Project information

Keywords
hazardous substances, metals, dioxins, border regions, industrial pollution

Project title
Contaminants, food- and health security in the border region of Norway, Russia and Finland.

Year
2014

Project leader
Eldbjørg Heimstad & Torkjel Sandanger

Participants

NILU/UiT: Torkjel Sandanger& Eldbjørg Heimstad

University of Tromsø (Gunhild Hoogensen, Erik Anda)

Akvaplan-niva (Anita Evenset and Guttorm Christensen)

NORUT (Eirik Mikkelsen, Anne Normann)

Statens strålevern (Anna Nalbandyan, Inger Eikelmann)

County governor Finnmark

University of Oulu, Northern and environmental issues, Finland

Finnish Meteorological Institute, Finland

The Northwest Public Health Researcher Center, St Petersburg, Russia

Murmansk Country Birth Registry (MCBR), Murmansk, Russia

Institute of the Industrial Ecology Problems of the North KSC RAS, Apatity, Russia

Flagship
Hazardous Substances

Funding Source

Kolarctic ENPI CBC: ENPI financing instrument of the European Union. The ENPI programmes are being implemented on the external borders of the EU.

External funding (Kolarctic ENPI Norway and Troms fylkeskommune) for year 2014: 1mill NOK for Norwegian Partners.

(Total funding 3 mill NOK (Norwegian partners) 25.10.2012- 24.05.2015 where Kolarctic Norway is financing: 50 %, Troms fylkeskommune: 20 %, Flagship “Miljøgifter” 15 % and University of Tromsø 15 %)

Summary of Results

The flagship financing is a partial financing of own contribution for the Norwegian participation in the Kolarctic ENPI project “KO467- Food and health security”. Additional funding from the flagship in year 2014 has made an important contribution to the project for the coordination and administration by the lead partner NILU, the questionnaire surveys and chemical analysis.

The project has progressed with all activities for Fram Centre partners in accordance with the initial time frame. A project meeting was held January 20 2014 in connection with the Arctic Frontier conference in Tromsø. Several partners participated in the Arctic Frontier conference and the project was presented with a talk in the health session and with a poster presentation (see information www.kolarctic.nilu.no). A Steering Committee meeting was held May 8 2014 where the committee discussed further progress of the various WP’es and deliverables. The steering committee therefore decided to ask for prolongation of the project to May 2015. The prolongation to May 24 2015 was accepted by the JMA in early fall 2014 and the addendum to Grant Contract was signed by NILU September 3 2014.

A project meeting October 23 2014 finalized a list of relevant scientific publication to be initiated late fall 2014 and further fulfilled during spring 2015.

All planned analysis of local food samples from Norway and Russia are finalized, and Finnish samples will be analysed during November and December 2014. The chemical analysis have included toxic elements (heavy metals)in all samples of mushrooms, berries, fish and game, and some persistent organic pollutants (dioxins, PCBs and HCB) in fish and game. The samples from Norway are collected in Sør Varanger municipality. If there is a difference in exposure to contaminants between the three countries, we should be able to measure this difference in pregnant women from birth registries.

The results from the questionnaires survey in the border region in each of three countries are finalised and the results are now being analysed. A workshop for interpretation and analysis of results, in addition to planning of joint publications is arranged by NORUT on November 27 2014 in Tromsø.

Highlights

- Analysis of toxic elements (heavy metals) in pooled fish samples from small lakes on the Norwegian area of the border; in Sør Varanger municipality, show in average concentration levels below maximum limits for human consumption set by the European commission, but some perch and pike samples had mercury concentrations near the maximum limit of 0.5 kg/mg wet weight.

- First interpretation of results from analysis of 3 pooled reindeer samples from Svanvik area revealed higher dioxin concentrations than previous reported values in Finland and Sweden; 9.9-13.6 pg TE/g fat for the sum of dioxins, furans and non-ortho PCBs. The European maximum limit (human concumption) for Sum of dioxins and dioxin-like PCBs (WHO-PCDD/F-PCB-TEQ) for bovine muscle is set to 4.5 pg TE/g fat. These concentrations are higher than what has been reported from other areas of Norway but data is extremely limited. The elevated dioxin concentrations in reindeer indicate a point source of dioxins in this area.

- Concentrations of toxic elements, such as copper and nickel, in edible mushrooms (Orange Birch bolete (rødskrubb)) were higher in the border region of Norway than in the same mushrooms from a reference site in Tromsø. Further evaluation and comparison to other reported data will be performed in the coming months.

- Preliminary results of the survey going out to the general population of Inari, Pechenga and Sor-Varanger municipalities/regions indicate some differences in risk perception between different groups. The population in Pechenga, females and the higher educated ones are generally more concerned about the risks related to pollution, with geography and education as the most marked origins of differences. There is a higher level of concern for what pollution can mean for the local nature/ecosystem than for local food sources. There does not seem to be differences in risk perceptions between those who have grown up in the border region and those who have not, nor between major age groups, nor between those that are pregnant or want more children and those that are not pregnant or do not want children. When it comes to assessments of specific types of pollution, a majority of the respondents (>70%) typically do not know the local status. Exceptions are notably for Nickel and SO2 in all the three regions. The respondents in the three regions further differ in their knowledge and awareness of different pollutants.

For the Management

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Published Results/Planned Publications

Arctic Frontier Conference January 2014, Tromsø:

Abstract Poster presentation

Local risk perceptions on contamination in the Russian-Finnish-Norwegian border area

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Regions of the Arctic are contaminated to different degrees. Pollution comes from local and regional sources as well as long-transported. The pollution situation in the area around the joint Russian-Finnish-Norwegian border, the Nickel-Zapolyarny and the Pasvik-Inari regions, has received substantial interest over the years, and specially the emissions from the mining and metallurgical industries in the region. Heavy-metal levels in soil, plants, fish and animals there are elevated. An ongoing project is investigating, among other issues, how the local population perceives the local pollution situation, the health risks associated with the pollution, and how their risk perception affects consumption of local food and outdoor activities. Also, what sources of information groups with differences in risk perception rely on are investigated. The risk perception of the local population will be compared to experts' assessment of the risk. Results from the project will be useful for understanding how different groups of the local population assess and are affected by local pollution and to improve risk communication to the different groups. This presentation will give information on study aims and design, as well as preliminary results from a survey to the population in all three countries in the border region

Abstract Oral presentation:

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

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Although small, the border regions between Norway, Finland, and Russia are very important to local communities for both food availability and economic stability. Spanning over several political jurisdictions, environmental management of this region is of the utmost importance and provides the unique opportunity for integration of research projects among the neighbouring countries.

Contaminant exposures in many Arctic communities are complex with both long-range transport and local sources acting as inputs for contaminants. A number of local industrial sources are present in this area and with planned increased activity. This has raised concerns from the local population regarding food safety and potential risks to health through consumption of food from this region. Contamination of local food could also have large economic implications in terms of export since the reputation on food quality is essential for this region. Thus, there is a need to study relevant contaminants in food and investigate effects and consequences for human health with increasing economic and industrial development.

Although elevated concentrations of numerous contaminants (i.e., metals, dioxins) have been reported in various environmental media from this region, limited data exists on contaminants in important food items and their potential risk to human health.

The objective of the project is to assess industrial impact on food safety and human health in highly populated Norwegian, Finnish, and Russian border region specified in the Kolarctic ENPI CBC 2007-2013 Programme. Integration of contaminant results with monitoring of key human health endpoints can be implemented in future human risk assessments and food safety management. Assessment of results will be communicated to stakeholders within participating countries (i.e., general public, government, and industry) where both the socio-economic benefits of increased industrial activity will be weighed against potential food safety and human health risks.

Questionnaires have been circulated in all countries and blood and food samples are being collected on all sides of the border. Analyses are completed for pregnant women on the Norwegian side of the border and on the way in Russia and Finland. The project will end December 2014. Results from this project will be presented at the Arctic frontier meeting.

List of peer reviewed papers to be written and published in 2015:

1) POPs in pregnant women from Norway, Finland and Russia all residing in the common border area

2) Toxic elements in pregnant women from Norway, Finland and Russia all residing in the common border area

3) Diet and dietary differences among Russian, Finnish and Norwegian pregnant women residing in the common border area

4) Toxic elements and POPs in food from the Finnish, Norwegian Russian border area.

5) Contents of radioactive substances in natural food products from Northern Norway, Finland and Northwest Russia in 2013-2014.

6) Identifying the gap between perceived risk and actual risk by investigating contaminants in food and peoples perception of local food as a source of contaminants.

7) Risk perceptions related to hazardous substances in the Norwegian-Finnish-Russian border area (including risk communication related to trust, and perception of food safety

8) Method / methodological challenges. What is possible in a tripartite cross-border survey? Strengths and weaknesses of the method(s) opted for.

Communicated Results

- Barents Summer School week 25 arranged by T. Sandanger and E. Anda. Sandanger, Anda, Rautio, Kovalenko, Normann participated in the Summer school. Arja Rautio had a presentation of our project "Food- and Health security". Panel debate Thursday 19 with strong link to the topic of the project, see also article in the Barentsobserver.com:

Inaugural Barents Summer School brings researchers face-to-face with local leaders

Interdisciplinary Cooperation

The project is a true inter-disciplinary cooperation with the following disciplines:

Epidemiology (human biomonitoring, birth registries)

Ecotoxciology

Ecology

Environmental Chemistry

Social sciences

Human security, risk communication

Socio-economic sciences

The number of disciplines involved in the human health project is large and this is clearly an asset to all. At the same time, it is not always easy to communicate across all disciplines and it is challenging to publish the interdisciplinary work. The challenge in publishing the inter disciplinary work lies both in the fact that the traditions and way of writing are different and in the fact that it is not easy to find good and suitable journals that is interested in publishing these elements. This is indeed an aspect that deserves special attention from the Flagship and even the whole Fram centre where interdisciplinarity is key.

Budget in accordance to results

The Fram Centre funding has been very important in order to get the grant contract from Kolarctic. The additional funding in 2014 has made an important contribution to the project for the coordination and administration by the lead partner NILU, the questionnaire surveys and chemical analysis. Specifically, the

findings of elevated dioxin concentrations in reindeer samples would not have been possible without the Fram Funding.

Could results from the project be subject for any commercial utilization

No

Conclusions

a) The project has led to:

- PhD student will start early year 2015 in the project and will continue to work with central topics from the ongoing project on food and health security issues in the border region.
- Potential future monitoring of pollutants in natural food resources such as fish, game, mushroom due to local emissions from industry as well as human health monitoring due to exposure to polluted air and local food.

b) The project collaboration has developed the following common methodology:

- Common questionnaire for risk perception of pollution to be used in the border region of Norway, Russia and Finland
- Food safety issues of local nature resources such as of game, fish, berries and mushrooms in the border region
- Use of birth registries for potential future risk factors for disease, diet information in addition to chemical analysis of blood samples:

  Kirkenes MISA (40 mothers 2008-2009)

  Murmansk County Birth Registry (50 mothers)

  Inari region, National program (25 mothers)

  Expected impact after 2014:

  - Communication and dissemination of information and results from the project to stakeholders, decision makers and the general public.
  - Recommendations and joint actions towards future environmental and health projects, monitoring and regulations in the region.

Food security strategies including nutritional aspects specific for each country

E. Heimstad, November 24 2014