



## Conversations

# Breaking Bread: weaponised landscapes in Ukraine

Lina Bondarenko, Nina Dyrenko and Iryna Zamuruieva discuss the weaponisation of nature and the cultivated landscape itself in Ukraine, from bread basket to fuel tank.

Interviewee [Lina Bondarenko](#), [Nina Dyrenko](#), [Iryna Zamuruieva](#)

Interviewer [Federica Zambeletti x KoozArch](#)

Published 20 Dec 2024

Reading time 20 minutes

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The restless interrogations of spatial practitioners and researchers at the [Tbilisi Architecture Biennial](#) was not muted or censored by political situation. Bearing this out in conversation, Lina Bondarenko, Nina Dyrenko and Iryna Zamuruieva discuss the weaponisation of nature and the cultivated landscape itself in Ukraine, from bread basket to fuel tank.

**FEDERICA ZAMBELETTI / KOOZ** Thank you all for taking the time to meet today. Let's start by tracing when and how you started investigating the weaponisation of nature and land within the context of the full-scale invasion of Ukraine.

**LINA BONDARENKO** My research has long focused on how topography, soil, and geology shape history, culture, and identity, whether on the scale of a piece of infrastructure, a hill slope, an urban region, or an entire watershed. In Ukraine, where I'm originally from, this lens has primarily led me to a fascination with the *chernozem*, the fertile soils of the gently cascading steppe that account for 30% of the world's rich black soils. Upon starting graduate school at MIT in August 2023, just two months after the attack on the Kakhovka Dam, I started to research the resulting widespread flooding and desertification in the landscapes surrounding the dam, and how the depletion of these vital soils was part of a much larger pattern. I tried to understand why this specific dam was attacked and what this series of dams along the Dnipro River mean to the history of industrialisation in Ukraine. I began to trace further back to the goals of the Soviet-era five-year plans to consolidate the value of *chernozem* in agricultural output and the resulting *Holodomor* as a particularly grim instance of the weaponisation of nature against its own people. There have been evident moments of both construction and destruction that point to long term slow violence in beyond the current full scale invasion in Ukraine. Eventually, these inquiries expanded to consider Ukraine's role as the "breadbasket" of the world — how wheat exports became a focal point of global attention during the grain deal of the summer of 2023, while millions of acres of chernozem continue to be mined and bombed. For me, the research always remained rooted in trying to understand the essence of the soil itself, to ask what the earth digests and how it is digested — violence or sustenance.

"As this war develops, we see more and more ways how nature can be weaponised."

- Nina Dyrenko

**KOOZ** Nina, this subject cut a bit deeper in your research — is that right?

**NINA DYRENKO** Well, I live in Kyiv. It's just impossible not to think about the war and its impact on everything — including nature, of course. I started to work on the topic of weaponisation of nature in 2022. Actually at the time we were preparing, with FORMA architects, for the Tbilisi Architectural Biennale. At the time we chose “protective structures” — both natural and man-made — as a topic.

As this war develops, we see more and more ways how nature can be weaponised. In the first weeks of the war, water was the most effective tool for slowing down the russian advance on Kyiv. Blowing up the dam on the Irpin River is what saved Kyiv from the rapid advance of russians; there was a similar episode on the Oskil river near Kharkhiv.

A very effective defensive structure is a swamp. In the north of Ukraine in the Polissya region there used to be a lot of swamps - they protected us from enemies. During the Soviet period, more than half of the swamps were drained. If the swamps were still there, the russians would not have been able to attack us from the territory of Belarus, as they did in early 2022.

In the third year of the war, the russians have moved on to another way of weaponising nature — they are poisoning our rivers. The latest case is the poisoning of the Seim River in the east — everything living in it has died. The Seim flows into the Desna (once the cleanest river in Ukraine), and the Desna flows into the Dnipro. By the way, the Dnipro, our largest river, begins in russia. I think it is a matter of time before they poison it.



2/4 The shore of the former Kakhovka reservoir, covered with reeds. Kamyanska Sich National Park. ← →  
Photo by Nina Dyrenko.

**IRYNA ZAMURUIEVA** It's so fantastic to hear you both speak about the broader context of your work. We know each other from working together, but it's so good to hear it as a story. Broadly, I've been interested in critically exploring human environmental relationships for about ten years; for me, it evolved from paying attention to climate change, and how it has affected people and ecosystems in Ukraine. I organised a residency — Climate Art Labs — some years ago, in which artists, researchers and activists were creative collaborative works in relation to climate change in Ukraine, not just as an ecological or physical phenomena, but a cultural and political one as well. From there, I shifted my focus towards ecofeminism as a topic, trying to trace how gender and environment have been understood in Ukrainian scholarship and literature. The topic of land weaponisation didn't come up for me back then, but it was more broadly thinking about how the environment is instrumentalised. My focus more recently has been on large scale agriculture and its impacts — so at the beginning of the war, there came the question of what a full-scale invasion would do to Ukrainian land, water and all living beings.

This was one of the questions we discussed at the Biennale in Georgia. What does it mean to weaponise the land for military purposes, as opposed for extractive agriculture purposes? Reflecting on language momentarily, I can't think of a word for weaponisation directly in Ukrainian — it's a very English way of conceptualising it and I don't know how to translate it. A weapon is such a clear function for a device: it could be a gun or a tank, either way it's something that kills or does harm. But if we take that broader category — the 'thing that kills' or the thing that brings harm — it makes me think about pesticides, toxic agrochemicals and so on. What is a weapon, how different is a weapon from a tool? When does a tool turn into a weapon? This concept can be used in very different ways, both to bring harm and also to defend ourselves.

"The mere removal of a mine does not signal the regeneration of the ecosystem — this could take decades or centuries — but the larger question is around what ethos determines the function of the land itself."

- Lina Bondarenko

**KOOZ** Lina, you discussed the time when the war ends: where does that leave the land? The “breadbasket” panic hints to the existence of a heavy monoculture. Before we get into weaponised pesticides — to what extent could we talk about the ground in a healthy condition: was it already made overly anthropocentric?

**LB** Thank you for the question. Over the past two and a half years, much has been written about the devastating impact of landmines in Ukraine compared to the painstakingly slow pace of demining — a single day of shelling requires roughly a month of restoration just to clear the mines. This stark disparity reflects how quickly violence can be enacted and how laborious it is to undo. Yet the mere removal of a mine does not signal the regeneration of the ecosystem — this could take decades or centuries — but the larger question is around what ethos determines the function of the land itself.

With Ukraine's history of industrial-scale monocrop farming, imposed during collectivisation under Soviet control, the policies prioritised maximising export value to fund industrialisation and militarisation. Despite this, the persistence of resistance farming in dachas and small urban plots maintained some biodiversity and kept people connected to the soil. When those large-scale industrial agriculture practices are applied to these broad swathes of land, it seems as if the health and fertility of that soil is self-regulating; in reality, people had been managing a relationship with that land for thousands of years before industrialisation.

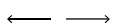
In recent years, more research has been resurfacing how Ukraine's land was once stewarded by its Neolithic-era cultures as far back as 5000 BC, such as Trypillia, who are believed to have practiced sustainable management through rotational farming, maintaining soil health to foster long-term ecosystems. There is an understanding that the *chernozem* is not just naturally occurring constant through geomorphological self-regulation, but has been maintained through a long

collaboration with humans. A return to the idea of a healthy ground would re-establish centuries-old practices of living symbiotically with the environment — with a value system that centers the metabolic life of the soil.

My second project about Ukrainian Soil was part reproduction and part speculation on the ceramic artifacts discovered in the soils of these Trypilian sites, which signal evidence to the ways the *chernozem* may have always been anthropocentric. These objects included vessels used in planting rituals, tools for tracking the changing seasons, and deities representing the fertility of the soil. Perhaps a return to healthy ground may be less about removing human interference, and more about what kind of grounding kinship this anthropos is perpetuating or how we reframe to not see ourselves as separate from the ground that needs regrounding in the first place.



5/5 Talismans for Black Earth: Hand made re-interpretations of Trypilian neolithic-age archaeological ritual ceramics for planting sunflowers, tracking moon cycles, and tending to black soils (chernozem). Part of the project "Rooting Sunflowers on Moontime | Talismans for Black Earth", sculpture installation produced for Art and Agriculture, Spring 2023, with Professor Nida Sinnokrot, MIT. Credits: Lina Bondarenko.



**IZ** The question around the state of the soil before the full scale invasion is an incredibly difficult question to answer — simply because the state of the soils is not monitored or accounted for nearly with the same intensity and precision as the economic data on what is grown on that soil. It is very easy to find what kind of crops and how much has been grown, where they export it, the profits of these exports. But the condition of the soils? No, it's very difficult. Even the EU is in the early stages of enforcing its soil quality monitoring The Soil Health Monitoring law adopted by the EU parliament in 2023 is a significantly weaker legislation, compared to what has been proposed for decades by environmentalists. In Ukraine, these sorts of measures around environmental protection, and soil health in particular, are extremely patchy..

There have been so many scientists who have tried to voice their alarm with the government; we do have some data to make the case. By pre-war estimates, we have an approximate figure of ten million hectares — nearly a third of all arable land in Ukraine — that is degraded, infertile and which shows signs of desertification. There is also plenty of evidence from social scientists, economists and ecologists, who are saying that within those places of intense agriculture, there is not a single area where the soils are in satisfactory agroecological conditions. This degree of violation of ecological balance, they're calling it catastrophic. It's important we don't overlook this and comprehend the scale of how bad the long term soil degradation has been. Personally, I would begin my observations with the 1880s, during the Russian Empire; that was the beginning of this large-scale agriculture that we know today. But that's another lecture!

"Ecodozor is one of the most useful but also heartbreaking maps that we currently have of the war in Ukraine. It allows you to see the scale of the war."

- Iryna Zamuruieva

**KOOZ** You raised this idea of how much one can quantifiably know about the territory and this idea of mapping. There was an image of the website Ecodozor — can we address that mapping, its accuracy and its violence?

**IZ** Ecodozor is one of the most useful but also heartbreaking maps that we currently have of the war in Ukraine. It's an initiative where people are mapping the ecological and environmental harm that russia commits in Ukraine and they update it monthly. They do have a network of people that help them document it; essentially, this is a large-scale documentation project. They mark various categories of harm there, and you can filter by choosing to look at agriculture facilities that have been hit, or look at nature reserves at the same time as all of the hits on the map. It allows you to see the scale of the war.

As with every map, the map is not the place itself. It's only a representation. So what they document is the bare minimum; it's what they've been able to geo-tag or where there's a specific story behind each of these cases. Among the many war documentation projects in Ukraine, it's one of the few that has a consistent ecological focus. There are many others that are focused on the more social dimensions of harm. The logic behind that is that, hopefully, one day this will be evidence to hold russia accountable. If we are to have any faith in the international criminal justice system, that's the vision: that one day this could serve as incriminating evidence against russia. I specifically found it useful for my own research to look at the agricultural facilities that were hit by russia; we know that in Ukraine currently, there are some thirty thousand potentially hazardous facilities; 3000 of these are warehouses that store highly toxic agrochemicals. When russia hits those, they leach into Ukrainian soils at very intense levels. It's an eerie and horrendous way of weaponising these agrochemicals; it is chemical warfare, turning Ukraine's agricultural tools into their weapons of destruction.

"It also won't end on the day when the war ends, because of the nature of toxicity and the weapons that they use. It's already in our soils."

- Iryna Zamuruieva

**KOOZ** In your research, you present this narrative into four steps, starting from the event, through the symbolic element and the toxicity which remains. Can you unpack those four steps and how they've informed the way you view the weaponisation of land?

**IZ** I guess that's all part of an attempt to see toxicity and harm in a wider historical perspective. The 'event' relates to very specific things that we read about in the news: russia hit this, russia hit that. That might indicate where the missiles, rocket or drone has landed; the attention, meticulously documenting all these events that bring harm is crucial. But when we think about those events, we must remember that they did not happen in the vacuum. Anthropologist Kali Rubaii writes that nuclear tests go "boom" once, but the world is never the same after that. And I think about the explosions in Ukraine in a similar way; there's the before and the after. This scaffolding, for me, is a way of speaking about how we ended up in a place of having so many storage facilities that have toxic chemicals that store them, how they got there in the first place, right? They were not imported with the war. A big part of my research looks at the history of pesticide use in Ukraine, because when we're talking about large-scale monoculture, we're talking about a form of agriculture that is entirely reliant on these pesticides. They're not a bonus to increase crop yields — they are entirely reliant on agrochemicals.

To use a simple metaphor, it's as if we as humans would consume energy drinks and food supplements instead of proper meals the whole time. Obviously it's not a great idea, but this is what's happening with land use in Ukraine. Looking at rapeseed, one of the top five export crops, that cultivation uses about 700 different pesticides. So currently in Ukraine, we have 3500 legal pesticides that you can buy and sell. A lot of them are banned in the EU, but still legal in Ukraine; some European companies export those chemicals into Ukraine, and this is the kind of scaffolding that makes possible those violent events we discussed. Rapeseed is a fascinating crop, one that illustrates the complexity of how enmeshed Ukraine's history is with the russian colonial project, but also Western capital expansion at the cost of Ukrainian land. At the same time, it's not just some external force that is bringing nasty toxic stuff into Ukraine. We need to see our own accountability internally. That is also part of the scaffolding that I'm talking about; the extent to which the Ukrainian government or agro-oligarchs, who have been complicit in upholding that model. It's not that we can conveniently point all our fingers elsewhere.

In a more symbolic way, I was looking specifically at the plant names. I was working with geraniums, as part of a project that involved photographing military landscapes in Scotland, where I currently live. And as part of that work, I discovered that the combat drones russia purchases from Iran are called "Shaheds" by their manufacturers name; but russia renames them domestically into "Geraniums" and shoots daily to hit civilian and military targets in Ukraine. Currently, russia is building a factory in Yelabuga in the Republic of Tatarstan, where they plan to mass produce them by summer 2025. Anyway, I ended up looking at this duality between the thing that kills and the thing that blooms. This is part of russia's military tradition of naming weapons after blossoming plants; there are geraniums, there are chrysanthemums, cornflowers, peonies, tulips. There are some women's names, like Katyusha, and even some trees: Topol, for example, which translates to poplar. But it's predominantly blossoming plants —

**ND** I would add another to that list: the petal mines, known as petals...

**IZ** Right! In Iraq, people are still finding these petal bombs left behind by American forces; they're super dangerous, kids mistake them for toys because they're small and green. So how did plants get folded into this world? There's so much of this kind of weird, floral imagery in there. I'm actually less interested in analysing what it means and how it comes about, but more interested in the effects of these weapons — also tracing the histories of both parallel strands, for instance the geranium as a plant and geranium as a drone. Unsurprisingly, there are colonial and imperial legacies that have made both possible.

Very briefly, on the point about the toxicity that remains — looking at harm that will be there for decades and decades to come, even after the war is over — this is when we have to acknowledge that the harm did not start necessarily on February 24th in 2022, when russia invaded. It also won't end on the day when the war ends, because of the nature of toxicity and the weapons that they use. It's already in our soils. Lead and other heavy metals left behind in Ukrainian soils from russian ammunition, if not treated, would remain toxic for years to come. We have so many examples of this long-term damage in the Middle East. There's an amazing book edited by Umüt Yıldırım, called *War Torn Ecologies, Anarchic Fragments* — in which women, artists and researchers reflect on that harm that stays in people's bodies, in wombs, in petals, in leaves, in the water; that continues to generate harm even when the war is formally over.



5/5 Analogue photograph from “A field from afar” project by Iryna Zamuruieva, 2024–ongoing. The image depicts wood small-reed, yarrow and other steppe plants in a Kovylovi Horby nature reserve ← → in Kirovohrad region, Ukraine.

**LB** Iryna, your research behind this so hauntingly poetic and beautifully precise. It brings me to the question of scale: if this is what is entering in the metabolism of our lives, and that gets exported and fed to the rest of the world, then what else is the “breadbasket” carrying? The toxicity permitted to seep into ecologies, through roots, through plants, through entire water systems, this goes into the seas and into the clouds. This is not a border-to-border condition. In ecologies and environments, these externalities seep beyond anything that can be drawn onto a geopolitical map; the effects are amplified through internationally politicised systems of global interdependencies, and this starts to become a planetary condition. Even if different countries have their environmental regulations, the repercussions of ecocide circulate horizontally and vertically, atmospherically and microbially.

Then, as new environmental regeneration techniques emerge, a critical question arises: according to what principles do we discuss the imposition of systems that reshape ecosystems at scale? An intriguing intersection is forming between climate-focused FinTech and large-scale bio-regional restoration efforts, where decarbonisation and carbon credits are marketed as solutions. These campaigns, while well-intentioned, often allow corporations or states to maintain extractive



or polluting business as usual while offsetting with carbon credits. In practice, however, will action on the ground be quantified by scientific metrics like nitrogen levels or soil stratification or revolve around narratives of permaculture or symposiums? Who defines these standards, and who benefits from them? How do we determine the international value of soil health, to whom is this value being communicated or sold, and through what means? Ultimately, what role will the mediums of representation and storytelling play in determining the international ethos of how we perceive our metabolic relationship and responsibility to the land?

## "What role will the mediums of representation and storytelling play in determining the international ethos of how we perceive our metabolic relationship and responsibility to the land?"

- Lina Bondarenko

**IZ** Lina, I love the way that you talk about metabolism; it's a very important concept to think about these continuities, of what is being taken out and given back to the land and the environment. If we pull this conversation into the space of values, we can see that it's a very unequal exchange; if you read what is reported by agricultural firms and the mainstream media, the narrative centres around how much they contribute to Ukraine's economy. That's the tagline.

But what is being taken away is the capacity of soils to support life. That's not part of the story, and I find that terrifying. Rapeseed, the crop that I've been researching, is a really bizarre and fascinating example of how Ukraine was drawn into the EU's attempts to address the climate crisis, something political ecologist Christina Plank has pointed out; the majority (by which I mean over 90–95%) of rapeseed grown in Ukraine is grown for biofuel, or agrofuel. Rapeseed is one of the oil crops whose energy can be transformed into biodiesel for transportation. The reason that the production of rapeseed in Ukraine spiked in 2003 was the EU's adoption of a directive that set targets for EU member states on how much biofuel they should add to conventional petroleum, as a way to reduce carbon dioxide emissions. There was a lot of pressure from researchers and environmentalists arguing that this approach does not lead to fossil fuel reductions — it only makes things worse, creating more monoculture plantations that are heavily reliant on pesticides that do not figure in their shiny green plans. Although the directive was changed, it contributed to the creation of a biofuel market in Ukraine, which made sense for many agriculturalists. In the way that we discuss this, it's important to keep in focus both on the way that not only Russia but Western capital at large is also part of the story. That said, just look at the profits that are accumulated within Ukrainian political and business elites.

**KOOZ** Lina, you're based in the United States; Iryna, you're in Scotland. Nina, meanwhile you're 'on site' in Kyiv. I wanted to hear your perspective on this aspect of distance and detachment — not only from the Kakhovka dam disaster but also the wider ecocide. While entire cities are being destroyed and human lives are under attack, is nature still part of your daily discourse?

**ND** In my professional bubble, yes, nature is the main theme. Picking up on the effects of the attack of the Kakhovka Dam explosion now — that is, a year and a half later — the main effect is the appearance of the largest natural forest in Europe. And I love it very much. That's what we have now. There is a famous Ukrainian historian, Yaroslav Hrytsak, who teaches us to see war not only as a catastrophe but also as an opportunity. Of course, war is the catastrophe of the highest level, for humans and for nature — but there are possibilities this war creates. Ukraine is now the most land-mined country in the world; those petals, we mentioned, as well as many other types. The longer these remain, the more difficult they are to find in the future — especially if we talk about natural areas. But territories which are inaccessible for people, become a paradise for other living organisms.

The other thing is the contamination from explosives and fuels in the soil. The land which is now on the frontline should no longer be used for growing food in the future; this land must be conserved. If not for this war, we would never attempt to remove such a large amount of land from use. It will take hundreds or maybe even thousands of years for natural ecosystems to recover, but the sooner we start, the more chances we have of seeing natural ecosystems restored. Going back to the dam, I believe it should not be rebuilt; this is obvious for me and people in my bubble, but it's not so obvious for people in government who make decisions and policies. Rebuilding the dam would be the biggest mistake;

on the contrary, it is necessary to develop a plan to dismantle all the infrastructures that are not needed. Moving from this chaotic destruction of war to the deliberate dismantling during peacetime is a dream wish to see.

"The land which is now on the frontline should no longer be used for growing food in the future; it will take hundreds or maybe even thousands of years for natural ecosystems to recover, but the sooner we start, the more chances we have of seeing natural ecosystems restored."

- Nina Dyrenko

It is also important to mention the necessity of existence of such killer infrastructure. That's how I describe it — for instance in the case of the dams, there are five more dams on Dnipro, all built after the Second World War — not originally intended to provide water and electricity, but as a geographical weapon, in case of an enemy attack from the west. This is exactly what russians did by blowing up the Kakhovka Dam, against Ukrainians living in their own land. This infrastructure is deadly for humans and for the environment; I have no argument for such an infrastructure to exist in the future — it is murderous in war time and in peace time, it is murderous for the river itself and its ecosystem. European legislation clearly tells us that rivers must be free-flowing. I can only hope that European countries will not deviate from its 2030 strategy for biodiversity; for now we can see in the news that there are plans to rebuilt the dam on the Dnipro river. Zelensky has already declared that we have a plan to rebuild Kakhovka Dam. How to convince them that it's a bad idea...

**IZ** Yes, I love the idea of the liberation of the rivers; the way that you also speak about it makes me think about this web-like entanglement of war-related weaponisation and agriculture, related to instrumentalisation of the same bodies of water or land. Another significant purpose for damming the whole Dnipro, was also to irrigate the fields to support this large-scale crop growing project. A significant chunk of the river goes to sustain agriculture; going back to the connection between pesticides and the war, the whole industry emerged from the Second World War. These chemicals were developed to kill in gas chambers, but also in other ways. Since they had no war purpose, or not so much anymore after the Second World War, the agriculture industry made use of skills, knowledge and all the innovation that was existing in the murder business. If you look at the kinds of weapons that russia is using today, appealing to international laws makes not much difference in this case. They use chloropicrin, a chlorine-based chemical weapon that is also used as a pesticide. It's not approved for use in the EU though in Ukraine, you can still buy it. There's this entangled horror story; both russia and Ukrainian agribusiness use the same physical component: in one case, to kill in a very immediate, direct, violent, intense way — and in the second case, it's a more slow, lurking violence.

The big question for me is how to keep both of those things in focus. If you look at some of the Ukrainian government's recovery plans, presented at annual conferences in London, Berlin, Zurich and so on, what is proposed under the agricultural recovery plans — and this is the area where agriculture scholar Natalia Mamonova is doing such excellent research — is a return to the pre-war large scale, export-oriented agricultural model. To me, that's not compatible with any meaningful social and ecological recovery. So we need to really expand our sense of what a recovery means. I also find a very interesting dynamic with the conversation about decolonisation in Ukraine. It's one of the most popular words; everyone is talking about some form of decolonisation. What is often implied is the removal of anything related to russia, any kind of Soviet legacy. But as we're trying to get rid of the toxic legacies of the empire that Ukraine as an independent state inherited, we are still complicit in reproducing them. We need to learn to see extractive, large scale agriculture as part of that imperial and colonial legacy. Meaningful postwar recovery, meaningful decolonisation means rethinking our agroecological model of food production, and getting rid of the infrastructures oriented around extraction and export.

"Meaningful postwar recovery, meaningful decolonisation means rethinking our agroecological model of food

# production, and getting rid of the infrastructures oriented around extraction and export."

- Iryna Zamuruieva

**LB** I'm attempting to think beyond rapid responses as temporary bandaids towards narratives with more nuance and context. In particular in dialogues around decolonisation: the conversation expands beyond visual markers or any one singular structure. It's about attempting to include storytelling about why an entire infrastructural system was implemented in the first place, and what it meant in orchestrating larger social strategies or the shaping of ethos and worldviews. The ways that any form of ecocide yields repercussions of slow violence far beyond a singular event, both in the physical landscape and in the internal, emotional landscape of the mind.

This is why I appreciate that our conversation today has expanded in so many directions, from nomenclature and art to history and policy, to memory and policy. All of these perspectives inform one another; each incident, object, and place ripples beyond its moment in time and space. These interconnected lenses together enable a view looking at the value systems that generate the decisions across sectors. That's exactly what the three of us are doing: looking for the ways that research and storytelling can unravel the threads of the question of "why". It's been so inspiring to get to know the ways that Nina and Iryna have been researching and telling these stories. Thank you so much for inviting me to be a part of this.

**KOOZ** Thanks so much to the three of you; this has been such a generous exchange.

*N.B. When relaying the words of interlocutors, this article features the lower case 'r' in reference to the nation or name of Russia. This format is used by request from our contributors, whose position we respect.*

## Bios

**Lina Bondarenko's** art practice is rooted in rewilding perceptions of topography and healing the metabolic rift through temporal happenings and site-specific movement practices as mediums of environmental kinship. As an architecture research graduate student at MIT, she is currently examining how the urban infrastructure of steep terrain can re-enthrall us with geomorphology and ecology. Her presentation at the Biennale in Georgia is titled *The Basket Contains no Bread, Metabolizing Ecocide in Ukraine's Grains and Soils*.

**Nina Dyrenko** works with nature as an architect, writer, curator, and conservationist based in Ukraine. Now focused on studying the impact of the Russian war on various biotopes of Ukraine. Her presentation at the Georgian Biennale focussed on water as an infrastructure of war.

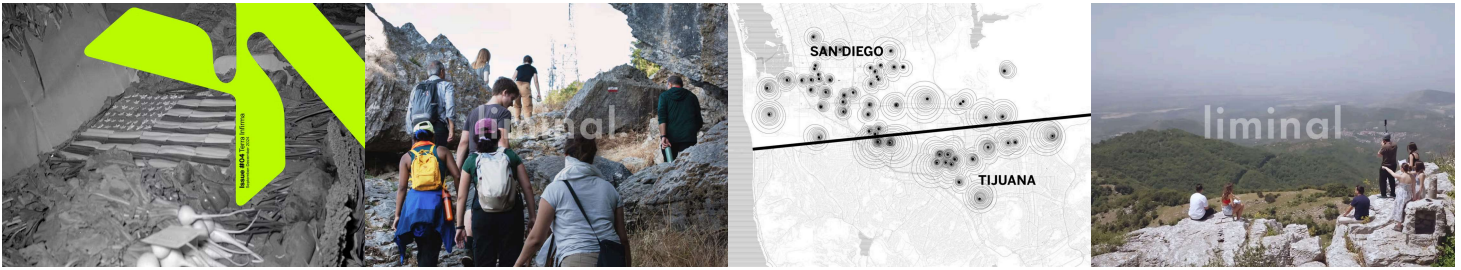
**Iryna Zamuruieva** explores human-environmental relationships through photography and writing. She has been writing about adonis vernalis and her kin-region; geranium and the militarisation of landscapes; rapeseed and monoculture farming in Ukraine. Iryna's current focus is on the environmental history and weaponisation of central Ukrainian landscapes. Most recently Iryna has been an artist in residence at Street Level Photoworks in Glasgow and a research fellow at the Institute for Human Sciences (IWM) in Vienna. Iryna is currently based in Edinburgh, where she works on climate and land policy and community climate adaptation at a sustainability charity. Her writing has been published in the Eurozine, Commons, Open Democracy, Korydor and Scottish Left Review amongst others.

**Federica Zambelletti** is the founder and managing director of KoozArch. She is an architect, researcher and digital curator whose interests lie at the intersection between art, architecture and regenerative practices. In 2015 Federica founded KoozArch with the ambition of creating a space where to research, explore and discuss architecture beyond the limits of its built form. Parallel to her work at KoozArch, Federica is Architect at the architecture studio UNA and researcher at the non-profit agency for change UNLESS where she is project manager of the research "Antarctic Resolution". Federica is an Architectural Association School of Architecture in London alumni.

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