



Commentary

Rethinking the Coexistence of Industrial Mining Near Protected Areas: Human Concerns for Sustainable Development in the Arctic

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Abstract: This commentary was written as part of a travel symposium organized by the Calotte Academy between Finland, Russia, and Norway entitled “Resilience Related to Sustainable Development in Globalization” which occurred from the period of May 30 to June 5, 2016. The focus is in particular on environmental perspectives towards industrial mining and nature protection at community level. As the socio-economic and political systems of communities evolve in time and space through globalization, the challenge remains for humans to meet the needs of present without compromising the ability of future generations. One of the crucial examples in today’s world includes locating industrial mines near protected areas. In general, this raises concerns of endangering ecological landscapes and undermining human needs. However, there are possibilities for sustainable development to the immediate community. For instance, by means of employment in the mining sector incorporated with the establishment of sustainable environmental management schemes. Using a method approach of document review, a case study of Hannukainen mine near Pallas-Yllas National Park in Finnish Lapland is analyzed. This paper responds to the 2013 Environmental Impact Assessment report by Northland Mines Oy which planned to re-open mining operations in 2016 but faced resistance. Both problems and benefits posed by mining to the human and natural environment are highlighted including human reactions to such problems. It then concludes by proposing possible implications for sustainable development at community level.

Keywords: Protected Area, Sustainable Development, Industrial Mining

1. Introduction

Mining is an economic activity which, at times, poses a problem to the sustainable development of protected areas and the nearby human community, with respect to risks on natural and human environments. For example, the case of Hannukainen iron ore mine in Kolari municipality of Finnish Lapland was illustrated in an Environmental Impact Assessment (EIA) report by Northland Mines Oy [9]. This report reviews the extent of predictable risks of open-pit mining on humans and the natural environment. However, amidst this problem, there are possibilities for sustainable development at the community level. For instance: the provision of employment through the creation of jobs; the

creation of appropriate measures for groundwater quality analysis; and developing potentials for environmental resources maintenance. In the paragraphs below, I seek to inquire the various risks being posed by mining to immediate environment, how the human community responds to such risks, and in what ways mining could be beneficial to the local community.

2. Theoretical Background to Ore Mining in Finland

The mining of ore has been an important industrial activity in Finland during the last five decades. Studies have argued that the extraction of iron ore mining in Finland started back in

the year 1540. Since then, many operational sites have also been established such as: Harjavalta for processing and refining of copper and nickel; chromium processing in Kemi; iron mining in Raahe; and zinc extraction at Kokkola. Several contributive mines and queries have been set up to include; Suurikuusikko in Kittilä, Jokisivu in Huitinen, Orivesi in Orivesi, Pampalo in Ilomantsi, Rämepuro in Ilomantsi, Kevitsa in Sodankylä, Kylylahti in Polvijärvi, Pahtavaara in Sodankylä, Laiva in Raahe, and Pyhäsalmi in Pyhäjärvi. According to a 2015 report by the Geological Survey of

Finland, about 250 million tons of ore has been produced so far in Finland with its main components that consist of 66% sulfide and 34% oxide ores. When we look at data reports on the annual output of metallic ore in Finland from 1997 to 2013, about 3 471 597 tons was produced in 1997 compared to the significant increase of up to 20 846 551 tons in 2013. However, the year 2014 witnessed a sharp drop with 13 403 495 tons recorded [3].

The table below represents data on the outputs of metallic ore production in Finland from 1997 to 2014.

Table 1. Metallic Ore production in Finland 1997-2014 [3].

| Year | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|-------------------------|-----------|-----------|-----------|------------|------------|------------|------------|------------|------------|
| Total ore output (tons) | 3,471,597 | 3,215,019 | 3,101,275 | 3,338,525 | 2,940,334 | 3,185,150 | 3,243,608 | 3,636,679 | 3,623,531 |
| Year | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
| Total ore output (tons) | 3,605,223 | 3,732,900 | 6,311,123 | 11,845,051 | 18,191,462 | 17,213,074 | 19,591,999 | 20,846,551 | 13,403,495 |

In recent times, ore mining in Finland has drawn community attention on the basis of the argument that the ability to protect nature sites is being compromised. An example is the case of the Hannukainen mining project; an open pit mine which is located in the Kolari municipality of Lapland in Northern Finland. Since 1970s and 1980s, the companies Outokumpu Oy and Rautaruukki Oy had been mining in the area. In 2013, Northland Mines Oy targeted a restart of the mining site which is argued to have a life span of 17 years estimated from 2016 till 2034. In response, an Environmental Impact Assessment (EIA) report was submitted to the Regional State Administrative Agency and Kolari Municipality in 2013.

3. Methodology and Aim of Study

The initial report [9] was aimed at estimating preliminary profitability, the technical and financial viability of the project, and the amount of risks involved on both human life and the immediate environment. In addition, the report was aimed at promoting mutual understanding among different stakeholders (reindeer herders, hunters, vacation homes and tourist center operators, skiing resort business, protected resources such as the nearby rivers and forest, and the local inhabitants) in the Hannukainen area. This study relates to conflicting issues of interest in combining nature sites with industrial activity. Using a review of documents and a commentary approach of methodology, I seek to critically address various environmental risks of mining near nature protected sites, while proposing possible benefits to community from the perspective of sustainability.

4. Result

The EIA report published by Northland Mines Oy, takes into consideration the need to promote mutual understanding among different stakeholders in the Hannukainen community of Northern Finland. These include; reindeer herders, hunters, vacation home operators, touristic center business agents, winter resort owners, protected resources such as the nearby rivers and forest, and the local inhabitants of the Hannukainen

village. Specific issues being assessed include; the landscape, soil and bedrock, aquatic ecosystems, vegetation and fauna, climate, and air quality. For instance, in terms of the landscape, it is predicted that the location of the mine's concentration gravel pool risks impacting the nearby touristic center of Ylläs fell (which is about 10-15 km away), Pallas-Ylläs fells (of about 8 km away), and Pakasaivo Sami culture landscape area (about 13 km away), based on vulnerability to land surface erosion and pollution caused by mining construction. In addition, activities of demolishing infrastructure, drilling, landscaping, and explosions during construction are arguably said to remove topsoil and bedrock.

Also, the Environmental Impact Assessment report showed that there were risks involved in relation to the aquatic ecosystems. As such, the report predicts Hannukainen as a class III ground water category presumably from historical iron ore soil contaminants during 1970s mining. This scientific argument however, requires research to prove if the ground water is suitable for drinking or if it is contaminated. Furthermore, the surrounding rivers (Äkäs, Kuer, and Valkea) are exposed to water from the mine. Nearby protected Tornio-Muonio River runs about 20 km downstream beside the Rivers Äkäs, Kuer, and Valkea. Northland Mines Oy identified Tornio River as a spot used by the Game and Fish Research Centre for fish population research on monitoring Salmon and Trout growth. Both the Äkäs and Kuer rivers are of significant salmon (alevin) production and home to brook trout. The Muonio River is also a habitat for salmon and is located just 15 kilometers from the mine [9].

Arguably, mining also poses a risk to hindering the life sustenance of nearby protected flora and fauna. The Hannukainen natural environment constitutes boreal forest with numerous springs under protection by the 1948 *Water Act*. The Orchid and Lapland buttercup are the most protected plant species in the area. The hare, northern bat, and fox are common mammals in the area protected under the 1992 *Nature Conservation Act* [9]. Equally, favorable climate and air quality suitable for human, plant, and animal life are affected by mining. It's estimated that the explosion of fuel, power plant fuel, transportation fuel, and dust during construction, will affect air

quality based on greenhouse gas emission levels of between 0,89-1,6% [9] (See: Option 4 on GHG emission estimates, EIA report, Northland Mines Oy 2013: 432-439).

5. Discussion

5.1. Human Reactions to the Hannukainen Project

In response to the problems that may occur upon starting mining operation in the Hannukainen community, various sources of published reports have illustrated mixed feelings among individuals, business operators, and groups of people. For example, Mainio and Teivainen (2014) in the *Helsinki Times* magazine argued that business owners operating in the Ylläs area were concerned about mining discoloring the snow and discrediting Lapland's touristic image. Their report highlighted that a Swiss travel agency has already threatened to suspend organization of tours in Ylläs. In addition, it was indicated that the manager of the Ylläshumina hotel *Toivo* expressed signs of fear that his life's work may be destroyed by the mine when he said "Tourists often admire the untouched nature of Lapland. The sounds of blasting, lights and dust scattered on the snow collide with that," [7].

Furthermore, critical reports have shown that apart from a petition signed by 5,000 local people in Finnish Lapland against starting the operation of a mining project in the region, a survey by the Finnish Forest Research Institute argued that 70% of the tourists interviewed in the region perceived mining as having an adverse effect on the image of Ylläs area [7].

Northern lights, which are a crucial contribution to tourism experience in Finnish Lapland, may be distorted by industrial lights which hinder the visibility of the clear skies for blazing auroras (Haataja 2014). This would clearly have further negative ramifications for the tourist industry in the region. Nonetheless, the implications are not all bad, following the statement by the mayor of Kolari, *Kyösti* who said; "Combining tourism and the mine is difficult, but not an impossible task. You do have to consider the roughly 360 new jobs the mine would create," [7].

5.2. Beneficial Considerations of Mining to the Community

Nonetheless, amidst the fears of mining and its consequences for both the natural and human environment, it is possible to benefit from mining. This is quite encouraging when thinking of Finnish Lapland whose region remained sparsely populated before and after the 20th century. The average unemployment rate was 13% in 2011 and 2012 compared to 9% in Finland as a whole [11]. Youths emigrate to the South in search of better opportunities. Regional Council of Lapland [10] argued that since 1953 until 2012, not only has Finnish Lapland population remained under 183,000 people but the elderly group has been increasing.

Considerably, mining could be an opportunity for job creation, allowing for the enhancement of immigration in Kolari, boosting business sectors of all kind, meanwhile strengthening trust among stakeholders, and these viewpoints remain to be proven. The example of Grasberg in Indonesia

whose population grew from under 1000 in 1973 to about 110,000 in 1999 emerged from the creation of the Grasberg gold and copper mine in 1973 [8]. However, weighing possibilities of this kind will require a community-based survey to compare perceptions of both locals and various stakeholders regarding benefits of mining to community.

6. Conclusion

The occurrence of conflict among stakeholders in Hannukainen necessitates a mutual understanding that is beneficial for all operators in the area. A suitable approach could be achieved through the establishment of a Strength Weakness Opportunity Threat (SWOT) analysis to identify and compare the strengths, weaknesses, opportunities, and threats between estimated job numbers to be created for locals; through mining, and in comparison to jobs in traditional reindeer herding, tourism, and other sectors within the Hannukainen community. Emphasis could equally be made on engaging a great number of local laborers in the mining sector.

The Environmental Impact Assessment report was limited in not providing accurate details on the status of actual ground water quality. A possible step forward will be to analyze the groundwater quality which could then help establish adequate control mechanisms against water contamination.

Sustainable scientific methods of plant, animal, soil, and groundwater quality maintenance could be proposed and tested as an alternative solution to maintaining salmon populations in nearby rivers, including endangered bird and mammal populations around Rautuvaara boreal forest. For instance by using plants through phytoremediation (a process of using plants and microorganisms for the treatment of contaminated ground water and soil) to prevent heavy metal pollution in soils and in water through rhizofiltration (See: [1]; [4]; [6]). Also, in Southwestern Virginia, appropriate reclamation of areas near mined lands through vegetation and wetland construction led to increase in diverse bird species and amphibians [2].

The idea that mining is detrimental to sustainable development in globalization appears to be realistic, when we look at the evidence of risks on the human and natural environment. However, such fears may not all be permanent in the context of a sparsely populated community. Mining could offer an economic boost by providing job opportunities for locals while attracting foreign investors. However, stakeholders involved in such economic activities must take responsibility to actively maintain and protect the natural environment. A way forward, will be, to apply surveys at community level to test, and compare stakeholder perceptions on possible benefits and setbacks of mining in Kolari.

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