USING BIG DATA, SCENARIOS DEVELOPMENT AND GAME THEORY TO MONITOR, UNDERSTAND AND ADAPT TO CLIMATE CHANGE IN THE CIRCUMPOLAR ARCTIC for ISAR3 Third International Symposium on the Arctic Research

Magdalena AK Muir1 and Michael Evans Goodsite2

1 Associate Professor, Aarhus School of Business and Social Sciences & Nordic Centre of Excellence for Strategic Adaptation Research, Aarhus University & Research Associate, Arctic Institute of North America, University of Calgary

2 Centre Director, Professor of Atmospheric Chemistry, Climate and Global Processes Aarhus School of Business and Social Sciences and NCoE NORD-STAR, Aarhus University Herning
AINA participates in collaborative and multi-disciplinary research projects. The AINA has over 65 Research Associates and over 280 Fellows. AINA manages the Kluane Lake Research Station, in Yukon Territory, Canada.
AINA Research Tools: Arctic Journal and ASTIS

ARCTIC Journal is North America’s premier journal of northern research. The Arctic Science and Technology and Information Systems (ASTIS) are open access databases with over 77,000 records and reports.
The Nordic Centre of Excellence for Strategic Adaptation Research is a virtual centre of excellence with nine founding partners in five Nordic countries. The NCoE NORD-STAR has two research questions:

- What constitutes a strategic approach to addressing the dual challenge of adapting sustainably to the inevitable impacts of climate change and the unintended consequences of climate policy?
- How can dialogue and innovation best be used to advance adaptation strategies in the Nordic region?
Issue 1
Land-use change

Project 1
Interactive land-use modelling, visualisation and decision support

Approach 1
Scientific visualisation and modelling

Issue 2
Energy transitions

Project 3
Energy transition modelling

Issue 3
Insurance and finance

Project 5
ICT based decision support on multiple levels

Approach 2
Policy analysis

Project 2
Land-use trade-offs affecting adaptive capacity

Project 4
Energy transition management

Project 6
Appraising adaptation policy
WHY ADAPTATION GOVERNANCE?

Climate change stresses Arctic ecosystems, economies and societies. These stresses will be magnified without appropriate decision making processes for governments, business and communities. Vulnerabilities, impacts and necessary adaptations may differ across the Arctic given location, culture, heritage, economies and businesses.
IMPLEMENTING ADAPTATIVE GOVERNANCE

Depending on national situation, adaptive governance can be implemented in collaboration with:

- National and regional governments
- Industry associations for energy, mining, tourism and small & medium enterprises
- Local communities and organizations
- Public and private academic institutions.
ADAPTATION GOVERNANCE PROJECT

AINA, Aarhus University, and NCoE NORD-STAR are examining the use of big data analytics, scenarios development and game theory to engage government, businesses and communities in monitoring, understanding & adapting to climate change in the circum-Arctic.
ADAPTATION GOVERNANCE PROJECT

Approaches are developed, case studies explored, and recommendations made. The project incorporates existing and related research on renewable and non-renewable resource management (energy, fishing, mining, tourism). It is hoped to develop academic and research collaborations at ISAR3.
Research Area 1: Scenarios Development

Scenarios are stories that describe possible futures. Building scenarios allows an exploration of what the future may look like, and preparation for change. Scenarios are useful in developing Climate strategies, including shared learning and visions for future action.
Research Area 2: Big Data Analytics

Climate monitoring gives rise to data which needs to be analysed & modeled. Big data analytics, and the modeling and interpretation of that data:

– Supports decision making,
– Clarifies climate impacts,
– Informs climate responses, and
– Can provide unforeseen insights.
Research Area 3: Game Theory

Game theory is the study of strategic decision making. Games allow information and knowledge sharing, and strategic interactive decision making, and can be designed for any society and situation. Climate games have been used for disasters, emergencies and security.
NORD-STAR assisted in the development of game. 2 hour facilitated board game for 8 to 10 players. Based in urban setting where objective is to acquire land. Players learn about climate adaptation and mitigation.
Use of Strategic Role Playing Games To Develop Regional Climate Responses

Strategic role playing games allow complex reiterative responses to climate situations.

Three stages:
1) preparation of game and role assignment
2) simulation, and
3) debrief and analysis.

Example of 2010 Global Shipping Game by Naval War College which considered future Arctic shipping and navigation.
Academic Partnerships
Possible role for Japanese and Asian scientific and research institutions.
Existing partners:
Johns Hopkins University’s Master of Science: Energy Policy and Climate
University of the Arctic, a cooperative network for northern education and research.
Industry and Civil Society Partnerships
Existing partners are:
Industry associations in energy, mining and tourism.
The Conference Board of Canada’s Centre for the North’s Roundtable with government, industry, not for profit groups, and aboriginal participation.
Coastal and Marine Union (EUCC), with 2700 members in over 40 countries.
Sustainable Cities International, a leader in urban sustainability with a global network of cities.
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For further information on the research, please contact Magdalena Muir at mamuir@ucalgary.ca

See also Adaptation Governance for Global & Climate Change in the Circumpolar Arctic at arctic.ucalgary.ca/research/adaptation-governance