Local observations

Victoria Gofman-Wallingford discusses key findings of a seven-year project, the importance of working closely with local communities and her plans to continue this work.

The Bering Sea Sub Network (BSSN) achieved great success with its pilot phase. How did you accomplish this?

Success stemmed from careful considerations for political support, local participation and the application of rigorous scientific methods. The International Polar Year (IPY) 2007-08 opened doors for additional opportunities, including funding.

Local participation was sought at the very onset of the project. I travelled to all but one community around the Bering Sea to discuss the project and listen to local suggestions. The survey, based on semi-structured interviews, resulted in qualitative and quantitative datasets. We were able to conduct cross-comparisons between the villages, Russian and Alaskan communities, and between species. Gathering local observations systematically and using uniform protocols enabled us to validate data based on human perceptions.

Much attention is given to the effects of climate change on the Arctic. What other changes are indigenous communities facing?

The communities that experience dramatic changes often receive a lot of attention. However, there are hundreds of small communities that do not experience media-worthy events. These people quietly cope with, and adapt to, everyday challenges. Our research may help us better understand these strategies, what makes some communities more vulnerable than others and where intervention may be needed.

Although it is too early to give a definite answer, as the data are in the process of analysis, it is safe to say that the picture is not all ‘doom and gloom’. We see subtle, nuanced changes and need to take time to understand the results.

How has your career in Arctic research developed?

In 2002, I joined the Aleut International Association (AIA). My goal was to build the organisation, and research projects seemed to fit the organisational mission and were viable to develop. In 2003 I attended my first Arctic Council (AC) meeting and became involved in the Arctic Climate Impact Assessment (ACIA). Throughout, I was a vocal proponent of incorporating language on the inclusion of traditional knowledge in all relevant documents.

The concept of a community-based observing network was first presented at a 2004 AC meeting. I was encouraged by how well it was received and developed it further for an IPY submission. Again, there was a lot of support and encouragement. When the US National Science Foundation (NSF) announced the Arctic Observing Network programme, the concept was ready for proposal development.

What motivates you to carry out this project?

My motivation to continue this work comes from encounters in the villages that I visited. One of my strongest memories is of a test interview with a hunter at the very beginning of the project. I realised that a successful hunt for him and his family meant food for dinner – how ridiculous my ‘scientific’ questions must have sounded to him. I hope the results of my research can bring benefits to such communities and we can learn to ask the right questions.

In 2013 you hosted the BSSN International Conference. What did you discuss and was there a take-home message?

The BSSN project involved eight villages in Alaska and northeast Russia. Due to distance, communication was very limited and the only opportunities for face-to-face meetings were BSSN conferences held in Alaska. Sharing experiences and learning from each other were important objectives.

The 2013 conference was held to summarise BSSN history, activities and preliminary results, and to discuss its final report. This led to a set of recommendations. In particular, participants overwhelmingly decided that the report should be written for the communities.

With change comes opportunity. Is this true for the communities you work with? How might their lives be improved through careful planning?

This is absolutely true. Every BSSN community has a set of unique circumstances and their capacities to respond to change vary. Although these questions were not directly addressed by our research, hopefully the participating communities can apply the results in local decision making.

One example is Gambell, a village located just south of the Bering Strait that may be affected by increased marine traffic through the strait. In BSSN II, we compiled geospatial data consisting of harvest density maps. These maps were subsequently used by the community in consultations with the US Coast Guard regarding shipping lane design.

Have you learnt any valuable lessons? How will these inform the future of the research?

We have learnt a lot about how to design a survey that can yield useful data. We also learnt about the benefits of using local research assistants to conduct surveys.

The project is a two-way partnership between communities in Russia and the US. However, we had no Russian researchers as senior members of our team. I would like to change this in the future, so the researchers can exchange knowledge and expertise.
Environmental changes are impacting ecosystems around the Bering Sea. Therefore, the *Bering Sea Sub-Network* is using indigenous and local knowledge to better understand biophysical changes and their socioeconomic impact in an effort to increase the resilience of local communities.

**THE BERING SEA**, a northern extension of the Pacific Ocean, separates Asia and North America and spans an area of 2 million km². The region is of great economic and ecological significance, it is one of the world’s most productive fishing grounds and home to a diverse array of wildlife. A unique combination of cold temperatures, strong ocean currents, long days of summer light, nutrients from the deep sea and ice result in rich phytoplankton, which provide the base of the food web and support about 450 species of fish and 25 species of marine mammals.

For all these reasons, the connection between the Bering Sea and its local communities is very close; the health, economic welfare and indeed way of life of these communities are intimately linked to the Sea and its resources. However, rapid changes to the environment may be threatening the well-being of these arctic communities. A more comprehensive understanding of the changing biophysical environment and social-ecological systems is crucial for developing adaptive policies.

Indigenous and local knowledge is vital to this process as it provides insight into the local impact of changes and a more holistic understanding.

Victoria Gofman-Wallingford, together with Drs Lillian Na’la Alessa and Andrew Kliskey from the Resilience and Adaptive Management Group, University of Alaska Anchorage, and Patricia Cochran from the Alaska Native Science Commission developed the Bering Sea Sub-Network (BSSN) to allow communities to participate in research within a structured network. BSSN began as a pilot project in 2007, endorsed by the International Polar Year 2007-08. The first phase was completed in 2009; phase II was launched in September of the same year and will be completed in August this year.

Already, the project has developed a framework to enable residents in remote Arctic communities to systematically document the physical and social changes occurring in their region. By analysing these data, Gofman-Wallingford hopes to advance knowledge of the environmental changes taking place both in and around the Bering Sea – changes that may have great significance for understanding important Pan-Arctic processes. Insight obtained by the project will enable scientists, governments and communities to respond to these changes most effectively.

**THE ROLE OF HUMAN PERCEPTION**

It is becoming increasingly recognised that indigenous peoples deserve a voice in managing their own resources, land and ultimately fate, especially in the face of environmental change. In light of this, BSSN is fully harnessing traditional knowledge, as Gofman-Wallingford explains: “Data based on human perceptions are indispensable in understanding complex social-environmental systems. Indigenous communities possess intimate knowledge of the environment, which is important for their subsistence”.

Local communities were involved at every level of planning and developing the network. There are currently eight communities involved, representing six indigenous cultures – three in the Russian Federation and five in the US. Using their observations, it is possible to identify trends and relationships that are inaccessible by other means. Gofman-Wallingford explains what this participation means in real terms: “The involvement of local residents should be meaningful, such as hiring them as research assistants. Human perceptions are a valuable source of information, but it is important that they meet the requirements for validity, reliability and objectivity that are applied to any other data”.

**COMPPELLING FINDINGS**

In 2008-09, around 300 people took part in the pilot surveys. Data were assembled into two datasets: qualitative, quantitative and hosted on the servers of the National Snow and Ice Data Center (NSIDC). Over 70 per cent of participants had lived in the same area for over 30 years, and thus accumulated years of valuable observations. The survey captured information on meteorological, geophysical and oceanographic conditions, as well as important subsistence species, many of which are indicators of ecosystem change.

Analysis of the interviews revealed a number of trends. For instance, some communities reported significant changes to ice conditions, with many noticing that ice is breaking earlier and developing later. What is particularly interesting, however, was that ice-dependent communities respondents reported more frequently on environmental changes. High incidences of disease were found in fish by Russian communities, but Alaskan communities noted increased sightings of rare or new species to the area, such as the white king salmon seen in Gambell.

Beyond these specific scientific findings, the pilot phase taught the BSSN team many valuable lessons. It showed that hiring local residents is important for the sustainability of research. It also highlighted the value of surveys to encourage local residents to think about environmental issues. Community involvement thus enhanced the research and improved prospects for local communities. The phase II project has built on the successes of the pilot and further investigates emerging trends. The survey instrument evolved into a set of three questionnaires targeting observations on the physical environment, life-time harvesting areas and biannual survey on community-selected subsistence species. In addition, respondents
outlined the harvesting areas on the maps. Three datasets contain quantitative, qualitative and spatial information. A novel density mapping technique was developed for aggregated spatial data. Three types of data allow for internal validation and thus increase the validity and credibility of the findings. BSSN II data are currently under analysis, but preliminary findings suggest that a multi-year, community-based monitoring is an effective method to capture social-environmental interactions and trends.

ADAPTING TO CHANGE

BSSN has the potential to benefit policy makers, local communities and regulatory agencies, as well as to advance scientific progress. The project has provided community leaders with direct access to project management and facilitated the transfer of traditional knowledge to younger members. The Network has also provided income to villages with limited earning opportunities by hiring local research assistants. But beyond the immediate boost to prospects, BSSN has provided communities with transferable expertise, such as advanced computer and basic interviewing skills.

Perhaps most importantly, BSSN may empower communities to plan for, and adapt to, environmental and social change. The information obtained by BSSN could enable communities to make better decisions, improve their resource management and ultimately enhance their way of life. But this information is important for many groups, as Gofman-Wallingford clarifies: “This might help plan future industrial activities in the Arctic more carefully, and with an understanding that it is home to unique and vibrant communities”.

Climate change is a real and present issue in the Arctic, and Bering Sea communities will experience its effects for years to come. Climate change is making Arctic waters, and their resources, more accessible. The consequent increase in human activities will bring with it new challenges, but also more opportunities. BSSN has enabled communities to convey their observations and concerns about this to scientists and policy makers. In turn, this may help communities to prepare for change and make them more resilient.

GLOBALLY SIGNIFICANT

The primary outcome of the pilot phase was proof of concept: “We proved that an international network for systematic gathering of local observations can be successfully operated and the data be validated,” Gofman-Wallingford explains. The BSSN team developed a pioneering model for a community-based observing network. The diversity of participants, range of collected data and interdisciplinary approach of BSSN makes this model applicable to other regions.

BSSN products have already been requested by government agencies, industry and academia. BSSN is part of the Arctic Observing Network, a multidisciplinary programme launched by the US National Science Foundation during the International Polar Year 2007-08. BSSN could act as a catalyst for further research in the region and regional networks elsewhere. To enable this, BSSN will develop partnerships with other projects and increase opportunities for local communities to engage in research. Through the creation of a structured community-based monitoring network, BSSN made a valuable contribution to the international effort to observe changes in the Arctic. The two phases of BSSN spanned from 2007 to 2014. This work resulted in a substantial accumulation of data based on local and traditional knowledge of eight communities, representing five indigenous cultures (Aleut, Chukchi, Central Yup’ik, Koryak and St Lawrence Island or Siberian Yupik). The qualitative, quantitative and spatial data reveals observations on 22 subsistence species and 16 environmental factors in the harvesting locations of eight communities. The data were compiled for baseline and seasonal information and are currently in the process of analysis.