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Municipal Programs and Sustainable Development in Russian Northern Cities: Case Studies of Murmansk and Magadan

Tatiana S. Degai [1,2], Natalia Khortseva [2], Maria Monakhova [3] and Andrey N. Petrov [2,*]

[1] Department of Anthropology, University of Victoria and Canada, Oak Bay and Saanich, Victoria, BC 3002, Canada; tatianadegai@uvic.ca
[2] Arctic, Remote and Cold Territories Interdisciplinary Center (ARCTICenter), University of Northern Iowa, Cedar Falls, IA 50614, USA; khortseva.nata@gmail.com
[3] School of Human Evolution and Social Change, Arizona State University, Tempe, AZ 85281, USA; mmonakho@asu.edu
* Correspondence: andrey.petrov@uni.edu

Abstract: Cities play an important role in promoting sustainable development. In the Arctic, most particularly in Russia, cities concentrate the majority of residents and economic activity. Sustainable development initiatives are often deployed through programs that operate at different spatial and jurisdictional scales. While national and regional policies and programs have received some attention, the understanding of urban development policies and programs at the municipal level in the Arctic is still limited. This paper presents a case study of municipal sustainable development programming in Arctic cities and examines municipal programs in two larger Russian northern cities: Murmansk and Magadan. While both are regional capitals and the most populous urban settlements in their regions, the cities have district historical, economic and geographical contexts. Through the content analysis of municipal programs active in 2018, we aim to understand, systematize and compare the visions and programmatic actions of the two municipalities on sustainable development. Ten sustainable development programming categories were identified for using a UN SDG-inspired approach modeled after the City of Whitehorse, Canada. While the programs in Magadan and Murmansk are quite different, we observed striking commonalities that characterize the national, regional and local models of urban sustainable development policy making in the Russian Arctic.

Keywords: Arctic; urban; sustainable development; municipal programs; policy

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1. Introduction

Cities have been at the center of the global sustainability scholarship since the very beginning of sustainability scholarship (e.g., [1,2]). This is not surprising given that the majority of the world's population lives in urban areas, and large urban communities play a crucial role in shaping the global path to sustainability. Since sustainability is place-bound and scale-dependent [3], the local scale represents the main realm of implemented sustainabilities through the actions of local actors, such as municipal governments, civic groups, non-governmental organizations and individual residents [4,5]. Thus, the local urban sustainable development action is critical to examine. Although close to three-quarters of the Arctic population resides in cities and towns [6], with the majority living in the Russian Arctic (a home for two dozen settlements with more than 100,000 people [7]), the knowledge about Arctic urban sustainability is quite limited. The growing literature in the last few years (e.g., [8–10] articulated the central role of Arctic urban communities in defining the future of the rapidly changing Arctic in respect to the sustainability of both human and natural systems). Yet, the understanding of urban sustainability in its relationship with urban development policies and programs at the municipal level in the Arctic is still rudimentary.

The goal of this paper is to improve the understanding of municipal programs in Russia's Arctic and near-Arctic cities as instruments of sustainable development. Under the sustainable development-related programs, we include all local programs that explicitly or implicitly connect to sustainable development in their process or outcomes. Using the case studies of two large northern Russian cities, Murmansk and Magadan, we pursue the following research questions:

1. How do municipal programs in Murmansk and Magadan address sustainable development?
2. What are the key characteristics, strengths and weaknesses of sustainable development municipal programming in the two large Russian Arctic cities?

1.1. Sustainable Development in Urban Communities

In recent decades, sustainable development in urban communities has been a growing concern. According to the Sustainable Development Knowledge Platform, in 2008, the urban population for the first time outgrew the rural population [11]; by 2030, this figure will exceed five billion people [12], and by 2050 two-thirds of the world population will live in towns and cities [11]. Due to the harsh climate and remoteness, the Arctic is less populated than areas located in warmer climates. As mentioned, approximately 75% of Arctic residents live in cities [13], and continuing Arctic urbanization is recognized as an ongoing "megatrend" [14]. A growing volume of the Arctic economy, especially tertiary and quaternary sectors, is also concentrated in cities [15], as is the Arctic's human capital [16]. Still, the largest cities in Alaska, Canada and Greenland have a population generally around 10,000 people, with a few exceptions [8]. Among the Arctic countries, Russia is known to have the most populous cities in the Arctic, with the population of some of them reaching more than 100,000 [17].

While urban areas are hubs for innovative thinking, diverse ideas and human and economic development, they are also the centers of massive socio-economic and environmental transformations [12] that have direct or indirect impacts on rural areas [18]. Cities also contribute to climate change and exhibit complicated patterns of wealth distribution, social inequality and political disparities. Therefore, over the last decade, more attention has been brought to sustainable development in urban communities.

In the vast literature on the subject, the idea of a sustainable city typically refers to striking "a balance between the development of the urban areas and protection of the environment with an eye to equity in income, employment, shelter, basic services, social infrastructure and transportation in the urban areas" [19] (p. 556). The scholarship in urban sustainability has developed the notion of sustainable cities conceptually and quantitatively by examining various aspects of urban resilience, 'smartness,' 'greenness' and defining an array of sustainability indicators, such as the ISO system [20]. Yet, the mainstream literature on sustainable cities has been criticized for emphasizing environmental aspects of sustainability compared to economic and social [21].

The UN Sustainable Development Goal 11 focuses on sustainable cities and communities and calls upon making "cities and human settlements inclusive, safe, resilient and sustainable" [22]. Since there is no single definition of what a sustainable city is, the concept is relatively open to interpretation [23]. The majority of the urban sustainable development models are being developed using the three pillars of sustainability [24]—economy, environment and equity [1,23,25]. Leach et al. [25] suggests that we should think about sustainable cities in conjunction with livable cities, and therefore when developing urban sustainability programs, we need to "first understand how cities function and how well they perform" (p. 98).

In the Arctic context, sustainable development can be defined as development that improves wellbeing, health and security of Arctic communities and residents while preserving ecosystem structures, functions and resources [3]. In the Arctic cities, sustainable development is concerned, for example, with the adaptation to climate change, more specifically rising temperatures and thawing permafrost that damage infrastructure, as well as a strong economic dependency on extractive industries, which is "inherently unsus-

tainable" [8] (p. XIV). Orttung [8] emphasizes that "Long-term economic stability, a lower environmental impact from natural resource extraction, and a social sphere that meets the needs and aspirations of Arctic residents comprise the central elements of sustainability for the cities of the Russian North" (p. XIV).

Although Arctic cities remain on the outskirts of the urban sustainability scholarship, in recent years, researchers have made considerable strides to engage these settlements into the global frameworks of analysis. The issue of sustainably developing in an Arctic city has demonstrated an acute importance in the conditions of changing climate and economic uncertainties many northern urban places have faced since the beginning of the 21st century [1,26]. A number of case studies both attempted to apply globalized sustainability approaches to understand Arctic sustainable development pathways (e.g., [8–10,27,28]) and pursued uncovering Arctic-specific characteristics of urban sustainability [29–31]. Environmental [32–34], economic [15,35,36], social [37,38], political [39], cultural [40] and other aspects have been brought to light to a considerable extent. There also have been efforts to develop sustainability indicators for Arctic urban communities either based on existing global monitoring frameworks [9,27,30] or using Arctic-borne assessment tools, such as Arctic Social Indicators [9,41].

Still the knowledge base on Arctic urban sustainability is quite limited. In particular, the linkages between sustainability and urban development policies at the municipal level remain underexplored. Only a few case studies examined them explicitly [9,29,42]. Yet, since sustainability is place-bound and scale-dependent [3,43,44], the thrust of sustainable development activity in the cities is often located at the local scale, and the actions of local actors, first of all municipal governments, define the nature and success of such efforts [4,5]. Therefore, it is important to focus on understanding local instances of urban sustainable development action in the Arctic, and municipal programs in particular.

1.2. Sustainable Development Policies in Russia

Government programs in Russia are mandatory documents of strategic planning that exist at three levels: at the federal level; at the level of the subjects of the Russian Federation (regional level); and at the municipal level [45]. Municipal programs are developed and approved by the local administration and the federal government, respectively [46]. Some programs are initiated by the local authorities, but most are the result of the implementation of national strategies or doctrines (such as the Russian Federation National Action Strategy for Women (2017–2022), Russian National Security Strategy (2015–2020), etc.). These strategies and programs outline the principles and ideas guiding sustainable development policy in the Russian Federation [47].

The concept of sustainable development officially came to Russia in February 1994 when President Boris Yeltsin issued the decree No. 236 "On the state strategy of the Russian Federation for the environmental protection and sustainable development" as a follow-up to the United Nations Conference on Environment and Development in Rio de Janeiro [48]. In January 1996, President Yeltsin also approved the "Concept of the transition of the Russian Federation towards sustainable development." It was followed by the resolution of the Russian Government "On development of the draft national strategy for sustainable development of the Russian Federation" that came out in May 1996. However, the draft of the National Strategy for Sustainable Development of the Russian Federation proposed later was not approved [48].

In 2002, the Russian Ecological Doctrine was adopted by the Russian Government resolution No. 1225 and has given further development to the concept of sustainable development in Russia. In the same year, the "National Assessment of the Progress of the Russian Federation in its Transition to Sustainable Development" was prepared for the World Summit on Sustainable Development in Johannesburg. It reviewed the results of the work completed in Russia in the field of sustainable development, providing an evaluation of the main trends and factors influencing the progress [48].

The 2012 Report on Implementing the Principles of Sustainable Development in the Russian Federation highlighted the progress made in implementing the principles of sustainable development in the Russian Federation in the run-up to the United Nations Conference on Sustainable Development or Rio + 20 [48]. In 2015, Russia along with the other 192 UN member states adopted the 2030 Development Agenda "Transforming our world: the 2030 Agenda for Sustainable Development" that outlines 17 sustainable development goals [49]. Each goal has a list of targets that are measured with indicators so that member countries may track their progress towards the goals [50]. The Voluntary National Review on SDGs submitted by Russia in 2020 [51] indicated that the Russian Federation implements SDGs through its various governmental bodies and has integrated the UN Agenda 2030 into twelve national projects and other programs addressing more than 100 SDG targets.

1.3. Sustainable Development Programming in the Russian Arctic

It is often pointed out that the turn towards sustainable development in the Russian Arctic can be traced to Mikhail Gorbachev's 1987 Murmansk speech [52] and subsequent support by the USSR and Russia to the international environmental protection initiatives that resulted in the creation of the Arctic Council. In the 1990s and 2000s, legislation was passed to support sustainable development of the Indigenous Peoples and involved a dialogue between different levels of government and NGOs [53]. However, the subsequent implementation of these initiatives has been disappointing [54]. In the 2010s, new strategic planning methods were introduced in the Russian regions and some municipalities mostly to improve the investment climate, but also to increase the effectiveness of strategic initiatives, including sustainable development [55].

Sustainable development is recognized by the Russian authorities and academic community as a key priority for the Arctic. It has been mentioned in past and recent strategic documents regulating the development of the Russian Arctic [29,56], including the governmental program on "Social and Economic Development of the Arctic Zone of the Russian Federation" enacted in various iterations since 2014 and most recently revised in March of 2021 [2]. While the main goal of the program is to increase the level of socio-economic development in the Russian Arctic [57], it refers to sustainable development throughout the document and, in the current edition, elevates sustainable socio-economic development to the third major goal of the program. Since 2011, considerable efforts have been implemented by the Russian government to address a variety of environmental issues in the Arctic, such as accumulated waste, nuclear utilization, and pollution. However, the main focus of sustainable development in the strategic documents has been on socio-economic aspects of sustainability. As some have argued, the Kremlin prioritizes economic development in the Arctic while paying little attention to the environment [58].

The implementation of the concept of sustainable development in Russia comes across numerous challenges. Arriving in Russia at the time of political transformation and economic crisis after the collapse of the Soviet Union, it was considered attractive by many in the government as a possible post-Soviet model of development and was welcomed by the environmental movement [59]. However, as Russia developed an impressive volume of sustainable development-inspired federal legislation since the 1990s, the implementation of these provisions locally stagnated due to the lack of resources and political will. As some pointed out, the main problem in implementing sustainable development strategies in the Russian Arctic is the gap between "words and deeds" [29] (p. 505).

In addition, Russia has had a complicated intellectual relationship with the idea of sustainability. Oldfield [47] who analyzed the Russian legislative and policy base for sustainable development of the 1990s found that Russia exhibits 'conflicting characteristics' that obstruct the implementation of sustainable development initiatives. On the one hand, Vladimir Vernadsky in the 1940s introduced the concept of the noösphere as a sphere of human reason (*Sfera razuma*) that enables humans to attain balanced management of the nature and their society through technology and ethics [60,61]. This early notion of 'sus-

tainable development' has been popular since and constitutes one of the cornerstones of a polycentric interpretation of sustainability by Russian intellectuals [62]. On the other hand, the mentality and political culture in some ways impede the appreciation of environmental issues by the Russian political elites and society at large, being superseded by the narratives of improving the quality of life and creating an effective economy [63]. Much of sustainable development programming is thus narrowed to socio-economic issues and is separated from environmental protection and conservation [29].

1.4. Sustainable Development in the Russian Urban Arctic

According to the Russian Census of 2010, 89.5% of the population of the Russian Arctic zone were living in urban areas [64]. Despite a slow decrease in the Arctic population, the proportion of people living in cities is steadily rising. One reason is the influx of industrial workers to major Arctic urban centers in Russia's oil and natural gas regions [17,37]. In addition, in some areas, rural residents, many of whom are Indigenous, move to urban centers from rural hinterlands due to the lack of economic and educational opportunities and environmental change [58,65,66].

Arctic residents face a number of challenges, including climate change. Diverse reports emphasize that the Arctic environment is affected by climate warming faster than other regions [34,67]. In recent decades, the average annual temperature had risen 2–3 °C in the Arctic [68,69]. Warming leads to glaciers melting [70], permafrost thawing [71], land degradation and major destruction of urban and transportation infrastructure [72–74]. These processes affect people's lives, including urban residents and Indigenous peoples who continue having strong dependence on the natural environment [75,76].

The Russian Arctic possesses vast non-renewable natural resources such as gas and oil [77]. Therefore, many Arctic cities in the Soviet Union were established around extractive industries (for example, Norilsk, Vorkuta, Nadym, Naryan-Mar, etc. [10,78]). Extraction of non-renewable resources constitutes the economic base of these cities and seems to contradict the principles of sustainable development. For example, pollution issues, inherited from the USSR, continue to persist [47,79,80]. In this context, some authors suggest using more flexible definitions of sustainable development when applied to Arctic cities. For instance, since resource extraction is a large industry that may improve socio-economic wellbeing, it could be considered a part of a sustainable development 'package' "as long as the environmental impact does not undermine the ability of future generations to meet their own needs" [58] (p. 196). Orttung and Reisser define four elements of Arctic Urban Sustainability in Russia: (1) climate change and resource development, (2) policymakers' decisions towards urban sustainability, (3) demographic characteristics of the urban population, such as size, ethnicity, and religion, and (4) international cooperation. These are important to keep in mind in planning the sustainability agenda for the Russian Arctic cities.

Normally, Arctic cities in Russia do not have a standalone sustainable development strategy, but other official documents incorporate local initiatives in that regard [29]. Depending on the size of the city, it can be a strategic urban development plan or a municipal program. However, even the largest Arctic cities have limited capacity to design and ensure the effectiveness of such programs: there is usually a small group of planning specialists who coordinate development plans or programs with the regional and federal sustainable development strategies. This is also done differently by each city. Some cities develop their policies with a strong link to the regional and federal levels, but others design them in a more autonomous manner [52]. Often due to the lack of an integrated approach to sustainable development planning in Russia, local municipalities do not have a specific body responsible for sustainable development strategy. Instead, they make their economic departments responsible, thereby taking the environmental and social aspects out of the context [29].

Strategic and planning documents, such as city strategic plans, have been created under the new management mechanisms established in some Russian cities (e.g., [81,82]). However, even though such plans may be in place, the implementation is not guaranteed.

The front line of urban sustainable development is formed by municipal programs that are designed to implement policies introduced by federal, regional and municipal authorities within a city space. Consequently, the analysis of active programs is the most grounded and effective way of examining urban sustainable development as a process. The focus on the process allows moving away from fixating on sustainable development outcomes, as they are often normative and discursive, and shifting the attention from intentions to actions in respect to sustainable development. In this paper, we conduct such analysis for municipal programs in Murmansk and Magadan.

2. Methodology: From Content Analysis to Categorization

We explore the implementation of sustainable urban development in the Russian Arctic through analyzing the municipal development programs of two Arctic cities: Murmansk and Magadan. The two case studies were selected for analysis and comparison in order to identify broad commonalities among different Russian Arctic cities while also elucidating dissimilarities that stem from regional and local contexts. Magadan and Murmansk are both regional capitals with relatively large, but declining, populations, and they are both industrial centers and ports, as well as cultural and transportation hubs that dominate their respective hinterlands. At the same time, the cities are very different in the level of connectedness to the mainland, geographical location, history, and regional settings. Broad similarities in the municipal programs between the two urban communities would likely point to high convergence of these programs throughout the Russian Arctic.

Although there are a number of tools and benchmarks that could be used for assessing municipal sustainable development efforts, for this study, a system that has been used in an Arctic urban community would be most useful. Therefore, we selected the Whitehorse Sustainability Plan for the City of Whitehorse, Yukon, Canada as a reference [9]. Whitehorse's experience presents a comprehensive plan that exemplifies a productive cooperation between multiple municipal agencies aimed at achieving UN Sustainable Development Goals (SDGs) in the context of an Arctic regional capital.

We then adopted and modified sustainable development categories distinguished in the Whitehorse Sustainability Plan to systematize existing municipal programs in the Russian Arctic. With this foundation, but also taking into account the specificity of municipal activities in Russia, we identified ten sustainable development programming categories for a Russian Arctic city (Table 1).

Table 1. Arctic City Sustainable Development Programming Categories.

	Whitehorse Sustainability Plan		Modified Classification for Murmansk and Magadan
1.	Clean air, water, soil, healthy habitat and a sense of wilderness	1.	Clean air, water, soil, healthy habitat
2.	Zero waste	2.	Strong livable neighborhoods
3.	Strong downtown livable neighborhoods	3.	Efficient transportation system
4.	Green building and infrastructure	4.	Diverse local economy
5.	Energy and greenhouse gas (GHG) reduction	5.	Energy reduction
6.	Efficient low impact transportation	6.	Connected, engaged, participatory community
7.	Diverse local economy	7.	Safe and healthy community
8.	Resilient, accessible food system	8.	Social equity: affordable housing and poverty reduction
9.	Connected, engaged, participatory community		
10.	Safe and healthy community	9.	Dynamic and diverse culture, heritage and arts
11.	Social equity: affordable housing and poverty reduction	10.	Human capital investment and accessible education and training
12.	Dynamic and diverse culture, heritage and arts		

For this study we reviewed a broad range of municipal programs operating in Magadan and Murmansk in 2018 and identified those containing elements of sustainable development. Most of these programs have been in the process of implementation before and during 2018 and reported actual expenditures and programmatic results. Each municipal program in Russia has a so-called 'passport,' a document that includes informa-

tion about the program's goals, implementation, assessment and budget. All municipal programs' passports have a similar structure. The first part of the passport incorporates a table with the name of the program, goals, indicators for assessing program efficiency, timings and stages of program implementation, budget, and expected results. The main body of the documents consists of the following subsections: description of the problem which the program aims to solve, goals of the program and indicators of program implementation, elements of the program, detailed budget, mechanisms of implementation and efficiency marks. Although the program documents in Murmansk and Magadan are very similar in structure, there are some minor differences. For example, in Magadan it includes information about the legal basis for development of a program.

We conducted a content analysis of the program 'passports'. First, we examined the declared program goals. If the goals corresponded to the categories of sustainable development programming (Table 1), they were selected for further analysis. Therefore, 14 municipal programs (with 53 subprograms) in Murmansk and 19 programs in Magadan were chosen for an in-depth study. In addition to the goals and program descriptions, we focused on examining the ways and means of program implementation. Detailed 'passports' of these programs and subprograms could be found at the official websites of Murmansk and Magadan administrations. (https://www.citymurmansk.ru, accessed on 1 September 2021) (https://old.magadangorod.ru/econimika/programm/prg1/, accessed on 1 September 2021)

2.1. Study Areas

2.1.1. Magadan

Magadan is located in the Far East of Russia, on the Sea of Okhotsk in Nagayev Bay (Figure 1). Although not formally a part of the Russia's Arctic Zone, the city demonstrates Arctic-like characteristics and is considered a key near-Arctic urban area in Russia [30]. Geographically, it is an isolated city surrounded by mountains both to the west and northeast and extensive permafrost and tundra areas. The nearest large city accessible by road (Yakutsk), is located 2000 miles away. With a population of 92,782 [83], Magadan is an administrative center and the largest city of the Magadan Oblast (region). The city was initially founded as a harbor in 1933 and was also serving as a supply center for the Kolyma gold mines. Fisheries and gold mining remain the two main income sources for Magadan, yet the gold production has significantly declined during the past decade.

2.1.2. Murmansk

Murmansk is one of the largest Russian cities in the Arctic and the capital of the Murmansk Oblast (region) (Figure 1). It is located in the westernmost part of the Russian Arctic near the Norwegian border. In 2018, the population of Murmansk was estimated at 295,374 [83]. The history of the city goes back to the early 20th century, when the Murmansk harbour was founded. The main sectors of the economy of Murmansk are fishing and fish processing (the fish factory was closed in 2014), sea transportation, ship repair and metalworking.

Figure 1. Murmansk and Magadan on the Arctic Map.

3. Results: Typology and Content of Municipal Programs for Sustainable Development

This study analyzed municipal programs in Murmansk and Magadan active in 2018 by applying the sustainable development programming categories that were adapted to the Russian Arctic/near-Arctic cities based on the Whitehorse sustainable development programming categories (Table 1) and transformed into Figure 2. It is important to start by indicating that none of the analyzed Russian programs contained the explicit language of sustainable development or made any references to the UN sustainable development goals or other global sustainability principles. However, many programs were designed to tackle certain elements of sustainability, and the content analysis was used to establish that. The detailed description of the sample programs for each category is provided in Table S1.

Figure 2. Urban Sustainable Development Programming Categories in the Russian Arctic.

The *Healthy Habitat, Clean Air, Water, and Soil* programs aim to protect, maintain, and restore these essential natural resources. They target reducing air pollution by implementing technological advancements in the industry, ensuring water safety and improving water quality by constructing water and sanitation infrastructure, providing proper waste recycling to keep the soil free of pollution, etc. Examples include the Clear Water program in Magadan that targets clean water supply and water treatment. Another example is the Environmental Protection program in Murmansk focused on waste and sewage treatment.

The *Strong Livable Neighborhoods* program area aims at improving quality of life for all residents by providing easy access to education, medical care, shops, entertainment, various services and nature. Through these programs, local authorities take the necessary actions to make residential buildings, blocks and neighborhoods better places to live by investing in playgrounds, sports or amusement facilities; achieving sanitary norms or safety requirements; increasing green areas; and improving pedestrian roads. In both cities there are programs aimed at improving public spaces and communal backyards (Table S1).

Efficient Transportation System programs support accessible, affordable, and safe transportation systems. In the context of sustainable development, they may also provide social, economic and environmental benefits. The focus of these programs is often on repairing roads, developing infrastructure and addressing urgent passenger management needs. However, there is little emphasis on improving fuel consumption or instituting other efficiency measures.

The Diverse Local Economy program cluster is intended to create long-term economic opportunities and employment for the local residents, leading to a stable, diverse economy of the city. At the municipal level, these programs often concern assisting medium and small-sized businesses (Table S1).

Energy Reduction programs include program elements aimed to reduce the level of energy consumption, improve energy efficiency, increase renewable energy production and use, etc. As energy reduction programs are diverse, they may be implemented comprehensively [8]. Murmansk runs the program that channelizes efforts to modernize municipal energy systems and reduce consumption (i.e., by installing meters), while Magadan does not appear to have a similar program in place.

The goal of *Connected, Engaged, Participatory Community* programs is to make people involved in policy and decisions which affect them, to make them aware about environmental issues and act as stewards of the environment. Programming aims at connecting people and informing them about their responsibilities. An example of a Magadan program is the informational campaign designed to improve the communication between the general public, public administration and mass media on local issues. In Murmansk, the administration runs a small fund to support public and civil initiatives, including public associations and non-profit organizations, active citizens, and foster patriotism and civil engagement.

Safe and Healthy Community programming is focused on increasing public health, and protecting people from natural and technological hazards, crime, etc. These programs are especially important in Arctic regions, because local residents face harsh climate conditions, which affect their health. As an example, Murmansk has a program to assist citizens to develop healthy lifestyles by reducing smoking, alcohol consumption and non-communicable diseases through healthy living. However, only 200,000 rubles (or merely USD 3000) has been allocated to it in the municipal budget in 2018. In contrast, the large-scale (27 million rubles) security "Safe City" program was implemented in Magadan with the purpose of creating a security monitoring center to gather information from video surveillance equipment in public spaces.

Social Equity: Affordable Housing and Poverty Reduction program area targets the improvement of dwelling conditions and reduction in the housing costs burden on low-income families and other marginalized groups, such as orphans. Additionally, the accessible environment programming is included in this category, which is aimed to help people with disabilities to be more mobile in the city environment.

Programs falling under the *Dynamic and Diverse Culture, Heritage and Arts* category provide funding to local culture and arts and increase citizens' participation in cultural events. Examples of representative municipal efforts range from assisting with organizing festivals, events and cultural activities to remodeling theaters.

Finally, *Human Capital Investment and Accessible Education* in Magadan and Murmansk is an additional category entered to reflect a strong emphasis on primary and secondary education, as well as youth programming in Russian cities. Both communities invest major resources into their education systems (Table S1) in terms of human and physical capital.

Although most elements of sustainable development have been present in some form across the municipal programs in the two cities, the program bundles differed considerably. Figure 3 compares the number of programs per each of the 10 urban programming categories. The portfolio in Magadan appears to be more balanced with most programs in the Safe and Healthy Community and Connected and Engaged Communities groups followed by Social Equity and Dynamic and Diverse Cultures categories. However, none of the program areas are dominant. In contrast, in Murmansk the number of programs in Social Equity and Safe and Healthy Community by far exceeds other categories. In both cities, economic opportunity and energy efficiency programs are underrepresented.

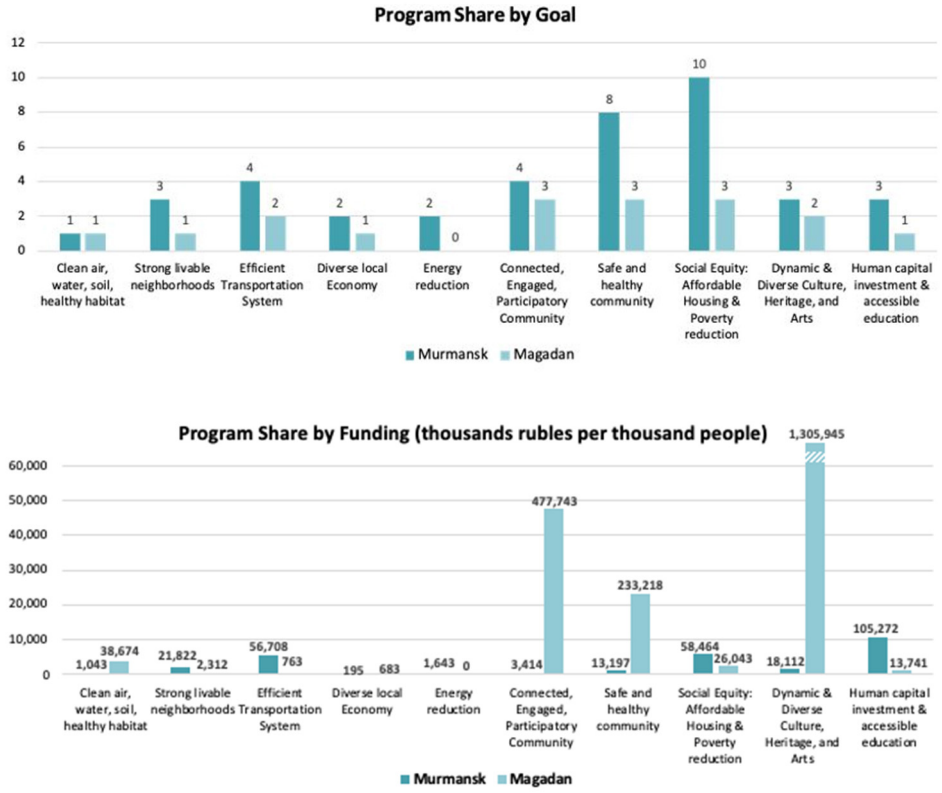
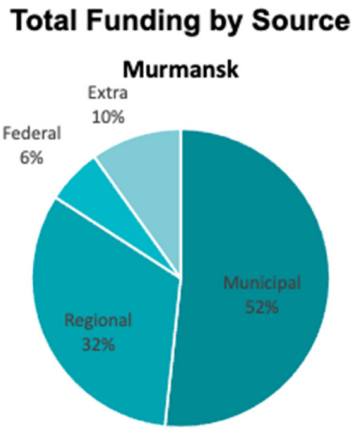


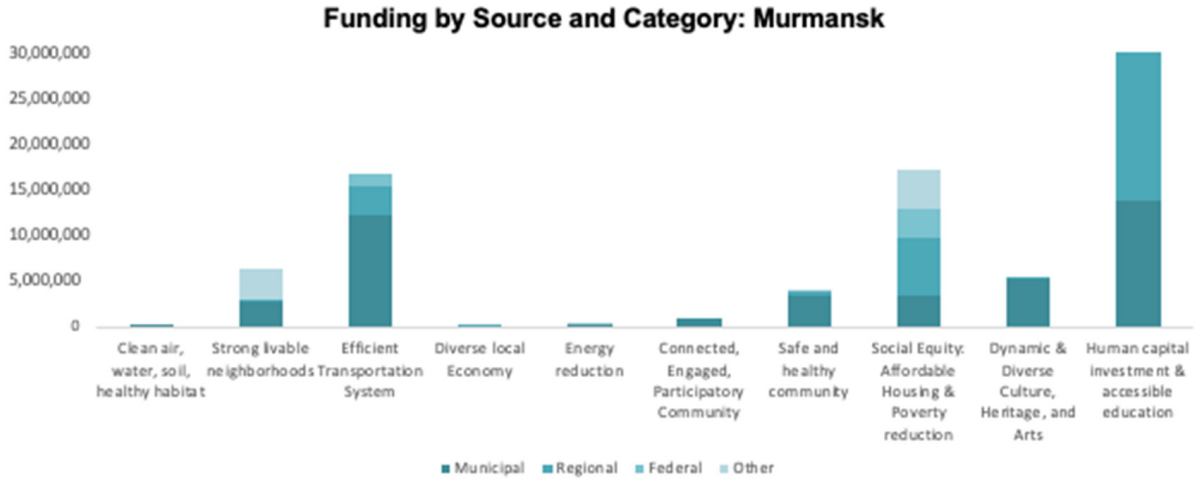
Figure 3. Murmansk and Magadan Municipal Program.

In respect to funding, which arguably is a more telling indicator of priorities and resource allocation, we analyzed the funding rates per 1000 residents allotted to each program (keeping in mind that figures are dynamic depending on the actual budget that may deviate from the original funding plans stated in the program, which are also subject to change, and that only a fraction of the total funding is directed to address sustainable development issues). Education, Social Equity and Transportation funding takes the center stage in Murmansk. The Magadan's program portfolio appears to be tilted towards funding Culture and Heritage, Social Equity and Safe and Healthy Community, and Healthy Habitat, Clean Air, Water, and Soil programs. This may indicate some city-specific or regional priorities (e.g., the emphasis on environment and culture in Magadan), as well as different budgeting practices.

As mentioned earlier, many of the municipal programs fulfilled federal or regional mandates established by the laws and decrees resulting from the local implementation of federal and regional programming. Consequently, a number of programs had federal and regional funds distributed from the top to finance the activities, as exemplified in Murmansk (Figure 4a). Yet, the combination of funding sources varied considerably among sustainable development categories (Figure 4b). Some of them heavily relied on federal funds (e.g., Social Equity: Affordable Housing and Poverty Reduction), regional support (e.g., Human Capital Investment and Accessible Education) or on other ('non-budgetary') sources (e.g., Diverse Local Economy).



(**a**)



(**b**)

Figure 4. Program Funding by Source (%) in Murmansk: (**a**) total, (**b**) by programming category.

A peculiar characteristic of the municipal program funding in Russia is the reliance on so-called 'other' and 'non-budgetary' funds. This is an eclectic group of sources that lay outside of the normal municipal budgetary system, and includes paid services by municipal entities, social security funds, loans, dividends, fines, as well as voluntary contributions from businesses, individuals and other income. In other words, the cities are expected to find additional money to finance their programs. While this may not be a serious problem for prosperous urban municipalities, smaller, less affluent cities and towns may find it difficult to fulfill such a mandate, and thus may face funding uncertainty.

4. Discussion: Strengths and Weaknesses of the Sustainable Development Programming in Murmansk and Magadan

4.1. Comparison to Whitehorse

The key differences between Whitehorse and Russian Arctic program classifications introduced in this paper are quite telling in respect to the diverging approaches to implementing sustainable development goals. First, Russian municipal programs address SDGs in a rudimentary way. For example, the Whitehorse program area "Efficient Low Impact Transportation" was reduced to "Efficient Transportation" for Russia, because Murmansk and Magadan programs do not focus on cutting the negative CO_2 impact of transportation, but rather focus on improving the efficiency of the road and bus systems for people to use. Secondly, there were no programs in the Russian case studies that focused on minimizing waste generation, as well as there were no programs focusing on building resilient food systems. However, Russian municipal programs paid considerable attention to education. We consider the latter a part of sustainable development programming because the aim is to increase the accessibility of education for children and invest in human capital.

4.2. Main Programmatic Strengths in the Russian Cities

All Murmansk and Magadan program descriptions are publicly available at the website of each municipality. The programs are well structured and presented in considerable detail. Each program has a 'passport' which includes information about goals, indicators of assessment, timings, budget, expected outcomes and other categories. Passports of programs are available at the website of each municipality. Full details are accessible online, alongside the funding figures. Presumed transparency of the program content is certainly a strength of municipal programming. However, it is not known how often these documents are updated. In addition, the nature of this public access assumes the community residents have Internet connectivity and appropriate technology.

4.3. Top-Down Nature

Most programs we reviewed were top-down, sometimes fulfilling federal and regional mandates. This was also observed by Sergunin [29], who pointed out the top-down nature of policy planning and implementation in Russian northern cities rather than bottom-up, thus diminishing the participatory process and the impact of these efforts. There is a need for municipalities to pay more attention to sustainable development planning and establish capacity with qualified personnel [52]. However, there are small-scale, bottom-up, locally initiated programs or funds directed to support such initiatives.

4.4. Weak Environmental Programming

While the original approach to sustainable development comprises three main components, economic, environmental and social development, the implementation of sustainable development in Russia's urban municipal programs seems to mainly focus on social and economic issues, paying less attention to environmental sustainability. For example, in Murmansk only one program titled "Residential security and environmental protection" directly refers to addressing environmental issues (Table S1). More specifically its subprogram titled "Environmental Protection in Murmansk" is aimed to resolve a number of environmental issues which were caused by a variety of factors: growth of production, consumption and waste, particularly comprised of plastic and polyethylene packaging, and the low level of eco-culture of city residents, emergence of unauthorized landfills, and lack of waste sorting systems. In addition, the city lacks a systematic approach to the protection, conservation and reproduction of urban forests. The goals of the Environmental Protection subprogram are (1) to reduce the negative impact on the environment of production and consumption wastes, and (2) to encourage eco-friendly behavior among residents. Among the key activities of the program for 2018–2020 are sewage treatment, construction, and informing the population about environmental protection. This subprogram is aimed to improve the environmental situation in Murmansk, which will also have beneficial

impacts on citizen health and preserve Murmansk's urban ecosystem in the long term. However, it seeks to reduce the amount of waste by simply removing it and burying it nearby. Such an approach does not seem to be effective in terms of the general reduction in waste and overall sustainability agenda. Nevertheless, some programs in other categories are indirectly connected to the environment. For example, the greening of public spaces is included as an additional part of the municipal programs of both Murmansk and Magadan on improving public areas through planting more trees (Table S1, category 2 a,b).

4.5. Focus on Material Well-Being

The overall analysis reveals that sustainable development at the municipal level is being understood from a rather human-centered and material benefit-focused perspective, having safety, comfort, and security as the core components. All of the programs and subprograms reviewed aimed at enhancing the living conditions and material well-being of local residents (new and affordable housing, clean water supply, etc.), refining infrastructure (efficient road construction, improving public spaces and increasing green areas, etc.), strengthening civil society engagement (patriotic education, education on taking care of the neighborhood, etc.) and developing small and medium-sized businesses. This is not surprising given that Russian Arctic municipalities are facing acute social and economic challenges that they need to address. Another factor is that strategic plans in the Russian cities often have an "economic bias" by prioritizing the economy at the expense of social/humanitarian and environmental dimensions of sustainability. The sectoral/single-issue character of the local development plans was identified as the major challenge to developing an integrated/comprehensive approach to sustainable development planning [29].

The amount of funding invested also indicates that Murmansk and Magadan programs have a strong emphasis on education. These programs view development through strengthening accessibility to education, providing equal opportunities to education and improving its quality. Quality improvements are realized through building/reconstructing schools and pre-schools, modernizing the educational system and improving technical characteristics of the educational facilities (Table S1, category 10 a,b). In addition to material well-being and education, municipal programs in both cities have a strong focus on culture. Much effort is invested into involving citizens in a diverse array of art and folklore development programs (Table S1, category 9 a,b).

4.6. Bureaucratization and 'Self-Investment' by the Local Governments

Municipal development programs appear to be quite bureaucratically complicated or even over-bureaucratized, as each step and goal of the program is prescribed and approved by the city authorities. An additional feature of these programs is considerable attention (and funding) given to investing in government efficiency. The programs routinely channel considerable finances to improving the municipality's own administrative work, training personnel and enhancing bureaucratic infrastructure. While these improvements constitute a legitimate item and may lead to considerable savings and more sustainable government operations, their accountability, transparency and, eventually, effectiveness could be questioned.

In the same manner, local governments invest in the programs that are focused on informing the population about their activities through mass media, promoting interaction between the mayor's office and public associations, NGOs, and elected officials, developing information and telecommunication infrastructure (Table S1, category 8 a,b). These programs serve as a mechanism to connect local authorities to the civil society, but also to create a positive public image of the municipal government.

4.7. Weak Indicators of Success

Each program contains primarily quantitative indicators that are measured to determine its success. Although this is a commendable characteristic of municipal programming

in both cities, the nature of such indicators often remains formal and superficial, especially as it concerns measuring the program's effectiveness (both in respect to process and outcomes). The lack of data is likely one of the main challenges. The derivative of having formal indicators, however, may be the orientation of the bureaucratic apparatus on 'hitting the indicator targets' rather than ensuring that the program objectives are met comprehensively. Needless to say, this becomes even more problematic when indicators and benchmarks of success are determined outside of the community, in the regional or federal capital.

4.8. Lack of Integration

The main shortcoming of the municipal programs that relate to sustainable development appears to be the lack of programmatic integration. While none of the programs was specifically designed to target sustainable development, many implicitly contained certain elements of the sustainable development goals. However, with the absence of such an umbrella, these elements remained unlinked. As a result, from the positions of *implicit* sustainable development programming, the existing municipal initiatives present a combination of gaps and overlaps. Partially, this is a consequence of multiple mandates (federal, regional and their own) that municipalities have to perform. Another consideration may be the lack of guidance from the higher policy levels in respect to 'downscaling' the concept of sustainable development (often declared by federal and regional authorities) to the municipal level. At the same time, limited opportunities for 'bottom up' and participatory inputs, which could serve as an integrative platform for local programming, may preserve the disjoined and administrative nature of the programs in question. Integrating the programs (whether under the auspices of sustainable development or some other overarching purpose) would likely increase programmatic success and save resources, and thus increase the efficiency and effectiveness of local governance. It may also reshape the understanding and appreciation of sustainable development at the local level and demonstrate its practicality to municipal authorities and citizens.

4.9. Funding Patchwork and Underfunded Mandates

Figure 4 demonstrates that programs often have quite complex funding structures using a combination of sources: federal, regional, municipal, and other (including 'non-budgetary' funds). The mix of funds varies depending on whether a program is realized through a federal or regional mandate, and whether relevant federal or regional programs are in existence. Russia operates a system of delegated mandates when priorities promulgated at the higher level of government are sent to the lower levels for enactment with appropriate resources attached (e.g., [84,85]. In fact, in 2018 in Murmansk, the local budget paid for just over 50% of all program implementation costs (Figure 3). The rest was covered by the regional (32%) and federal (6%) governments, as well as non-budgetary sources (10%). A relatively small share of federal funds may create the underfunded federal mandates. In addition, in some cases we see an overreliance on 'non-budgetary' funds, an eclectic group of municipality self-generated or set-aside funds. Since these funds are outside of the normal budget planning, they may be less reliable and predictable, thus making the program outcomes more uncertain (especially if the municipality is not prosperous).

5. Conclusions

The municipal programs of Magadan and Murmansk that were in effect in 2018 clearly indicate that sustainable development is not used as an overarching concept or approach with minimal adherence to its principles or the UN SDGs. However, reviewed programs may be considered as sustainable development programs implicitly. The analysis of these programs indicates that achieving the 2030 UN sustainable development agenda and planning post-2030 in the Russian urban Arctic requires serious assessment and monitoring of effectiveness. While there are a number of well-defined programs aimed at improving the quality of life of urban Arctic citizens and development, very limited attention is

paid to the environmental aspects of sustainability. Although we focused on the 'mature' programs effective in 2018, it is important to add that Magadan in 2019–2021 developed a number of new municipal programs covering 2021–2025, and Murmansk in 2019–2020 produced new background documents on socio-economic development scenarios to guide its policies. These recent initiatives are yet to be analyzed in detail as they are being implemented, but a review of the documentation indicates that they are generally based on the same principles and approaches to sustainable development as the earlier set of programs. Although the programs in the two cities are considerably different, there are notable similarities. Often, municipal programs are disconnected from each other, therefore missing the integrative nature of sustainable development, even if sustainable development objectives are implicitly present. Our analysis indicates that there is a strong need to go beyond largely socio-economic interpretation of sustainable development and approach it from the holistic perspective strengthening all components of sustainability. In order to effectively move forward, there is a need to increase engagement with global knowledge and initiatives, while linking with local knowledge systems, strengthen the integrative approach to programming, revisit the overarching sustainable development concept, enhance cooperation among different levels of government, and broaden the participatory nature of the programs. Both municipalities are investing into education, sports, and culture, and an additional emphasis on healthy and environmentally friendly solutions is due.

This study conducted a document analysis of active municipal programs in two Russian Arctic urban settlements. These two cases, although informative, do not provide insight into the full spectrum of programs enacted in Russian cities. In addition, the official program documents, while sufficiently detailed to ascertain program characteristics, do not reveal the full picture of programmatic activities as they do not disclose contexts and real-life processes that surround the development and implementation of these instruments. A further study of these processes is needed to understand the role of sustainable development in municipal programming discourses. A comparative study involving a diverse group of Arctic/near-Arctic cities in Russia and elsewhere would be a desirable ultimate step to continue this work where a direct engagement of policy- and decision-makers would be of high priority for both analytical and practical purposes.

Supplementary Materials: The following are available online at https://www.mdpi.com/article/10.3390/su132112140/s1, Table S1: Examples of the Municipal Programs with Sustainability Content in Murmansk and Magadan.

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