Marginal Farmland in European Russia

Grigory Ioffe and Tatyana Nefedova[1]

Abstract: Two geographers specializing in Russian agriculture and rural development present an exploratory essay on the phenomenon of agricultural land abandonment in the countryside of European Russia. A particular focus is on investigating the relative importance of physical conditions (fertility) and proximity to regional population centers in explaining the prevalence of land abandonment. A map depicting the differences between actual and normative (natural/climatic) grain yields sets the stage for a comparison of the contributions of physical and locational factors to agricultural productivity and a critical assessment of the merits of "development in breadth" versus "development in depth." *Journal of Economic Literature*, Classification Numbers: O18, Q10, Q15. 1 figure, 7 tables, 30 references.

> I abandoned one-quarter of my arable land based on mathematic calculation, and he abandoned land out of inability to cope with it.
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> —Afanasii Fet (1863/2001, p. 163).

The Soviet period in Russian history was marked by sizable expansion of farmland. The area sown to crops in Russia grew from 52 million hectares in 1921 to 127 million hectares in 1978. In the 1970s, this growth came to a halt, and by the early 1980s, farmland and most of its components (first pastures and meadows and then arable land, including the area under crops) began to contract. According to Aleksey Gordeyev, Russia's current Minister of Agriculture, about 20 million hectares of arable land in Russia are abandoned (Sivkova, 2003). In the European Union, with its 380 million people, the total area of arable land is only about 75 million hectares.

The principal objective of this paper is to examine the general characteristics of land abandonment in Russia, thus setting the stage for more focused and penetrating analysis in the future. Reflecting the geographer's perspective, we scrutinize this issue from the vantage point of areal variations. Because a steadily productive farmland is hardly ever deserted,[2] it is the areal variation in agricultural productivity that we focus on, assuming that abandonment is preceded by persistently low yields. If this reasoning is basically correct, two aspects of

[1]Respectively, Professor of Geography, Radford University, Box 6938, Radford, VA 24142 [email: gioffe@radford.edu] and Institute of Geography, Russian Academy of Sciences, 29 Staromonetny per., 109017 Moscow, Russia. This paper is based on work supported by the National Science Foundation under Grant No. 0134109.

[2]However, this may be the case in areas contiguous with expanding urban boundaries. We have elaborated on this phenomenon in earlier publications (e.g., Ioffe and Nefedova, 1999). We address this issue briefly when citing the example of Moscow Oblast. For the most part, however, the transfer of agricultural land to residential or other urban uses lies beyond the scope of the present paper.

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differential productivity in agriculture should command our attention: the natural fertility of the soil, and location vis-à-vis major urban centers. We have discussed these aspects of differential rent elsewhere (Ioffe and Nefedova, 2002). Among other things, it was shown through calibration of a regression model that fertility and location relative to major cities are reliable predictors of the regional land tax, a measure of differential utility of land in Russia. But if this is the case, then the same logic should apply to the antithesis of utility: in the aftermath of persistently low yields, farmland of two types is likely to be deserted first: (1) that located in a harsh physical environment; and (2) that located in remote rural areas. The likelihood of land abandonment should be even higher if *both* factors of low productivity are in place. Our abundant field observations in the less fertile Nonchernozem Zone of European Russia support this argument. Here, centripetal gradients in agricultural output per unit of land were revealed (see especially Ioffe and Nefedova, 1997, Chapters 10–12; Ioffe and Nefedova, 2001a). In contrast, in European Russia's south, where natural fertility is higher, distance from a regional center is not a ubiquitous predictor of output per unit of land. In our previous research we paid significantly more attention to modern incarnations of location rent,[3] and so-called differential rent I (areal variations in output due to natural fertility) was not our primary subject.

Cognizant of this bias, we now focus on natural conditions of Russian agriculture first. Following the reference to the much-underrated research by Neal Field (1968), we present original calculations used to disaggregate Russian farmland into physiographically defined classes. On the basis of a well-known Russian methodology for assessing natural soil fertility, we then investigate whether agricultural output has been low only because of physical conditions. Because the likely answer to this question points to the no-less significant influence of rural depopulation, we turn to agricultural location relative to regional centers—that is, to a variable whose association with rural demographics has long been highlighted (see, for example, Igudina and Ioffe 1986). We also address the more and less reliable statistics that may enable one to monitor land abandonment. Finally, we attempt to place our results in the more general context of Russia's spatial development. Given the exploratory nature of the paper, no quantitative methods other than table enumeration are utilized. The focus is on European Russia, which contains 90 million of the Russian Federation's total of 119 million hectares of arable land.

PHYSICAL ENVIRONMENT

"Russian farmers have to contend with some of the worst climates faced by farmers anywhere" (Symons, 1990, p. 126). This especially pertains to winter temperatures, the length of the growing season, the depth of freezing, and the erratic patterns of cold blasts and thaws. Comparative analysis of the environmental conditions for agriculture that set Russia apart from much of Europe and North America used to be a popular topic of 19th-century Russian and European scholars (e.g., Klyuchevskiy, 1904; Hettner, 1905). Such comparisons are rare these days. To our knowledge, they have not been called upon over the last two decades by Western experts assessing the performance of Russian agriculture.

[3]Specifically, we focused on center-periphery gradients in gross agricultural output, the gradients to some extent attributable to rural population density (e.g., Ioffe and Nefedova, 1997, Chapters 5, 10, and 12 ; Ioffe and Nefedova 2001b), and on the persistence of a quasi–von Thunian economic landscape in Russia (Ioffe and Nefedova, 2001a).

This stands in peculiar contrast to the wealth of relevant environmental data available. In 1968, Field actually used some of these data in his superb but rarely cited comparison of the agricultural land bases of the USSR and North America. According to Field, "environmental quality must be weighed heavily in assessing the relative productivity of the agricultural land resources of the Soviet Union and North America" (Field, 1968, p. 11). He continued, "One must be . . . cautious in attributing largely to the human factors differences in the per acre returns" (ibid.). Field demonstrated that in the USSR four-fifths of the cropland fell within the least productive thermal zone, that with less than 200 degree-months (ibid., p. 9). He also showed that in the USSR the best conditions were in the West (West Ukraine being the very best) and the worst in parts of Russia. According to Field's thermal (degree-months) and moisture (percentage of potential evapotranspiration) ratings, Moscow is equivalent to Sault Ste. Marie, Michigan, and Rostov-Don, in the premier agricultural region of Russia, to Pierre, South Dakota (ibid., p. 8). Both U.S. locations are relatively marginal in the American agrarian realm.

Why wasn't Field's well-documented analysis consulted more extensively by Sovietologists? For those who, like these authors, did not live in the West at the time, it is difficult to second-guess. But a not-so-tacit agreement seem to have dominated the agrarian subfield of Sovietology, whereby references to nature were considered mere excuses. Interestingly, the same perspective dominated among the analysts and liberal reformers in the USSR itself.

After the collapse of communism, the environmental constraints of Russian farming and other activities again became a topic popular with Russian writers who began to revisit the 19th century classics. The most discernible of today's voices is that of Leonid Milov, who emphasized the fact that in Europe, with the exception of its extreme north, winter isotherms trend north-south (Milov 1998, p. 8). So, for example, Kursk (52° N. Lat.), located in the middle of Russia's Chernozem belt, has colder winters than Helsinki, Finland (61° N. Lat.). Milov devoted special attention to the annual period in which cattle must be kept stalled (seven months) as undermining the productivity of animal husbandry, and argued that Russia's historical penchant for subjecting an over-abundant land base to cultivation is in fact a response to the inadequate quality of land in Russia's heartland (ibid., p. 22). According to Milov, Russia is the archetypal society with environmentally conditioned minimum surplus value per unit of land, which historically has resulted in specific forms of socio-political organization (e.g., the *mir*, or rural commune) and governance (despotism).

Milov's reasoning, which establishes a causal link between despotism and the harsh natural environment, may justifiably place him in a cohort with the most unabashed environmental determinists of the past. One reason why a paradigm "largely ridiculed out of mainstream [American] geography by the 1920s" (Beck, 1985, p. 1) is held in high regard in today's Russia is that removing old taboos is often considered a virtue in and of itself. Under the Soviets, a deterministic paradigm was neither defeated in substantive debates nor even sidelined in the name of political correctness. Rather, the excoriation of determinism "became officially canonized as part of Stalinist dogma" (Bassin, 1992, p. 4). So today, according to the principle of reactive perception, it is regarded by some as a new and fashionable orthodoxy, with all the pretensions of a normative theory. Popularizing this orthodoxy, a book by Andrey Parshev cites Milov as the only source of information about Russia's inferior physical environment. Titled "Why Russia is Not America" (Parshev 2000), the book explains that Russia's involvement in free trade is self-defeating in view of inherent environmental disadvantages bound to make Russian goods costly. The book was on the Russian bestseller list for 52 straight weeks.

Despite the overtly ideological biases of Milov's approach, we think that its premises cannot be discarded out of hand. We share Bassin's view, according to which "environmentalism per se [does] not possess an inherent ideological bias" (Bassin, 1992, p. 5) that leads in a preconceived direction, whether it is the enslavement of non-Western civilizations or the justification of Russia's economic self-isolation from the rest of the world (as per Parshev 2000) or, for that matter, Russia's long affair with despotism. What is more, the opposite approach—that is, a tacit denial of the environment's essential role in agriculture and socio-economic development in general—would be a mistake of similar, if not greater, proportion. Recent research by Allen Lynch (Lynch, 2002) reinforces this idea.

The present study seeks to present a distribution of European Russia's agricultural land according to thermal and moisture zone categories, a distribution somewhat more detailed than that compiled by Field, but following the general logic of his analysis. Field's information base on temperature and moisture distribution in the USSR was fairly limited and generalized. Much more detailed classifications of the Soviet agricultural land resource became available in the 1970s and 1980s (*Prirodno-*, 1975, 1983). These classifications involved many more indicators than Field's analysis (e.g., temperature extremes, the degree of continentality, snow cover, soil type, net primary productivity, etc.), which are more spatially detailed and involve a taxonomy of biomes and their component ecosystems. Among other things, the authors of these classifications—for the most part, physical geographers by training—substantiated numerical thresholds of natural characteristics outside of which certain swaths of agricultural land (cropland in particular) could be regarded as marginal. For example, zones with less than 1600 degree-days above 10° Celsius (mean daily temperature) and zones with a ratio of precipitation (P) to evaporation (E) below 0.55 are considered marginal. Correspondingly, zones with 1600–2200 degree days may be labeled submarginal, as are semi-arid ($0.55 < P/E < 0.77$) and overly humid ($P/E > 1.33$ on gley soils) zones. In the latter case (parts of Vologda and Kostroma oblasts as well as the Republic of Karelia), relatively small pockets of arable land are usually interspersed within large and often expanding tracts of forest. Any interruption in agricultural activity poses the risk that these pockets will be reclaimed by the surrounding forests.

Tables 1–3 present the distributions of European Russia's farmland compiled by the authors from maps contained in *Prirodno-* (1983), the network of the 1,483 current (2000) rayons (minor civil divisions) of European Russia, and current (2001) records of rural population and arable land procured from regional statistical data books. These tables indicate that 38 percent of European Russia is marginally cold, and 27 percent is submarginally cold; 11 percent of European Russia is marginally arid, 25 percent is submarginally arid, and 25 percent is marginally wet. These distributions apply to European Russia's total land area. The same tables, however, suggest that only 2–3 percent of *arable* land is marginally and 24 percent is submarginally cold; about 16 percent of arable land falls in the area with 70–90 percent probability of drought, and about one-third of arable land is in the semi-arid area where every third year is fraught with drought.

Successful farming requires a certain *combination* of heat and moisture. Following Field's example, we compiled Table 4 with a bimodal distribution of European Russia's total land between supply classes of heat *and* moisture. A small dark rectangle within this table fits the area that is favorable for agriculture. It accounts for 10 percent of European Russia's total rural land area. The outer portion of a larger rectangule (defined by double lines) in the same table includes submarginal areas, which account for an additional 40 percent. This means that half of European Russia is ill suited for agriculture. According to Table 5, however, marginal lands contribute 15 percent of the gross agricultural output, with 9 percent of

Table 1. Thermal Zones of European Russia Defined on the Basis of Sums of Daily Mean Temperatures Exceeding 10°C by Rural Rayon

Degree-days	Description	Zones' percentage shares in:			Rural population density, people per km²
		Total land area	Arable land	Rural population	
<1200	Grossly inadequate supply of heat possibly suitable only for vegetables with a short growing season	22	1	1	1
1200–1600	Inadequate supply of heat, suitable only for early-ripening crops	16	1	5	3
1600–2200	Below average supply of heat, suitable for mid-season maturing crops: cereals, potatoes, flax, and sugar beet used for animal feed	27	24	31	10
2200–2800	Average supply of heat for mid-season maturing crops, including corn, sunflower, and sugar beets	19	44	32	14
2800–3400	Above-average supply of heat suitable for late ripening crops, including corn, rice, and soybeans	14	30	25	22
Mountainous districts	Crop farming is limited	3	0	5	29

Source: Calculated by the authors on the basis of *Prirodno-*, 1983 and data on rural population and arable land in regional statistical data books.

Table 2. Moisture Zones of European Russia Defined on the Basis of Annual Precipitation and Evaporation by Rural Rayon

Ratio of precipitation to evaporation	Moisture zones	Likelihood in pct. of years with variable moisture supply			
		Arid	Semiarid	Humid	Excessively humid
<0.33	Excessively arid	99–100	1	0	0
0.33–0.55	Arid	68–88	12–31	0–1	0
0.55–0.77	Semi-arid	33	59	7	1
0.77– 1	Semi-humid	13	55	24	8
1–1.33	Humid	5	33	32	30
1–1.33 on gley soils	Excessively humid	1	15	20	64

Source: Calculated by the authors on the basis of *Prirodno-*, 1983.

it contributed by excessively arid and 6 percent by excessively cold areas. Submarginal areas account for the largest share of output: 59 percent, including 38 percent produced in cold areas. Areas with an optimal supply of heat and moisture account for only 29 percent of the total output.

Table 3. European Russia's Rural Population and Land Area Distribution among Moisture Zones

Ratio of precipitation to evaporation	Moisture zones	Percentage share of moisture zone in: Total land area	Arable land	Rural population	Rural population density, people per km²
<0.33	Excessively arid	4	2	2	8
0.33–0.55	Arid	7	14	9	11
0.55–0.77	Semi-arid	25	30	25	15
0.77–1.00	Semi-humid	16	29	30	18
1.00–1.33	Humid	21	12	24	11
1.00–1.33 on gley soils	Excessively humid	25	10	6	3
	Mountainous districts	3	3	5	29

Source: Calculated by the authors on the basis of *Prirodno-*, 1983 and data on rural population and arable land in regional statistical data books.

Table 4. European Russia's Rural Land Distribution between Thermal and Moisture Zones

Degree-days	Ratio of precipitation to evaporation: < 0.33	0.33-0.55	0.55-0.77	0.77-1.0	1.0-1.33	1.0-1,33[a]	Total
<1200	—	—	—	—	—	22	22
1200-1600	—	—	—	2	2	13	17
1600-2200	—	—	2	6	17	3	28
2200-2800	—	2	9	5	3	—	19
2800-3400	4	5	3	2	—	—	14
Total	4	7	14	15	22	38	100

[a]On gley soils.
Source: Author calculations.

These results may suggest that the consistently poor performance of Russian farming can be explained by unwarranted agricultural expansion into areas that are poorly suited for agriculture. Although this may indeed be the case, the natural environment alone can hardly provide a complete explanation for poor yields. This becomes clear when one compares actual and normative grain yields. In Russia, the latter are based on long-term records of yields on specially designated, regionally representative parcels of land that do not use irrigation, fertilizers, or herbicides—that is, they reflect natural conditions of soil type, heat, and moisture. A map of normative grain yield, dubbed "bioclimatic potential of the area," was published in an earlier work by the authors (Ioffe and Nefedova, 2000, p. 296). Figure 1 compares that map with actual grain yields in the late 1980s (that is, when they were at their highest throughout the entire Soviet and post-Soviet periods). It is clear that in most regions of Russia, actual grain yields were short of normative even during the best of times. Apparently, then, adverse physical environment is not the only factor that matters.

Table 5. 1996–2000 Distribution of Gross Agricultural Output between Thermal and Moisture Zones of European Russia

Degree-days	Ratio of precipitation to evaporation						Total
	< 0.33	0.33-0.55	0.55-0.77	0.77-1.0	1.0-1.33	1.0 –1.33[a]	
<1200	—	—	—	—	—	1	1
1200-1600	—	—	—	—	2	3	5
1600-2200	—	—	3	12	21	2	38
2200-2800	—	2	14	12	8	—	36
2800-3400	1	6	7	6	0	—	20
Total	1	8	24	30	31	6	100

[a]On gley soils.
Source: Author calculations.

LOCATION

That Russia is a spacious country with inferior roads is abundantly clear. Yet the economic effects of remoteness are recognized for the most part in dicussions of Siberia and the Far East, not to the inner periphery found in every region of European Russia. We have discussed at length the effects of accessibility to Russia's regional centers on agricultural productivity. Empirical observations are summarized in Ioffe and Nefedova (1997, Chapters 8–12), while the most consistent explanation of centripetal gradients in output per unit of land is presented elsewhere (Ioffe and Nefedova, 2001b). The explanation boils down to rural depopulation, which is especially acute in the outlying districts of the Nonchernozem Zone, and to the central planning strategies of the 1960s, 1970s, and 1980s that deprived those districts of investment due to expectations of low returns. Indeed, a disproportionate share of rural investment under the 1974 program designed bolster agriculture in the Nonchernozem Zone was implemented in the areas adjacent to regional capitals.

Spatially, rural depopulation has been exceedingly uneven. In the 1970s and 1980's—when births still outnumbered deaths in the countryside, but the rural exodus was already under way and rural population numbers declined in every oblast—many peri-urban/exurban areas (but rural in status) recorded population growth. Contrary to what might have expected, the agricultural contingent of the peri-urban population was growing (Ioffe, 1990, p. 90-91). Peri-urban areas also enjoyed a higher quality of agricultural labor. The disruptive influence of urbanization on agriculture as described by Western authors (e.g., Bryant and Johnson, 1992, pp. 25-26) hardly fits the Russian context. Agriculture has in fact benefited from urbanization in most, if not all, Russian regions.

In contrast, sweeping depopulation has affected the outlying segments of the countryside, located beyond a two-hour isochrone from the regional capitals, especially in the Nonchernozem Zone. For example, in the province of Novgorod (55,300 km^2) in Northwest Russia, the 1998 rural population was only one-half that of 1959, but in areas outside the two-hour isochrone the population was but one-sixth the 1959 level. Such remote districts account for about 40 percent of the oblast's total land area. This sharp polarization imposes a powerful demographic constraint on agricultural development. Two major variables inform this constraint: the percentage of retirees and the amount of agricultural land per available worker. One should understand that this constraint is not universal but applies under the

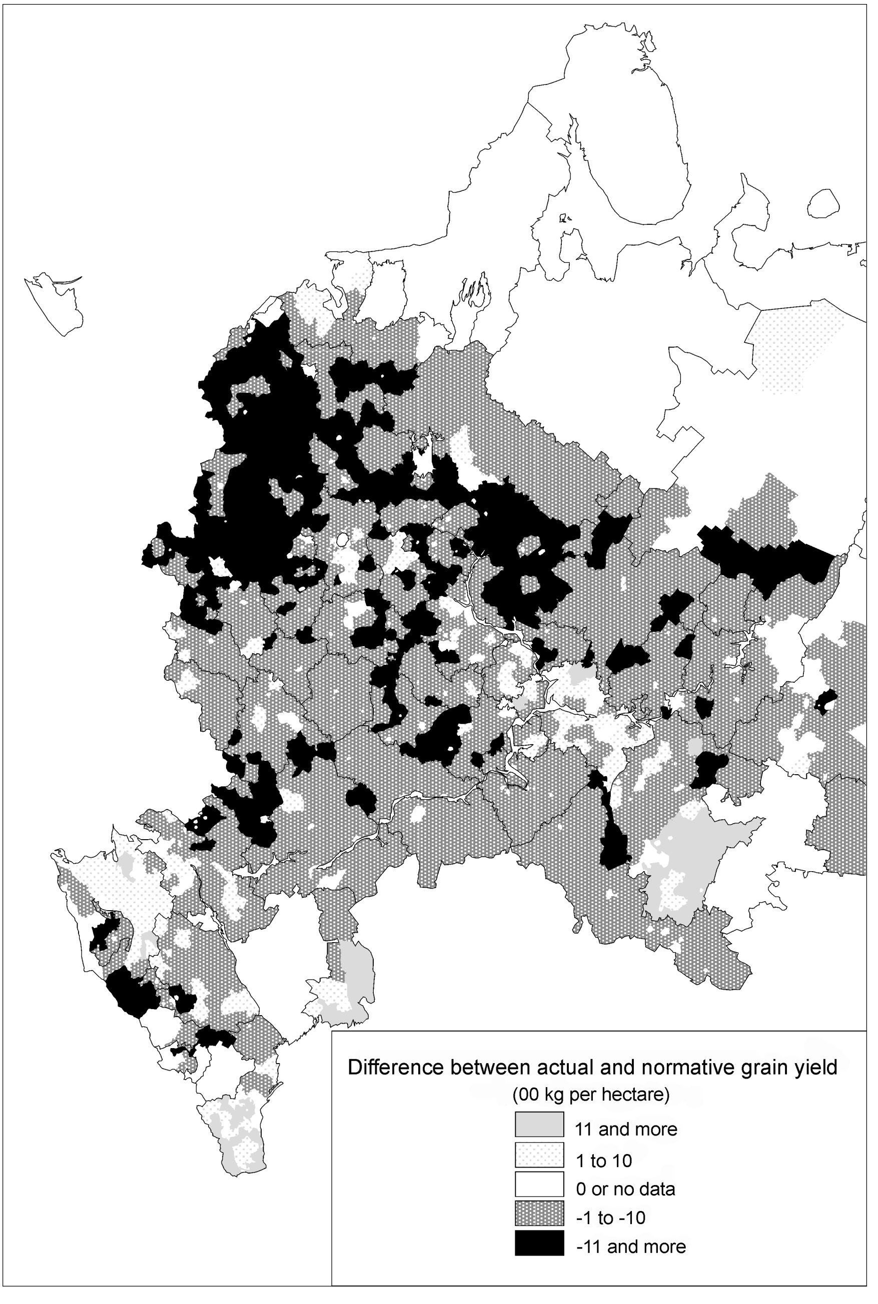

Fig. 1. Difference between actual and normative grain yields, European Russia, in tens of kg of grain per hectare.

current form of land tenure and, even more importantly, to the current quality of human capital in the Russian countryside. Under these conditions, collective farms, which continue to be the major landholders, effectively stop being production units when the rural population density falls below 10 people per km^2 and the share of retirees reaches 40 percent.

Although we provided information on productivity gradients in our previous publications, we stopped short of monitoring the dynamics of land in agricultural use. We will now attempt to address this shortcoming, first focusing on changes in seven rural rayons that are deemed representative for at least six typical locational niches within European Russia, and then furnish more generalized information as to the extent and regularities of land retention/abandonment. Attention to changes in land use intensity at the rayon level is important because at the more common scale of analysis (that of Russian oblasts, or "regions") land use intensity contrasts within units often exceed those between them.

The following rayons were selected. Ramenskoye Rayon is one of the leaders in terms of agricultural output per unit of farmland in Moscow Oblast, Russia's top-ranking region in terms of this criterion. Kasimov Rayon of Ryazan' Oblast is also located in Russia's heartland, but it is an outlying Nonhernozem district lacking any environmentally marginal land. Kosa Rayon of the Komi-Permyak Okrug (Perm' Oblast) is also an outlying district, but with a submarginally cold environment.[4] L'gov Rayon of Kursk Oblast is located in an outlying district in one of the agriculturally best-endowed Russian regions. Novouzensk Rayon of Saratov Oblast is environmentally submarginal on account of excessive aridity. Krasnyye Chetai and Komsomol'skoye rayons in the Chuvash Republic are outlying districts, but their region has been much less affected by depopulation than most ethnically Russian regions of the Nonchernozem Zone.

Table 6 shows that the relative magnitude of farmland contraction (both for total farmland and for cropland) was at its highest in Kosa Rayon, where both aspects of agricultural land (environment and location vis-à-vis major urban centers) are at their worst. The second-greatest contraction was sustained by cropland in Kasimov, which is most vulnerable because of its remote location. A similar scale of cropland contraction was evident in Novouzensk, where farming is restricted mostly by aridity. In contrast to these rayons, those near Moscow (major location advantage), in Kursk Oblast (major fertility advantage), and in ethnically non-Russian areas of the Chuvash Republic reported no significant decline in farmland or area under crops.

Analysis of our data set of 1,483 rural rayons of European Russia[5] has confirmed that overall, distance from the regional capital (oblast center) affects land abandonment in nearly the same way that it affects productivity. In the most fertile regions (the Central Chernozem and North Caucasus macroeconomic regions), this influence is negligible. It is noticeable, however, in the southern Volga region, where those rayons most remote from the oblast center have sustained a 39–45 percent decline in cropland since 1990. The steepest gradients are in the Nonchernozem Zone. Here, rayons abutting or surrounding the regional capital have sustained a 15–20 percent reduction of cropland; in the second-order neighbors of the regional capital, the decrease of cropland has been up to 40 percent of the 1990 area in oblasts north of Moscow, and up to 30 percent in oblasts to the south. More remote rayons sustained even greater losses, but the increment in cropland decline with the rise in the district's order of neighborhood[6] is gentle. Only in the coldest parts of the Volga-Vyatka and

[4]For a closer examination of difficult rural living conditions in Kosa and other predominantly rural rayons in northern Perm' Oblast, see Pallot and Moran (2000)—*Ed.*, *EGE.*

[5]This analysis and a full description of a database can be found in Ioffe and Nefedova (2004).

Table 6. Characteristics of Land Use in Selective Rural Districts of European Russia

Oblast:	Moscow	Ryazan’	Komi-Permiak Okrug	Kursk	Saratov	Chuvash Republic	
Rayon:	Ramenskoye	Kasimov	Kosa	L’gov	Novo-uzensk	Komso-mol’skoye	Krasnyye Chertai
Farmland, thous. hectares	75	113	16	66	388	41	35
Farmland per resident, hectares	0.8	4.5	1.7	3.3	21.5	1.5	1.5
Cropland per agricultural worker, hectares	7.1	14.3	3.5	14.5	38.0	6.8	6.1
2000 agricultural land, 1990 = 100	103	99	50	91	100	95	98
2000 cropland, 1990 = 100	89	60	34	90	63	83	79
2000 number of cattle, 1990 = 100	55	40	14	55	41	52	60
2000 number of cattle per 100 hectares of farmland	49	22	35	37	5	40	36

Source: Compiled by authors from data received in rayon farm administrations.

Urals regions were losses of farmland in outlying districts very steep compared to more proximal rayons.[7] The situation is entirely atypical in the environs of Moscow. Here, the reduction of farmland has been particularly significant (up to 44 percent of the 1990 level) in the districts abutting the Moscow city line, due to the transfer of land to dachas (second homes) of Muscovites and for the construction of the *kottedzhi* (detached, large, single family homes for the wealthy).[8]

LAND ABANDONMENT

Table 6 contains two estimates of land contraction, one of which applies to farmland total and another to a component of it, the area under crops. Note that the reported relative contraction of the latter invariably exceeds that of the former. To some extent, this reflects the specifics of the time span (1990– 2000), which is much shorter than the actual duration of land abandonment in Russia. Over a longer period, pastures and meadows tend to be abandoned first and arable land last, so the above relationship might be reversed if a longer time frame were employed. However, the aforementioned estimates also reflect the quality and periodicity of records. It may take 10 years or more until records of land use begin to reflect

[6]Order of neighborhood with the regional capital proved to be a better proxy of relative location than physical distance.

[7]Kosa Rayon is a case in point.

[8]On the latter phenomenon, see Bater (1994, pp. 318-324)—*Ed.*, *EGE.*

the actual transfers. In contrast, the area that actually has been sown is reported annually by collective farms up the ranks of agricultural administration. All too often, the abandoned or soon-to-be abandoned arable land is listed as fallowed—that is, set aside temporarily.[9]

According to our calculations, regional differentials between arable land and cropland (sown area) were minuscule as recently as 1980, and in some regions nonexistent. However, by 1990 the average regional differential had risen to 11 percent of arable land. Practicing agronomists in various regions of Russia believe that modern practices allow fallowing of up to 12 percent of arable land. Any area of land exceeding this threshold is most likely abandoned land. Based on this assumption, we concluded that the overall area of abandoned arable land in Russia is about 20 million hectares, which matches the estimate by Minister of Agriculture Gordeyev. If our calculations are correct, in the Central and Volga-Vyatka regions, arable land that is abandoned but still recorded as active accounts for 10 percent of the total land area, whereas in the Volga macroregion, more than 15 percent of arable land is abandoned. Most probably, these are understatements; in many Nonchernozem regions, much of the arable land recorded as sown in perennial grass is actually abandoned. Having compared the above statistics with our selective field observations, we concluded that focusing on records of cropland alone permits a more accurate assessment of actual land use change.

PHYSICAL ENVIRONMENT VERSUS ACCESSIBILITY TO MAJOR CITIES

Table 7 allows a rough comparative assessment of environment versus accessibility as they impact cropland contraction. The table features two oblasts, Pskov and Perm', both meridionally aligned with their north-south axes noticeably longer than east-west. Rural rayons of each oblast are grouped in two ways—a "north-middle-south" continuum that may be conceived as reflecting a variable natural environment, and a "suburb-semiperiphery-periphery" continuum that reflects location relative to the oblast center. In this case, suburbs include one rayon per oblast,[10] the semiperiphery includes second- and third-order neighbors, and the periphery encompasses the remaining rayons. The resulting comparison is indeed rough: although the southern rayons of both oblasts lie at about the same latitude (57° N), the northern districts of Perm' Oblast extend farther north. Also, similar latitudes are more continental in Perm' (with somewhat longer and harsher winters) than in Pskov. Overall, the Pskov region does not contain environmentally marginal land at all, whereas Perm' does; the northernmost districts of Pskov are approximately as warm as the districts lying south of the city of Perm.'

As everywhere in the Nonchernozem Zone of Russia, the center-periphery gradients are particularly noticeable in rural population density. The intra-oblast pattern of population density reflects not only a regular exponential decline outward from the major city but also the rural depopulation of the last decades, which has affected the periphery the most. Thus, in the central rayon (Perm Rayon) of Perm' Oblast, there are 19 people per km^2; in the semiperiphery, the density declines to just 6; and in the periphery, population density averages 3 people

[9]Traditionally, the area of arable land was a determinant of the relative importance of a collective farm, and supplies of agricultural machinery were tied to it. Although the practice of centralized supply has been discontinued, many expect its return at some point.

[10]This "suburban" or central rayon is the one in which the oblast center is located (i.e., Perm' Rayon in Perm' Oblast and Pskov Rayon in Pskov Oblast).

Table 7. Cropland (sown area) in 2000 as a Percentage of 1990 in Perm' and Pskov Oblasts

Area	Perm' Oblast				Pskov Oblast			
	Suburb	Semi-periphery	Periphery	Total	Suburb	Semi-periphery	Periphery	Total
South		79	70	76		81	69	73
Middle	84	68	55	67	92	68	73	71
North		58	43	45		58	—	58
Total	84	74	61	70	92	69	70	71

Source: Compiled by authors from data received in rayon farm administrations.

per km^2. The corresponding gradient in the Pskov region is more gentle: from 9.5 (central) to 5 (semiperiphery) to 4 people (periphery) per km^2.

As Table 7 shows, in Perm' the relative impact of the environment appears to be stronger than that of the center-periphery gradient: the north-south ratio of cropland retention is 45:76, whereas the center-periphery ratio is 84:61 percent. Indeed, in Perm's northern periphery, cropland declined by more than half, whereas in the southern periphery, the decline is less significant. In contrast, in Pskov Oblast the regional capital matters more than the physical environment, even though there is no northern periphery in that region because the city of Pskov is located in the northern part. However, the southern periphery of Pskov Oblast, as well as the adjacent rayons of Novgorod Oblast, sustained the largest losses of farmland. These areas fall in a peculiar demographic trough located between Moscow and Saint Petersburg. The junction of Pskov, Novgorod, and Tver' oblasts is the area of the most drastic rural depopulation in European Russia. Currently the area is experiencing secondary, this time recreational, "colonization" by dachniks from both Russian capitals.

CONCLUSION

By and large, the impacts of physical environment and accessibility to major urban centers on farmland contraction seem to be comparable. Under current conditions, each of these facets of differential rent has the capability of "marginalizing" land to the point of its abandonment by agricultural users. These current conditions include a negative demographic situation (aging and depopulation of the countryside) as well as an atmosphere of agrarian reform, which has loosened centralized control over production and land use. Land abandonment has become a scourge in the Nonchernozem Zone, because it is here that the poor accessibility of many rural districts often coincides with low natural fertility of the soil, so both factors conducive to persistently low productivity are in place.

In this regard, two lines of investigation deserve further attention: broadening and deepening of research into agricultural land abandonment, and considering its consequences for Russia. In our opinion, research tasks should include a comparative perspective that would draw from similar phenomena in North America and Europe. Also, a larger-scale analysis is needed to focus on the sequence of events preceding land abandonment. Some threshold values specific for each mode of farming (e.g., collective vs. private family farming) ought to be revealed. For example, we have noticed that in Russia collective farming is no longer profitable when rural population density falls below 10 people per km^2, with the possible exception of cattle fattening operations. This is certainly not a universal threshold, and should private farmers with more entrepreneurial spirit and without a habit of heavy drinking take over, profitable commercial farming possibly could be sustained under even lower population densities. Unfortunately, for many rural rayons in Russia this may be wishful thinking; due to various obstacles whose analysis lies beyond the scope of this paper, those with an entrepreneurial bent tend to steer clear of the agricultural sector. Consequently, the demographic renewal of a productive labor force is likely to be spatially selective, and more land is destined for abandonment.

Russia's 206 million hectares of farmland is simultaneously both a great asset and a heavy burden. That burden has become increasingly heavy as a result of rural depopulation. No more than 20 percent of Russia's 27,000 collective farms and their reorganized forms (joint stock companies) are steadily profitable. Perhaps another 30–40 percent could be rescued to achieve profitability under certain conditions. The remaining farms are for the most part irremediable. Writing off their debts may make sense only to aid them in their capacity as communities for collective survival, not as commercial enterprises. However, social supports ought to be recognized as such, so no illusions of economic recovery are entertained.

For a long time, the essence of economic strategies employed in the Russian countryside has been to level the playing field. Since the "New Economic Policy" of 1921–1927 was abandoned, the main principle of government control over agriculture has been to keep unprofitable farms afloat and to hold back progressive establishments. Although this strategy never achieved its ultimate leveling goals, it was promoted by dedicated ideologues. Perhaps the most outspoken and candid reasoning in support of keeping weak farms afloat can be found in publications by Anatoliy Salutskiy (1988, 1990). The entire "national-patriotic" flank of the Russian political scene views these farms as sacred cows and land abandonment as an indisputable evil.

However, nothing seems capable of forestalling the collapse of many weak farms in the foreseeable future. Zemfira Kalugina, who studied adjustment strategies of collective farms in Novosibirsk Oblast, one of the agricultural strongholds of Russia, concluded that about 70 percent of the farms employ what she termed "survival" and "destructive adaptation" strategies, whereas only 5–7 percent are adjusting to market conditions, effectively finding new buyers, changing specialization to match demand, and cooperating with food processors (Kalugina, 2002). These percentages accord with our observations in the regions of European Russia.

However, the impending overall contraction of Russia's agricultural space may be a blessing in disguise. It is not unlike pruning trees by cutting off dead and rotten branches. It is highly likely that programs of agricultural aid will yield positive results if confined to a smaller number of farms on a smaller area of farmland. The northern half of European Russia is reemerging as an archipelago of quasi–von Thunian isolated states, with fast expanding forest tracts in the outer part of every region. This emerging spatial morphology is ecologically attractive, as evidenced by Boris Rodoman, the author of the "polarized biosphere" model (Rodoman, 1999), and economically it is much less wasteful than the traditional Russian paradigm of development in breadth. Vladimir I. Lenin, who criticized this paradigm in 1899, wrote that it ensures the simultaneous existence of "the most advanced forms of industry and semi-medieval forms of agriculture" (Lenin, 1956, p. 653). He made no secret of his preference for development in depth, European style.[11] If anything, it may be that Russia's coveted "coming to Europe" lies, among other things, in rendering its spatial pattern more

[11]In his writings prior to the Bolshevik Revolution, Lenin's tone is much more that of a Westernizer than a practicing revolutionary.

European—that is, more compact. And this will only be possible if much of Russia's "inner periphery" reverts to a more natural state, functioning as havens for ecological tourism and the like. The idea of reclaiming this periphery as a breadbasket ought to be abandoned once and for all.

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