Food and health security in the Norwegian, Finnish and Russian border region: linking local industries, communities and socio-economic impacts

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Murmansk County Birth registry

The Northwest Public Health Researcher Center

Institute of the Industrial Ecology Problems of the North

Kirkenes 12.09.2013 Eldbjørg S. Heimstad, NILU & Torkjel Sandanger, UiT/NILU

Outline

- Introduction
- Background for the project
- Knowledge gaps
- Design of project
- Expected results

Pollution & contaminants

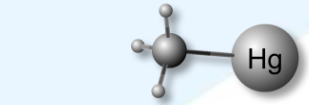
Industrial &

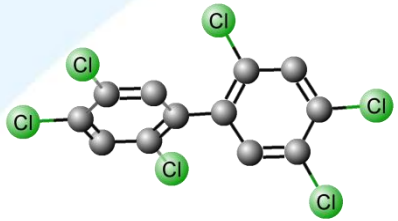
Economical development

Industry

Traffic

Waste





Exposure: food, water, air

Toxic metals, PM10, SO_2, NOx, PCBs, dioxins

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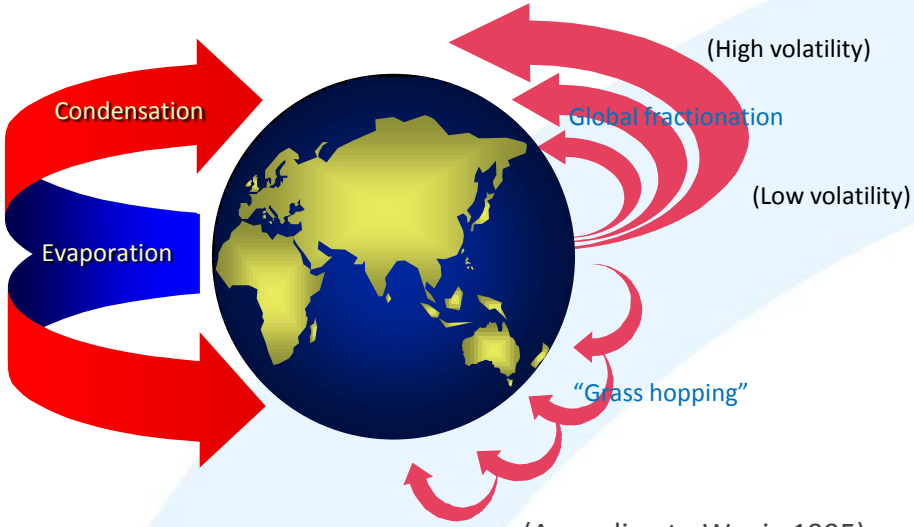
Remote & local sources



(According to Wania 1995)

Photo: NILU, 2008

Photo: Thomas Nilsen

Long range transport from distant sites

Local sources; Smelters, Mining, Petroleum, Military sites, Waste

Contaminants in the Arctic

- Contaminants: Toxic metals, POPs, Radionuclides
- Long range transport pollution dominate
- Bioaccumulation in food chains
- Diet is the most important exposure pathway
- Health risks for people with a marine and game diet (AMAP 2009)
- **Large local point sources in some areas**

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Photo: Thomas Nilsen

Lake Kuetsjarvi

Photo: Espen Tangen Aarnes

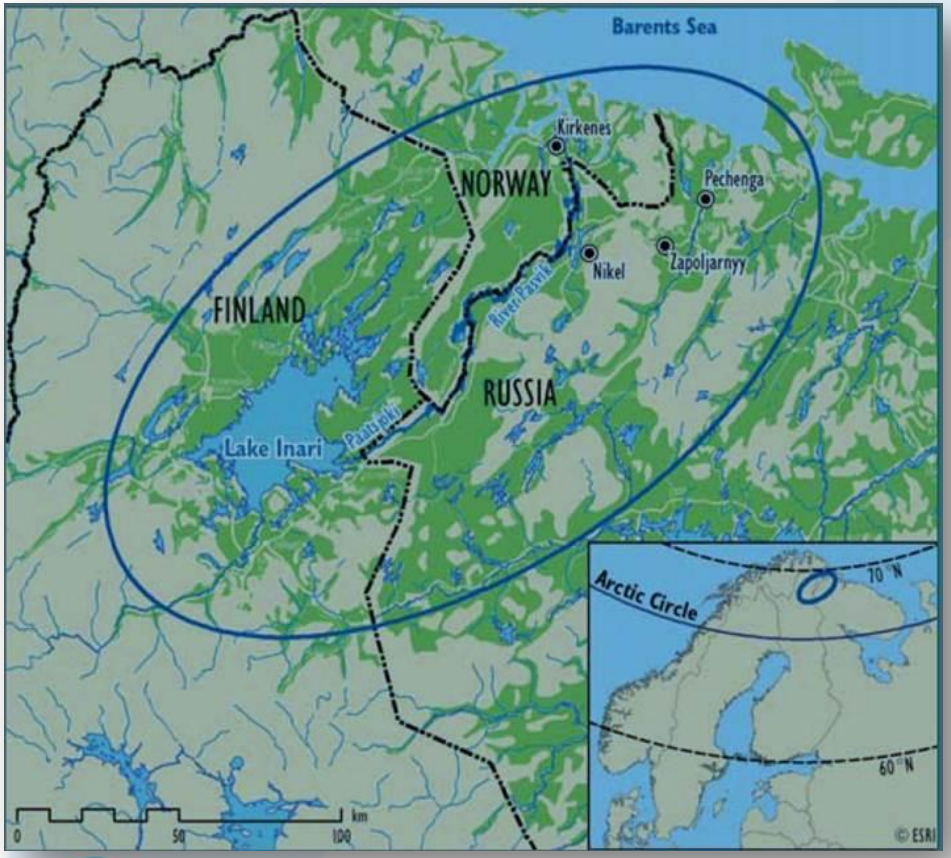
Metallurgical industry with the smelter in Nikel and briquetting facility in Zapolyarny

Collaboration

- Well established collaboration between the partners
- Complementary knowledge and competence
- Epidemiology, Birth registries in all 3 countries
- Environmental Chemistry
- Toxicology, Ecotoxicology
- Social sciences, Socioeconomics
- Human Security

Interdisciplinarity

Background for the study



- Several monitoring and research projects on ecosystem health
  - The Pasvik Programme 2003-2007
  - Monitoring programs
    - Air and precipitation
    - Mosses
    - Freshwater
- Food and health security less known
- Indications that people are concerned

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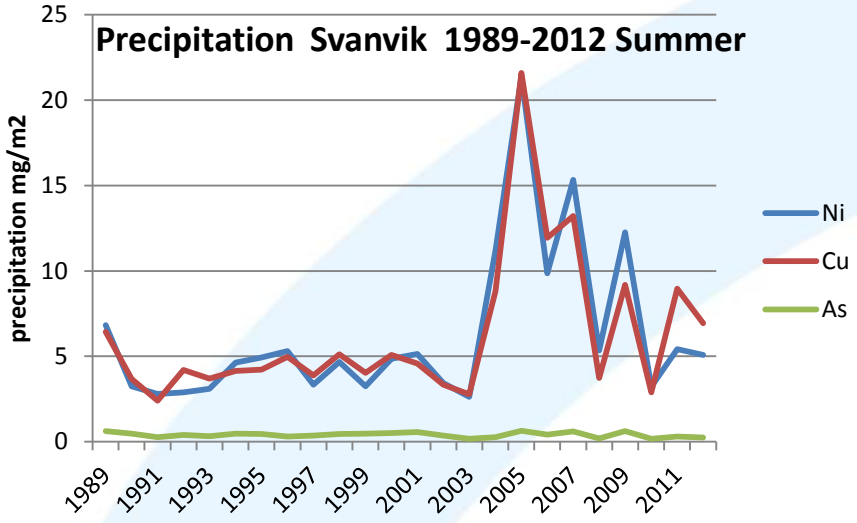
What do we know?



- SO_2 emissions declined over the last 30 y; but still a problem in near vicinity

- No decline and increase of metal concentrations (Ni, Cu, Co and As) in precipitation, mosses and in the Pasvik water course

- Water from small lakes Jarfjord area 2010-2012 - highest metal concentrations ever measured

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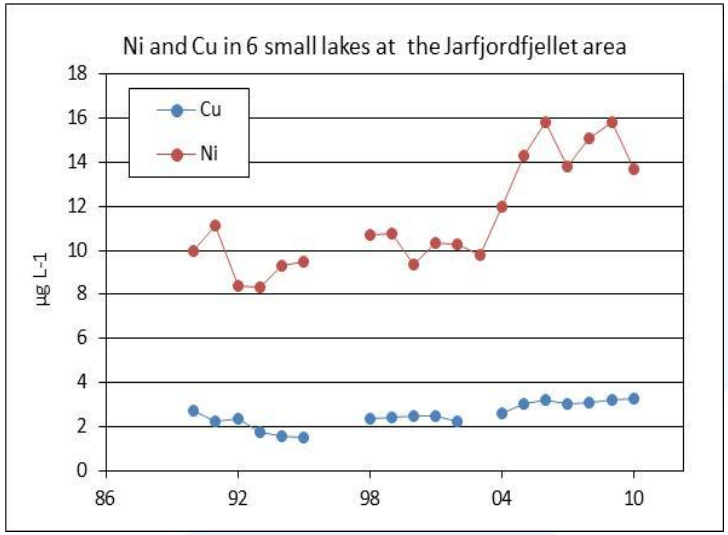
Food safety



- No data available for contaminants in fish from lakes except Pasvik water course
- Concentrations of metals near maximum limits in fish from the Pasvik watercourse, Skrukkebukta (Hg: 0.5 mg/kg ww)
- Few data on local harwested food game (reindeer, moose, birds), berries and mushrooms, drinking water

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What will be done?

- Literature survey on contaminants in food and blood, risk perception, human security.
- Questionnaires/interviews
- Sampling local food items (fish, reindeer, ptarmigan, berries , mushrooms)
- Sampling pregnant women (plasma) & interview
- Assessment of impacts from local industries on local food
- Analysis of human plasma and local food items
- Identification of populations at increased risk
- Data analysis and data integration
- Communication with stakeholders and dissemination

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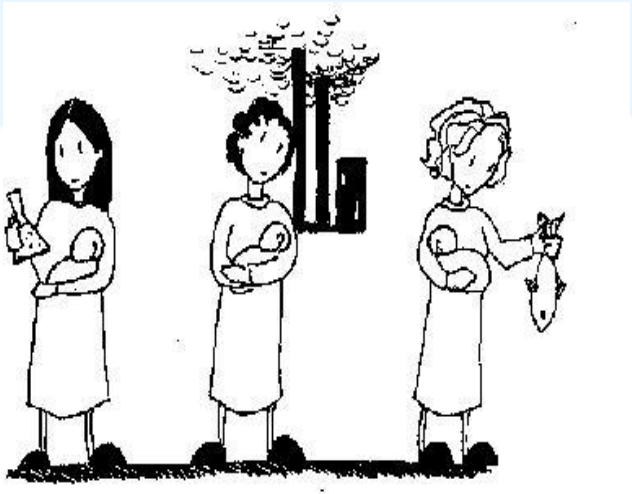
Food Security

- Is the local food contaminated? – Game, fish, berries
- If so - in what regions is this the case?
- To what extent do people actually eat this food?
- Who are they?
- Are people concerned about this, and has this influenced their use of local food?
- Social and physical aspects, using the outdoors.



Risk perception

Sampling & Questionnaires/interviews in progress

Food Security

- What contaminants are people exposed to through food?
- Identify health endpoints to study
- Adress concerns/threats discrepancies.

Birth registries


MISA, University of Tromsø

- Kirkenes MISA – (40 mothers 2008-2009)
- Murmansk County Birth Registry (50 mothers)
- Inari region, National program (25 mothers)

Blood levels, lifestyle, food consumption

Pilot study for future health effect studies

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The use of Birth Registries

- Most environmental contaminant exposure will have the greatest effects during early life-stages
- Birth registries include almost all information on outcomes and risk factors for disease
- Additional information needed for determination of the role of contaminants in this equation is blood levels of contaminants and diet
- Blood levels of contaminants in the mother to child-1:1 (except for cadmium)

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The use of Birth Registries

- From a birth registry, cases and controls are easily collected for contaminant studies
- Linking birth registries with other registries and other measurements has been a recipe for success in Norway
- Unfortunately, continuation and funding of the Murmansk County Birth Registry very uncertain

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Blood sampling in all 3 countries

If there is a difference in exposure to contaminants between the three countries, we should be able to measure this difference in pregnant women

A selection of pregnant women from the three birth registries have been asked to give blood for analysis and answer a food questionnaire

All the information will be gathered in the same way in the three countries

Deliverables

- Dietary data and human blood and food concentrations of contaminants
- Spatial distribution of contaminants in key food items within the region
- Questionnaires and in depth interviews
- Joint actions towards future environmental and health regulations

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Thank you for your attention!

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i kommunen tungmetaller?
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