

# Environmental drivers and sustainable transition of *dachas* in Eastern Europe: An analytical overview

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## ABSTRACT

*Dachas* (collective gardens with summer houses in post-Soviet countries) is one of the most common features of peri-urban landscapes within the region that is the erstwhile USSR, with *dacha* conglomerates constituting half of the areas in the exurbs of major cities. In Belarus, Russia and Ukraine *dachas* largely preserved their original form and function. Arguably, they are at the turning point now, and can be further transformed sustainably if appropriate incentive structures will be created within national governance systems. The central objective of this study therefore is to understand the origin and transition of *dacha*'s form, process and function in terms of their environmental and social impact, as well as opportunities for transformative change towards sustainability under various governance conditions in the three countries.

Building on field data from three suburban locations in Belarus, Russia and Ukraine, as well as analysis of applicable regulatory frameworks and institutions in the three countries, we analysed social and behavioural background of *dachas*, management practices relevant to their environmental footprint, as well as governance frameworks, actors and power relations. Findings were further discussed in terms of governance barriers and solutions for sustainability transformation of *dachas* in a broader context of peri-urban transformation, and provide a comparative perspective across Eastern Europe. As such, none of the pathways have emerged as better than the rest in terms of sustainability. Variability of socio-economic and political contexts found in the region suggests that no "one size fits all" governance approach can be recommended. Any solutions paving the way for transformative changes would require proper information and knowledge systems with a smoother regulatory framework, and a purposeful restructuring of existing actor relationships.

## 1. Introduction

A *dacha* (collective gardens with summer houses in post-Soviet countries) is one of the most common features of peri-urban landscapes within the region that is the erstwhile USSR (Shkaruba et al., 2017). They constitute half of the areas in the exurbs of major cities (Struyk and Angelici, 1996). An estimated two-thirds of urban population in Russia possess a *dacha* (Kolosov and Nefedova, 2014); renowned Soviet geographer Rodoman (1993) was scared and fascinated by the sheer scale and fast sprawl of *dacha* conglomerates in 1980–90 s, and named them "slam supercities". Currently, the extent of *dachas* is challenging to estimate since their functions are in flux. In various geographical

contexts across ex-USSR, *dacha* remaking is characterised by different speeds and directions. In the now EU member-states Estonia, Latvia and Lithuania, *dacha* estates have mostly lost their initial function and have been converted into residential areas (Roose et al., 2013; Šiupšinskas et al., 2016). In contrast, despite undergoing transformation, *dachas* in Belarus, Russia and Ukraine maintain their unique cultural, political, and economic significance.

It can be reasonably assumed that in the foreseeable future, *dachas* will remain an important feature of land use systems (especially peri-urban ones) in Belarus, Russia, and Ukraine (hereinafter referred to as Eastern Europe). Their environmental impact is significant, while their role as food production systems is still high despite the gradual decline.

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*Dachas* in Eastern Europe are on the verge of rapid modernisation in terms of form and socio-ecological characteristics. The seeds of this transformation can be observed, for example, in Central Europe, where socio-economic transitions started earlier on and have since expedited. More ideas can be drawn from plans and proposals for rethinking the collective gardens of Central Europe (Roose et al., 2013; Šiupšinskas et al., 2016), or from further cases within Eastern Europe, such as Moscow (duly recognising its idiosyncrasy) (Nefedova, 2018). It can be argued that *dachas* in Belarus, Russia and Ukraine have a chance to use sustainable options for their further development if appropriate incentive structures will be created within national governance systems.

Although *dachas* were always a focus of human geographical studies in both the Soviet (French and Hamilton, 1979; Pallot and Shaw, 1981) and post-Soviet eras (Struyk and Angelici, 1996; Lowell (2003); Rudolph and Brade, 2005; Nefedova and Treivish, 2019), discussion of their sustainability implications in international or national publications (Belarusian, Russian, Ukrainian) has been rudimentary at best. At the same time, Belarus, Russia and Ukraine comprise a large portion of Eurasia, and therefore understanding of *dachas*' environmental and social impacts, as well as options for their sustainability transition is globally important, especially in terms of land-use & -cover change scenarios.

Recognising this important gap we aim to understand the origin and transition of *dacha*'s form, process and function in terms of their environmental and social impact, as well as opportunities for transformative change towards sustainability under various governance conditions of Belarus, Russia and Ukraine. In doing so, within this broad aim we will specifically deal with the following specific objectives, recognising their fundamental importance for understanding *dachas* as a target for policies leading to sustainable transformation:

- (1) to understand socio-political and economic drivers behind the behavioural patterns of *dachniks*' (*dacha* residents), their changes since the collapse of the USSR, associated environmental impacts, as well as sustainable options, which are plausible in *dacha*'s contexts;
- (2) to place *dachas* into the contexts of peri-urban governance transition, and outline barriers and opportunities for transformative change towards sustainability, which are provided by these contexts.

We further recognise that after the collapse of the USSR, the three Eastern European countries have the same point of departure in terms of their governance systems (i.e. the USSR's). However by 2020, they have arrived to very different results, as can be seen e.g. in the World Bank's the Worldwide Governance Indicators (<https://info.worldbank.org/governance/wgi/>). Therefore, a further objective of this study is (3) to develop a comparative perspective on the two previous objectives in order to reflect on sustainability pathways provided by various governance modes and in diverging political cultures and economic contexts.

## 2. Analytical strategy, methods and data

### 2.1. Analytical strategy

Due to persistent legacies of the past, *dachas* of Eastern Europe, apart from the idiosyncratic cases of Moscow, St. Petersburg and Kyiv, are only at the beginning of a radical transformation regarding their socio-ecological metabolism. They are "frontiers for sustainability" in a sense that rising socio-economic challenges bring opportunities for innovation, as well as synergy options in the peri-urban zone (Marshall, 2016). In this sense, it is of utmost significance to understand origins and historical background of both *dachniks*' management practices, and governance arrangements created for *dachas* since their rapid proliferation in the 1980s, as well as circumstances leading to modification and reaffirmation of those arrangements and creation of new ones. This

is the first point of our analysis that would present findings structured as an analytical narrative addressing social and behavioural background of *dachas*, management practices relevant to their environmental footprint, as well as governance frameworks, actors and power relations. This would cover the first (and partly also the third) research question, and provide context to further ones.

To address the second research question, we explored the framework of Marshall and Dolley (2019) who analysed opportunities for sustainability in peri-urban areas of China and India. A useful aspect of their framework that is extremely relevant to our *dacha*'s study is its focus on local social dynamics and environmental impacts, as well as transformation of local knowledge systems and related behavioural practices (including management and political ones), drawing on existing pioneering work on transformative innovation (Schot and Steinmueller, 2016). In line with the socio-technical transition approach (Geels, 2004; Grin et al., 2010; Schot and Steinmueller, 2016) states that fundamental change is required in various socio-technical systems intersecting with socio-ecological systems, such as food, energy, mobility, material provision and disposal. In transition literature, change in complex adaptive systems, such as *dacha* neighbourhoods, is a result of a non-linear co-evolution dynamic within cultures (such as attitudes, perceptions, worldviews), structures (such as institutions, hierarchies), and practices (such as behaviour, procedures, routines) that grow progressively (Grin et al., 2010; Loorbach, 2010; Markard et al., 2012).

For a conceptual view of peri-urban transition Marshall and Dolley (2019) employed the neo-liberal restructuring of peri-urban space, which gave a basis for comparing roles of national governance regimes across the region. Keeping with this approach they analysed blurring of boundaries and changing dynamics of peri-urban socio-technical-ecological systems, which are also highly relevant for *dachas* and clearly describe transformations on the interface of knowledge and management systems. Discussion of study's findings using these analytical points addresses the second research question, while the consistently employed comparative perspective covers the third one.

### 2.2. Methods of data collection

Our findings are based on the analysis of national institutional regimes established over *dachas* in Belarus, Russia and Ukraine in combination with case study research in three peri-urban locations in these countries. The qualitative data were collected through a mixed-methods approach mainly consisting of documents, key-informant interviews (see Appendix A for the list of interviewees and the dates), and in-depth surveys of *dacha* partnerships, conducted to resolve or explain ambiguities and increase consistency, reliability, and representativeness of data (Patton, 2002). The quantitative data came from local statistical departments, reports by *dacha* partnerships, and analysis of time series of high resolution topographic maps.

The peri-urban locations studies in the three countries were *dacha* belts in the cities of Mahilioŭ in Belarus, Pskov in Russia and Kharkiv in Ukraine (Table 1 and Fig. 1). These cities and their suburbia have different scales, however, they also share several common properties, which are critical to this research. For instance, the cities do not belong to capital areas or large agglomerations, and over the recent decades their suburbia have not been affected by major one-off neo-liberal restructuring interventions, such as large-scale urban development projects (Swyngedouw et al., 2002). They are neither booming nor declining metropolises, and overall can be assumed to reasonably represent their respective countries.

We first focused on the legislative framework, planning documents, regulations, rules, and norms relevant to *dachas* (Appendix B). We specifically referred documents regulating the use of natural resources, sanitation, infrastructure provision, land use rights, building norms, taxation, and local and (if applicable) *dacha* partnership governance, as well as implementation practices. These documents are in the form of

**Table 1**  
 Sizes of garden partnerships in case study areas (based on statistics from local authorities and map analysis).

Indicator	Pskov	Mahilioŭ	Kharkiv
Number of dacha settlements in the city district (including association of several garden partnerships)	100	111	127
Number of land plots in dacha settlements			
Min	50	30	70
Max	2000	2290	1600
Average	200–500	200–250	240–390
Size of dacha land plots, ha			
Min	002	003	002
Max	015	015	012
Average	006	008	006

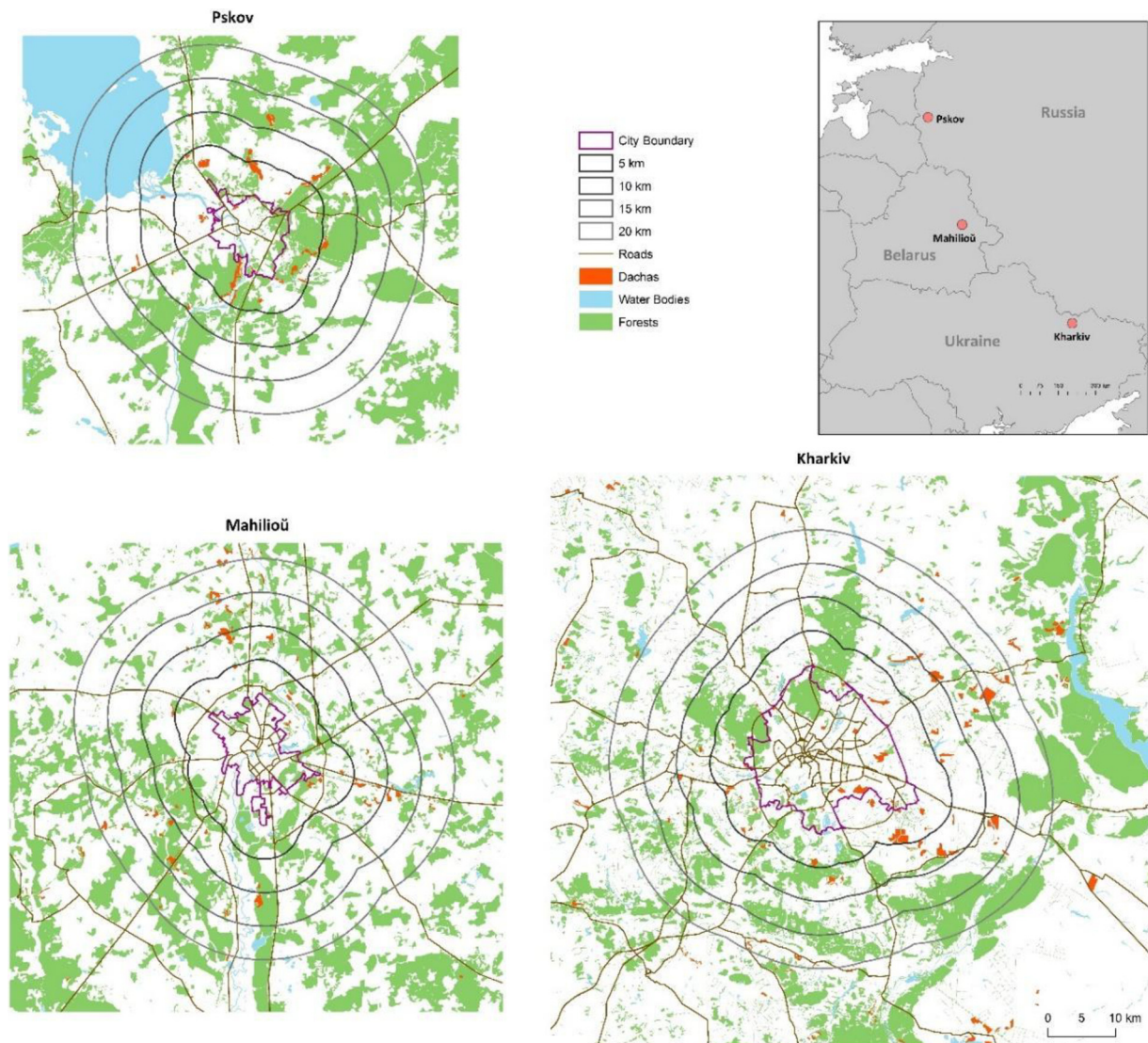
explanatory notes, specific guidelines, or opinion pieces of decision-makers and broader stakeholder representatives accessed through semi-structured interviews and local and national media and social networks. The same sources, combined with literature review, were explored to understand behavioural dynamics, perceptions, core beliefs, management practices of *dachniks*, as well as potential environmental and social impacts. In order to fill data gaps identified by desktop research,

twelve dacha partnerships selected on the basis of age and size representation received a deeper survey. Their paperwork was studied and individual *dachas* were visited to learn about their technical parameters, individual stories, milestones and achievements, agricultural and household management practices, resource consumption patterns, plans, ideas, and broader reflections about dacha life.

### 3. Results: socio-environmental dynamics and sustainability options

#### 3.1. Social and behavioural background of dachas

Fig. 2 shows a *dacha* allotment in its typical form with all its main characteristics. *Dacha* areas of Eastern Europe still exercise Soviet-era agricultural and household management practices. Even current *dacha* owners who were minors or not yet born in that era, carry on with many of the established routines (especially due to mostly inherited or even unchanged ownership, except for the most attractive areas on cities' outskirts). These practices emerged as an outcome of the fundamental failure of that era's planned economy to meet the demand for consumer goods (Mamonova and Sutherland, 2015; Kallus and Vinnitsky, 2016; Šiupšinskas et al., 2016; Rusanov, 2019). In case of *dachas*, this was enhanced by "hands off" policies in relation to *dachas*.



**Fig. 1.** *Dacha* belts around case studies cities (own representation based on statistics from local authorities and topographic map analysis).

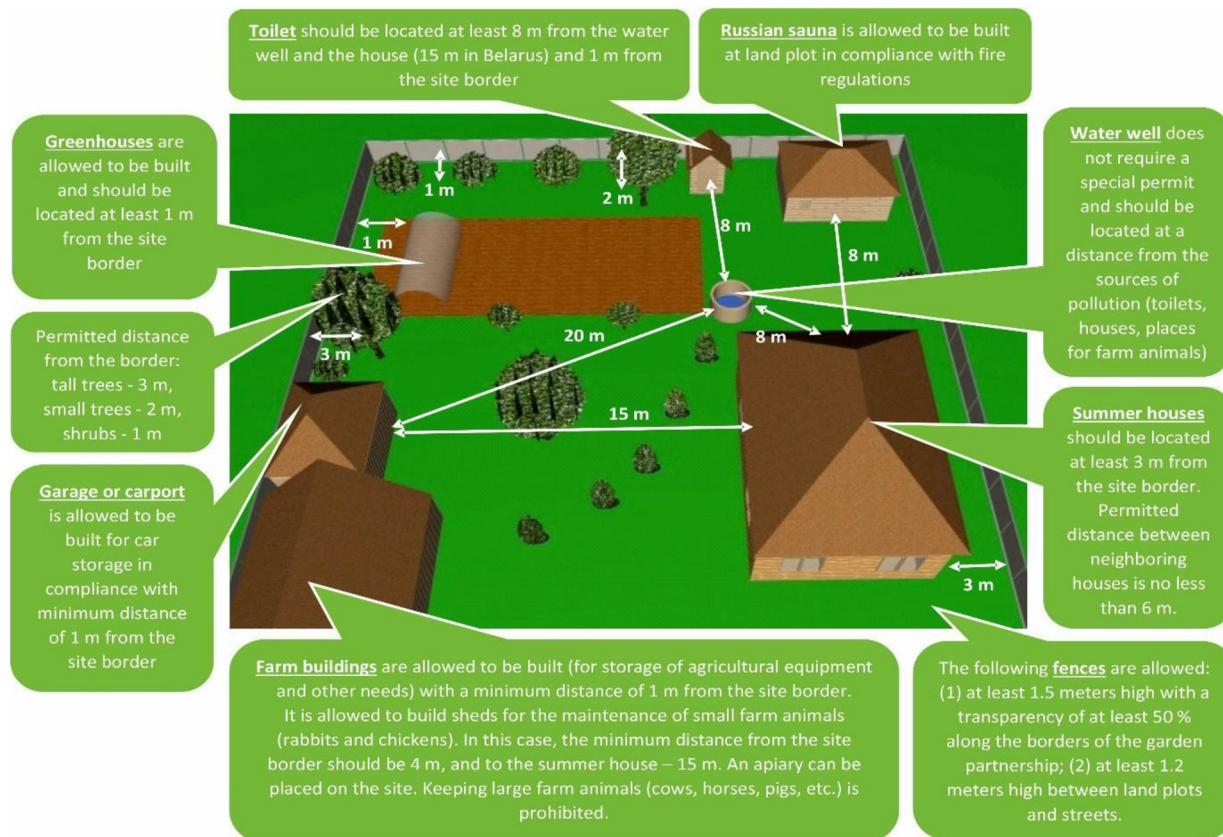


Fig. 2. Typical dacha land plot (own data synthesis and representation).

As a result, specific needs of dacha communities were (mostly) unrecognised or unaccounted for by the centralised planning system. For example, there were limited options for purchasing construction materials due to “unreasonable” prices (interviews 1, 4, 7, 14, 18). In the Soviet era, any deficit or overpricing of goods in stock and services was compensated by:

- 1 Strong informal networks helping to locate and acquire labour or goods in stock (albeit in limited quantities) (Anderson and Boettke, 1997; Alexeev and Pyle, 2003; Borén, 2003) or to arrange collective work to accomplish larger scale projects (e.g. building a house) were common, whereas today this culture is fading (Williams et al., 2013).
- 2 Widespread homemade solutions, often produced using components, blanks or manufactured parts obtained from workplaces (at discounted prices or at no cost) or bartered from within informal networks (Vagin, 1997; Helmke and Levitsky, 2004).
- 3 Enhanced recycling and re-using (also in order to produce homemade solutions) (Golubev and Smolyak, 2013). Construction materials for reuse and recycle often came from construction waste from demolished buildings (Štupšinskas et al., 2016) (interviews 1–15).

Another important contextual factor had to do with the “urban” social and professional backgrounds of dachniks. As a result, they were not bound to household and agricultural practices of local rural communities, but broadly used literature and mass media (including dedicated dachnik periodicals appeared in the 1980s (interviews 1–15)) on gardening, landscaping, recycling/reusing tips, homemade solutions for house constructions and infrastructure developments instead. In general, dachniks were open to experimentation and attempted novelties. This included propagation of some important invasive species, such as the Canada goldenrod (*Solidago canadensis* L.), and the new agricultural species.

2000–2010s brought relative prosperity to cities in Eastern Europe. Many illegal and semi-legal practices common in the Soviet era and until the 1990s became socially unacceptable to varying degrees across the countries. This resulted in higher costs of labour, fuel, and construction materials (Williams et al., 2013). In addition, citizens started to appreciate more personal and family leisure time. These factors combined have changed preferences of dachniks to ready-to-use solutions. Nevertheless, recycling and reusing remain significant. Over time, this corresponded with a broader process of dacha rethinking and transition of its functionality since the early 2000s. Food deficit is not an issue anymore, and food articles are substantially cheaper in supermarkets. Hence, vegetable gardening and growing vegetables is being replaced by such activities as landscaping, and development of recreational capacities (Mamonova and Sutherland, 2015).

### 3.2. Management practices relevant to environmental footprint of dachas

Water in the dacha partnerships in Belarus, Russia and Ukraine are traditionally supplied through dug wells, as well as drilled and unconfined wells that can be individually or collectively owned or managed. Generally, dacha partnerships do not choose centralised water supply grids even when such an option is available because of the high cost involved. Use of surface water bodies has been usually limited to irrigation and fire water supply. Groundwater resources including confined aquifers, are broadly used for irrigation, drinking, and sanitation. This is especially the case with individual drilled wells. However, this leads to seasonal overexploitation of aquifers, especially in the dry years (interviews 1–9).

In lieu of published works on water consumption of dacha households, we conducted interviews in the study areas to estimate the scale of water production. This research revealed seasonal debits of individual wells varying from 1 to 10 m<sup>3</sup>. Seasonal water consumption hence varied from 7 to 56 m<sup>3</sup>/household (see Table 1, for average sizes

of partnerships in case study areas), which may result in significant overexploitation, especially in water-deficit watershed areas. Rainwater collectors are uncommon but present at most partnerships, especially in locations with low access to other water supply modes.

The sanitation system installed in a *dacha* usually depends on the era in which it was constructed or radically renovated. Pit latrines with shelters are the most common system among *dachas* built in 1970–1980, while indoor solutions with or without septic tanks have been more favoured since the late 1980s (the latter is typical mostly for *dachas* situated close to the suburbia). Faecal sludge management is poorly organised in general; pits are not regularly emptied, while sludge from both pits and tanks is disposed and buried underground within the estate (to be used as fertiliser later) (Melekhin et al., 2013) or in a close neighbourhood. Solutions involving proper sludge treatment, e.g., centralised collection by a waste treatment company or proper decentralised practices (such as aquifer isolation from sludge), emerged only in the 2000s, and they are common only in some urban areas. To the best of the authors' knowledge, no research focusing on the water quality at *dachas* in any of the three countries has been published (a rare exception is work by Pidlisnyuk et al. (2004) covering some of the relevant aspects for Ukraine). However, there is compelling empirical evidence to suggest that drinking water supply in these *dachas* is unsafe. Evidence reveals that wastewater from the estates infiltrates the aquifers and leaks through worn out underground water supply pipes (Pidlisnyuk et al., 2004; Nikitina and Smirnovskaya, 2015; Kolasava, 2018). In areas with large groups of *dacha* estates, such as the Moscow region, *dachas* are believed to be the major sources of water pollution (Yangutov, 2006).

In case of waste management, *dachniks* choose for “not-in-my-backyard” (Morell and Magorian, 1982; Portney, 1991) options. Studies have revealed that *dachniks* tend to avoid waste collection and dispose their waste outside the bounds of their estates (Titenko and Shyrokostup, 2017). The environmental impact of *dachas*, according to studies, is recognisable within 1 km from the settlements (Yangutov, 2006). The differences between the waste management practices of the three countries are a result of the respective government policies, especially the quality of monitoring and enforcement (read Sections 3.3,3.4). However, *dachniks* in and around large cities are functionally closer to settled citizens, and have better financial capacities and arrangements (Makhrova, 2014), employ better waste management practices (interviews 12, 19). Some of the sustainable traditional waste management practices include composting and reusing of organic waste from gardens and the kitchen (except bulky waste, e.g., trunks or persistent weeds, which are incinerated). As mentioned, *dachniks* send from their primary households to their *dachas* outdated appliances, furniture, kitchenware, clothes, etc. with intentions to recycle and reuse. As such, this represents a practice that is normally praised as a sustainable one. However, it also generates a massive inflow of waste (or soon to be waste) from cities to rural areas, and much of this waste eventually ends up in landscapes surrounding *dacha* estates due to the reasons discussed above and the difficulties of electronic waste disposal.

*Dachas* in all the three countries are billed for their electric power at higher rates than regular settlements. This motivates *dachas* to reduce energy consumption (interviews 4–8, 14). For example, they may limit the use of household appliances or using washing machines only to their main residences in the city. However, the saving behaviour is often compromised by re-using patterns — the electric appliances in use are often outdated [for concerns of robbery (interviews 3–7, 11–14)]. Alternative energy generation at *dachas* is perceived as disproportionately expensive because these estates are inhabited only in particular seasons, and therefore such equipment are at high risk of larceny (interviews 6, 7, 15). Feed-in systems to supply surplus electricity to the grid when not consumed by the *dacha* represent a viable opportunity only in Ukraine (interviews 14, 16, 17), while access to feed-in tariffs by small-scale producers in Belarus was hindered due to bureaucratic barriers and has been practically terminated by recent

regulatory developments (DPRB, 2019). In Russia, feed-in energy sales are permitted, but at regular market price (Lanshina, 2018).

The use of solid fuels such as peat and wood pellets, firewood or woodchips, which are usually burned in a “Russian oven” or its derivatives, is common to *dachniks* in the three countries. The fireplace is widely used in *dachas* for aesthetic appeal only, as they are not fuel efficient in most climatic zones across the three countries.

Due to this seasonal character, *dachas* are energy inefficient. This will hinder efforts to transform them into year-round residences because of the significant investments involved. However, secondary and summer houses of peri-urban areas across several European countries are following this trend (Roose et al., 2013; Šiupšinskas et al., 2016). Oven ash is usually reused as fertilisers. For cooking, *dachniks* prefer liquefied natural gas in balloons.

In terms of architecture and planning solutions for *dachas*, *dachniks* were strongly influenced by the limited size of land, legal requirements at the time of construction, seasonal character of the *dachas*, and intentions of owning a house other than the common ones (see Appendix C). This resulted in distinct “*dacha* designs” that has evolved since the 1970s to become a unique architectural style by the late 1980s. By the mid-1990s, most of houses in *dacha* partnerships were liveable ones (at lease in summer) with access to basic utilities (Seredina, 2017).

Historically, agricultural practices of the *dachniks* have been shaped by the broken or low agricultural value bestowed on the land endowments (Struyk and Angelici, 1996; interview 20). To overcome this, *dachniks* transported fertile soil, sand clay, or peat (as needed) to their garden allotments, constructed local drainage systems, and abundantly used fertilisers. Particularly, they favoured (and continue to favour) manure as it is a cheaper and presumably safer option than chemical fertilisers. Many *dachniks* overestimate the food safety aspect of manure application and overuse it, causing nitrate contamination of groundwater and food (Caldwell, 2011). Pesticides, insecticides, and fungicides are also used commonly. Inexperienced gardeners tend to overuse them, while seasoned and lower-income *dachniks* prefer cheap home-made solutions such as ammonium carbonate or iodine. Some of the solutions are useful and environmentally viable alternatives to conventional practices. Crop rotations are common and often sensibly arranged.

Transport is a major cause of air pollution and increasing carbon footprint. Privately owned cars were considered a luxury in the USSR, and historically, *dachniks* chiefly relied on public transportation, especially commuter trains, with the largest *dacha* estates crowding next to train stops. Since the early 2000s, the importance of private transport is growing rapidly, especially as suburban commuter services decline and road quality improves. No dedicated quantitative research is available, but apparently growing fleets of private cars and related environmental impacts are particularly relevant for *dachas* on the city outskirts, as they are becoming to be dominated by first homes of city commuters (Mason and Nigmatullina, 2011).

### 3.3. Governance frameworks, actors and power relations

In all the three countries, *dacha* partnerships today are governed largely by the same principles as those in the USSR era. In the Soviet era, *dacha* partnerships were entitled to substantial portions of autonomy and self-governance. This also explains the flaws found in present governance principles and mechanisms, which were inherited from the “non-governance gaps” of those times. Traces of the original regulatory framework still exist in the current *dacha* regulation as “typical rules of gardening partnerships” approved by governments of Union republics (Appendix B: DCMRSFSR, 1985b, 1988; RMCBSSR, 1986; RMCUSSR, 1986). Appendix C gives a comparative overview of the legal and organisational formats and applicable names for *dacha* partnerships, their evaluations and land ownership entitlements from late 1980s to 2019. Nowadays, they are recognised as consumers' cooperatives in Belarus (Appendix B: DPRB, 2008; RMCRB, 2008),

**Table 2**  
Summary of sector-wise enabling factors for environmental sustainability of *dachas* provided by national regulatory frameworks (based on findings from 3.1–3.3 and Appendix C).

Sector or a regulatory field	Belarus	Russia	Ukraine
Planning (within the national policy framework)	↘	↗	↘
Legal recognition (in comparison to established settlements)	↘	↘	↘
Taxation (in comparison to established settlements)	↘	→	↘
Gas supply & consumption	→	→	→
Electricity power supply & consumption	↘	→	→
Water supply & consumption	↘	↘	↘
Sewage & sanitation	↘	↘	↘
Waste management	↗	↘	↘
Crops and agricultural practices	→	→	→
Recycling and reusing	↗	↗	↗

horticultural or gardening non-profit partnership in Russia (Appendix B: FLSDRF, 2017), and have no clear organisational definition in Ukraine — although the overall logic of the national regulation and administrative practices suggests that it should be a consumers' co-operative as well (Appendix B: Letter SCURPE, 2009). In all the three countries, there exists a simplified procedure for the allocation of land parcels by local governments; if available, vacant parcels of up to 0.15 ha in Belarus (Appendix B: LCHRRB, 2008) (except areas around Minsk) (Appendix B: DPRB, 2014), 0.02–0.15 ha in Russia (specific parcel sizes are set by subjects of the Federation) (Appendix B: LCSDRF, 2001), and 0.12 ha in Ukraine (Appendix B: LCVRU, 2001) can be allocated to citizens. *Dacha* partnerships are formally not entitled to assign or withdraw land parcels from their members. Citizens are, however, can privatise their parcels to make them saleable and inheritable.

In all the three countries, the heads of *dacha* partnerships are not vested the power to enforce decisions of partnership councils, and their accountability to partnerships is also very limited. This is not only due to obsolete governance arrangements, but also because law enforcement and local governing bodies generally avoid interfering in *dacha* affairs (Tsapkov, 2016; Mityukov, 2017). In Belarus and Russia, there are cases where heads discharged from their duties by the partnerships refused to recognise the decision and continued financial operations on behalf of the partnerships (Belsat, 2018). In Russia and Ukraine, this was reportedly used for raiding partnerships on high value lands (e.g., close to or within big cities) (Chubakha, 2013; Grechukh, 2017). On the other hand, members often ignore the decisions and rules of the partnerships or indulge in free riding (Zubel, 2017). The scale of the problem can be illustrated by statistics from the Moscow Region, where memberships are not paid by c.a. 10 % of the *dacha* partnership members (Koraykin, 2019).

That being said, as long as affordable conflict resolution mechanisms for *dacha* partnerships are not provided by the government, a lot depends on the personality of the elected heads of those partnerships, their relations with regular members, and the overall culture of trust, transparency and accountability established with each partnership. Management collapse due to weak governance is a common occurrence and adds uncertainty to a *dacha's* socio-ecological dynamics. This governance model is vulnerable to illegal rent seeking intentions, and it easily collapses in case when those intentions are strong enough. Yet, in most cases, this works sufficiently well to deliver a reasonable level of service to partnerships and maintain balanced relations with other actors.

Conflicts of interest between partnerships and their neighbouring rural communities over dispute such as disagreement about the status and use of field roads or waste disposal and fly-tipping (if local disposal

sites are abused or fly-tipping is considered excessive), also arise. *Dachniks* usually rely on formal channels to seek support from local governments but rarely succeed (interview 20; Pro nedvizhimost, 2014; Niedziakowski and Shkaruba, 2018). In most cases, *dachas* and rural communities peacefully explore the bilateral benefits of neighbouring each other, e.g., locals supply eggs and dairy products to the *dachniks* and are employed by them for help, or co-benefit from social and physical infrastructure specifically developed for *dacha* settlements in some areas of Belarus and Russia (Grodno, 2017; Seredina, 2017).

In all the three countries, local governments represent an interface between *dacha* partnerships and the State [in Belarus, they are effectively a part of the national government (Appendix B: DPRB, 2008)]. They oversee most of the natural resource management, sanitation and environmental issues, as well as population registers and any land affairs, including land cadastres and land use regimes. Regional and national authorities in Belarus have laid out plans to increase the liability of local governments for *dacha* affairs (Appendix B: DPRB, 2008). In 2019, to enhance the monitoring of *dacha* affairs, Russia established a set of building permit requirements for the *dachas* and mandated the submission of formal notifications about the completion of their construction (Ignatova, 2018; Nikishin, 2019). This is accompanied by stringent criterion regarding the official status of houses and constructions, as well as higher taxation demands (Krivoshapko, 2019; Arakelyan, 2019; Ladushkinsky city district, 2019). In Ukraine, due to the legal non-existence of *dachas*, consistent regulations on *dacha* administration and taxation are missing, and many administrative practices exist on *ad hoc* basis, depending on the market value of the *dacha* land, the approach of local and regional authorities, existence of mal-practice, and so on (Yatsenko, 2014).

Cross-regional variability regarding the space for exploring viable options for household and partnership sustainability appears to be primarily determined by national institutional regimes. Evidence collected from the analysis of *dacha*-relevant sectoral policies, regulatory frameworks and implementation practices (including their interplays with behavioural patterns) in Belarus, Russia and Ukraine (also see Appendix C) had permitted for identifying overall trends for *dachas'* transition towards sustainability in these countries. Each sector was analysed in terms of usable opportunities emerging or disappearing within the last decade (as indicated by available evidence), with the respective sectoral dynamics being recognised as supportive, constraining or neutral in terms of sustainable management practices (see Table 2).

#### 4. Discussion: Sustainability pathways for *dachas* in the context of peri-urban transitions

Marshall and Dolley (2019) argue that peri-urban regions are a critical frontier of sustainability, but traditional institutions, practices, rules, and norms that could facilitate or hinder the transition are weak or non-existent, often shrouded in informality. *Dachas* in Eastern Europe are conservative institutions. However at the moment they are at the point of reinventing themselves and choosing development trajectories, as their original functions of providing economic and food security to urban communities are declining. Formerly auxiliary functions, such as recreation, DIY retreat or permanent residency are coming to the fore. Yet, as we demonstrated, they are often in conflict with persistent physical and institutional legacies (Spyra et al., 2020). Further we discuss governance barriers and solutions for sustainability transformation of *dachas* in a broader context of peri-urban transformation, and provide a comparative perspective across Eastern Europe.

##### 4.1. Neo-liberal restructuring

Neo-liberal restructuring is treading distinct pathways across the region. Ukraine, for instance, is applying a mostly “hands-off” approach regarding policy planning, building requirements, infrastructure

provision, protection of property rights, and taxation. The hands-off component potentially could open up avenues for innovations in environmental and social sustainability that do fit the prescribed “dacha standards”. National energy policies encouraging independent green energy solutions are, in principle, supportive of such developments. Yet, this analysis of *dachas* around Kharkiv did not provide convincing examples of such options put to a good cause. Instead, loopholes in the agency as well as poor monitoring are exploited to keep household costs low (e.g., through environmental pollution and overexploitation), or for corporate raiders to grab settlements and allotments in areas with high real estate value. Having renounced the special status of *dachas*, the Ukraine’s government lifted planning bans and limits. However, it also introduced standard property taxation regimes, significantly increasing dacha maintenance costs and triggering their mass abandonment, unless they could serve as main residences (e.g., in city outskirts). Decentralisation policies unfolding in Ukraine and the subsequent transfer of decision-making competencies from central to local governments creates more challenges for *dachas*. *Dachas* are not favoured by local constituencies, like elsewhere in Eastern Europe, and therefore local politicians removed any support to *dachas*, thus putting additional barriers to inclusion.

In Belarus, neo-liberal restructuring processes were significantly less pronounced. The overall effort of the State was towards preserving existing institutions, with only minor adjustments seeking to account for new socio-economic and technological realities. From this, it can be inferred that Belarus is missing a consistent vision of a *dacha*. This creates a fundamental miscommunication between the national socio-economic system that functions according to five-year plans and the state dominating and managing all the sectors. In this setup, *dacha* partnerships are still allowed their semi-anarchic governance modes; however, due to ICT developments, *dachas* are becoming increasingly transparent to State agencies. This invoked the regulatory requirements and duties which were ignored before for being too challenging to monitor and enforce. Many of them appeared to be conflicting with each other or with *dacha* configurations. This overall situation of regulatory and enforcement uncertainty represents an important barrier to experimentation and changing the direction of socio-technical regimes, because, the most common solution out of any uncertain situation is to maintain a status quo. As a result, many management arrangements leading to pollution or resource wasting are preserved (e.g., see Section 3.2 for examples from sanitation and water supply), while space for sustainable innovations is not created either. Importantly, the rigid frameworks also help to contain urban sprawl, thus containing land use change and associated impacts. At the same time, while *dacha* partnerships are largely isolated in their geographical locations and do not integrate with the surrounding communities, because of reasonable taxation policies, *dachas* are still affordable and very inclusive in itself.

In Russia, the neo-liberal restructuring dynamics were such that both the hands-off anarchy such as in Ukraine and the overregulation and conservation as in Belarus were largely avoided. *Dachniks* are offered several legal exit pathways, providing options for a relative status quo or converting *dacha* allotments to full-fledged housing units, as well as hybrid options. Meanwhile, the value of regulatory developments was compromised by major flaws in the operational floor (particularly where land cadastres are concerned), poor information and communication support, fluidity of regulatory requirements, as well as weak national governance framework. As of yet, the working of regulatory novelties still needs to be demonstrated. Moreover, in general, the actual choices *dachniks* have are still similar to those available in, say, Belarus, with the exception that there are no enforceable restrictions on planning within the *dacha* allotments of Russia. In principle, this removes, to some extent, barriers to experimentation and socio-technical innovation. However, unlike in Belarus, in most regions in Russia, specific environmental and natural resource issues related to *dachas*, such as waste management, sanitation, aquifer over-exploitation, propagation of invasive species, are not addressed. Additionally, unlike in

Ukraine, Russia does not encourage alternative energy generation. On the upside, while in Russia there are some promising discussions by political institutions, in Belarus and Ukraine, governance solutions for plausible futures of *dachas* are not even discussed. The process of modernisation of *dachas* is reasonably inclusive, i.e., any landowner is permitted to join, leave, and hold accountable the management of *dacha* partnerships, while the costs involved are low. On the downside, in many partnerships, membership fees are not affordable for low-income groups.

#### 4.2. Blurring of boundaries

Among the three countries, Ukraine is the fastest in blurring the lines between urban and rural. It does not enforce land use restrictions and barriers to converting *dachas* to regular settlements, and exercises land taxation at the same rate as with any other land users. Until wooden cottages with garden allotments is a familiar planning feature of a post-USSR city, *dachas* are relatively easy to integrate with the urban fabric once they are administratively recognised as so. *Dachas* outside formal city limits, however, represent more of a problem. For instance, being residential areas, they are not supported by the municipality and have to rely on traditional homemade solutions, which are often wasteful. This poses as major obstacles to change in direction and experimentation, and also greatly contributes to environmental footprint. Meanwhile, governance arrangements are often re-negotiated, sometimes involving informal arrangements such as “nepotism” or “corruption”. Therefore, such solutions may be inaccessible to lower income groups.

In Russia, *dachas* represent an important spatial resource for urban sprawl as well. Unless *dachas* are formally reorganised to rural municipalities, there will be additional pressure on the cities’ public infrastructure. Since no compensation schemes have been provided by the legislation and no personal income taxes are collected in local budgets (only corporate taxes paid by workplaces located in cities), administrative conflicts, departmental silos, and underfunded public services and underinvested local infrastructure are common (Shkaruba et al., 2017). Because relevant legislation is still being drafted, and is the competence of regional rather than federal authorities, there is space for re-negotiating governance arrangements. Although the process is underway for peri-urban zones *dachas* are not a part of the re-negotiation yet, at least in Pskov. This can be due to a larger promise of green- and some brownfields (including demolished *dacha* conglomerates) rather than *dachas* for new housing, as they appeal better to big developers due to scenic opportunities and potentially easier financing and administrative arrangements.

In Belarus, due to strict administrative barriers against changing a *dacha*’s function and status, merging of rural–urban boundaries is less common than elsewhere in Eastern Europe. Indeed, in the areas closest to the city outskirts, a growing number *dachniks* use *dachas* as their main residence. Yet, such *dachniks* are fewer in number because *dacha* estates are not maintained year-round, while any heating options are pricier for *dachniks* than for residents of recognised settlements.

#### 4.3. Changing socio-technical-ecological dynamics

The modernisation of *Dachas* is being delayed in all the three countries, perhaps more so in Belarus and less so in Ukraine. This results in socio-technical-ecological dynamics that are relicts of the past. As demonstrated in Sections 3.2 and 3.3, many behavioural patterns, technical solutions, and environmental impacts are associated with institutions and socio-economic drivers that have been discontinued and have lost any relevance by now. In terms of transformative innovations, this represents a major obstacle that can be, however, turned to an opportunity if managed in adaptive manner. For instance, should conservative land and household management, and agricultural approaches be regarded as roadblocks ahead of the promotion of energy

and resource-efficient solutions or permaculture? Or are they something to build on while promoting a circular economy at the household or settlement scales, or when further developing interest (albeit potential rather than demonstrable) in clean agricultural products?

Although the overall direction of socio-technical-ecological dynamics is similar across the region (e.g., shift from food production to recreation and dwelling), it has very different social and environmental implications (read Sections 3.2 and 3.3). Both over-regulation (as is in Belarus) and *laissez faire* (Ukraine) harm social and ecological sustainability, but any other model could be difficult to sell in either country because chosen pathways are intrinsic to the societies that nurtured them. In Russia, although the governance approach is not exactly balanced between the two extremes, due to its relatively flexible and comprehensive nature, *dachas* is given a chance to migrate from the context of a “legacy of the past” to an organic component of evolving suburban structures and dynamics. Indeed, Belarusian and Ukrainian *dachas* feature a lot of good practices and approaches, too, but most of them are not transferrable. For example, Ukrainian renewable energy policies do not comply with Russia’s, while implementation of Belarusian waste management approaches would require global changes of Russia’s and Ukraine’s governance frameworks.

Transition of *dacha* functions marks not only a shift in socio-economic contexts in Eastern Europe but also a major generational change, with a whole new structure of behavioural dynamics and consumption preferences emerging and replacing those from the Soviet era. Although reliant on some wasteful household practices, old *dachas* were rather simple in terms of the level of comfort, and hence required resources for maintenance. Higher level of comfort demanded by the new generation of *dachniks* as well as the overall transition of *dachas* from food production to recreation and residency (which imply more comfortable living) are important and emerging drivers of the qualitative and quantitative transformation of *dachas*’ energy and material consumption. On the one hand, the overall consumption should be increasing, but the other implications may include more energy efficient household infrastructure and appliances, and better sanitation. Decline in food production would mean lower consumption of fertilisers, agrochemicals, and water, especially in regions with water scarcity (Kharkiv, in this case). The exact implications still need to be analysed, and they might significantly vary across the region due to sharp income variability (hence access to technological options, significance of agriculture, etc.) even within the same country and peri-urban area.

In terms of steering transition towards more sustainable options, the logical way forward would be to make aware and motivate higher income groups to choose material and energy saving, enable lower income groups to access to such options, encourage food producing *dachniks* to consider organic agriculture and elements of circular economy, among others. Likewise, variability of socio-economic and political contexts found in the region suggests that no “one size fits all” governance approach can be recommended.

## 5. Conclusions

The modernisation of *dachas* has been difficult to explore in terms of environmental impact and sustainable transition. On the one hand, consumption of resources and pollutant emissions can be disproportionately high due to inefficiency of *dachas*. Existing governance mechanisms are creating new obstacles for sustainable transformation of *dachas*. Furthermore, new patterns of unsustainability are emerging or can be expected to emerge. On the other hand, sustainable behavioural patterns (existing ones as well as core beliefs that may, under

certain conditions, trigger new behavioural dynamics) have been recognised, with dropping interest in intensive agricultural production alongside new means and incentives for better sanitation representing an important upcoming sustainability driver. This trend provides the opportunity for innovation, advanced technologies, and building synergies across the natural, urban, and rural land use types.

In 1991, when the USSR collapsed and Belarus, Russia, and Ukraine regained their independence, *dachas* were almost the same in the three countries. Nowadays, *dachas* have changed quite a lot, and the differences in their sustainability status and options for modernisation can be significantly different due to the different strategies and neo-liberal restructuring chosen by the respective societies. As such, none of the pathways have emerged as better than the rest in terms of sustainability. It can be argued, for instance, that in Russia the current regulatory framework works better in terms of social cohesion. At the same time, in terms of environmental sustainability, Belarus scores higher due to stricter enforcement of environmental standards delivered by its overall robust national governance and relatively low corruption. In Ukraine, *dachas* have full *carte blanche* in regard to their format and function, which is seen as a good opportunity for transformative change. It also boasts of an advanced set of environmental policy instruments from its association with the European Union. However, all those opportunities can be challenging to harness due to severe enforcement and accountability issues (and even non-governance gaps).

Any solutions paving the way for transformative changes in the context of *dachas* would require proper information and knowledge systems with a smoother regulatory framework, and a purposeful restructuring of existing actor relationships. Experiences from a rapidly transforming peri-urban Asia (Marshall and Dolley, 2019) illustrate the importance of partnership building for such communities to overcome sustainability challenges. Power relations, local politics, and community leadership are important determinants of how particular development pathways of a *dacha* partnership are formed, evolved, and implemented. This suggests a direction for future research in which the social capital of *dachas* and power relations surrounding them must be further explored.

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## CRedit authorship contribution statement

**Anton Shkaruba:** Conceptualization, Formal analysis, Funding acquisition, Investigation, Methodology, Supervision, Writing - original draft, Writing - review & editing. **Hanna Skryhan:** Data curation, Formal analysis, Investigation, Project administration, Resources, Visualization, Writing - review & editing. **Olga Likhacheva:** Data curation, Formal analysis, Project administration, Resources, Validation, Writing - review & editing. **Viktar Kireyev:** Conceptualization, Formal analysis, Software, Visualization. **Attila Katona:** Methodology, Writing - original draft, Writing - review & editing. **Sergey Shyrokostup:** Data curation, Investigation. **Kalev Sepp:** Funding acquisition, Resources, Supervision, Writing - review & editing.

## Appendix A. List of interviewees

Interview ID	Stakeholder group	Organization	Interviewee description	Date	
1	Gardens cooperatives	"Buynicheskiy", 8.3 km from the Mahilioŭ city center	Chairman of garden cooperative, a master in the village school, male	August 22, 2018	
2			<i>Dachnik</i> , owner of land plot, worker, male	August 22, 2018	
3			"Dnepr-1", 13.7 km from the Mahilioŭ city center	<i>Dachnik</i> , owner of land plot, retiree, female	August 21, 2018
4			"Sputnik", 14.6 km from the Mahilioŭ city center	<i>Dachnik</i> , owner of land plot, worker, female	August 21, 2018
5				<i>Dachnik</i> , owner of land plot, worker, male	August 21, 2018
6			"Proektirovshchik", 15.3 km from the Mahilioŭ city center	<i>Dachnik</i> , owner of land plot, retiree, male	August 21, 2018
7				"Politekhnik-2", 19.3 km from the Mahilioŭ city center	<i>Dachnik</i> , owner of land plot, retiree, female
8			"Solnechnoe", 10.1 km from the Mahilioŭ city center	<i>Dachnik</i> , owner of land plot, worker, male	August 23, 2018
9				"Vysotskoe", 9.5 km from the Pskov city centre	<i>Dachnik</i> , owner of land plot, retiree, male
10			"Vesna", 11.6 km from the Pskov city centre	<i>Dachnik</i> , owner of land plot, worker, male	July 15, 2019
11				"Chernyakovitsy", 13.5 km from the Pskov city centre	<i>Dachnik</i> , owner of land plot, worker, female
12			"Promezhitsi", 7.0 km from the Pskov city centre	<i>Dachnik</i> , owner of land plot, retiree, female	April 10, 2019
13				"Velikoretskoe", 10.9 km from the Pskov city centre	<i>Dachniks</i> , owner of land plot, workers, male and female
14			"Statistik", 25 km from the Kharkiv city centre	<i>Dachnik</i> , owner of land plot, male	April 25, 2019
15	NGOs and public organisations	Pskov Regional Public Organization "Commission on garden cooperatives" Kharkiv Regional Union of Horticultural Partnerships	Chairman, chairman of a number of garden cooperatives, female	March 20, 2019	
16			Chairman, male	April 05, 2019	
17			Biloterkovsk city association of the gardener cooperatives	Deputy Chairman	April 11, 2019
18	Urban construction, planning and architectural companies	Mahilioŭ district inspectorate on natural resources and environment protection	Construction engineer and manager, retiree	August 5, 2019	
19			Head of district inspectorate	August 23, 2018	
20	District executive committee	Mahilioŭ district executive committee	Head of the economy department	August 22, 2018	
21			Vice-head of the land department	August 22, 2018	

## Appendix B

### Legislative regulation of 'dachas'

#### Regulations of the Soviet times

DCPCUSSR, 1933. Council of People's Commissars of the USSR. *Decree "On the deployment of individual working garden"*, approved on December 25, 1933. Code of Laws of the USSR, 1934, 1, 8. <http://istmat.info/node/42961>

DCMUSSR, 1949. Council of Ministers of the USSR. *Decree "On collective and individual gardening and horticulture of workers and employees"*, approved on February 24, 1949, № 807. [http://www.libussr.ru/doc\\_ussr/ussr\\_4736.htm](http://www.libussr.ru/doc_ussr/ussr_4736.htm)

DCMRSFSR, 1956. Council of Ministers of the Russian Soviet Federative Socialist Republic. *Decree "On the approval of a model charter of a gardening partnership of workers and employees"*, approved on October 15, 1956, № 678. [http://www.libussr.ru/doc\\_ussr/ussr\\_5140.htm](http://www.libussr.ru/doc_ussr/ussr_5140.htm)

DCMRSFSR, 1966. Council of Ministers of the Russian Soviet Federative Socialist Republic. *Decree "On collective gardening of workers and employees in the RSFSR"*, approved on March 18, 1966, № 261. Collection of decrees and orders of the government of the RSFSR (SP RSFSR), 1966, 8, 37.

OMHSURSFSR, 1966. Ministry of housing of the Russian Soviet Federative Socialist Republic. *Order "Model charter of gardening partnership of workers and employees"*, approved on May 18, 1966, 161/227.

DCMUSSR, 1977. Council of Ministers of the USSR. *Decree "On personal household plots of collective farmers, workers, employees and other citizens and collective gardening and horticulture"*, approved on September 14, 1977, № 843. Code of laws of the USSR, 1990, 7, 201.

DCMUSSR, 1984. Council of Ministers of the USSR. *Decree "On streamlining the organization of collective gardening and horticulture"*, approved on December 29, 1984, № 1286. Code of Laws of the USSR, 1990, 7, 214–1.

DCMRSFSR, 1985a. Council of Ministers of the Russian Soviet Federative Socialist Republic. *Decree "On streamlining the organization of collective gardening and horticulture"*, approved on January 29, 1985, № 40. Collection of decrees and orders of the government of the RSFSR (SP RSFSR), 1985, 7, 26.

DCMRSFSR, 1985b. Council of Ministers of the Russian Soviet Federative Socialist Republic. *Decree "On approval of the typical rules of gardening partnerships"*, approved on November 11, 1985, № 517. Collection of decrees and orders of the government of the RSFSR (SP RSFSR), 1986, 18, 132.

RCBSSR, 1986. Council of Ministers of the Belarussian Soviet Socialist Republic. *Resolution “Model charter of a gardening partnership”*, approved on December 31, 1986, 404

RMCUSSR, 1986. Council of Ministers of the Ukraine Soviet Socialist Republic. *Resolution “Model charter of a gardening partnership”*, approved on December 2, 1986, 416

DCMRFSR, 1988. Council of Ministers of the Russian Soviet Federative Socialist Republic. *Decree of the “On approval of the typical rules of gardening partnerships”*, approved on March 31, 1988, № 112. Collection of decrees and orders of the government of the RSFSR (SP RSFSR), 1988, 10, 45.

DCMUSSR, 1987. Council of Ministers of the USSR. Decree “On additional measures for the development of the personal household plots of citizens, collective gardening and horticulture”, approved on September 19, 1987, № 1079. Code of Laws of the USSR, 1990, 7, 214–8.

LCSCRSFSR, 1991. Supreme Council of the Russian Soviet Federative Socialist Republic. *Land code of the Russian Soviet Federative Socialist Republic*, approved on April 25, 1991, № 1103–1. Vedomosti of the Congress of People's Deputies and the Supreme Council of the RSFSR, May 30, 1991, 22, 768.

#### **Regulations of Belarus**

LCSCRB, 1990. Supreme Council of the Republic of Belarus. *Land Code of the Republic of Belarus*, approved on December 11, 1990, № 455-XII. <http://pravo.levonevsky.org/bazaby11/republic64/text195.htm> Law of the Republic of Belarus approved on 11.12.1990 № 455-3.

LCHRRB, 1999. House of Representatives. *Land code of the Republic of Belarus*, approved on January 04, 1999, 226-3 <http://pravo.newsby.org/belarus/kodeks/k027.htm>

LCHRRB, 2008. House of Representatives. *Land code of the Republic of Belarus*, approved on June 23, 2008, № 425-3. <http://kodeksy.by/kodeks-ozemle>

DPRB, 2008. President of the Republic of Belarus. *Decree “On measures to streamline the activities of gardening partnerships”*, approved on January 28, 2008, 50. National Register of Legal Acts of the Republic of Belarus, February 6, 2008, No. 29, 1/9400

RMCRB, 2008. Council of Ministers of the Republic of Belarus. *Resolution “On some issues of implementation of the Decree of the President of the Republic of Belarus from January 28, 2008 № 50”*, approved on July 21, 2008, 1048. National Register of Legal Acts of the Republic of Belarus, August 1, 2008, No. 183, 5/28041.

DPRB, 2014. President of the Republic of Belarus. Decree “On the implementation of additions and changes to the Decree of the President of the Republic of Belarus from December 27, 2007 № 667”, approved on August 4, 2014, 387. National Legal Internet Portal of the Republic of Belarus, August 6, 2014, 1/15214.

#### **Regulations of Russian Federation**

FLSDRF, 1998. State Duma of the Russian Federation. *Federal Law “On horticultural, vegetable garden and country non-profit associations of citizens”*, approved on April 15, 1998 66-FZ. Collection of Legislative Acts of the Russian Federation, April 20, 1998, 16, 1801. [http://www.consultant.ru/document/cons\\_doc\\_LAW\\_18461/](http://www.consultant.ru/document/cons_doc_LAW_18461/)

LCSDRF, 2001. State Duma of the Russian Federation. *Land Code of Russian Federation*, approved on October 25, 2001 № 136-FZ. Collection of Legislative Acts of the Russian Federation, October 29, 2001, 44, 4147. [http://www.consultant.ru/document/cons\\_doc\\_LAW\\_33773/](http://www.consultant.ru/document/cons_doc_LAW_33773/)

UPCSDRF, 2005. State Duma of the Russian Federation. *Urban Planning Code of the Russian Federation*, approved on December 29, 2004 № 190-FZ (as amended on August 13, 2019). Collection of Legislative Acts of the Russian Federation, January 03, 2005, 1(1), 16. [http://www.consultant.ru/document/cons\\_doc\\_LAW\\_51040/](http://www.consultant.ru/document/cons_doc_LAW_51040/)

FLSDRF, 2017. State Duma of the Russian Federation. Federal Law “On the of gardening and horticulture by citizens for their own needs and on introducing amendments to certain legislative acts of the Russian Federation”, approved on July 29, 2017 № 217-FZ (the latest edition of the law entered into force on January 1, 2019). Collection of Legislative Acts of the Russian Federation, July 31, 2017, 31(1), 4766. [http://www.consultant.ru/document/cons\\_doc\\_LAW\\_221173/](http://www.consultant.ru/document/cons_doc_LAW_221173/)

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SBN 360–92. State building norms of Ukraine. SBN 360–92 “Urban planning. Planning and development of urban and rural settlements”. Kiev, 2002. <http://proxima.com.ua/dbn/articles.php?clause=161>

LCVRU, 2001. Verkhovna Rada of Ukraine. *Land code of Ukraine*, approved on October 25, 2001 № 2768-III. <https://zakon.rada.gov.ua/laws/main/2768-14>

LVRU, 2004. Verkhovna Rada of Ukraine. *Law of Ukraine “On cooperation”*, approved on November 11, 2004 № 1087-IV. <https://zakon.rada.gov.ua/laws/show/1087-15>

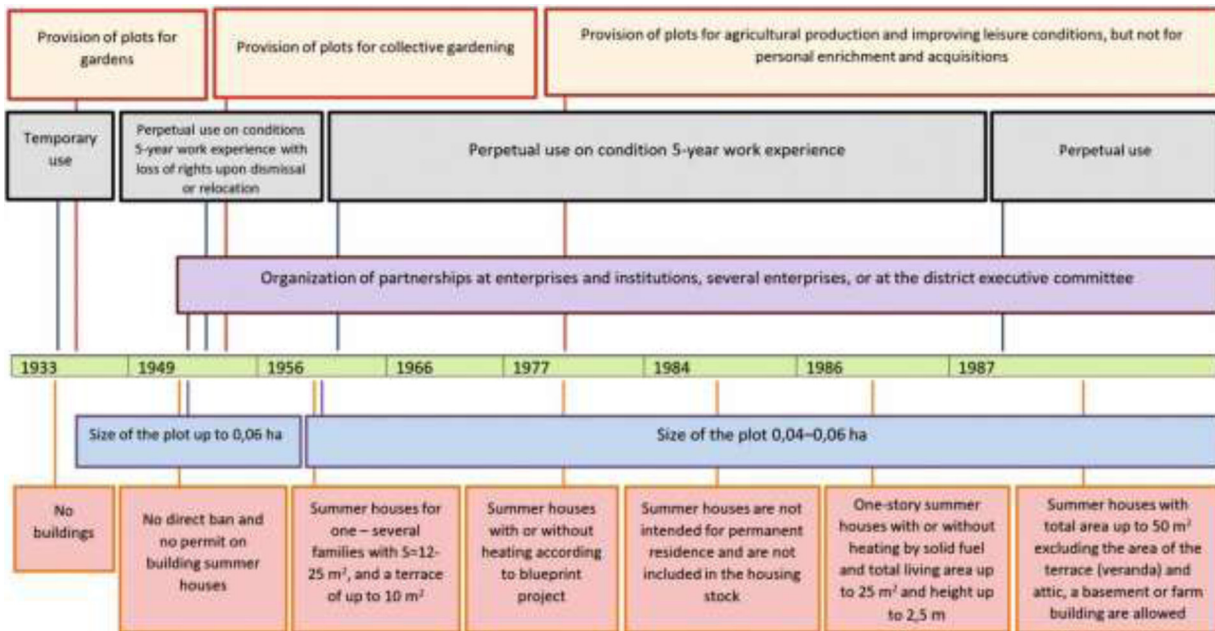
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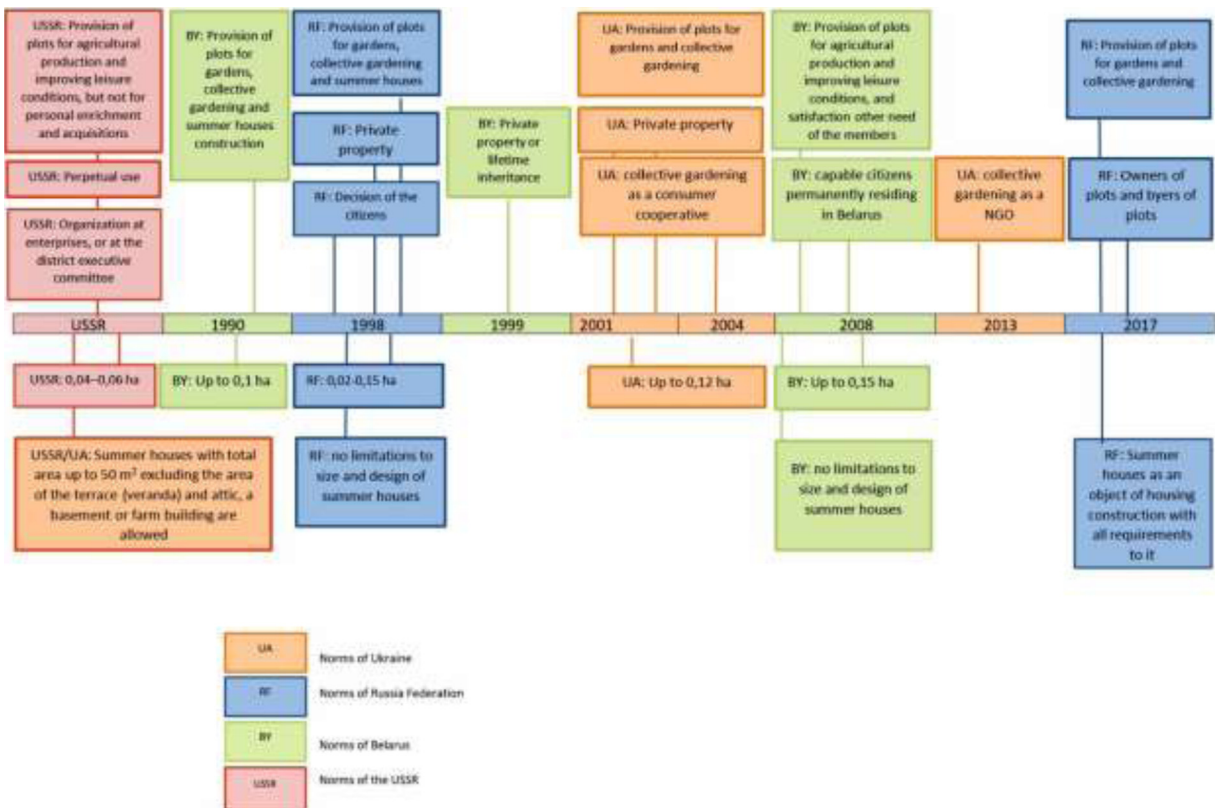
## **Appendix C**

Changes in legislation requirements regarding ‘*dacha*’ permitted land-use purpose, plot ownership status, legal status of ‘*dacha*’ partnerships, and restrictions for house construction:

1 In the USSR period



2 After the collapse of USSR



Appendix D. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.landusepol.2020.104887>.

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