Central Asia Climate Survey

Central Asia faces significant challenges in addressing widespread land degradation, increasing pressure on transboundary water resources, and a more extreme climate. While the region's general warming trend is well documented, there remains significant uncertainty and knowledge gaps with respect to how future climate change will affect water resources, conservation, agriculture, human health, and infrastructure. With the Caspian Sea being the largest inland body of water in the world and with the presence of high mountain regions, Central Asia presents a unique environment to study the effects of land-atmosphere interactions on weather and climate and how these affect water resources. The Global Energy and Water Exchanges (GEWEX) project of the World Climate Research Program (WCRP) is collaborating with (START) (SysTem for Analysis, Research and Training) to advance climate change science and scientific capacities in Central Asia. The proposed collaboration seeks to:

- Better understand the regional implications of large-scale climate change.
- Improve understanding of land-atmosphere interactions that determine weather and climate.
- Link these exchange processes to improved understanding of potential climate change impacts on water availability and its implications for food production, hydropower, industry, disaster risk management, and environmental protection, among others.
- Develop a basis for well-informed and efficient adaptation to the coming changes

In establishing this initiative, we prioritize the engagement of early- and mid-career scientists and relevant experts from the region in shaping the nature and scope of knowledge needs, setting agendas for research and related capacity development, and strengthening the potential for evidence-informed action. One of the first tasks in undertaking this initiative is to better understand the state of climate change knowledge in the region and to identify important gaps in regional understanding of key aspects of climate change. To that end we performed a brief survey that will help us to begin that process. Below you will find the outcomes of this survey.

Thank you,

Michael Brody (George Mason University)
Peter van Oevelen (Director GEWEX)
Jon Padgham (Executive Director Start)

Central Asia Survey Results

Total number of completed surveys submitted: 60

Explanation of the results

Each question covered multiple subjects with a certain range of answers.

The answer range consisted of:

Do Not Know = 0	0
Not…. = 1	1
Somewhat/Modest… = 2	2
Significant/Very/Strong… = 3	3

The results of each question are presented in a table, where the first column is the subject, the second column the mean response rounded (MR), the third column the mean response (R) and the fourth column the standard deviation (SD), for example:

Subject	MR	M	SD
Warmer nighttime temperatures	2	1.77	0.98

Conclusion

In general, the survey indicates a strong need for capacity development related to climate research and communications. Although this survey was a rather general first step, it provides an incentive to further develop more initiatives in the region.

Q1) In your expert opinion, what are important knowledge gaps in your country and in the region with respect to understanding climate change? Please evaluate the following in terms of the level of understanding.

Subject	MR	M	SD
Warmer nighttime temperatures	2	1.77	0.98
Warmer daytime temperatures	2	2.23	0.93
Changes in precipitation patterns: timing, distribution, and intensity of rain and snowfall	2	2.32	0.65
Changes in winter snowpack	2	1.92	0.93
Changes in the seasonality of snowfall	2	1.98	0.95
Changes in spring/summer meltwater volume and timing	2	1.92	0.91
Changes in the frequency and severity of extreme weather events	2	1.97	0.86
Other seasonal or subseasonal changes (describe in next question)	1	1.35	1.16

If you selected "Other seasonal/subseasonal changes" in the question above, please describe those seasonal changes below:

- Changes in droughts and floods are important as well as change of season duration (long winters and summers, shorter shoulder seasons it seems).
- Changes in precipitation and storage.

Summary outcome Q1:
A consistent response that these factors are modest/somewhat important, however with a large spread (high standard deviation). The strongest responses concerned daytime temperatures and changes in precipitation patterns. The latter has the lowest spread (standard deviation) and thus the highest 'confidence'.

Q2) From the perspective of your profession/area of expertise, what are important factors for understanding future climate change in your country and in the region?

Subject	MR	M	SD
Observational and other scientific infrastructure	3	2.90	0.35
Scientific knowledge in the relevant disciplines	3	2.90	0.30
University level education and training in climate change related disciplines	3	2.83	0.42
Access to data or information on climate change	3	2.90	0.35
Access to and availability of computational resources	3	2.75	0.57

Summary outcome Q2:
In general, most aspects are considered important by survey respondents.

Q3) In what sectors is knowledge of climate change most needed?

Subject	MR	M	SD
Water resources	3	2.90	0.30
Disaster risk management	3	2.70	0.55
Agriculture	3	2.93	0.25
Animal science	2	1.97	0.91
Biodiversity conservation	3	2.68	0.65
Human health	3	2.55	0.74
Infrastructure	2	2.40	0.88

Summary outcome Q3:
All sectors are clearly in need of climate information, where not surprisingly, water resources and agriculture have the highest need (also lowest spread) and animal science the lowest need (and highest spread). The latter can (and likely is) be due to the background of the audience that has been polled (more geophysicists, water resources background).

Q4) In your opinion, are there sufficient capacities in your country to address these knowledge gaps? Where is capacity strong and what additional capacities are needed?

Subject	MR	M	SD
Geophysical and biological science capacities for studying climate change	2	1.78	0.88
Technical knowledge and skills related to instrumentation for studying climate change	2	1.78	0.78
Where is capacity strong and what additional capacities are needed? Social science capacities for studying climate change	2	1.58	0.80
Ability to communicate climate change science in international peer review journals	2	1.72	0.85
Ability to communicate climate change science to policy makers and society	2	1.72	0.79
Where is capacity strong and what additional capacities are needed? Ability to work across disciplines to study climate change	2	1.82	0.75

Summary outcome Q4:
Capacities are considered to be modest at best. For survey respondents working/residing outside of the region the response was a bit more positive about present capacities, resulting in a high spread (standard deviation).