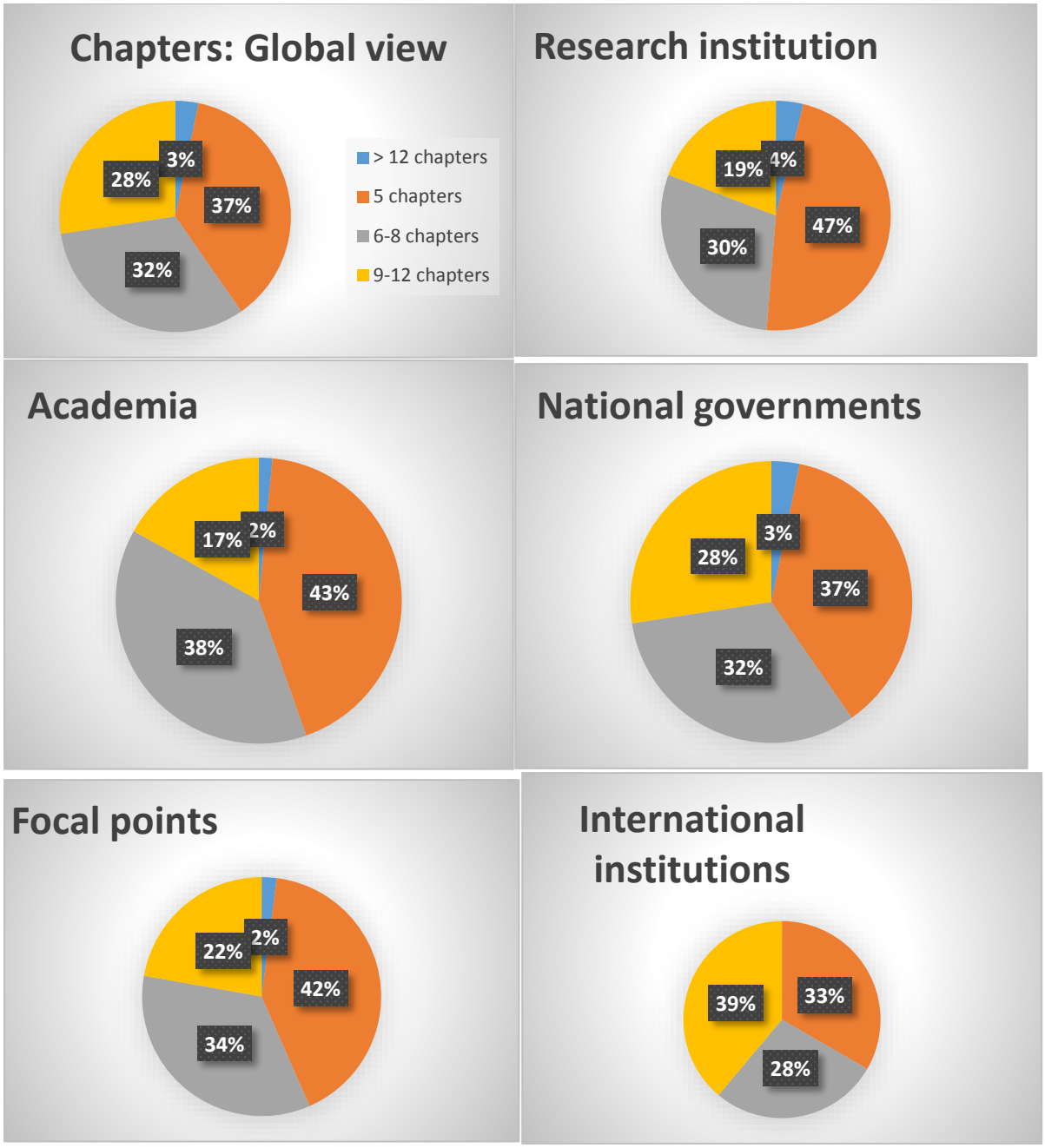
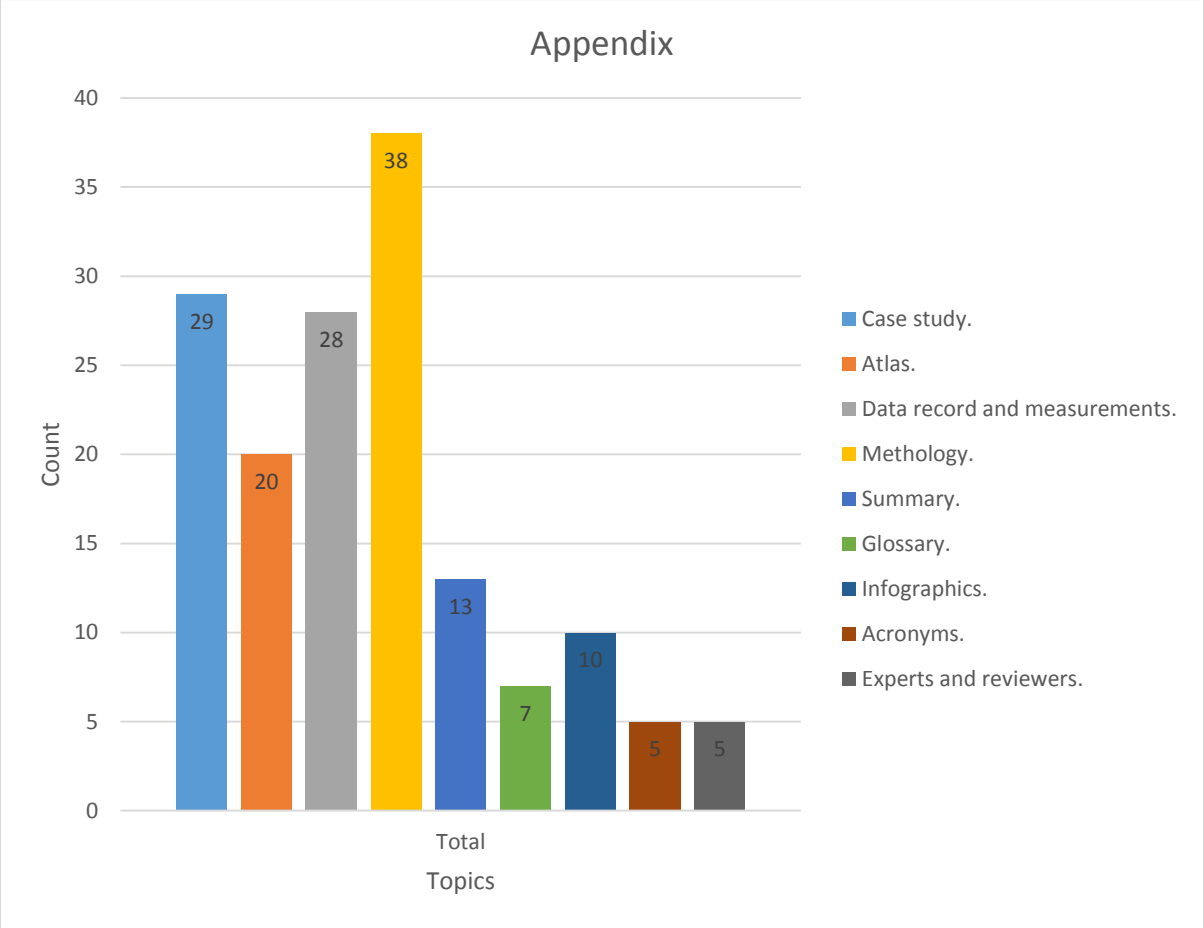


Figure 3.4: Number of chapters from different category of responses



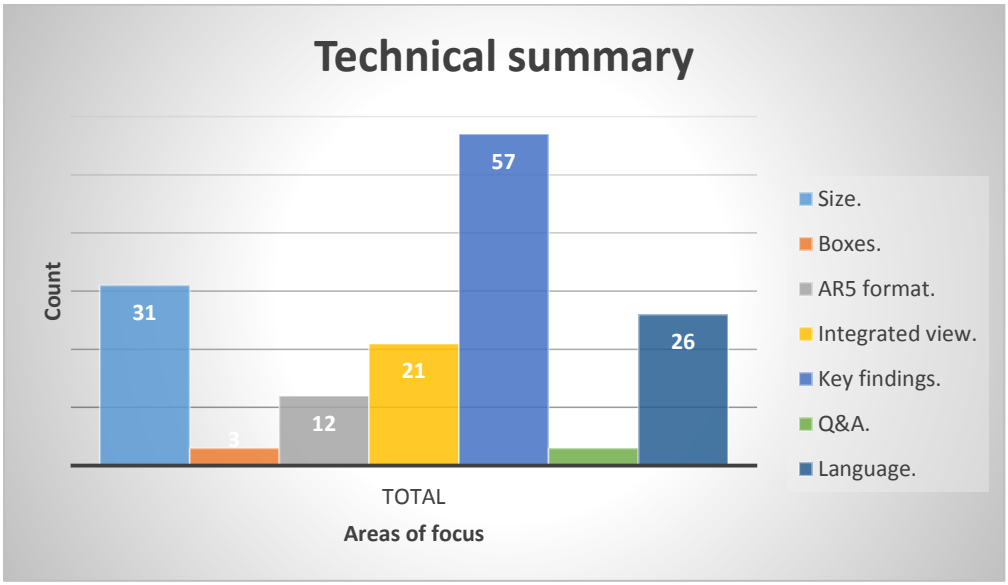


Figure 3.5: Components to be included in Appendix and Technical summary.

References

- Mitchell, D., James, R., Forster, P., Betts, R., Shiogama, H., Allen, M. "Realizing the impacts of a 1.5C warmer world". Nature Climate Change 2016. doi:10.1038/nclimate3055;
- Schleussner C.-F., T. K. Lissner, E. M. Fischer, J. Wohland, M. Perrette, A. Golly, J. Rogelj, K. Childers, J. Schewe, K. Frieler, M. Mengel, W. Hare, and M. Schaeer. "Dierential climate impacts for policy-relevant limits to global warming: the case of 1.5 C and 2 C". Earth Syst. Dynam. Discuss., 6, 2447–2505, 2015. doi:10.5194/esdd-6-2447-2015;
-

Appendix

A) List of the questionnaire questions:

1) In your vision, which are the main, relevant elements that could be addressed in the Special Report? (clear and specific topics/questions, maximum 600 characters)?
2)

2.a) Please provide your suggestions for the format of the Special Report?

- Number of chapters?
- Number of pages?
- Appendices?
- Technical Summary?
- Summary for policy makers?
- Online material?
- Frequently asked questions?
- Other recommendations?

2.b) The Special Report will be communicated to non-specialists. In this respect, in your view, how could this be best served by the report structure, presentation and supporting materials?

3) Please highlight emerging knowledge (including scientific, technological, policy) that you consider highly relevant for this Special Report. Are there any potential overlaps with assessment reports from other bodies?
4) In your view, which sectors would you deem relevant to be addressed in the report? Please prioritize your choices?
5) Which stakeholder challenges or decision contexts is this Special Report relevant for?
6) How do you expect this special report be used and what is its expected impact for your institution and/or field of expertise?
7) Which field of expertise or sector do you represent?
8) Which type of institution do you represent?
9) Does your response represent your own expert opinion or is this response on behalf of your institution or affiliation?
10) The responses to the questions will be treated as anonymous. To help evaluate the coverage of the results, please indicate?
11) In future pre-scoping exercises for IPCC reports, would you be interested in participating in a more detailed consultation?
12) Any other suggestions?

B) Ranking of key topics

N°	Main relevant elements to be addressed in SR	N°	Main relevant elements to be addressed in SR
1	Differential impacts	36	Financing
2	Emission pathways	37	Vulnerability
3	Mitigation	38	Natural system
4	Improved understanding	39	Health
5	Review of knowledge	40	Climate projections
6	Mitigation pathways	41	Arctic
7	Regionalisation	42	Cryosphere
8	Adaptation	43	Loss and damage
9	Benefit cost analysis	44	Economic growth
10	Feasibility of 1.5°C	45	Equity
11	Climate extremes	46	Paleoclimate perspective
12	Sectorial impacts	47	Impacts of response measures
13	Sustainable development	48	Carbon budget
14	Avoided impacts	49	Justice
15	Technology	50	Water
16	Policy actions	51	Impacts on trade
17	Agriculture and food security	52	Climate threshold
18	Development pathways	53	Climate resilience
19	Uncertainty	54	Coastal
20	Disaster risks reduction/Risks management	55	Detection and attribution
21	NDCs	56	Climate governance
22	Transformational changes	57	Confidence level
23	Negative emission	58	Impacts on tourism
24	Social impacts	59	Carbon sequestration
25	Human impacts	60	Heat inertia
26	Short live emission	61	Dynamica downscaling
27	Sea level rise	62	Ground water contamination
28	Energy	63	Migration
29	Urban and agglomeration		
30	Societal impacts		
31	Ecosystem		
32	Poverty reduction		
33	Human system		
34	Restoration and land degradation		
35	Dangerous climate change		

C) Ranking of key sectors

Rank	Sector
1	Energy
2	Agriculture and food security
3	Water
4	Transport
5	Health
6	Land use (LU/LUC)
7	Forestry
8	Industry
9	Infrastructure
10	Urban and agglomeration
11	DRR
12	Coastal
13	Technology
14	Tourism
15	Air quality
16	Education
17	Security
18	Research
19	Conservation
20	mining
21	Oil and gas

D) List and acronyms of contributing organisations

ANU
ATHENA
BAFU
C21st
CAN
CFF
Cities Alliances
CMA
CMCC
COA
Department of Climate Policy
DGAC
DIRMET

DMI
Economic Web Institute
EDF
EMA
EMBRAPA
ETHZ
EU
FAO
FCEA
GIZ
Greenpeace
HKO
IBA
ICLEI
ICMOD
ICTSD
IFRC
IGAC
IGSD
IIED
IMAFLORA
IMGW
IMO
IOC UNESCO
JRF
KMD
KNMI
LES
Luc Hoffmann Institute
MAE
Mary Robinson Fondation
ME
MEGJC
MEIM
MEWR
MFA
MFE
MGM
National Institute of Meteorology of Guinea-Bissau
NCCA
NEA
NIHM
RHMSS
RITE
SAWS
SMHI
TGICA
The University of the South Pacific

TU
UBA
UCL
UM
UNEP
UNFCCC
UNMA
WASCAL
Women and Gender Constituency
WWF