WCRP Academy

Climate Training Stocktake Synthesis Report

April 2023

WCRP Academy

The WCRP Academy is the research training advisory and coordination arm of the World Climate Research Programme. Its mission is to equip current and future climate scientists with the knowledge, skills and attributes required to tackle the world's most pressing and challenging climate research questions. The Academy's activities will promote and advance lifelong learning opportunities and global equity in climate science training. It will measure its success by the scope and diversity of the global climate research community that engages with the Academy as well as its ability to improve global access to high-quality climate science training and professional development without prohibitive costs to the trainee.

Climate Training Stocktake

In line with its mission, the WCRP Academy conducted the First Climate Training Stocktake Survey in 2021 which identified the training needs of current and future climate scientists and examined gaps in availability and access from the perspective of training recipients. To better understand the current landscape of available climate science training opportunities, the WCRP Academy also conducted the Second Climate Training Stocktake Survey in 2023 primarily focused on training providers.

First Climate Training Stocktake Survey

The First Climate Training Stocktake Survey was conducted online from July to end November 2021, gathering a total 414 unique survey responses from training recipients. These responses showed a good gender balance (54% men, 44% women, 2% other) and a fairly even split between respondents living in the global North (48%) and global South (52%). Respondents were mostly working full time in universities or research institutions, and roughly half (51%) had obtained a PhD as their highest level of education.

Second Climate Training Stocktake Survey

The Second Climate Training Stocktake Survey was conducted online from January to March 2023. A total of 23 institutions who provide climate training completed the survey. Respondents can be broadly classified into two main groups: research institutes (26%) and universities / educational institutions (21%). Other organizations are classified as nonprofits, research programs, regional training centers, or government offices.

First Climate Training Stocktake Survey: training recipients

Availability of climate training opportunities

1. Various climate training opportunities are available in the training recipients' countries.
    - *Climate-process based topics*: Analysis of observation, analysis of model results, model evaluation and collecting observations
    - *General topics:* GIS and coding/programming
    - *Contemporary topics:* Climate impacts, climate extremes, adaptation, risk and mitigation
2. However, there are gaps between the training opportunities available and needed.
    - *Climate-process based topics:* Available opportunities aligned reasonably well with the needs of survey respondents, except for theoretical studies which ranked fairly highly as available in most countries, but fairly low as important or needed
    - *General topics:* Capacity development/exchange was ranked highly as a general training area needed, but low in terms of training available. It is not clear whether survey respondents felt that more capacity development is needed in general, or whether training in capacity development is needed (i.e. training in the field of climate education).
    - *Contemporary topics:* Available opportunities aligned well with the needs of survey respondents
3. Indigenous voices and indigenous-led training featured often in open-ended responses or comments but not high on either available training or on importance of training, suggesting that its value is not widely known.
4. Whereas respondents who had not obtained a PhD wanted further training on data gathering and management, climatology, and climate modeling, respondents who had obtained a PhD put more emphasis on communication, engagement, and policy and law. This suggests that PhD graduates are more concerned with impact and uptake of research than with developing skills for primary research.
5. The Global North had almost double the percentage of respondents whose highest level of education was a PhD (64%) compared to the Global South (38%).
6. Most respondents from the Global North (59%) felt that the climate science training and education available in their country was adequate to allow researchers to work effectively on climate change science and associated fields, compared to only 24% in the Global South.
7. In the Global South, most respondents felt that the climate science training and education available was not adequate (61%).

Accessibility of available climate training opportunities

1. Financial barriers are the most reported personal obstacle to accessing adequate science training, followed by limited knowledge of available training opportunities and lack of local expertise.
2. Gender biases are also an important obstacle for women, many of whom prefer training to be held entirely online (23% of women vs only 10% of men respondents). This may indicate that women appreciate the flexibility of online training more as they balance other responsibilities, or that men have greater access to resources to travel to in-person training.
3. All respondents from the Global South reported that they would like access to additional climate science training or education, whereas 26% of Global North respondents said that they did not want access to additional training.
4. A much higher percentage of respondents who had not obtained a PhD reported that they would like access to additional climate science training (97%) compared to those who had obtained their PhD (77%).

The 414 responses to the First Climate Training Stocktake Survey were categorized by gender, by educational level, and by region to elucidate key similarities and differences between the groups. Results show that across all groups, *short courses* are the most suggested training that the WCRP Academy could provide, followed by *seasonal schools* and *webinars by experts*. Respondents with PhDs also highly suggest online lectures, while respondents from the Global South suggest blended/hybrid learning on practical skills.

Suggestions of different groups on the type of climate training that the WCRP Academy could provide (respondents could choose multiple):

	By gender				**By educational level**		**By region**	
	Man (n=222)	**Woman** (n=180)	**Non-Binary** (n=6)	**Prefer not to say** (n=6)	**Pre-PhD** (n=180)	**PhD** (n=210)	**Global North** (n=198)	**Global South** (n=216)
Short courses	145*	115*	3	4	143*	124*	120*	147*
Seasonal schools (e.g., summer schools, winter schools)	122**	86***	3	2	112**	83	91***	122**
Webinars by experts	113***	96**	3	2	108***	105***	106**	108
Online lectures	109	83	4	1	105	109**	90	107
Blended/hybrid learning options that encompass practical/ hands-on learning (e.g., workshops on practical skills such as using sensors, fieldwork methods, etc.)	107	84	4	0	101	96	83	112***
Longer online courses such as Massive Open Online CourseS (MOOCS)	71	54	2	0	79	48	56	71
Online models of practicums and internships	71	42	1	2	79	37	38	78
Other	3	4	0	1	4	4	4	4

Note: The top 1 (*), top 2 (**) and top 3 (***) suggestions of each group are indicated.

In-depth interviews from the Global South

To complement the results of the First Climate Training Stocktake Survey and to further understand the climate training needs of the Global South, key informant interviews were conducted from July - October 2022. The interviews examined in greater detail the availability and accessibility of climate training opportunities in the Global South. A total of 14 key informant interviews were conducted, with all interviewees having also participated in the First Climate Training Stocktake Survey. The interviewees came from Africa (36%), Asia (36%) and Latin America (29%). They were 50% male and 50% female; and 71% Pre-PhD and 29% PhD degree holders.

Availability of climate training opportunities

1. Climate training opportunities are available locally, but to a very limited extent. Oftentimes, they are only offered by top local universities and are only available to enrolled students.
2. As organizing climate training necessitates the cooperation of multiple disciplines/departments, this can be hard for some universities to accomplish administratively.
3. There are few local experts, and fewer who are able to offer training (mostly via the universities where they teach).
4. Lack of local data is also an important issue, as data can be patchy and/or are collected by old equipment.
5. Collaborating with organizations from within the same region who share similar risks have so far helped overcome the issue of lack of local experts.
6. Engaging with organizations from the Global North is also envisioned to help with lack of data and equipment.
7. Local studies and local data are preferred to be used in climate training, but are limited.
8. A strong emphasis is placed on the practical usability of information and skills obtained from climate training.
9. Depending on the current climate-related issues faced by a particular country or region, training topics sought may differ.
10. There is also a need to make climate training available to non-scientists, covering contemporary topics such as sustainable development, environmental science, geography, agriculture, climate policy, engineering, and science communication.
11. There is also a common interest to include indigenous and local knowledge in climate training, and to build the capacity of local communities most vulnerable to climate change.

Accessibility of available climate training opportunities

1. Lack of funding is a serious barrier to accessing climate training opportunities, and obtaining financial support can be very competitive; the socio-economic and political situation of a country also directly impacts availability of funding.
2. Climate training opportunities from the Global North are viewed as more accessible and economically attractive. However, they are not always locally applicable.
3. Online training opportunities are more accessible, especially if they are available for free. However, poor internet connectivity and unreliable electricity can be important barriers.
4. Face-to-face training is still preferred, especially when hands-on exercises and intensive courses are involved.
5. Offering training in English is generally okay, although local translation can also be helpful for reaching non-English speakers.
6. Introductory courses are more accessible compared to advanced courses designed to increase skills and capacities of climate scientists, as these require some background in climate-related studies.

Second Climate Training Stocktake Survey: training providers

There are a total of 23 training providers that have completed the Second Climate Training Stocktake Survey. Research institutes (26%) and Universities / Educational institutions (21%) comprise the majority of the respondents, with a few from WMO regional training centers and government offices. There are more organizations based in the Global North (57%) than in the Global South (43%). The list of training providers who can be potential partners of the WCRP Academy can be found below:

Name of Organization / Institution / Research Group	Classification	Country
ARC Centre of Excellence for Climate Extremes	Research Institute	Australia
Ateneo Institute of Sustainability	Research Institute	Philippines
Bureau of Meteorology / Science and Innovation / Research	Government	Australia
Canadian Centre for Climate Services	Government	Canada
Center for People and Environ	Research and Policy Organization	Bangladesh
Centre for Climate Change & Food security (CCCFS)	Environmental Consulting	Ghana
CLIVAR	WCRP Project	China
ICIMOD (International Centre for Integrated Mountain Development)	Intergovernmental Organization	Nepal
Institute for Meteorological Training and Research, Nairobi WMO/RTC	WMO RTC	Kenya
Inter American Development Bank	Financial Institution	United States

Name of Organization / Institution / Research Group	Classification	Country
Interdisciplinary Studies Center for Water, University of the Philippines Los Banos	Educational Institution	Philippines
International Research Institute for Climate and Society, Columbia University Climate School	Educational Institution	United States
Jet Propulsion Laboratory, NASA	Research Institute	United States
Lichtenbergschule	Educational Institution	Germany
Meteorological Training Institute, India Meteorological Department, WMO RTC	WMO Regional Training Centre	India
NASA Applied Remote Sensing Training (ARSET) Program	Research Institute	United States
National Centre for Medium Range Weather Forecasting	Government	India
Research Institute of Meteorology and Atmospheric Science (RIMAS), I.R. of Iran Meteorological Organization	Research Institute	Iran
SERVIR	Research Program	United States
Tel Aviv University	Educational Institution	Israel
The Hague Academy for Local Governance	Non-profit Organization	Netherlands
The National Institute of Water and Atmospheric Research	Research Institute	New Zealand
University of Bergen / Bjerknes Centre for Climate Research	Educational Institution	Norway

These organizations specialize in climate-related services, including but not limited to: climate change, climatology, atmospheric science, climate studies and research, and climate finance.

Availability of climate training opportunities

1. More than half of the respondents, especially educational institutions, offered more than 20 trainings in the last five years, while research institutes offer between 6 - 19.
2. The climate science training offered by these organizations are mostly conducted regularly (60%), with the rest usually offering training alongside projects.
3. Short courses, seasonal schools and expert webinars are the most popular type of training offered.
4. Target audience are mostly practitioners, decision-makers, and policy-makers, who are practical users of climate science and information, while students with higher levels of education (Postdoc, PhD, Master) are also more likely to be the target of climate training.
5. Almost all organizations provide successful participants with certificates of completion and other intangible benefits including practical/hands-on learning, networking opportunities, and mentoring. Other benefits include active involvement in a research project, and industry and policy benefits.
6. Topics covered by climate training include: Climate forecasting, interpreting weather information, climate projections, climate model downscaling, remote sensing, Ensemble Model Data, Permafrost, Marine heatwaves, risk assessments, Data assimilation, and use of specific tools and software (e.g. Climate Predictability Tool (CPT), GEOGloWS tool, maprooms).

Accessibility of available climate training opportunities

1. Almost all of the organizations offer training in English, with two offering them in Spanish.
2. Majority of the training is available for free, and those that require funding are usually conducted in-person at the country where the organization is based (e.g. The Hague Academy for Local Governance).
3. Almost half of the training opportunities require some prior knowledge of any climate-related field.
4. There is no preferred format (in-person, online, or hybrid) in delivering climate training.

Working with WCRP and the WCRP Academy

1. WCRP Academy and My Climate Risk are the Lighthouse activities that would benefit most from the training opportunities the respondents currently offer.
2. The WCRP Academy will benefit from connecting with other organizations that can contribute to the rest of the lighthouse activities, namely: Explaining and Predicting Earth System Change, Safe Landing Climates, and Digital Earths.
3. The organizations who have responded to the Second Climate Training Stocktake Survey have expressed their interest in partnering with the WCRP Academy through featuring

their training opportunities on the World Climate Science Academy (WCSA) website or training portal (19), regularly receiving updated information on opportunities posted on the WCSA website or training portal (14), and getting feedback from the community on how to improve training courses (12). There is little interest in the inclusion of the WCRP Academy logo on certificates issued (9).

Key messages

Availability of climate training opportunities

1. Training recipients from the Global South felt that the climate training opportunities currently available are inadequate, and they would like to access additional training. However, there are relatively fewer training providers from the Global South; local experts, studies and datasets are also limited in the region.
2. There is a good match between the type of training opportunities offered by training providers and those sought by training recipients, who indicated a strong preference for informal options such as short courses, seasonal schools, and expert webinars.
3. The target audience of available climate training opportunities do not only include climate scientists, but practical users of climate information as well. This is especially beneficial for training recipients in the Global South who emphasize the importance of the practical usability of information and skills obtained from climate training.
4. There is great interest in contemporary topics such as climate impacts, climate extremes, adaptation, risk and mitigation among training recipients, especially from the Global South. However, indigenous and local knowledge is often not included in the training.

Accessibility of available climate training opportunities

1. Lack of funding is the most important barrier to accessing climate training opportunities. Nonetheless, the majority of the opportunities offered by training providers (especially those conducted online) are available for free.
2. Offering training in English is generally okay, although translating to other languages can increase the accessibility of training opportunities especially for non-English speakers.

Opportunities for the WCRP Academy

1. Serving as a marketplace for climate training, the WCRP Academy can match not only training providers with training recipients, but also opportunities available with training needed. For example, the WCRP Academy can encourage more training opportunities in the following areas:
    - Impact and uptake-oriented training for PhD degree holders and skills-based training for pre-PhD degree holders, with a stronger focus on the latter who have expressed greater interest in accessing additional climate training
    - Contemporary topics that offer practical usability of skills and information
    - Locally relevant training in the Global South that features local experts, local studies and datasets, and indigenous knowledge

2. The WCRP Academy can seek to partner with more training providers from the Global South, and to facilitate collaboration among them to address the lack of training opportunities and local experts in the region.
3. The WCRP Academy can encourage partner training providers to also offer training in other languages, and to expand in-person training to hybrid format to become more affordable and more accessible especially for women.