

Online Resource

Co-creating adaptation-stories for climate change communication in North Karelian dairy production

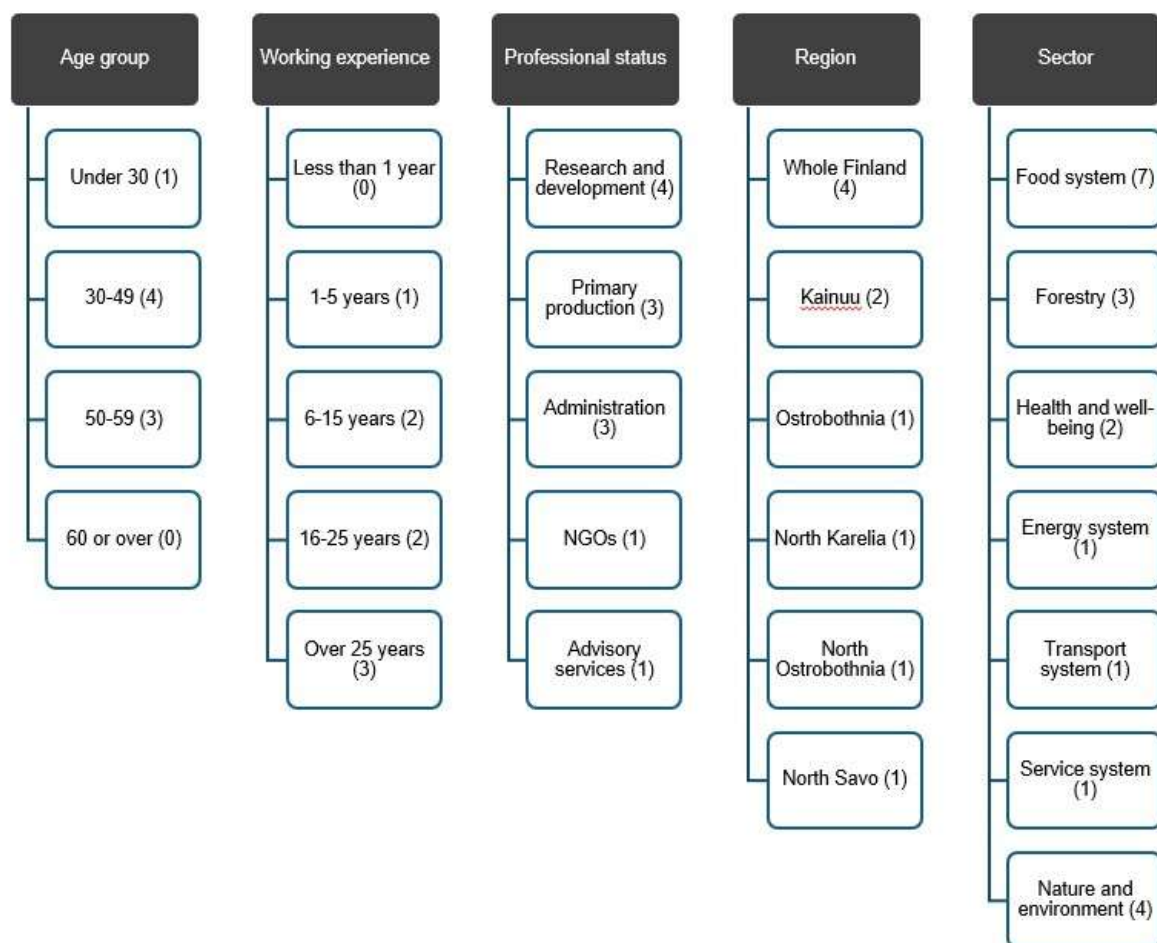
Regional Environmental Change

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Online Resource 1

Fig. S1. Characteristics of participants in the adaptation-story workshop held in Nurmes (n=8), including age, work experience, professional background, region and sector. Because some participants represented multiple professional roles, regions or sectors, category totals may exceed the number of participants



Online Resource 2

Questions for small-group discussions to gather feedback from stakeholders to assess the effectiveness of the stories

What emotions did the story evoke?

What aspects of the story did you particularly like?

What could be changed or improved in the story?

What do you think about using stories as a science communication approach? What strengths and weaknesses do you see in this method?

Online Resource 3

Observations from the small group discussion

Workshop: Rural Parliament 2024: How well are we adapting to climate change? Greetings from North Karelia in the 2050s -workshop, 27.9.2024

Number of participants: _____ Women, _____ Men

Facilitator:

I Content questions for the facilitator

1. Did the story spark discussion in the group? What topics were raised?
2. Were there any questions or topics participants wanted to ask or discuss further after the story?

II Discussion atmosphere and interaction

1. Atmosphere in the small group

1.1. General mood – Was the atmosphere:

- ☐ Positive
- ☐ Neutral
- ☐ Negative

1.2. Level of participation – Rate the engagement:

- ☐ High
- ☐ Moderate
- ☐ Low

1.3. Comfort level – Rate the overall comfort:

- ☐ Very comfortable
- ☐ Quite comfortable
- ☐ Uncomfortable

Additional notes on the atmosphere:

2. Participant interaction

2.1. Forms of interaction – Did you observe the following?

- ☐ Active discussion
- ☐ Listening
- ☐ Asking questions
- ☐ Disagreeing
- ☐ Encouraging others

2.2. Balance of participation:

- ☐ Everyone participated
- ☐ Most participated
- ☐ Some participated
- ☐ Few participated

Who spoke the most? _____

Who spoke the least? _____

2.3. Balance of speaking turns:

- ☐ Well-balanced
- ☐ One or two people dominated the discussion

Additional notes on interaction:

3. Key observations

3.1. Noteworthy moments:

3.2. Suggestions for improvement:

Thank you for your observations!

Online Resource 4. Full versions of adaptation-stories and accompanying visualisations

Story 1. Bold experiments made Hillamäki farm a pioneer

On the slopes of North Karelia's majestic hills lies a dairy farm called Hillamäki. The farm has been owned by the same family for several generations, and its fields have long produced traditional crops—grass and grain—for livestock feed. The young farmer, Minttu, works tirelessly each day with the cows, the fields, and milk production. Living on the farm with her family, Minttu's heart burns with passion for developing agriculture and dairy farming. We meet Minttu at the edge of a Hillamäki field on a warm August evening in 2050 to hear how the farm has adapted to climate change.

It would have been hard to believe how much dairy farming and rural life would change. The warming climate began to have an impact long ago. As early as the beginning of the 2000s, long before I was born, the first signs of change appeared. My grandparents noticed summers growing hotter and fieldwork starting earlier in the spring. When my parents continued running the farm, the changes became even clearer. Heatwaves grew longer, rainfall became unpredictable, and the growing season stretched further than ever before. Heat waves also became more intense, which was particularly evident in the welfare of cows: the animals suffered from the heat, ate less, and produced less milk. This forced us to develop new ways to ensure their comfort. When the farm was passed on to me, I knew I couldn't continue in the same way as previous generations. I didn't want to merely react to change—I wanted to anticipate it and turn it to my advantage.

Another significant change might seem almost self-evident today, but it surely made a big impression on earlier generations. I'm talking about the mechanisation of agriculture. Nowadays, many aspects of Hillamäki Farm depend on machines and equipment, making everyday work more efficient and less physically demanding. Thanks to this, we can also focus more on improving animal welfare.

I wasn't alone in my thoughts. Many other young farmers in the village were wondering about the same things. We had long discussions about how we could adapt to the changing climate while keeping our farms profitable. Together, we contacted the local agricultural advisor, Ville, who had introduced climate-smart farming methods and shared experiences from crop trials with new species during young farmers' evenings and field events. Who else but he could give us such valuable knowledge and support for the change we needed?

With Ville's help, we began drafting a roadmap for our farm's future. I listened carefully to his words and realised we held the key to how the farm could survive in a changing world. This must have been how my great-grandparents felt when they saw the first agricultural machines on the fields. Now we were in the same situation—on the threshold of something new. The first step was to start experimenting with new crops on the farm. I had already read about the benefits of alfalfa in online discussion forums, but Ville's additional insights truly

sparked my excitement. He explained its strong feed value, the new winter-hardy varieties, and the challenges he had seen in cultivation. Could I succeed? I wondered at the time.

Encouraged by Ville, I decided to start cultivating alfalfa on a small plot. I thought that if successful, the crop would bring diversity and resilience to the farm. With climate change, North Karelia's growing conditions have improved—growing a new crop could be a way to take advantage of this shift. At the same time, it was clear that heatwaves would become even harsher trials for our cows. That's why we had installed fans, cooling, and misting systems to help the animals cope better and to prevent milk production from collapsing during the hottest weeks.

So I carefully planned the new cultivation, limed the soil, and planted the first seeds in spring. I followed the seedlings' development with both excitement and anticipation as spring gradually turned into summer at Hillamäki Farm. Soon, lush alfalfa was thriving across a larger field, its blue flowers shining brightly in the summer light. The cows were delighted with the new treat. Alfalfa proved to be excellent fodder—fresh and tasty, and the cows enjoyed it.

Gradually, the impact of the new feed became visible in both milk production and quality. The cows grew healthier and began producing significantly more milk. We also noticed that the high-quality, palatable alfalfa feed helped the cows cope better during heatwaves—because it was easy to digest and the animals readily ate it, their appetite remained steady and the drop in milk yield was smaller than before. At the same time, the farm's fields received the nitrogen they needed from the air, and the plant's deep, strong root system improved soil structure. The farm's other crops and fields thrived better than ever.

As a result of these reforms, I have received a great deal of positive feedback. Interaction with other producers is important to me, so nowadays I also invite fellow farmers to my farm to learn about the solutions I've developed and to share experiences. I am also happy to present the everyday life of a farmer to school groups and ordinary consumers—I hope my enthusiasm is contagious. Climate change is no longer just a threat, but also an opportunity to develop new solutions and create more sustainable agricultural practices.

Fig. S2. Illustration accompanying Story 1, depicting the Hillamäki dairy farm in a future climate context with diversified crops and adaptation measures supporting dairy production.
Artist: Anne Stolt



Story 2. Long-term cooperation among farmers made North Karelia a model of responsible agriculture

We meet Eelis, CEO of the EcoMoo dairy in North Karelia, beside the cooperative's own solar power plant. He shares how local producers and farmers joined forces during the toughest times to make North Karelia a leading region in sustainable agriculture. Thanks to perseverance, open communication, training, and advanced technology, the area is now setting an example for the rest of Europe.

Back in the 2020s, we were in constant contact with farmers. We visited farms to figure out why cows weren't producing milk, where to get more fodder, and why bacterial counts in milk were rising. Stress levels were sky-high, both for animals and humans, due to the scorching heat. For us, the ideal was to have steady milk output at all times. When production suddenly dropped—or rose—well below or above normal, planning became extremely difficult.

Milk production in North Karelia has long been known for quality products, environmental responsibility, and strong cooperation among producers. The region is home to many medium and large dairy farms. But in recent decades, agriculture has changed—and it nearly spelled the end of local dairy farming.

Climate change brought a flood of new challenges. From the early 2000s onward, hot and dry summers, along with warm and rainy winters, became increasingly common. Storms, heavy rains, and long droughts tested farmers' livelihoods. At the same time, input costs kept rising, worsening already weak profitability. In the 2020s, milk production in this region declined by more than 10% each year. Many wondered if the industry would disappear altogether. Young people moved to cities, village schools shut down, and communities emptied.

The impacts of climate change were deeply felt in everyday farm life. It was especially painful to see animals suffer from heat and drought, producing less milk—and of lower quality—than before. Our local EcoMoo dairy faced production problems, and even the future of our internationally renowned specialty cheese was at risk. As CEO, I worried not just about my own livelihood but also about the survival of high-quality local food production and the identity of our rural communities. But problems don't solve themselves, so I decided to take action to help the entire region adapt.

Although many producers had already moved away in search of better conditions, a determined group of young farmers still believed in the future of North Karelian agriculture. They expanded operations using farmland left behind by those who quit. Alongside a couple of active farmers, I organized a “future evening” at the local youth hall, where we listened to farmers' concerns and discussed changes happening on their farms.

Farmers described how climate change was affecting their daily lives. Drought and extreme weather were especially hard on field cultivation. Together, we brainstormed ways to better support adaptation. We decided to strengthen ties with local experts and researchers, and to participate in seminars and trainings on climate change. We also made several study trips to Central and Southern Europe, learning new methods for forage cultivation and cooling cows during heatwaves.

In North Karelia, dairy farmers have traditionally worked closely together—a fact we can be proud of. This existing network was the perfect platform to start developing new practices and climate-smart solutions. Through the network, we shared our experiences more widely, offering advice on farming techniques suited to local conditions and strategies for managing climate impacts. We organized trainings on mixed grass cultivation, rotational grazing, irrigation, and water-saving measures. We also encouraged farmers to adopt renewable energy sources like solar and wind power.

Small peer groups became—and still remain—the most popular way of working together. In these groups, we exchange knowledge and experiences from on-farm trials—both successes and failures. Over time, trust grew, and people began sharing even very personal matters: divorces, illnesses, and hardships. Thankfully, there were also many reasons to celebrate, like successful harvests and new calves. Celebrations are important, as they remind us of the meaning of our work and bring joy to everyday life. And what could be better than sharing these moments with neighbors and fellow farmers?

We also focused especially on young people, offering broad support for adopting sustainable practices. Our dairy's own mentoring program has so far reached dozens of agricultural

professionals, helping them develop, learn, and succeed. Mentoring has boosted motivation, improved capacity to innovate, and increased interest in farming careers. You can even see the results in the growing number of students applying to agricultural schools.

One of our key incentives is the “climate bonus,” paid for climate-smart practices. It motivates farmers to adopt sustainable, environmentally friendly methods. Financial support is the strongest driver for change—and a concrete sign of appreciation for farmers’ work.

What has the climate bonus achieved? In our village, farms have diversified crop rotations, invested in drainage and liming, and improved energy efficiency. Many have shifted increasingly toward organic farming and sustainable principles to ensure long-term environmental, social, and economic viability. These actions have reduced emissions, boosted carbon sequestration, promoted biodiversity, and improved water quality. About ten years ago, we also made a major change at our dairy by building a solar power plant. Now we produce more electricity than we need, reducing our carbon footprint, cutting emissions, and saving money.

Sometimes I look back at the 2020s, when our livelihood was on the brink of collapse. Now I can say with confidence that community determination and innovation are paying off. Today, we can manage water use well enough to prevent drought damage. The cows seem to be adapting, forage quality and reliability have improved significantly, and milk production has rebounded. I’ve heard from other farmers that productivity is rising year by year thanks to advanced methods. For younger producers—raised in an environmentally conscious era—sustainable solutions have opened new business opportunities and created steadier incomes. A thriving industry with so many possibilities has also boosted enthusiasm for generational renewal.

Right now, we’re running a consumer campaign week that the whole village has prepared for months. Consumers are increasingly curious about the origins and responsibility of their food. In the campaign, we share openly about daily farm life and animal care through videos, photos, and interviews. We also highlight farmers’ commitment to sustainable agriculture. This week, the first milk cartons labeled “Carbon-Free Milk” hit the store shelves. Now consumers truly have the chance to support climate-resilient milk production with their choices. The response has been overwhelmingly positive. People value transparency and the effort farmers put into sustainable dairy production. The campaign has also boosted demand for our dairy products.

Our joint effort has borne fruit. The story of EcoMoo dairy and North Karelian farmers has inspired others to take steps toward climate-resilient agriculture. Thanks to solutions rooted in long-term cooperation and local strengths, North Karelia has become a European leader and role model in sustainable farming, quality food production, clean nature, animal welfare, and high technology. Climate change taught us an important lesson we’ll carry into the future: together, with innovation and responsibility, we were able to adapt to difficult conditions and build a more sustainable tomorrow.

Fig. S3. Illustration accompanying Story 2, depicting climate-resilient dairy production in North Karelia based on cooperation, renewable energy and sustainable farming practices.
Artist: Anne Stolt



Story 3. A dairy farm in Lieksa adapts to climate change by combining traditional knowledge and technological innovation

Niilo and Venla Nevalainen's dairy farm is located in Lieksa, at the end of a winding road between patches of forest and fields. Through the trees, you can catch a glimpse of Lake Pielinen glittering in the distance. The farm was passed down to Niilo just after his 30th birthday, eight years ago in 2042. Climate change has brought challenges to the Nevalainen farm as well. However, the couple has managed to adapt, keeping the farm thriving by combining traditional know-how with science-based innovations. The well-being of the cows and the surrounding nature has always been a priority. Now, approaching forty, Niilo shares how the farm has stayed vibrant over the years.

There it stands: the new cowshed, equipped with a vertical farming system. There, high-quality fresh fodder can be grown year-round to complement the cows' traditional feed. Inside the barn, crops grow protected from uncertain rains and scorching heat. Just last

spring, they had to wait over a month into the growing season before the rains finally came—only to flood the fields when they arrived. By July, the nights will once again almost certainly be spent sweating through relentless heatwaves.

It's been about thirty years since this “new normal” began showing its first signs. When the previous barn was being built, father had to wrestle with the milking robot even in the middle of the night, as the oil overheated in the summer heat. He still tells the story of that summer, when the animals in the old section were panting from the heat and had to be cooled down by any means possible. Windows were removed to create cross-ventilation in the barn and give the cows some relief. Once the new barn was completed, natural ventilation improved considerably. Later, various fans were installed as heatwaves became more common. The cows used to lie in the doorway, where the air circulated best, blocking the path. Thanks to the fans, they no longer need to crowd underfoot to keep cool. Shade trees have also been systematically added to pastures and around the barn over the years.

In the 2020s, regenerative farming was a major talking point. My parents embraced it wholeheartedly, diversifying their crops and introducing crop rotation. They also moved largely to mixed sowing in grass cultivation. I've always been convinced that we could learn to cope with changing conditions—probably thanks to my parents' example.

I clearly remember the severe droughts that struck Finland year after year in the late 2030s. Farms with sandy soils suffered major losses. For us, the effects were less dramatic, as our fields had diverse soil types and we practiced mixed cropping, which brought many benefits. That was when the importance of adaptation really became undeniable.

My parents relied mostly on traditional methods. But I had something of an awakening when I spent a year as an exchange student in Utah, USA. I visited a massive dairy farm there, where an automated vertical farming system supported over 7,000 cows! That really opened my eyes to the possibilities science and technology could bring. Of course, the scale of operations in the U.S. is entirely different from what we have here in North Karelia. But that doesn't mean we can't also invest in innovative solutions. That trip probably sparked my ambition to serve as something of a pioneer back home.

But back to the present. The cows, which spent the night grazing outdoors, are once again walking in a line toward the barn. It's more comfortable inside, where automation regulates the ventilation according to the temperature. This way, the cows enjoy optimal conditions during the hottest hours of the day. Fortunately, electricity prices in Finland have remained at a moderate level, so all this technology doesn't cause us extra worries. As the newspapers have reported, electricity price fluctuations were brought under control in Finland through decades of investment in renewable and self-sufficient energy production.

Out in the fields, carefully selected deep-rooted grass species grow—varieties that tolerate variable weather and drought. Grazing plots are rotated frequently, which helps the soil withstand drought better and reduces compaction. Sensors monitor the fields and crop growth, alerting us when interventions are needed. Our farm has long been part of research

into precision agriculture. It's clear to see how the farm's finances have improved, unnecessary driving has decreased, and the environmental footprint has been reduced.

And there goes Lumi, the last one heading inside. It's obvious that cows all have their own personalities: one has to practically be pushed out, while another would happily stay in the pasture all day—if the heat weren't driving her in. Venla and I have managed the farm well together and successfully adapted to the changing environment. Elsewhere in Europe, summers bring such extreme heat and drought year after year that the center of dairy production has gradually shifted northward. Together with other dairy farmers in the region, we have strengthened North Karelian milk production's role as a significant European hub—one that successfully combines high quality with sustainable practices. And that feels good.

Fig. S4. Illustration accompanying Story 3, showing a North Karelian dairy farm combining technological innovation, precision agriculture and animal welfare measures to adapt to climate change. Artist: Anne Stolt



Story 4. A farm in Lieksa favors locality and strengthens self-sufficiency

Niilo and Venla Nevalainen's dairy farm is located in Lieksa, at the end of a winding road between patches of forest and fields. Through the trees, you can glimpse the glittering surface of Lake Pielinen. The farm passed to Niilo just as he turned 30, eight years ago in 2042. Climate change and societal shifts have challenged the farm's vitality and forced

diversification. The couple has adapted to these changes and kept operations running. Now, approaching forty, Niilo shares how the farm has been sustained in changing times.

This is a day I've been waiting for! My old friends Veeti and Eetu will be here any moment, and Venla has just left with the children for the weekend at grandma and grandpa's in Joensuu. Artem and his crew, who work here as seasonal laborers, are helping out on the farm. They're all familiar faces, so I don't need to supervise them—which means I finally get a little break. Tonight, we can sit up late since I don't have to wake at five for chores. Seasonal workers are common on larger farms. Here, it's not so usual, but from time to time we've had Artem's team help with bigger projects.

I can hardly keep still, that's how excited I am for Veeti and Eetu's visit. These days, it's rare to see old friends, since most have moved away: some to Helsinki, Kuopio, or Joensuu, others abroad. At one point, this place began to feel deserted. One farm after another shut down, and people left.

Luckily, my parents decided to stay and do everything possible to keep our farm profitable. Venla and I truly enjoy living here, despite everything, and wouldn't want to be anywhere else. What would I even do if I couldn't work with these animals? Still, planning for the future requires care. Heatwaves have become so common they're now a yearly nuisance. Rain is unpredictable: sometimes it doesn't come at all, other times it feels like it never stops.

I think it was around 2023 when our farm gave up organic production. It had been great for a time, but for many reasons we had to let it go. Costs rose, and organic criteria became stricter. Around then, the farm also stopped cultivating bread grains and focused fully on developing milk production. My parents invested in a large new cowshed, more robots, and expanded the herd. As heatwaves increased, we put a lot of effort into cattle breeding—so cows would tolerate heat better and produce more milk. As a result, the cows got smaller. It felt as if the cowshed itself had grown, no longer crowded with massive Holsteins lumbering about.

As local dairy farms shut down, multinational companies began moving in, aggressively pursuing contracts with local producers. Sure, new players bring stability and jobs to the area in these uncertain times, but Venla and I wanted no part of it. Profitability usually drops when working with multinational farms, and their ethical standards often leave much to be desired.

Most of the farms left around here are now large-scale intensive operations. But we chose instead to focus on socially and environmentally sustainable milk production. That's why we signed a contract with a local dairy, which produces high-quality products. Well-off people from the cities come here especially during holiday seasons, willing to pay for cleanly produced food and quality services.

Still, we couldn't rely only on milk production—competition with international operators is too tough. So we diversified by adding berries and vegetables into the crop rotation, which we process into products appealing to visitors: berry powders, fermented vegetables, and more, reflecting long North Karelian traditions. We also grow for our own use, since store

prices tend to be so high. We do our best to maintain soil fertility, since it suffers if you're not careful. In grass cultivation, we use our own custom mix of deep-rooted, drought-tolerant varieties.

Venla also gets a well-earned break this weekend with the grandparents. She has been running agritourism services on the farm alongside our crop production. Without it, our farm wouldn't be what it is today: productive and lively. Agritourism income helps stabilize our finances against uncertain growing conditions and brings welcome extra revenue. We even run a small petting zoo. The guided forest trips for mushroom and berry picking are especially popular. After all, it's not easy to access a forest unless you own one. We've taken good care of ours, so it's a pleasure to guide urban elites there. Still, I miss the forest adventures of my childhood, when everyman's rights gave free access to vast woods brimming with endless opportunities for exploration.

Our own biogas plant has been the most important of all our investments. Thanks to it, we've come close to full energy self-sufficiency. The plant has been running for quite some time, and I can say from experience that in these times of expensive energy, it's been essential to our operations, given all the technology we use. The plant has also saved us a fortune in fertilizer costs, since we can process slurry into not only energy but also high-quality fertilizer. That makes us less dependent on costly purchased fertilizers, while also improving nutrient cycling and reducing emissions to air and water. The icing on the cake is that the plant produces fuel for our own machinery—and sometimes even surplus for sale.

But enough about work. There's Veeti's car pulling up! Time to hang up the overalls and enjoy some free time.

Fig. S5. Illustration accompanying Story 4, portraying a diversified dairy farm emphasising local production, self-sufficiency, agritourism and renewable energy in response to climate and societal change. Artist: Anne Stolt



Online Resource 5

Table S1. Supporting evidence for story excerpts organised by the different steps of analysis and citing key footnoted data sources. Codes on the left are referenced within square brackets in the annotated version of Story 1 presented in Box 1 of the main manuscript.

Step 1: Co-defining a notable climate change impact	
1 ¹	The impact of warming on milk production was co-selected as the notable climate change impact based on discussions with experts of dairy production as well as on findings from scientific literature ^{a-d} .
Step 2: Climatic (a) and non-climatic (b) impact drivers	
2a ¹	Annual mean temperature has increased by 0.6°C from 1981-2010 to 1991-2020 in North Karelia ^e .
2a ²	In North Karelia the mean annual number of heatwave days exceeding 20 °C is projected to rise from 2.5 days during a 1977–1996 baseline period to 10–15 days under a 2.0 °C global warming scenario relative to pre-industrial levels, where the baseline was already 0.5 °C warmer than pre-industrial ^f .
2a ³	The number of heavy rainfall days at Juuka, North Karelia, has increased by 0.3 days per decade during 1961–2020. Projections suggest that both the intensity and frequency of heavy rainfall events will further increase by the 2050s and throughout the century ^g .
2b ¹	The mechanisation of agriculture in the context of Nordic dairy production can lead to reduced heat vulnerability through improved cooling and housing systems and automatic monitoring of feeding and milking assisting better management of heat stress impacts ^h .
Step 3: Co-evaluating the effectiveness of adaptation measures for ameliorating or exploiting impacts	
3 ¹	Longer and warmer growing seasons have already been reported to allow the expansion of cultivation of crops, such as spring and winter varieties of wheat, into new areas of Finland. Cultivation of certain minor crops, such as oilseed rape and faba beans, also became more popular during the 2010s ⁱ .

3 ²	Fans and sprinklers have been demonstrated to mitigate the effects of heat stress on dairy cows in northern Europe. Their use has been associated with improvements in both animal welfare and milk quality during periods of elevated temperatures ^{j,k} .
Step 4: Analysing the causal processes and key assumptions resulting in specific notable impacts	
4 ¹	Warmer springs have lengthened the growing season, allowing work in the fields to begin earlier. The timing of sowing has been observed to start earlier in the 1990s and 2000s than in the 1970s and 1980s. This advance in sowing dates is projected to continue in northern Europe with climate change ^{l-n} .
4 ²	The impacts of heat stress on cow physiology, health, physiology and general welfare, leading to a decline in milk quantity and quality are well documented in the literature ^{b,o} .
4 ³	Alfalfa has been widely recognised as a highly palatable forage, supporting greater dry matter intake compared with many grass-based feeds. Its inclusion in dairy cow diets has been associated with improved milk yield and quality, partly due to its high protein concentration and favourable rumen fermentation characteristics. As a leguminous crop, alfalfa fixes atmospheric nitrogen and thereby reduces the need for synthetic fertilizer applications both of the alfalfa stand itself and subsequent crops in rotation. In addition, its deep and extensive root system enhances soil structure by promoting aggregate stability and increased water infiltration, benefits that contribute to long-term soil health and resilience ^{p-s} .
4 ⁴	Peer interaction and collaboration with other actors have been shown to enhance learning processes and strengthen the adaptive capacity of farmers. Evidence from northern Europe indicates that discussion groups, living lab approaches, and farmer-led action groups serve as effective platforms for exchanging experiences, testing new practices, and co-developing solutions. In dairy production, peer-to-peer learning and advisory networks have been linked to increased adoption of adaptation measures in response to environmental and market challenges. More broadly, research highlights that social networks and participatory approaches support informed decision-making and promote long-term adaptation strategies at the farm level ^{t-w} .

a Discussions with dairy production experts, b Ahmed et al. (2022), c Hempel et al. (2019), d Tamminen et al. (2024), e Gregow et al. (2021), f Ruosteenoja and Jylha (2023), g Luomaranta et al. (2025), h Islam et al. (2021), i Peltonen-Sainio and Jauhiainen (2020), j Herzog et al. (2021), k Zhou et al. (2024), l Kaukoranta and Hakala (2008), m Olesen et al. (2012), n Peltonen-Sainio and Jauhiainen (2014), o Blanco-Penedo et al. (2020), p Bundy et al. (n.d.), q Buse and Kononoff (2025), r Guo et al. (2019), s Laroche et al. (2022), t Ahmed et al. (2024), u Bruce et al. (2021), v Doidge et al. (2024), w Sutherland and Marchand (2021)