

Chapter 20

Urbanisation and Land Use Management in the Arctic: An Investigative Overview

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Abstract This chapter investigates the role of land use planning in the context of arctic urban development through six city-profiles. Urbanisation in the Arctic is driven by a range of socio-economic and political factors. Not least, these include political processes to concentrate public services and a withdrawal from state-led socio-economic planning, economic processes that have led to the development of labour markets and new social institutions that are needed for reproducing the labour force. While these processes create development opportunities, they also have a wide range of spatial impacts and these require increased attention toward urban land-use planning. Through the city-profiles, we suggest that effective urban land use planning in the Arctic is highly context dependent. Significant issues appear to include: the importance of preserving relationships between society and the natural environment; the necessity in some cases for planning measures in response to significant urban sprawl; the recognition of complex governance structures that influence development strategies; and even the necessity for planning responses to suburban sprawl.

Keywords Urban • Land use • Arctic • Planning • Development

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20.1 Introduction

Land use is a heavily researched planning topic in the context of sustainable urban development, where diverse challenges and responses associated with urban sprawl dominate many discussions. Problems include the loss of productive land for agriculture, the disruption of ecosystems services, pollution associated with car dependency, and reduced quality of life due to increased commuting distances (Nilsson et al. 2014). Solutions often include densification strategies such as the compact city, brownfield development, infilling, or transport oriented development. However, most of the discussion continues to take place within continental European and North American perspectives, bound to the territorial contexts of mid-latitude, developed countries. In reality however, the interplay between growth and land use impacts requires an understanding of the local context to create resilient, attractive, and sustainable urban settlements. Local factors include issues of scale, environment, society and culture, politics, and economy – each of which engrain both explicit and hidden agendas into the development discourse.

This chapter focuses on the urbanisation of arctic settlements. It uses historical planning documents and the situated perspectives of the authors to investigate how socio-economic development has impacted urban land use processes in selected arctic urban areas. The main focus is on urban morphology within settlements, and, vis-à-vis the hinterland, governance factors associated with urban land management. The chapter begins by briefly examining the main socio-economic factors influencing urbanisation in the Arctic, and follows up with an analysis of land use development in six different urban settings. Each city profile was developed in a semi-structured way, where individual authors used general guidelines to present key trends in the historical development and current land use management of each city.

20.2 Urbanisation in the Arctic

By 2010, over 50 % of the world's population was living in urban areas (EC 2011) and Fig. 20.1 shows that the Arctic is no exception to this trend. With the exception of Russia (depopulation) and Alaska (high birth rate), larger urban centres in the Arctic are growing compared to the stagnation or depopulation being experienced in smaller settlements. This pattern is particularly clear in Anchorage, Whitehorse, Nuuk, Reykjavik, Akureyri, Tromsø, Bodø, Luleå, and Rovaniemi.

While urbanisation is a complex phenomenon, some common drivers in the Arctic include:

- *Urbanisation as a political process:* Changes in the payments of transfers, concentrated public service provision, and the withdrawal of the state from social and economic planning have led to the continued concentration of populations in larger settlements (Southcott 2010).

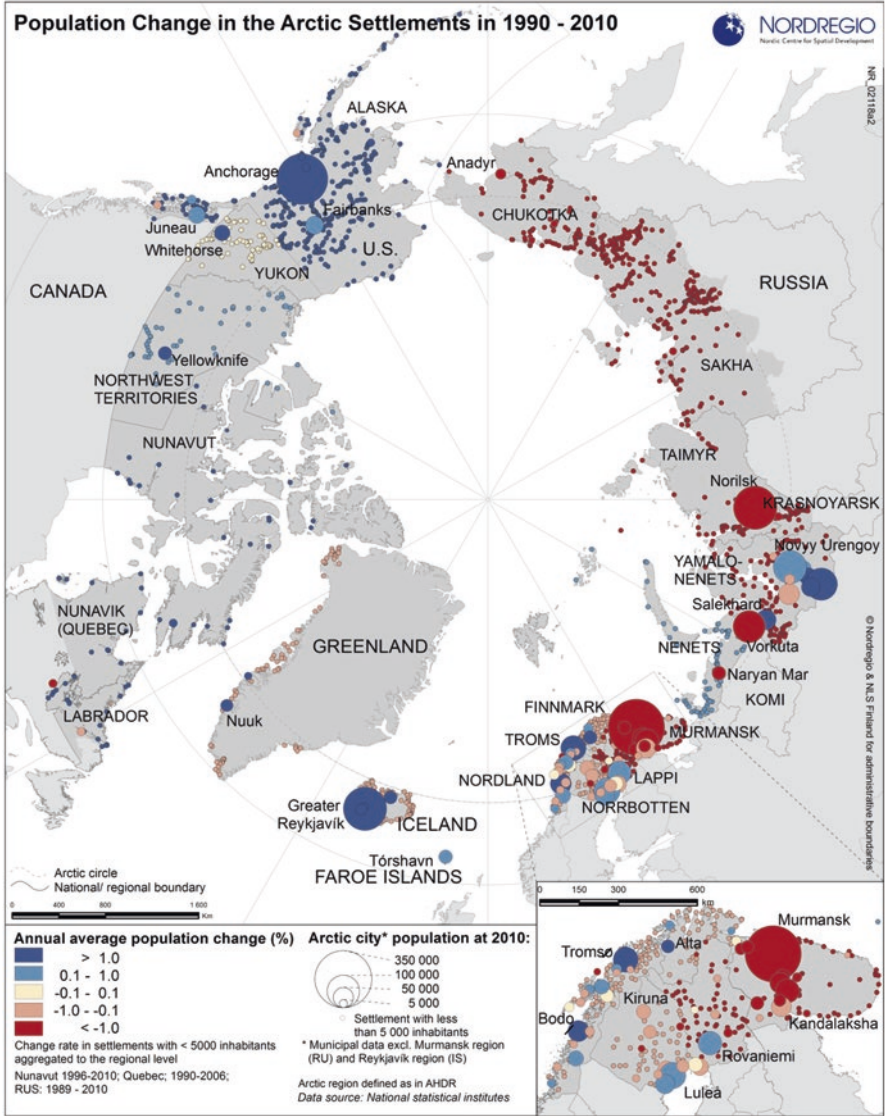


Fig. 20.1 Change in settlement structure in the Arctic

- Urbanisation as an economic shift:* Traditional arctic resource dependencies required a dispersed and flexible settlement structure. However, as a result of modernisation and industrialisation, it became necessary to create labour markets. This especially includes economic development via natural resource exploitation in the post-war period, which has coincided with the increased influence of national and international institutions in terms of political and economic

management (Hansen and Rasmussen 2013). This growth has continued to evolve to the present day. Arctic urban economic expenditure tends to be dominated by administrative and educational activities.

- *Urbanisation as opportunity*: Alongside new labour structures, new social institutions are needed for reproducing the labour force. For instance, young people are attracted to urban centres for educational purposes and are less likely to return to small villages after they complete their education (Rasmussen 2011).

20.3 City Profiles

This section provides a short synthesis of land use development in six arctic cities: Reykjavik, Iceland; Rovaniemi, Finland; Nuuk, Greenland; Kirovsk, Russia; Thorshavn, Faroe Islands; and Kiruna, Sweden.¹

20.3.1 Reykjavik, Iceland

With a current population of 201,000, greater Reykjavik consists of seven municipalities and covers 1062 km² – a territory that is ten times larger than the size of Paris. Since the Icelandic Republic gained independence from Denmark in 1944, the capital has incrementally grown in several different phases. Between 1945 and 1965, growth was driven mainly by the region's role as the commercial and administrative centre of the country. Spatially, greater Reykjavik's population grew by 70 % and the built landmass increased by 700 %, and thus experienced typical North American notions of urban sprawl and automobile dependence (Bjarnason and Gylfadóttir 2004).

In the 1970s and 1980s, modernisation and the expansion of Reykjavik towards neighbouring municipalities further contributed to urban sprawl. By the 1980s, the neighbouring municipalities surrounding Reykjavik were hardly discernible as separate towns. Development over the past two decades has reinforced urban sprawl even further. Average population development by municipality in Fig. 20.2 shows little or no growth in Reykjavik proper, whereas populations are increasing in many of the municipalities surrounding the city. Public housing has had very limited or no impact on development. After the 1970s, favourable mortgage conditions made home buying realistic and, by the early 1980s, upwards of 91 % of people in suburb municipalities “owned” their own home (Sveinsson 2007).

Alongside the acceptance of long commutes and the private car as a way of life in Reykjavik, urban sprawl seems to be predominantly driven by inter-municipal competition for growth through land bids and residential growth. This challenge is

¹More detailed presentations of each city profile are presented in an elaborated version of this paper: www.nordregio.se/publications

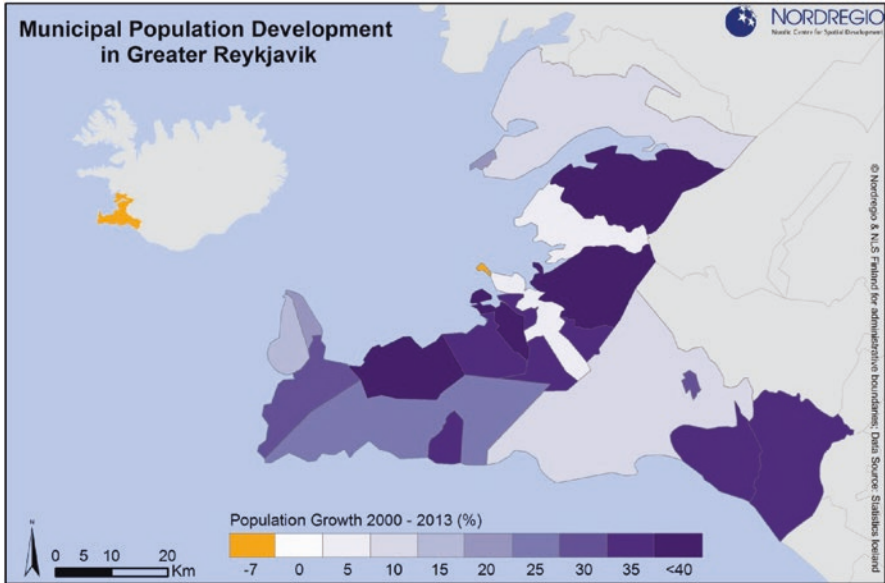


Fig. 20.2 Population development (%) in municipalities around the capital 2000–2010 (Source: Ryan Weber)

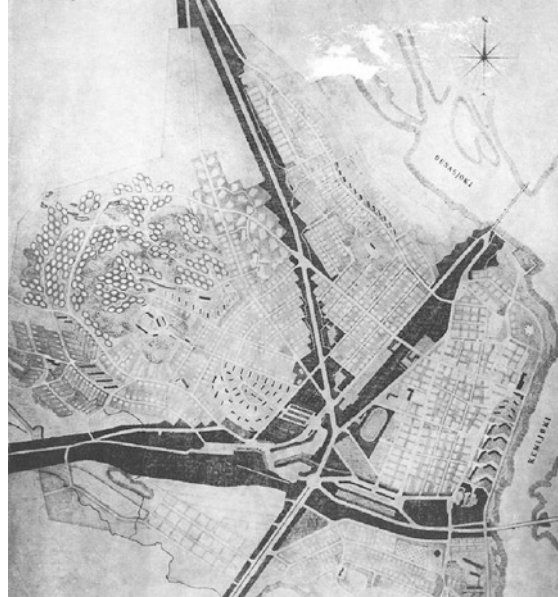
well understood by local authorities and it raises questions about the need for a regional and/or national policy on urban growth boundaries and sustainable land use, including the question of regional allocation of new housing units between the different municipalities (Theodórsdóttir et al. 2012).

20.3.2 Rovaniemi, Finland

The municipality of Rovaniemi has 61,000 residents, making it the 13th most populous municipality in Finland. However, it also covers an area of 8016 km², making it the largest municipality in Europe by area. Rovaniemi has a relatively balanced economy based on its role as the political and administrative capital of Lapland, alongside contributions from the education, tourism, and energy (hydro) sectors. Slow and stable population growth between 1985 and the late 1990s led to a short downturn, but steady growth has returned since 2003 and trends suggest a continuation of slow and steady growth in the future (Rovaniemi Municipality 2012).

The town suffered near complete destruction during the Second World War, and redevelopment was based on a town plan conceptualised by the Finnish architect Alvar Aalto (Fig. 20.3). The implementation of the plan resulted in extensive, low density development and current planning documents regard this development as limiting the ability for improving Rovaniemi’s resource efficiency through compact

Fig. 20.3 Alvar Aalto's "Antler Like" city plan (Used with permission, *Arkkitehti – Finnish Architectural Review* 11-12/1945)



city planning principles of density, mixed land use and accessibility (Rovaniemi Municipality 2012).

In Finland, land use planning is integrated through multiple levels of government. For instance, Rovaniemi's Local Land Use Strategy must comply with Lapland's Regional Land Use Plan, which presents the general principles of land use and the community structure that guide development for the region. As such, regional councils in Rovaniemi have greater planning authority than regional governments in other Nordic countries (Smas et al. 2012).

Rovaniemi's Climate Adaptation Strategy (Järviluoma and Suopajärvi 2009) concentrates on three themes: (1) tourism; (2) energy and waste management; and (3) urban planning and traffic. The third theme highlights how Aalto's plan resulted in a sprawled urban form, and how smaller villages around Rovaniemi have grown since they were consolidated into one municipality. This has put further strain on services and infrastructure, increased private car use and raised questions regarding urban sustainability (Järviluoma and Suopajärvi 2009). As a result, the strategy describes the importance of integrating the community structure through the strategic densification of already built-up areas and the promotion of more eco-friendly means of travel, including public transport, walking and cycling.

Yet, public opinion is divided regarding the priority for city-centre development. Some people favour densification around the existing urban centre, while others are concerned over the loss of urban green space and the preservation of the current building qualities near the city centre (Järviluoma and Suopajärvi 2009). Residents of outer villages also fear that strategic densification will mean a prioritisation of the town centre over their non-central neighbourhoods, forcing residents to seek basic

services in distant locations. As such, existing villages face the dual challenge of a lack of services and effective public transport to Rovaniemi city centre. While these villages may not be large enough to sustain a comprehensive public transportation network, there does seem to be the need for improved local bus service as well as some concentrated, mixed-use development within these suburban communities.

20.3.3 *Nuuk, Greenland*

Founded in 1728 as a Danish-Norwegian colony, Nuuk's current population is approximately 16,000 residents (29 % of Greenland's population). Its role as the political and administrative centre was supported by the G50 and G60 socio-economic development plans² (Petersen and Rasmussen 2007; Rasmussen 1998; Kjær-Sørensen 1983) which included the modernisation and growth of the fishing industry. The establishment of Home Rule in 1979 brought another wave of urban growth in Nuuk, as many decision-making and management duties were transferred from Denmark to Greenland.

Figure 20.4 shows the evolution of Nuuk since 1945. The settlement was first concentrated around the original western harbour, but the harbour's limited growth capacity led to the construction of a new harbour to the southeast. By 1965, development evolved to include power facilities, a hospital, a fish processing plant and, in particular, new housing. However, private investment sought by the G50 and G60 plans did not materialise and the Danish Government assumed responsibility for large-scale housing investments. This resulted in rapidly built, industrial-style concrete housing blocks built close to today's city centre.

The population growth through 1975 coupled with the low quality of existing housing led to the construction of higher quality apartment blocks and colonial-style detached houses with bright colours. Three new schools, two churches and extended central administration buildings were also built. By 1985 a new airport was built, along with 45 km of roadways and three bus routes, and by 1995 rock blasting helped development move into previously unsuitable areas. Since 2000, the concrete apartment blocks built in the 1970s have been incrementally demolished and replaced by smaller-scale and higher quality apartment buildings. Furthermore,

²The G50 and G60 (the report of the Greenland Commission of 1950 and Greenland Commission of 1960 respectively) were long-term development plans for Greenland and its people under the direction of the Danish Government. G50 had the ambition to establish a similar economic system, the same civil rights and the same standard of living as in Denmark. The G60 aimed at continuing the plans of G50 and furthermore improve the health conditions and living conditions to standards comparable to those in Denmark by improving the health care, the education system, the electrification of the country and increasing the concentration of housing and job creation in the major towns along the west coast of Greenland close to the major fishing opportunities. Furthermore, the G60 had the ambition to raise the political, social and cultural status of the Greenlandic people and improve their standard of living.

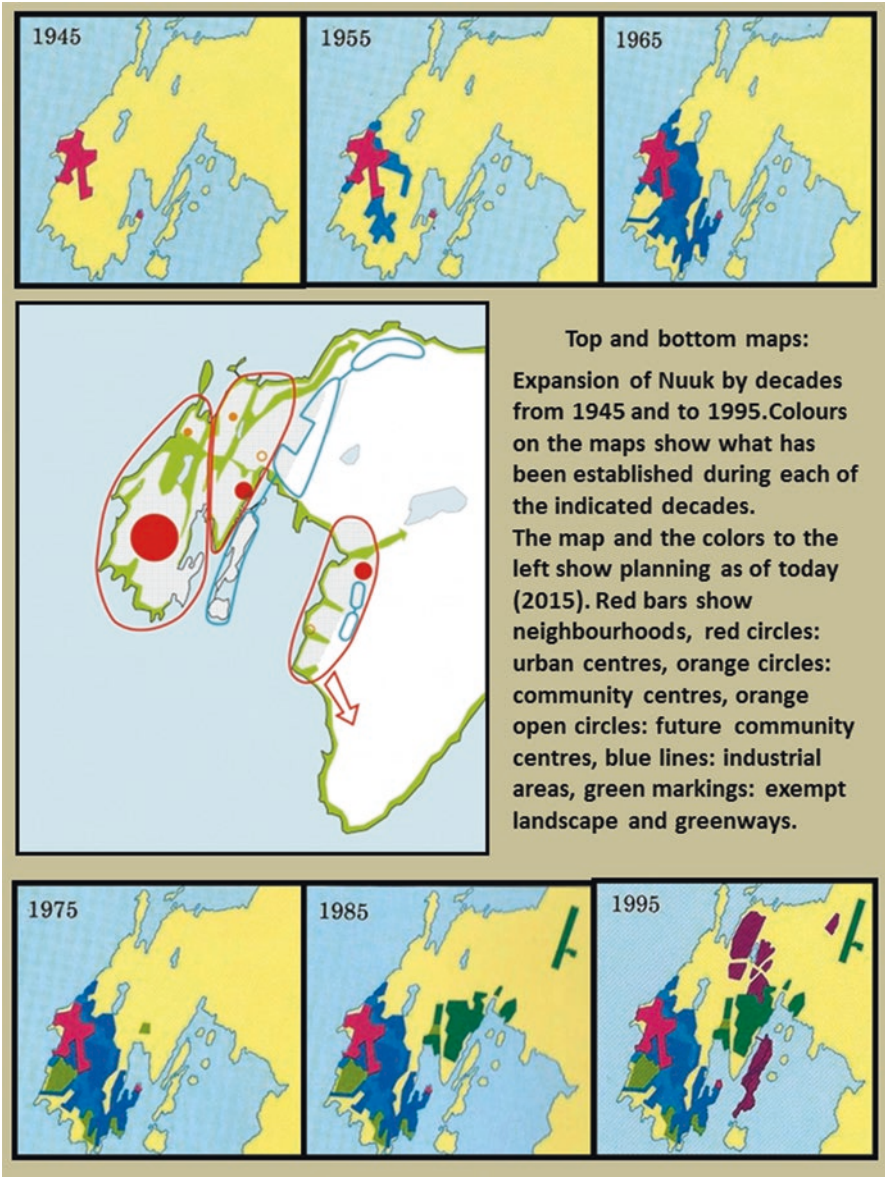


Fig. 20.4 Territorial development of Nuuk since 1945. Maps for 1945 to 1995 based on Berthelsen et al. (1993). 2015 plans based on kommuneqarfik sersmersoq (2015) (Design: Rasmus Ole Rasmussen)

a main focus of growth is currently to the southeast in Qinngorput, a completely new urban district east of Malene Bay.

In 2009, Greenland's 18 municipalities were amalgamated into four municipalities, a move which has strengthened land use planning by concentrating and formalising urban planning competencies. In Sermersooq (which includes Nuuk), this includes development of the new "Digital Municipal Plan" promoting "robust and sustainable" development. "Robust" largely refers to growth driven development by a planned airport expansion to enable access by trans-Atlantic flights, development possibilities in the raw materials sector and the development of the harbour. "Sustainable" reflects Nuuk's goal to strengthen the special qualities of the community in an environmentally and economically sound manner.

In the new municipal plan "open countryside" is a collective term for all areas not zoned for settlement. In the past, the development of open space was undertaken on a case-by-case basis by the national government (i.e. no comprehensive strategy) because of the impression that there would always be plenty of room available. Reflecting important social and economic connections to nature, however, the open countryside can no longer be considered an area where there are no potential land use conflicts as a wide range of actors (and their associated interests) are increasingly vying for space. For example, a number of abandoned settlements surrounding Nuuk have been re-born with important new land use functions and these settlements need to be planned and managed accordingly. When these are considered in relation to national decisions on further large-scale natural resource exploitation there appears to be a need for further revisions of the open land planning strategy, toward more consistent and integrated approaches to spatial planning, reflecting the socio-economic interests of various different stakeholders.

20.3.4 Kirovsk, Russia

Kirovsk, in Murmansk *Oblast'* (region) in northwestern Russia, was founded as a natural resource town based on apatite-nepheline deposits in the Khibiny mountains. Initial mining operations started in 1929 and by 1931 Kirovsk had a population of 32,000. While this grew to nearly 44,000 by 1990, the city has declined in population in a similar manner to other towns in arctic Russia and currently has a population of roughly 28,000 (Fig. 20.5).

Strategic land use planning was initiated in 1938, but was challenged from the outset. A plan for a new main street was developed that did not consider local topography, making it impossible to use the street during the winter. In the meantime, new buildings had been constructed along the previous route so it was impossible to restore it. A new master plan was developed, but this too was only partially implemented due to poor coordination and a lack of funding. Nevertheless, successful mining operations resulted in a strong population profile between the late 1950s and 1990. As a result, 93 % of the current residential building stock was constructed in the 1970s and 1980s.

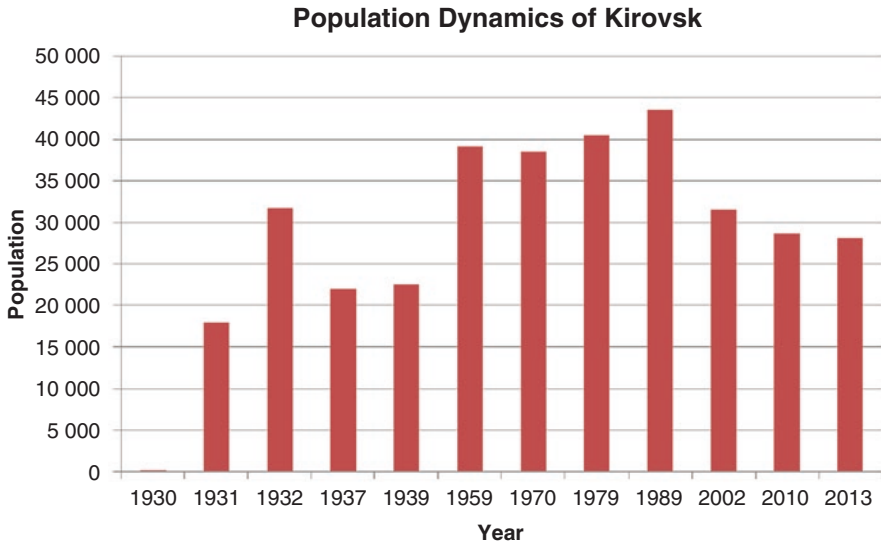


Fig. 20.5 Population dynamics Of Kirovsk, Russia (Data source: Kirov History Museum [2014](#))

Until the 1990s, the state was the sole land owner, and it granted rights to individuals as land users. In 1991, rights of individuals increased and by 2001, a new Land Code had legalized private ownership and set general zoning. This included the development of new municipal master plans, local land use acts and multipurpose investment plans, iterations of which are still in place today. Thus, the municipality is the main authority for land use matters and it currently promotes two directions of development: industrial growth via mineral extraction and tourism growth, particularly skiing.

Reflecting the attachment to nature, the town's population actively uses the forests and foothills surrounding Kirovsk for recreation and production of agricultural goods in private plots. During the overall socio-economic crisis and food shortage in the early 1980s, the local government started a gradual allocation of land to employees for dachas and gardens. Nowadays, people continue to actively use these plots for holiday stays and for growing produce for home consumption or informal market sale.

Yet, the main land use conflict is in regards to mining development versus the formation of a national park. Proposed mining development around Kirovsk conflicts with the national government's plan to create the Khibiny National Park. Establishing the park would mean that a considerable portion of land currently owned by the Kirovsk municipality would be transferred to national control. While the municipality understands that both local residents and domestic tourists use the surrounding landscape for recreation, they are against plans for the park because of the impact it would have on mining expansion. The municipality prefers a balanced approach where nature preservation and the development of tourist infrastructure coincide with additional mining activities in the area, which they view as critical to

sustaining the livelihoods of the current population. We see, therefore, a clear power struggle between local and national planning authorities, each of which is interpreting a different best course of action due to the different stakeholder and development perspectives they favour.

20.3.5 *Tórshavn, Faroe Islands*

The abolishment of the Danish Trade Monopoly by the mid-nineteenth century presented new growth opportunities in the Faroe Islands, at the time a colony of Denmark, especially in fisheries. As a result, villages where fish trade houses were located bloomed, including Tórshavn. Shifts towards a modern economy took place in the immediate post-war period, mainly resulting in a more productive fishing fleet and fish processing industry. In parallel, infrastructure was developed throughout the country as roads were paved and the first tunnel that began connecting the 18 islands opened in 1963. By 1975, more than 11,000 people lived in Tórshavn (28 % of the Faroese population) and development over the next 15 years expanded out toward Hoyvík and Argir, which were originally small settlements in the vicinity of Tórshavn. Today, Tórshavn has a population of more than 12,600.

During the 1960s and 1970s ‘village-development’ was the main focus of public policy that steered spatial development. This policy supported the fishing industry in smaller settlements in an effort to prevent migration away from these settlements. It was kept alive through different forms of financial transfers until it collapsed in the early 1990s, leading to outmigration toward the larger towns. However, as part of the village development policy, investments were made in roads, tunnels, bridges and other infrastructure components to reduce travel time from small settlements to Tórshavn (Fig. 20.6). While the intention was to improve village accessibility to services in larger cities (thus maintaining the attractiveness of small settlements) the opposite happened – people moved within commuting distance to Tórshavn.

Today, 72 % of the total land area and 86 % of the population in the Faroe Islands are linked to a fixed road. The new traffic plan for the Faroe Islands (2008–2020) is the spatial backbone of the Faroe Islands; enabled by the main transportation network linking various regions of the country to Torshavn.

20.3.6 *Kiruna, Sweden*

Sweden’s most northern municipality was established following the Swedish Parliament’s decision to extend the railway to exploit iron ore in the Kirunavaara and Luosavaara mountains. Greater Kiruna has more than 23,000 inhabitants, 18,000 of whom live in the town itself. The population peaked during the 1970s, but after a long period of decline, it has begun to increase again with the development of additional mining opportunities.

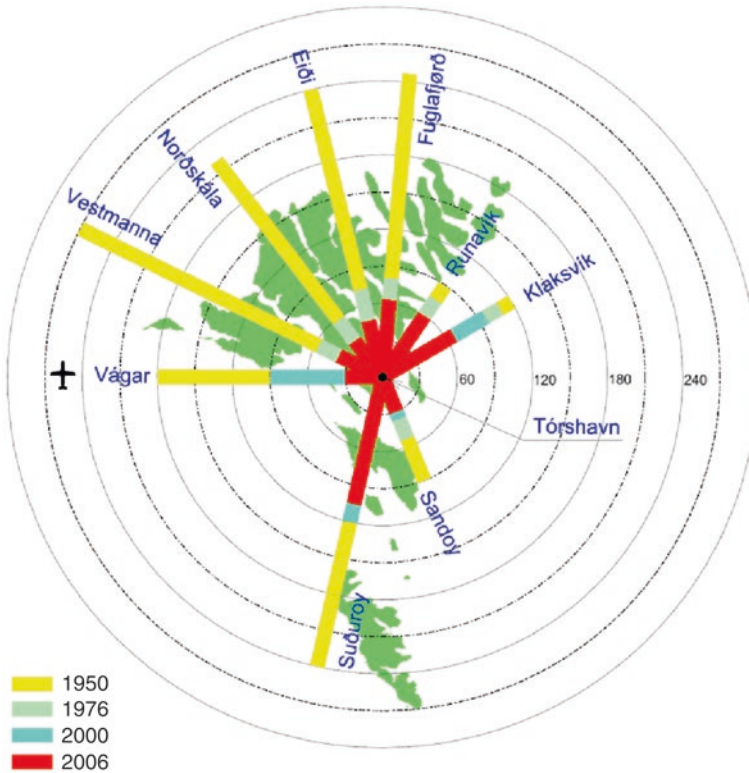


Fig. 20.6 Development of transport time from 1950 to 2006. The *colours* show how long time it would take to move from Tórshavn to other towns/villages and islands (Source: Steinhólm 2007, used with permission)

Kiruna represents an extraordinary case of land use planning. Plans to extend and expand existing mining activity until at least 2030 have forced the relocation of the city centre due to ground level deformations (Fig. 20.7).

The first phase of the construction of the new city centre started in 2014, and by 2033, approximately 3000 apartments, 750 beds in hotels and hostels, and nearly 200,000 m² of retail and service offerings will be relocated (Zackrisson and Cars 2013). Kiruna's residents also realise the necessity of moving the city, and have contributed to the planning and design of the new city centre. Zackrisson and Cars (2013) summarise the residents' four main demands:

- Accessibility to the centre by car, but a centre that promotes walking, cycling and public transportation.
- Mixed land use with retail shopping on the ground floor of residential houses and good accessibility to work-places and public services.
- High quality public space and meeting places, including parks, squares, streets, libraries, art galleries, cafés and restaurants.



Fig. 20.7 Moving of the city centre Of Kiruna (Design: Ryan Weber)

- High architectural quality, including the preservation of cultural buildings. This includes the Church of Kiruna, which was recently voted as the most beautiful building in Sweden. As a result, it will be taken down and reassembled in the new city centre.

Kiruna has thus managed to turn a threatening situation into an opportunity through open and transparent dialogue with its residents. Although many issues are still unresolved – primarily those of an economic nature since the costs for new home construction is much higher than the market values of existing single-family houses or apartments – Kiruna is facing the future with optimism. Therefore, the process of building a completely new, mixed-use city centre with high architectural quality might serve as a model for a new kind of sustainable urban development in the arctic region.

20.4 Conclusions

Based on this presentation of land use planning and development strategies in diverse arctic contexts, some key findings are identified. First, in many cases, arctic urbanisation is a new phenomenon and in communities such as Nuuk and Kirovsk it was shown how connections to nature are a critical component of the arctic

culture in many regions, both through informal economic activities and for leisure. For instance, hunting, fishing, berry and mushroom picking, hiking and camping, sailing, skiing and even farming are all activities that are included as an integral part of living in the Arctic; not only as leisure time activities, but also in some cases as a means of subsistence, related to dietary needs and informal distribution mechanisms. As a result, arctic cities have unique and strong societal relationships to their natural surroundings and providing opportunities for regular interaction with nature constitutes an important dimension of human development, which can be met through proactive land use planning measures. This includes improved accessibility through green-space infrastructure investment and the preservation of natural assets within the built environment.

Second, some arctic cities face challenges associated with urban sprawl and strategic densification is a necessary planning response. In Reykjavik and Rovaniemi, the impacts of urban sprawl are clearly evident. In Reykjavik's case, the "Americanisation" of the city's buildings was perhaps an inherited outcome of the U.S. military presence and the main period of development took place while the car was seen as an ideal form of personal mobility. In both cases, the challenges associated with urban sprawl and the pursuit of urban sustainability is well understood by local planners.

Third, each case highlights how the division of roles and responsibilities between different levels of government has impacted land use planning in unique ways. In Kirovsk, the municipality's vision of what entails sustainable development is fundamentally different from that of the national government. In Reykjavik, the importance of governance scale was evident as a factor contributing to urban sprawl, where intense competition for investment between municipalities in the city-region has extended development away from the city centre. Planners acknowledge the need for a city-regional approach to comprehensive land use planning, but negotiating within the entrenched municipal barriers is a major hurdle. However, the Rovaniemi case demonstrated how urban sprawl increased following municipal consolidation. Seemingly counter intuitive to the necessary policy response for Reykjavik, it shows the unique, situational context of urban land use planning, regardless of where in the Arctic it is taking place.

Fourth, in Nuuk, Tórshavn, Kirovsk and Kiruna, urban development was founded upon the presence of a single natural resource based industry. In these cases, initial settlement structure hinged exclusively on maximising labour force accessibility to work locales. As a result, it seems that each city has maintained a relatively dense settlement structure considering that none of the existing planning documents describe challenges associated with sprawl. However, while primary sector interests continue their dominant economic role in Kirovsk and Kiruna, public sector roles such as administration and education are now key drivers of the economy in Nuuk and Tórshavn. In contrast, the lack of a single industrial presence in Reykjavik and Rovaniemi, coupled with larger overall population growth has coincided with the urban sustainability challenges associated with sprawl. This supports further investigation on the sustainability potentials associated with urban development

surrounding single sector activities, along with more insight on how to resolve existing land use challenges in dispersed arctic settlements.

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