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The organization of mineral exploitation and the relationship to urban structures and local business development

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Abstract

The key question of the paper is how to organise mining projects to involve the local workforce and support the potentials of mining projects for development in Greenland. Following this paper explores the concept of flexible settlements in relation to develop socio-economical sustainability. A major challenge for Greenland is the on-going decoupling between existing settlements and the main export industry based on marine living resources. Because Greenland, as other Arctic regions, is divided into relatively isolated island economies with only modest trade between the settlements, limited possibilities of commuting, and where a number of settlements are left without a substantial industrial base. Administering the settlements often is the most important wage based occupation and the society in general struggles with unemployment and widespread social problems.

Mineral extraction is seen as a key to overcome the contemporary economic challenges. But few mineral resources are located in proximity to existing settlements. Many of the mining companies envisage potentials for a fast extraction of the resources using immigrant and migrant labourers that work intensively over a period of time while living in shantytowns. Both local and international experiences show that such an organization of work and everyday life is not very attractive for those parts of the population that still have alternative option, and that these forms of mining activities often end in significant human and social challenges also for the surrounding community. The historic experiences of Greenland tell that a different and long-term organisation of exploitation of mineral resources can contribute to a socially better organised, socially functional and innovative society. Therefore there is seen a need for further research regarding the possibility of re-establish the coupling between settlements and local resources and thereby trade possibilities primary linked to mineral extraction. When extraction only last for a decade or two there is a demand for incorporating flexibility in how the settlements are constructed. The focus in the research will be whether it is possible in such temporary mine-related settlements to create an attractive and sustainable alternative with a reasonable population and economic diversity.

1. Introduktion

This article is based partly on a PhD study that, among other things, analyses the Greenlandic economy for different types of habitats, and partly on knowledge developed through the teaching of Arctic engineering students associated with **Sanaartormik Ilinniarfik in Sisimiut and the** Technical

University of Denmark.

First, the introduction presents the central framework of understanding regarding the Greenlandic settlement pattern, economic base and Greenland's economic situation.

Section two shows the increased interest in

exploiting Greenland's mineral resources, and section three discusses experiences with work organization. Finally, in section four, the article discusses the need for a new approach to work organization of the mining industry in relation to urban structures and business development.

1.1 The link between residence and business bases

As many other Arctic communities, Greenland is characterized by a very small population in relation to its size, and the country's settlements are widely dispersed. At the same time, all Greenlandic settlements practically operate as islands without roads or any other option for daily commuting between settlements. This means that the Greenlandic economy in reality is not a coherent economy, but a number of interconnected island economies. One of the major challenges of the island economy structure is that there is an extremely modest trade between the individual settlements. Only around 15 % of

ship cargo is between Greenlandic settlements, while around 50 % is import from Denmark, and approx. 35 % is export to or through Denmark.

For island economies without the possibility of daily commuting, having a locally based livelihood becomes vital to the financing of the settlement. For the Greenlandic settlements, the primary commercial basis has traditionally been the exploitation of marine living resources, but for decades it has not been able to fund community service, which is why Greenland has been and still is entirely dependent on financial transfers (subsidies) from Denmark. Greenland also has a large education gap, which is why a large part of skilled labour and labour with higher education is exogenous and mainly from Denmark.

For both the individual settlements and Greenland as a whole, over time there has been a growing disconnection from the exploitation of marine living resources because, in growing proportion, these resources are being caught by large ocean-going trawlers, processing or freezing on board, which then sell directly to ports outside Greenland, or sell in Greenland, where most of the raw materials are exported unprocessed. This means that the impact on employment, and thus added value for the communities where there still exists a seafood buyer, is modest, and that the settlement's localization in reality will be decoupled from the local resource utilization.

For major towns, the primary industrial base has become the maintenance of the settlement's operations, including administration, health, education, retail, construction, etc. In contrast to this trend, there still exist a number of smaller settlements where the primary existent and occupation base continues to be linked to the exploitation of marine living resources and the vast majority of the inhabitants and workforce is of Greenlandic origin. (Hendriksen 2013)

Facts

Population (January 1st 2013): 56,370
Of these 6,270 were born outside Greenland

Population in cities: 48,151
Population in settlements: 7,775

However, the difference between towns and settlements is unclear and is primarily based on historical and administrative status. Based on this, there are currently 18 towns ranging from 452 (Ittoqqortoormiit) to 16,454 (Nuuk) inhabitants, and 58 settlements ranging from 22 (Qassimiut) to 512 (Kangerlussuaq) inhabitants. Moreover, there are a series of sheep farms and technical / scientific stations.

There is a remarkable deficiency of women with 89 women per 100 men in all of Greenland, and similarly in the reproductive age (defined as 18 to 42 years) with 92 women per 100 men.

1.2 The Danish government's economic contribution

Currently, the Danish government contributes almost half of Greenland's government budget (577 million out of 1.261 million EURO in 2011) (Statistics Greenland 2013) and approx. one third of the disposable gross national income. At the same time, Greenland have the same demographic challenges as a number of other Arctic areas, with increased life expectancy, a declining birth rate which is down to 1.8, and migration from Greenland, which together result in an increased dependency ratio, with consequent growth in public spending. Public spending is also challenged by expectations of increased welfare, education and health, while export incomes are declining, overall resulting in an expected increase in the deficit in public finances. The autonomy agreement with Denmark implies that the Danish transfers (subsidies) to Greenland are regulated by the Danish price index without compensating for rising costs.

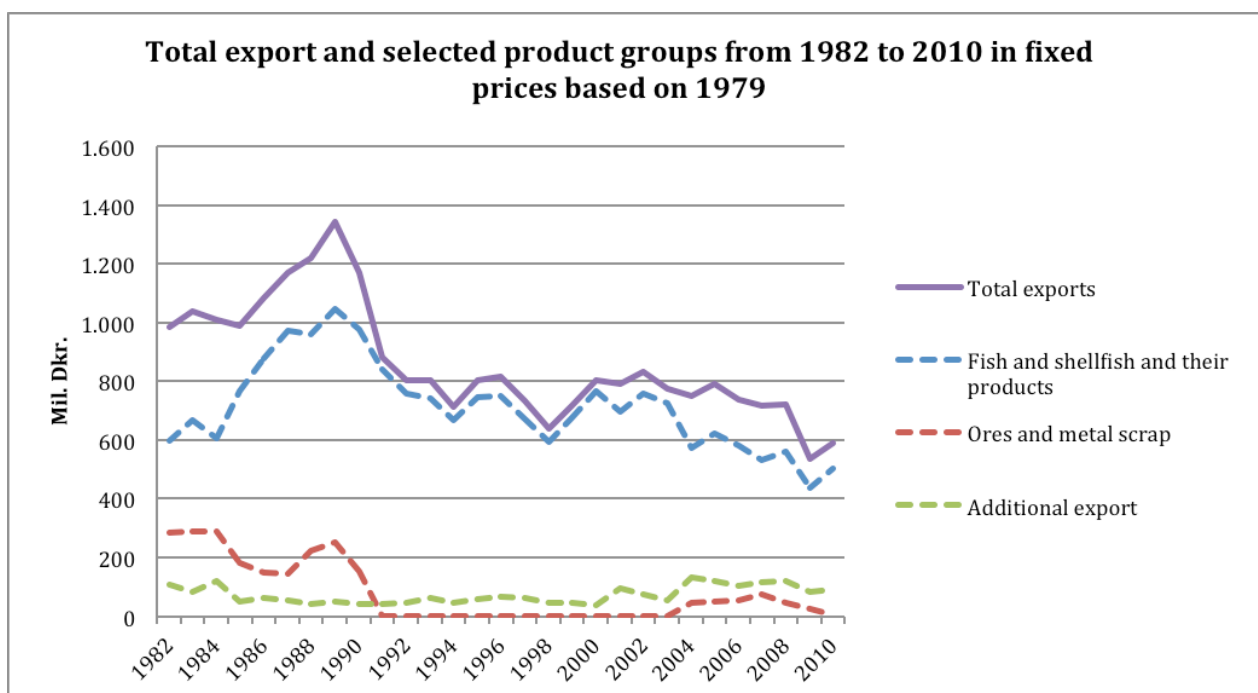
1.3 The desire for increased differentiation in the industrial base

The political desire in Greenland for increased political and economic autonomy creates an obviously untenable situation, and it is in this light that the growing interest in the country's mineral resources has to be seen.

That is why there is a massive political desire to develop new business areas and thus expand the export incomes to more areas than just living marine resources. Over the past decades, the value of mineral exports has been quite modest, while fish and shellfish account for the predominant share of exports.

2. Potential mineral resources

It is noteworthy that most of the known mineral deposits have been known for decades, but has not been exploited because no one has found it profitable. The increasing global resource shortages of certain raw materials and consequent expectations of price increases is a major explanation for the increased international interest in some of the Greenland mineral potentials. Another explanation is more intensive Greenlandic marketing of these potentials, combined with increased flexibility of the rules. Additionally, there may be political considerations of the superpowers behind, for example, the Chinese interest in mineral exploration in Greenland, where a geographically rooting in Greenland can help legitimize a Chinese seat in the Arctic Council and other international bodies, thus making China an 'Arctic nation'.



In recent years, a large number of exploration licenses have been extended, and currently, the exploitation licenses for a handful of projects are being negotiated. However, currently only one relatively small project is close to being realised.

3. The use of local manpower

Apart from the so-called rare earths elements (REE) in Kuannersuit (Kvanefjeld) at Narsaq, none of the current potential mines are directly linked to an existing settlement. Currently, it is uncertain whether a mineral exploration in Kvanefjeld will be undertaken, as the mountain contains uranium, and both the Greenlandic autonomous government and the Danish government has a zero-tolerance policy in relation to uranium based on both environmental concerns for the local area and population, as well as security considerations with regards to non-proliferation of nuclear materials and the ratification of international conventions. Abandoning the zero-tolerance policy is currently being debated in Greenland.

The general strategy for mining companies is to make a relatively quick extraction and a subsequent closing of the activities, balancing the cost of equipment and the development of market price for the resource in question. There is an emphasis on migrants or emigrant labour boarded for the period in shantytowns at the mine itself, interrupted by shorter furloughs at home. During the work period, working will typically be done in 12 hour shifts 6 days a week for a longer period.

The Greenlandic government announced that potential Greenlandic labour can only expect to be transported to and from the mine from a major city, while they themselves must pay for any transportation to smaller settlements, and the government encourages people to move towards the major cities.

3.1 Experience of work organization

Past Greenland experiences with this type of work organization is not particularly positive.

From 1972 to 1980, the Canadian (and later Swedish) mining company Greenex operated the zinc- and lead mine Marmorilik in the Ummannaq district (Nordregio 2009:12). The work shifts were 14 days followed by 14 days off (ibid: 13). Approximately 15% of the workers were born in Greenland. (Dahl 1977: 6; Nordregio 2009:15) An illustration of Marmorilik being a special community is the percentage of women, that during the years 1997-1992 only were 9%. (Nordregio 2009:14) Until 1977 the Greenlandic workforce were discriminated with lower salary and poorer employment and work conditions. After a work conflict the formal conditions were equalised, however the number of employees with a Greenlandic background were not elevated, according to Nordregio because of the company's right to choose who to employ. (2009:13-14)

The only currently active mine is the Nanulaq gold mine in Kirkespirdalen in South Greenland, Nanortalik district, which has been running since 2004. The mine has continuously employed 80-100 people, but only for short periods of time did it manage to have more than 50% domestic manpower and a large part of these is working with the services such as cleaning, catering and transport. It is remarkable, because the mine is located in one of the country's poorest districts with massive unemployment.

Relatively many Greenlanders have worked shorter periods at the Nalunaq mine, but few have done it for a long time. The explanation often heard is that they work in the mine for a period to raise money for e.g. a new tractor for their sheep, a dinghy or motor for hunting and fishing, consumer

goods for the home or similar, but they do not want to work under the given conditions for an extended period of time. (Hendriksen 2013)

Work organization do not seem to fit into the culture of Greenland, where time spent with family counts very much, just as many considers having time to get out into the countryside, hunting and fishing, to be very important. This also explains that a relatively large part of the crew on Greenlandic trawlers is recruited in the Faroe Islands, Iceland, Norway and Denmark. (Nielsen 2000)

The socio-economic impact of mining may be very modest, as long as the only direct income is taxation of employees' wages, and workers from outside Greenland are exempt from council tax and only pay land tax. Because they do not live permanently in Greenland, their wages are not put into circulation in society through general consumption, and therefore there is a limited multiplier effect for this part of the workforce.

3.2 Experience with other work organizations

From 1924 to 1972 there was an active coal mine in Qullissat, which was organized as a real community with school, shop, hospital, administration, etc., and where there was a fairly even gender distribution. Although Qullissats primary industrial and existence base was mining, a broad occupation base of hunting, fishing, construction companies, etc. emerged, and the city developed into an attractive habitat that attracted people from all over the country, and for a period of time, Qullissat was Greenland's second largest city with about 1,200 inhabitants. Qullissat was an innovation centre and the birthplace of the Greenland trade union movement, as well as a cultural centre for music and politics.

In this context, it is key that the Greenlanders were a very large part of the mine workers, and that there was a community which was also seen as

attractive for citizens who did not work in the mine.

There is thus a historical example of mining in Greenland being successfully combined with an attractive community with great diversity.

On the other hand, the closing of the settlement of Qullissat stands as no success. In 1972, Greenland was formally an integrated part of Denmark, and it was the Danish Government which decided to close the mine. The closure was based on the fact that the coal grade was low, that it was more difficult to produce coal, because the easily accessible part had been extracted, and that Qullissat had no port, so coal had to be lightered out to the ships that sailed it to Denmark. Another key factor was that Polish and South African coal was cheaper, making world prices crucial to the closure of the mine. It gave rise to some political discussion in Denmark, since the closure took place during the Cold War, where not everyone found trade with Poland opportune, and many found it unacceptable to buy coal from the apartheid system in South Africa, where miners lived and worked under miserable conditions.

The decision was made without consulting enough with locals, and people saw it as a decree. There was not put enough thought into alternative economic opportunities or phasing out the mining activities over a period of time. Inhabitants of the community were forcibly relocated and scattered to the winds. The decision became a politicizing factor in Greenland and was an important political mobilization leading to the Home rule Government in 1979. The closing of Qullissat is still traumatizing in Greenland, and it may be some of the reason that the establishment of actual settlements in connection with mining operations is not on the political agenda?

4. Exploring alternatives

As mentioned above, Greenland faces a number of challenges of an economic nature in relation to education and to re-establishing a link between residence and

commercial basis, if the vision of economic self-dependence must be met.

The Greenland Government's plan that people should move from the smaller settlements and gather in large cities, from which some of the men should commute to the mine's shantytowns for stays of 3-4 weeks followed by a week or two at home, seems, in light of experience, not very realistic.

It should not be seen as an argument against increased mining, as there may be good reason to increase the country's revenue base on the exploitation of mineral resources. It is only a question of how it is implemented environmentally and in terms of securing a socio-economic and socio-cultural sustainability.

This complex area has for some years been taken up in the engineering education. In an attempt to shed light on alternatives to the mining industry's dominating work organization with emigrants and migrant workers in shantytowns, we organised a special course with groups of students from the engineering education to more systematically working with this problem complex. Their work has resulted in the exhibition material for the Danish exhibition at the 2012 Venice Biennale International Architecture Exhibition. These preliminary studies indicate that among parts of the population there is a great interest in discussing alternatives.

As an example we have looked at a potential mine on the east coast of Greenland at Kangerlussuaq, midway between Ittoqqortoormiit (Scoresbysund) and Tasiilaq (Ammassalik). There has already been a settlement at Kangerlussuaq, which was closed during the Danish Government's efforts to centralize the population. Kangerlussuaq is one of the best hunting spots in Ammassalik district, and every summer around 30 families sail the 300 km up to Kangerlussuaq, where they camp and hunt, among other species, narwhals and polar bears.

Ammassalik district is one of the country's poorest, and the base for hunting and

fishing and fish purchasing capacity is inadequate to effectively secure the district's existence, which is why a part of the population is dependent on social transfers.

The students' interviews indicate that there exists a connection between interests in working at the mine, and whether there will be the establishment of a proper settlement at Kangerlussuaq, including room for women and children. There is also a desire for the work to be organized with normal operating hours, allowing time for family and leisure, which is typically spent on hunting and fishing. In this context, there is a desire for flexibility, allowing for holidays or other forms of free time in the periods where this is e.g. narwhal catch, something that cannot be planned and predicted in the longer term.

If mining is organized as a slightly less intensive and lengthy process, there can be established a residence with about 200 inhabitants, a quarter to a third are employed in the mine and the other of working age ensures the settlement's operation and operates catch. Under these assumptions, it is estimated that there are resource potentials for at least 30 years of operation. New businesses opportunities may develop around the mining settlement related to fishing and tourist, creating a more diverse economic base.

There will obviously be some societal costs of (re) establishing a proper settlement at Kangerlussuaq, but the alternative may result in the classic Greenlandic problem where major projects are based on outside labour and wage money circulation will take place outside Greenland and the majority of secondary multiplication is thus absent.

4.1 B Sustainability challenges

Preliminary studies indicate a central problem in relation to sustainability. First, there is of course the challenge of running a given mine in an environmentally acceptable manner, an issue not examined more closely here. In addition, the challenge of ensuring that mining gives socio-economic and socio-cultural benefits to the Greenlandic society.

In recent decades, several hydropower stations and runways have been constructed by external contractors primarily using outside labour, and local job creation has been extremely modest. And there are indications that the next big mining projects can quickly end up creating the same problem. At the expected iron mine at Isua in the bottom of Nuup Kangerlua (Godthåbsfjord), alone, there are expected a workforce of up to 1,000 during the operational phase. It may be asked whether it seems realistic to find this manpower within the country when we consider the failure to find more than approx. 50 % resident labour for a mine with 80-100 employees. If labour is not Greenlandic, how does the mine benefit the country? Although there is not charged royalties for mineral extraction, it can of course be expected that some modest income tax revenues will be generated from the outside labour. Experience shows, however, that there is no evidence to suggest that mining companies will have to pay business tax at any significant rate, and thus the social contribution remains small. This means that the overall positive momentum through the generation of jobs for the surrounding communities also remains modest, and this challenges the overall sustainability.

Traditionally, the population of Greenland has a very high mobility and there is still a relatively high mobility of the population, and, most surprisingly, there is a relatively high mobility of the population engaged in hunting and fishing. (Nordregio 2010) The question is whether this mobility can be exploited for mineral extraction, if the work is organized and arranged in accordance with social and cultural frames of reference.

4.2 Need for more research

There is a great need for more research in this area, involving experience from similar projects in areas with indigenous peoples in and outside the Arctic.

It is essential to explore how local people can be involved positively in the Greenland mineral extraction projects, and how work can be organized so that it is attractive, and will not undermine the existing cultural

context, but will be included as a positive element in sustainable development dynamics. In this context, it is necessary to analyse the socio-cultural implications of establishing settlements with an expected service life limit, and how the settlements can be soundly closed when livelihoods are exhausted. Already in the start-up phase, should it be assessed whether the site has other potentials that can enable a long-term establishment and continued run of the settlements or parts thereof. Inuit is originally a nomadic culture, and parts of the population have maintained a high mobility. It should therefore be examined to what extent the general mobility can be included as a positive factor in the establishment of settlements, which is of temporary nature.

In addition, an assessment of the individual mines socio-economic potentials under different operating modes is needed, where it is necessary to analyse much broader than just the financial return for the mining company.

Finally, there are a number of technical challenges to the establishment of settlements, which are expected to have a limited lifespan, so that most elements can be reused at another settlement, and so that the settlement also environmentally becomes sustainable in the operation phase, and that there may be an environmentally sound dismantlement.

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